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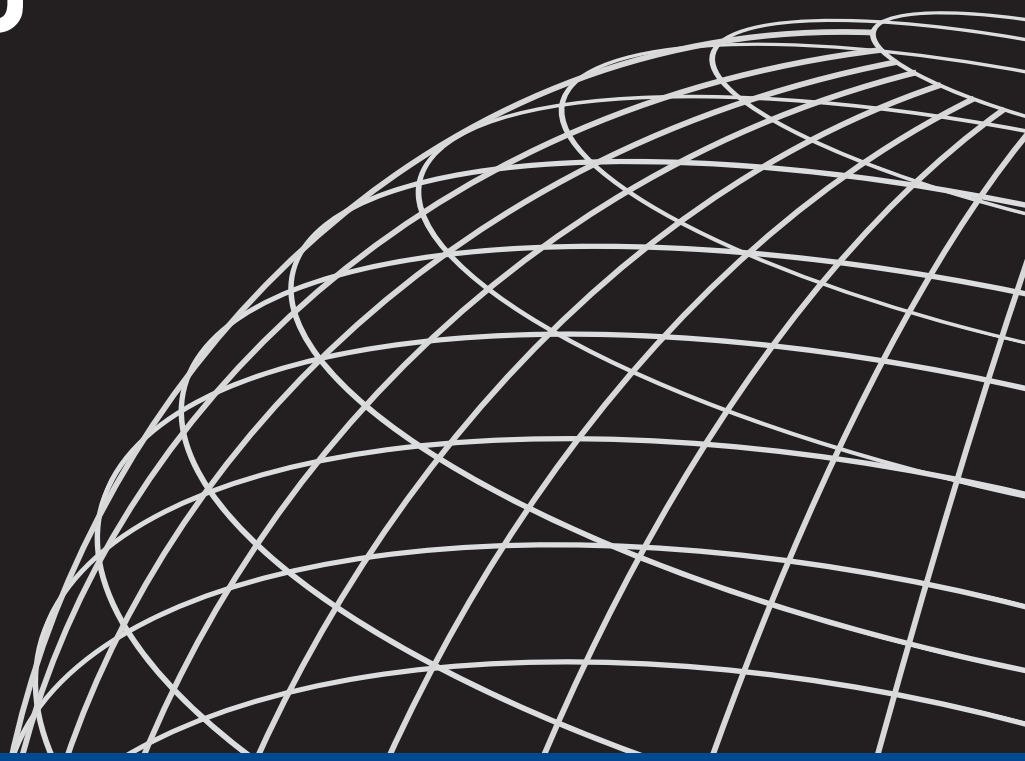
LEVELS, TRENDS, AND REASONS FOR CONTRACEPTIVE DISCONTINUATION

DHS ANALYTICAL STUDIES 20



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- to provide decisionmakers in survey countries with information useful for informed policy choices;
- to expand the international population and health database;
- to advance survey methodology; and
- to develop in participating countries the skills and resources necessary to conduct high-quality demographic and health surveys.

DHS Analytical Studies No. 20

Levels, Trends, and Reasons for Contraceptive Discontinuation

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Preface

One of the most significant contributions of the MEASURE DHS program is the creation of an internationally comparable body of data on the demographic and health characteristics of populations in developing countries.

The *DHS Comparative Reports* series examines these data across countries in a comparative framework. The *DHS Analytical Studies* series focuses on analysis of specific topics. The principal objectives of both series are to provide information for policy formulation at the international level and to examine individual country results in an international context.

While *Comparative Reports* are primarily descriptive, *Analytical Studies* comprise in-depth, focused studies on a variety of substantive topics. The studies are based on a variable number of data sets, depending on the topic being examined. A range of methodologies is used in these studies including multivariate statistical techniques.

The topics covered in *Analytical Studies* are selected by MEASURE DHS staff in conjunction with the U.S. Agency for International Development.

It is anticipated that the *DHS Analytical Studies* will enhance the understanding of analysts and policymakers regarding significant issues in the fields of international population and health.

Ann Way

Project Director

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Abstract

Contraceptive discontinuations contribute substantially to the total fertility rate, unwanted pregnancies, and induced abortions. This study examines levels and trends in contraceptive switching, contraceptive failure, and abandonment of contraception while still in need of pregnancy prevention. Data come from the two most recent Demographic and Health Surveys in Armenia, Bangladesh, Colombia, the Dominican Republic, Egypt, Indonesia, Kenya, and Zimbabwe. Results show that contraceptive discontinuation in the first year of use is common (18 to 63 percent across countries), and that the majority of these discontinuations are among women who are still in need of contraception: between 12 and 47 percent of women stop using contraception within one year even though they do not want to become pregnant. We found discontinuation to be strongly associated with the type of contraceptive method used. Additionally, age, parity, education, partner's desired fertility, community-level contraceptive prevalence, and the region in which women live were all associated with contraceptive switching, failure, or discontinuing while still in need of contraception. In summary, rates of contraceptive discontinuation, even among women who want to avoid pregnancy, remain high and are increasing in some countries where family planning efforts have decreased. This contraceptive discontinuation study, along with future research in this area, can help policymakers and program managers track family planning progress and refocus efforts to meet the goal of reproductive health for all.

1

Contraceptive Discontinuation: Introduction, Background, Data, and Methods

1.1 Introduction

Fifteen years ago, the United Nations International Conference on Population and Development (ICPD) declared that "all couples and individuals have the basic right to decide freely and responsibly the number and spacing of their children and to have the information, education, and means to do so" (UN, 1994). Unfortunately, the family planning programs of many developing countries have yet to meet this goal. The proportion of women who are sexually active and do not want to become pregnant but are not using family planning remains high and is increasing in many developing countries (Westoff, 2006). Among women who use contraceptives, many stop using them despite a continuing desire to avoid pregnancy; become pregnant while using contraception; or switch from highly effective contraceptive methods to less effective methods.

Numerous reports in the past have focused on the levels, trends, and reasons why women do not use or do not intend to use contraceptives (e.g., Sedgh et al., 2007; Westoff, 2001; Westoff, 2006; Lutalo et al., 2000). In this report we focus on women who have begun using contraceptives but who stop using them while still "in need" of contraceptives or wishing to avoid pregnancy.[1] We make use of detailed contraceptive histories from nationally representative samples of women in eight developing countries to investigate levels and trends of contraceptive discontinuation. We also examine why and when women:

- Stop using contraception when they still wish to avoid pregnancy (abandon while still in need)
- Become pregnant while using contraceptives (failure)
- Switch between contraceptives, particularly to less effective methods

In the background section, we review previous work on contraceptive discontinuation and provide information on the family planning context within each country. In Section 2 we present descriptive statistics on trends in awareness of contraceptive methods (a necessary precursor to contraceptive use); ever-use of family planning; contraceptive prevalence; and method mix. In Section 3, we examine the reasons women give for discontinuation of contraception, overall and by specific method. Rates at which users discontinue each method within the first year of use are presented. We also investigate reasons given for switching to a more or less effective method, and summarize methods switched from and to. Section 4 describes the associations between individual-level characteristics and the risks of abandoning contraception in need, failing, or switching contraceptives, using multilevel discrete time survival regression models. A detailed methodological appendix is included for readers who may want to replicate these analyses.

[1] The term "in need" of contraceptives is used throughout this report and refers to women who are at risk of becoming pregnant, do not want to become pregnant, and are not using contraception. For detailed discussions of the concept of "need" for contraception, please see Westoff (2001; 2006).

1.2 Background

1.2.1 Previous work on contraceptive discontinuation

The majority of studies on contraceptive discontinuation use data from the Demographic and Health Surveys (DHS) calendar. There are several types of contraceptive discontinuation that are often studied; namely method failure, switching, and abandonment. Of these, method failure is studied most often (Curtis and Blanc, 1997). Studies have consistently found that the most important factor in discontinuation is the contraceptive method type (Jejeebhoy, 1991; Steele et al., 1996; Ferguson, 1992; Ali and Cleland, 1995). Discontinuation occurs least often among users of intrauterine devices (IUDs) and implants—methods that require device removal by a health professional (except in relatively rare cases of IUD expulsion). Discontinuation rates are much higher for methods that do not require user action to stop the method (sometimes referred to as passive discontinuation) such as condoms, pills, and injectables (Steele and Curtis, 2003; Ali and Cleland, 1995; Blanc et al., 2002). Steele and Curtis (2003) found that method choice is endogenous to contraceptive discontinuation; however, they also determined that general conclusions about factors related to contraceptive discontinuation are robust to the biases introduced by not considering this endogeneity.

Contraceptive discontinuation is an important determinant of contraceptive prevalence, as well as unwanted fertility and other demographic impacts. Several studies have found contraceptive abandonment and failure to contribute substantially to the total fertility rate (TFR), unwanted pregnancies, and induced abortions. In a study of 15 countries, Blanc, Curtis, and Croft (2002) estimated the total fertility rate would decrease by 20 to 48 percent in the absence of abandonment while in need of contraceptives. In addition, they found over half of all unwanted pregnancies were attributable to either abandonment while in need of contraception or contraceptive failure. On average across 19 countries studied, Cleland and Ali (2004) discovered that 84 percent of births resulting from contraceptive failure and carried to term were classified as unwanted or mistimed by the mother. Contraceptive failure also contributed significantly to induced abortion and miscarriage. On average, 12 percent of failures ended in abortion or miscarriage, with much higher rates in Armenia and Kazakhstan. In those two countries, approximately 80 percent of pregnancies resulting from contraceptive failure were terminated. Similarly, Creanga et al. (2007) estimated that in Romania almost 60 percent of failures resulted in induced abortion, accounting for 30 percent of all induced abortions during the period of study.

Studies on contraceptive discontinuation have significant programmatic implications. Blanc et al. (2002) concluded that, with a decline in fertility, programs should shift their emphasis from simply providing contraceptive methods toward providing services such as counseling in order to reduce discontinuation rates. As pointed out by Ali and Cleland (1999), studies on contraceptive discontinuation give insight into both the adequacy of family planning services and client satisfaction with methods. Similarly, in an earlier study, those authors discuss how high rates of discontinuation may signal discontent with the method and/or family planning service provision, and that high failure rates likely indicate inadequate counseling (Ali and Cleland, 1995).

Contraceptive switching has also been investigated as a potential marker of family planning service quality, though whether high rates of switching equate to strong or weak service provision has been debated in the literature. Several studies suggest that high rates of switching among modern methods can indicate an adequate range of available methods and a service environment flexible to women's needs (Steele and Diamond, 1999; Jain, 1989). High switching rates could, therefore, be seen as indicative of a high-quality service environment in which clients are encouraged to present problems early, enabling providers to guide women to a method with side effects that are acceptable without judgment (Bongaarts and Bruce, 1995). On the other hand, high levels of switching may indicate poor counseling on the original method chosen, unsatisfactory management of method-related side effects, or method stock-outs (Steele and Diamond, 1999). Additionally, Ping (1995) noted that relatively low contraceptive switching behavior is correlated with limited method choice.

Along with the contraceptive method chosen, women's demographic and socioeconomic characteristics have also been found to be associated with contraceptive discontinuation and failure. Women under age 25 have higher contraceptive discontinuation rates than women 25 years of age or older (Moreno, 1993; Ali and Cleland, 1999). Higher parity is associated with longer episodes of continuous injectable use (Riley et al., 1994) and decreased risks of abandonment in need (Curtis and Blanc, 1997). Additionally, women with children are less likely to experience method failure or discontinuation than women without children (Steele et al., 1996). Higher socioeconomic status has been shown to be associated with lower levels of failure and abandonment in need and higher levels of switching (Curtis and Blanc, 1997; Steele and Curtis, 2003).

1.2.2 Background of countries included in analysis

To examine contraceptive discontinuation, we were limited to countries that implemented an expanded monthly calendar for two recent, consecutive DHS surveys.[2] The data for this study come from eight countries, two from each region with available DHS data: sub-Saharan Africa (Kenya and Zimbabwe), North Africa/West Asia/Europe (Armenia and Egypt), South and Southeast Asia (Bangladesh and Indonesia), and Latin America and the Caribbean (Colombia and the Dominican Republic).

[2] In high contraceptive prevalence countries, an expanded version of the monthly calendar collects the reason for contraceptive discontinuation. Only surveys that include this expanded calendar can be used to examine reasons for discontinuation. In DHS V, which began in 2003, the expanded monthly calendar (including reason for discontinuation) was no longer included in the core questionnaire. Continued inclusion of the expanded monthly calendar was determined in consultation with host-country partners.

Table 1.1: Descriptive statistics for countries included in analysis

	Family Planning Effort Index scores, 1999 and 2004 rounds[1]	Total fertility rate, all women 15-49	Total CPR, married women 15-49	% of married women 15-49 with no education
Sub-Saharan Africa				
Kenya 1998	62	4.7	39.0	14.2
Kenya 2003	na	4.9	39.3	15.5
Zimbabwe 1999	61	4.0	53.6	8.6
Zimbabwe 2005-06	62	3.8	60.2	5.4
North Africa/West Asia/Europe				
Armenia 2000	na	1.7	60.5	0.1
Armenia 2005	30	1.7	53.1	0.1
Egypt 2000	57	3.5	56.1	42.2
Egypt 2005	53	3.1	59.2	33.6
South/Southeast Asia				
Bangladesh 1999-2000	74	3.3	54.3	44.7
Bangladesh 2004	64	3.0	58.5	39.9
Indonesia 1997	82	2.8	57.4	12.7
Indonesia 2002-03	56	2.6	60.3	7 5
Latin America and the Caribbean				
Colombia 2000	64	2.6	76.9	4.4
Colombia 2005	49	2.4	78.2	3 5
Dominican Republic 1996	50	3.2	63.7	9.6
Dominican Republic 2002	46	3.0	69.8	5 0

[1] Family planning program effort scores calculated as a percentage of maximum possible score. Countries' earlier surveys (1996-2000) are shown next to effort scores from he 1999 cycle; later surveys (2002-06) are shown next to effort scores from the 2004 cycle. Data from 1999 cycle from Ross and Stover 2001; data from 2004 cycle via personal communication with J. Ross 2008.

The family planning effort index is the most widely used measure of family planning program strength, incorporating data on local policies, service quality, and overall method availability. Table 1.1 shows data from the two most recent family planning effort index cycles. The first cycle, 1999, corresponds roughly to the situation in the countries at the earlier time points (1996-2000). The second cycle, 2004, describes the situation in most countries during the later survey (2002-2006).[3] Index scores are adjusted to range from 1 to 100, where 100 represents the maximum family planning program effort. Family planning effort scores have been shown to be inversely related to contraceptive failure rates (Moreno and Goldman, 1991). All of the countries included in this analysis have relatively strong family planning programs, with the exception of Armenia. Armenia received only 30 percent of the maximum effort score, far lower than any other country included in this analysis. It is worth noting the large decrease in effort scores between cycles in Bangladesh, Colombia, and particularly Indonesia. In all three of these countries, however, the total fertility rate continued to decrease and the contraceptive prevalence rate (CPR) increased over time.

The TFR has decreased between time points for every country we examined except Kenya and Armenia. The stall in Kenya's fertility transition has been discussed elsewhere (e.g., Westoff and Cross, 2006). It is thought to be at least partially attributable to increased ambivalence about future childbearing or decreases in communication campaigns promoting small families (Speizer, 2006). The TFR was consistently low at the two survey time points in Armenia—the only

[3] See Ross and Stover (2001) and Ross et al. (2007) for full details on the construction of the family planning program effort index. The strength of the family planning program preceding the date of survey likely had more of an impact on discontinuation rates within the last five years, and so both time points are included. Data were not collected for the 1999 round in Armenia and the 2004 round in Kenya.

country included in this study with below replacement-level fertility.[4] The CPR, or percentage of women using contraception, has also increased between time points in all countries studied except Armenia. Armenia's 2005 CPR is much lower than any other country studied in which the vast majority of females attend school (e.g., Zimbabwe, Indonesia, Colombia, and the Dominican Republic). The low level of contraceptive use in Armenia, where female education is nearly universal, is particularly striking, as several studies have found female education to be the strongest predictor of contraceptive use (Castro Martín, 1995; Spira, 1994; Saleem and Bobak, 2005; Barkat-e-khuda et al., 2000). To better understand the context for these and other results presented throughout the report, we briefly review the history of the family planning program in each country.

Kenya

Kenya is well-known for its history of a strong family planning program, with modern methods made available in the 1950s. Although Kenya was an early leader in political commitment to family planning and reproductive health, the prioritization of reproductive health in the national agenda weakened in the 1990s (Spiezer, 2006; Crichton, 2008; Bongaarts, 2006). The decrease in family planning emphasis may have impacted contraceptive use patterns shown in this analysis, particularly from the calendar period captured in the 2003 Kenya DHS.

Zimbabwe

A notable feature of Zimbabwe's family planning program has been a successful community-based distribution (CBD) program.[5] For many years, the CBD program was focused on the contraceptive pill. The first fieldworkers were "pill agents" who provided information, education, and supplies in many rural areas. This practice was later extended to other contraceptive methods. The injectable has had a rocky history in Zimbabwe, withdrawn from general use in 1981 after concerns that injectables were given to women without their consent. The injectable was reintroduced along with implants in 1992 with the aim of enhancing the selection of contraceptive methods available (Sambisa, 1996).

Armenia

Armenia was part of the Soviet Union until 1991. Much has been written about contraceptive use under the Soviet regime (Popov et al., 1993 Popov, 1991; Taniguchi, 1991; Potts, 1991; Jacobson, 1990; Petrikovsky and Hoegsberg, 1990). Briefly, in Soviet society, modern contraceptive methods were not widely available. Scarce imported contraceptives were only available on the black market. Locally made condoms were poorly manufactured. Contraceptive use was discouraged, and propaganda was used to suggest that hormonal methods were

[4] "Below replacement-level fertility" refers to a TFR of less than 2.1 births per woman, or fewer births than would be needed to replace the woman and her partner.

[5] At the time of this writing, the economic and political situation in Zimbabwe is critically unstable. We note that many of the observations based on the 2005-06 data are likely no longer applicable due to the recent dramatic changes in this country. We do not, however, have more recent data from Zimbabwe. Without more recent data from Zimbabwe, we must present only from available information, with the caveat that the situation has likely changed since the data were collected.

particularly harmful to women's health. One study states that "Due in large part to government assertions during the Soviet period that modern contraceptive methods such as the oral contraceptive pill were dangerous…much of what women *knew* was misconception and myth" (Thompson and Harutyunyan, 2006:2772). Induced abortion was the predominant method of fertility regulation, followed by traditional methods (Popov et al., 1993. In many post-Soviet countries today, including Armenia, withdrawal and induced abortion remain the primary methods of fertility control (Thompson and Harutyunyan, 2006; Agadjanian, 2002; Vjatere, 1995).

Other factors related to Armenia's current contraceptive use situation include the historic distrust of modern contraception, social acceptance of abortion, and fear of population decline. These factors help to explain some of the results, including the drop in contraceptive prevalence between 2000 and 2005 and the heavy reliance on withdrawal as a contraceptive method (shown in Table 2.3). Another factor in Armenia that likely affected our results was the outmigration of men, which directly contributed to women not using contraception because of infrequent sex or an absent partner, as explained in a report investigating trends in Armenia (Johnson, 2007).

Egypt

Sterilization is not often used in Egypt, as religious objections to the method are common (Sullivan et al., 2006). Instead, IUDs are the primary method used for limiting births. The Egyptian government has promoted the IUD, and IUD insertion is widely available at government facilities and private doctors (ibid). We expect high use of the IUD, which cannot be discontinued passively, to affect our analyses.

Bangladesh

The East Pakistan family planning program left Bangladesh with particularly difficult barriers to overcome. In 1968, backlash against the East Pakistani government's coercive approaches to family planning contributed to the government's collapse and Bangladesh's independence (Levin, 2007). In recent years, the Bangladesh family planning program has focused on providing culturally acceptable family planning—particularly reversible methods—promoted through social marketing and a large cadre of outreach workers. Whether the door-to-door visits by outreach workers are essential to providing rural women access or such visits reinforce gender norms that keep women isolated is still a topic of debate (Arends-Kuenning, 2002; Schuler et al., 1995). We expect that access problems in rural areas may be minimized in Bangladesh and Indonesia due to these outreach programs.

Indonesia

Bangladesh and Indonesia's family planning programs have several similarities. Both programs have focused on making a wide range of methods available, make extensive outreach efforts in rural areas, have been described as family planning success stories (Janowitz et al., 1997; Mize and Robey, 2006), and have experienced recent decreases in family planning effort scores. The decline in Indonesia's Family Planning Program Effort Index score has been particularly sharp, from 82 in 1999 to 56 in 2004. This change has been primarily attributed to the decentralization of health and family planning programs in 2001. Decentralization relocated management of

family planning to the district level, which has been described as leading to funding shortfalls and a shift of users from the public to the private sector (Schoemaker, 2005). Another challenge to Indonesia's family planning program, despite Indonesia's history of working with religious leaders to defuse religious opposition to family planning, is a rising tide of Islamic conservatism that encourages large families (Diani, 2009).

The Dominican Republic

In the Dominican Republic, well over half of the contraceptive prevalence is female sterilization, a method that has been widely available in the country since the 1940s (Sullivan et al., 2006). Across Latin America, female sterilization has been a widely accepted means of limiting fertility. Many women opt for sterilization at a young age after closely spaced pregnancies (Baez, 1992; Sullivan et al., 2006). The median age at sterilization is 28 in the Dominican Republic (Achécar et al., 2003).

Colombia

Similar to the Dominican Republic, the median age at sterilization is 30 in Colombia (Ojeda et al., 2005). As female sterilization cannot—except under rare circumstances—be discontinued, sterilized women are not at risk of discontinuation.[6] Sterilized women are, therefore, not included in the analysis, which makes the results for countries in which sterilization is the dominant family planning method (particularly the Dominican Republic and Colombia) not representative of all contraceptive users.

In short, family planning contexts vary drastically in the countries included in this analysis. We expect to see many of the factors that shape these different contexts reflected in the levels and trends of contraceptive abandonment in need, failure, and switching.

1.3 Data

Table 1.2 displays the sample parameters for all surveys included in analyses. Egypt, Bangladesh, and Indonesia only interviewed ever-married women, and many relevant questions were asked only of currently married women. Women under age 15 were interviewed in 2005 in Colombia and in both Bangladesh surveys. To maintain comparability across regions and countries, we restricted our study sample to currently married women age 15-49. Sample weights are used throughout the report to make results nationally representative of married women of reproductive age (15-49).

[6] Male sterilization, however, can be discontinued by women via changing partners, so episodes of male sterilization use within the period of observation are included in analyses. Male sterilization episodes of use make up less than 1 percent of all episodes of contraceptive use in all countries studied.

Table 1.2: DHS surveys included in analysis and base population

	Sample type	Unweighted number of women interviewed	Number of currently married[1] women 15-49	
			Unweighted	Weighted
Sub-Saharan Africa				
Kenya 1998	All women 15-49	7,881	4,847	4,834
Kenya 2003	All women 15-49	8,195	4,876	4,919
Zimbabwe 1999	All women 15-49	5,907	3,553	3,609
Zimbabwe 2005-06	All women 15-49	8,907	5,118	5,143
North Africa/West Asia/Europe				
Armenia 2000	All women 15-49	6,430	4,198	4,125
Armenia 2005	All women 15-49	6,566	4,112	4,044
Egypt 2000	Ever-married women 15-49	15,573	14,393	14,382
Egypt 2005	Ever-married women 15-49	19,474	18,134	18,187
South/Southeast Asia				
Bangladesh 1999-2000	Ever-married women 10-49	10,544	9,530	9,540
Bangladesh 2004	Ever-married women 10-49	11,440	10,417	10,436
Indonesia 1997	Ever-married women 15-49	28,810	26,833	26,886
Indonesia 2002-03	Ever-married women 15-49	29,483	27,784	27,857
Latin America and the Caribbean				
Colombia 2000	All women 15-49	11,585	6,026	5,935
Colombia 2005	All women 13-49	41,344	20,087	19,762
Dominican Republic 1996	All women 15-49	8,422	5,171	4,983
Dominican Republic 2002	All women 15-49	23,384	14,504	13,996

[1] This and all other tables in this analysis refer to all women who are married or in union/living together as "currently married."

Analyses of discontinuation are based on data collected through the contraceptive calendar, a month-by-month retrospective history of every birth, pregnancy, termination, and episode of contraceptive use a woman had in the five years preceding the survey. When a woman reported discontinuing a contraceptive method, she was asked what the primary reason was for that discontinuation. The format of the contraceptive calendar allows only one reason for discontinuation.

1.3.1 Reasons for discontinuation and types of discontinuation

Reasons for discontinuation and subsequent groupings are shown in Figure 1. We divided discontinuations into two categories: (1) not in need of contraception and (2) in need of contraception. These two broad categories were then broken down into seven categories to examine reason-specific discontinuation rates. We considered women to have reduced or no need for contraception if they gave any of the following reasons for discontinuation:

- Wanted to become pregnant
- Infrequent sex/husband away
- Marital dissolution/separation
- Difficult to get pregnant/menopausal

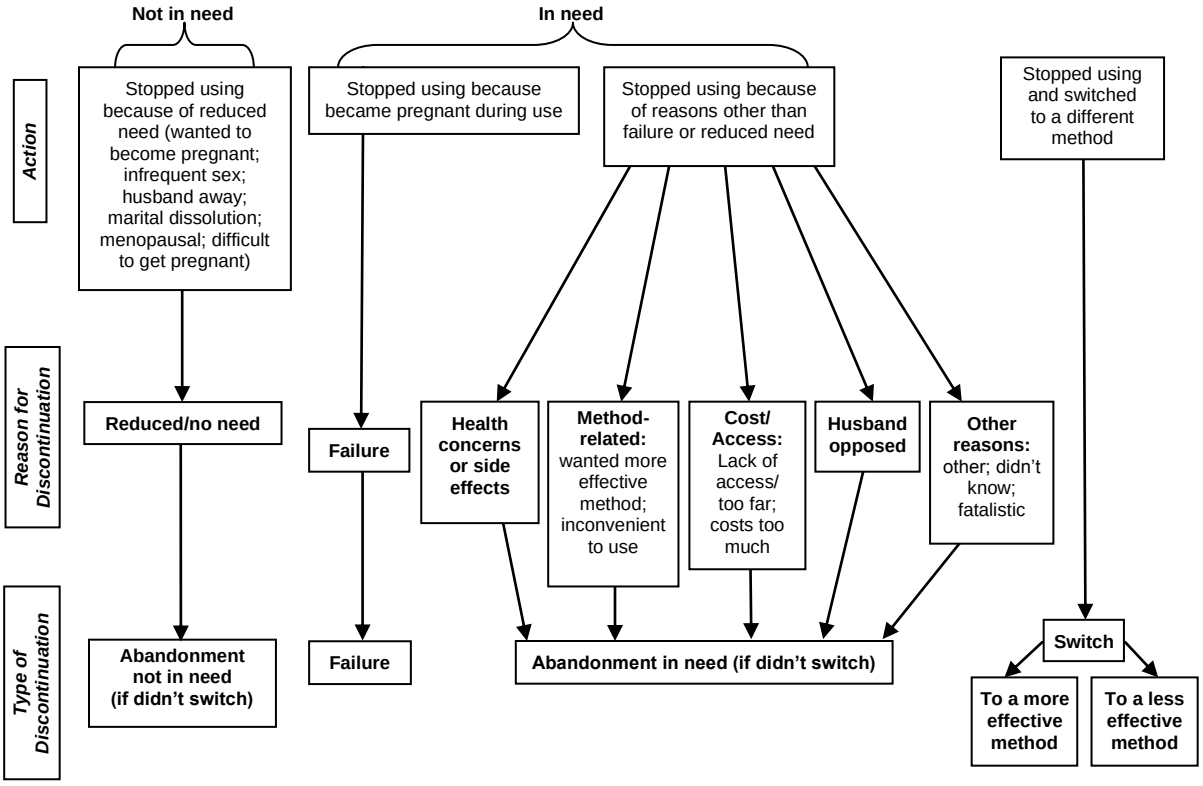
In-need discontinuation rates were examined in six categories:

1. Became pregnant while using (failure)
2. Health concerns or side effects

3. Method-related:
   - Wanted a more effective method
   - Method inconvenient to use
4. Cost/access:
   - Lack of access/too far
   - Costs too much
5. Husband opposed
6. Other reasons:
   - Other
   - Don't know
   - Fatalistic
   - Country-specific reasons

Some reasons, such as "Fatalistic," "IUD expelled," and "Ramadan" were not given as options in every country. These country-specific reasons for discontinuation were grouped into the "Other" category for comparability across countries and time points.

Figure 1: Reasons for and types of discontinuation



In the analyses from Table 3.4 onward, we use discontinuation "types," which consider not only the reason given for discontinuation but also a woman's actions. If a woman discontinued a contraceptive method but began using a different method in the following calendar month, that episode of use was categorized as a contraceptive switch, regardless of the reason she gave for discontinuing. Following the DHS standard methodology, we also considered women to have switched methods if (a) the reason she gave for discontinuation was "wanted a more effective method," (b) she used no contraception for only one month following this discontinuation, and (c) she began using a different contraceptive method in the following month. This additional consideration allowed women one month to switch to a different method if that was their stated objective. When the sample was large enough, switches were further categorized according to whether a woman switched to a more or less effective method than the one she was previously using.[7]

From Table 3.4 onward, episodes of discontinuation are considered to be abandonment not in need, failure, or abandonment in need only if the episode does not end in a contraceptive switch. This is contrary to earlier tables, in which discontinuations are coded solely according to the reason given for discontinuation, without considering switching.

1.3.2 Period of observation

The term "period of observation" is used to describe the period during which we examine women's exposure to the risk of discontinuing a method of contraception. As described in Appendix 1, the length of the calendar varies according to the month in which the woman was interviewed. For discontinuation rate calculation, we standardize the period of observation as 3-62 months preceding the interview for all women. This timeframe allows for a full five-year period of observation for each woman. The three months immediately preceding the interview are excluded to avoid underestimating contraceptive failure, as a woman in her first trimester may not yet realize that she is pregnant. Episodes of contraceptive use that began before month 62 in the calendar and continued into the period of observation are treated as late entries in discontinuation rate calculation.

In Section 4, we focus on correlates of discontinuation, and are less concerned with underestimating failure. Therefore, in these models we do not exclude the most recent three months from analysis. We used the most recent episode of discontinuation for each woman who discontinued a method during the period of observation. For women who had no episodes of discontinuation during the period of observation, we use the most recent episode of continued use. To focus on discontinuations within the first three years of use, episodes of contraceptive

[7] Estimates of contraceptive effectiveness vary. We used effectiveness rates for contraceptive methods as the methods are commonly used in the general population and relied predominantly on data collected in developing countries, supplementing these rates with developed-country data as needed. Using these rates, we ranked contraceptive methods in order of effectiveness, from most to least effective: sterilization, implant, IUD, injectable, lactational amenorrhea method (LAM) if preceded by a birth and used for six months or less, male condoms, female condoms, diaphragm, spermicides, withdrawal, periodic abstinence, other traditional methods, and LAM if used for 7+ months (WHO, 2007; UNDP, 2004; Hatcher et al., 2003). Switches from a higher-ranked method to a lower-ranked method were categorized as switches to a less effective method, and switches from a lower-ranked to a higher-ranked method were categorized as switches to a more effective method.

use longer than 36 months were censored (treated as non-discontinuations) and included in the reference category "did not abandon in need."

In both Sections 3 and 4, episodes of contraceptive use that were ongoing when the calendar began are excluded from analysis, as we do not have a start date for these episodes and so cannot determine duration. Further details on the periods of observation used are included in Appendix 1.

1.3.3 Unit of analysis

One woman may report several episodes of contraceptive use in the DHS calendar. When extracting data from the calendar, we created a contraceptive events-based dataset wherein each episode of contraceptive use is one observation. We use all episodes of contraceptive use that occurred during the five-year period of observation in calculating discontinuation rates (Section 3), so the unit of analysis for Section 3 is the episode of contraceptive use.

In the hazard models (Section 4), we use only one episode of discontinuation or contraceptive use from women who had at least one contraceptive event during the period of observation; therefore, in Section 4 women are the unit of analysis.

1.3.4 Independent variables

When selecting independent variables for the multivariate models, we based our approach on Bulatao's framework for understanding contraceptive method choice (1989), as contraceptive discontinuation and method choice are highly correlated (Steele and Curtis, 2003). We were limited to variables that were available in all surveys used. The only exception was media exposure, which was not included in the Colombia survey with the understanding that all women in Colombia are exposed to multiple forms of media regularly. As the most recent episode may have occurred some time in the past (usually within two years of the interview),[8] we also could not use variables that were relevant only to the time of the interview (e.g., visits from a family planning worker within the last six months, or visits to a health facility in the last two weeks). Based on Bulatao's framework, we selected variables that were available in all surveys to represent women's contraceptive goals, competence, access, and evaluation.

[8] The mean and median time from the end of the episode to the date of interview were less than one year in all countries, and 75 percent of events had ended within 20 months of the interview in all but two countries: 75th percentiles were 24 months in Colombia and 25 months in the Dominican Republic. We make the assumption that the independent variables that were not measured at the time of discontinuation did not vary between the time of discontinuation and time of interview; for example, that women who lived in an urban area at the time of interview did not live in a rural area at the time of discontinuation. In some cases (most likely in Colombia and the Dominican Republic, due to longer times between the end of the episode and interview), it is inevitable that this assumption will be violated, which would lead to a decrease in the strength of any association between these variables and discontinuation type. We avoid this situation as much as possible by using only the episode of discontinuation closest to the date of interview; however, some mis-specification for this reason is unavoidable.

Women's contraceptive goals are measured by the contraceptive method, her age and parity at the time of discontinuation, and whether or not she worked in the past year.[9] The type of contraceptive method discontinued is included in all models except the switching to more or less effective methods models (the categorization of switch type was dependent upon the methods a woman switched from and to). In models of switching to a more or less effective method (shown in Table 4.4), we could not include the contraceptive method used. The contraceptive method switched from was used in determining whether the user switched to a more or less effective method, and so the method variable is endogenous. Models are not presented for switching to a less effective method in Kenya and Armenia due to small sample sizes.[10]

Pills, injectables, male condoms, and IUDs were included as separate methods unless noted below. Traditional methods (withdrawal, periodic abstinence, and other non-modern methods) were grouped into one category. All other less common modern methods (diaphragm, female condoms, foam, jelly, and implants) were grouped into "other modern methods." There were too few IUD users in Kenya, Zimbabwe, Armenia, and Bangladesh to maintain the IUD as a separate category in the hazard models; thus, in these countries, the IUD was included in "other modern methods." Baseline hazard graphs, therefore, are not shown for IUDs. Additionally, in Armenia there were too few users of the pill and injectable; therefore, all modern methods other than the male condom in Armenia are included in the "other modern methods" category.

Contraceptive competence is measured via three variables: respondent's years of education; the number of contraceptive methods known; and spousal agreement on number of children desired. The number of contraceptive methods women know reflects contraceptive awareness, the foundation of contraceptive competence. The number of methods known ("have you ever heard of this method?") is included as a continuous variable and is centered at the mean.

In the Bulatao framework, contraceptive competence is measured not only by a respondent's understanding of a method and competence of use, but also the spouse's ability to cooperate in using the method. Because spousal communication about family planning was not asked in most recent surveys, we use a proxy measure for spousal cooperation based on the question "Do you think your husband wants the same number of children that you want, or does he want more or fewer than you want?" Responses are coded as the partner wants the same, more, or fewer children than the respondent, or the respondent does not know, which indicates that they have not discussed the number of children they want with their partner. The "don't know" category reflects limited spousal communication on reproductive intentions, and likely indicates a lack of discussion of issues around contraceptive use.

[9] Having worked in the past year is used as a proxy of ever-exposure to work. We assume that women who had worked in the past year were more likely to have worked previously than women who had not worked in the past year. Therefore, they have higher opportunity costs associated with becoming pregnant. In Bangladesh, information on working in the past year was not available, so current working status was used.

[10] Less than 50 unweighted cases of switching to a less effective method as the most recent type of discontinuation.

Contraceptive access is measured using three variables: whether the woman is living in an urban or rural area; the household wealth status;[11] and the region or province[12] in which she is living.

Bulatao considers contraceptive evaluation to involve women's judgments, practical and moral, about the implications of using a particular method (1989). We measure contraceptive evaluation in multivariate models through media access and the community-level contraceptive prevalence. Media access is measured by the number of media sources women usually see or hear in a week. Access to media may influence women's perceptions of the acceptability of contraception in general. If specific methods are mentioned, they may influence perceptions as well, particularly if the benefits or side effects of particular methods are advertised. This value can range from 0 (no media exposure) to 3 (exposed to television, radio, and newspapers/printed material in an average week). The value is included as a continuous variable in the models. To assess the community environment in which women may consider, discuss, judge, use, and discontinue contraceptives, a community-level CPR is calculated as the percentage of women in a cluster, excluding the index woman, using contraception.

1.4 Statistical Methods

1.4.1 Discontinuation rates

One difficulty in handling calendar data is that a number of episodes of contraceptive use are still ongoing at the time of interview, so we have no way to calculate the complete duration of the episode. Therefore, we use a competing risks approach (analogous to multiple-decrement life tables) that is able to handle events that are ongoing, or right-censored. Many previous analyses comparing discontinuation rates by reason for discontinuation have calculated rates for each possible reason separately, as though all other potential reasons for discontinuation did not exist. For example, a failure rate calculated as an independent rate would not be dependent on the rate of discontinuation for any other reason. Such independent rates[13] are often used in multi-country comparisons because they are unaffected by discontinuation rates for other reasons (Farley et al., 2001; Curtis and Hammerslough, 1995). Despite the advantage of comparability, we use a competing risks approach in this paper that takes into account the fact that women are simultaneously at risk of discontinuing due to failure, their husband's opposition, side effects, etc. Competing risks estimates are "observable" or reflective of what is actually happening in the

[11] DHS surveys do not collect direct information on income or wealth, but collect information on household ownership of durable goods and amenities that have been shown to be correlated with household wealth status (Rutstein and Johnson, 2004). For each DHS survey, a "wealth index" made up of these survey items is constructed using principal components analysis, placing households on a continuous scale of wealth within a given country. We divided this continuous score into terciles, with the lowest tercile representing the poorest third of the population, and the highest tercile representing the wealthiest third of each country. We use terciles rather than the standard quintiles to preserve statistical power.

[12] The region/province variable is included to control for differences in contraceptive behaviors and access by regional residence, as well as to help program managers and planners assess the impact of regional programs. Regions are identified by number in each table. A listing of region names for each country and the corresponding numbers is shown in Appendix 3. In all countries, the region including the capital city was used as the reference category.

[13] Also referred to as "unobservable," "hypothetical," or "associated single decrement" rates.

population. Using a competing risks approach, a failure rate would be affected by the discontinuation rate for each other reason. We use the "stcompet" command in Stata 10 to estimate the rates using the competing risks approach (Coviello and Boggess, 2004). Although we sacrifice some comparability across countries due to cross-country differences in the proportion of users discontinuing for each reason, we felt that competing risks estimates would provide more useful information for program managers by showing discontinuation rates by reason/type as they actually occurred on the ground, rather than what would occur if other potential reasons for discontinuation did not exist.

Discontinuation rates are presented for all reversible methods together, and separately for pills, injectables, IUDs, male condoms, and traditional methods (traditional methods include withdrawal, periodic abstinence, and other non-modern methods, including "prolonged breastfeeding" in Egypt). If there were less than 125 unweighted episodes of contraceptive use for a method, rates for that method are not shown.

1.4.2 Survival models

To investigate why some women are more likely than others to abandon in need, experience failure, or switch methods, we use multilevel discrete time hazard models. Similar to the competing risks estimates, these models are able to handle right-censored data. The models use logit transformations, also referred to as pooled logistic regression analysis. Pooled logistic regression has been demonstrated to provide valid estimates that are similar to those from continuous time survival analysis, or Cox proportional hazards models (D'Agostino et al., 1990). Further details on model construction and specification are included in Appendix 1.

DHS sampling strategy involves selecting households from clusters, or small geographic areas, and interviewing all eligible women in those households. Women residing in the same cluster area may share characteristics associated with our outcome of interest that we are not able to capture in our models. Therefore, we measure variation at both the individual and cluster levels using multilevel models. By restricting our analysis to only one episode of contraceptive use per woman, we do not need to include the episode as a level of analysis in our multilevel models.

The outcomes of interest in the hazard models are abandonment in need, failure, switching, and (where sample size allowed) switching to more effective or less effective methods. The reference category for all models is women who did not discontinue while in need of contraception (i.e., women who abandoned due to reduced/no need or who continued to use contraception throughout the period of observation).

1.5 Limitations

There are several limitations that should be kept in mind when interpreting the results below.

In collecting the calendar data, women are asked to recall events that occurred up to five years ago; thus, the data may be less reliable than current status data. Previous analyses of the overall quality of calendar data, however, show that information reported in the calendar is not subject to selection bias or attrition (Goldman et al., 1983; Moreno and Goldman, 1991; Moreno, 1993). We assessed the quality of the calendar data used in this analysis by examining data heaping. We

then calculated estimates of CPR from the calendar for each country in which the calendar from a more recent survey included the interview dates from an earlier survey. We compared the estimated contraceptive prevalence at the time of the earlier survey using the calendar data from each recent survey to the current status data from the corresponding earlier survey. Results from these data quality checks are described in Appendix 2. Briefly, we found some heaping at 6 and 12 months in all countries, but overall the heaping was probably not severe enough to significantly affect estimates of discontinuation. We found consistently lower estimates of contraceptive prevalence with the calendar data from the more recent survey as compared with current status data from the earlier survey for each country. The difference in prevalence from the two data sources shows that not all contraceptive use is captured in the calendar. As a result, our analysis may slightly underestimate discontinuation rates.

Another limitation is that only one reason for discontinuation was collected. In reality, there are often multiple reasons for discontinuing a contraceptive method. Analysis of data from Morocco shows that this approach oversimplifies contraceptive decisionmaking and is unreliable (Strickler at al., 1997). We recognize our analyses of reasons for discontinuation are likely oversimplified, and highlight this unavoidable limitation for the reader.

A third limitation regarding data quality is that contraceptive failures are more likely than any other type of discontinuation to be misreported. A woman who has experienced contraceptive failure may report her reason for discontinuation as a desired pregnancy—or another reason—rather than failure, particularly if the subject is culturally taboo. To assess the potential impact of under-reported contraceptive failure, we conducted a sensitivity analysis by recoding all contraceptive discontinuations that met the following criteria: (1) they were followed immediately by a pregnancy and (2) the reason for discontinuation was not "wanted to become pregnant"; these were recoded as potential failures, and failure rates were recalculated. Including these potential failures increased failure rates by 5 percentage points or less. To maintain consistency with the rest of our analyses in which we rely on women's reported reasons for discontinuation, and because recoding these possible failures would have only a small impact, we base our failure rates only on reported failures with the understanding that these rates may be slightly underestimated. Additionally, we recognize that pregnancy terminations are likely to be under-reported, particularly in areas where induced abortion is socially stigmatized. It is possible that contraceptive use episodes that ended in terminated pregnancies may be unreported, suggesting one possible reason for the underreporting of contraceptive use in the calendar data.[14]

A final limitation is methodological. While we include right-censored episodes of use that did not end before the date of interview, we are unable to include "left-censored" episodes that began before the calendar period started. Between 2 and 20 percent of women in each country are excluded from discontinuation rates and hazard models because they used the same reversible method of contraception consistently throughout the entire calendar period (Table 2.4). As these women are the "strongest" or most consistent users of contraception, it is problematic to exclude them from analysis. Excluding these women, who are at risk of discontinuation but do not

[14] Researchers have also expressed concern that estimated failure rates based on DHS calendar data may be biased downward due to redundant use of methods, which occurs when episodes of contraceptive use overlap with periods of reduced fertility. However, previous analysis of calendar data in nine countries showed that the impact of redundant use, for the most part, is modest (Curtis, 1996).

discontinue during the observation period, puts us at risk of overestimating the discontinuation rates. Naturally, this risk is highest for countries with a higher proportion of women using the same method continuously throughout the calendar period, which includes Armenia, Egypt, and Indonesia (all have greater than 15 percent of women who used the same reversible method throughout the calendar period).

2

Descriptive Results

Awareness of a contraceptive method is nearly universal among women in our sample, ranging from 95 percent in Kenya (2003) to 100 percent in Egypt and Bangladesh (Table 2.1). Contraceptive pill and injectable awareness were both over 90 percent in every country except Armenia, where four-fifths of women knew about the pill and less than half knew about the injectable at both time points. Also of note were the low levels of awareness about female sterilization in Armenia—lower than in any other country—and male sterilization in Egypt where only 8 to 16 percent of women had heard of the method. Knowledge about the IUD was highest in Egypt, Colombia, Armenia, and the Dominican Republic, while knowledge about implants was highest in Egypt, Indonesia, and the Dominican Republic. Awareness about male condoms was over 90 percent in every country except Egypt and Indonesia.

Overall, awareness of female sterilization has decreased or remained stable over time in every country. At the same time, awareness of injectables increased or remained stable in all countries except Armenia. Awareness of implants, though lower at both time points than awareness of the injectable, also increased in all countries except Armenia and Colombia. Periodic abstinence awareness decreased over time in every country except Indonesia and Bangladesh.

As shown in Table 2.2, over three-quarters of women included in the analysis in all countries except Kenya have used a method of contraception during their lifetime. The percentage of women who ever used any method increased or remained stable over time in every country studied except Armenia. The majority of women in Zimbabwe, Bangladesh, Colombia, and the Dominican Republic have used the contraceptive pill. Over half of Egyptian women have used the IUD at some point, and the percentage rose between surveys. Between one-quarter and one-half of women in every country except Armenia, Egypt, and the Dominican Republic have used the injectable. In Armenia, less than 1 percent of women have ever used a contraceptive injectable. Ever-use of male condoms rose or remained stable in every country except Armenia, the Dominican Republic, and Indonesia. In Indonesia and Egypt, only 4 percent of women have ever used the male condom. Ever-use of withdrawal is on the rise in four countries, including Colombia, where ever-use of withdrawal jumped from 35 to 42 percent between 2000 and 2005. The only country in which withdrawal use was more common was Armenia, where ever-use of withdrawal decreased from 56 to 50 percent over the same period.

Table 2.1: Trends in knowledge of contraceptive methods among currently married women 15-49 by method and country, DHS surveys 1996-2006

	Any method	Modern methods											Traditional methods			
		Sterilization						Condom								
		Female	Male	Pill	IUD	Injectable	Implants	Female	Male	LAM[1]	EC[2]	Vaginals[3]	Periodic abstinence	Withdrawal	Other traditional/ folk[4]	Number of women
Sub-Saharan Africa																
Kenya 1998	98.1	88.4	53.0	96.5	79.9	95.1	56.1	na	93.4	na	na	36.9	73.7	40.9	9.9	4,834
Kenya 2003	95.4	80.3	52.1	93.1	74.6	93.5	72.3	43.1	91.6	na	25.2	1.1	70.1	46.8	11.9	4,919
Zimbabwe 1999	98.6	63.5	42.8	97.6	70.2	92.5	27.8	57.8	94.2	36.5	11.9	24.0	29.4	62.5	15.2	3,609
Zimbabwe 2005-06	99.3	50.0	34.7	98.4	61.2	94.6	47.9	70.6	95.6	28.9	15.8	na	27.7	58.8	8.3	5,143
North Africa/West Asia/Europe																
Armenia 2000	98.7	47.5	20.4	83.3	92.7	48.9	10.4	24.6	90.1	78.6	22.3	24.8	65.0	88.0	7.0	4,125
Armenia 2005	98.8	27.7	13.4	82.2	93.5	37.4	8.8	23.0	95.0	17.6	17.5	46.0	52.9	87.2	11.1	4,044
Egypt 2000	100.0	74.9	15.7	99.9	99.9	99.4	83.1	na	68.1	na	na	68.2	38.0	31.3	68.5	14,382
Egypt 2005	99.9	66.0	8.2	99.6	99.7	99.4	93.5	na	52.6	na	6.6	64.8	35.4	27.9	64.9	18,187
South/Southeast Asia																
Bangladesh 1999-2000	100.0	97.7	77.4	99.8	90.3	98.3	56.5	na	90.2	16.4	na	na	67.4	57.2	7.8	9,540
Bangladesh 2004	100.0	96.3	73.2	99.9	85.7	98.7	77.1	na	92.5	na	na	na	71.5	59.1	7.7	10,436
Indonesia 1997	97.0	60.5	36.4	93.9	85.1	93.9	81.3	na	66.1	na	na	11.7	27.7	17.9	3.5	26,886
Indonesia 2002-03	98.6	63.6	39.0	96.4	87.4	97.1	87.1	na	76.3	20.3	na	12.2	33.9	26.1	7.1	27,857
Latin America and the Caribbean																
Colombia 2000	99.9	98.4	80.4	99.4	97.6	98.0	77.9	na	99.2	62.3	18.5	83.3	88.2	85.5	25.3	5,935
Colombia 2005	99.9	98.2	85.7	98.9	97.0	98.5	77.7	na	99.1	63.7	35.3	79.0	84.0	87.2	11.5	19,762
Dominican Republic 1996	99.7	98.2	57.4	99.0	93.3	91.3	81.1	na	98.2	73.2	na	62.6	69.5	71.0	8.9	4,983
Dominican Republic 2002	99.8	98.4	55.9	99.2	94.0	96.9	90.9	46.9	98.2	71.9	30.8	61.0	71.6	79.0	8.0	13,996

[1] Lactational Amenorrhea Method. Phrasing of question varied across surveys: In many earlier surveys (e.g., Armenia 2000), women asked about LAM were prompted with the definition "women can use a specially taught method of pregnancy avoidance to delay the return of the menstrual period by feeding their child nothing but breast milk for up to 6 months after a birth." Due to concerns that this definition was leading to misreporting of breastfeeding as LAM, in later surveys (e.g., Armenia 2005) the defini ion was dropped, and women were only asked if they knew about LAM, with no further informa ion. Reporting of LAM has been shown to be less reliable than other methods, as many women who said they are using LAM do not meet all three criteria of LAM. However, in this analysis LAM is recorded as reported, and has been coded as a modern method unless otherwise noted.

[2] Emergency Contraception.

[3] Vaginals includes diaphragm, foam, and jelly. The phrasing of this question varied across surveys: Kenya 1998 asked about diaphragm, foam, or jelly as one method category, as did Egypt 2000 and 2005, Indonesia 1997, and Colombia 2000 and 2005. In the Dominican Republic, women were asked only about foam/jelly/tablets. In Indonesia 2002-03, women were only asked about the diaphragm. In Kenya 2003, women were not prompted about any vaginal method, but if they reported a vaginal method in the open-ended "other methods" category they were included as knowing/using vaginals. In Zimbabwe 1999, and Armenia 2000 and 2005, women were asked about both diaphragms and foam/jelly separately. Any positive response to diaphragms, foam, and/or jelly is included in this category.

[4] Other traditional/folk methods include prolonged breastfeeding in Egypt.

na: not asked.

Table 2.2: Trends in ever-use of contraceptive methods among currently married women 15-49 by method and country, DHS surveys 1996-2006

	Any method	Modern methods											Traditional methods			
		Sterilization						Condom								
		Female	Male	Pill	IUD	Injectable	Implants	Female	Male	LAM[1]	EC[2]	Vaginals[3]	Periodic abstinence	Withdrawal	Other traditional/ folk[4]	Number of women
Sub-Saharan Africa																
Kenya 1998	64.1	6.2	0.0	32.7	8.4	24.9	1.1	na	9.7	na	na	0.8	19.3	4.1	2.3	4,834
Kenya 2003	64.2	4.4	0.1	32.3	7.9	33.2	2.6	0.3	10.2	0.0	1.0	0.2	20.4	5.8	1.9	4,919
Zimbabwe 1999	83.0	2.6	0.1	70.9	2.7	23.1	0.7	1.2	19.6	8.5	0.8	0.4	3.6	19.3	2.3	3,609
Zimbabwe 2005-06	87.2	2.0	0.2	77.9	1.6	29.9	2.1	2.4	22.0	5.2	2.1	na	2.7	14.6	1.8	5,143
North Africa/West Asia/Europe																
Armenia 2000	81.5	2.7	0.0	5.9	19.6	0.7	0.0	0.5	22.0	26.5	0.6	0.7	18.4	56.0	4.7	4,125
Armenia 2005	75.5	0.6	0.0	5.9	18.4	0.6	0.1	0.6	21.7	2.6	1.1	2.0	13.7	49.8	6.3	4,044
Egypt 2000	77.3	1.4	0.0	40.6	58.2	14.9	0.4	na	3.8	na	na	6.3	1.5	0.9	6.6	14,382
Egypt 2005	81.2	1.3	0.0	39.7	62.1	21.5	1.5	na	3.9	na	0.1	10.8	2.0	1.6	10.9	18,187
South/Southeast Asia																
Bangladesh 1999-2000	78.5	6.8	0.6	58.9	7.3	21.7	0.7	na	19.9	0.7	na	na	19.8	14.8	2.5	9,540
Bangladesh 2004	83.2	5.3	0.7	65.5	5.9	27.8	1.4	na	21.6	na	na	na	19.9	14.7	2.8	10,436
Indonesia 1997	77.8	3.0	0.4	44.2	19.0	43.9	9.2	na	4.1	na	na	0.2	3.4	3.2	3.3	26,886
Indonesia 2002-03	81.6	3.7	0.6	41.0	15.0	53.7	9.3	na	4.0	2.2	na	0.3	3.8	4.6	1.8	27,857
Latin America and the Caribbean																
Colombia 2000	95.3	27.1	1.0	57.6	33.9	24.6	1.0	na	35.7	4.1	0.6	18.1	31.2	35.3	13.2	5,935
Colombia 2005	96.2	31.2	2.2	57.5	35.2	33.8	1.5	na	48.6	10.8	2.0	16.1	26.4	41.5	3.7	19,762
Dominican Republic 1996	84.7	40.9	0.2	57.3	12.7	3.0	1.9	na	19.9	5.1	0.0	5.6	14.1	18.5	3.1	4,983
Dominican Republic 2002	89.3	45.8	0.4	61.0	12.2	10.0	2.2	0.2	14.9	6.5	0.7	3.0	10.9	14.5	5.1	13,996

[1] Lactational Amenorrhea Method. Phrasing of ques ion varied across surveys: In many earlier surveys (e.g., Armenia 2000), women asked about LAM were prompted with the definition "women can use a specially taught method of pregnancy avoidance to delay the return of the menstrual period by feeding their child nothing but breast milk for up to 6 months after a birth." Due to concerns that this definition was leading to misreporting of breastfeeding as LAM, in later surveys (e.g., Armenia 2005) the definition was dropped, and women were only asked if they knew about LAM, with no further information. Repor ing of LAM has been shown to be less reliable than other methods, as many women who said they are using LAM do not meet all three criteria of LAM. However, in this analysis LAM is recorded as reported, and has been coded as a modern method unless otherwise noted.

[2] Emergency Contraception.

[3] Vaginals includes diaphragm, foam, and jelly. The phrasing of this question varied across surveys: Kenya 1998 asked about diaphragm, foam, or jelly as one method category, as did Egypt 2000 and 2005, Indonesia 1997, and Colombia 2000 and 2005. In the Dominican Republic, women were asked only about foam/jelly/tablets. In Indonesia 2002-03, women were only asked about the diaphragm. In Kenya 2003, women were not prompted about any vaginal method, but if they reported a vaginal method in the open-ended "other methods" category they were included as knowing/using vaginals. In Zimbabwe 1999, and Armenia 2000 and 2005, women were asked about both diaphragms and foam/jelly separately. Any positive response to diaphragms, foam, and/or jelly is included in this category.

[4] Other traditional/folk includes prolonged breastfeeding in Egypt.

na: not asked.

Figure 2.1 compares the percentage of women who have ever used a modern method with the percentage who have only ever used traditional methods, calculated as the percentage who ever used a modern method subtracted from the proportion who ever used any method. In most countries, the percentage of women who have used a modern method is very close to the percentage of women that have ever used any method, with the exceptions of Kenya and Armenia (Figure 2.1). In Kenya, the percentage of women who have only ever used traditional methods decreased between time points, from 11 percent in 1998 to 9 percent five years later. In Armenia, the percentage of married women who have only ever used traditional methods is quite high and appears to have grown: 26 percent of women had only ever used traditional methods in 2000, increasing to 36 percent in 2005. However, this apparent anomaly is due to the differences in how questions on lactational amenorrhea method (LAM) were phrased in the 2000 and 2005 surveys (see first footnote in Table 2.2). When the analysis was re-run without LAM, the percentages of women who had ever used a modern method were 41 and 38 percent in 2002 and 2005, respectively, and the percentage who only used traditional methods became consistently high at 26 percent in 2000 and 29 percent in 2005.

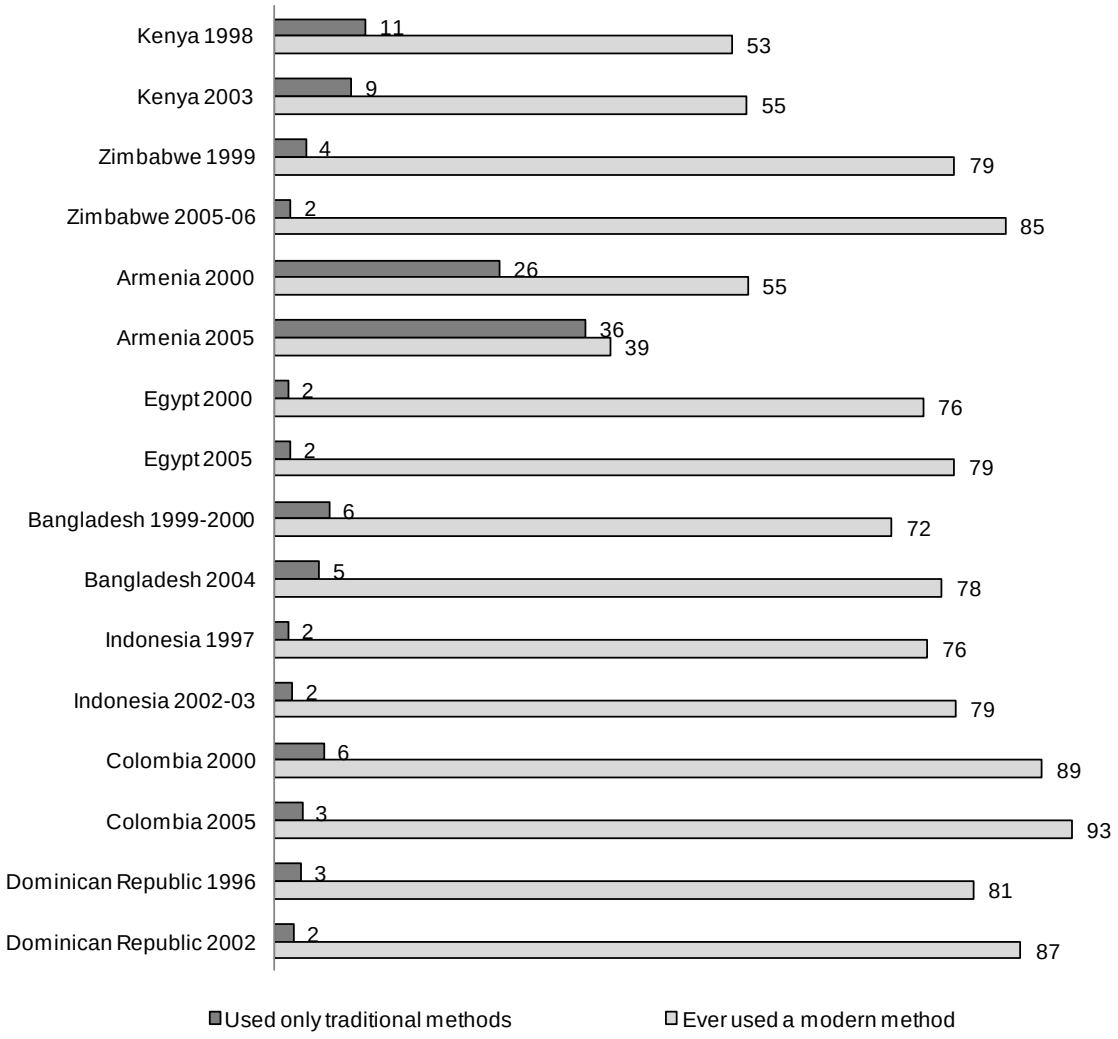


Table 2.3: Trends in contraceptive prevalence among currently married women 15-49 by method and country, DHS surveys 1996-2006

	Total CPR	Modern methods										Traditional methods			
		Sterilization						Condom							
		Female	Male	Pill	IUD	Injectable	Implants	Female	Male	LAM[1]	Vaginals[2]	Periodic abstinence	Withdrawal	Other traditional/ folk[3]	Number of women
Sub-Saharan Africa															
Kenya 1998	39.0	6.2	0.0	8.5	2.7	11.8	0.9	na	1.3	na	0.0	6.1	0.6	0.8	4,834
Kenya 2003	39.3	4.4	0.0	7.5	2.4	14.4	1.7	0.0	1.2	na	0.0	6 3	0.7	0.8	4,919
Zimbabwe 1999	53.5	2.6	0.1	35.5	0.9	8.1	0.5	0.0	1.8	0.9	0.0	0 2	2.6	0.4	3,609
Zimbabwe 2005-06	60.2	2.0	0.1	43.0	0.3	9.9	1.2	0.0	1.4	0.6	na	0 2	1.2	0.4	5,143
North Africa/West Asia/Europe															
Armenia 2000	60.5	2.7	0.0	1.1	9.4	0.1	0.0	0.0	6.9	1.9	0.2	4 8	31.9	1.5	4,125
Armenia 2005	53.1	0.6	0.0	0.8	9.4	0.0	0.0	0.0	8.1	0.4	0.2	3 8	27.7	2.1	4,044
Egypt 2000	56.1	1.4	0.0	9.5	35.5	6.1	0.2	na	1.0	na	0.2	0.6	0.2	1.3	14,382
Egypt 2005	59.2	1.3	0.0	9.9	36.5	7.0	0.8	na	1.0	na	0.0	0.7	0.3	1.7	18,187
South/Southeast Asia															
Bangladesh 1999-2000	54.3	6.8	0.5	23.3	1.3	7.4	0.5	na	4.3	0.0	na	5.4	4.0	0.9	9,540
Bangladesh 2004	58.5	5.3	0.6	26.4	0.6	9.8	0.8	na	4.2	na	na	6.6	3.6	0.7	10,436
Indonesia 1997	57.4	3.0	0.4	15.5	8.2	21.2	6.0	na	0.7	na	0.0	1.1	0.8	0.8	26,886
Indonesia 2002-03	60.3	3.7	0.5	13.3	6.2	27.9	4.3	na	0.9	0.1	0.0	1.6	1.5	0.5	27,857
Latin America and the Caribbean															
Colombia 2000	76.9	27.1	1.0	11.8	12.4	4.0	0.2	na	6.1	0.7	0.8	6 0	6.3	0.7	5,935
Colombia 2005	78.2	31.2	1.8	9.7	11.2	5.8	0.3	na	7.1	0.6	0.5	3 8	5.7	0.6	19,762
Dominican Republic 1996	63.7	40.9	0.1	12.9	2.5	0.5	0.6	na	1.4	0.2	0.3	1 8	1.9	0.5	4,983
Dominican Republic 2002	69.8	45.8	0.1	13.5	2.2	1.9	0.5	0.0	1.3	0.4	0.0	1.4	1.7	0.9	13,996

[1] Lactational Amenorrhea Me hod. Phrasing of question varied across surveys: In many earlier surveys (e.g., Armenia 2000), women asked about LAM were prompted wi h the definition "women can use a specially taught method of pregnancy avoidance to delay he return of the menstrual period by feeding their child nothing but breast milk for up to 6 months after a birth." Due to concerns that this definition was leading to misreporting of breastfeeding as LAM, in later surveys (e.g., Armenia 2005) the definition was dropped, and women were only asked if they knew about LAM, with no further information. Reporting of LAM has been shown to be less reliable than other methods, as many women who said they are using LAM do not meet all three criteria of LAM. However, in this analysis LAM is recorded as reported, and has been coded as a modern method unless otherwise noted.

[2] Vaginals includes diaphragm, foam, and jelly. The phrasing of this question varied across surveys: Kenya 1998 asked about diaphragm, foam, or jelly as one method category, as did Egypt 2000 and 2005, Indonesia 1997, and Colombia 2000 and 2005. In the Dominican Republic, women were asked only about foam/jelly/tablets. In Indonesia 2002-03, women were only asked about the diaphragm. In Kenya 2003, women were not prompted about any vaginal method, but if they reported a vaginal method in the open-ended "other methods" category they were included as knowing/using vaginals. In Zimbabwe 1999, and Armenia 2000 and 2005, women were asked about both diaphragms and foam/jelly separately. Any positive response to diaphragms, foam, and/or jelly is included in this category.

[3] Other traditional/folk includes prolonged breastfeeding in Egypt.

na: not asked.

The contraceptive prevalence rate (CPR) has increased or remained stable between surveys in every country except Armenia (Table 2.3). The total CPR is highest in Colombia at 78 percent and lowest in Kenya at 39 percent.

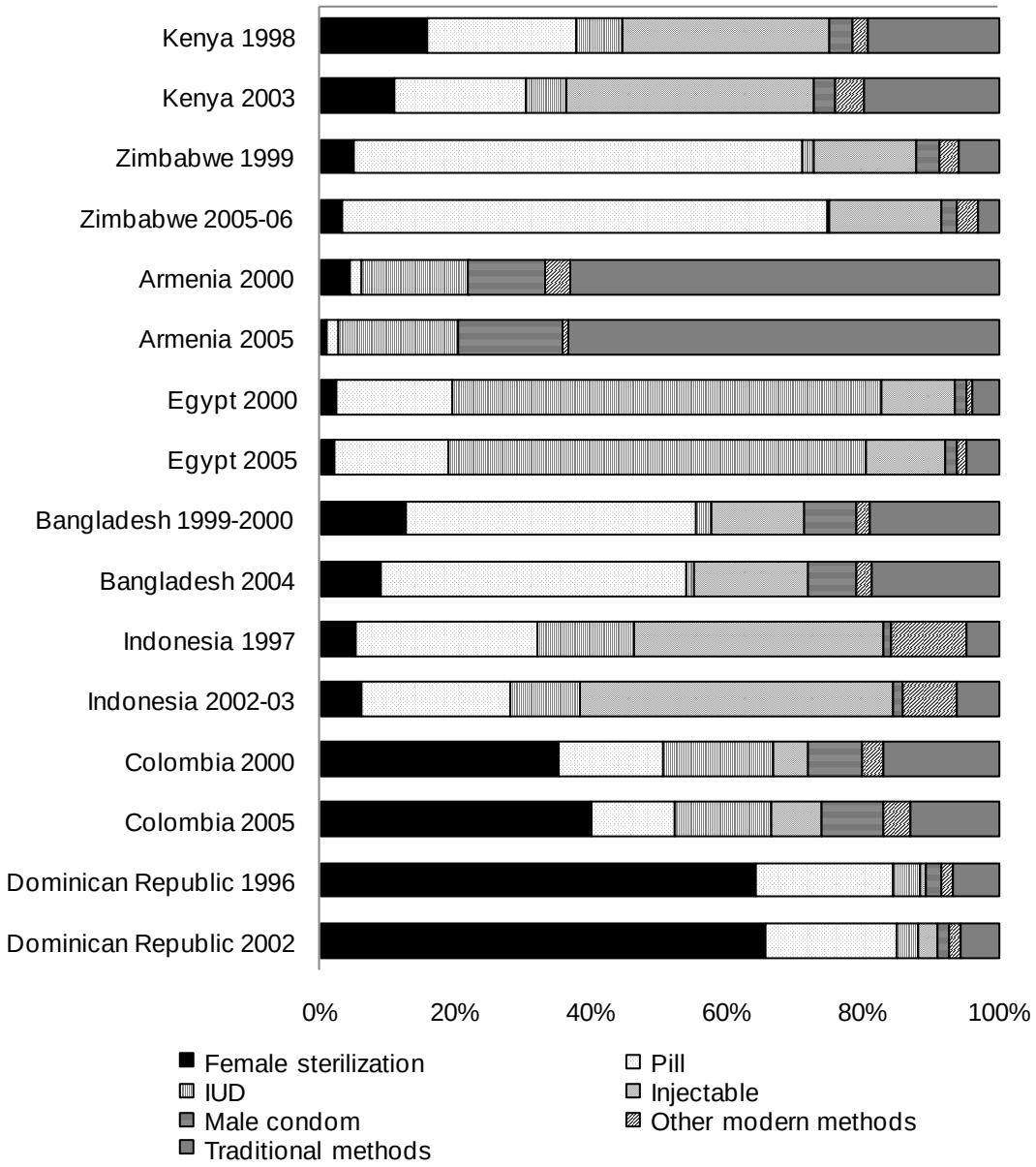
Injectables are the most common currently used method in Kenya and Indonesia. The percentage of injectable users increased in both countries over time, while pill use decreased. Pills are the dominant method in Zimbabwe and Bangladesh, and injectables are the second most commonly used method in both of these countries. Both pill and injectable use has become increasingly common in these countries, while withdrawal use has become less so. Withdrawal is the most common method in Armenia; however, withdrawal use decreased in Armenia from 32 percent to 28 percent between 2000 and 2005. IUD use remained steady in Armenia at 9 percent in both surveys, while male condom use increased and female sterilization decreased. Female sterilization also decreased between time points in Kenya and Bangladesh. In Egypt the dominant method is the IUD, which is becoming slightly more common. In Indonesia, female sterilization and injectable use increased while pill, IUD, and implant use decreased. In both Colombia and the Dominican Republic, female sterilization is the predominant method, with 46 percent of women sterilized in the Dominican Republic in 2002 and 31 percent in Colombia in 2005. The pill, IUD, periodic abstinence, and withdrawal were all widely used in Colombia, but use decreased between the two survey periods for all of these methods. At the same time, use of the injectable and male condom became more common in Colombia. In the Dominican Republic, female sterilization and pill use are both on the rise.

The contraceptive implant is not widely used outside of Indonesia, where implant use is decreasing. Female condom use is almost nonexistent in the countries that asked about this method. Similarly, proportions of LAM and vaginal method users are also low, though these methods were not specifically asked about in every survey.

The contraceptive method mix is of particular interest in this study due to the close relationship between discontinuation and method type. Figure 2.2 shows the contraceptive method mix in each country among contraceptive users, scaled to show the percentage of all contraceptive use in a country that is attributable to each method. Zimbabwe, Armenia, Egypt, Colombia, and the Dominican Republic all have method mixes that are heavily skewed toward one method. In Zimbabwe, approximately 70 percent of the CPR was pill use at both time points. In Egypt, over 60 percent of contraceptive use was due to IUDs, which tend to be used for long periods of time and usually require action on the part of the user to discontinue. Because of this skew in method mix, we expect to see lower discontinuation and failure rates in Egypt. On the other hand, we expect to see much higher failure rates in Armenia, where over half of the CPR was attributable to withdrawal, a method that is not highly effective in preventing pregnancy. There was also considerable use of traditional methods in Kenya, Bangladesh, and Colombia. Female sterilization comprises about two-thirds of the CPR in the Dominican Republic and over one-third of the CPR in Colombia.

In Zimbabwe, Colombia, and the Dominican Republic, the method mix grew increasingly skewed toward one method between surveys. As the CPR decreased along with the percentage of women using withdrawal in Armenia, the percentage of CPR made up of withdrawal remained almost exactly the same.

Figure 2.2: Contraceptive method mix among currently married contraceptive users 15-49



Other modern methods include male sterilization, implants, LAM, and vaginal methods

Table 2.4 shows the proportion of women in each of the most recent surveys who contributed at least one episode of contraceptive use to the contraceptive episode dataset. Only the findings from the most recent surveys are shown in this table, but reasons for exclusion from contraceptive episode-based analysis were similar between the two surveys for each country.

Table 2.4: Characteristics of sample: Percentage of married women 15-49 who were included in the events-based analysis and reason for exclusion among those excluded, most recent DHS surveys 2002-06

	Kenya 2003	Zimbabwe 2005-06	Armenia 2005	Egypt 2005	Bangladesh 2004	Indonesia 2002-03	Colombia 2000	Dominican Republic 2002
Included in episode-based analysis	**44.5**	**67.0**	**39.3**	**55.4**	**58.8**	**48.9**	**52.5**	**41.6**
Reason excluded from events-based analysis:								
Never used contraception	35.8	12.8	24.5	18.8	16.7	18.4	3.8	10.7
No contracep ive use during period of observation	9.8	11.8	15.3	8.9	8.9	13.4	8.3	6.1
Only contraceptive use during period of observa ion was sterilization	4.1	1.9	0.6	1.1	5.0	3.5	24.8	39.9
Used same method of contraception throughout period of observation[1]	5.8	6.6	20.4	16.3	10.5	15.6	10.6	1 8
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Number of women	4,876	5,118	4,112	18,134	10,390	27,784	20,087	14,504

[1] Excludes sterilization. Includes women whose only episode of contraceptive use during the calendar period was ongoing when the calendar began.

The majority of women in Zimbabwe, Egypt, Bangladesh, and Colombia had at least one episode of contraceptive use during the period of observation, and so are included in further analyses. Just under half of the women in the Indonesia sample are included in the rest of the analyses in this report. Approximately 39 to 45 percent of women in Kenya, Armenia, and the Dominican Republic samples are included. The most common reason for exclusion from contraceptive episode-based analysis in most countries is never having used contraception. In Colombia, however, 25 percent of women had only used sterilization during the period of observation. Forty percent of Dominican women are excluded from contraceptive episode-based analysis for the same reason. Between 6 and 15 percent of women in all countries had used contraception in their lifetime, but not in the last five years. An additional 2 to 20 percent of women were using contraception when the calendar began and this was the only episode of use during the period of interest and/or used the same contraceptive method throughout the entire five-year period. These women could not be included in the episode-based analyses because we cannot establish when they began to use contraception and, therefore, the duration of use. Almost all (94 to 100 percent) women in this category used the same reversible method throughout the calendar period (data not shown).

As noted previously, one woman may have started and stopped contraception several times during the period of observation. In the next section, we include all episodes of use during the period of observation. Sample sizes reported are for episodes of use, which are greater than the number of women.

3

Reasons for Discontinuation and Discontinuation Rates

3.1 Reasons for Discontinuation

Table 3.1 shows the reason for discontinuation of all episodes of discontinuation during the five years preceding the survey. Reasons for discontinuation are grouped by whether they represent discontinuations due to reduced need for contraception ("not in need") or discontinuations while women were presumably still exposed to the risk of pregnancy and did not want to become pregnant ("in need").

Among discontinuations that were not in need, the most common reason given was wanting to become pregnant, ranging from 10 percent in Armenia in 2000 to 41 percent in Zimbabwe in 2005-06. The only exception was Armenia 2005, where 16 percent of discontinuations were said to be due to infrequent sex or husband's absence. Five years earlier in Armenia (2000) only 4 percent of discontinuations were for this reason. This increase was investigated by Johnson (2007), who found the change to be primarily attributable to out-migration of men for work.[15] Less than 2 percent of contraceptive use episodes were discontinued due to marital dissolution.

Among in-need discontinuations, the most common reasons given were that women became pregnant while using the method (contraceptive failure) or that they stopped using the method because of side effects. The percentage of discontinuations due to side effects ranged from 2 percent in Armenia to 37 percent in Egypt. The percentage due to failure is almost the opposite of the percentage due to side effects. The proportion of discontinuations due to failure was highest in Armenia (58 percent of all discontinuations in 2000 and 46 percent in 2005) and lowest in Egypt (9 to 10 percent). The high proportions of discontinuations due to failure, as well as the low proportion of discontinuations due to side effects in Armenia can be explained by the heavy reliance on withdrawal. This method is not an effective method of contraception[16] but has few, if any, side effects. The percentage of discontinuations because women wanted a more

[15] Infrequent sex and subfecundity are not externally validated, as with all reasons for discontinuation. However, preliminary analyses indicated that reports of non-use or discontinuation due to infrequent sex were particularly incompatible with women's actions. For example, approximately 30 percent of women in Kenya and Zimbabwe who reported they were not currently using contraception due to infrequent sex also reported intercourse within the last two weeks; in Indonesia over 30 percent of women who were not using contraception for this reason reported intercourse within the last seven days, and many reported sex the prior day. We note, therefore, that reported "infrequent sex" may be particularly subject to varied interpretation by respondents.

[16] Additionally, women in Armenia may have greater exposure to the risk of failure due to the high abortion rate (2.6 lifetime abortions per woman [National Statistical Service et al., 2006]). Women who fail and have an abortion return to a state in which they are again exposed to the risk of pregnancy (and if they use contraception again, the risk of failure) much more quickly than women who fail and carry the pregnancy to term. In countries where abortions are not as readily available nor socially acceptable, carrying pregnancies to term is more common, which removes women from the risk of subsequent pregnancies for the entire duration of the pregnancy and period of postpartum insusceptibility.

Table 3.1: Percent distribution of reasons for discontinuation among married women 15-49 who discontinued at least one contraceptive method in the last five years, all methods except sterilization, DHS surveys 1996-2006

	Not in need				In need										
					Failure	Health and side effects		Method-related		Cost/access		Opposition			
	Wanted to become pregnant	No/ infrequent sex/husband away	Marital dissolution/ separation	Difficult to get pregnant/ menopause	Became pregnant while using	Side effects	Health concerns	Wanted more effective method	Inconvenient to use	Lack of access/ too far	Costs too much	Husband opposed	Other/ don't know	Total	Number of episodes
Sub-Saharan Africa															
Kenya 1998	26.1	3.4	0.0	0.1	18.7	20.9	4.3	5.1	4.0	1.5	0 5	4.4	11.0	100.0	1,383
Kenya 2003	23.8	2.8	0.3	0.3	17.2	28.7	3.5	4.0	3.8	2.1	1 0	4 9	7.7	100.0	1,674
Zimbabwe 1999	35.0	2.1	0.3	0.3	13.0	12.4	7.0	5.3	2.7	4.7	3 5	4 3	9.2	100.0	1,589
Zimbabwe 2005-06	40.8	3.8	0.5	0.4	14.7	10.6	4.6	4.5	5.9	3.9	0.6	2 3	7.4	100.0	2,296
North Africa/West Asia/Europe															
Armenia 2000	9.7	4.4	0.0	0.4	57.6	1.8	4.5	8.6	2.9	0.7	0 9	3 3	5.2	100.0	2,320
Armenia 2005	14.9	15.9	0.0	0.3	46.1	1.7	3.4	5.6	3.0	0.1	1.6	2 9	4.4	100.0	1,221
Egypt 2000	26.4	6.9	0.1	0.3	9.0	37.4	4.4	5.7	2.8	0.3	0.1	0 8	5.8	100.0	5,326
Egypt 2005	25.9	8.3	0.2	0.4	9.6	35.4	1.8	5.9	7.5	0.3	0.1	0 5	4.1	100.0	8,322
South/Southeast Asia															
Bangladesh 1999-2000	18.9	5.0	0.0	0.2	9.7	30.4	7.3	5.6	3.1	2.6	0.6	6 9	9.6	100.0	5,404
Bangladesh 2004	20.0	9.2	0.1	0.8	10.7	28.1	5.9	6.9	5.4	1.9	0 3	7 0	3.8	100.0	6,736
Indonesia 1997	28.4	2.2	0.3	0.3	12.0	18.9	17.8	7.8	1.9	1.2	3.4	0 8	5.0	100.0	7,115
Indonesia 2002-03	29.1	1.7	0.4	0.3	10.0	18.5	11.8	9.4	2.6	0.9	2.4	0.4	12.5	100.0	7,103
Latin America and the Caribbean															
Colombia 2000	14.0	3.5	0.5	0.1	20.9	17.7	2.1	20.0	7.2	1.0	2 5	3 0	7.5	100.0	4,299
Colombia 2005	14.1	2.3	0.8	0.5	21.1	18.4	5.2	18.4	7.3	1.5	3.4	2.4	4.6	100.0	12,047
Dominican Republic 1996	18.7	6.4	1.8	0.1	15.2	23.2	4.1	9.0	2.5	1.2	0 5	5.1	12.4	100.0	2,878
Dominican Republic 2002	18.4	4.5	1.6	0.2	14.5	22.0	5.8	8.0	5.1	2.5	0 5	3 0	13.8	100.0	7,376

effective method was under 10 percent in every country except Colombia, where 18 to 20 percent of women discontinued for this reason.

In most countries, discontinuations due to side effects decreased or remained stable over time. The only exception is Kenya, where the proportion of discontinuations attributable to side effects increased from 21 percent in 1998 to 29 percent in 2003. Discontinuations due to health concerns decreased between surveys in every country except Colombia and the Dominican Republic. Discontinuations because the method was "inconvenient to use" increased between time points in Zimbabwe, Egypt, Bangladesh, and the Dominican Republic.

There were few discontinuations due to cost and access issues. The highest percentage of discontinuations due to cost were in Zimbabwe, in which the percentage decreased from 4 to 1 percent between 1999 and 2005-06. Husband's opposition was cited as the reason for 7 percent of discontinuations in Bangladesh and 2 to 5 percent in Kenya, Zimbabwe, Armenia, Colombia, and the Dominican Republic.

Reasons for discontinuation broken down by common methods (pills, injectables, IUDs, male condoms, and traditional methods) are shown in Appendix Table 2.

3.2 Discontinuation Rates

Table 3.2.1 presents 12-month discontinuation rates for all methods combined, excluding female sterilization. For calculating discontinuation rates, all reasons for discontinuation due to reduced/no need have been grouped into one "not in need" category. We present the total 12-month discontinuation rate, or percentage of contraceptive users who discontinue a reversible method for any reason in the first year of use. We also present the 12-month rate of discontinuations for any reason other than reduced need, or the in-need discontinuation rate. The in-need discontinuation rates are the sum of the discontinuation rates for any reason other than "not in need."

The overall 12-month discontinuation rates are highest in the Dominican Republic (63 to 65 percent), Bangladesh (49 percent), and Colombia (44 to 53 percent). The highest in-need discontinuation rates are also found in these same countries, ranging from 36 to 47 percent. Discontinuations in the first year for any reason have remained stable or decreased between time points in all countries studied except for slight increases in Egypt (from 30 to 32 percent), and Kenya (from 33 to 36 percent). The total 12-month discontinuation rate for all methods is lowest in Zimbabwe (18 percent).

In Kenya, the increase in the overall discontinuation rate is attributable to an increase in the percentage of women discontinuing because of health and side effects, from 9 to 14 percent, and a slight increase in the percentage of women discontinuing because of cost and access issues. The highest reason-specific discontinuation rates across countries were health and side effects, reduced need, failure, and method-related reasons ("inconvenient to use" or "wanted a more convenient method"). Method-related reasons for discontinuation were highest in the Dominican Republic and Colombia. Colombia was the only country where the method-related discontinuation rate is greater than any other discontinuation rate.

One-year discontinuation rates for all methods due to failure were highest in Armenia, which is not surprising given the high levels of withdrawal use in that country. The all-method failure rate dropped substantially over time in Armenia, however, from 23 percent in 2000 to 15 percent in 2005. Failure rates are also high at 8 to 11 percent in Colombia and the Dominican Republic. Zimbabwe and Indonesia have the lowest all-method failure rates at less than 3 percent.

The increase in the discontinuation rate due to health and side effects in Kenya is notable. In all other countries, this rate decreased or remained steady. The 12-month discontinuation rate due to cost and access issues remains low in all countries. Four percent of women in Bangladesh discontinued because of their husband's opposition in the first year of use.

Table 3.2.1: 12-month discontinuation rate by reason for discontinuation, all methods except female sterilization, among married women 15-49, DHS surveys 1995-2006

	Not in need[1]	Failure	Health and side effects	Method-related[2]	Cost/ access	Husband opposed	Other/DK[3]	In need[4]	Total 12-month discontinuation rate	Number of episodes[5]
Sub-Saharan Africa										
Kenya 1998	7.2	6.0	9.0	4.1	0.9	2.1	3.4	25.4	32.7	2,597
Kenya 2003	7.0	5.8	13.5	3.2	1.5	2.0	3.0	28.9	36.0	2,964
Zimbabwe 1999	4.8	1.7	4.9	2.2	1.6	1.1	1.9	13.4	18.3	3,040
Zimbabwe 2005-06	6.0	2.2	3.7	2.6	0.9	0.7	1.6	11.8	17.7	4,692
North Africa/West Asia/Europe										
Armenia 2000	4.8	22.9	1.8	5.9	0.8	1.3	2.4	35.1	39.9	3,767
Armenia 2005	8.7	14.8	1.1	3.5	0.4	0.9	1.2	21.9	30.6	2,386
Egypt 2000	7.2	3.0	14.2	3.1	0.2	0.3	1.6	22.3	29.5	10,475
Egypt 2005	8.3	3.3	13.6	5.0	0.2	0.2	1.5	23.8	32.0	15,025
South/Southeast Asia										
Bangladesh 1999-2000	10.4	4.2	19.5	4.6	1.6	3.8	4.6	38.3	48.7	8,415
Bangladesh 2004	13.6	4.6	17.6	6.6	1.1	4.1	1.8	35.7	49.3	10,359
Indonesia 1997	6.5	2.8	9.9	2.7	0.8	0.2	1.1	17.5	24.1	16,837
Indonesia 2002-03	5.4	2.1	7.2	2.8	0.6	0.1	2.5	15.4	20.8	17,563
Latin America and the Caribbean										
Colombia 2000	8.2	10.9	10.1	16.0	1.8	1.7	3.8	44.3	52.6	6,697
Colombia 2005	6.6	8.8	10.4	12.6	2.2	1.1	2.1	37.2	43.8	20,714
Dominican Republic 1996	15.7	9.9	17.5	7.4	1.1	3.6	7.8	47.3	63.0	4,464
Dominican Republic 2002	11.2	7.6	16.0	8.0	1.7	2.1	8.0	43.4	54.6	11,935

[1] Not in need includes "wanted to become pregnant," reported sub/infecundity, and no or infrequent sex.

[2] Method-related includes "inconvenient to use" and "wanted more effective method."

[3] Other/DK includes all responses other than those listed above, and women who said they did not know or remember why they discontinued.

[4] In need includes failure, health and side effects, method-related, cost/access, husband opposed, and other/DK.

[5] Number of episodes for discontinuation rates includes both episodes of discontinuation during the period of observation (the numerator) and episodes of use that were not discontinued during the period of observation (the denominator).

Table 3.2.2 breaks down the 12-month discontinuation rates further, examining reasons for discontinuing the most commonly used methods: pills, injectables, IUDs, male condoms, and traditional methods.

Pills

More than 30 percent of pill users discontinued the method within the first year in every country analyzed except Zimbabwe. In Egypt, Bangladesh, Colombia, and the Dominican Republic, this figure ranges from 45 to 58 percent. In Zimbabwe, however, there were far fewer pill discontinuations within the first year of use, 14 percent during both time points. Discontinuations for any reason other than reduced need remained stable or decreased between time points in

every country except Kenya, where the in-need discontinuation rate increased from 30 to 37 percent between time points.

Pill failure rates and discontinuation rates due to health and side effects were much lower in Zimbabwe than in any other country studied. Over 15 percent of pill users discontinued in the first year due to health and side effects in every country except Zimbabwe and Indonesia. Not in-need pill discontinuation rates range from 9 to 19 percent outside sub-Saharan Africa, indicating that women in these regions are likely using the pill predominantly for spacing births.

Injectables

The total discontinuation rates for injectables remained steady or decreased in every country studied except Kenya. In Kenya, 22 percent of users discontinued the injectable within the first 12 months of use in the 1998 survey, while 32 percent of users did so according to data collected in 2003. Total 12-month discontinuation rates for injectables varied widely, from 18 percent in Indonesia 2002-03 to 67 percent in the Dominican Republic in 2002. The variability in these rates may be due in part to greater availability of monthly injectables in Latin American countries than in other regions. Outside of Latin America, one-month injectables may not have been widely available until recently.[17] This possibility is supported by the high injectable failure rates seen in Colombia and the Dominican Republic of 5 to 6 percent, compared with failure rates under 1.5 percent in all other countries. Although clinical failure rates for one-month and three-month injectables are assumed to be similar (WHO/RHR and CCP, 2007), delays in receiving an injection will increase the likelihood of failure. As the risk of late injection increases from four times per year with a three-month injectable to 12 times per year with a one-month injectable, it is not surprising that we see higher overall discontinuation and failure rates in countries where one-month injectables may have been more widely available.

Discontinuation rates due to reduced need are consistently lower for injectables than for pills, except in Zimbabwe where the rates are the same. Discontinuation of injectables due to health and side effects are particularly high in Egypt, Bangladesh, Colombia, and the Dominican Republic, where 23 to 37 percent of users discontinue due to health concerns/side effects in the first year of use. Injectable discontinuation due to health and side effects is comparatively low in Zimbabwe and Indonesia at less than 14 percent. In Kenya, injectable discontinuations due to health concerns or side effects increased from 12 to 20 percent between surveys, leading to an increase in the in-need discontinuation rate from 17 to 26 percent. Discontinuation rates due to cost and access issues were slightly higher for injectables than for pills, particularly in Zimbabwe, Bangladesh, Colombia, and the Dominican Republic.

[17] According to the 2005 Colombia survey manager, the one-month injectable was likely widely available in both Colombia and the Dominican Republic, at least at the time of the most recent surveys. We cannot, however, document exactly when the one-month injectable became available, and DHS surveys do not ask separately about one-month versus three-month injectables. Though this interpretation is speculative, the much higher failure and other discontinuation rates for injectables in Colombia and the Dominican Republic gives credence to our speculation that some or most injectable users in these countries were using a one-month injectable.

IUD

The 12-month discontinuation rate for IUDs is generally low—less than 18 percent in most countries studied; however, it is between 29 and 36 percent in Bangladesh and the Dominican Republic. As IUDs require active participation of the user to remove (except in cases of IUD expulsion) it is expected that these rates would be lower than rates for methods that can be discontinued passively (i.e., by simply not taking a pill, getting an injection, or using a condom).

IUD discontinuations due to reduced need range from 1 to 4 percent. The failure rate is similarly low, ranging from 1 to 5 percent. Surprisingly, over 30 percent of IUD users in Bangladesh and 14 to 24 percent in the Dominican Republic discontinued the method within the first year of use due to side effects. Discontinuations due to cost, access, opposition, or other reasons (including IUD expulsion) were quite low at less than 3 percent in all countries studied.

Male condom

Total discontinuation rates for the male condom are higher on average than for any other method. Over half of condom users discontinued within the first year in every country except Armenia, Indonesia, and Egypt in 2005. Nearly two-thirds of condom users in Kenya, Bangladesh, and the Dominican Republic discontinued the method within 12 months. Total and in-need discontinuation rates for condoms dropped substantially in Armenia, Egypt, Colombia, and the Dominican Republic between surveys. For example, 32 percent of condom users in Armenia discontinued while in need in the first 12 months of use in the period captured by the 2000 survey, but that rate dropped to 19 percent in the 2005 survey.

Discontinuations due to partner opposition are much higher for the condom than for the pill or injectable, which is not surprising given the male involvement required for male condom use. Condom failure rates were high in Egypt and Armenia in 2000 at 13 percent, but in both countries the rate was cut almost in half to 7 percent in 2005.

Condom discontinuation rates due to cost or access problems decreased or remained stable across time points in every country except the Dominican Republic. Unlike hormonal methods, discontinuation of condoms due to health and side effects is low. The only exception is Bangladesh, where the rate was 7 percent in 2004, down from 10 percent in 1999-2000. This surprisingly high rate could possibly be capturing concerns about allergies, similar to a 1990 study that found high reports of allergic reactions to condoms among Bangladeshi women (Ahmed et al., 1990).

Traditional methods

More than one-third of traditional method users stopped using in the first year, except in Zimbabwe and Indonesia, where recent discontinuation rates were 23 and 19 percent, respectively. On average, the most common reasons for discontinuing traditional methods are failure, reduced need, and method-related reasons, which include wanting a more effective method.

Table 3.2.2: 12-month discontinuation rates by reason for discontinuation and method among most common methods used, married women 15-49, DHS surveys 1996-2006

Pills

	Not in need[1]	Failure	Health and side effects	Method-related[2]	Cost/ access	Opposition	Other/DK[3]	In need[4]	Total 12-month pill discontinuation rate	Number of episodes[5]
Sub-Saharan Africa										
Kenya 1998	5.9	2.2	16.8	4.0	1.5	1.7	3.5	29.7	35.6	766
Kenya 2003	6.5	4.0	21.6	4.9	2.2	1.9	2.2	36.7	43.2	810
Zimbabwe 1999	4.2	1.7	3.6	1.6	1.3	0.8	1.2	10.2	14.4	2,015
Zimbabwe 2005-06	5.4	2.2	2.4	1.6	0.8	0.4	0.8	8.2	13.6	3,339
North Africa/West Asia/Europe										
Egypt 2000	15.5	6.0	21.1	3.3	0.3	0.6	1.4	32.6	48.2	2,465
Egypt 2005	16.4	6.7	18.4	5.8	0.5	0.4	1.8	33.7	50.1	3,840
South/Southeast Asia										
Bangladesh 1999-2000	11.2	2.9	22.0	2.6	1.8	1.0	4.5	34.8	46.0	4,146
Bangladesh 2004	15.7	4.0	20.7	3.0	0.5	0.5	1.7	30.4	46.0	5,222
Indonesia 1997	11.7	4.1	11.5	4.3	0.2	0.3	1.3	21.7	33.4	5,329
Indonesia 2002-03	9.0	4.2	8.8	4.7	0.5	0.1	4.3	22.6	31.6	4,777
Latin America and the Caribbean										
Colombia 2000	11.1	7.3	17.5	6.3	2.8	0.2	1.7	35.8	46.8	1,555
Colombia 2005	8.5	5.9	18.2	7.7	3.3	0.2	1.0	36.3	44.8	4,550
Dominican Republic 1996	18.7	6.9	25.0	1.4	1.2	0.6	4.3	39.5	58.1	1,939
Dominican Republic 2002	13.7	6.8	20.2	2.3	1.5	0.6	4.0	35.3	49.1	5,325

Armenia suppressed because <125 unweighted episodes.

Injectables

	Not in need[1]	Failure	Health and side effects	Method-related[2]	Cost/ access	Opposition	Other/DK[3]	In need[4]	Total 12-month injectable discontinuation rate	Number of episodes[5]
Sub-Saharan Africa										
Kenya 1998	4.8	0.8	11.7	0.7	1.0	0.9	2.1	17.2	22.0	703
Kenya 2003	5.7	0.9	19.5	0.5	2.1	1.2	1.9	26.2	31.9	1,039
Zimbabwe 1999	4.3	1.0	13.5	0.4	3.1	0.4	2.3	20.7	24.9	512
Zimbabwe 2005-06	5.4	1.5	11.2	2.3	2.2	0.5	1.4	19.1	24.4	752
North Africa/West Asia/Europe										
Egypt 2000	7.8	0.8	33.9	1.8	0.8	0.4	2.7	40.4	48.2	1,438
Egypt 2005	10.7	1.1	28.2	1.0	0.5	0.3	3.1	34.2	45.0	2,430
South/Southeast Asia										
Bangladesh 1999-2000	4.3	1.3	36.6	0.6	3.1	0.8	3.0	45.4	49.7	1,331
Bangladesh 2004	7.9	0.4	33.6	0.6	3.5	0.5	1.6	40.3	48.2	1,773
Indonesia 1997	4.8	1.6	12.1	1.6	1.7	0.2	0.9	18.1	22.9	7,448
Indonesia 2002-03	4.5	1.1	8.0	1.7	0.9	0.1	1.9	13.6	18.1	9,106
Latin America and the Caribbean										
Colombia 2000	8.7	5.5	31.3	7.5	4.8	0.5	3.2	52.8	61.5	712
Colombia 2005	7.0	6.0	23.2	6.5	4.3	0.3	1.9	42.2	49.2	3,122
Dominican Republic 2002	9.4	5.0	36.7	5.1	4.1	0.2	7.5	58.4	67.8	913

Armenia and the Dominican Republic 1996 suppressed because <125 unweighted episodes.

IUD

	Not in need[1]	Failure	Health and side effects	Method-related[2]	Cost/ access	Opposition	Other/DK[3]	In need[4]	Total 12-month IUD discontinuation rate	Number of episodes[5]
North Africa/West Asia/Europe										
Armenia 2000	0.6	1.4	4.2	na	na	na	na	5.6	6.1	320
Armenia 2005	1.2	0.6	5.1	na	na	na	na	5.8	7.0	305
Egypt 2000	3.7	1.0	8.6	0.2	na	0.0	0.4	10.2	13.9	5,413
Egypt 2005	4.2	1.3	8.8	0.3	0.0	0.0	0.7	11.1	15.3	6,820
South/Southeast Asia										
Bangladesh 1999-2000	2.1	na	30.5	0.8	na	0.9	1.2	33.4	35.5	185
Indonesia 1997	1.2	1.4	7.5	0.4	na	0.1	1.5	10.9	12.1	1,287
Indonesia 2002-03	0.8	0.7	6.0	0.6	na	na	0.9	8.2	8.9	912
Latin America and the Caribbean										
Colombia 2000	1.6	4.2	9.8	1.1	na	0.1	1.0	16.2	17.8	709
Colombia 2005	1.3	2.5	11.0	1.6	0.2	na	0.8	16.0	17.3	2,328
Dominican Republic 1996	4.4	5.1	23.7	0.3	na	na	0.6	29.7	34.2	225
Dominican Republic 2002	2.5	2.4	13.8	5.4	na	1.4	3.4	26.5	28.9	566

Kenya, Zimbabwe, and Bangladesh 2004 suppressed because <125 unweighted episodes.

continued

Table 3.2.2 (continued). 12-month discontinuation rates by reason for discontinuation and method among most common methods used, married women 15-49, DHS surveys 1996-2006

	Male condoms									
	Not in need[1]	Failure	Health and side effects	Method-related[2]	Cost/ access	Opposition	Other/DK[3]	In need[4]	Total 12-month condom discontinuation rate	Number of episodes[5]
Sub-Saharan Africa										
Kenya 1998	19.1	5.4	0.5	14.9	2.1	13.7	8.3	44.9	64.0	188
Kenya 2003	14.0	6.7	na	17.4	1.8	13.3	8.8	47.9	61.9	156
Zimbabwe 2005-06	22.1	4.1	1.5	14.1	0.7	7.6	6.5	34.5	56.6	193
North Africa/West Asia/Europe										
Armenia 2000	7.1	12.9	2.2	5.3	5.0	3.2	2.8	31.5	38.6	451
Armenia 2005	10.4	7.2	0.4	6.5	2.3	2.3	0.6	19.3	29.7	397
Egypt 2000	12.8	13.2	4.2	18.5	na	3.7	0.3	39.9	52.7	190
Egypt 2005	7.8	7.3	2.0	15.6	0.4	1.8	3.4	30.4	38.2	218
South/Southeast Asia										
Bangladesh 1999-2000	15.2	6.5	9.7	11.6	1.4	15.9	6.4	51.5	66.7	1,094
Bangladesh 2004	15.3	6.4	7.0	17.6	1.4	18.9	4.4	55.8	71.1	1,328
Indonesia 1997	8.8	6.6	0.7	13.9	2.2	1.7	3.0	28.0	36.8	217
Indonesia 2002-03	7.2	4.4	2.5	16.3	0.4	0.6	7.3	31.5	38.7	253
Latin America and the Caribbean										
Colombia 2000	7.9	5.7	2.4	29.6	3.7	7.4	2.1	50.8	58.8	822
Colombia 2005	9.8	6.0	1.7	23.7	2.8	4.9	1.7	40.8	50.5	2,794
Dominican Republic 1996	16.4	8.0	2.3	27.7	2.2	14.2	10.6	65.0	81.3	339
Dominican Republic 2002	13.5	2.8	3.4	23.6	4.0	14.4	11.1	59.4	72.9	554

Zimbabwe 1999 suppressed because <125 unweighted episodes.

	Traditional methods									
	Not in need[1]	Failure	Health and side effects	Method-related[2]	Cost/ access	Opposition	Other/DK[3]	In need[4]	Total 12-month traditional method discontinuation rate	Number of episodes[5]
Sub-Saharan Africa										
Kenya 1998	8.9	16.2	0.3	5.3	na	0.9	3.8	26.4	35.3	684
Kenya 2003	9.0	15.7	0.2	2.8	na	1.2	4.8	24.8	33.8	714
Zimbabwe 1999	9.2	2.0	na	5.5	na	2.4	5.6	15.5	24.7	208
Zimbabwe 2005-06	4.3	5.0	0.6	5.5	na	0.8	6.8	18.7	23.0	179
North Africa/West Asia/Europe										
Armenia 2000	4.9	27.8	0.8	3.2	0.1	1.4	0.4	33.7	38.7	2,439
Armenia 2005	9.4	19.8	0.2	2.5	na	0.7	1.3	24.5	33.9	1,531
Egypt 2000	3.2	6.8	0.4	19.4	na	na	8.0	34.7	37.8	795
Egypt 2005	2.4	6.8	0.6	31.6	na	0.1	1.6	40.7	43.2	1,414
South/Southeast Asia										
Bangladesh 1999-2000	11.2	9.7	3.5	9.2	0.3	5.8	5.3	33.8	45.0	1,484
Bangladesh 2004	13.4	10.0	0.6	15.7	0.0	7.6	0.4	34.3	47.7	1,727
Indonesia 1997	7.8	10.7	0.4	7.1	0.1	1.0	0.8	20.0	27.8	802
Indonesia 2002-03	6.8	4.8	0.6	4.2	0.4	0.3	1.7	11.9	18.8	915
Latin America and the Caribbean										
Colombia 2000	9.4	20.8	0.7	24.4	na	1.8	3.3	51.0	60.5	1,902
Colombia 2005	6.5	18.7	0.4	17.2	0.1	1.3	0.9	38.7	45.2	3,994
Dominican Republic 1996	16.0	21.1	1.2	14.1	0.2	7.5	9.8	53.8	69.8	869
Dominican Republic 2002	9.6	14.5	1.7	18.5	0.8	4.2	11.7	51.4	61.0	1,871

[1] Not in need includes "wanted to become pregnant," reported sub/infecundity, and no or infrequent sex.

[2] Method-related includes "inconvenient to use" and "wanted more effective method."

[3] Other/DK includes all responses other than those listed above, and women who said they did not know or remember why they discontinued.

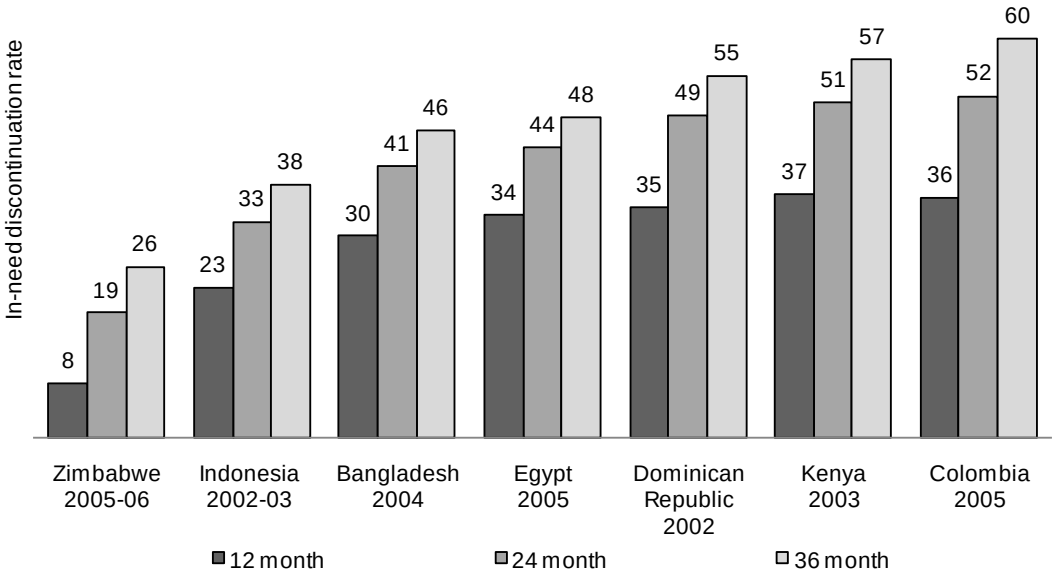
[4] In need includes failure, health and side effects, method-related, cost/access, husband opposed, and other/DK.

[5] Number of episodes for discontinuation rates includes both episodes of discontinuation during the period of observation (the numerator) and episodes of use that were not discontinued during the period of observation (the denominator).

In-need discontinuation rates at one, two, and three years of use

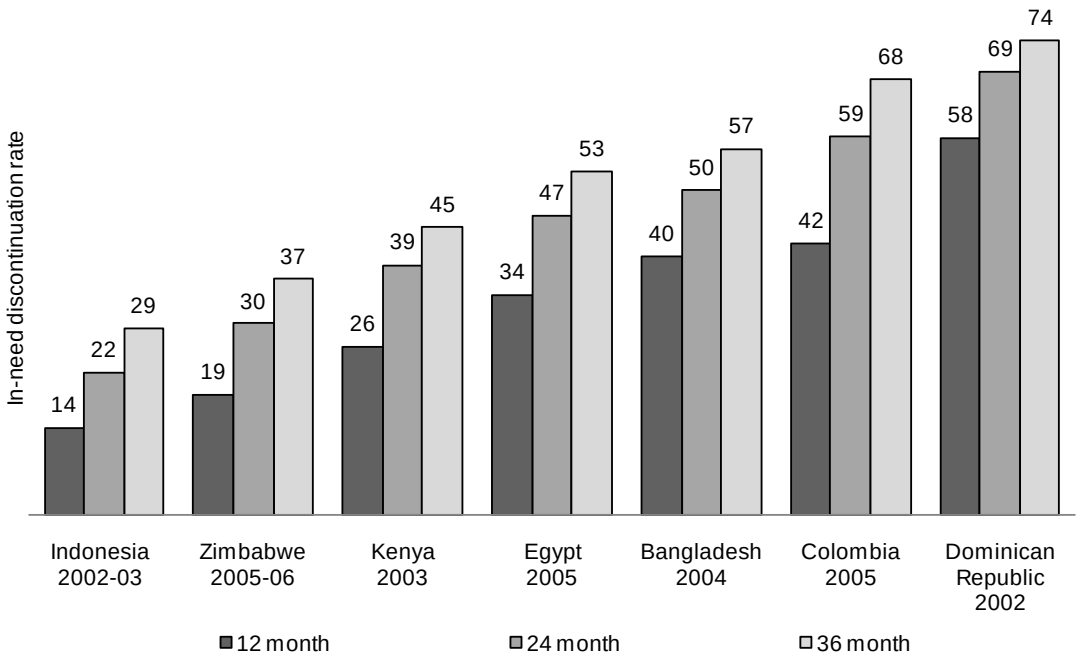
Figures 3.2.1 to 3.2.5 present the 12-, 24-, and 36-month discontinuation rates of commonly used methods for all reasons other than reduced need for the most recent surveys from each country. As shown in Figure 3.2.1, the proportion of users who discontinue pills in the first year while still in need of contraceptives ranges from 8 percent in Zimbabwe to 37 percent in Kenya. The 12-month in-need discontinuation rate for pills in Zimbabwe is less than half of the rate in any other country. By 24 months after the start of use, over 40 percent of pill users in Bangladesh, Egypt, and the Dominican Republic stopped using the method while still in need. The same was true for more than half of users in Kenya and Colombia.

Figure 3.2.1: 12-, 24-, and 36-month in-need discontinuation rates for contraceptive pills



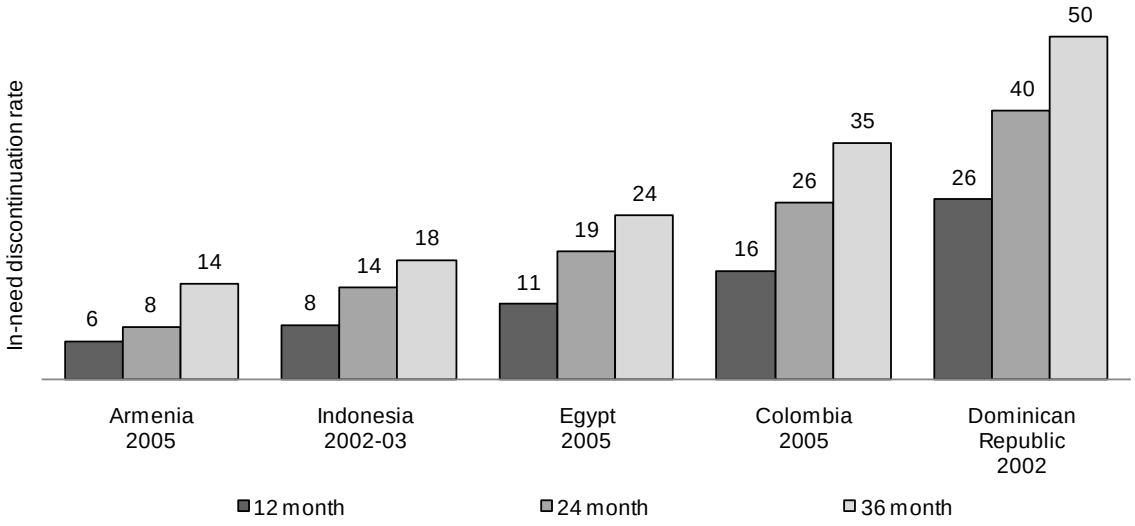
As shown in Figure 3.2.2, in-need discontinuation rates for injectables were much higher in the Dominican Republic at each time point than in the other countries analyzed. By 12 months after beginning injectable use, 58 percent of women in the Dominican Republic discontinued the method for reasons other than reduced need. This was higher than the in-need discontinuation rate after three years of use in Indonesia, Zimbabwe, Kenya, Egypt, and Bangladesh. More than one out of three injectable users discontinue for reasons other than reduced need during the first year of use in Egypt, Bangladesh, Colombia, and the Dominican Republic. By 36 months, two out of every three injectable users in Colombia and the Dominican Republic discontinued while still in need.

Figure 3.2.2: 12-, 24-, and 36-month in-need discontinuation rates for injectables



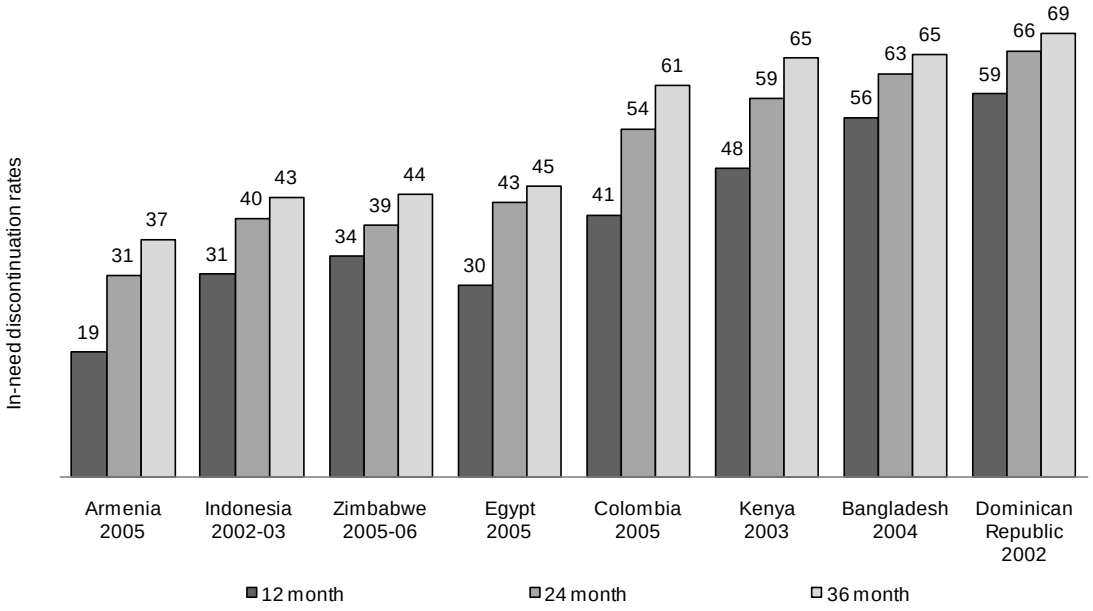
As seen with the 12-month discontinuation rates, in-need IUD discontinuations are substantially lower than those for other methods. Armenia has the lowest in-need discontinuation rates at all time points, while the Dominican Republic has the highest. Half of IUD users in the Dominican Republic have discontinued the method after three years of use, while in Armenia only 14 percent have done so.

Figure 3.2.3: 12-, 24-, and 36-month in-need discontinuation rates for IUDs



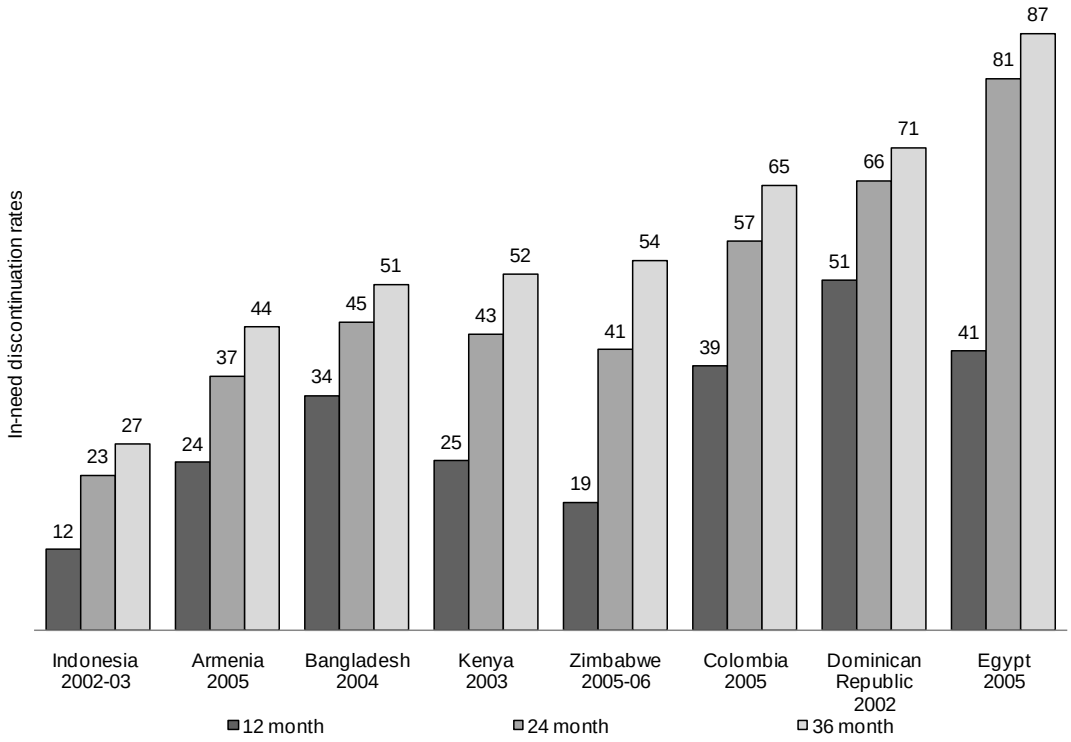
At least one-third of male condom users in all countries except Armenia, Indonesia, and Egypt discontinued for reasons other than reduced need within the first year (Figure 3.2.4). Over half discontinued in the first year in Bangladesh and the Dominican Republic and within the first two years in Colombia and Kenya. Two out of every three users discontinued while in need by 36 months in Kenya, Bangladesh, and the Dominican Republic. Condom discontinuation rates are noticeably lower at all time points in Armenia, Indonesia, Zimbabwe, and Egypt than in the other countries studied. This finding is of particular note, considering the low prevalence of condom use in these countries: 8 percent in Armenia and 1 percent in Indonesia, Zimbabwe, and Egypt. Though condom failure rates are relatively high in Armenia, Indonesia, and Egypt, failures have also decreased over time in all three of these countries. Together, these findings suggest that, although condoms are being used by small populations of women in Armenia, Indonesia, and Egypt, women and couples who do select them are able to use condoms quite effectively.

Figure 3.2.4: 12-, 24-, and 36-month in-need discontinuation rates for male condoms



Discontinuation rates for traditional methods vary across countries (Figure 3.2.5). While less than one-third of traditional method users in Indonesia discontinued while in need within 36 months, discontinuation while in need was quite common in Egypt by that time (87 percent). The latter finding is likely attributable at least in part to the inclusion of "prolonged breastfeeding" as a traditional method in Egypt. In every country except Indonesia, more than one in three users of traditional methods discontinued within 24 months of use while still in need. The jump in in-need discontinuation rates between 12 and 24 months in Zimbabwe and in Egypt are notable. In Zimbabwe, 19 percent of users discontinued by 12 months, and over double that percentage—41 percent—discontinued by 24 months. In Egypt, rates are much higher but the change is still quite large: 41 percent of traditional method users discontinued while in need during the first year of use, while by two years 81 percent of users—nearly double again—had abandoned traditional methods while in need.

Figure 3.2.5: 12-, 24-, and 36-month in-need discontinuation rates for traditional methods



3.3 Types of Discontinuation

In the next several tables, we examine contraceptive discontinuations by discontinuation type: abandonment while in need; switching between different methods; failure; and abandoning a method while not in need. To understand the switching rate, we first examine the types of methods switched to and from.

Table 3.3.1 shows the distribution of switching episodes by method type, disaggregated by whether women switched to a method that was more or less effective than their current method. The percentage of switching events in which a woman switched to a more effective method increased slightly over time in every country studied. The majority of switches were to a more effective method in all countries except Bangladesh and Indonesia. Over 80 percent of switches in Indonesia were between hormonal contraceptives. As hormonal contraceptives are still much more effective than barrier or traditional methods, these switches are unlikely to have a great demographic impact. In Bangladesh, however, 13 to 15 percent of switches were from hormonal to traditional methods, which have much higher failure rates. Switches from hormonal to traditional methods were also over 10 percent in Kenya (2003), Armenia (2005), and both time points in Colombia and the Dominican Republic.

Table 3.3.1: Distribution of method types switched from and to among married women 15-49, DHS surveys 2002-06

	Kenya 1998	Kenya 2003	Zimbabwe 1999	Zimbabwe 2005-06	Armenia 2000	Armenia 2005	Egypt 2000	Egypt 2005	Bangladesh 1999-2000	Bangladesh 2004	Indonesia 1997	Indonesia 2002-03	Colombia 2000	Colombia 2005	Dominican Republic 1996	Dominican Republic 2002
Switch to more effective[3]	**58.1**	**59.3**	**64.0**	**65.5**	**56.0**	**61.3**	**57.3**	**59.2**	**49.0**	**49.8**	**41.8**	**42.2**	**61.2**	**63.7**	**55.2**	**59.2**
Any method to sterilization	2.1	0.8	1.9	0.2	1.0	0.0	0.4	0.1	0.5	0.6	0.8	1.0	5.6	12.0	4.8	6.4
Less effective hormonal to more effective hormonal[1]	32.4	39.3	38.5	46.2	0.5	2.6	36.2	37.3	17.9	19.1	36.6	33.6	9.2	13.5	8.5	12.3
Barrier to hormonal	7.9	7.0	4.5	8.0	3.9	11.0	4.1	2.0	16.3	15.8	1.3	1.9	12.8	13.5	12.0	7.1
Traditional to hormonal	8.7	9.1	5.0	2.7	16.0	20.2	15.7	19.4	11.0	10.1	2.7	2.8	18.1	11.9	17.2	20.8
LAM to hormonal	-	-	9.1	7.1	1.6	4.9	-	-	0.1	-	-	1.7	4.3	6 0	3.1	6.1
Traditional to barrier	4.3	2.2	1.8	0.3	10.0	8.5	0.2	0.3	2.0	3.1	0.2	0.5	4.6	3 2	4.8	2.5
Switch to less effective[3]	**41.9**	**40.7**	**36.0**	**34.5**	**44.0**	**38.7**	**42.7**	**40.8**	**51.0**	**50.2**	**58.2**	**57.8**	**38.8**	**36.3**	**44.8**	**40.8**
More effective hormonal to less effective hormonal[2]	18.7	22.0	24.7	23.1	0.8	2.0	37.1	36.1	16.1	16.7	50.8	50.1	8.9	12.8	7.2	11.0
Hormonal to barrier	9.8	4.6	5.2	5.3	2.2	10.0	3.1	2.1	15.0	13.1	1.3	1.6	8.2	8 2	8.9	6.8
Hormonal to traditional	6.5	11.3	3.7	3.0	9.1	11.4	2.0	2.5	14.6	14.3	5.3	5.4	12.3	10.8	17.8	13.4
Barrier to traditional	5.3	2.1	-	0.8	9.9	13.4	0.4	0.1	4.1	5.0	0.5	0.3	5.7	2 8	4.8	4.0
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Number of episodes of switching[3]	229	288	298	349	350	145	1,413	2,370	2,130	2,878	2,682	2,510	1,980	5,048	710	1,814

[1] Less effective to more effective hormonal methods include switching from pills to injectables, IUD, or implant; injectables to IUD or implant; or IUD to implant.

[2] More effective to less effective hormonal methods include switching from an implant to pills, injectables, or IUD; IUD to pills or injectables; or injectables to pills.

[3] Includes switches within traditional methods and within barrier methods not shown separately in table.

Switches to sterilization were rare during the period of observation outside of Colombia and the Dominican Republic. Switches from barrier to hormonal methods are relatively common, and increased in Armenia from 4 to 11 percent of switches between surveys. Over 15 percent of switches are from traditional to hormonal methods in Armenia, Egypt, Colombia, and the Dominican Republic, increasing between time points in all of those countries except Colombia. Less than 5 percent of switches were from traditional to barrier methods in every country except Armenia.

By far, the most common reason for switching to a less effective method was health concerns or side effects (Table 3.3.2). This result suggests that better counseling in these areas has the potential to greatly decrease these types of switches. As expected, wanting a more effective method was a common reason for switching to a more effective method. Interestingly, in every country some women who switch to a less effective method say they made the switch because they wanted a more effective method. In most cases, these were switches between hormonal methods, largely from injectables to pills. In the Armenia 2000 survey, however, where 35 percent of switches to a less effective method were ostensibly because the woman wanted a more effective one, almost all switches in this category were between traditional methods.

"Method inconvenient to use" was a common reason given, particularly for switching to a more effective method. Problems with access to contraceptives, poor availability, or high cost of the method was the reason given for 9 to 16 percent of switches to a less effective method in Zimbabwe, Armenia, and Colombia.

Table 3.3.2: Distribution of reasons for discontinuation among episodes of switching by type of switch, married women 15-49, DHS surveys 2002-06

	Reduced need	Health and side effects	Wanted more effective method	Method inconvenient to use	Cost/ access	Husband opposed	Other/ DK	Total	Number of episodes of switching
Switch to a more effective method									
Sub-Saharan Africa									
Kenya 1998	0.4	35.6	35.8	15.2	2.3	2.5	8.3	100.0	133
Kenya 2003	0.5	34.1	27.8	19.9	2.1	3.3	12.3	100.0	170
Zimbabwe 1999	0.6	27.1	36.2	11.9	4.3	6.3	13.6	100.0	191
Zimbabwe 2005-06	0.0	30.3	30.9	17.0	3.8	1.0	17.1	100.0	229
North Africa/West Asia/Europe									
Armenia 2000	0.0	6.2	62.5	8.8	0.7	9.3	12.6	100.0	196
Armenia 2005	0.0	3.1	61.8	10.8	0.0	14.9	9.5	100.0	89
Egypt 2000	0.0	50.1	30.0	11.0	0.0	0.3	8.6	100.0	810
Egypt 2005	0.0	42.1	28.4	22.3	1.4	0.5	5.3	100.0	1,404
South/Southeast Asia									
Bangladesh 1999-2000	0.9	38.0	21.6	9.2	2.5	18.0	9.9	100.0	1,044
Bangladesh 2004	0.2	30.8	27.6	15.8	1.7	19.4	4.5	100.0	1,433
Indonesia 1997	0.4	45.8	33.9	4.4	7.7	2.0	5.7	100.0	1,122
Indonesia 2002-03	0.0	35.4	41.3	4.1	4.8	0.4	14.0	100.0	1,058
Latin America and the Caribbean									
Colombia 2000	0.1	13.5	63.3	6.7	0.9	4.2	11.2	100.0	1,211
Colombia 2005	1.0	17.9	61.0	7.1	2.6	4.4	6.0	100.0	3,216
Dominican Republic 1996	0.0	12.9	51.9	8.4	0.3	9.3	17.2	100.0	392
Dominican Republic 2002	0.9	16.7	42.5	8.7	1.9	6.9	22.5	100.0	1,073

continued

Table 3.3.2 (continued). Distribution of reasons for discontinuation among episodes of switching by type of switch, married women 15-49, DHS surveys 2002-06

	Reduced need	Health and side effects	Wanted more effective method	Method inconvenient to use	Cost/ access	Husband opposed	Other/ DK	Total	Number of episodes of switching
Switch to a less effective method									
Sub-Saharan Africa									
Kenya 1998	6.6	66.2	8.6	3.5	2.5	5.5	7.1	100.0	96
Kenya 2003	0.6	76.3	3.4	2.6	1.5	5.6	10.0	100.0	117
Zimbabwe 1999	1.0	72.7	1.8	3.6	11.9	4.0	4.9	100.0	107
Zimbabwe 2005-06	0.0	56.6	7.6	6.5	16.3	3.7	9.4	100.0	120
North Africa/West Asia/Europe									
Armenia 2000	0.0	25.7	35.1	9.6	9.0	9.2	11.3	100.0	154
Armenia 2005	0.0	59.9	5.6	6.1	14.7	13.0	0.7	100.0	56
Egypt 2000	0.4	91.3	3.1	0.7	1.3	0.5	2.7	100.0	604
Egypt 2005	0.2	89.9	2.0	1.6	0.4	0.1	5.9	100.0	966
South/Southeast Asia									
Bangladesh 1999-2000	1.0	72.5	2.7	3.5	4.2	5.7	10.3	100.0	1,086
Bangladesh 2004	1.0	75.8	1.2	5.4	4.7	7.4	4.5	100.0	1,446
Indonesia 1997	0.6	74.3	6.8	2.1	8.5	0.7	7.1	100.0	1,560
Indonesia 2002-03	0.4	68.0	9.0	4.7	5.8	0.3	11.8	100.0	1,452
Latin America and the Caribbean									
Colombia 2000	1.0	57.2	4.8	12.1	8.9	6.7	9.3	100.0	769
Colombia 2005	1.0	68.5	4.1	7.8	9.9	2.8	5.8	100.0	1,832
Dominican Republic 1996	2.8	59.7	6.6	2.1	4.2	6.2	18.4	100.0	318
Dominican Republic 2002	2.3	54.2	4.6	9.1	4.8	6.2	18.7	100.0	741

Table 3.4.1 shows the 12-month discontinuation rate for all reversible methods by type of discontinuation, including switching. Discontinuation rates in this and the following table are different from those shown in Tables 3.2.1 and 3.2.2 in that switching is not treated as a competing risk in the earlier tables. Switches may, therefore, have been included in the in-need or not-in-need discontinuation rates in Tables 3.2.1 and 3.2.2, while Tables 3.4.1 and 3.4.2 present these rates exclusive of switching.

Table 3.4.1: 12-month discontinuation rate by discontinuation type including switching, all methods except sterilization, married women 15-49, DHS surveys 1996-2006

		Switch to:						
	Abandon in need	More effective method	Less effective method	All switches	Failure	Abandon, not in need	Total 12-month discontinuation rate	Number of episodes
Sub-Saharan Africa								
Kenya 1998	12.5	4.4	2.6	7.0	6 0	7.1	32.7	2,597
Kenya 2003	15.2	4.5	3.5	8.0	5 8	7.0	36.0	2,964
Zimbabwe 1999	5.8	3.5	2.5	6.0	1.7	4.8	18.3	3,040
Zimbabwe 2005-06	5.0	2.7	1.9	4.6	2.1	6.0	17.7	4,692
North Africa/West Asia/Europe								
Armenia 2000	4.7	4.0	3.4	7.4	22.9	4.8	39.9	3,767
Armenia 2005	2.4	3.3	1.5	4.7	14.8	8.7	30.6	2,386
Egypt 2000	9.0	6.5	3.9	10.4	3 0	7.2	29.5	10,475
Egypt 2005	8.2	7.7	4.6	12.3	3 3	8.2	32.0	15,025
South/Southeast Asia								
Bangladesh 1999-2000	11.8	11.0	11.6	22.6	4 2	10.1	48.7	8,415
Bangladesh 2004	6.5	12.2	12.6	24.7	4.6	13.5	49.3	10,359
Indonesia 1997	4.3	5.0	5.6	10.6	2 8	6.4	24.1	16,837
Indonesia 2002-03	4.2	4.5	4.6	9.1	2.1	5.4	20.8	17,563
Latin America and the Caribbean								
Colombia 2000	6.0	17.5	10.1	27.5	10.9	8.1	52.6	6,697
Colombia 2005	7.4	13.7	7.5	21.2	8 8	6.4	43.8	20,714
Dominican Republic 1996	20.4	9.5	7.8	17.3	9 9	15.4	63.0	4,464
Dominican Republic 2002	19.9	9.8	6.4	16.2	7.6	11.0	54.6	11,935

The 12-month all-method discontinuation rates due to abandoning while in need of contraception, excluding switching, range from 2 percent in Armenia in 2005 to 20 percent in the Dominican Republic in 1996. By comparison, the all-method in-need discontinuation rate from Table 3.2.1 ranges from 12 percent in Zimbabwe 2005-06 to 47 percent in the Dominican Republic 1996. Differences in the in-need discontinuation rates between these tables are naturally largest in the countries with high switching rates.

The 12-month all-method switching rate was highest in Bangladesh and Colombia, where over 20 percent of women who began using a reversible method switched contraceptives in the first year of use. Fewer than 10 percent of reversible method users switched in the first year during both time points in Kenya, Zimbabwe, and Armenia. Total switching rates remained relatively stable across time points. The largest change was a decrease from 28 percent in 2000 to 21 percent in 2005 in Colombia.

The probability of switching to a more effective method during the first year of use was greater than the probability of switching to a less effective method in every country except Bangladesh and Indonesia.

Table 3.4.2: 12-month discontinuation rate by discontinuation type including switching and method among most common methods used, married women 15-49, DHS surveys 1996-2005/6

	Pills							
		Switch to:						
	Abandon in need	More effective method	Less effective method	All switches	Failure	Abandon, not in need	Total 12-month pill discontinuation rate	Number of episodes
Sub-Saharan Africa								
Kenya 1998	18.3	7.2	2.1	9.4	2 2	5.7	35.6	766
Kenya 2003	20.1	10.6	2.0	12.6	4 0	6.5	43.2	810
Zimbabwe 1999	5.1	2.6	0.8	3.4	1.7	4.2	14.4	2,015
Zimbabwe 2005-06	3.4	2.1	0.5	2.7	2.1	5.4	13.6	3,339
North Africa/West Asia/Europe								
Egypt 2000	12.7	13.5	0.4	14.0	6 0	15.5	48.2	2,465
Egypt 2005	10.2	15.6	1.2	16.7	6.7	16.4	50.1	3,840
South/Southeast Asia								
Bangladesh 1999-2000	13.5	7.2	11.5	18.6	2 9	11.0	46.0	4,146
Bangladesh 2004	7.5	7.8	11.3	19.1	4 0	15.5	46.0	5,222
Indonesia 1997	5.9	10.7	1.2	11.9	4.1	11.6	33.4	5,329
Indonesia 2002-03	6.7	11.0	0.7	11.7	4 2	9.0	31.6	4,777
Latin America and the Caribbean								
Colombia 2000	10.2	9.0	9.4	18.4	7 3	10.9	46.8	1,555
Colombia 2005	12.1	10.6	7.9	18.5	5 9	8.4	44.8	4,550
Dominican Republic 1996	23.4	2.6	7.0	9.7	6 9	18.2	58.1	1,939
Dominican Republic 2002	20.6	3.7	4.5	8.2	6 8	13.6	49.1	5,325

Armenia suppressed because <125 unweighted cases.

continued

Table 3.4.2 (continued). 12-month discontinuation rate by discontinuation type including switching and method among most common methods used, married women 15-49, DHS surveys 1996-2005/6

Injectables								
		Switch to:						
	Abandon in need	More effective method	Less effective method	All switches	Failure	Abandon, not in need	Total 12-month injectable discontinuation rate	Number of episodes
Sub-Saharan Africa								
Kenya 1998	11.7	0.7	4.0	4.7	0.8	4.8	22.0	703
Kenya 2003	17.8	0.4	7.1	7.4	0.9	5.7	31.9	1,039
Zimbabwe 1999	8.9	0.2	10.5	10.7	1.0	4.3	24.9	512
Zimbabwe 2005-06	8.8	0.4	8.4	8.8	1.5	5.4	24.4	752
North Africa/West Asia/Europe								
Egypt 2000	21.4	8.1	10.2	18.3	0.8	7.7	48.2	1,438
Egypt 2005	15.9	6.5	10.8	17.3	1.1	10.7	45.0	2,430
South/Southeast Asia								
Bangladesh 1999-2000	17.7	0.6	25.8	26.4	1.3	4.3	49.7	1,331
Bangladesh 2004	11.3	0.7	28.0	28.7	0.4	7.8	48.2	1,773
Indonesia 1997	4.3	2.1	10.2	12.3	1.6	4.7	22.9	7,448
Indonesia 2002-03	3.6	1.3	7.6	8.9	1.1	4.5	18.1	9,106
Latin America and the Caribbean								
Colombia 2000	10.0	5.8	31.6	37.5	5.5	8.5	61.5	712
Colombia 2005	11.2	6.1	19.0	25.1	6.0	6.9	49.2	3,122
Dominican Republic 2002	33.2	2.6	18.6	21.1	5.0	8.5	67.8	913

Armenia and Dominican Republic 1996 suppressed because <125 unweighted cases.

IUD								
		Switch to:						
	Abandon in need	More effective method	Less effective method	All switches	Failure	Abandon, not in need	Total 12-month IUD discontinuation rate	Number of episodes
North Africa/West Asia/Europe								
Armenia 2000	2.4	0.0	1.8	1.8	1.4	0.6	6.1	320
Armenia 2005	1.9	0.0	3.3	3.3	0.6	1.2	7.0	305
Egypt 2000	4.6	0.1	4.6	4.7	1.0	3.7	13.9	5,413
Egypt 2005	4.4	0.2	5.3	5.5	1.3	4.2	15.3	6,820
South/Southeast Asia								
Bangladesh 1999-2000	13.8	0.0	19.6	19.6	0.0	2.1	35.5	185
Indonesia 1997	2.6	0.1	6.8	6.8	1.4	1.2	12.1	1,287
Indonesia 2002-03	2.3	0.2	5.0	5.2	0.7	0.8	8.9	912
Latin America and the Caribbean								
Colombia 2000	2.2	0.3	9.4	9.8	4.2	1.6	17.8	709
Colombia 2005	3.7	1.1	8.8	9.9	2.5	1.3	17.3	2,328
Dominican Republic 1996	12.8	0.0	11.8	11.8	5.1	4.4	34.2	225
Dominican Republic 2002	15.1	1.9	7.0	8.9	2.4	2.5	28.9	566

Kenya, Zimbabwe, and Bangladesh 2004 suppressed because <125 unweighted cases.

continued

Table 3.4.2 (continued). 12-month discontinuation rate by discontinuation type including switching and method among most common methods used, married women 15-49, DHS surveys 1996-2005/6

	Male condoms							
		Switch to:						
	Abandon in need	More effective method	Less effective method	All switches	Failure	Abandon, not in need	Total 12-month condom discontinuation rate	Number of episodes
Sub-Saharan Africa								
Kenya 1998	25.0	10.7	5.4	16.0	5.4	17.5	64.0	188
Kenya 2003	27.2	10.2	4.3	14.5	6.7	13.5	61.9	156
Zimbabwe 2005-06	14.3	13.8	2.2	16.1	4.1	22.1	56.6	193
North Africa/West Asia/Europe								
Armenia 2000	9.4	2.1	7.0	9.1	12.9	7.1	38.6	451
Armenia 2005	4.4	4.0	3.7	7.7	7.2	10.4	29.7	397
Egypt 2000	4.5	19.5	2.8	22.2	13.2	12.8	52.7	190
Egypt 2005	2.5	19.4	1.2	20.6	7.3	7.8	38.2	218
South/Southeast Asia								
Bangladesh 1999-2000	7.5	30.8	7.3	38.1	6.5	14.6	66.7	1,094
Bangladesh 2004	4.3	34.2	10.9	45.1	6.4	15.2	71.1	1,328
Indonesia 1997	8.7	8.9	3.8	12.7	6.6	8.8	36.8	217
Indonesia 2002-03	6.5	18.2	2.4	20.7	4.4	7.2	38.7	253
Latin America and the Caribbean								
Colombia 2000	6.0	26.4	12.9	39.3	5.7	7.7	58.8	822
Colombia 2005	7.4	23.2	4.8	28.0	6.0	9.2	50.5	2,794
Dominican Republic 1996	20.6	26.1	10.4	36.5	8.0	16.4	81.3	339
Dominican Republic 2002	20.8	24.6	11.3	35.9	2.8	13.3	72.9	554

Zimbabwe 1999 suppressed because <125 unweighted cases.

	Traditional methods							
		Switch to:						
	Abandon in need	More effective method	Less effective method	All switches	Failure	Abandon, not in need	Total 12-month traditional method discontinuation rate	Number of episodes
Sub-Saharan Africa								
Kenya 1998	5.5	4.3	0.4	4.7	16.2	8.9	35.3	684
Kenya 2003	5.3	3.3	0.3	3.7	15.7	9.0	33.8	714
Zimbabwe 1999	2.6	11.1	0.0	11.1	2.0	9.0	24.7	208
Zimbabwe 2005-06	9.2	4.5	0.0	4.5	5.0	4.3	23.0	179
North Africa/West Asia/Europe								
Armenia 2000	2.2	3.3	0.5	3.7	27.8	4.9	38.7	2,439
Armenia 2005	1.3	3.4	0.0	3.4	19.8	9.4	33.9	1,531
Egypt 2000	6.9	20.7	0.2	20.9	6.8	3.2	37.8	795
Egypt 2005	9.9	24.1	0.0	24.1	6.8	2.4	43.2	1,414
South/Southeast Asia								
Bangladesh 1999-2000	4.6	18.1	1.6	19.7	9.7	11.0	45.0	1,484
Bangladesh 2004	1.0	21.6	1.9	23.5	10.0	13.3	47.7	1,727
Indonesia 1997	0.7	7.7	1.0	8.7	10.7	7.7	27.8	802
Indonesia 2002-03	2.1	4.6	0.4	5.0	4.8	6.8	18.8	915
Latin America and the Caribbean								
Colombia 2000	2.2	25.9	2.2	28.1	20.8	9.4	60.5	1,902
Colombia 2005	2.1	17.3	0.9	18.2	18.7	6.2	45.2	3,994
Dominican Republic 1996	11.8	19.1	1.9	21.0	21.1	16.0	69.8	869
Dominican Republic 2002	11.2	24.2	1.6	25.8	14.5	9.5	61.0	1,871

The probability of switching in the first 12 months of use was highest among male condom users and lowest among users of IUDs in almost every country (Table 3.4.2). The majority of switches from pills in the first year were to a more effective method in Kenya, Zimbabwe, Egypt, and Indonesia. In Bangladesh and the Dominican Republic, however, switches from pills to a less effective method were more likely to occur. The vast majority of switches from injectables were to a less effective method. In the most recent Bangladesh survey, 28 percent of injectable users switched to a less effective method within the first year of use, while less than 1 percent switched

to a more effective method. Almost all switches from IUDs are to a less effective method, as IUDs are one of the most effective forms of contraception. Switches from IUDs were generally rare except in Bangladesh in 1999-2000 where 20 percent of women switched from the IUD to a less effective method in the first year of use. This appears to be an anomaly, however, as the 2004 rate dropped to 7 percent, which is comparable with other countries surveyed. Other anomalies in switching rates include those for male condoms in Armenia. While over 15 percent of users switched from condoms to another method during the first year of use in almost every other country, switching rates in Armenia have remained under 10 percent and decreased between 2000 and 2005.

The 12-, 24-, and 36-month switching rates are presented according to whether the switch was to a more or less effective method for the most recent survey in each country in Figures 3.4.1 to 3.4.5. Results are presented separately for pills, injectables, IUDs, male condoms, and traditional methods. Total switches were generally highest for male condoms, particularly by 36 months, when over 40 percent of users in Colombia, the Dominican Republic, and Bangladesh switched from the method. Switches to a less effective method are highest for injectables. More than 20 percent of injectable users switched to a less effective method within the first year of use in the Dominican Republic, Colombia, and Bangladesh. That figure rose to 40 percent by 36 months in Bangladesh, while in the Dominican Republic rates remained stable at 21 to 25 percent. Switches to a more effective method were most common for traditional methods in Egypt, where 43 percent of users switched to a more effective method by 36 months.

Figure 3.4.1: 12-, 24-, and 36-month rates of switching from contraceptive pills

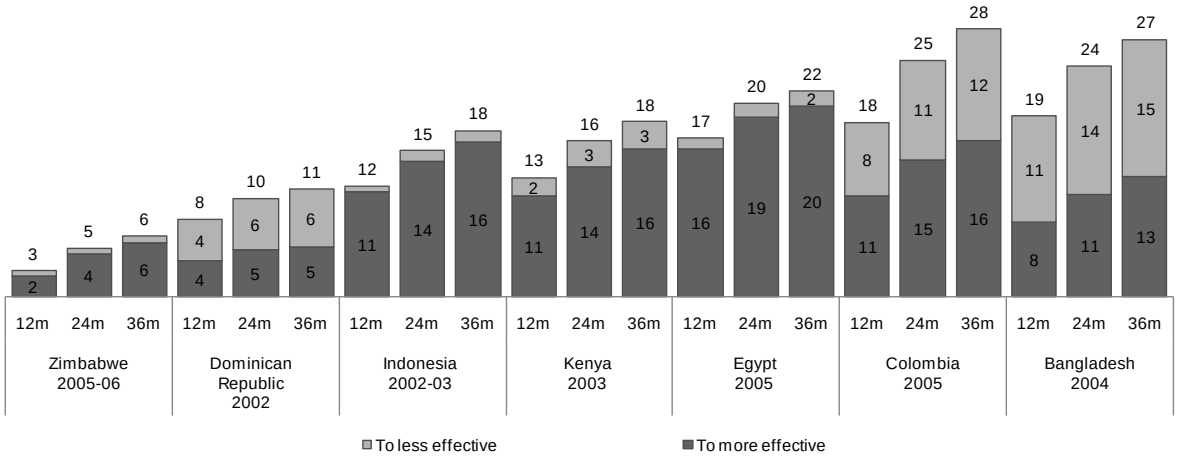


Figure 3.4.2: 12-, 24-, and 36-month rates of switching from injectables

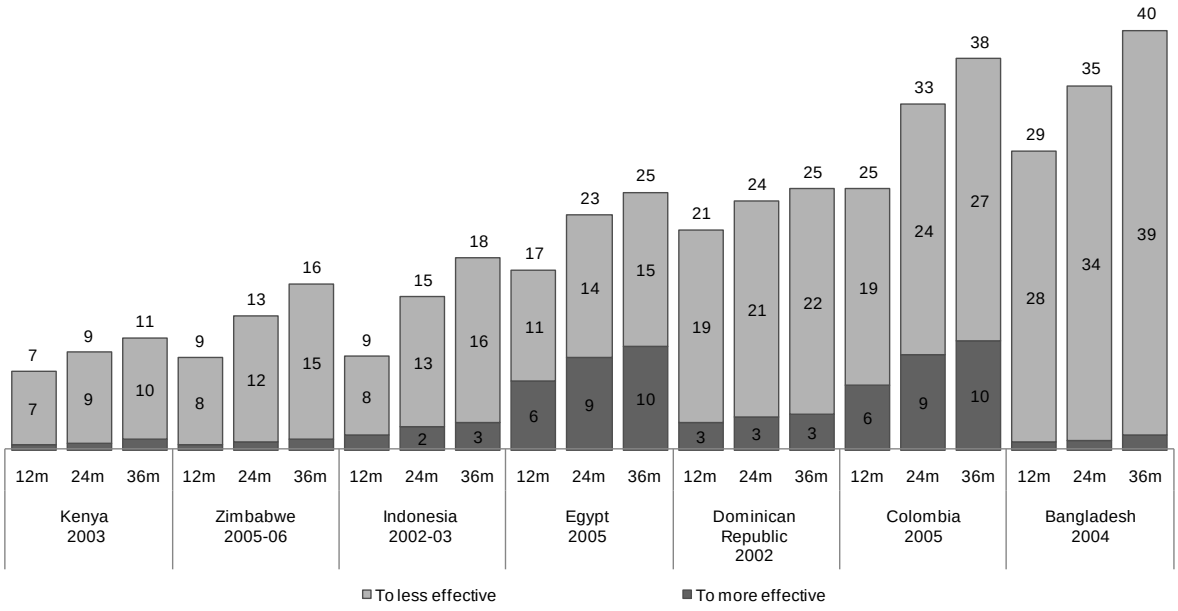


Figure 3.4.3: 12-, 24-, and 36-month rates of switching from IUDs

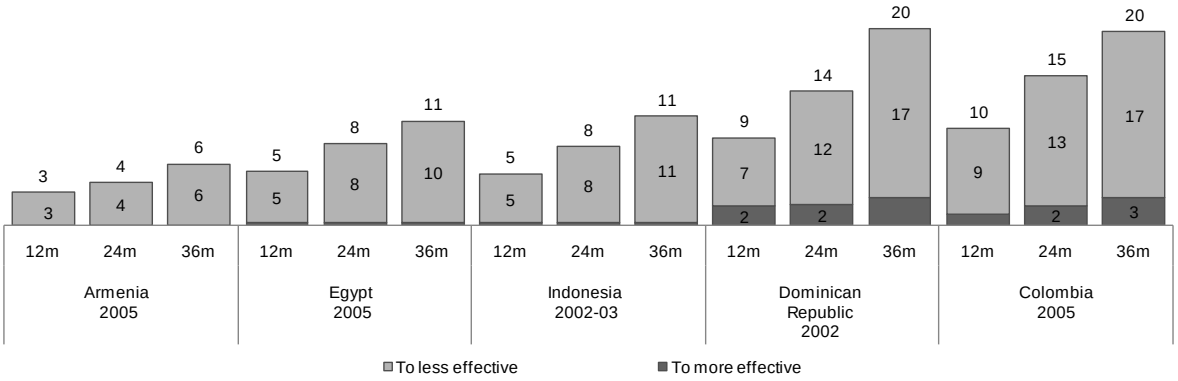


Figure 3.4.4: 12-, 24-, and 36-month rates of switching from male condoms

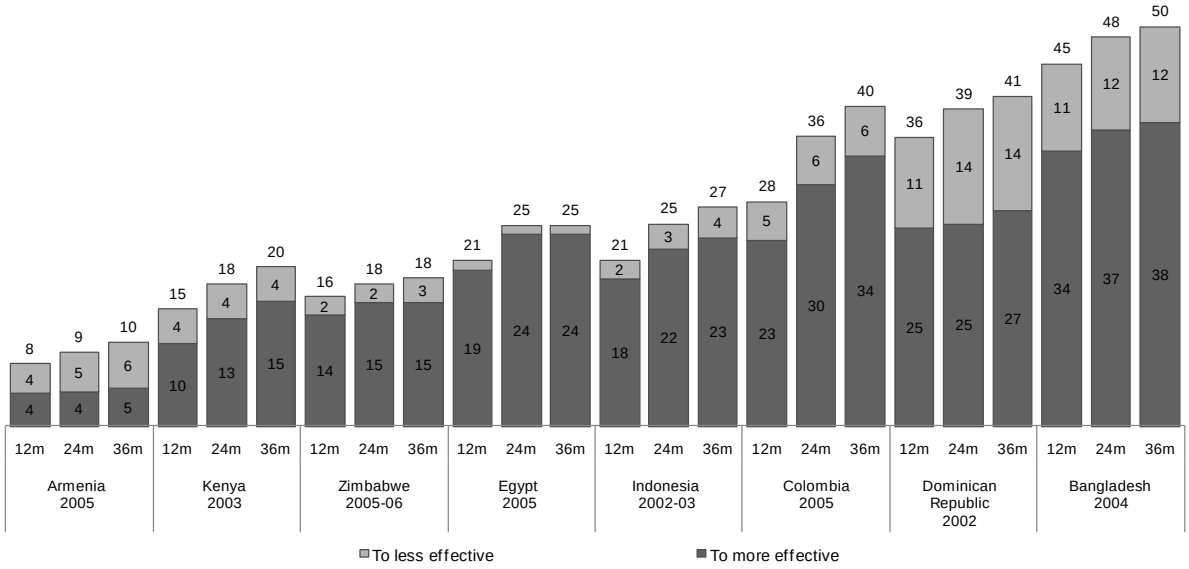
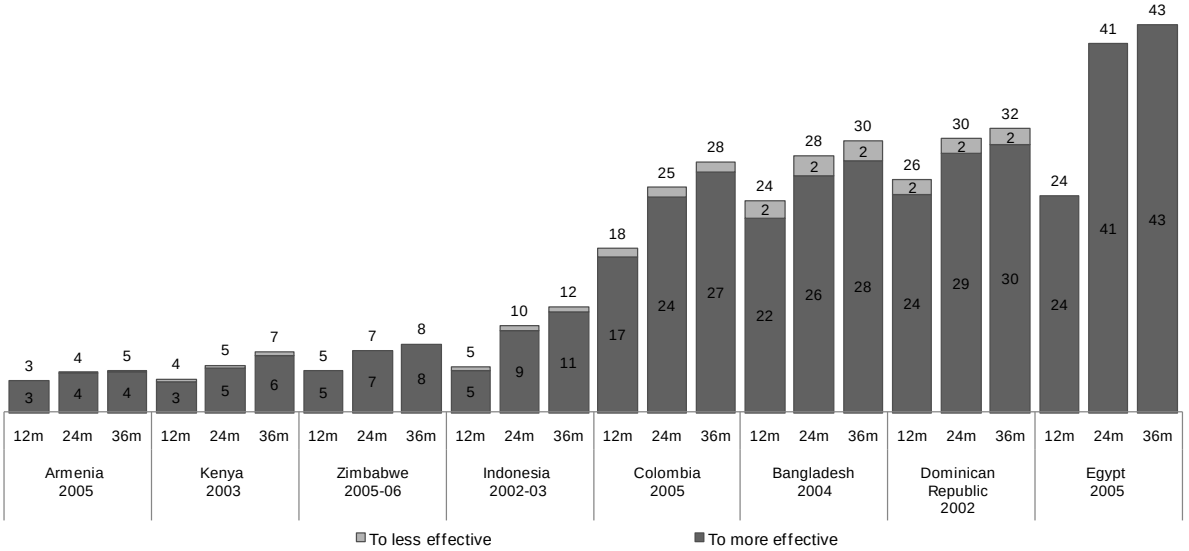


Figure 3.4.5: 12-, 24-, and 36-month rates of switching from traditional methods



Whether pill users switch to a more or less effective method varies greatly by country. Over half of switches from pills were to less effective methods in the Dominican Republic and Bangladesh at all three durations of use. Virtually all switches from pills were to a more effective method in Zimbabwe, Indonesia, and Egypt. For IUD users, almost all switches were to a less effective method except in the Dominican Republic and Colombia where, by 36 months, 3 percent of IUD users switched to a more effective method—sterilization.

4

Survival Analysis Results

In Section 4, we use only the most recent episode of contraceptive use from each woman who used a reversible method of contraception during the period of observation. We present separate multilevel hazard models for abandoning in need, failure, and switching. For each model, the reference category is women who did not abandon in need: women who either discontinued due to reduced need, or who continued use of the same reversible method for longer than 36 months. Results from these models can be interpreted as odds ratios. Descriptive statistics for each category of discontinuation are presented in Appendix Table 3.

4.1 Abandonment While in Need of Contraception

Table 4.1 shows results from the multilevel hazard models for abandoning in need. Overall, the odds of abandonment in need during the first 36 months of use are most consistently associated with the method used and women's age at the time of discontinuation, controlling for the other variables in the model. Women are significantly more likely to abandon most modern methods compared with traditional methods in Kenya, Armenia, Bangladesh, Indonesia, and Colombia. In Zimbabwe, women are significantly less likely to abandon pills while in need; in Egypt, women are less likely to abandon any modern method. In the Dominican Republic, women are 27 percent less likely to abandon IUDs in need than they are to abandon traditional methods.

Table 4.1: Odds ratios from hazard models of abandoning in need within three years of use, using the most recent episode from married women 15-49, DHS surveys 2002-06

	Kenya 2003	Zimbabwe 2005-06	Armenia 2005	Egypt 2005	Bangladesh 2004	Indonesia 2002-03	Colombia 2005	Dominican Republic 2002
Contraceptive method								
Traditional (ref)	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1.00
Pill	4.15 **	0.31 **		0.53 **	6.56 **	5.76 **	3.64 **	1.08
Injectable	2.60 **	0.71		0.80 *	8.91 **	2.63 **	5 06 **	2.31 **
Male Condom	5.58 **	1.22	2.82 **	0.11 **	6.67 **	3 86 **	2 99 **	1.55 **
IUD				0.17 **		0 87	1 36 *	0.73 *
Other modern	1.10	0.75	4.52 **	0.46 **	3.70 **	1.18	3 25 **	2.06 **
Age at discontinuation								
15-24 (ref)	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1.00
25-34	0.33 **	0.53 **	0.51	0.54 **	0.40 **	0 58 **	0 37 **	0.61 **
35-49	0.17 **	0.21 **	0.55	0.28 **	0.30 **	0.47 **	0 21 **	0.27 **
Parity at discontinuation								
0-1 (ref)	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1.00
2-3	1.03	0.82	1.57	0.97	1.18	1 09	1.17 *	0.96
4+	1.20	1.77 *	2.34	0.96	1.51 *	1.64 **	1.76 **	1.35 **
Worked in past year (no=ref)	0.89	1.04	0.33 **	0.97	1.09	0.79 **	1 06	0.86 *
Years of education	0.94 **	0.96	0.91 *	0.99	0.97 *	1 00	0 98 *	0.98 *
Contraceptive awareness	1.03	0.98	1.05	1.02	0.97	1 08 **	1 01	1.02
Partner's desired fertility								
Same (ref)	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1.00
More	1.64 **	0.83	0.89	1.06	1.67 **	1 31 **	1 01	0.91
Fewer	1.34	1.08	0.85	1.67 **	1.53 **	0 97	0 91	0.86
Don't know	1.50 *	1.01	1.36	1.19	1.39	1.15	1 22	0.93
Media exposure	0.90	0.92	1.44 *	0.91 *	0.91	0 98		0.85 **
Community CPR	0.71	0.64	0.45	1.11	1.07	0 21 **	0.45 **	0.87
Residence (urban=ref)	0.97	0.99	1.10	1.13	0.91	0 91	0 90	1.03
Wealth status								
Lowest	1.06	1.45 *	1.31	1.09	0.98	1.12	1.41 **	1.09
Middle (ref)	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1.00
Highest	0.96	1.03	1.91	0.84 *	0.83	1.12	0.78 **	0.86 *

continued

Table 4.1 (continued). Odds ratios from hazard models of abandoning in need within three years of use, using the most recent episode from married women 15-49, DHS surveys 2002-06

	Kenya 2003	Zimbabwe 2005-06	Armenia 2005	Egypt 2005	Bangladesh 2004	Indonesia 2002-03	Colombia 2005	Dominican Republic 2002
Region[1]								
Region 1 (ref)	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1.00
Region 2	0.69	1.24	1.22	0.62 **	1.36	1 35 **	1.76 **	1.23 *
Region 3	0.76	0.89		0.99	1.64 **	1 88 **	1 03	1.00
Region 4	1.01	0.54		0.92	1.37 *	1 08	0 82	0.89
Region 5	1.07	0.83			0.76 *	1.46 **	0 91	1.22
Region 6	1.28	1.42			2.28 **		0.67	1.11
Region 7	1.42	2.40 **						1.19
Region 8		1.01						0.92
Region 9		1.20						1.21
Region 10		1.71						
Interval (months)								
1-5 (ref)	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1.00
6-10	0.98	0.68 *	1.01	0.79 **	0.51 **	0.68 **	0.65 **	0.60 **
11-15	0.75	0.69 *	0.50	0.87	0.47 **	0.70 **	0 83 *	0.59 **
16-20	0.76	0.95	1.09	0.88	0.37 **	0.44 **	0 59 **	0.40 **
21-25	0.66	0.84	1.11	1.40 **	0.51 **	0.71 **	0.66 **	0.47 **
26-30	0.53 *	0.89	0.58	0.88	0.26 **	0.47 **	0.47 **	0.37 **
31-36	0.68	1.31	0.53	0.94	0.31 **	0.62 **	0.75*	0.36 **
Cluster-level variance	0.04 *	0.03	0.00	0.02 *	0.03	0 05 **	0 05 **	0.01
Number of episodes	1,812	2,995	1,191	8,179	4,469	11,708	6,179	4,360

Reference category for outcome is "did not abandon in need."

*p<0 05; **p<0.01

[1] Region names corresponding to each region number are shown in Appendix 3.

Women age 25 and older are consistently less likely to abandon in need than younger women, and the odds are lowest for the oldest women in the model. This finding is consistent in every country except Armenia. Having worked in the past year is associated with a 66 percent decrease in the odds of abandonment in need compared with women who have not worked in Armenia. Similar results are seen in Indonesia and the Dominican Republic, though the magnitude of the effect is not as large. In the majority of countries (Kenya, Armenia, Bangladesh, Colombia, and the Dominican Republic), the odds of abandoning in need decrease significantly with each one-year increase in women's education. Wanting more children than one's partner as compared with wanting the same number is associated with increased odds of abandonment in Kenya, Bangladesh, and Indonesia. Higher-than-average media exposure is associated with decreases in the odds of abandonment in need in Egypt, Bangladesh, and the Dominican Republic, while this measure is associated with increased odds in Armenia.

In Zimbabwe, women living in Matabeleland South are more than twice as likely to abandon a method while in need compared with women living in the capital city. Women living in Lower Egypt are less likely to abandon in need than women living in the Urban Governates. In Bangladesh, living in the Chittagong, Khulna, or Sylhet divisions is associated with increased odds of abandoning in need compared with women living in Dhaka, while living in Rajshahi is associated with decreased odds. Living outside of Java is associated with increased odds of abandonment in need in Indonesia, though results are not significant for Kalimantan. In Colombia, women in Atlántica are more likely to abandon in need than women in Bogotá. Abandonment in need in the Dominican Republic is positively associated with living in Health Region I compared with Region 0.

In every country, the odds of abandonment in need after six or more months of use are lower or no different than the odds of abandonment within the first five months, with the exception of Egypt. In Egypt, there is an increase in the odds of abandonment in need in the 21- to 25-month interval, which is predominantly due to prolonged breastfeeding. A disproportionate number of prolonged breastfeeding users abandoned in need in this interval.

There is a statistically significant proportion of cluster-level variance that is not captured by the variables in the model in Kenya, Egypt, Bangladesh, Indonesia, and Colombia. It is, therefore, clear that there are unobserved factors at the cluster level that contribute significantly to the probability of abandonment in need in these countries.

4.2 Failure

Table 4.2: Odds ratios from hazard models of failure within three years of use, using the most recent episode from married women 15-49, DHS surveys 2002-06

	Kenya 2003	Zimbabwe 2005-06	Armenia 2005	Egypt 2005	Bangladesh 2004	Indonesia 2002-03	Colombia 2005	Dominican Republic 2002
Contraceptive method								
Traditional (ref)	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00
Pill	0.33 **	0.19 **		0.40 **	0.33 **	1 24	0 36 **	0 22 **
Injectable	0.07 **	0.14 **		0.07 **	0.05 **	0 21 **	0.42 **	0 23 **
Male Condom	0.87	0.40 *	0.39 **	0.53 *	0.85	0 94	0 35 **	0 22 **
IUD				0.04 **		0 26 **	0.11 **	0 08 **
Other modern	0.13 **	0.04 **	0.10 **	0.05 **	0.03 **	0 06 **	0.71 **	0.48 **
Age at discontinuation								
15-24 (ref)	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00
25-34	0.59 *	0.31 **	0.46 **	0.58 **	0.37 **	0 32 **	0.41 **	0.44 **
35-49	0.30 **	0.05 **	0.13 **	0.23 **	0.07 **	0 09 **	0.17 **	0 09 **
Parity at discontinuation								
0-1 (ref)	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00
2-3	1.35	1.81 **	1.92 **	1.19	1.12	1 58 **	1 29 **	1 32 **
4+	1.30	3.66 **	1.32	1.66 **	1.91 **	4.10 **	1.67 **	2 20 **
Worked in past year (no=ref)	0.66 *	0.61 **	0.96	0.84	1.11	0.77 **	0 94	0 81 *
Years of education	1.04	1.09 *	1.01	1.00	0.99	1 07 **	1 00	1 01
Contraceptive awareness	0.98	1.01	1.06	1.05 *	1.10 **	1.12 **	1 03	1 02
Partner's desired fertility								
Same (ref)	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00
More	1.44	1.26	1.51 **	1.10	1.65 **	1 06	0 82 **	0 88
Fewer	1.39	1.21	1.93 *	1.06	1.60 **	1 55 *	0 88	0.73 *
Don't know	2.14 **	0.87	1.50	1.03	1.30	0 86	0.70 *	0.73 *
Media exposure	0.98	0.98	1.09	0.82 **	0.98	0 98		0 84 **
Community CPR	1.54	0.91	2.00 *	1.48	1.38	0.49 *	0.66 **	1 01
Residence (urban=ref)	1.72	0.65	0.96	1.19	0.75 *	0.69 **	0 87	1 02
Wealth status								
Lowest	0.92	1.79 **	1.26	1.21	0.86	1 02	1.11	1.14
Middle (ref)	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00
Highest	0.74	0.74	0.87	0.90	0.94	0 84	0.69 **	1 25
Region[1]								
Region 1 (ref)	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00
Region 2	0.81	1.81	0.75	0.78	1.09	1 34 *	0.72 **	1 51 **
Region 3	1.23	0.64		0.61 **	0.90	1 50	0.76 **	1 31 *
Region 4	1.17	0.80		0.44	0.74	1 06	0 56 **	1.16
Region 5	1.29	0.99			1.10	0 99	0.66 **	1.44
Region 6	1.17	1.14			1.01		0 52 **	1.16
Region 7	1.12	1.31						1 89 *
Region 8		0.94						1 01
Region 9		0.76						1 22
Region 10		0.74						

continued

Table 4.2 (continued). Odds ratios from hazard models of failure within three years of use, using the most recent episode from married women 15-49, DHS surveys 2002-06

	Kenya 2003	Zimbabwe 2005-06	Armenia 2005	Egypt 2005	Bangladesh 2004	Indonesia 2002-03	Colombia 2005	Dominican Republic 2002
Interval (months)								
1-5 (ref)	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00
6-10	1.37	1.49	1.82 **	1.07	1.24	1 20	0.78 **	1 03
11-15	2.43 **	2.45 **	1.69 **	1.46 **	1.06	1 23	0 93	0 98
16-20	1.99 **	4.31 **	1.60 *	1.58 **	0.99	1 35 *	0 87	0 90
21-25	2.57 **	3.60 **	1.87 **	0.87	1.11	1.15	0 99	0 86
26-30	1.62	5.14 **	1.53	0.89	1.02	0 91	0.68 **	0.60 *
31-36	2.41 *	5.23 **	1.82 *	0.86	1.34	1 24	0 52 **	0.64
Cluster-level variance	0.08 *	0.08 *	0.09 **	0.03	0.01	0 04 *	0 00	0 07 **
Number of episodes	1,555	2,856	1,430	7,277	4,326	11,191	6,411	3,419

Reference category for outcome is "did not abandon in need."

*p<0 05; **p<0.01

[1] Region names corresponding to each region number are shown in Appendix 3.

Similar to abandonment in need, the odds of women experiencing contraceptive failure in the first 36 months of use is significantly related to the method used and women's age at time of discontinuation. Failure is also associated with parity, work status, and contraceptive awareness in most countries. As expected, the odds of failure are significantly lower for modern method users than for users of traditional methods in almost every case. The odds of failure are consistently lower for women 25 and older compared with younger women. The oldest women are the least likely to experience failure: odds ratios are smaller for women age 35-49 than for women age 25-34. Women with four or more children have greater odds of failure than women at parity 1 or lower in Zimbabwe, Egypt, Bangladesh, Indonesia, Colombia, and the Dominican Republic.

Women who worked in the past year have significantly lower odds of failure than women who did not work in Kenya, Zimbabwe, Indonesia, and the Dominican Republic. Living in a community with a higher-than-average CPR is associated with large decreases in the odds of experiencing failure in Indonesia and Colombia, but the reverse is true in Armenia.

Women who do not know their partner's desired family size are more than twice as likely to experience failure as women who have the same desired family size in Kenya. Wanting more children than one's partner is also associated with increased odds of failure in Armenia and Bangladesh, and wanting fewer children is associated with increased odds in Armenia, Bangladesh, and Indonesia. Unlike the results in other countries, wanting more children is associated with lower odds of failure in Colombia; wanting fewer children is associated with lower odds in the Dominican Republic; and not knowing one's partners' desired family size is associated with lower odds of failure in both of these countries.

Though urban-rural residence is not significantly associated with women's odds of abandonment in need, women living in rural areas are less likely to fail than women in urban areas in Bangladesh and Indonesia—both countries with histories of strong family planning programs that include outreach into rural areas.

Regional differences are striking, particularly in Colombia where women living in any region outside of Bogotá have significantly lower odds of experiencing failure than women within Botogá. In Egypt, the odds of failure are cut almost in half for women living in Upper Egypt as compared with women living in the Urban Governates. In Indonesia, the odds of failure are

higher for women living in Sumatera than in Java; in the Dominican Republic, the odds of failure are significantly higher for women living in Health Regions I and VI compared with Region 0. The increase in the odds of failure after 10 months of use in several countries is likely due to redundant postpartum contraceptive use, which is explored further in Section 4.5: Timing of discontinuation. There is significant cluster-level variance not explained by the variables in the model in every country except Egypt, Bangladesh, and Colombia.

4.3 Switching

Table 4.3: Odds ratios from hazard models of switching methods within three years of use, using the most recent episode from married women 15-49, DHS surveys 2002-06

	Kenya 2003	Zimbabwe 2005-06	Armenia 2005	Egypt 2005	Bangladesh 2004	Indonesia 2002-03	Colombia 2005	Dominican Republic 2002
Contraceptive method								
Traditional (ref)	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00
Pill	3.56 **	0.20 **		0.46 **	0.69 **	2 83 **	0 97	0 22 **
Injectable	1.10	0.78		0.39 **	1.44 **	1 89 **	1.49 **	0 80
Male Condom	4.55 **	1.33	1.12	0.66 *	2.09 **	4.41 **	1 33 **	1.46 *
IUD				0.06 **		0.70	0.42 **	0 23 **
Other modern	0.16	0.59	1.34	0.24 **	0.92	1 06	1 51 **	1.48 *
Age at discontinuation								
15-24 (ref)	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00
25-34	0.33 **	0.25 **	0.24 **	0.51 **	0.48 **	0 39 **	0.44 **	0.45 **
35-49	0.10 **	0.05 **	0.17 **	0.24 **	0.30 **	0.19 **	0.19 **	0.15 **
Parity at discontinuation								
0-1 (ref)	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00
2-3	2.42 **	2.65 **	2.09 *	2.96 **	1.80 **	1.67 **	2.10 **	2.15 **
4+	3.38 **	6.01 **	4.01	3.77 **	2.17 **	1 80 **	3.45 **	4 35 **
Worked in past year (no=ref)	1.35	1.11	0.44 *	1.07	1.09	1 05	1 02	1.43 **
Years of education	1.02	1.01	0.99	1.00	1.02	1 02 *	1 02 **	1 05 **
Contraceptive awareness	1.10	1.09 **	1.15 **	1.06 **	1.12 **	1.17 **	1.11 **	1 06 **
Partner's desired fertility								
Same (ref)	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00
More	1.40	0.65 *	1.62	0.89	0.94	1.11	0 89 *	1 04
Fewer	2.01 **	1.12	2.09	1.32 *	1.00	1 57 **	0.73 **	0 80
Don't know	1.23	0.85	0.09	0.94	0.73	1 23	0 81	1 00
Media exposure	1.19	1.00	1.33	0.92	1.00	1 04		0 83 **
Community CPR	2.63 *	2.45	3.80 *	4.10 **	3.18 **	2 20 **	2 56 **	2 88 **
Residence (urban=ref)	1.23	1.03	0.94	1.03	0.94	0 91	0 90	1 21 *
Wealth status								
Lowest	0.73	0.82	0.81	0.96	0.86	0.75 **	1 20 **	0 90
Middle (ref)	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00
Highest	1.15	1.72	1.08	0.87	1.14	0 92	0 99	0 89
Region[1]								
Region 1 (ref)	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00
Region 2	1.13	1.79	0.82	0.81	1.34 *	1 34 **	1 29 **	1.18
Region 3	1.06	1.59		0.89	0.86	1 03	1.13	1.10
Region 4	1.32	1.09		0.64	1.16	1.44 **	1.10	0 90
Region 5	0.41	1.53			1.19 *	1.78 **	1 25 **	1 29
Region 6	0.46 *	1.93			0.76		0.79	0.78
Region 7	0.48	1.12						0 98
Region 8		1.05						0 96
Region 9		2.05 *						1 03
Region 10		0.48						

continued

Table 4.3 (continued). Odds ratios from hazard models of switching methods within three years of use, using the most recent episode from married women 15-49, DHS surveys 2002-06

	Kenya 2003	Zimbabwe 2005-06	Armenia 2005	Egypt 2005	Bangladesh 2004	Indonesia 2002-03	Colombia 2005	Dominican Republic 2002
Interval (months)								
1-5 (ref)	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1 00
6-10	0.90	0.86	0.56	0.66 **	0.57 **	0.76 **	0 80 **	0.74 **
11-15	0.53 *	0.84	0.44 *	0.70 **	0.51 **	0 96	0 80 **	0.45 **
16-20	0.31 **	0.89	0.24 **	0.39 **	0.30 **	0 51 **	0.45 **	0 36 **
21-25	0.68	0.87	0.38 *	0.47 **	0.51 **	0 95	0 50 **	0 33 **
26-30	0.52	0.65	0.01	0.24 **	0.31 **	0 36 **	0 36 **	0 27 **
31-36	0.54	0.59	0.25 *	0.37 **	0.36 **	0 57 **	0.43 **	0.47 **
Cluster-level variance	0.00	0.01	0.14 *	0.01	0.00	0 05 **	0 02	0 03 *
Number of episodes	1,483	2,855	1,203	7,946	4,982	12,105	7,534	3,445

Reference category for outcome is "did not abandon in need."

*p<0 05; **p<0.01

[1] Region names corresponding to each region number are shown in Appendix 3.

Switching is most strongly associated with method type, age, parity, contraceptive awareness, and community-level CPR in the models presented in Table 4.3. In most countries, women are more likely to switch from most modern methods than traditional methods. The exceptions to this pattern are in Egypt, where women are less likely to switch from any modern method than from traditional methods; Kenya, where women are less likely to switch from "other" modern methods; Zimbabwe, Bangladesh, and the Dominican Republic where women are less likely to switch from pills; and Colombia and the Dominican Republic where women are less likely to switch from IUDs. Egypt is the only country in which women are less likely to switch from condoms than from traditional methods.

As with abandonment in need and failure, women over age 24 are significantly less likely to switch methods than women age 15-24, and the effect is stronger for women age 35-49. Women at higher parities are significantly more likely to switch methods compared with women with no children or one child, and the odds increase as parity increases. Education is positively associated with switching in Indonesia, Colombia, and the Dominican Republic. Contraceptive awareness and community-level CPR are also consistently positively associated with switching in every country, though the associations do not reach statistical significance in Kenya and Zimbabwe, respectively.

The strongest regional associations are seen in Indonesia, where women living in the regions within Sumatera, Kalimantan, and Sulawesi are between 34 and 78 percent more likely to switch methods than women living in Java. In Kenya, women in the Rift province are less likely to switch than in Nairobi, while in Zimbabwe women in Masvingo are more than twice as likely to switch methods than women in Harare. In Bangladesh, women in the Barisal and Rajshahi divisions have higher odds of switching compared with women in Dhaka. In Colombia, odds of switching are higher for women in the Atlántica and Pacífica regions than in Bogotá.

Women are more likely to switch methods in the first five months of use than at any other time in Egypt, Bangladesh, Colombia, and the Dominican Republic, and the relationship is similar in other countries. The cluster-level variance is statistically significant in Armenia, Indonesia, Colombia, and the Dominican Republic.

4.4 Switching to a More or Less Effective Method

Age, parity, contraceptive awareness, community-level CPR, and duration of use are the most consistent predictors of both switching types. Women age 15-24 are much more likely to switch to either a more or a less effective method than women 25 and older, and—as with the other models—the effect is larger for women age 35-49. In countries where both types of switching are presented, there do not appear to be large differences in the relationship between age and switching to a more effective versus a less effective method. Women with more than one child are more likely to make either type of switch, and again the effect size increases with parity. The odds of switching to a more effective method increases with years of education in Colombia, and the odds of both switch types increase in the Dominican Republic. Education is also positively associated with switching to a less effective method in Bangladesh and Indonesia.

Contraceptive awareness is positively associated with both types of switches in most countries. In Kenya, Armenia, and Egypt, women whose partners want fewer children than they do are significantly more likely to switch to a more effective method than women who have the same desired family size as their partners. In Colombia and the Dominican Republic, however, women are less likely to switch to a more effective if their partners want fewer children. Women who don't know their partners' desired family sizes are more likely to switch to a less effective method in Zimbabwe, Indonesia, and Colombia. Community-level CPR is significantly associated with both types of switches in every country except Zimbabwe and Armenia. Results for urban-rural residence are mixed. In Zimbabwe, rural women are almost five times more likely to switch to a less effective method, while rural women in Bangladesh, Indonesia, and Colombia are less likely to switch to a less effective method than women in urban areas.

In the majority of countries, results by region were quite different in models of switching to more effective versus less effective methods. Regional differences were greatest in Zimbabwe, where women in Mashonaland Central and Matabeleland North were between four and six times more likely to switch to a less effective method than women in Harare. Women in Manicaland and Masvingo, however, were more than twice as likely to switch to a more effective method. In Kenya, women in Rift province had decreased odds of switching to a more effective method as compared with women in Nairobi. In Bangladesh, women in the Barisal, Khulna, and Rajshahi divisions were more likely to switch to more effective methods than women in Dhaka. In Indonesia, regional results were the most similar for both switching types: the odds of both types of switches were increased in Kalimantan and Sulawesi compared with Java, though only the odds of switching to a more effective method were higher in Sumatera. In Colombia, women in the Atlántica, Oriental, Central, and Pacífica regions were more likely to switch to a less effective method than women in Bogotá, while women in the Atlántica region were also more likely to switch to a more effective method. In the Dominican Republic, women in Health Region VI were more than twice as likely to switch to a more effective method compared with women in Health Region 0.

Table 4.4: Odds ratios from hazard models of switching to a more or less effective method within three years of use, using the most recent episode from married women 15-49, DHS surveys 2002-06

	Kenya 2003	Zimbabwe 2005-06		Armenia 2005	Egypt 2005		Bangladesh 2004		Indonesia 2002-03		Colombia 2005		Dominican Republic 2002	
	More effective	Less effective	More effec ive	More effective	Less effective	More effective	Less effective	More effec ive	Less effective	More effective	Less effective	More effective	Less effective	More effective
Age at discontinuation														
15-24 (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1.00	1.00	1 00	1.00
25-34	0.28 **	0.22 **	0.26 **	0.19 **	0.45 **	0.51 **	0.55 **	0.42 **	0 39 **	0 37 **	0.36 **	0.42 **	0.42 **	0.45 **
35-49	0.09 **	0.07 **	0.06 **	0.07 **	0.26 **	0.26 **	0.41 **	0.24 **	0.18 **	0.16 **	0.15 **	0.18 **	0 33 **	0.13 **
Parity at discontinuation														
0-1 (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1.00	1.00	1 00	1.00
2-3	2.13 **	2.06 *	3.17 **	3.42 **	3.58 **	3.25 **	2.07 **	1.87 **	1 85 **	1.49 **	1.56 **	2.48 **	1.45 *	3.09 **
4+	2.78 **	12.62 **	5.10 **	6.56 *	4.33 **	4.93 **	2.61 **	2.35 **	1 57 *	2 07 **	2.66 **	4.44 **	1.48	7.46 **
Worked in past year (no=ref)	1.37	0.93	1.07	0.58	1.07	1.08	1.22	1.06	0 96	1.12	1.14	0.98	1 38 *	1.47 **
Years of education	1.04	1.11	1.02	0.97	1.02	0.99	1.05 **	1.02	1 04 **	0 99	1.01	1.03 **	1.10 **	1.05 **
Contraceptive awareness	1.09	1.13 *	1.12 **	1.14 *	1.05	1.09 **	1.14 **	1.13 **	1 08 **	1 27 **	1.08 **	1.13 **	1 04	1.12 **
Partner's desired fertility														
Same (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1.00	1.00	1 00	1.00
More	1.49	0.38 *	0.84	1.56	0.77	1.07	0.96	0.92	1 08	1.16	1.21 *	0.67 **	1.16	0.85
Fewer	1.79 *	0.85	1.32	3.09 *	1.11	1.44 *	1.02	0.93	2 26 **	0 87	0.87	0.62 **	0 80	0.71
Don't know	1.07	1.97 *	0.65	0.00	0.80	1.10	0.77	0.77	1.61 **	0 96	1.39 *	0.59 **	1.16	1.02
Media exposure	1.28	1.01	1.04	1.68 **	0.86	0.87 *	1.03	1.00	1 05	1 03			0.73 **	0.82 **
Community CPR	2.77 *	4.89	1.51	5.08	6.51 **	3.38 **	4.15 **	3.37 **	2 00 *	2.61 **	2.13 **	3.06 **	4.42 **	2.94 **
Residence (urban=ref)	1.17	4.75 **	0.64	0.85	1.16	0.90	0.78 *	1.01	0.68 **	1 24 *	0.76 *	0.99	0 84	1.69 **
Wealth status														
Lowest	0.79	0.55	1.10	0.91	1.10	1.07	1.05	0.79 *	0 81	0.63 **	1.18	1.16 *	0 93	0.84
Middle (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1.00	1.00	1 00	1.00
Highest	1.17	5.72 **	1.28	1.33	0.87	0.94	1.38 **	1.09	0 83	0 98	1.00	1.05	1.14	0.83
Region[1]														
Region 1 (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00	1 00	1.00	1.00	1 00	1.00
Region 2	1.18	1.71	2.09 *	0.72	0.72	0.82	1.13	1.66 **	1.19	1 54 **	2.08 **	1.22 *	0 83	1.13
Region 3	0.85	4.10 *	1.11		1.20	1.14	0.82	0.91	0 91	0 88	1.53 **	0.98	0 85	0.84
Region 4	0.94	0.93	1.50		0.54	1.04	1.02	1.47 **	1 56 **	1.66 **	1.57 **	1.04	0 97	0.69
Region 5	0.45	2.49	1.25				1.01	1.37 **	1.69 **	1 91 **	1.71 **	1.15	1 21	1.32
Region 6	0.38 *	5.86 **	2.05				0.93	0.68			1.51	0.74	0.68	0.71
Region 7	0.46	2.12	1.96										2.12 *	0.66
Region 8		2.19	0.90										1 05	0.74
Region 9		0.48	2.51 **										1 21	0.85
Region 10		2.09	0.23 *											

continued

Table 4.4 (continued). Odds ratios from hazard models of switching to a more or less effective method within three years of use, using the most recent episode from married women 15-49, DHS surveys 2002-06

	Kenya 2003	Zimbabwe 2005-06		Armenia 2005	Egypt 2005		Bangladesh 2004		Indonesia 2002-03		Colombia 2005		Dominican Republic 2002	
	More effec ive	Less effective	More effective	More effective	Less effec ive	More effective	Less effective	More effective	Less effec ive	More effective	Less effective	More effective	Less effective	More effective
Interval (months)														
1-5 (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6-10	0.72	0.73	0.86	0.62	0.73 *	0.57 **	0.98	0.30 **	1.04	0.53 **	0.65 **	0.81 **	0.56 **	0.75 *
11-15	0.38 **	0.42 *	1.00	0.37 *	0.72	0.54 **	0.71 *	0.33 **	1.27 *	0.66 **	0.64 **	0.75 **	0.30 **	0.43 **
16-20	0.23 **	0.43	1.04	0.18 **	0.33 **	0.28 **	0.27 **	0.27 **	0.59 **	0.40 **	0.32 **	0.42 **	0.32 **	0.27 **
21-25	0.61	0.21 *	1.15	0.22 *	0.47 **	0.27 **	0.64 **	0.33 **	1.42 **	0.49 **	0.35 **	0.46 **	0.43 **	0.16 **
26-30	0.47	0.44	0.62	0.02	0.36 **	0.08 **	0.26 **	0.27 **	0.41 **	0.27 **	0.23 **	0.33 **	0.16 **	0.22 **
31-36	0.47	0.37	0.59	0.02	0.52 **	0.12 **	0.43 **	0.23 **	0.76	0.34 **	0.44 **	0.30 **	0.43 *	0.28 **
Cluster-level variance	0.00	0.00	0.00	0.13	0.01	0.02	0.00	0.03 *	0.05 *	0.05 *	0.00	0.02	0.00	0.10 **
Number of episodes	1,438	2,703	2,783	1,182	7,113	7,551	4,345	4,458	11,417	11,365	5,619	6,767	2,927	3,212

Reference category for outcome is “did not abandon in need.”

*p<0 05; **p<0.01

[1] Region names corresponding to each region number are shown in Appendix 3.

Models for switching to a less effective method are not included for Kenya or Armenia due to small sample sizes.

Similar to the results for overall switches, women are generally less likely to make either type of switch after longer periods of use than they are within the first five months. The cluster-level variance is significant for switching to more effective methods in Bangladesh, Indonesia, and the Dominican Republic, while it is significant for switching to less effective methods in Indonesia only.

4.5 Timing of Discontinuation

To further explore the timing of discontinuation, we present the predicted probabilities of discontinuation derived from each hazard model in Figures 4.5.1 to 4.5.4. These figures were generated by setting all categorical variables other than contraceptive method to the reference category, and all continuous variables to their mean.

As explained by Curtis and Blanc (1997), we expected the probability of failure to decline over time, as women who are poor users of a method or who are highly fecund are expected to fail early on. However, overlap between contraceptive use and postpartum amenorrhea may lead to a reduced risk of failure early on, and increases in the probability of failure after the period of postpartum insusceptibility ends. In this scenario, the probability of failure increases around the 11- to 15-month interval as is seen in several countries, including in Zimbabwe, Egypt, and Indonesia—all countries that had high levels of redundant use in earlier surveys (Curtis, 1996; Sambisa and Curtis, 1997). These increases are most obvious when examining odds ratios of failure at each time point as shown in Table 4.2, and in the probabilities of traditional method failure at each time point as shown in Figure 4.5.4. We confirmed that the overlap with postpartum amenorrhea was likely the reason behind rising failure rates by stratifying the graphs by whether the previous event was a pregnancy/birth, episode of contraceptive use, or non-use (not shown). We found that the probability of failure rose sharply over time among women whose previous episode was a pregnancy/birth, but declined or rose only slightly among other women. This same pattern of sharply increasing probabilities of discontinuation among postpartum women was also seen among women who abandoned in need, further suggesting that some women may be experiencing failure and reporting it as abandonment in need.[18] Alternatively, these increases at later time points may also be in part attributable to heaping. For example, some heaping at 18 and 24 months of use is seen in Egypt in Appendix Figure 1.2, and may also be seen particularly in the 21- to 25-month interval in the Egypt Figures 4.5.1 to 4.5.4.[19]

[18] We suspected this pattern might result from under-reporting of failures in the first trimester. To investigate this theory, we re-ran these analyses, censoring the most recent three months of exposure. This censoring did not change the increases in abandonment in need seen in several of the graphs at the 11- to 15-month or 21- to 25-month intervals.

[19] The increase in abandonment in need in months 21-25 in Egypt is also influenced by the inclusion of prolonged breastfeeding, which was abandoned in need by a disproportionate number of users in this interval. Though figures are stratified by contraceptive method, because the hazards are proportional, the predicted probabilities by method are affected by other methods as well.

As shown in Figure 4.5.1, the probabilities of abandoning pills while in need are higher at all time points than the probabilities of discontinuation for any other reason in Kenya, Egypt, and the Dominican Republic. Pill failures remain relatively steady over time in all countries except Egypt, in which pill failures increase slightly at intervals 11-15 and 16-20 months, which may suggest that overlap with postpartum amenorrhea is a factor. The probability of switching from pills to another method remains relatively steady across the three-year window of observation in most countries, decreasing over time in Egypt and Colombia.

The probability of abandoning injectables while in need is higher than the probabilities of discontinuing injectables for any other reason at every time point in Kenya, Zimbabwe, Egypt, and the Dominican Republic (Figure 4.5.2). In Bangladesh, Indonesia, and the first three intervals in Colombia, the probability of switching from injectables is higher than the probability of failure or abandonment in need. In the Dominican Republic, the baseline probability of abandoning contraceptives during the first five months is quite high at almost 40 percent, but the probability then decreases sharply down to around 20 percent and remains fairly stable from the 16- to 20-month interval onwards.

As shown in Figure 4.5.3, abandonment of condoms in need is particularly high in Kenya and the Dominican Republic at all time points, as expected based on the condom discontinuation rates in Table 3.4.2. The probabilities of all types of condom discontinuation are notably low in Armenia, again as expected based on Figure 3.2.4.

Discontinuations of traditional methods are much lower in Indonesia than in other countries at all time points (Figure 4.5.4), and are particularly high in Egypt and Colombia. The probability of traditional method failure is generally higher than the probability of switching or abandoning in need at all time points, with the exception of Egypt. Discontinuation types other than failure remain relatively steady over time except in Egypt and the Dominican Republic. In Egypt, abandonment in need peaks at months 21 to 25, and switching decreases over time. In the Dominican Republic, abandoning in need and switching both decrease over time.

Figure 4.5.1: Baseline hazard of pill discontinuations by country

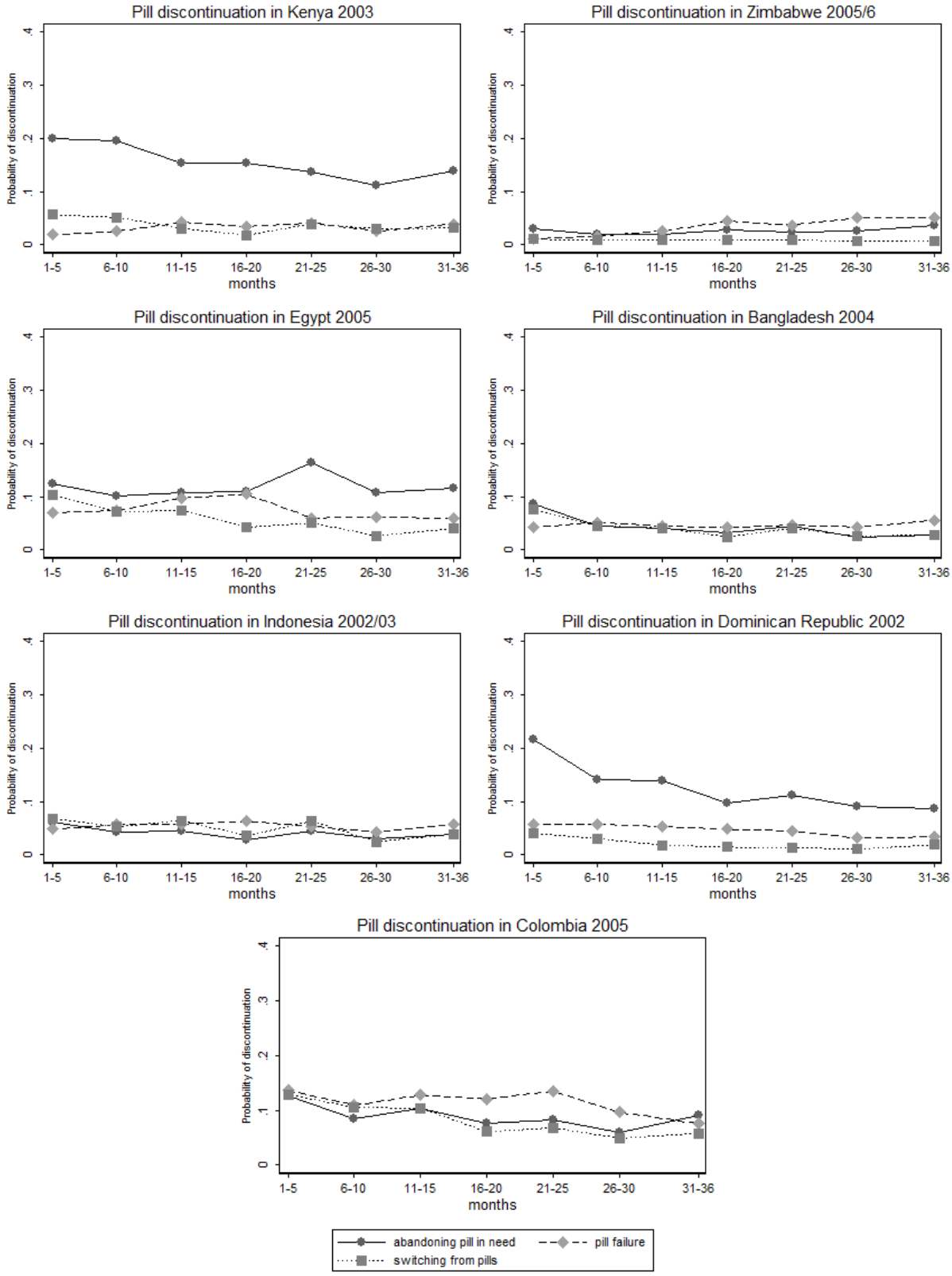


Figure 4.5.2: Baseline hazard of injectable discontinuations by country

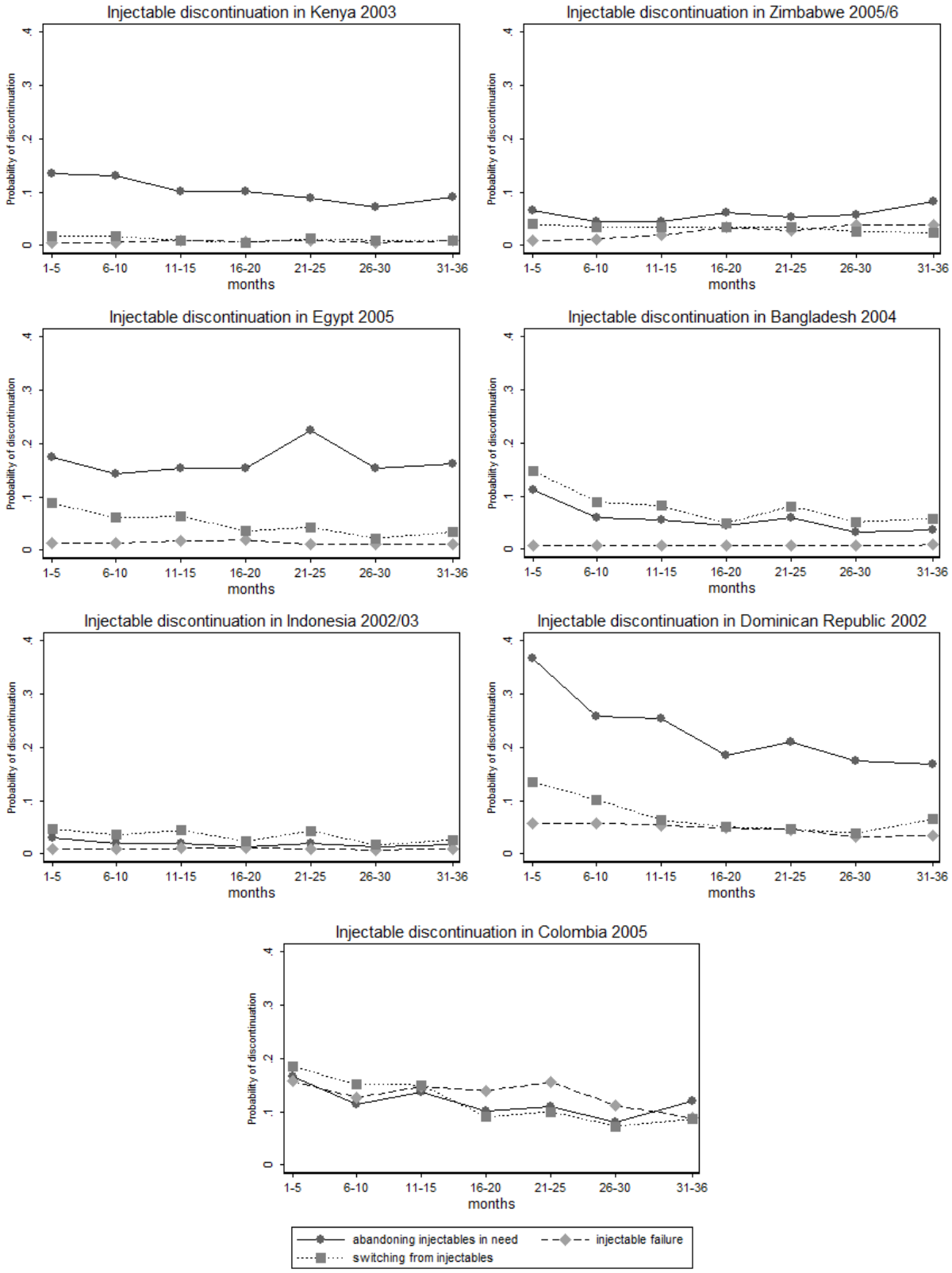


Figure 4.5.3: Baseline hazard of male condom discontinuations by country

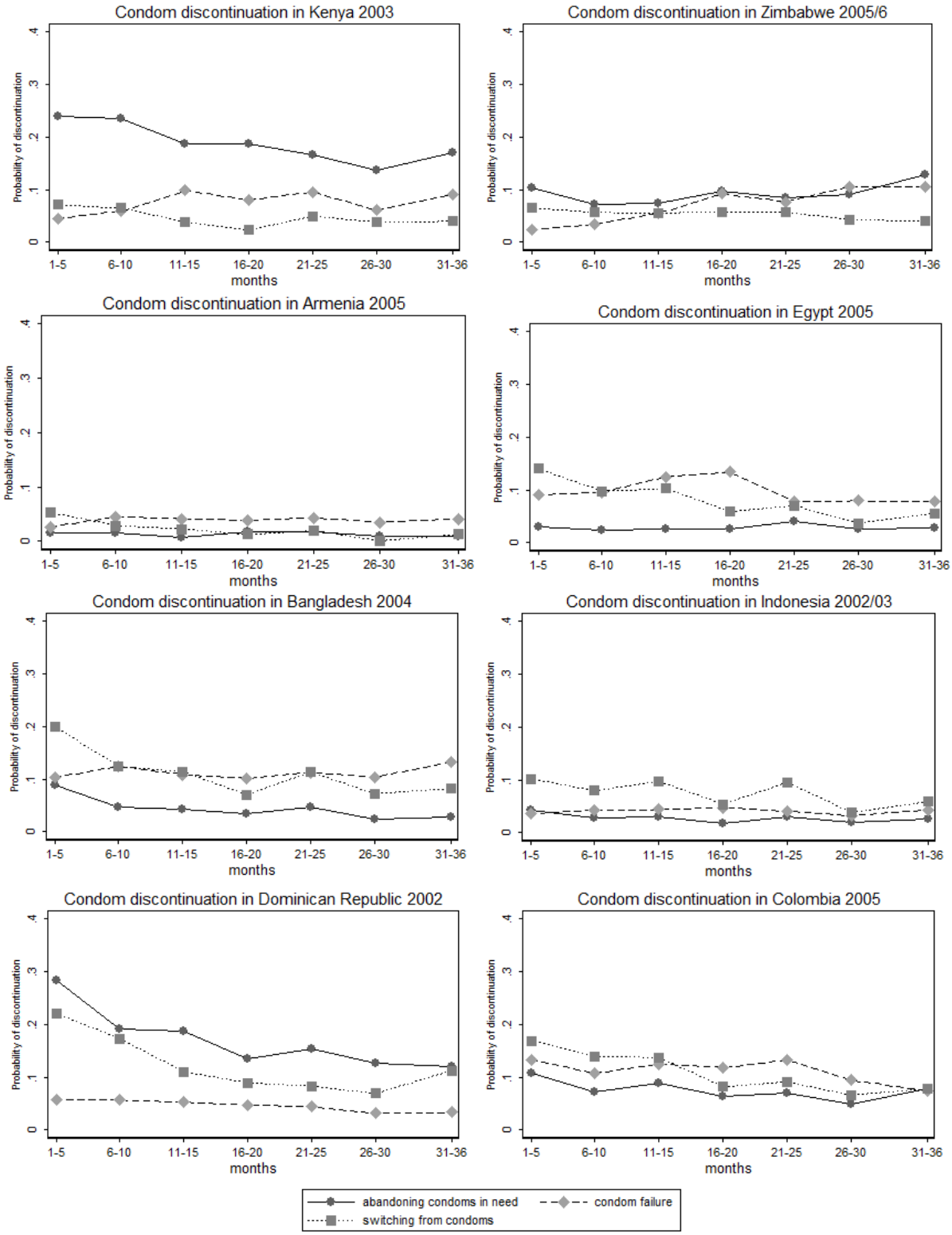
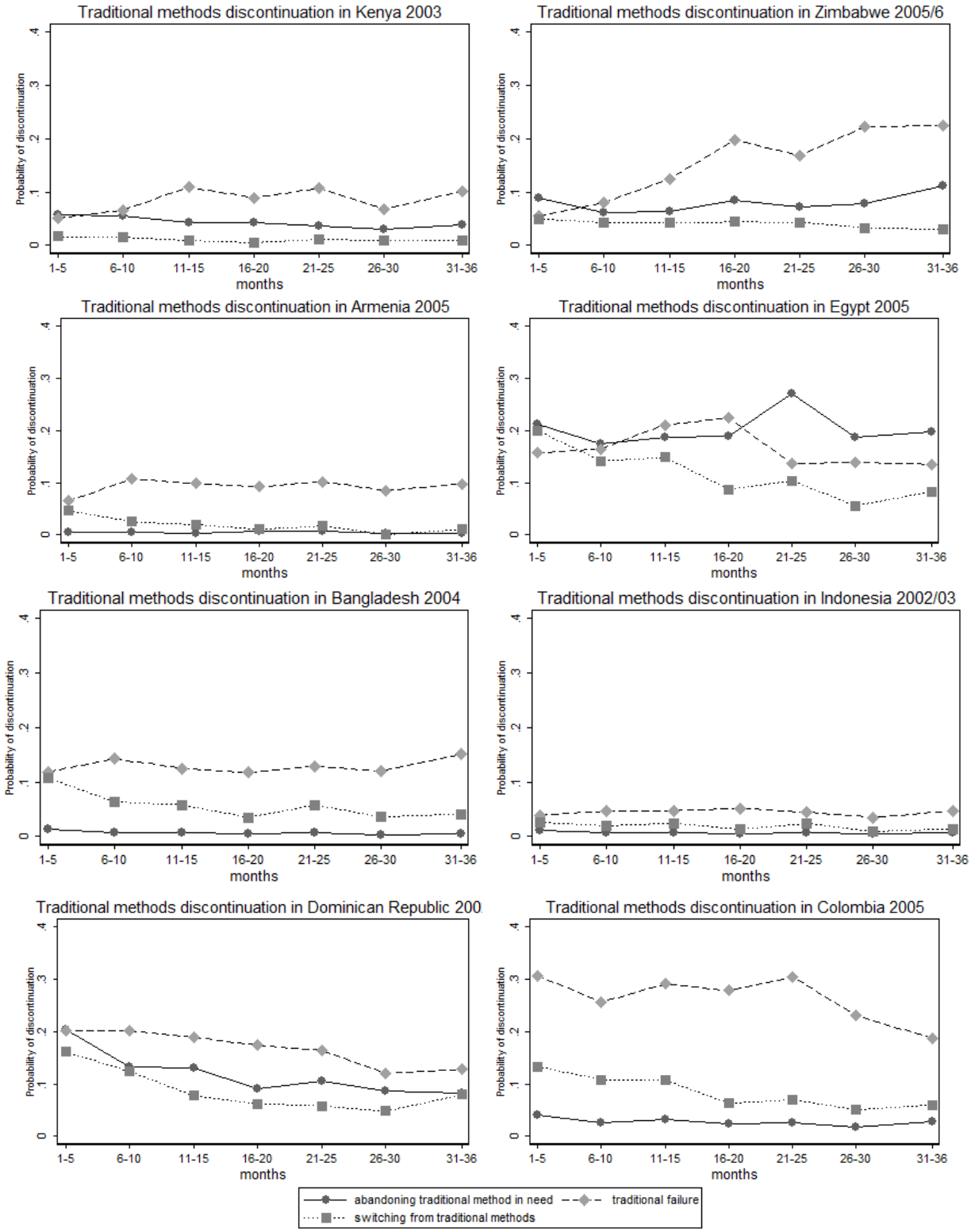


Figure 4.5.4: Baseline hazard of traditional method discontinuations by country



5

Discussion and Recommendations

This report has investigated levels and trends in contraceptive discontinuation in eight diverse countries, focusing on abandonment while in need of contraceptives, failure, and switching. Between 18 and 63 percent of women who began using a reversible method of contraception discontinued it within the first 12 months of use (Table 3.2.1). The majority of these discontinuations were due to reasons other than reduced need in every country. In-need discontinuation rates (rates of discontinuation for reasons other than reduced need) varied across countries and time points, from as low as 12 percent in Zimbabwe in 2005-06 to 47 percent in the Dominican Republic in 1996.

Our analysis cannot draw causal linkages between family planning programs and contraceptive discontinuations; however, previous analyses have shown high correlations between evaluations of family planning efforts and discontinuation rates, particularly in need discontinuation rates (Blanc et al., 2002). This report may provide further evidence in that regard. Several authors have suggested that Kenya's family planning program effort has decreased in recent years (Speizer, 2006; Crichton, 2008; Bongaarts, 2006) and this is reflected in the rates shown in this analysis. While in-need discontinuation rates decreased between the time points studied in most countries in the analysis, all-method in-need discontinuation rates increased in Kenya from 25 to 29 percent. In-need pill discontinuation rates increased in Kenya from 30 to 37 percent between 1999 and 2003, and in-need injectable rates increased from 17 to 26 percent. Given the sharp decrease in Indonesia's most recent Family Planning Effort Index scores, we expected to see increases in discontinuation rates there as well. Instead, the in-need discontinuation rates for Indonesia remained relatively steady during the time points studied. As this report went to press, however, data from 2007 became available for Indonesia, which showed marked increases in discontinuation rates from the 2002-03 survey (Statistics Indonesia and Macro International, 2008). Therefore, it is likely that the decrease in family planning program effort is reflected in the more recent data.

We present two sets of in-need discontinuation rates in this report—with and without switching. In several cases, the differences between the rates are dramatic. For example, Armenia's 2005 in-need condom discontinuation rate was 30 percent when switching was included in the calculation, compared with 4 percent exclusive of switching. Further research in this area could include comparisons of these in-need discontinuation rates and potentially determine whether switching indicates high- or low-quality family planning services. Such research could also help determine whether in-need discontinuation rates that do not include switching are more strongly correlated with family planning program efforts.

All three types of discontinuations studied (abandonment in need, failure, and switching) were found to be strongly associated with the contraceptive method chosen after controlling for other factors, which is consistent with other studies of discontinuation (Steele and Curtis, 2003; Moreno, 1993; Curtis and Blanc, 1997). A woman's age at the time of discontinuation is also consistently associated with all three types of discontinuation. After controlling for other factors, women age 25 and over are significantly less likely to abandon in need, fail, or switch methods

than women age 15-24. This is consistent with previous findings (Ali and Cleland, 1999, Steele and Curtis, 2003; Moreno, 1993). Family planning programs should focus additional efforts on women younger than 25, particularly to decrease rates of failure and abandonment in need in this age group. Women with more than one child are also consistently more likely to fail or switch methods in the first three years of use when compared with women with no children or one child. There is not, however, a consistent relationship between parity and abandonment in need. In countries where the relationship is statistically significant, having worked in the past year is consistently associated with decreased odds of abandonment in need and failure. As hypothesized, this may point to increased intention to avoid pregnancies if women have the opportunity to work. Increased economic opportunities could potentially, therefore, be linked with decreases in rates of abandonment in need and failure, which would help women, couples, and countries achieve their reproductive health goals.

As expected, women's education is negatively associated with abandonment in need and positively associated with switching in all countries for which the relationship is statistically significant. Surprisingly, though, education is positively associated with failure in Kenya, Zimbabwe, and Indonesia. The relationship between failure and education could potentially reflect more accurate reporting of failure among women with higher levels of education. Similarly, higher-than-average contraceptive awareness is positively associated with switching, which was expected. Contraceptive awareness is also positively associated with failure in all countries in which the relationship is significant, however. We had anticipated that awareness of contraceptives would be correlated with knowledge on how to use them and, therefore, be negatively associated with failure. This finding may also be related to better reporting of failure among women who have higher-than-average knowledge about contraceptive methods. Alternatively, this could be related to the fact that this variable only captures whether women have heard of a method, rather than familiarity with how to use each method effectively.

Women whose partners wanted greater or fewer children were more likely to abandon in need than women with the same desired family size as their partners in all countries for which the relationship was significant. A woman's lack of knowledge of her partners' desired family size was associated with significantly higher odds of abandonment in need in Kenya, Egypt, and Bangladesh, and with higher odds of switching to a less effective method in Zimbabwe, Indonesia, and Colombia. Although these results do not determine causation, it seems likely that increases in spousal discussion on fertility desires and contraception would be associated with decreases in abandonment in need and switches to less effective methods, highlighting a possible area for programmatic intervention. This recommendation is supported by other research as well (Ngom, 1997).

Community-level contraceptive prevalence, which was calculated at the cluster level, was consistently negatively associated with abandonment in need and failure (except in Armenia) and positively associated with switching when the relationship was statistically significant. These findings support the assertion that women's contraceptive use is related to norms in their communities. Media exposure, urban-rural residence, and wealth were not consistently related to contraceptive discontinuation, which is similar to findings in previous studies (Ali and Cleland, 1995; Moreno, 1993).

After controlling for other factors in the model, significant cluster-level variance remained in several countries, particularly in models of abandonment in need. As noted by Curtis and Blanc (1997), this variance may capture unobserved effects of the family planning service environment. The service environment includes method availability as well as the quality and availability of counseling on selection of methods and how to properly use contraceptive methods. Thus, it is expected that the local family planning service environment would have an impact on rates of abandonment in need, failure, and switching.

A new strategy used in this study was to examine switching by whether a woman switched to a method that was more or less effective than her current one. Among all switches during the calendar period, the percentage of switching events to a more effective method increased slightly over time in every country studied. Switches to more effective methods were more common than switches to less effective methods in all countries except Bangladesh and Indonesia. The 12-month discontinuation rate was higher for switches to less effective methods than to more effective methods—again, for every country but Bangladesh and Indonesia. In those two countries the rates were almost identical for switches to a more or less effective method. By far the most common reason for switching to a less effective method was health concerns or side effects. This result suggests that better counseling in these areas might have the potential to greatly decrease these types of switches. Wanting a more effective method was a common reason for switching to a more effective method. In every country, at least some women who switched to a less effective method said they made the switch because they wanted a more effective method. This may indicate that women are not well-informed about contraceptive method effectiveness. In particular, many women seem to think the pill is more effective than the injectable. Although the differences in clinical efficacy between hormonal methods are not great, there are larger differences in failure rates in common use as shown in this report. One-year pill failure rates are up to six times higher than injectable failure rates. Given these different failure rates, switching to less effective methods can have a significant impact on the prevalence of unplanned or unwanted pregnancies. It is important that family planning information and counseling incorporate details on method effectiveness to give family planning users all the information on family planning before they make a decision on which method to choose.

Family planning counselors should be aware of the most common reasons for discontinuation of each method. Abandonment while in need is a much more common type of discontinuation seen among pill and injectable users than either failure or switching at almost every time point, controlling for other factors. The primary reason both pill and injectable users discontinued while still in need were health concerns and side effects. When women select either of these methods, counselors should provide women with clear information about potential side effects, and address any concerns women have that these methods may be harmful to their health. Counselors should also be prepared for the fact that the side effects will not be tolerated by some women, and provide options for switching to other methods if they are still trying to avoid becoming pregnant—a more desirable option than abandoning contraception altogether.

The analysis presented here, together with future contraceptive discontinuation analyses, will allow for continuous monitoring of progress along the challenging road to achieving reproductive health goals. This study shows we are still far from reaching the 1994 ICPD goal of the “basic right to decide freely and responsibly the number and spacing of their children and to have the information, education and means to do so.” Results from this study emphasize that

rates of contraceptive discontinuation—even among women who want to avoid pregnancy—remain high and are increasing in some countries where family planning efforts have decreased. If money and political will continue to be drawn away from reproductive health and into other areas, these changes will likely be seen not only in discontinuation rates, but will eventually negatively impact larger reproductive health goals, including increases in unintended pregnancy and maternal mortality.

References

Achécar, M.M., N. Ramírez, J.J. Polanco, L.H. Ochoa, G. Lerebours, and B. García. 2003. *Encuesta Demográfica y de Salud: ENDESA 2002. Centro de Estudios Sociales y Demográficos, Secretaría de Estado de Salud Pública y Asistencia Social, Comisión Ejecutiva para la Reforma del Sector Salud, Consejo Presidencial del SIDA, Agencia de los Estados Unidos para el Desarrollo Internacional, Banco Mundial/CERSS, Banco Interamericano de Desarrollo/CERSS, Programa MEASURE DHS+/ORC Macro*. Santo Domingo: CESDEM.

Agadjanian, V. 2002. Is "abortion culture" fading in the former Soviet Union? Views about abortion and contraception in Kazakhstan. *Studies in Family Planning* 33(3): 237-48.

Ahmed, G., E.C. Liner, N.E. Williamson, and W.P. Schellstede. 1990. Characteristics of condom use and associated problems: Experience in Bangladesh. *Contraception* 42(5): 523-33.

Ali, M., and J. Cleland. 1995. Contraceptive discontinuation in six developing countries: A cause-specific analysis. *International Family Planning Perspectives* 21: 92-97.

Ali, M., and J. Cleland. 1999. Determinants of contraceptive discontinuation in six developing countries. *Journal of Biosocial Science* 31: 343-360.

Arends-Kuenning, M. 2002. Reconsidering the doorstep-delivery system in the Bangladesh Family Planning Program. *Studies in Family Planning* 33(1): 87-102.

Baez, C. 1992. *República Dominicana: La Esterilización como la Opción Unica. Una Solución? Instituto de Estudios de Población y Desarrollo/Demographic and Health Survey/CELADE (Centro Latinoamericano de Demografía)*, Santiago, Chile.

Barkat-e-khuda, N.C. Roy, and D.M. Rahman. 2000. Family planning and fertility in Bangladesh. *Asia-Pacific Population Journal* 15(1): 41-54.

Blanc, A.K., S.L. Curtis, and T.N. Croft. 2002. Monitoring contraceptive continuation: links to fertility outcomes and quality of care. *Studies in Family Planning* 33 (2): 127-140.

Bongaarts, J. 2006. The causes of stalling fertility transitions. *Studies in Family Planning* 37(1): 1-16.

Bongaarts, J., and J. Bruce. 1995. The causes of unmet need for contraception and the social content of services. *Studies in Family Planning* 26(2): 57-75

Bulatao, R.A. 1989. Toward a framework for understanding contraceptive method choice. In R.A. Bulatao, J.A. Palmore, and S.E. Ward (eds.), *Choosing a contraceptive: Method choice in Asia and the United States*. Boulder, Colorado: Westview Press, 277-304.

Castro Martín, T. 1995. Women's education and fertility: Results from 26 Demographic and Health Surveys. *Studies in Family Planning* 26(4): 187-202.

Cleland, J., and M.M. Ali. 2004. Reproductive consequences of contraceptive failure in 19 developing countries. *Obstetrics & Gynecology* 104(2): 314-320.

Coviello, V., and M. Boggess. 2004. Cumulative incidence estimation in the presence of competing risks. *The Stata Journal* 4(2): 103-112.

Creanga, A.A., R. Acharya, S. Ahmed, and A.O. Tsui. 2007. Contraceptive discontinuation and failure and subsequent abortion in Romania: 1994-99. *Studies in Family Planning* 38(1): 23-34.

Crichton, J. 2008. Changing fortunes: analysis of fluctuating policy space for family planning in Kenya. *Health Policy and Planning* 23(5): 339-350.

Curtis S.L., and C.R. Hammerslough. 1995. *Model further analysis plan: Contraceptive use dynamics*. Calverton, Maryland: Macro International Inc.

Curtis, S.L. 1996. The impact of postpartum redundant use of contraception on contraceptive failures. *Demography* 33(1): 24-34.

Curtis, S.L., and A. Blanc. 1997. *Determinants of contraceptive failure, switching, and discontinuation: An analysis of DHS contraceptive histories.* DHS Analytical reports No. 6. Calverton, Maryland: Macro International Inc.

D'Agostino, R.B., M.L. Lee, A.J. Belanger, L.A. Cupples, K. Anderson, and W.B. Kannel. 1990. Relation of pooled logistic regression to time dependent Cox regression analysis: The Framingham Heart Study. *Statistics in Medicine* 9(12): 1501-1515.

Diani, H. 2009. Experts sound warning on impact of Islamic conservatism on population growth. *The Jakarta Globe*. 1 January 2009. Accessed at http://www.thejakartaglobe.com/news/article/4744.html

Ferguson, A.G. 1992. Fertility and contraceptive adoption and discontinuation in rural Kenya. *Studies in Family Planning* 23(4): 257-267.

Farley, T.M.M., M.M. Ali, and E. Slaymaker. 2001. Competing approaches to analysis of failure times with competing risks. *Statistics in Medicine* 20: 3601-3610.

Goldman, N., A.R. Pebeley, C.F. Westoff, and E.P. Loos. 1983. Contraceptive failure rates in Latin America. *International Family Planning Perspectives* 9(2): 50-57.

Hatcher RA, Rinehart W, Blackburn R, Geller JS, Shelton JD. 2003. *The Essentials of Contraceptive Technology*. Baltimore, Johns Hopkins Bloomberg School of Public Health, Population Information Program.

Jacobson, J.L. 1990. Out from behind the contraceptive Iron Curtain. *World Watch* 3(5): 29-34.

Jain, A. 1989. Fertility reduction and the quality of family planning services. *Studies in Family Planning* 20: 1-16.

Janowitz, B., M. Holtman, D. Hubacher, and K. Jamil. 1997. Can the Bangladeshi family planning program meet rising needs without raising costs? *International Family Planning Perspectives* 23(3): 116-121.

Jejeebhoy, S. 1991. Measuring contraceptive use-failure and continuation: An overview of new approaches. In *Measuring the Dynamics of Contraceptive Use*. New York: United Nations, pp. 21-51.

Johnson, K. 2007. *Migration, Economy and Policy: Recent Changes in Armenia's Demographic and Health Indicators: Further Analysis of Data from the Armenia Demographic and Health Surveys. DHS Trend Report No. 3*. Calverton, Maryland, USA: Macro International Inc.

Levine, R. 2007. *Case studies in global health: Millions saved*. Sudbury, Massachusetts: Jones & Bartlett.

Lutalo, T., M. Kidugavu, M.J. Wawer, D. Serwadda, L.S. Zabin, and R.H. Gray. 2000. Trends and determinants of contraceptive use in Rakai District, Uganda, 1995-98. *Studies in Family Planning* 31(3): 217-227.

Mize, L.S., and B. Robey. 2006. *A 35 year commitment to family planning in Indonesia: BKKBN and USAID's historic partnership*. Baltimore: Johns Hopkins Bloomberg School of Public Health/Center for Communication Programs.

Moreno, L., and N. Goldman. 1991. Contraceptive failure rates in developing countries: Evidence from the Demographic and Health Surveys. *International Family Planning Perspectives* 17(2): 44-49.

Moreno, L. 1993. Differences by residence and education in contraceptive failure rates in developing countries. *International Family Planning Perspectives* 19(2): 54-60, 71.

National Statistical Service [Armenia], Ministry of Health [Armenia], and ORC Macro. 2006. *Armenia Demographic and Health Survey 2005*. Calverton, Maryland: National Statistical Service, Ministry of Health, and ORC Macro.

Ngom, P. 1997. Men's unmet need for family planning: Implications for African fertility transitions. *Studies in Family Planning* 28(3): 192-202.

Ojeda, G., M. Ordóñez, and L.H. Ochoa. 2005. *Salud Sexual y Reproductiva: Resultados Encuesta Nacional de Demografía y Salud 2005*. Bogotá, Colombia: Profamilia.

Petrikovsky, B.M., and B. Hoegsberg. 1990. Obstetrics and gynecology in the USSR. *Obstetrics & Gynecology* 75(1): 128-130.

Ping, T. 1995. IUD discontinuation patterns and correlates in four counties in North China. *Studies in Family Planning* 26(3): 169-179.

Popov, A.A. 1991. Family planning and induced abortion in the USSR: basic health and demographic characteristics. *Studies in Family Planning* 22(6): 368-77.

Popov, A.A., A.P. Visser, and E. Ketting. 1993. Contraceptive knowledge, attitudes, and practice in Russia during the 1980s. *Studies in Family Planning* 24(4): 227-35.

Potts, M. 1991. The challenge of the 1990s. *IPPF Medical Bulletin* 25(1): 1-3.

Riley, A.P., M.K. Stewart, and J. Chakraborty. 1994. Program- and method-related determinants of first DMPA use duration in rural Bangladesh. *Studies in Family Planning* 25(5): 255-267.

Ross, J., J. Stover, and D. Adelaja. 2007. Family planning programs in 2004: New assessments in a changing environment. *International Family Planning Perspectives* 33(1): 22-30.

Ross, J. and J. Stover. 2001. The Family planning program effort index: 1999 Cycle. *International Family Planning Perspectives* 27(3): 119-129.

Rutstein, S.O., and K. Johnson. 2004. *The DHS Wealth Index.* DHS Comparative Reports No. 6. Calverton, Maryland: ORC Macro.

Saleem, S., and M. Bobak. 2005. Women's autonomy, education and contraception use in Pakistan: A national study. *Reproductive Health* 21(2): 8.

Sambisa, W. 1996. *Contraceptive use dynamics in Zimbabwe: Discontinuation, switching, and failure. Zimbabwe Further Analysis*. Calverton, Maryland: Macro International Inc.

Sambisa, W., and S.L. Curtis. 1997. *Contraceptive use dynamics in Zimbabwe: Postpartum contraceptive behaviour. Zimbabwe Further Analysis*. Calverton, Maryland: Macro International Inc.

Schoemaker, J. 2005. Contraceptive use among the poor in Indonesia. *International Family Planning Perspectives* 31(3): 106-114.

Schuler, S.R., S.M. Hashemi, and A.H. Jenkins. 1995. Bangladesh's family planning success story: A gender perspective. *International Family Planning Perspectives* 21(4): 132–137.

Sedgh, G., R. Hussain, A. Bankole, and S. Singh. 2007. *Women with an unmet need for contraception in developing countries and their reasons for not using a method. Occasional Report No. 37*. New York: Guttmacher Institute.

Speizer, I.S. 2006. Using strength of fertility motivations to identify family planning program strategies. *International Family Planning Perspectives* 32(4): 185-191

Spira, A. 1994. Contraception by the end of the 20th century. *Human Reproduction* 9(3): 445-447.

Statistics Indonesia (Badan Pusat Statistik—BPS) and Macro International Inc. 2008. *Indonesia Demographic and Health Survey 2007*. Calverton, Maryland: BPS and Macro International Inc.

Steele, F., and S. Curtis. 2003. Appropriate methods for analyzing the effect of method choice on contraceptive discontinuation. *Demography* 40(1): 1-22.

Steele, F., and I. Diamond. 1999. Contraceptive switching in Bangladesh. *Studies in Family Planning* 30(4): 315-28.

Steele, F., I. Diamond, and D. Wang. 1996. The determinants of the duration of contraceptive use in China: A multilevel multinominal discrete-hazards modeling approach. *Demography* 33(1): 12-23.

Strickler, J.A., R.J. Magnani, H.G. McCann, L.F. Brown, and J.C. Rice. 1997. The reliability of reporting of contraceptive behavior in DHS calendar data: Evidence from Morocco. *Studies in Family Planning* 28(1): 44-53.

Sullivan T.M., J.T. Bertrand, J. Rice, and J.D. Shelton. 2006. Skewed contraceptive method mix: Why it happens, why it matters. *Journal of Biosocial Science* 38(4): 501-521

Taniguchi, H. 1991. The agenda for family planning in the USSR. *Integration* 292-293.

Thompson, M.E., and T.L. Harutyunyan. 2006. Contraceptive practices in Armenia: Panel evaluation of an Information-Education-Communication Campaign. *Social Science & Medicine* 63(11): 2770-2783.

United Nations (UN). 1994. *A/CONF.171/13: Report of the International Conference on Population and Development (94/10/18)*. Available at: http://www.un.org/popin/icpd/conference/offeng/poa.html

United Nations Population Division (UNDP). 2004. *Levels and trends of contraceptive use as assessed in 2002*. Geneva: United Nations Publications.

Vjatere, D. 1995. Family planning in Latvia: A blossoming flower. *Planned Parenthood in Europe* 24(2): 31-33.

World Health Organization (WHO). 2007. *Selected practice recommendations for contraceptive use* (2nd ed.). Geneva: Department of Reproductive Health and Research, Family and Community Health, World Health Organization.

World Health Organization Department of Reproductive Health and Research (WHO/RHR) and Johns Hopkins Bloomberg School of Public Health/Center for Communication Programs (CCP), INFO Project. 2007. *Family planning: A global handbook for providers*. Baltimore and Geneva: CCP and WHO.

Westoff, C.F. 2001. *Unmet need at the end of the century*. DHS Comparative Reports No. 1. Calverton, Maryland: ORC Macro.

Westoff, C.F. 2006. *New estimates of unmet need and the demand for family planning.* DHS Comparative Reports No. 14. Calverton, Maryland: Macro International Inc.

Westoff, C.F., and A.R. Cross. 2006. *The stall in the fertility transition in Kenya.* DHS Analytical Studies No. 9. Calverton, Maryland: ORC Macro.

Appendix 1: Methods

Calendar Data

The calendar is a month-by-month history of pregnancies, births, terminations, and episodes of contraceptive use going back at least five years before the date of interview. In surveys with an "expanded" monthly calendar (which includes all surveys used in this analysis), for any month in which a woman discontinued contraception she was asked for the primary reason she stopped using that method.

The earliest date in the calendar, or the month farthest back in time, is the same for every woman in a survey. The latest or most recent month in the calendar, however, is dependent upon the month of interview. For example, in the Zimbabwe 2005-06 survey, every woman was asked to describe her reproductive history for each month beginning in January 2000. Women were asked about any births, pregnancies, terminations, or contraceptive use that occurred up to the date of their interview, which ranged from August 2005 to April 2006. The length of the calendar therefore ranged from 68 months for women who were interviewed in August 2005 to 76 months for women interviewed in April 2006.

Period of Observation

Discontinuation rates

The period of observation is defined as the period during which women may be exposed to the risk of discontinuing a contraceptive method. To standardize this exposure length for all women, we defined the period of observation as 60 months. Women may not know they are pregnant in the first trimester, and so may not report recent pregnancies when surveyed. This may lead to biased failure rates (Moreno, 1993). Therefore, in discontinuation rate calculation, we censored episodes of contraceptive use that ended within the three months before the interview or that continued through the interview date, treating these episodes as non-discontinuations. For discontinuation rates, the beginning of the period of observation is 62 months preceding the survey interview date, and the end of the period is three months preceding the survey. Episodes of use that began and ended earlier than 62 months before the interview date were dropped from the sample. Episodes of use that began prior to 62 months before the interview date and ended within the period of observation were included as late entries.

Hazard models

In the hazard models, we used only the most recent observation from each woman. This decision was made primarily to avoid, as much as possible, assigning data from the date of interview to an event that may have occurred up to five years in the past. A woman's wealth, education level, and contraceptive awareness could have been significantly different at the time of an episode of discontinuation than it was at the time of her interview several years later. We have no way to estimate any changes in these variables over time, which could lead to biases in our results that we would have no way to detect. (Dates of birth for the woman and for each of her births are

included in the dataset, however, allowing us to calculate her age and parity at the time of each event, so these variables are not subject to this problem.)

As we were not concerned about the risk of underestimating failure in the hazard models, we did not exclude the most recent three months from our period of observation. This change has the added benefit of allowing us to include discontinuations that occurred in the three months preceding the interview, providing more recent data that is less likely to be affected by changes in the independent variables between the time of interview and the time of discontinuation. Episodes of use that continued into the month of interview are censored.

Most women who discontinued during the calendar period did so within the first three years of contraceptive use. The number of women who discontinued after three years of use in most countries was very small, leading to unstable results for longer durations of use. Therefore, we censored episodes of contraceptive use longer than three years in the hazard models, treating them as non-discontinuations and including them in the reference category "did not abandon in need." To preserve sample size for discontinuations, if a woman's most recent episode of use continued into the month of interview, we looked backwards to find the most recent discontinuation that occurred after less than 36 months of continued use.

The outcomes of interest in the hazard models are abandonment in need, failure, switching, and (where sample size allowed), switching to more effective or less effective methods. The reference category for all models is women who either abandoned due to reduced need or did not discontinue (i.e., all women who did not discontinue while still in need of contraception).

An argument could be made that women who switched methods did not abandon in need, but instead continued using another method, and so should be compared with women who did abandon in need. Though we do not dispute the validity of this argument, we use the same reference category for all models to make results across models as comparable as possible.

In both discontinuation rates and hazard models, episodes of contraceptive use that began in the first month of the calendar were excluded from analysis, as we have no way to determine the length of use preceding the calendar start date.

Dataset Creation

The DHS has created a system for generating events-based datasets from the calendar data, where each change in the calendar becomes one observation, or "row," in a dataset. Each event in the calendar—an episode of contraceptive use, a pregnancy, a birth, a termination, or an episode of contraceptive non-use—is converted from the calendar string (the VCAL variables in individual recode or woman-based datasets) into a separate observation for analysis. The start and end date of each event is also recoded, allowing us to calculate directly the duration of the event, women's age, women's parity, and children ever born (using the birth history) at the start or end of each event.

We used these events-based datasets, which are updated forms of the datasets produced using the CAL2SPSS program referred to in Curtis and Hammerslough (1995), for the analyses shown in this report. This report presents one example of the type of analysis that can be conducted using

calendar data. We hope that making events-based datasets more widely available will increase use of these data. The DHS plans to make events-based datasets available for all recent surveys with expanded monthly calendars, available for download at http://www.measuredhs.com.

Model Selection and Dataset Creation for Multivariate Hazard Models

We chose to use discrete rather than continuous time survival analysis because we have time-to-event data. Our episode duration data are discrete, as contraceptive use duration is calculated in months. A second reason for considering these data to represent discrete time is the large number of ties in the data, or events that occurred at the same time point. As calendar data are collected in months, it is inevitable that many women will discontinue in the same month. As pointed out by Ali and Cleland (1999), use of continuous time models such as the Cox proportional hazard models in the presence of ties can lead to serious biases.

In determining the type of model to use, we examined the baseline hazards for each country month-by-month, by expanding the events-based dataset into a "long" form in which each month of exposure became a separate record. Including all 36 months as separate covariates in the model would have (1) been excessive, (2) decreased the statistical power, and (3) dropped months of exposure in which there were no events. The latter was a particular problem in longer exposure lengths when the risks of discontinuation became rare. We decided to use five-month intervals to smooth out some heaping, which occurred at months 6 and 12 (see Appendix 2). This prevented any interval from dropping out of the model due to a lack of discontinuations during the interval. We created five-month intervals for months 1-30 and a final six-month interval for months 31-36. We then created a person-period dataset in which the interval was represented by one record. This model allows the slope of the baseline hazard to change at each interval, giving us the option to examine the odds of discontinuation in each time period, as well as for the entire period of observation.

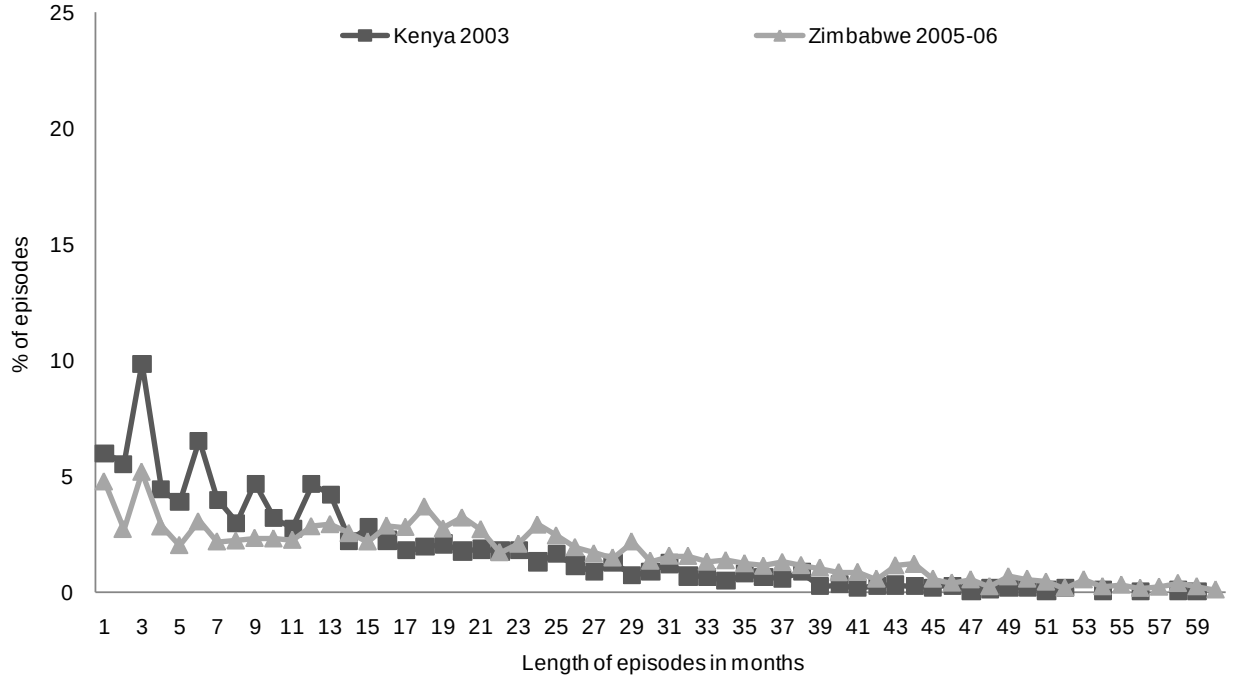
The pooled logistic regression model assumes proportional odds (i.e., that the effects of different independent variables do not change over time). We tested this assumption for each model in each country and found a few violations of the assumption, but none that were consistent across each country and model. Attempting to address this assumption by introducing interactions for the non-proportional variables with time produced results that were rarely significant did not improve model fit; moreover, it did not increase interpretability of the results. Therefore, we did not include these interaction effects.

Appendix 2: Data Quality

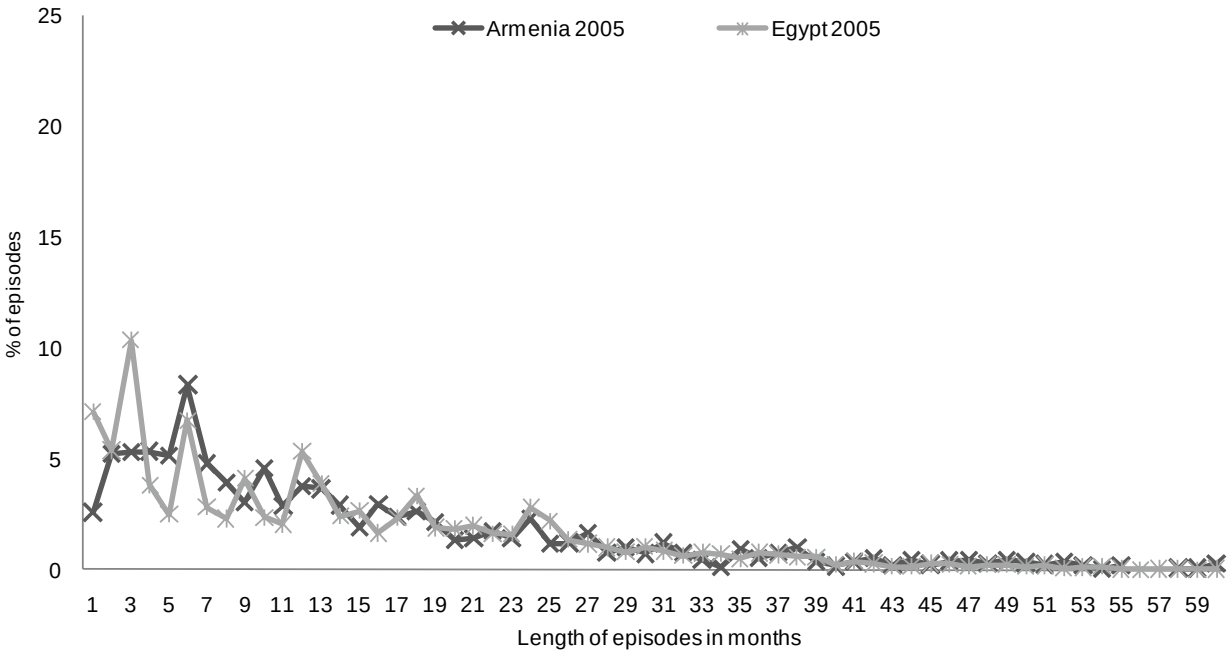
Often, data reported retrospectively show patterns of heaping around common time intervals. For example, a woman may report her pill use as a one-year duration although, in actuality, it may have been 11 months in length. While retrospective recall ability may be of concern, there are certain situations in which one would expect to see accurate contraceptive use duration heaping. For example, in a country where the most commonly used method is three-month injectables, one would expect to see true contraceptive use duration heaping at three-month intervals. Consideration of the method mix in each country is necessary when examining contraceptive use duration heaping, in order to make reasonable conclusions about the extent that data heaping affects the data quality.

To examine the quality of the calendar data used in this study, we first graphed the distribution of the duration of episodes of use to look for heaping, as discussed in the limitations section. These graphs are shown in Appendix Figures 1.1-1.4. We expect countries where large proportions of women use three-month injectables to show what looks like heaping around three-month intervals, but likely accurately reflects discontinuations. As shown, large proportions of women discontinue use at 3, 6, 9, and 12 months in Kenya, Bangladesh, and especially Indonesia—all countries in which over 10 percent of women use injectables. Heaping around three-month intervals is seen to a lesser extent in Zimbabwe and Egypt, which could also be attributable to injectable use. Heaping at 6 and 12 months is seen in all countries, but overall the heaping seen here is probably not severe enough to significantly affect estimates of discontinuation.

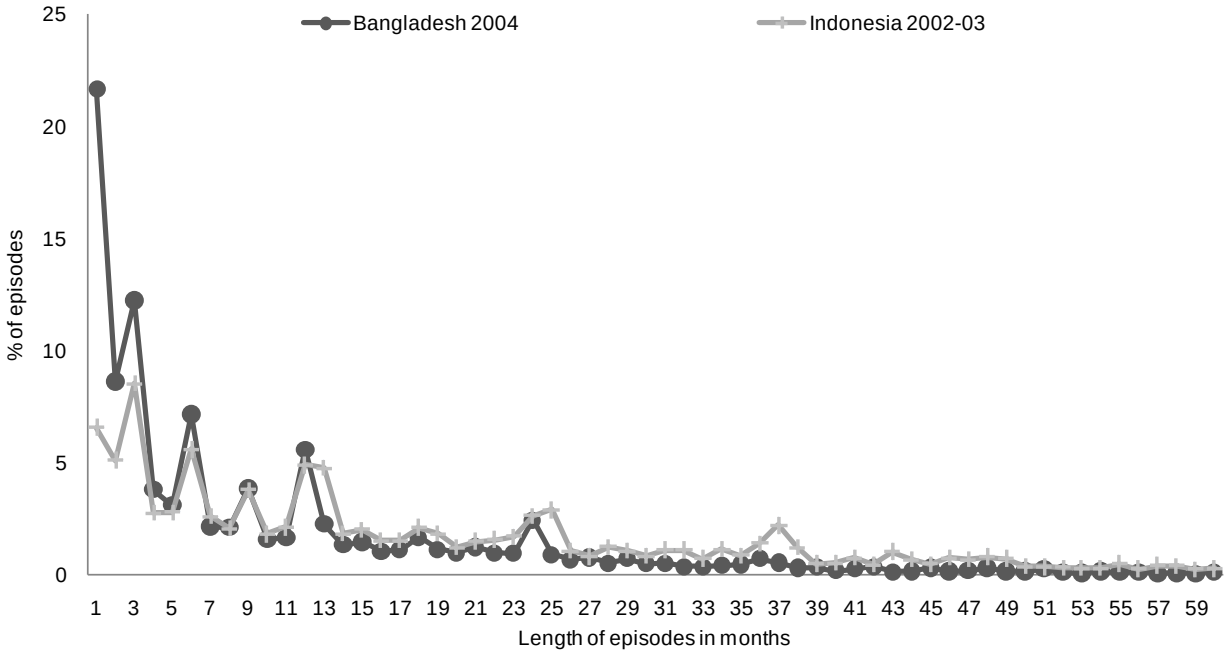
Appendix Figure 1.1: Percent distribution of reported durations of episodes of contraceptive use, Kenya and Zimbabwe



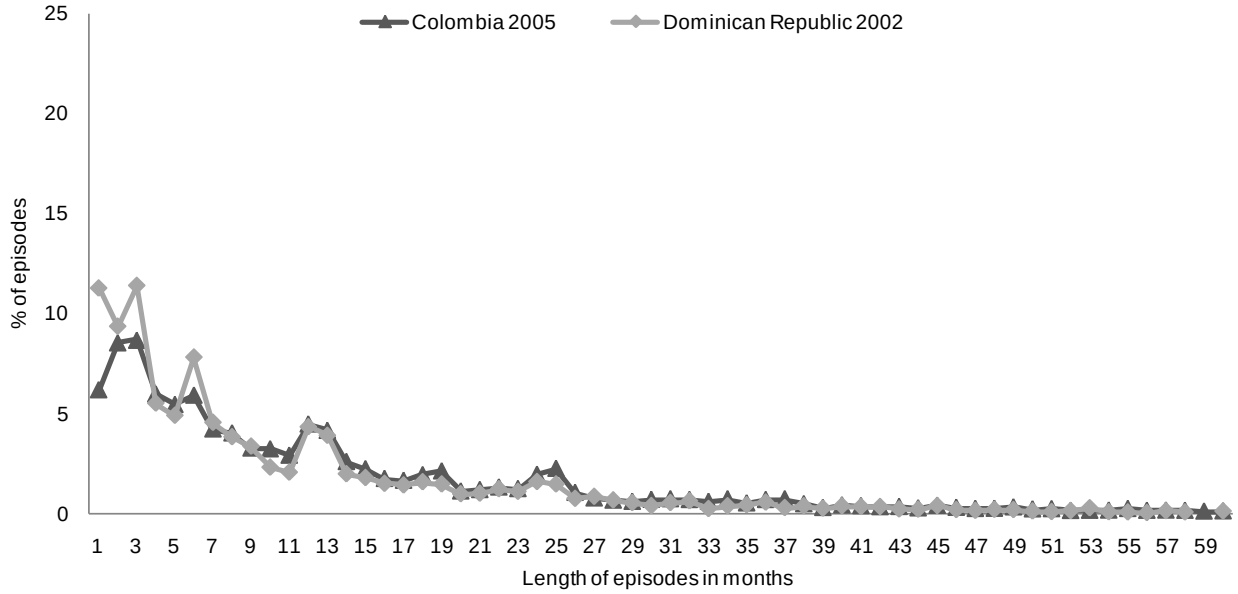
Appendix Figure 1.2: Percent distribution of reported durations of episodes of contraceptive use, Armenia and Egypt



Appendix Figure 1.3: Percent distribution of reported durations of episodes of contraceptive use, Bangladesh and Indonesia



Appendix Figure 1.4: Percent distribution of reported durations of episodes of contraceptive use, Colombia and the Dominican Republic



Another measure of data quality is shown in Appendix Table 1, which examines estimates of contraceptive prevalence using current status data, compared with contraceptive prevalence from calendar data for the same point in time. Women who were 20-49 years old at the time of the later survey would have been 15-44 years old at a survey conducted five years earlier, and ages have been adjusted accordingly. A full description of the methods used to create this table is given in Curtis and Hammerslough (1995).

If the calendar data were complete, we would expect the contraceptive prevalence estimates from the calendar data to be very close to the current status estimates. When Curtis and Blanc (1997) performed this comparison on earlier surveys, their current status and calendar estimates were remarkably similar, with less than one percentage point difference in the two CPR estimates in several countries. Our estimates are not as similar. The closest estimates are in Egypt, with only a two percentage point difference in estimates. The difference is largest in Indonesia, at 8 percentage points. Many of the discrepancies can be attributed to underreporting in the calendar of traditional method use in Armenia, Bangladesh, and Colombia. Surprisingly, sterilization appears to be under-reported in the calendar in Kenya and Armenia. Overall, the differences are not large, but the consistently lower estimates from calendar data compared with current status data may suggest that not all contraceptive use is being captured in the calendar; therefore, discontinuation rates may be slightly underestimated.

Appendix Table 1: Data Quality—Consistency between calendar and current status (CS) data. Percentage of currently married women using contraception at time of earlier survey from current status data and from calendar data for the corresponding point in time

	Kenya 1998		Armenia 2000		Egypt 2000		Bangladesh 1999-2000		Indonesia 1997		Colombia 2000	
	Kenya 2003 calendar	Kenya 1998 CS	Armenia 2005 calendar	Armenia 2000 CS	Egypt 2005 calendar	Egypt 2000 CS	Bangladesh 2004 calendar	Bangladesh 1999-2000 CS	Indonesia 2002-03 calendar	Indonesia 1997 DHS	Colombia 2005 calendar	Colombia 2000 CS
Ages	20-49	15-44	20-49	15-44	20-49	15-44	20-49	15-44	20-49	15-44	20-49	15-44
Pill	7.8	8.9	1.1	1.3	9.6	9.9	24.1	24.5	13.2	16.5	13.9	12.9
IUD	2.7	2.7	8.5	10.1	35.9	37.4	1.0	1.3	7.2	7.8	12.6	13.2
Injectables	10.7	12.3	0.0	0.1	5.9	6.3	7.4	7.8	20.8	23.1	4 8	4.5
Male condom	0.9	1.3	8.2	7.7	0.8	0.9	2.6	4.5	0.4	0.7	4 3	6.6
Sterilization (female or male)	3.7	5.7	0.6	2.2	1.0	1.1	6.5	6.3	3.8	2.9	24.8	25.7
Other modern methods	0.9	1.0	0.2	0.2	0.5	0.4	0.6	0.5	4.1	6.5	1.1	1.0
Periodic abstinence	4.6	6.3	4.1	4.7	0.6	0.5	6.0	5.3	1.3	1.1	4.6	5.9
Withdrawal	0.3	0.6	30.2	34.5	0.3	0.2	2.1	4.1	1.2	0.8	4.7	6.4
Other traditional methods	0.6	0.8	2.1	1.3	1.6	1.5	0.4	0.9	0.5	0.7	1 3	1.4
Total	32.3	39.6	55.0	62.2	56.1	58.2	50.6	55.2	52.5	60.2	72.1	77.7
N	4,059	4,469	3,503	3,484	14,849	12,522	8,720	8,837	23,357	24,032	17,295	5,248

More than five years passed between surveys in Zimbabwe and the Dominican Republic. The calendar period of he later survey did not cover the earlier survey, and so data for Zimbabwe and the Dominican Republic are not available.

Appendix Table 2: Percent distribution of reasons for discontinuation by most common methods among married women 15-49 who discontinued contraceptives in the last five years, DHS surveys 1996-2006

	Pills														
	Not in need				In need										
					Failure	Health and side effects		Method-related		Cost/access		Opposition			
	Wanted to become pregnant	No/ infrequent sex/husband away	Marital dissolu ion/ separation	Difficult to get pregnant/ menopause	Became pregnant while using	Side effects	Health concerns	Wanted more effective method	Inconvenient to use	Lack of access/ too far	Costs too much	Husband opposed	Other/ don't know	Total	Number of episodes
Sub-Saharan Africa															
Kenya 1998	27.1	1.6	0.0	0 3	8.6	31.9	5.7	3.8	4 3	2.4	0.9	3.4	10.1	100.0	469
Kenya 2003	20.3	2.9	0.3	0 0	10.0	38.6	4.6	5.1	5.6	3 9	0.7	3.4	4.7	100.0	544
Zimbabwe 1999	38.8	2.2	0.1	0 3	15.6	10.6	6.1	3.9	3 2	5 0	3.3	4.1	6 8	100.0	1,009
Zimbabwe 2005-06	47.1	3.3	0.4	0 2	15.9	9.1	3.9	3.4	5.6	3 8	0.5	1.9	4 9	100.0	1,572
North Africa/West Asia/Europe															
Armenia 2000	7.8	5.7	0.0	0 0	17.2	7.4	36.9	4.8	4 3	7 0	7.1	0.0	1 8	100.0	64
Armenia 2005	11.2	14.3	0.0	0 0	26.1	3.7	21.1	4.0	11.6	0 0	5.1	0.0	3 0	100.0	63
Egypt 2000	20.9	14.2	0.1	0 3	12.3	35.5	5.4	5.7	0 8	0.4	0.2	1.3	2 9	100.0	1,687
Egypt 2005	21.2	14.8	0.2	0 3	13.9	32.2	2.3	8.7	1 3	0.4	0.4	0.6	3.7	100.0	2,685
South/Southeast Asia															
Bangladesh 1999-2000	20.4	6.5	0.0	0 3	7.7	36.4	8.1	2.9	2 5	2 9	0.7	2.1	9 5	100.0	2,672
Bangladesh 2004	22.8	12.5	0.0	0 3	10.2	35.0	6.6	3.0	3 5	1 2	0.5	0.9	3.7	100.0	3,410
Indonesia 1997	33.5	3.4	0.5	0 3	14.0	14.1	15.5	11.0	1 5	0 8	0.3	0.8	4.4	100.0	2,746
Indonesia 2002-03	30.2	1.6	0.4	0.4	14.8	14.1	8.9	10.7	2.4	0 9	1.1	0.3	14.1	100.0	2,575
Latin America and the Caribbean															
Colombia 2000	19.8	4.6	0.8	0.1	14.8	32.2	3.8	4.4	8 2	1.6	4.8	0.5	4.4	100.0	1,101
Colombia 2005	17.9	2.7	0.9	0 3	14.4	29.9	7.5	6.3	9.1	2 2	5.5	0.4	2 8	100.0	3,273
Dominican Republic 1996	21.2	9.3	2.4	0 0	11.6	34.9	5.6	1.6	0 9	1 3	0.9	1.2	9.1	100.0	1,476
Dominican Republic 2002	22.8	6.0	2.2	0.1	14.6	29.2	6.5	2.6	2.6	2.7	0.8	1.1	8 9	100.0	3,898

continued

Appendix Table 2 (continued). Percent distribution of reasons for discontinuation by most common methods among married women 15-49 who discontinued contraceptives in the last five years, DHS surveys 1996-2006

	Injectables														
	Not in need				In need										
					Failure	Health and side effects		Method-related		Cost/access		Opposition			
	Wanted to become pregnant	No/ infrequent sex/husband away	Marital dissolu ion/ separation	Difficult to get pregnant/ menopause	Became pregnant while using	Side effects	Health concerns	Wanted more effective method	Inconvenient to use	Lack of access/ too far	Costs too much	Husband opposed	Other/ don't know	Total	Number of episodes
Sub-Saharan Africa															
Kenya 1998	25.1	1.2	0.0	0 0	4.2	40.9	8.1	2.0	1.1	2 2	0.4	3.3	11.5	100.0	301
Kenya 2003	22.2	3.0	0.3	0 5	3.8	47.9	5.0	1.0	0 5	2.1	2.5	4.5	6 5	100.0	528
Zimbabwe 1999	20.7	2.3	1.1	0 3	6.4	30.5	15.9	0.3	0 9	6.6	7.4	1.4	6 2	100.0	289
Zimbabwe 2005-06	25.9	3.6	0.8	0 5	6.4	26.1	10.3	2.5	7 2	7.1	1.6	1.8	6 3	100.0	370
North Africa/West Asia/Europe															
Egypt 2000	10.1	7.3	0.0	0.7	1.5	61.3	7.6	3.3	0.6	1 2	0.1	0.6	5.6	100.0	829
Egypt 2005	12.2	10.4	0.1	1 5	2.8	59.5	2.7	1.3	1	0 8	0.1	0.6	7	100.0	1,544
South/Southeast Asia															
Bangladesh 1999-2000	9.8	1.6	0.0	0 0	2.9	62.7	7.1	0.7	0 3	5 3	0.9	1.5	7 3	100.0	832
Bangladesh 2004	12.4	4.1	0.2	2 2	1.2	54.9	10.9	1.1	0 8	6 5	0.2	1.2	4 5	100.0	1,065
Indonesia 1997	25.2	1.5	0.2	0.4	6.6	25.1	22.1	4.8	1.1	1 5	6.9	0.3	4 2	100.0	3,211
Indonesia 2002-03	28.7	2.1	0.4	0 3	5.2	24.0	15.0	6.3	2.1	0 8	3.8	0.4	10.9	100.0	3,465
Latin America and the Caribbean															
Colombia 2000	12.0	3.9	0.5	0 0	9.5	44.5	3.9	5.3	8.1	1 0	6.0	0.6	4 8	100.0	543
Colombia 2005	14.0	2.6	0.7	0.7	12.0	35.7	8.6	7.1	6 0	1 8	7.2	0.5	3 3	100.0	2,276
Dominican Republic 1996	3.8	3.8	0.0	0 0	0.6	59.0	8.5	3.5	0 0	7.7	3.1	0.0	9 8	100.0	73
Dominican Republic 2002	10.1	2.5	1.7	1 2	6.8	44.5	10.5	3.9	4.6	3 8	0.9	0.2	9 3	100.0	723

Observations from Armenia not shown.

continued

Appendix Table 2 (continued). Percent distribution of reasons for discontinuation by most common methods among married women 15-49 who discontinued contraceptives in the last five years, DHS surveys 1996-2006

IUDs															
	Not in need				In need										
					Failure	Health and side effects		Method-related		Cost/access		Opposition			
	Wanted to become pregnant	No/ infrequent sex/husband away	Marital dissolu ion/ separation	Difficult to get pregnant/ menopause	Became pregnant while using	Side effects	Health concerns	Wanted more effective method	Inconvenient to use	Lack of access/ too far	Costs too much	Husband opposed	Other/ don't know	Total	Number of episodes
North Africa/West Asia/Europe															
Armenia 2000	7.2	1.4	1.4	11.8	11.8	61.8	0.0	0.0	1.7	0 0	0.0	1.4	1.7	100.0	82
Armenia 2005	12.1	3.0	0.0	0 0	8.7	28.2	37.2	0.0	1.1	0 0	0.0	1.8	7 9	100.0	65
Egypt 2000	43.4	2.3	0.1	0 2	5.1	41.5	3.4	0.5	0.4	0 0	0.0	0.4	2.7	100.0	2,077
Egypt 2005	46.0	3.6	0.3	0.1	5.6	38.6	1.4	0.5	0.6	0.1	1.3	0.2	3 0	100.0	2,841
South/Southeast Asia															
Bangladesh 1999-2000	12.0	0.0	0.0	0 0	0.0	65.3	14.1	1.4	2.1	0 0	0.0	2.2	2 9	100.0	110
Bangladesh 2004	11.2	0.0	0.0	0.4	0.0	3.3	63.2	7.2	10.2	0 0	0.0	2.7	1 9	100.0	66
Indonesia 1997	24.0	0.6	0.0	0 0	17.6	21.2	19.2	5.2	0 9	0 0	0.0	0.7	10.6	100.0	429
Indonesia 2002-03	28.0	0.1	0.3	0.1	12.4	19.4	16.2	4.5	4.7	0 8	0.3	0.1	13.1	100.0	247
Latin America and the Caribbean															
Colombia 2000	12.9	0.5	0.0	0 0	21.4	46.2	6.6	2.5	3.1	0 0	0.0	0.3	6.6	100.0	251
Colombia 2005	14.7	0.1	0.1	0.1	12.7	43.5	15.3	6.3	2.4	0.6	0.0	0.0	4 3	100.0	887
Dominican Republic 1996	21.1	1.0	1.7	0 0	8.7	50.1	8.5	0.8	0 0	0 0	0.0	1.0	7 0	100.0	125
Dominican Republic 2002	19.2	0.2	1.2	0 0	6.0	28.5	18.5	1.9	9.7	0 0	0.0	2.5	12.5	100.0	313

Observations from Kenya and Zimbabwe not shown.

continued

Appendix Table 2 (continued). Percent distribution of reasons for discontinuation by most common methods among married women 15-49 who discontinued contraceptives in the last five years, DHS surveys 1996-2006

	Male condoms														
	Not in need				In need										
					Failure	Health and side effects		Method-related		Cost/access		Opposition			
	Wanted to become pregnant	No/ infrequent sex/husband away	Marital dissolu ion/ separation	Difficult to get pregnant/ menopause	Became pregnant while using	Side effects	Health concerns	Wanted more effective method	Inconvenient to use	Lack of access/ too far	Costs too much	Husband opposed	Other/ don't know	Total	Number of episodes
Sub-Saharan Africa															
Kenya 1998	16.5	14.4	0.0	0 0	8.7	0.6	0.0	11.3	9 2	2 5	1.3	19.9	15.7	100.0	142
Kenya 2003	20.3	5.4	0.0	0 0	13.5	0.6	0.0	12.0	12.5	2 0	0.0	20.5	13.2	100.0	126
Zimbabwe 1999	37.9	4.0	0.0	0 0	5.1	0.0	2.9	7.0	8.4	7 5	2.4	15.1	9.6	100.0	80
Zimbabwe 2005-06	30.2	13.6	0.0	0 3	11.2	0.8	1.6	15.9	5 0	1 3	0.0	10.1	10.0	100.0	142
North Africa/West Asia/Europe															
Armenia 2000	17.7	7.0	0.0	1 2	35.2	4.2	2.3	3.5	7 5	3 2	5.6	7.2	5 5	100.0	271
Armenia 2005	24.7	15.6	0.0	0 0	26.2	0.2	0.5	8.5	5 9	0 0	7.0	7.7	3 5	100.0	206
Egypt 2000	9.0	12.3	0.0	0 2	23.6	8.6	2.1	29.2	4 8	0 0	0.0	7.0	3 2	100.0	123
Egypt 2005	16.3	6.6	0.0	0 2	23.1	3.8	0.0	31.3	4.7	0.6	0.0	7.0	6 2	100.0	120
South/Southeast Asia															
Bangladesh 1999-2000	19.5	4.4	0.0	0 5	9.6	7.3	6.5	10.1	5 9	1 5	0.5	23.6	10.6	100.0	860
Bangladesh 2004	18.5	5.2	0.0	0.6	10.4	4.6	4.3	9.2	14.2	1 8	0.4	25.0	5.7	100.0	1,073
Indonesia 1997	19.8	0.0	0.0	0 0	22.0	0.3	1.4	9.5	23.4	3 3	5.8	4.0	10.5	100.0	119
Indonesia 2002-03	21.4	1.6	0.0	0 0	12.0	0.5	4.9	30.4	10.5	0 3	1.0	1.3	16.2	100.0	126
Latin America and the Caribbean															
Colombia 2000	13.1	4.4	0.3	0 0	10.5	3.2	0.3	30.9	15.8	2.7	3.4	12.1	3 2	100.0	591
Colombia 2005	16.1	3.1	1.7	0 9	13.0	1.8	1.4	31.5	13.0	2 3	3.0	9.1	3 2	100.0	1,872
Dominican Republic 1996	14.7	6.9	1.8	0 0	8.9	3.1	0.1	23.2	10.1	2.1	0.0	17.2	11.9	100.0	311
Dominican Republic 2002	14.8	6.2	1.1	0 0	4.1	2.5	1.5	15.4	15.1	5.4	0.1	18.0	15.7	100.0	463

continued

Appendix Table 2 (continued). Percent distribution of reasons for discontinuation by most common methods among married women 15-49 who discontinued contraceptives in the last five years, DHS surveys 1996-2006

	Traditional methods														
	Not in need				In need										
					Failure	Health and side effects		Method-related		Cost/access		Opposition			
	Wanted to become pregnant	No/ infrequent sex/ husband away	Marital dissolu ion/ separation	Difficult to get pregnant/ menopause	Became pregnant while using	Side effects	Health concerns	Wanted more effective method	Inconvenient to use	Lack of access/ too far	Costs too much	Husband opposed	Other/ don't know	Total	Number of episodes
Sub-Saharan Africa															
Kenya 1998	27.6	3.3	0.0	0 0	45.1	0.1	0.4	6.8	4.1	0 0	0.0	1.6	10.8	100.0	421
Kenya 2003	30.8	1.9	0.3	0 5	43.3	0.6	0.0	4.2	3.1	0 2	0.0	3.2	12.0	100.0	437
Zimbabwe 1999	47.6	1.1	0.0	1 3	13.3	0.0	0.0	11.1	0.7	0 0	0.0	6.3	18.6	100.0	131
Zimbabwe 2005-06	25.8	2.2	0.0	2.7	32.5	0.9	0.0	4.7	6.6	0 0	0.0	1.9	22.7	100.0	113
North Africa/West Asia/Europe															
Armenia 2000	9.4	4.9	0.0	0 3	70.8	0.9	1.3	5.7	1.4	0.1	0.0	3.5	1.6	100.0	1,562
Armenia 2005	13.5	17.1	0.0	0.4	56.4	0.0	0.4	4.6	1.6	0 0	0.2	2.2	3 5	100.0	842
Egypt 2000	9.9	0.6	0.0	0 0	20.6	2.0	1.1	21.8	19.0	0 0	0.1	0.0	24.9	100.0	610
Egypt 2005	5.9	1.5	0.2	0.1	18.3	0.5	0.4	17.1	51.8	0 0	0.0	0.2	4 0	100.0	1,052
South/Southeast Asia															
Bangladesh 1999-2000	23.2	5.2	0.0	0 0	23.5	0.7	5.2	14.4	4.7	0.4	0.1	11.0	11.6	100.0	916
Bangladesh 2004	20.8	8.2	0.1	1 0	22.3	0.7	0.6	22.9	7 2	0 0	0.0	14.3	1 9	100.0	1,104
Indonesia 1997	29.6	1.4	0.0	0 0	39.6	0.3	0.9	14.2	5.4	1 0	0.1	3.9	3.6	100.0	387
Indonesia 2002-03	37.0	0.9	0.0	0 0	26.5	0.4	1.0	17.6	3 0	1 8	0.4	0.9	10.5	100.0	370
Latin America and the Caribbean															
Colombia 2000	13.2	3.0	0.3	0 2	35.5	0.6	0.4	34.5	3 2	0 0	0.0	2.9	6.1	100.0	1,440
Colombia 2005	11.7	2.5	0.5	0.6	43.3	0.4	0.7	30.6	4 2	0 3	0.0	2.8	2.4	100.0	2,794
Dominican Republic 1996	17.7	2.4	0.9	0 2	26.5	0.1	1.5	18.4	3.1	0 2	0.1	8.4	20.5	100.0	826
Dominican Republic 2002	16.9	2.8	0.8	0 2	25.0	1.2	0.9	20.5	6 2	0 9	0.0	5.8	18.8	100.0	1,523

Appendix Table 3: Women's characteristics and most recent type of discontinuation, married women 15-49, DHS surveys 2002-06

	Kenya 2003				Zimbabwe 2005-06				Armenia 2005				Egypt 2005			
	Abandoned in need	Failed	Switched	Did not abandon in need	Abandoned in need	Failed	Switched	Did not abandon in need	Abandoned in need	Failed	Switched	Did not abandon in need	Abandoned in need	Failed	Switched	Did not abandon in need
Contraceptive method																
Traditional	10.9	65.3	10.8	23.6	7.0	11.0	4.0	2.6	27.3	85.8	50.6	59.0	13.2	23.2	18.7	3.5
Pill	36.4	17.9	53.2	24.5	60.8	76.4	49.8	77.3					26.9	48.5	38.1	22.0
Injectable	43.9	7.5	26.1	40.6	21.2	7.4	29.2	13.1					29.2	4.8	22.0	12.9
Male condom	6.9	7.2	9.2	4.3	6.7	4.8	11.0	3.9	21.1	11.1	23.2	19.1	0.2	3.3	3.0	1.4
IUD	1.2	1.9	0.8	4.3	0.0	0.0	0.0	0.4	16.4	1 0	7 9	17.5	29.1	20.0	17.1	59.1
Other modern	0.7	0.3	0.0	2.7	4.3	0.5	6.0	2.7	35.2	2.1	18.3	4.3	1.3	0.3	1.1	1.0
Age at discontinuation (mean)	26.0	27.1	27.4	29.4	26.7	25.2	26.1	27.7	30.8	28.0	28.0	31.1	28.2	28.0	29.5	30.0
Parity at discontinuation (mean)	2.5	2.7	2.6	2.9	2.6	2.2	2.4	2.4	2.2	2 0	2 0	2.0	2.7	2.6	3.0	2.6
Worked in past year	68.2	63.5	77.3	75.1	43.1	34.5	49.5	46.8	12.8	24.5	15.9	28.2	18.1	16.1	21.4	20.3
Years of education (mean)	7.5	8.0	9.5	8.4	7.4	8.1	8.5	8.0	8.9	9 3	9 5	9.4	5.8	7.2	6.8	7.5
Contraceptive awareness	8.5	8.5	9.0	8.5	6.7	6.8	7.9	7.1	6.6	6 5	7.4	6.4	7.1	7.5	7.5	7.4
Partner's desired fertility																
Same	46.4	46.1	58.6	59.4	51.2	49.8	58.6	52.3	64.5	48.4	50.7	60.4	61.4	64.2	66.3	69.4
More	23.6	22.6	16.0	17.0	22.4	28.6	16.3	24.5	21.9	39.1	41.3	26.8	24.2	25.5	22.0	20.7
Fewer	15.4	12.9	17.8	12.7	11.7	11.4	14.4	11.4	3.3	5 9	7 5	4.5	6.5	4.2	5.5	4.0
Don't know	14.6	18.5	7.6	11.0	14.7	10.1	10.7	11.8	10.3	6 5	0 5	8.4	7.8	6.0	6.1	5.8
Mean community CPR	64.2	67.6	77.4	68.6	75.9	78.4	82.7	80.7	74.2	84.4	86.8	80.3	75.1	78.3	81.0	77.0
Media exposure	1.3	1.2	1.7	1.4	0.8	0.9	1.2	1.0	1.9	1.7	1 9	1.7	1.7	1.8	1.8	1.9
Residence																
Urban	26.4	16.1	33.5	28.5	25.4	30.8	42.1	34.8	59.2	59.5	70.3	59.0	34.0	39.8	40.5	41.5
Rural	73.6	83.9	66.5	71.5	74.6	69.2	57.9	65.2	40.8	40.5	29.7	41.0	66.0	60.2	59.5	58.5
Wealth status																
Lowest	31.3	34.2	10.8	25.4	52.5	48.5	29.4	36.9	31.3	36.8	20.0	33.9	44.6	33.4	34.5	29.4
Middle	33.6	41.9	38.2	36.4	28.2	30.8	33.5	35.8	23.6	31.6	30.3	30.0	33.3	35.8	35.5	36.0
Highest	35.2	23.9	51.0	38.2	19.3	20.7	37.1	27.3	45.1	31.6	49.7	36.1	22.1	30.8	30.0	34.5
Region[1]																
Region 1	10.2	6.2	17.2	10.9	10.7	15.8	18.4	16.3	33.0	38.5	46.7	34.6	13.8	17.8	16.3	16.7
Region 2	12.1	13.6	31.2	19.6	12.1	17.4	10.9	10.2	67.0	61.5	53.3	65.4	32.4	45.7	40.2	47.0
Region 3	4.8	5.3	5.5	6.1	11.7	8.0	11.4	12.2					52.4	35.4	42.5	35.2
Region 4	16.4	29.8	24.5	18.8	4.7	8.4	9.0	9.3					1.4	1.1	1.0	1.1
Region 5	12.8	9.4	4.7	11.7	8.1	12.1	10.7	10.6								
Region 6	26.3	24.8	11.6	21.9	8.2	6.2	7.4	4.6								
Region 7	17.3	10.8	5.3	10.9	7.8	5.3	3.5	3.0								
Region 8					13.9	13.5	11.4	14.8								
Region 9					17.4	10.2	13.6	13.7								
Region 10					5.3	3.2	3.7	5.3								
Number of episodes	483	225	154	1,329	364	225	224	2,631	73	312	85	1,118	1,461	559	1,229	6,718

[1] Region names corresponding to each region number are shown in Appendix 3.

continued

Appendix Table 3 (continued). Women's characteristics and most recent type of discontinuation, married women 15-49, DHS surveys 2002-06

	Bangladesh 2004				Indonesia 2002-03				Colombia 2005				Dominican Republic 2002			
	Abandoned in need	Failed	Switched	Did not abandon in need	Abandoned in need	Failed	Switched	Did not abandon in need	Abandoned in need	Failed	Switched	Did not abandon in need	Abandoned in need	Failed	Switched	Did not abandon in need
Contraceptive method																
Traditional	2.7	34.8	15.6	17.6	1.9	12.9	3.1	4.9	7.2	50.0	18.9	21.5	9.9	39.4	30.9	14.9
Pill	63.7	48.5	39.6	55.3	43.0	55.7	32.0	23.4	38.8	18.0	23.6	24.1	63.2	48.9	30.3	64.3
Injectable	24.0	1.4	24.4	15.2	48.5	24.5	55.2	56.2	26.5	11.7	21.5	14.8	13.2	4.5	11.9	6.6
Male condom	7.8	15.1	17.9	9.6	1.2	2.0	2.8	1.3	13.6	9.7	19.8	17.5	4.0	1.8	10.6	4.9
IUD	1.1	0.2	2.3	0.8	2.0	4.1	2.7	6.2	8.4	4.1	7.4	17.1	4.6	1.9	4.5	7.3
Other modern	0.8	0.0	0.3	1.4	3.4	0.8	4.2	8.1	5.6	6.5	8 8	4.9	5.1	3.6	11.9	2.0
Age at discontinuation (mean)	24.6	23.5	25.7	26.5	28.4	27.1	27.3	29.6	25.4	25.7	27.2	29.6	23.8	24.2	25.4	26.1
Parity at discontinuation (mean)	2.3	1.9	2.3	2.2	2.2	2.0	1.9	2.1	1.8	1.8	2 2	1.8	1.8	1.8	2.1	1.6
Worked in past year	19.8	18.5	22.0	19.2	41.2	37.6	44.7	46.3	54.6	57.6	60.2	60.3	40.0	39.8	57.0	49.3
Years of education (mean)	3.3	4.5	4.5	4.0	7.5	8.8	8.4	7.5	7.7	8.0	8.6	8.6	8.0	8.9	9.7	9.4
Contraceptive awareness	7.6	8.0	8.1	7.8	6.8	7.4	7.4	6.6	9.9	10.2	10.5	10.2	10.0	10.3	10.7	10.3
Partner's desired fertility																
Same	65.5	69.6	78.2	76.6	66.6	70.1	69.0	72.8	64.6	70.0	70.9	64.4	63.5	66.8	63.0	60.7
More	17.0	14.5	10.2	10.9	14.6	13.3	11.7	10.5	20.5	17.9	18.4	20.8	17.6	17.0	18.6	19.5
Fewer	11.7	11.3	9.1	8.3	3.8	6.6	6.7	4.1	8.9	9.0	7.1	10.4	8.3	8.7	8.3	9.8
Don't know	5.8	4.7	2.5	4.3	15.1	10.0	12.6	12.6	6.0	3.1	3 5	4.4	10.6	7.6	10.1	10.1
Mean community CPR	74.4	76.1	78.2	75.2	80.9	83.9	87.3	85.6	81.8	83.4	88.0	85.2	74.1	75.0	80.1	74.7
Media exposure	0.8	1.0	1.0	1.0	1.3	1.4	1.5	1.4	0.0	0.0	0 0	0.0	2.1	2.1	2.2	2.3
Residence																
Urban	22.8	28.3	26.8	22.6	47.1	57.8	50.9	45.0	65.1	72.5	73.1	74.2	65.2	65.1	66.6	70.3
Rural	77.2	71.7	73.2	77.4	52.9	42.2	49.1	55.0	34.9	27.5	26.9	25.8	34.8	34.9	33.4	29.7
Wealth status																
Lowest	37.8	28.4	26.6	31.9	34.2	28.6	24.4	32.6	53.5	42.5	39.0	35.0	45.8	40.8	32.0	33.5
Middle	34.3	33.6	31.3	33.2	33.4	35.4	39.8	35.0	29.5	37.4	32.6	34.3	33.3	31.2	34.8	32.9
Highest	27.9	38.1	42.0	34.8	32.4	36.0	35.8	32.5	17.0	20.1	28.4	30.8	20.9	28.0	33.2	33.6
Region[1]																
Region 1	30.1	34.3	30.4	33.7	55.7	55.6	58.3	63.9	12.3	22.5	16.4	17.6	31.4	29.1	41.7	37.7
Region 2	7.5	6.7	7.7	6.3	22.9	25.6	22.9	18.7	35.7	21.8	21.0	18.5	12.8	13.7	10.6	10.1
Region 3	22.0	15.4	12.3	17.2	6.7	4.7	3.0	4.7	16.7	19.6	17.7	19.6	17.7	19.7	16.8	18.4
Region 4	14.5	10.8	15.5	12.2	6.7	7.3	7.6	6.0	20.3	18.5	26.0	26.1	5.5	7.0	5.8	6.6
Region 5	18.7	28.3	31.6	26.6	7.9	6.8	8.2	6.6	13.7	16.5	17.7	16.6	4.4	3.6	4.2	3.0
Region 6	7.2	4.5	2.6	4.1					1.3	1.2	1 3	1.6	12.2	10.7	7.5	10.5
Region 7													3.4	3.1	2.3	2.3
Region 8													3.8	3.8	3.6	4.0
Region 9													8.8	9.3	7.5	7.4
Region 10																
Number of episodes	648	505	1,161	3,821	1,031	514	1,429	10,677	1,327	1,559	2,682	4,852	1,666	725	752	2,694

[1] Region names corresponding to each region number are shown in Appendix 3.

Appendix 3: Region/Province Listings

In Tables 4.1-4.5, each region/province/governate in a country is referred to by number. Below is a listing of the country regions that correspond to each code. In each country, the first region/province/governate includes the capital city.

Kenya:

1. Nairobi
2. Central
3. Coast and Northeastern[20]
4. Eastern
5. Nyanza
6. Rift
7. Western

Zimbabwe:

1. Harare
2. Manicaland
3. Mashonaland Central
4. Mashonaland East
5. Mashonaland West
6. Matabeleland North
7. Matabeleland South
8. Midlands
9. Masvingo
10. Bulawayo

Armenia:

1. Yerevan
2. All other regions[21]

Egypt:

1. Urban Governates
2. Lower Egypt
3. Upper Egypt
4. Frontier Governates

Bangladesh:

1. Dhaka
2. Barisal
3. Chittagong
4. Khulna
5. Rajshahi
6. Sylhet

Indonesia:

1. Java
2. Sumatera
3. Bali and Nusa Tenggara
4. Kalimantan
5. Sulawesi

Colombia:

1. Bogotá
2. Atlántica
3. Oriental
4. Central
5. Pacífica
6. Orinoqyía y Amazonía

Dominican Republic:

1. Región de salud 0
2. Región de salud I
3. Región de salud II
4. Región de salud III
5. Región de salud IV
6. Región de salud V
7. Región de salud VI
8. Región de salud VII
9. Región de salud VIII

[20] In Kenya, the Northeastern and Coast regions were combined due to small sample sizes in the Northeastern region.

[21] In Armenia, all regions except the capital, Yerevan, were combined to preserve sample size.

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