Modern Contraceptive Use among Youth in Mali
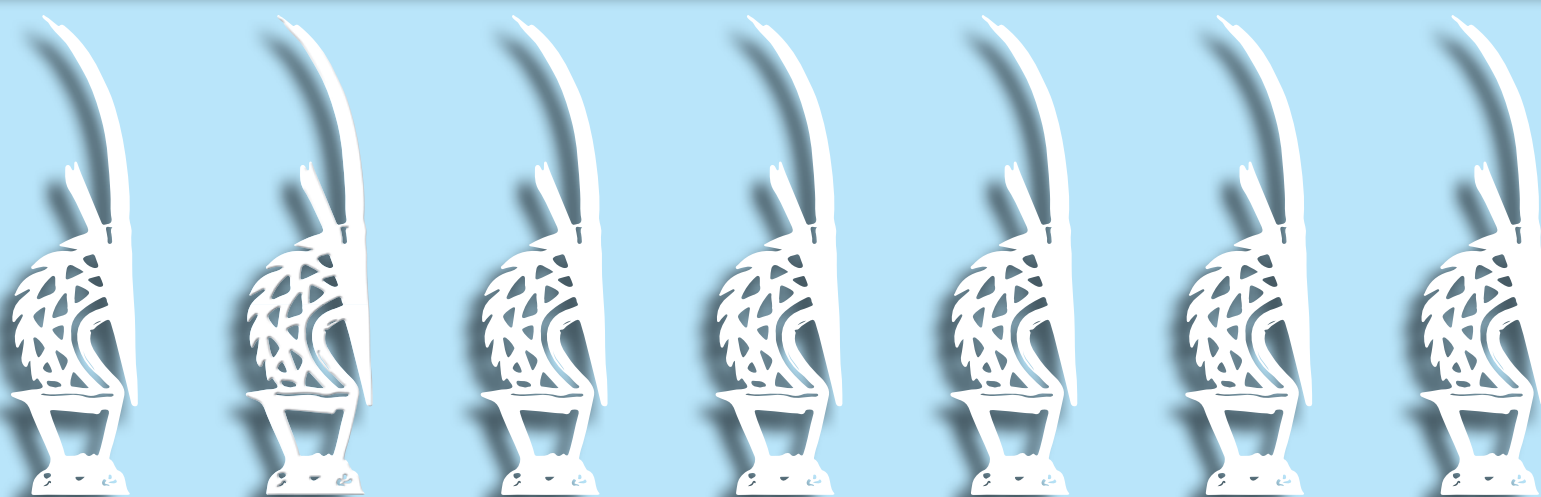
Further Analysis of the Mali Demographic and Health Survey 2018

DHS Further Analysis Reports No. 134

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Modern Contraceptive Use among Youth in Mali:

**Further Analysis of the Mali Demographic and
Health Survey 2018**

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ABSTRACT

Mali has a large youth population, making up 44% of women of reproductive age, and ambitious family planning goals. Given the potential to contribute to the country's family planning objectives, this study examines patterns of modern contraception among youth using data from 10,519 women and 1,478 episodes of contraceptive use from the 2018 Mali Demographic and Health Survey. Across multiple outcomes, the study compares young women with their older counterparts and married women with unmarried, sexually active women who are disproportionately young.

Unmet need for modern contraception is lower among young, married women than older, married women. Unmet need is very high for unmarried women, regardless of age, and is almost double that among married women.

Women age 15-24 are less likely to use modern contraception when compared with older women, but that unmarried, sexually active women are more likely than married women to use modern contraception. Contraceptive discontinuation rates are higher for young women than for older women, and this finding holds across all modern methods of contraception. About half of all discontinuation among young women is due to reduced need, while half is discontinuation while still in need. Discontinuation because pregnancy is desired is more common among young women than older women.

The method mix varies by age and marital status. Implants and injectables contribute a larger share to the method mix among young women than older women. Implants contribute a larger share while pills a smaller share of contraceptive use among unmarried women (regardless of sexual activity) than among married women.

The source of contraception is largely determined by the method used, and not by age or marital status of the user. However, both young pill users and unmarried injectable users avoid community health centres/dispensaries, and prefer private pharmacies (pills and injectables), other private sources (pills), and government hospitals/reference health centres (injectables).

These findings suggest that investment in supply-side and demand-side interventions that promote and sustain contraceptive use among current contraceptive users and potential new users, alike, and that reduce unmet need are warranted.

Key words: contraception, modern methods, family planning, unmet need, contraceptive dynamics, discontinuation, switching, failure, method mix, youth, adolescents

ACRONYMS AND ABBREVIATIONS

AMPPF   Malian Association for the Promotion of Family Planning
ASFR   age-specific fertility rate

CHW   community health worker
CI   confidence interval
CIP   Costed Implementation Plan
CPR   contraceptive prevalence rate

DHS   Demographic and Health Survey
DWSIN   discontinuation while still in need

GDP   gross domestic product

IUD   intrauterine device

LAM   lactational amenorrhoea method
LAPM   long-acting and permanent methods
LARC   long-acting reversible contraception

mCPR   modern method contraceptive prevalence rate

SDM   standard days method

1   BACKGROUND

1.1   Introduction

Mali is a vast, landlocked country in West Africa, bordered by Burkina Faso, Mauritania, Guinea, Niger, Côte d' Ivoire, and Senegal, with an economy based primarily on subsistence agriculture. Mali's high population growth rate of 3% per year (United Nations 2019), coupled with the marginal status of women in the society, restricts economic progress and resiliency in the country, especially in the rural areas. Stunting and wasting are extensive across the country. Access to, and availability of healthcare, are limited, with poor service quality and delivery (USAID 2018).

Since 2012, the country has been experiencing instability due to violent conflict and unrest in the north (Council on Foreign Relations 2019). Security remains an issue in much of the country, with inter-ethnic fighting over land increasing. The population has increased from 15 million in 2010 to 19 million in 2018 (World Bank 2020). High population growth rates, along with a fertility rate of 6.3 per woman (INSTAT and ICF 2019b; World Bank 2020) and climate change, pose major risks for the country's economy and overall growth potential.

With immense security and developmental challenges, Mali is one of the poorest countries in the world. Mali has a population of nearly 16.5 million (2015), a gross domestic product (GDP) of roughly $12 billion (2014), and a GDP per-capita of $1,700 (2014). According to the United Nations Department of Economic and Social Affairs, youth (25 and younger) represent 67% of Mali's population (USAID/Mali 2015). Young women (age 15-24) make up 44% of all women of reproductive age (Track20 2020a).

USAID/Mali's 2015 proposed five-year strategy set forth the goal, "Malians secure a democratic, resilient and prosperous future" (USAID/Mali 2015). Inherent in this goal statement and in USAID's country strategy is the recognition that Malian women and girls have traditionally faced unique developmental challenges that have not been systematically addressed (USAID/Mali 2015). To better focus on women and girls, the mission results framework cited "Human capital strengthened (social resilience)" as an intermediate result with a sub-result of "Nutritional and health status of women and children improved" (USAID/Mali 2015).

1.2   Family Planning in Mali

The country's high population growth rate of 3%, coupled with the marginal status of women in the society, restricts economic progress and resiliency in the country, especially in the rural areas (United Nations 2019). Access to and availability of healthcare are limited due to service quality and delivery. In the Sahel region, for example, young women in particular face on-going barriers to access and use of family planning such as poor health infrastructure, financial constraints, lack of contraceptive commodities, sociocultural opposition and beliefs such as children are divine blessings, and general misconceptions about certain types of family planning methods.

Historically, family planning in Mali was administered under the French law of July 31,1920. The policy was replaced in 1972 by a national family planning policy that established the Malian Association for the Promotion of Family Planning (AMPPF). In 1990, a programme that promoted contraceptive use was

implemented with a community-based approach of distributing community-based contraceptive products with assessments. This type of community approach is: 1) feasible; 2) culturally acceptable, and 3) contributes to a significant increase in contraceptive prevalence in intervention areas.

Mali is actively participating in several global family planning initiatives, such as the Ouagadougou Partnership and FP2020. As a part of its FP2020 commitments, Mali has an ambitious plan to increase modern family planning use among women of reproductive age from the current 16.4% in 2019 to 30% by 2023. Mali has developed a Costed Implementation Plan (CIP) to guide implementation (Republique du Mali 2019). To reach the goal, Mali has identified the following interventions: (1) demand creation, (2) supply and access to services, (3) policy that enables environment and financing, (4) product security, (5) and supervision, coordination, follow-up, and evaluation.

The Government of Mali updated its commitment at the Family Planning Summit in London, UK on July 11, 2017 and identified several objectives, one of which was *"To increase the rate of contraceptive use in Mali, from 9.9% in 2012 to at least 15% by 2018, through the reduction of unmet need for family planning and by targeting teens and young adults (ages 15 to 24)"* (FP2020 2017). To finance the London commitment, the Government of Mali pledged to substantially and regularly increase—by 5% per year— the share of the state budget allotted for the purchase of contraceptives (FP2020 2017). It is not known if this increased funding was made available, given the new threats faced by the country in national security and terrorism.

1.3   Youth and Family Planning in Mali

A non-monetary outcome from the London Family Planning Summit was the launch of the Malian 13th national family planning campaign on August 24, 2017. The campaign theme, "A responsible and engaged youth committed to family planning in Mali, a way to reach the demographic dividend," targeted young men and women of reproductive age, leaders, and health workers (MEASURE Evaluation 2018). The campaign also involved political decision makers such as non-governmental organisations and associations, civil society, media, and religious leaders who support family planning that targets youth and focuses on the needs of current and future generations through the lens of sustainable development.

Mali's modern contraceptive rate was 16.1% in 2019 with a projected slight increase to 16.7% in 2020 (Track20 and FP2020 2019). Modern contraceptive unmet need remains steady at 25.2% (Track20 and FP2020 2019). The fertility rate among adolescents age 15-19 in Mali is 172 (calculated as the age-specific fertility rate (ASFR) per 1,000 women for women ages 15 to 19), which is among one of the highest in Africa (MacQuarrie, Mallick, and Allen 2017; Power and Leahy Madsen 2019). In addition, Mali has very early fertility, with the world's highest ASFR of 17 births per 1,000 women age 10-14 (MacQuarrie, Mallick, and Allen 2017). Among young women, age 15-24, modern contraceptive use increased from 9.4% in 2001, 10.2% in 2006, to 15.3% in 2012 (O'Regan and Thompson 2017). Data from Demographic Health Surveys (DHS) revealed a teenage pregnancy rate of 39% in 2012, and modern contraception for married women at 6.5% for ages 15-19 and 10% for ages 20-24 (Power and Leahy Madsen 2019).

Use of long acting and permanent contraceptive methods (LAPM) among young women remains low, although there was an upward trend from 0.3% in 2001 to 4.1% in 2012 (O'Regan and Thompson 2017). A major challenge for Malians attempting to obtain family planning methods is the lack of access to basic health care and the limited availability of contraceptive methods.

Preliminary DHS 2018 analysis for Mali shows that more than 1 in 3 adolescent women age 15-19 (36%) are already mothers (30%), or are pregnant with their first child (6%) (INSTAT and ICF 2019a). Regionally, teenage childbearing ranges from almost half of adolescent women in Kayes (49%) to 22% of adolescent women in the Kidal Region. Teenage childbearing decreases with increased education. Twenty-two percent of women age 15-19 with secondary education or more are mothers or are pregnant for the first time, compared to 46% of young women without education.

1.4 Study Purpose

The Malian government's focus on targeting youth for family planning and to reach the demographic dividend remains a challenge because of the low use of modern contraception among youth. Given the size of Mali's youth population and its potential to contribute to the country's family planning objectives, this study aims to examine patterns of modern contraception among youth. In this study, we consider youth to be women age 15-24. We examine multiple outcomes—modern contraceptive use, method mix, source of methods, unmet need for modern contraception, and discontinuation of modern methods. Our main objective is to compare young women with their older counterparts and unmarried, sexually active women (who are disproportionately young) with married women (who may also be young). In so doing, this study provides important information on young women's behaviours that will assist Mali's family planning programmes to better meet its family planning and youth goals. The study results will also inform policy makers about the design of interventions that can increase modern family planning use among Mali youth.

2 METHODS

2.1 Data

This study uses data from the sixth, most recent DHS in Mali, the 2018 Mali DHS, and more specifically, data from the women's questionnaire. These data are contained in the women's standard recode (IR) data file, which is publicly available free of charge from The DHS Program website (www.dhsprogram.com/Data/). The survey is representative at the national level, urban and rural areas, and the nine regional domains (the district of Bamako plus the 8 administrative regions of Kayes, Koulikoro, Sikasso, Ségou, Mopti, Tombouctou, Gao, and Kidal) (INSTAT and ICF 2019b).

For most analyses of modern contraceptive outcomes, the unit of analysis is the individual woman. We do not restrict the sample, and we make use of data from all women who were surveyed. The survey achieved a 98% eligible woman response rate. All data are weighted and the *svyset* commands in Stata are applied to account for the complex, clustered sampling design of the survey (INSTAT and ICF 2019b). The weighted sample size, disaggregated by age group, is presented in Table 1.

Table 1   Analytic sample size, by age

Age	%	Weighted n
15-24	38.0	4,000
25-34	34.4	3,615
35-49	27.6	2,904
Total	100.0	10,519

Analysis of modern method contraceptive dynamics (discontinuation and switching) does not use individual women as the unit of analysis. Instead, this analysis uses episodes of modern contraceptive use as the unit of analysis. These data come from the contraceptive calendar that is administered as a part of the 2018 Mali DHS. For each woman the contraceptive calendar records a month-by-month retrospective history of episodes of contraceptive use, non-use of contraception, pregnancies, and births or terminations for at least the 5 years before the interview. If a woman uses a method of contraception and subsequently discontinues it, the interviewer records the reason for discontinuation in the month that contraceptive use stopped. The DHS contraceptive calendar was designed to facilitate the analysis of contraceptive dynamics, among other analytical possibilities. Depending on her contraceptive history, it is possible for an individual woman to contribute more than one episode of modern contraceptive use to the discontinuation analysis. The weighted sample size for this analysis is presented in Table 2 and is disaggregated by method and age group.

Table 2   Weighted observations for analysis of episodes of modern contraceptive use, by method and age

	15-24	25-34	35-49	Total
Implants	140	135	72	348
Injectable	285	306	148	739
Pill	89	160	60	308
Other modern	29	29	24	83
Total	543	631	305	1,478

2.2 Analytical Strategy

2.2.1 Outcome measures

To describe patterns of modern contraceptive use among youth, we examine several outcomes: modern contraceptive use, method mix, source of modern methods, unmet need for modern contraception, and discontinuation and switching of episodes of modern method use.

<u>Modern contraceptive use</u> (also sometimes termed the modern contraceptive prevalence rate or mCPR) is expressed as the percentage of women of reproductive age (age 15-49) who are using a modern method at the time of the survey. Modern methods in Mali consist of implants, injectables, pills, intrauterine device (IUD), and "other modern methods." This latter category includes male condoms, female sterilisation, male sterilisation, lactational amenorrhoeic method (LAM), female condom, and the standard days method (SDM). Consistent with our focus on modern contraceptive use, we exclude traditional methods such as periodic abstinence, withdrawal, or other folkloric methods.

<u>Method mix</u> uses users of modern methods of contraception as the denominator and shows the relative contribution of each modern method to the overall use of modern contraception. The total of all methods sums to 100%. The categories of modern methods in this study are the four most common methods—implants, injectables, pills, and IUD—plus a fifth category of "other modern methods."

<u>Sources of contraception</u> in this study are: (1) community health centres or dispensaries; (2) government hospitals or reference health centres; (3) private pharmacies; (4) health cabinet or community health workers (CHW); and "other." The "other" category consists of sources too infrequent to consider separately, namely private hospitals, clinics, doctors, medical care offices, and other private medical sector sources; other public sector sources; family planning clinics; kiosks/table shops; street vendors; other types of shops; friend or relative; and other.

<u>Need for family planning</u> is a fairly straightforward concept. A woman has an unmet need for family planning if she wants to delay or prevent a pregnancy but is not using contraception. Her need for family planning is considered to be met if she is using a method of contraception and has no need for family planning if she wants to have a child soon (typically defined as within 2 years). The calculation of unmet need for family planning, however, relies on a more complex algorithm that considers numerous factors such as post-partum amenorrhoea and infecundity (Bradley et al. 2012). Per this algorithm, unmet need for family planning is captured in a pre-calculated variable included in DHS standard recode files.

Consistent with this study's focus, we use a measure of **<u>need for modern contraception</u>**. We make one adjustment to the usual DHS definition of unmet need for family planning (Bradley et al. 2012). We reclassify women who use traditional methods (n=74) as having unmet need for modern contraception. This adjustment aligns with the definition of unmet need used by FP2020 as Core Indicator #3 (Track20 2019). We present three categories of need: no need, unmet need, and met need. We present these data for both married women and unmarried women who have been sexually active in the 30 days before the survey. Due to this adjustment, the figures of unmet need for modern contraception are not expected to match the figures of unmet need for family planning published in the survey's final report (INSTAT and ICF 2019b).

Contraceptive discontinuation

We convert the calendar data in the standard women's (IR) recode file into an events file, by using the procedures and programmes from the DHS Contraceptive Calendar Tutorial (Croft, Bradley, and Allen 2018). We censor our period of observation to calendar episodes between 3-62 months before the interview to avoid bias that could be introduced due to early pregnancies that are unrecognised. We omit women who are sterilised from our analysis of contraceptive discontinuation, since this is a permanent method (known in life table and survival analyses as an absorbing state). This results in the 1,478 episodes of contraceptive use described in Table 2.

With these data, we calculate 12-month net discontinuation rates using multiple decrement life table estimation procedures. In these multiple decrement procedures, we consider the discontinuation for each of the possible reasons to be competing risks. Each reason for discontinuation is mutually exclusive. We adapt programmes made available in the Contraceptive Calendar Tutorial, which use *stcompet* commands in Stata. One advantage of multiple decrement estimation procedures is that the resulting net discontinuation rates for each reason sum to the total discontinuation rate. These procedures may be less useful in applications where it is desirable to compare discontinuation rates over time or across countries in which case single decrement estimation approaches may be preferable. A discussion of the multiple decrement and single decrement life table approaches to analysing discontinuation can be found in Curtis and Hammerslough (1995).

We present total 12-month discontinuation rates for all methods (all method discontinuation rates), as well as method-specific discontinuation rates for the three most commonly used contraceptive methods in Mali: implants, injectables, and pills, and a fourth category that combines all less frequently used modern methods (IUDs, condoms, LAM, and SDM) and discontinuation rates by reason for discontinuation. After combining IUDs and other modern methods, this fourth category has few episodes of use (83). Thus, estimated discontinuation rates should be interpreted with caution (Croft, Marshall, and Allen 2018). We present 95% confidence intervals (CI) around our point estimates to express the degree of uncertainty in the estimated discontinuation rates. These 95% CIs widen with smaller sample sizes, such as with other modern methods. The 12-month discontinuation rates are expressed per 100 episodes of use and can be interpreted as the percentage of contraceptive episodes that women discontinue within 12 months.

Reasons for discontinuation

The twelve reasons for discontinuation that women can report when completing the contraceptive calendar are grouped into two broad categories: 1) discontinuation due to reduced need and 2) discontinuation while still in need (DWSIN). We present discontinuation rates by each of these two broad categories, as well as by the more detailed reasons within them. Discontinuation due to reduced need includes the desire to become pregnant and other fertility reasons, such as infrequent sex/husband away, difficult to get pregnant/menopausal, and marital dissolution/separation. DWSIN includes failure (became pregnant while using), health concerns/side effects, method-related reasons (wanted more effective method, inconvenient to use), cost/access, and other reasons (husband disapproved, up to God/fatalistic, other). Demographers are concerned with both DWSIN and discontinuation due to reduced need due to their impacts on fertility trends, while DWSIN is considered problematic by health programming and service delivery managers who aim to assist women in meeting their individual reproductive goals.

Switching

Switching rates are the percentage of contraceptive episodes over 12 months in which women discontinue one method of contraception, but immediately adopt another method of contraception. We allow up to a one month gap between discontinuation of one method and adoption of the next. The 12-month switching rates are calculated similarly to discontinuation rates, but are calculated separately and are not exclusive of other reasons for discontinuation.

2.2.2   Covariate measures

We analyse each of the above outcome measures according to several covariates that are consistent with the study's focus on contraception among youth. We examine these outcomes by age and by marital status.

Age

To facilitate comparison of contraceptive behaviour among young women with that of older women, we construct a categorical variable with three age groups: ages 15-24, 25-34, and 35-49. These categories capture the nonlinear age distribution of contraceptive use. In situations when the 35-49 age group has too few cases, the category is combined with women age 25-34 for an overall category of age 25-49.

Marital status

We construct a three-category marital status variable that describes women as currently married, unmarried and sexually active, and unmarried and not sexually active. Unmarried, sexually active women are women who have had sexual intercourse in the 30 days before the survey. Women who have not had sexual intercourse in the 30 days before the survey are considered as not sexually active.

Other variables used to describe the sample and not applied analytically include: urban/rural residence, education, household wealth quintile, religion, ethnicity, number of children ever born, and fertility desires. For women who are married, we also characterise if they are in a polygynous union, and if their husband resides with them. The terms married and in-union are used synonymously in this study.

All estimates are presented with their 95% CI. We assess statistical significance of differences between groups for most outcomes with a χ^2 test of independence. We accept differences as statistically significant with 99.9%, 99%, and 95% confidence, aligning with a p-value for the χ^2 test of p≤0.001, p≤0.01, and p≤0.05, respectively. Differences in discontinuation and switching rates are not assessed with a statistical test, but rather through a formal test of the 95% confidence bounds. If the estimated discontinuation rate for one group is outside the bound of the 95% CI of the comparison group, we conclude that the rates are significantly different. All data are weighted and robust standard errors are computed to account for the clustered sampling design.

3   RESULTS

The sample, disaggregated by age group, is described in Table 3 below. The sample is weighted toward young women with slightly more than one-third (38%) between ages 15-24 and about one-third or less in each of the two older age groups. Overall, the sample is predominantly rural (74%), lacking any education (66%), Muslim (94%), and currently married (82%). Of those who are married, nearly two-thirds are not in polygynous unions and nearly 9 in 10 women live with their spouse. While most women are married, 16% are unmarried and not sexually active, while 3% are unmarried and sexually active. About one-third of women have five or more children, while one quarter have 1-2 children, and 21%-22% have 3-4 children and no children, respectively. About half of women want a(nother) child within 2 years, while 28% want a child after 2 or more years, and 17% want no (more) children. The most common ethnicity is Bambara (33%), followed by Peulh (14%). Slightly more women reside in households in the richest wealth quintile (23%) than in the poorest wealth quintile (18%).

Table 3   Analytic sample profile

Characteristic	Age 15-24 (n=4,000)	Age 25-34 (n=3,615)	Age 35-49 (n=2,904)	Total (n=10,519)	p-value
Age					
15-24	100.0			38.0	
25-34		100.0		34.4	
35-49			100.0	27.6	
Residence					
Urban	29.0	24.5	24.7	26.3	0.0011
Rural	71.0	75.5	75.3	73.7	
Education					
None	48.2	69.6	84.4	65.5	0.0000
Primary	17.9	11.5	8.8	13.2	
Secondary	31.8	16.2	5.5	19.2	
Higher	2.2	0.3	1.2	2.1	
Household wealth quintile					
Poorest	14.5	18.4	20.8	17.6	0.0000
Poorer	17.9	18.6	20.4	18.8	
Middle	19.1	19.5	18.6	19.1	
Richer	21.5	21.5	19.9	21.1	
Richest	27.0	22.0	20.3	23.4	
Religion					
Muslim	92.6	94.2	94.6	93.7	0.0538
Catholic	3.2	2.8	2.5	2.9	
None/other	4.2	3.0	2.9	3.4	
Ethnicity					
Bambara	32.7	32.7	34.6	33.2	0.4035
Malinke	9.0	8.9	8.9	8.9	
Peulh	13.9	13.6	13.2	13.6	
Sarakole/Soninke/Marka	9.7	10.5	9.6	9.9	
Dogon	7.9	9.0	9.2	8.6	
Sonra	6.3	5.9	6.3	6.2	
Touareg/Balla	1.9	1.8	1.6	1.8	
Snoufo/Minianka	10.4	8.7	9.5	9.6	
Other Malian	5.9	5.9	4.8	5.6	
Other	2.4	3.0	2.4	2.6	
Marital status					
Never in union	37.8	3.9	0.9	16.0	0.0000
Currently in union	60.8	94.4	93.7	81.5	
Formerly in union	1.3	1.7	5.5	2.6	
Sexually active in past 30 days					
Unmarried, not sexually active	33.9	4.0	5.7	15.8	0.0000
Unmarried, sexually active	5.3	1.6	0.6	2.7	
Married	60.8	94.4	93.7	81.5	

(continued…)

Table 3—*continued*

Characteristic	Age 15-24 (n=4,000)	Age 25-34 (n=3,615)	Age 35-49 (n=2,904)	Total (n=10,519)	p-value
Polgyny	n=2,433	n=3,414	n=2,720	n=8,568	0.0000
Not polygynous union	78.5	62.7	48.1	62.6	
Polygynous union	21.5	37.3	51.9	37.5	
Husband co-resident	n=2,433	n=3,414	n=2,720	n=8,568	0.0000
Living together	83.5	88.6	91.6	88.1	
Living separately	16.5	11.4	8.4	11.9	
Children ever born					0.0000
0	47.1	5.6	2.5	20.5	
1-2	42.5	20.8	7.7	25.4	
3-4	10.0	38.4	17.5	21.8	
5 or more	0.6	35.3	72.3	32.3	
Fertility Preference					0.0000
Wants within 2 years	67.3	47.7	28.7	49.9	
Wants after 2 years	30.3	39.4	10.8	28.0	
Wants no more	1.4	10.6	48.2	17.5	
Sterilised/infecund	1.0	2.4	12.3	4.6	

Compared to their older counterparts, women age 15-24 are somewhat more likely to live in urban areas (p=0.001), are better educated (p=0.000), and live in wealthier households (p=0.000). There are substantial, significant differences in the marital and fertility planning status by age. Young women are less likely to be married, with 61% currently in union compared to more than 90% among older age groups, and 38% having never been in union compared to less than 4% in either of the older age groups (p=0.000). Women age 15-24 are more likely to be unmarried and not sexually active (34%) or unmarried and sexually active (5%), compared to women in the older age groups (p=0.000). Among those who are married, women age 15-24 are more likely to not be in a polygynous union and less likely to be living with their spouse than older women (p=0.000). Young women are more likely to have no children or 1-2 children and more likely to want a(nother) child within 2 years, compared to older women (p=0.000). About 3 in 10 women age 15-24 want a(nother) child after 2 or more years, which is less than that among women age 25-34, but triple that of women age 35-49. There are no significant differences in the ethnic or religious composition of young and older women.

3.1   Patterns of Modern Contraceptive Use

As shown in Figure 1, there are statistically significant differences in levels of modern contraceptive use across age groups in Mali (p<0.001). Modern contraceptive use follows an inverted U-shaped pattern with age. Women age 15-24 are the least likely to use modern contraception at 12%, while it is highest among women age 25-34 (19%) before falling again among women age 35-49 (16%). The differences between the two older age groups do not appear to be statistically significant.

Figure 1   Modern contraceptive use, by age
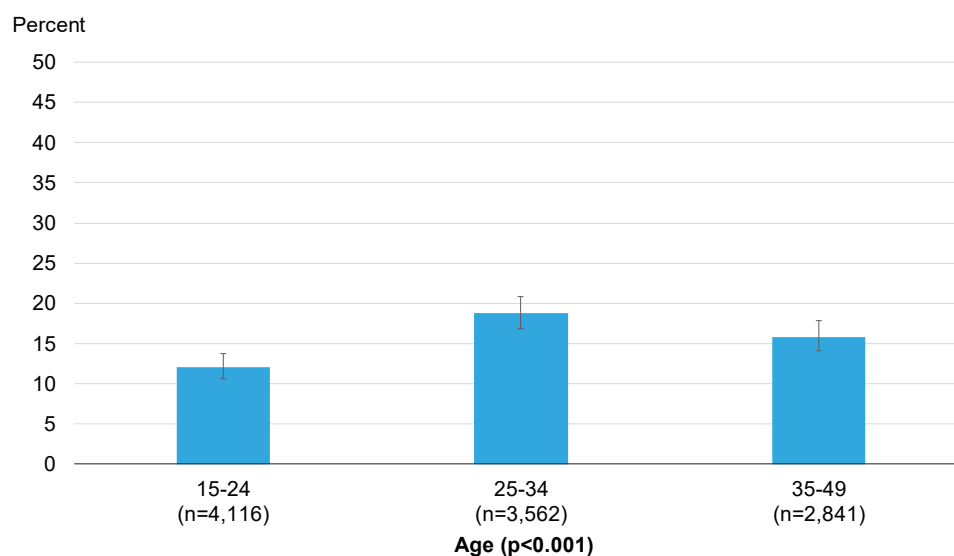
Note: Modern methods consist of implants, injectables, pills, IUDs, and "other modern methods" (male condoms, female sterilisation, male sterilisation, LAM, female condom, and SDM).

The U-shaped pattern also holds when the data are disaggregated by marital status, although differences among age groups are not statistically significant due to small sample sizes. See Appendix Table 1 for details.

Figure 2 shows that modern contraceptive use is significantly higher among unmarried, sexually active women of all ages (38%) than among married women (16%; p<0.001). Modern contraceptive use is lowest (7%) among women who are unmarried and have not been sexually active in the 30 days before the survey. This pattern also appears in all age groups (See Appendix Table 1).

Figure 2   Modern contraceptive use, by marital status

Percent

Note: Modern methods consist of implants, injectables, pills, IUDs, and "other modern methods" (male condoms, female sterilisation, male sterilisation, LAM, female condom, and SDM).

3.2   Method Mix

The method mix—the contribution of each method to all modern method use—is displayed in Figure 3. The method mix varies significantly with age (p<0.001). Implants contribute a larger share of modern method use among women age 15-24 (53%) than among their older counterparts (approximately 40%). The share of implants in the method mix declines with age.

Figure 3   **Method mix among modern contraceptive users, by age**

Note: Modern methods consist of implants, injectables, pills, IUDs, and "other modern methods" (male condoms, female sterilisation, male sterilisation, LAM, female condom, and SDM).

Similarly, injectables make a larger contribution to the method mix among women age 15-24 (33%) than women in the oldest age group, age 35-49 (30%), but a smaller contribution than among women age 25-34 (38%). Pills, IUDs, and other modern methods are less common overall, and also contribute less to the method mix among young women than their older counterparts. When combined, these three methods make up nearly 14% of the method mix for women age 15-24, compared to 22% among women age 24-35 and 32% among women in the oldest age group.

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Figure 4 shows that differences in the modern method mix by marital status are statistically significant (p<0.001). The method mix is generally similar among unmarried women, regardless of whether they are sexually active in last 30 days or not. However, there are substantial differences between the method mix of unmarried women and married women.

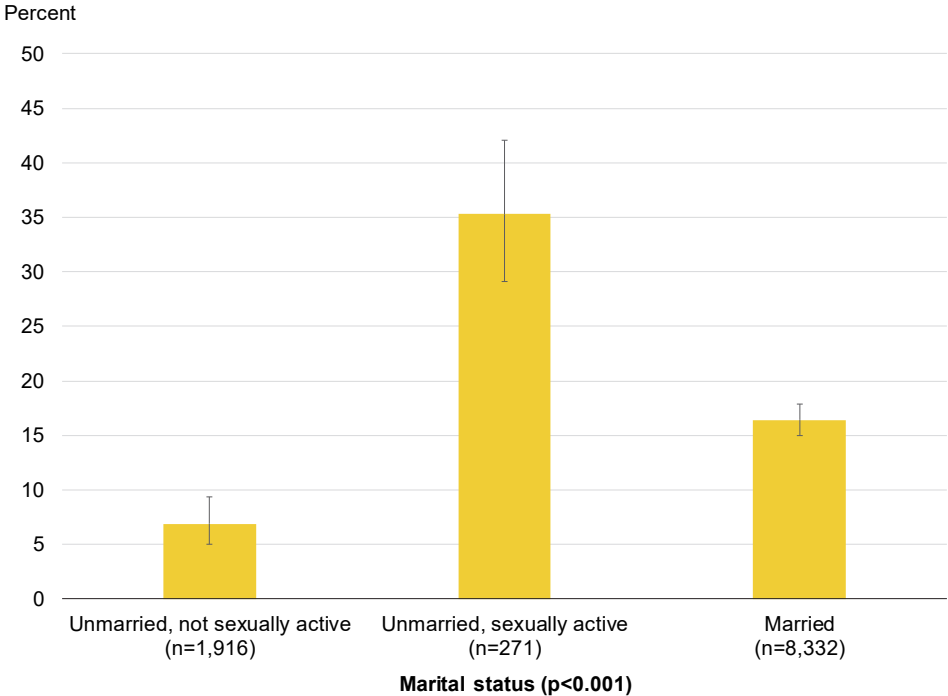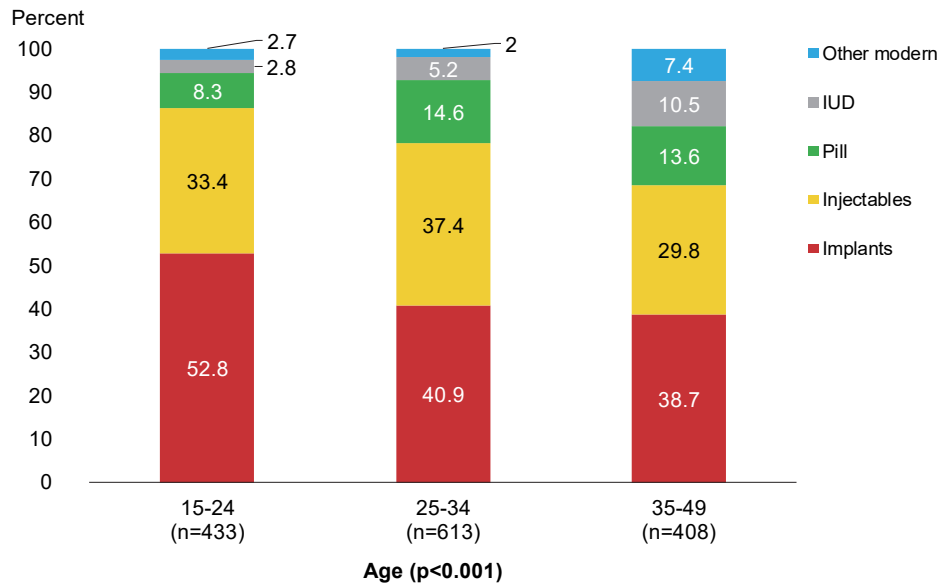**Figure 4   Method mix among modern contraceptive users, by marital status**

Note: Modern methods consist of implants, injectables, pills, IUDs, and "other modern methods" (male condoms, female sterilisation, male sterilisation, LAM, female condom, and SDM).

Implants make up a smaller portion of overall modern method use among married women (41%) than among either group of unmarried women (61%-67%). Meanwhile, injectables contribute a larger share to the method mix among married women (36%) compared to unmarried women (22%-26%). Pills (14%) and IUDs (6%) also make a larger portion among married women than unmarried women. However, there are some differences between categories of unmarried women. A larger share of contracepting, unmarried women who are not sexually active use the pill compared to their sexually active counterparts (7% versus 2%), while the pattern is reversed for IUDs. A smaller share of contracepting, unmarried women who are not sexually active use the IUD compared to unmarried, sexually active women (2% versus 5%). Other modern methods make up a similarly small share of modern method use across all marital statuses.

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3.3   Source of Modern Methods

3.3.1   Source of contraception by method

The data in Figure 5 indicates that the source of contraception varies significantly by method (p<0.001). Women most commonly obtain implants, injectables, and IUDs from community health centres and dispensaries, followed by government hospital/reference health centres. Women also obtain injectables from health cabinets/CHWs as frequently as they do from government hospital/reference health centres (14%).

Figure 5   Source of contraception among modern contraceptive users, by method
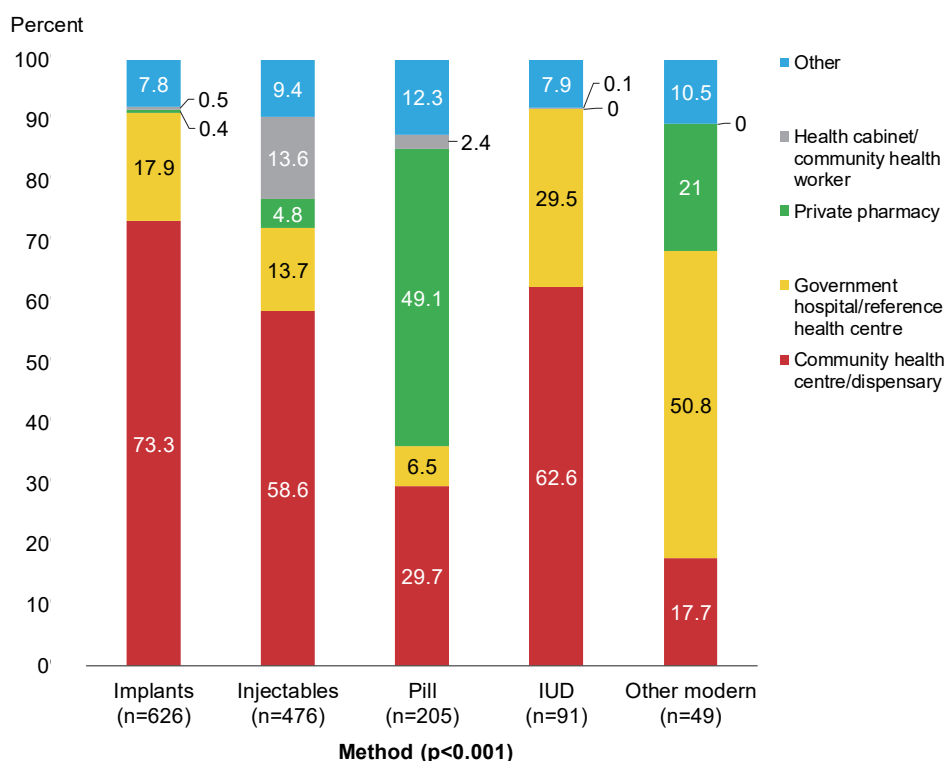
Note: Figures for other modern methods should be interpreted with caution because they are based on fewer than 50 unweighted cases
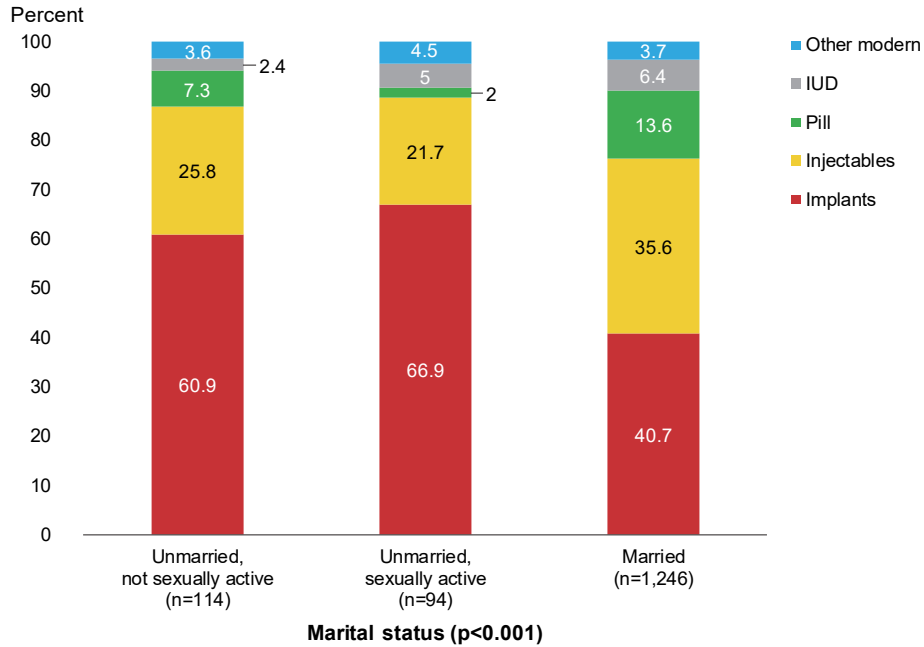
Modern methods consist of implants, injectables, pills, IUDs, and "other modern methods" (male condoms, female sterilisation, male sterilisation, LAM, female condom, and SDM).

In contrast to implants, injectables, and IUDs, women obtain pills less frequently from community health centres and dispensaries. The most common source for pills are private pharmacies. Other modern methods are typically obtained from government hospitals and reference health centres.

3.3.2   Source of contraception by age

Although the source of modern methods of contraception varies by method, the sources do not vary by age. Young women who use implants and injectables obtain these methods from the same sources as their older counterparts (see Appendix Table 2 for details).

However, young pill users do obtain their pills from different places than older pill users (p=0.002), as shown in Figure 6. Compared to pill users over the age of 25, younger pill users age 15-24 are less likely to obtain their pills from community health centre/dispensary or government hospital/reference health centres and are more likely to obtain them from private pharmacies and other private sources. Other private sources consist mainly of other non-pharmacy shops and street vendors (11% each) for women age 15-24.

Figure 6   Source of pills, by age
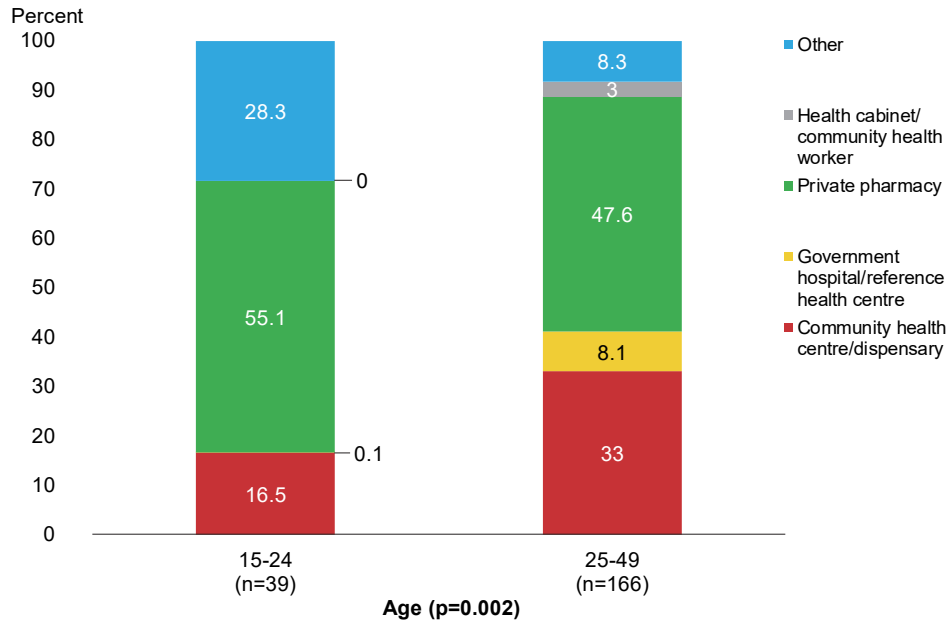
Note: Figures for pill users age 15-24 should be interpreted with caution because they are based on fewer than 50 unweighted cases

Modern methods consist of implants, injectables, pills, IUDs, and "other modern methods" (male condoms, female sterilisation, male sterilisation, LAM, female condom, and SDM).

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3.3.3 Source of contraception by marital status

The source of modern contraceptive methods does vary by marital status to a statistically significant degree, but this pattern is driven by injectable users (p=0.008). Women who use implants, pills, or other modern methods obtain these methods from the same sources regardless of whether they are married, unmarried, sexually active, or not sexually active. See Appendix Table 3 for details. However, unmarried, sexually active injectable users obtain their injections from different sources than do married injectables users, as shown in Figure 7.

Figure 7   Source of injectables, by marital status

Note: Figures for unmarried injectable users should be interpreted with caution because they are based on fewer than 50 unweighted cases.

Modern methods consist of implants, injectables, pills, IUDs, and "other modern methods" (male condoms, female sterilisation, male sterilisation, LAM, female condom, and SDM).

Unmarried, sexually active injectable users are less likely to obtain their injections from a community health centre/dispensary (47%) or health cabinet/CHWs (5%) than married injectable users (60% and 15%, respectively). Those unmarried users are more likely to obtain the injectables from a hospital/reference health centre (25% versus 13%) and other private sources (20% versus 9%). In this case, other private sources consist of mainly family or friends (5%).

3.4   Unmet Need for Modern Contraception

Figure 8 shows levels of need for modern methods of contraception (no need, unmet need, and met need), disaggregated by age and marital status. We deviated from the typical definition of unmet need for family planning (Bradley et al. 2012) and reclassified women who use traditional methods of contraception as having an unmet need for modern contraception rather than met need.

Figure 8   Unmet need for modern contraception, by age and marital status
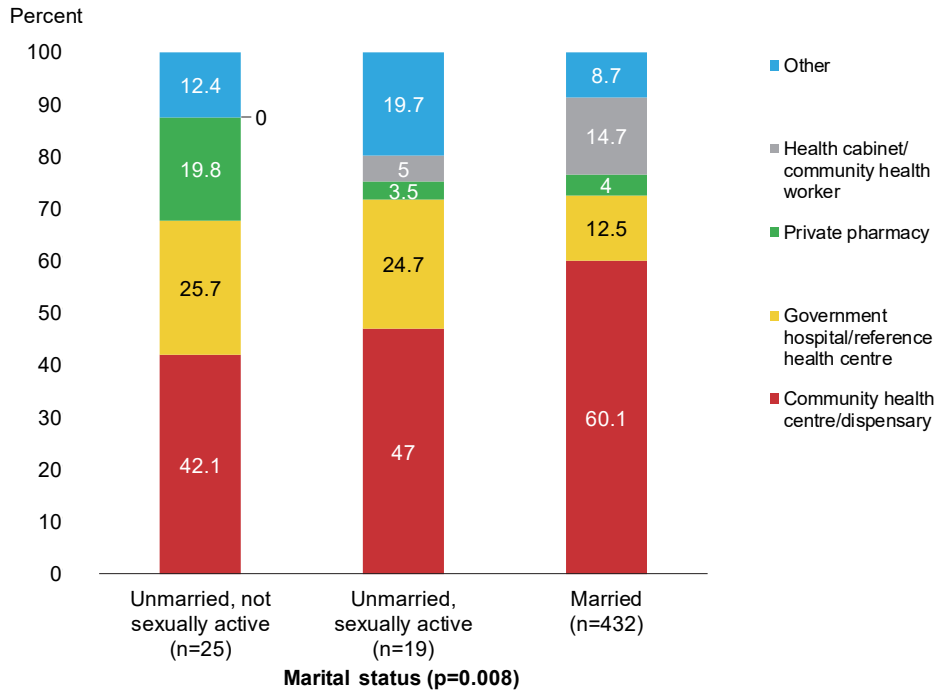

Note: Figures for unmarried, sexually active women age 35-49 should be interpreted with caution because they are based on fewer than 50 unweighted cases

Modern methods consist of implants, injectables, pills, IUDs, and "other modern methods" (male condoms, female sterilisation, male sterilisation, LAM, female condom, and SDM).

Figure 8 indicates that across all age groups, unmet need for modern contraception is higher for unmarried, sexually active women than for married women. Among married women, women age 15-24 experience statistically significantly (p<0.001) less unmet need for modern contraception (22%) than do women in either of the older age groups (25%-27%). Young women are also more likely to experience no need than do older women (64% versus 57%).

In contrast, there are no statistically significant differences in need for modern contraception across age groups among unmarried, sexually active women. Levels of unmet need appear similar between women age 15-24 and those age 25-34, while levels of met need seem to be slightly lower and levels of no need slightly higher among women age 15-24. Meanwhile, the need profile of unmarried, sexually active women above age 35 would appear to be different. However, the small sample of unmarried, sexually active women, particularly in older age groups, prevent us from drawing conclusions with confidence.

3.5   Discontinuation of Contraception

3.5.1   Discontinuation rates

Figure 9 presents 12-month discontinuation rates for all modern methods and all reasons, disaggregated by age group. The calculation of discontinuation rates uses episodes of contraceptive use in the 5 years before

the survey as the unit of analysis. Individual women may contribute more than one contraceptive episode. Discontinuation rates are significantly higher among women age 15-24 than their older counterparts, with about 50% of women age 15-24 stopping the use of their modern method within 12 months. These 12-month discontinuation rates decrease steadily with age group, declining to 40% among women age 25-34 and 28% among women age 35-49.

Figure 9   12-month discontinuation rates (all modern methods), by age
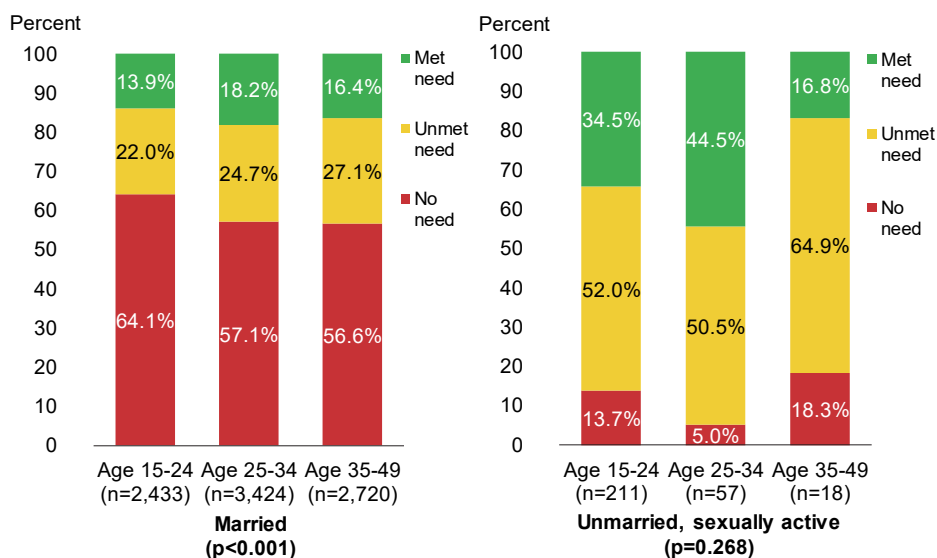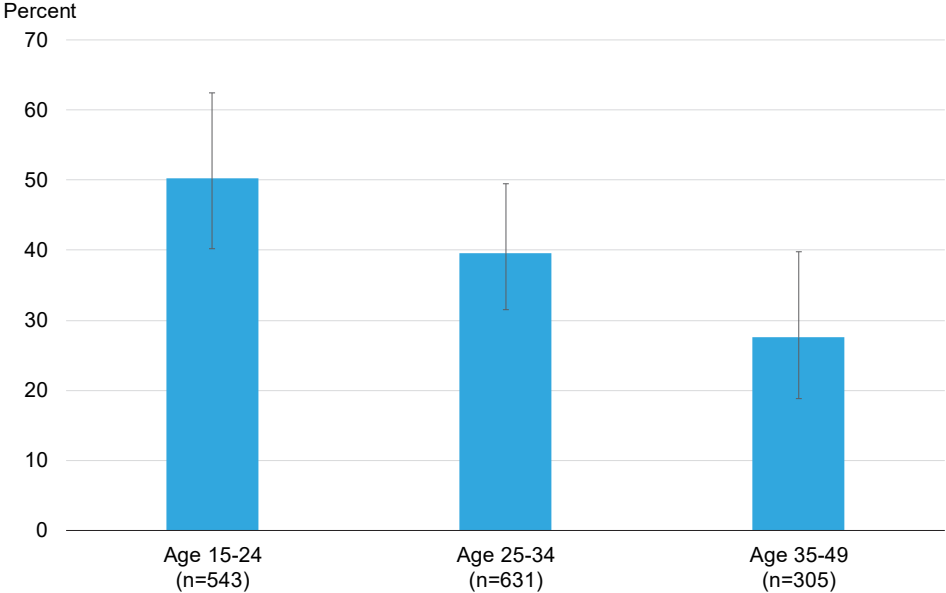
Percent

Note: Modern methods consist of implants, injectables, pills, IUDs, and "other modern methods" (male condoms, female sterilisation, male sterilisation, LAM, female condom, and SDM).

Figure 10 shows 12-month discontinuation rates for implants, injectables, pills, and other modern methods The same general pattern of declining discontinuation rates with age is seen across all these methods, although differences in discontinuation rates may not always be significant due to small numbers in some categories of age group/method use combinations. This figure also indicates that discontinuation rates are lowest for implants and highest for injectables and pills for all age groups.

Figure 10   12-month discontinuation rates, by method and age
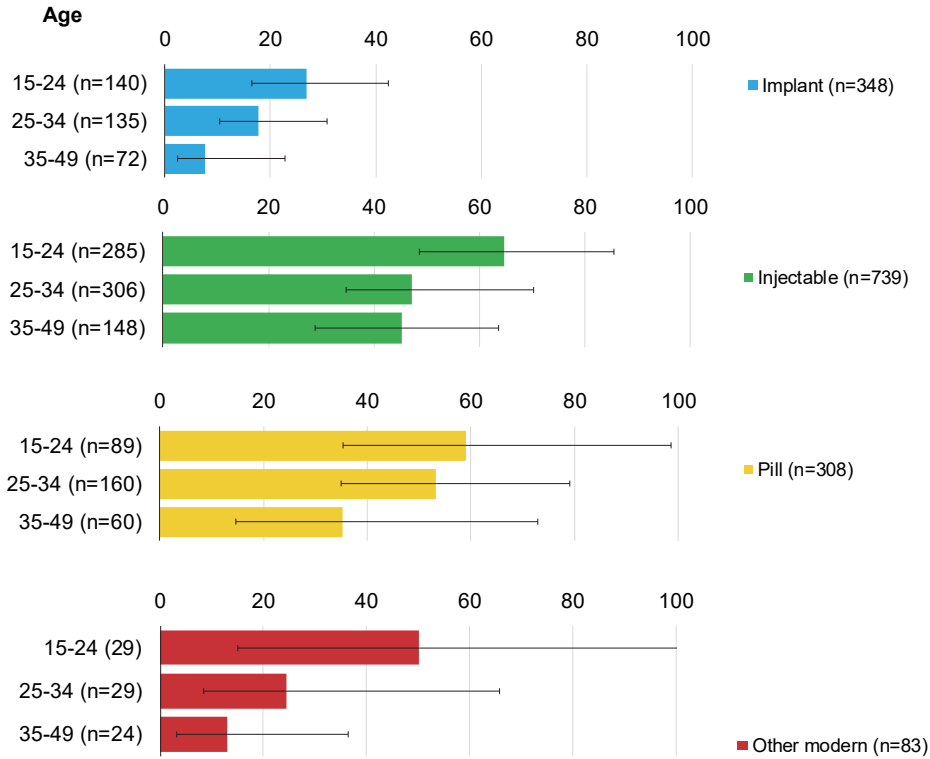
Note: Modern methods consist of implants, injectables, pills, IUDs, and "other modern methods" (male condoms, female sterilisation, male sterilisation, LAM, female condom, and SDM).

Discontinuation rates for other modern methods are based on fewer than 250 unweighted cases and should be interpreted with caution.

3.5.2   Reasons for discontinuation

In this section of the study, we explore the reasons for discontinuation among episodes of contraception that were discontinued within 12 months. Reasons for discontinuation are grouped into discontinuation due to reduced need and DWSIN in Figure 11. Discontinuation due to reduced need includes the desire to become pregnant and other fertility reasons. DWSIN includes failure (became pregnant while using), health concerns/side effects, method-related reasons, cost/access reasons, and other reasons.

Figure 11   Discontinuation due to reduced need and while still in need from 12-month discontinuation rates, by age
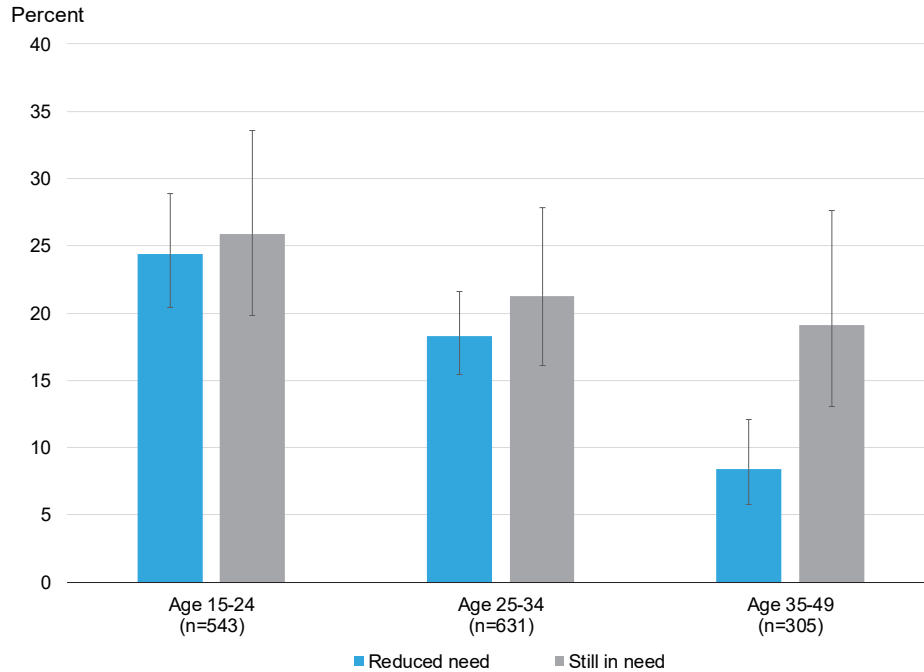
Note: Discontinuation due to reduced need includes: desire to become pregnant and other fertility reasons .
Discontinuation while still in need (DWSIN) includes: failure, health concerns/side effects, method related reasons, cost/access, and other reasons.

Figure 11 shows that young women age 15-24 discontinue due to reduced need and while still in need at similar rates. Both sets of reasons decline with increasing age. Discontinuation due to reduced need decreases with age at a faster rate than does DWSIN. Discontinuation due to reduced need is statistically significantly less than DWSIN only among women age 35-49.

Figure 12 provides a more nuanced look at the reasons for discontinuation. Reasons aligned with DWSIN are in blue shades and discontinuation due to reduced need in gray tones.

Figure 12   Reasons for discontinuation from 12-month discontinuation rates, by age
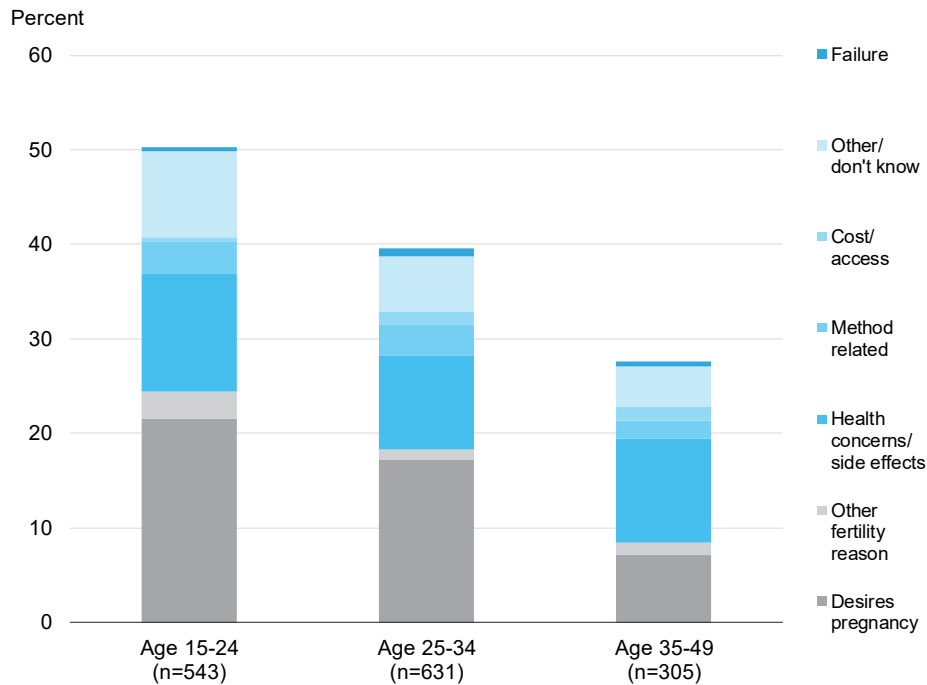
Note: Reasons related to discontinuation while still in need are in blue shades and discontinuation due to reduced need are in gray tones.
Method related reasons include: wanted more effective method and inconvenient to use.
Other reasons include: husband disapproved, fatalistic, other, and don't know.
Other fertility reasons include: infrequent sex/husband away, difficult to get pregnant, and marital dissolution.

The desire to become pregnant—a reason related to reduced need—is the most common reason for discontinuing modern contraception among women age 15-24 and 25-34. It is also the most common fertility-based reason among women age 35-49. The percentage of modern contraceptive users who discontinue due to wanting to become pregnant declines with age.

The most common reason for DWSIN among women age 15-24 is concerns about health concerns/side effects, as is the case for other age groups. It is not substantially higher (13%) among women age 15-24 than among older women (10%-11%). Contraceptive failure—becoming pregnant while using a method—is rare among all age groups.

3.6 Switching between Contraceptive Methods

Like discontinuation rates, the calculation of switching rates uses episodes of contraceptive use in the 5 years before the survey as the unit of analysis. Individual women may contribute more than one contraceptive episode. Figure 13 shows that, as with discontinuation rates, rates of switching methods over a 12-month period appear to decrease with increasing age, although these differences are not statistically significant.

**Figure 13   12-month switching rates (all modern methods), by age**
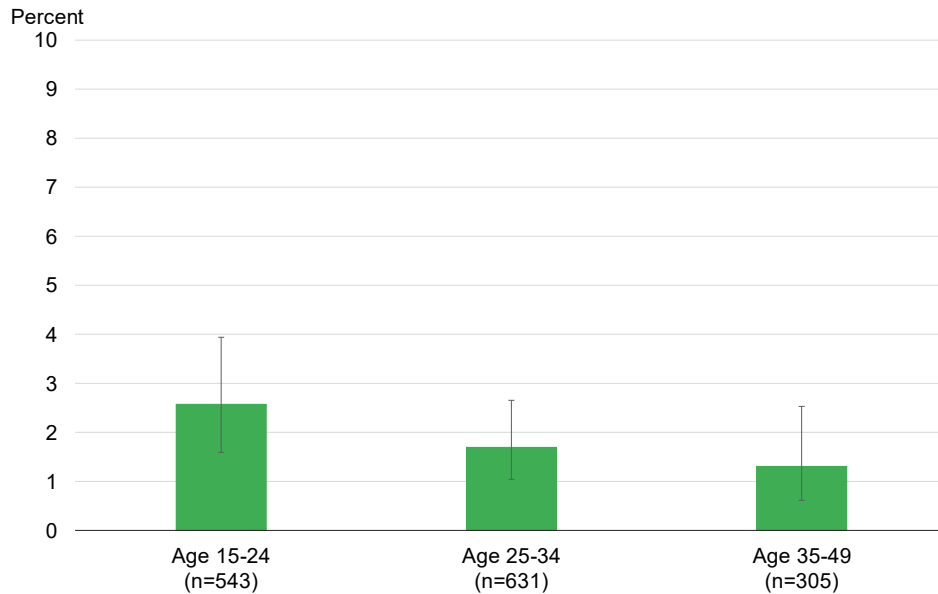
Note: Modern methods consist of implants, injectables, pills, IUDs, and "other modern methods" (male condoms, female sterilisation, male sterilisation, LAM, female condom, and SDM).

Switching rates appear to be higher among women age 15-24 for most methods, as shown in Figure 14. However, due to small sample sizes, these differences are not statistically significant. Pills are an apparent exception. The 12-month switching rates appear higher among women age 15-24 and age 35-49 compared to those age 25-34.

Figure 14   12-month switching rates, by method and age
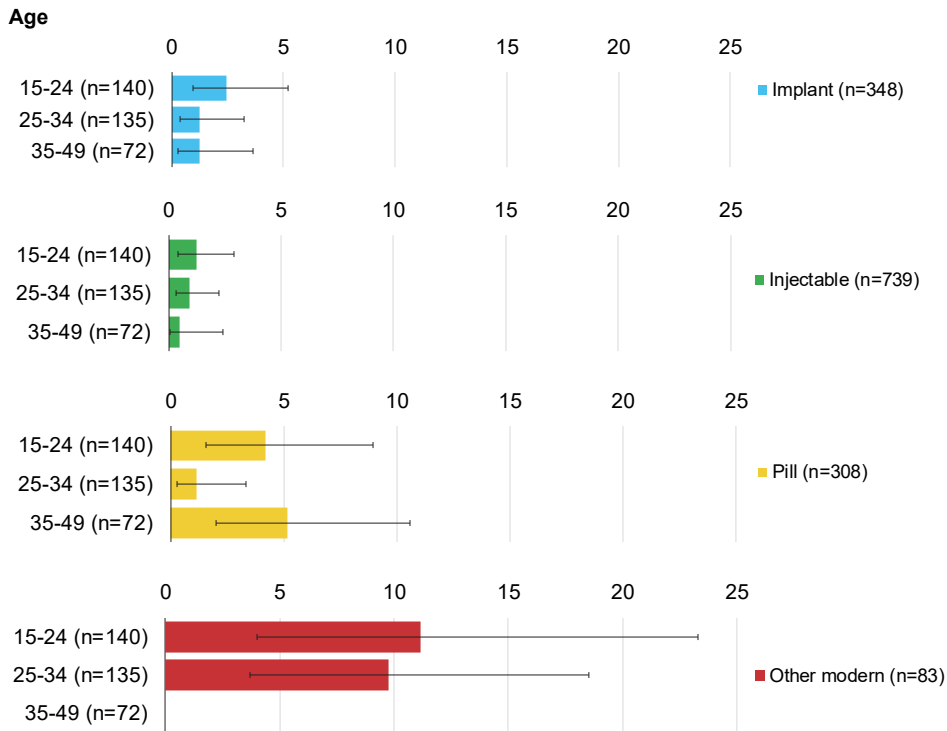
Note: Other modern methods include: male condoms, female sterilisation, male sterilisation, LAM, female condom, and SDM.

Switching rates for other modern methods are based on fewer than 250 unweighted cases and should be interpreted with caution.

There are no observations of switching from other modern methods among women age 35-49.

4   DISCUSSION AND CONCLUSIONS

This study examines patterns of modern contraception among youth in Mali. We examined multiple outcomes—modern contraceptive use, method mix, source of methods, unmet need for modern contraception, and discontinuation of modern methods. We further compared young women with their older counterparts and married women with unmarried, sexually active women who are disproportionately young. This study provides a depth of information on young women's behaviours that can assist Mali's family planning programmes to better meet its family planning and youth goals.

We find that women age 15-24 are less likely to use modern contraception as compared with older women but that unmarried, sexually active women are more likely than married women to use modern contraception. The levels of modern contraceptive use among young women in this study suggest a continuing trend of contraceptive use from studies that used earlier DHS data from Mali (Blanc et al. 2009; Kothari et al. 2012). Like ours, other studies have found that contraceptive use among young women lags behind that of older women in Mali, elsewhere in sub-Saharan Africa, and the world (Blanc et al. 2009; Kennedy et al. 2011; Loaiza and Blake 2010; MacQuarrie, Mallick, and Allen 2017). Low levels of modern contraceptive use is not uncommon among young married women in sub-Saharan Africa, a trend that reflects social expectations to bear children (Castle 2003; Hindin and Fatusi 2009).

We find that method mix varies by age and marital status. Implants and injectables contribute a larger share to the method mix among young women than older women. Implants contribute a larger share and injectables and pills a smaller share of contraceptive use among unmarried women (regardless of sexual activity) than among married women. This produces a method mix that is skewed (a single method—implants—accounts for more than 50% of use) for young women and unmarried women. There is no such skew for older women or married women, which is consistent with earlier studies of method mix among women of reproductive age in Mali (Bertrand et al. 2014). This skew suggests that there may be a lack of suitable alternative choices made available to young or unmarried women beyond implants in Mali or that providers may steer these women to use implants due to provider bias (Bertrand et al. 2014). However, studies in other settings showed an increased uptake of long-acting reversible contraception (LARC) methods when services were provided through youth-friendly providers with an expanded set of contraceptive choices (Birgisson et al. 2015; Kavanaugh et al. 2013). This suggests that the dominance of implant use could also be a function of choice and method preferences. Studies in Eastern and Southern Africa noted that youth prioritise the attributes of efficacy and invisibility of methods like implants and injectables (Cover et al. 2017; Montgomery et al. 2019).

With two exceptions, we find that the source of contraception is determined by the method used, not by age or marital status of the user. However, both young pill users and unmarried injectable users avoid community health centres/dispensaries. Instead, young pill users obtain their pills from private pharmacies and other private sources more frequently than older pill users do, while unmarried injectable users obtain their contraception from government hospitals/reference health centres and private pharmacies more frequently than married women. This preference may be due to a desire for anonymity or non-judgmental services that young and unmarried women hope to receive from service points that are not in their own community. Separate studies in Nigeria and Kenya have also found that private pharmacies are a main source of contraception for youth. However, in these cases, male condoms were the primary contraceptive

method (Arowojolu et al. 2002; Oindo 2002). Mali ranks in the bottom third of West and Central African countries in terms of modern contraception sourced from the private sector. The finding that young women patronise private sector sources more frequently than older women is common across most countries in the region (SHOPS Plus Project 2020).

In this study, unmet need for modern contraception is lower among young, married women than older, married women. Unmet need is similarly high for unmarried women, regardless of age. That unmet need for modern contraception among young unmarried, sexually active women exceeds that among young, married women is a finding common to other studies throughout sub-Saharan Africa (Hindin and Fatusi 2009; MacQuarrie 2014). However, unmet need for family planning among adolescents and young women typically exceeds that among adult women, as found in one study with 61 countries (MacQuarrie 2014). We find the opposite pattern in this study when we use more recent data and specify the need for modern contraception. This pattern appears to have reversed direction between 2006 and 2012 in Mali (The DHS Program nd).

We find that contraceptive discontinuation rates are higher for young women than older women, and this finding holds true across all modern methods of contraception. About half of all discontinuation among young women is due to reduced need and half is discontinuation while still in need. In our study, discontinuation because pregnancy is desired is more common among young women than older women, a finding that is consistent with previous studies (Blanc et al. 2009; Bradley, Schwandt, and Khan 2009). One possible explanation of this pattern is that young women may be in an active family formation stage of the life course (MacQuarrie et al. 2019).

Young women in Mali constitute 44% of women of reproductive age (Track20 2020a). Although a portion of these women are not sexually active, better meeting the contraceptive needs of young women has the potential to yield gains toward Mali's overall family planning goals. Analysis by Jain and colleagues suggests that unmet need can be reduced by supporting current users so that they do not discontinue their contraception while still in need (Jain et al. 2013). Given the high rates of DWSIN among young women in this study, this recommendation would ensure that youth-friendly services are offered at all points of service frequented by young women.

Similarly, young women are a large share of childbearing women. Half of discontinuation among young women in this study is for purposes of becoming pregnant. With 18% of women of reproductive age in Mali being postpartum in any given year, directing counselling and family planning services to postpartum women either through ANC, delivery, and immediate postpartum interventions may represent an opportunity for increasing contraceptive use in Mali (Track20 2020b). These services should make efforts to reach young women, in particular, with quality, youth-friendly care.

However, supporting young women's contraceptive use, either as current users or potential new users, need not be restricted to supply-side efforts. Although the WHO notes that interventions to increase contraceptive use among adolescents remains an evidence gap (Chandra-Mouli, Camacho, and Michaud 2013; WHO 2012), a systematic review suggests that intervention approaches that succeed in increasing contraceptive use or reducing unmet need among youth adopt some of the following strategies (Gottschalk and Ortayli 2014):

- address both user-side and provision-side issues
- involve adolescents in the planning process
- gain community buy-in
- use a combination of elements that fits the needs of that particular community,
- and are sustained over longer periods of time.

Drawing largely from studies in high-income countries, another review found that interventions that provided reproductive health education, counselling, *and* improved contraceptive availability were associated with increased contraceptive use among youth populations (Salam et al. 2016). For Mali to meet its goals for family planning access for youth and to achieve the demographic dividend that reinvigorates investment in youth, adopting these strategies may increase modern contraceptive use, expand acceptable contraceptive sources, and reduce discontinuation among young women, which this study found to be challenges.

REFERENCES

Arowojolu, A., A. Ilesanmi, O. Roberts, and M. Okunola. 2002. "Sexuality, Contraceptive Choice and Aids Awareness among Nigerian Undergraduates." *African Journal of Reproductive Health*: 60-70.

Bertrand, J. T., T. M. Sullivan, E. A. Knowles, M. F. Zeeshan, and J. D. Shelton. 2014. "Contraceptive Method Skew and Shifts in Method Mix in Low-and Middle-Income Countries." *International Perspectives on Sexual and Reproductive health* 40 (3): 144-153.

Birgisson, N. E., Q. Zhao, G. M. Secura, T. Madden, and J. F. Peipert. 2015. "Preventing Unintended Pregnancy: The Contraceptive Choice Project in Review." *Journal of Women's Health* 24 (5): 349-353.

Blanc, A. K., A. O. Tsui, T. N. Croft, and J. L. Trevitt. 2009. "Patterns and Trends in Adolescents' Contraceptive Use and Discontinuation in Developing Countries and Comparisons with Adult Women." *International Perspectives on Sexual and Reproductive Health* 35 (2): 63-71.

Bradley, S. E., T. N. Croft, J. D. Fishel, and C. F. Westoff. 2012. *Revising Unmet Need for Family Planning*, *DHS Analytical Studies No. 25*. Calverton, MD: ICF International.

Bradley, S. E. K., H. M. Schwandt, and S. Khan. 2009. *Levels, Trends, and Reasons for Contraceptive Discontinuation*. DHS Analytical Studies No. 20. Calverton, Maryland, USA: ICF Macro. http://dhsprogram.com/pubs/pdf/AS20/AS20.pdf.

Castle, S. 2003. "Factors Influencing Young Malians' Reluctance to Use Hormonal Contraceptives." *Studies in Family Planning* 34 (3): 186-199. https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1728-4465.2003.00186.x.

Chandra-Mouli, V., A. V. Camacho, and P.-A. Michaud. 2013. "WHO Guidelines on Preventing Early Pregnancy and Poor Reproductive Outcomes among Adolescents in Developing Countries." *Journal of Adolescent Health* 52 (5): 517-522.

Council on Foreign Relations. 2019. "Destabilization of Mali: Global Conflict Tracker." Washington, DC: Council on Foreign Relations, Center for Preventive Action.

Cover, J., J. Lim, A. Namagembe, J. Tumusiime, J. K. Drake, and C. M. Cox. 2017. "Acceptability of Contraceptive Self-Injection with DMPA-SC among Adolescents in Gulu District, Uganda." *International Perspectives on Sexual and Reproductive Health* 43 (4): 153-162.

Croft, T., S. E. K. Bradley, and C. Allen. 2018. *DHS Contraceptive Calendar Tutorial* Rockville, MD: ICF.

Croft, T., A. M. J. Marshall, and C. K. Allen. 2018. *Guide to DHS Statistics DHS-7*. Rockville, MD: ICF. https://dhsprogram.com/publications/publication-dhsg1-dhs-questionnaires-and-manuals.cfm.

Curtis, S. L., and C. R. Hammerslough. 1995. *Model Further Analysis Plan: Contraceptive Use Dynamics*. DHS Further Analysis Reports No. 59. Calverton, Maryland, USA: Macro International. http://dhsprogram.com/pubs/pdf/FA59/FA59.pdf.

FP2020. 2017. *Mali FP2020 Revitalized Commitment 2017*. Washington, DC: FP2020. http://www.familyplanning2020.org/MALI.

Gottschalk, L. B., and N. Ortayli. 2014. "Interventions to Improve Adolescents' Contraceptive Behaviors in Low- and Middle-Income Countries: A Review of the Evidence Base." *Contraception* 90 (3): 211-225. http://www.sciencedirect.com/science/article/pii/S0010782414002091.

Hindin, M. J., and A. O. Fatusi. 2009. "Adolescent Sexual and Reproductive Health in Developing Countries: An Overview of Trends and Interventions." *International Perspectives on Sexual and Reproductive Health* 35 (2): 58-62. www.jstor.org/stable/40233805.

INSTAT and ICF. 2019a. *2018 Mali Demographic and Health Survey Key Findings*. Rockville, MD: Institut National de la Statistique (INSTAT) and ICF.

INSTAT and ICF. 2019b. *Mali Demographic and Health Survey 2018*. Bamako, Mali: Institut National de la Statistique (INSTAT) Cellule de Planification et de Statistique Secteur Santé-Développement (CPS/SS-DS-PF) and ICF. http://dhsprogram.com/pubs/pdf/FR358/FR358.pdf.

Jain, A. K., F. Obare, S. RamaRao, and I. Askew. 2013. "Reducing Unmet Need by Supporting Women with Met Need." *International Perspectives on Sexual and Reproductive Health*: 133-141.

Kavanaugh, M. L., J. Jerman, K. Ethier, and S. Moskosky. 2013. "Meeting the Contraceptive Needs of Teens and Young Adults: Youth-Friendly and Long-Acting Reversible Contraceptive Services in U.S. Family Planning Facilities." *Journal of Adolescent Health* 52 (3): 284-292. http://www.sciencedirect.com/science/article/pii/S1054139X12007136.

Kennedy, E., N. Gray, P. Azzopardi, and M. Creati. 2011. "Adolescent Fertility and Family Planning in East Asia and the Pacific: A Review of DHS Reports." *Reproductive Health* 8 (1): 11. https://doi.org/10.1186/1742-4755-8-11.

Kothari, M. T., S. Wang, S. K. Head, and N. Abderrahim. 2012. *Trends in Adolescent Reproductive and Sexual Behaviors.* DHS Comparative Reports No. 29. Calverton, MD: ICF International.

Loaiza, E., and S. Blake. 2010. *How Universal Is Access to Reproductive Health. A review of the evidence. New York (NY): United National Population Fund.*

MacQuarrie, K. L. D. 2014. *Unmet Need for Family Planning among Young Women: Levels and Trends*, *DHS Comparative Reports No. 34*. Rockville, MD: ICF International.

MacQuarrie, K. L. D., C. Juan, C. Allen, S. Zweimueller, and A. Gemmill. 2019. *Women's Contraceptive Profiles Throughout the Life Course in Burundi and Nepal*. DHS Analytical Studies No. 72. Rockville, Maryland, USA: ICF. http://dhsprogram.com/pubs/pdf/AS72/AS72.pdf.

MacQuarrie, K. L. D., L. Mallick, and C. Allen. 2017. *Sexual and Reproductive Health in Early and Later Adolescence: DHS Data on Youth Age 10-19*. DHS Comparative Reports No. 45. Rockville, Maryland, USA: ICF. http://dhsprogram.com/pubs/pdf/CR45/CR45.pdf.

MEASURE Evaluation. 2018. *Assessment of 2017 National Campaign for the Promotion of Family Planning in Mali*. Chapel Hill, NC: MEASURE Evaluation, University of North Carolina. https://www.measureevaluation.org/resources/publications/tr-18-263.

Montgomery, E. T., M. Atujuna, E. Krogstad, M. Hartmann, S. Ndwayana, S. O'Rourke, L.-G. Bekker, A. van der Straten, and A. M. Minnis. 2019. "The Invisible Product: Preferences for Sustained-Release, Long-Acting Pre-Exposure Prophylaxis to HIV among South African Youth." *JAIDS Journal of Acquired Immune Deficiency Syndromes* 80 (5): 542-550.

O'Regan, A., and G. Thompson. 2017. "Indicators of Young Women's Modern Contraceptive Use in Burkina Faso and Mali from Demographic and Health Survey Data." *Contraception and Reproductive Medicine* 2 (1): 26.

Oindo, M. L. 2002. "Contraception and Sexuality among the Youth in Kisumu, Kenya." *African Health Sciences* 2 (1): 33-39.

Power, C., and E. Leahy Madsen. 2019. *Youth Family Planning Policy Scorecard*. Washington, DC: Population Reference Bureau. https://www.prb.org/youthfpscorecard/en/.

Republique du Mali. 2019. *Plan D'action National Budgétisé De Planification Familiale Du Mali 2019-2023*. Bamako, Mali: Ministère de la Santé et des Affaires Sociales, Santé de la Reproduction et Division de la Planification Familiale, Santé et l'Hygiène Publique. https://www.familyplanning2020.org/sites/default/files/Mali-PANB-2019-2023-Juin2019.pdf.

Salam, R. A., A. Faqqah, N. Sajjad, Z. S. Lassi, J. K. Das, M. Kaufman, and Z. A. Bhutta. 2016. "Improving Adolescent Sexual and Reproductive Health: A Systematic Review of Potential Interventions." *Journal of Adolescent Health* 59 (4, Supplement): S11-S28. http://www.sciencedirect.com/science/article/pii/S1054139X16301689.

SHOPS Plus Project. 2020. "Private Sector Counts." Washington, DC: Abt Associates.

The DHS Program. nd. "Statcompiler." Rockville, MD: ICF.

Track20. 2019. *Family Planning 2020 Core Indicators*. Glastonbury, CT: Track20 and Avenir Health. http://www.track20.org/pages/data_analysis/core_indicators/overview.php.

Track20. 2020a. *Assessing Opportunities for Family Planning Programming among Adolescents and Youth in Mali*. Glastonbury, CT: Avenir Health.

Track20. 2020b. *Opportunities for Family Planning Programming in the Postpartum Period in Mali*. Glastonbury, CT: Avenir Health.

Track20 and FP2020. 2019. *Mali: Fp2020 2019 Core Indicators 1-9 Country Fact Sheet*. Glastonbury, CT: Track20 and Avenir Health. http://www.track20.org/download/pdf/2019%201-9%20Handouts/english/Mali%202019%201-9%20Handout.pdf.

United Nations. 2019. *World Population Prospects 2019: Data Booklet*. New York, NY: United Nations, Department of Economic and Social Affairs, Population Division. https://population.un.org/wpp/Publications/Files/WPP2019_DataBooklet.pdf.

USAID. 2018. *Global Food Security Strategy (GFSS) Mali Country Plan*. Feed the Future.

USAID/Mali. 2015. *Country Development Cooperation Strategy Mali Forward 2015-2020*. Bamako, Mali: USAID/Mali. https://www.usaid.gov/sites/default/files/documents/1860/Mali_CDCS_2015-2020.pdf.

WHO. 2012. *Preventing Early Pregnancy and Poor Reproductive Outcomes among Adolescents in Developing Countries: What the Evidence Says*. World Health Organization.

World Bank. 2020. "World Development Indicators Databank." Washington, DC: The World Bank Group.

APPENDIX

Appendix Table 1   Modern contraceptive use, by marital status and age

	Percent	95% CI	p-value	Weighted n
Unmarried, not sexually active			0.000	
15-24	5.3	(3.7-7.5)		1,357
25-34	21.6	(14.5-30.9)		144
35-49	7.3	(4.0-12.9)		165
Subtotal	6.9	(5.0-9.4)		1,666
Unmarried, sexually active			0.188	
15-24	34.5	(27.1-42.7)		211
25-34	44.5	(30.3-59.6)		57
35-49[1]	16.8	(4.3-47.4)		18
35-50	35.3	(29.1-42.1)		286
Married			0.001	
15-24	13.9	(12.2-15.9)		2,422
25-34	18.2	(16.3-20.3)		3,414
35-49	16.4	(14.5-18.4)		2,720
Subtotal	16.4	(15.0-17.9)		8,567

[1] This figure is based on fewer than 25 unweighted cases and has been suppressed.

Appendix Table 2   Source of method among modern contraceptive users, by method and age

	Community health centre/dispensary		Government hospital/reference health centre		Private pharmacy		Health cabinet/CHW		Other		p-value	Weighted n
	Percent	95% CI	Percent	95% CI	Percent	95% CI	Percent	95% CI	Percent	95% CI		
Implant											0.3939	
15-24	68.3	(61.2-74.6)	20.9	(15.8-27.2)	0.8	(0.2-2.3)	0.4	(0.1-2.6)	9.7	(6.3-14.6)		228
25-34	76.0	(70.1-81.1)	15.6	(11.5-21.0)	0.4	(0.1-1.8)	0.3	(0.0-2.2)	7.6	(4.7-11.9)		251
35-49	76.4	(67.2-83.6)	17.1	(11.1-25.5)	0.0		1.0	(0.1-6.7)	5.5	(2.8-10.6)		147
Subtotal	73.3	(68.5-77.6)	17.9	(14.6-21.8)	0.4	(0.2-1.1)	0.5	(0.1-1.7)	7.8	(5.5-10.9)		626
Injectable											0.584	
15-24	58.6	(48.5-68.0)	12.9	(7.9-20.5)	2.3	(0.9-5.8)	16.0	(9.6-25.4)	10.2	(5.9-17.0)		142
25-34	56.1	(47.9-63.9)	14	(9.1-21.0)	7.0	(4.1-11.9)	14.1	(8.7-22.0)	8.8	(4.9-15.1)		215
35-49	63.1	(53.4-71.9)	13.9	(8.0-22.9)	3.8	(1.3-10.4)	9.8	(5.6-16.4)	9.4	(5.1-16.7)		119
Subtotal	58.6	(52.5-64.4)	13.7	(9.9-18.6)	4.8	(3.1-7.6)	13.6	(9.5-19.1)	9.4	(6.5-13.3)		476
Pill											0.001	
15-24[1]	16.5	(7.2-33.6)	0.1	(0.0-0.6)	55.1	(36.8-72.1)	0.0		28.3	(13.7-49.6)		39
25-34	30.2	(22.0-39.8)	11.1	(5.7-20.6)	43.4	(32.9-54.5)	3.6	(1.2-10.7)	11.8	(5.9-21.9)		98
35-49	37.4	(25.9-50.5)	3.4	(1.0-10.7)	54.4	(41.6-66.6)	2.1	(0.3-13.5)	2.7	(0.6-10.7)		68
Subtotal	29.7	(22.6-37.9)	6.5	(3.6-11.6)	49.1	(40.7-57.6)	2.4	(0.9-6.3)	12.3	(7.0-20.5)		205
IUD											na	
15-24[2]	58.0	(26.5-81.7)	33.8	(11.0-66.0)	0.0		0.0	(0.1-4.8)	8.2	(1.5-48.7)		12
25-34		(39.8-74.2)		(19.8-51.3)	0.0		0.0			(2.7-22.3)		35
35-49	67.8	(51.9-80.4)	25.3	(14.4-40.5)	0.0		0.0		6.9	(2.1-19.9)		44
Subtotal	62.6	(50.1-73.5)	29.5	(20.2-40.8)	0.0		0.1	(0.0-0.6)	7.9	(3.8-15.5)		91
Other modern											na	
15-24[2]		(1.4-48.8)		(23.9-81.4)	18.9	(35.8-92.9)	0.0		16.6	(7.1-64.2)		11
25-34[2]	26.5	(11.6-49.8)	68.7	(46.4-84.8)	2.3	(4.9-51.6)	0.0		2.5	(3.9-49.6)		11
35-49						(0.3-14.4)	0.0			(0.3-16.0)		27
Subtotal	17.7	(8.0-34.9)	50.8	(36.4-65.1)	21.0	(12.0-34.1)	0.0		10.5	(4.1-24.2)		49

[1] This figure is based on fewer than 50 unweighted cases and should be interpreted with caution.
[2] This figure is based on fewer than 25 unweighted cases and has been suppressed.

Appendix Table 3   Source of method among modern contraceptive users, by method and marital status

	Community health centre/dispensary		Government hospital/reference health centre		Private pharmacy		Health cabinet/ CHW		Other		p-value	weighted n
	Percent	95% CI	Percent	95% CI	Percent	95% CI	Percent	95% CI	Percent	95% CI		
Implant											0.387	
Unmarried, not sexually active	71.2	(60.2-80.2)	21.4	(14.0-31.3)	0.9	(0.1-5.8)	0.0		6.5	(2.6-15.3)		72
Unmarried, sexually active	61.1	(46.5-74.0)	28.1	(16.3-44.0)	0.0		0.0		10.8	(4.7-22.9)		61
Married	75.0	(69.7-79.7)	16.3	(12.7-20.7)	0.4	(0.2-1.2)	0.6	(0.2-2.1)	7.6	(5.2-11.1)		493
Subtotal	73.3	(68.5-77.6)	17.9	(14.6-21.8)	0.4	(0.2-1.1)	0.5	(0.1-1.7)	7.8	(5.5-10.9)		626
Injectable											0.008	
Unmarried, not sexually active[1]	42.1	(24.7-61.7)	25.7	(11.0-49.2)	19.8	(6.6-46.5)	0.0		12.4	(4.5-29.6)		25
Unmarried, sexually active[2]		(25.0-70.3)		(9.4-50.9)		(0.5-21.9)		(0.7-28.8)		(6.9-44.8)		19
Married	60.1	(53.8-66.0)	12.5	(8.7-17.5)	4.0	(2.4-6.7)	14.7	(10.3-20.7)	8.7	(5.8-12.9)		432
Subtotal	58.6	(52.5-64.4)	13.7	(9.9-18.6)	4.8	(3.1-7.6)	13.6	(9.5-19.1)	9.4	(6.5-13.3)		476
Pill											0.490	
Unmarried, not sexually active[2]		(22.2-85.6)				(13.2-76.1)				(0.3-17.0)		8
Unmarried, sexually active[2]						(97.3-100.0)				(0.0-2.7)		3
Married	28.8	(21.6-37.2)	6.9	(3.8-12.2)	48.9	(40.6-57.3)	2.5	(0.9-6.7)	12.8	(7.3-21.5)		194
Subtotal	29.7	(22.6-37.9)	6.5	(3.6-11.6)	49.1	(40.7-57.6)	2.4	(0.9-6.3)	12.3	(7.0-20.5)		205
IUD											na	
Unmarried, not sexually active[2]	96.8	(71.9-99.7)	0.0		0.0		3.2	(0.3-28.1)	0.0			4
Unmarried, sexually active[2]	42.9	(10.6-82.7)	57.1	(17.3-89.4)	0.0		0.0		0.0			6
Married	62.6	(49.6-74.1)	28.8	(19.1-40.9)	0.0		0.0		8.6	(4.2-16.8)		81
Subtotal	62.6	(50.1-73.5)	29.5	(20.2-40.8)	0.0		0.1	(0.0-0.6)	7.9	(3.8-15.5)		91
Marital status											na	
Unmarried, not sexually active[2]				(3.8-78.7)		(21.3-96.2)	0.0			(1.5-60.1)		5
Unmarried, sexually active[2]						(39.9-98.5)	0.0					5
Married[1]	21.5	(9.9-40.7)	58.8	(40.7-74.8)	8.4	(3.0-21.7)	0.0		11.2	(4.1-27.4)		39
Subtotal	17.7	(8.0-34.9)	50.8	(36.4-65.1)	21.0	(12.0-34.1)	0.0		10.5	(4.1-24.2)		49

[1] This figure is based on fewer than 50 unweighted cases and should be interpreted with caution.
[2] This figure is based on fewer than 25 unweighted cases and has been suppressed.