Research Article

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Abstract

BACKGROUND

Many health and demographic surveys routinely collect information on women's exposure to family planning (FP) messages, counseling on contraceptive side effects, discussions about FP with providers, contraceptive decision-making autonomy, and the desire for additional children. Several studies have shown significant associations with current contraceptive use status from these cross-sectional data. However, the predictive utility of these indicators on contraceptive use and its dynamics over time is not well-known, primarily due to the lack of longitudinal data.

OBJECTIVE

To empirically assess the predictive utility of key family planning indicators on contraceptive use outcomes using longitudinal data from women participating in national annual surveys in four sub-Saharan African countries.

METHODS

This study utilizes nationally representative longitudinal Performance and Monitoring for Action data collected in Kenya, Burkina Faso, Uganda, and Côte d'Ivoire from reproductive-age women to model the predictive influence of indicators measured at baseline on their subsequent contraceptive use (including intentions to use and method

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type) and contraceptive dynamics (including adoption, discontinuation, and switching) over an approximately three-year period.

RESULTS

Some indicators measured at baseline (e.g., FP media exposure and fertility preferences) consistently influenced women's contraceptive adoption and intentions over two to three years of observation, but the predictive utility of most indictors was largely weak for dynamic outcomes such as switching and discontinuation.

CONTRIBUTION

Our study highlights a programmatic need to reconsider long-standing FP indicators given the mixed evidence of their influence on contraceptive behavior over time. We recommend the identification of key measures that can predict dynamic contraceptive behaviors established through longitudinal data to inform actionable interventions.

1. Background

Several survey programs, such as the World Fertility Survey (WFS), the Contraceptive Prevalence Survey (CPS), and the Knowledge, Attitude, and Practice (KAP) survey, were launched in the 1970s to understand contraceptive use behavior in low- and middle-income countries (LMICs). The results from these population-level surveys were critical for tracking FP program performance in enabling individual contraceptive use, examining differential patterns in use by socioeconomic and demographic characteristics, and understanding the reasons for non-use of contraception. This information allowed FP programs to develop interventions to enhance acceptance and use of contraceptive methods among populations defined to be in need of contraception.

These interventions typically distinguished between supply and demand influences on contraceptive use (Phillips and Ross 1992). Program professionals refer to supply factors as the availability of and access to "services or advice to help couples achieve their fertility goals," while demand factors are those behaviors of individuals or couples that influence the number of children they have or want to have and their practice of contraceptive use (Simmons 1992). The supply–demand framework originally developed for fertility change (Easterlin and Crimmins 1985) substantially influenced the framing of models of contraceptive use determinants. Systematic literature reviews of family planning program interventions suggest that program efforts to address supply and demand factors have increased the use of modern contraceptive methods (Mwaikambo et al. 2011).

Accordingly, the two critical functions of FP programs are the provision of contraceptive methods and the promotion of ideational factors. Contraceptive supply

ensures the convenience, access, and quality of services, the cultural appropriateness of services, and the provision of a choice of methods. Ideational promotion seeks to disseminate awareness of birth control as an accepted means for timing births and for realizing desired family sizes. Thus the ideation of family planning is transmitted and promoted through the diffusion of innovations, social networks, mass media, and contacts with FP providers and outreach fieldworkers as key ideational change agents (Casterline 2001; Cleland and Wilson 1987). The early surveys were cross-sectional in design and limited the opportunity to fully test the effects of the measures. The Performance and Monitoring for Action (PMA) surveys, launched with a longitudinal design in 2019,[7] collect national and subnational data on contraceptive services and use from households, females, and health facilities in selected LMICs at the national and subnational levels. PMA rounds are approximately one year apart and follow cohorts of women from sampled households, as well as facilities, while also being designed to generate cross-sectional estimates of indicators of interest.

2. Key FP indicators: Their historic inclusion in surveys and evidence of longitudinal effect

The WFS and CPS found contraceptive knowledge to be low among women in LMICs (Anderson and Cleland 1984; Vaessen 1981). Improving knowledge through mass media communication programs, such as radio and TV, emerged as a key intervention strategy in the 1980s to promote contraceptive use and influence reproductive preferences. The Demographic and Health Survey (DHS), launched in 1984 as the next generation following the WFS, started to routinely collect data on FP information, education, and communication programs and later expanded to collect information on exposure to FP messages in newspapers and magazines, with the most recent survey rounds measuring respondent exposure to mobile phone SMS (short message service) and social media (Facebook, Twitter) messages.

The most robust evidence of media effects to date tends to be related to campaigns conducted to promote contraceptive use. Several prospective, longitudinal studies have been conducted in LMICs, and most have shown a positive association between exposure to media messaging and contraceptive use and intention to use. Using a nationally representative, longitudinal survey in the Philippines, Kincaid (2000) found that a mass television campaign had a significant indirect effect on intention to use and behavior through its effect on ideation. Similarly, a study using a population-based survey of

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[7] The PMA was preceded by PMA2020, which collected cross-sectional data on national and subnational samples of households, women, and health facilities between 2013 and 2019 annually. See https://www.pmadata.org/about for details about the PMA.

couples in Nepal showed that exposure to radio dramas led to increased use via the mechanism of spousal communication (Sharan and Valente 2002). Most recently, radio programs in urban areas of India, Kenya, Nigeria, and Senegal were found to be associated with increased use, and television programs were found to be associated with increased use of modern contraceptives in India and Nigeria (Benson et al. 2018; Measurement, Learning and Evaluation Project Nigeria Team 2017; Speizer et al. 2014).

Early FP indicators focused on supply aspects – that is, knowledge of contraceptive sources and the availability of services, again assessed through cross-sectional surveys. Research evidence on the effects of family planning programs on individual demand aspects, such as social norms and other barriers to contraceptive adoption, is likewise limited due to cross-sectional measurements. A major concern in the 1990s was the quality of FP programs (Cleland et al. 2006). The development of quality-of-care frameworks (Bruce 1990; Jain, Bruce, and Mensch 1992) emphasized client–provider interactions and included "information given to clients" as one of the key elements of quality-of-care indicators. Among users, unanticipated and unmanaged side effects were considered one of the most common causes of contraceptive method discontinuation, and client counseling on side effects was included as a key component of the quality-of-care framework. The DHS and PMA presently collect information from current users to measure a composite method information index (MII), considered a proxy for quality of counseling and reflecting the extent to which women are informed about side effects and alternate methods when they obtain contraception.

There is, however, very limited evidence from prospective studies as to whether the MII or the extended version, MII+, affects subsequent outcomes of contraceptive continuation or switching. One prospective cohort study of 1,998 social franchise clients in Pakistan and Uganda evaluated the association between MII and continuation over a 12-month period; in both countries, as the MII score increased, the woman's risk of discontinuation while in need decreased (Chakraborty et al. 2019). Another study in two states of India compared three-month continuation rates between women who received complete or less complete information; the study found that women who received the most complete method information (MII+) were less likely to discontinue compared to those who received partial information or the MII (Jain et al. 2019).

Survey questions have also been posed to non-users regarding discussions with providers about FP – that is, whether the women discussed FP with a visiting health worker or with a provider at a health facility. Evaluations of community health worker (CHW) programs have shown positive associations with contraceptive adoption and intention to use; a recent systematic review evaluating the strength of the evidence of CHW provision of FP services in low- and middle-income countries found that 93% of studies showed that CHWs effectively increased use (Scott et al. 2015).

Gender equality and women's empowerment are increasingly prioritized in FP programming, especially since their inclusion in the Sustainable Development Goals (SDG) of the United Nations Population Fund (UNFPA). However, FP programs have recognized and emphasized the importance of women's empowerment through the voluntary adoption of contraceptive use without any fear or coercion since the 1970s and formally declared its significance in the International Conference on Population and Development's Programme of Action in 1994 (Cohen and Richards 1994; McIntosh and Finkle 1995; Prata et al. 2017). A recent report on measurement of contraceptive decision-making that assessed the peer-reviewed literature since 2011 found that contraceptive decision-making (e.g., joint decision-making versus other types of decision-making) was associated with contraceptive use, contraceptive discontinuation, and method type (Nazarbegian et al. 2021), yet none of the studies utilized longitudinal data, again limiting the strength of the evidence base.

There has been long-standing interest in knowing a woman's reasons for not using a contraceptive method since the emergence of organized family planning programs in LMICs; cross-national survey programs have routinely collected information on programmatic, social, religious, and physiological reasons for not using a contraceptive method. Building in additional information on fertility desires and timing preferences, the indicator, unmet need, emerged as a measure of the gap in contraceptive need: women not using a contraceptive despite a stated desire to postpone or delay pregnancies (Westoff and Pebley 1981). Fertility preferences not only became important for measuring unmet need but also were framed as a determinant of contraceptive use (Feyisetan and Casterline 2000). Moreau et al. (2019) demonstrate, however, the low predictive value of unmet need as a cross-sectional point prevalence measure for future contraceptive use. Further evidence of unmet need's weakness in predicting subsequent contraceptive use based on longitudinal data is found in Sarnak et al. (2020) and Sarnak, Anglewicz, and Ahmed (2023).

The inclusion of exposure to family planning measures (FP messages, counseling on side effects, discussions about FP between non-users and providers) or demand for FP (desire for additional children; desire for decision-making autonomy) in national household surveys has provided opportunities to examine the cross-sectional associations of these key FP factors in relation to contraceptive use across different LMICs over the last three decades. However, their predictive utility on overall contraceptive use dynamics – adoption, switching, discontinuation, and method choice – is not well understood, primarily due to analyses confined to cross-sectional rather than longitudinal data. Longitudinal data collected in a standardized form enabling comparative analysis has not been publicly available until recently with the PMA program. Lack of temporal ordering in cross-sectional data impedes our understanding of whether program exposure influences contraceptive behaviors or whether observed associations are the result of

biased recall by users. While the calendar data in the DHS may be used to examine patterns of contraceptive use dynamics, they do not measure women's reports of communication exposure or the desire for another child at the time of a change in contraceptive use. The availability of PMA longitudinal data on national and subnational cohorts of women provides a major opportunity to examine the predictive utility of key, standard indicators on contraceptive adoption, switching, discontinuation, and methods.

This study's objective is to empirically assess the predictive utility of key family planning indicators on contraceptive use outcomes using longitudinal data on women participating in national annual surveys in four sub-Saharan African countries. We assess differentials in the magnitude, direction, and temporal strength of the effects of key indicators measured regularly by DHS, PMA, and other population-level surveys. These indicators are relied upon by global initiatives, such as FP2030[8] and the SDG, to assess progress on static outcomes, such as current modern contraceptive use and current intentions for future use, and dynamic ones, such as annual change in use and intentions. We further seek to observe cross-country consistency in effect patterns of indicators related to FP information and service delivery, individual fertility preferences, and family planning decision-making.

We note at the outset that our primary analytic pursuit is not for a comprehensive causal structure linking key indicators, as determinants, to contraceptive use and intentions as outcomes, an effort that extends beyond on the scope of this paper. The approach here instead is to take advantage of PMA's longitudinal and standardized data on national cohorts of reproductive-age women to assess the temporally ordered relationship of key, oft-used indicators of program exposure and fertility preferences, with subsequent continuity or change in use and intentions as outcomes of interest.

3. Methods

3.1 Data

We use data from PMA surveys, which feature a panel design with embedded cross-sectional surveys, to estimate family planning and other health indicators on an annual basis in selected country settings.[9] PMA currently operates in eight countries. It collects representative, longitudinal data at the national level in Kenya, Burkina Faso, Niger, Uganda, and Côte d'Ivoire, and data at the subnational level in India (the state of Rajasthan), Nigeria (the states of Kano and Lagos), and Democratic Republic of Congo (the provinces of Kinshasa and Kongo Central).

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[8] See fp2030.org.
[9] These countries are involved in the FP2030 initiative.

PMA uses a multistage stratified cluster survey design to draw a probability sample of households and females of childbearing age (15–49 years) in all geographies. PMA employs resident enumerators, women who live within or near the sample enumeration areas, to carry out data collection, using smartphones with the Open Data Kit software program. PMA weights all data to account for complex survey design and non-response, and attrition for the longitudinal panel data. More information about the PMA survey design can be found in Zimmerman et al. (2017) and at https://www.pmadata.org/data/survey-methodology. All data collection activities were approved by the institutional review boards at the Johns Hopkins Bloomberg School of Public Health as well as in-country, which for this study involves the Comité d'Ethique Institutionnel Pour La Recherche en Santé (Burkina Faso), École Nationale de Statistiques et d'Economie Appliquee of Abidjan (Côte d'Ivoire), Kenyatta National Hospital-University of Nairobi Ethics Research Committee (Kenya), and Makerere School of Public Health and the Uganda National Council for Science and Technology (Uganda).

For this analysis, we used data from the Phase 1 (P1), Phase 2 (P2), and Phase 3 (P3) surveys, which were collected between November 2019 and January 2023 in four sites: Kenya, Burkina Faso, Uganda, and Côte d'Ivoire, with approximately one year between each round (phase) in each country.[10] The attrition rates of participants range from 31% (Kenya) to 42% (Côte d'Ivoire) between P1 and P3 (Table A-1). Loss to follow-up weights are calculated for each round, adjusting for differential attrition rates. Although P2 or P3 surveys in some settings were performed during the COVID-19 period, PMA analysis suggests no deleterious effect of COVID on access to and use of contraceptive services by women in the earliest stages of the pandemic, when the data were collected (Moreau et al. 2023; Wood et al. 2021).

3.2 Analytic sample

Our analytical sample in each country is the cohort of women interviewed across all three survey rounds (P1, P2, and P3) so that their transitions in contraceptive use behavior can be traced over the one-year period from P1 to P2 and the two-year period from P1 to P3 for the same women. Within this panel, our study relies on one full sample and three subsamples of women defined according to their P1, P2, and P3 contraceptive use status.

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[10] Kenya P1 was conducted in November–December 2019; P2 in November–December 2020; P3 in November 2021–January 2022. Burkina Faso P1 was conducted December 2019–February 2020; P2 in December 2020–March 2021; P3 in December 2021–March 2022. Uganda P1 was conducted in September–October 2020; P2 in September–November 2021; P3 in September–October 2022. Côte d'Ivoire P1 was conducted in September–November 2020; P2 in September 2021–January 2022; P3 in September–December 2022.

The first sample is the full panel of women of childbearing age, irrespective of marital/cohabitation or pregnancy status. The next two subsamples are comprised of women who report being contraceptive users at the P1 survey. The first subsample is the P1 user panel, defined for women who report using at P1 but whose contraceptive use status over the next two waves could change. The second subsample is the continuous user panel, which includes women who report using at all three P1, P2, and P3 rounds. The third subsample, the P1 non-user panel, includes women who were non-users or pregnant at P1; they could have adopted by P2 or P3. The sample sizes for these panels are shown in Figure 1. Users and non-users with missing data are excluded from the subsamples.

Figure 1:   Model outcomes at round 3 (P3) and sample/subsample sizes: Kenya, Burkina Faso, Uganda, and Côte d'Ivoire PMA surveys
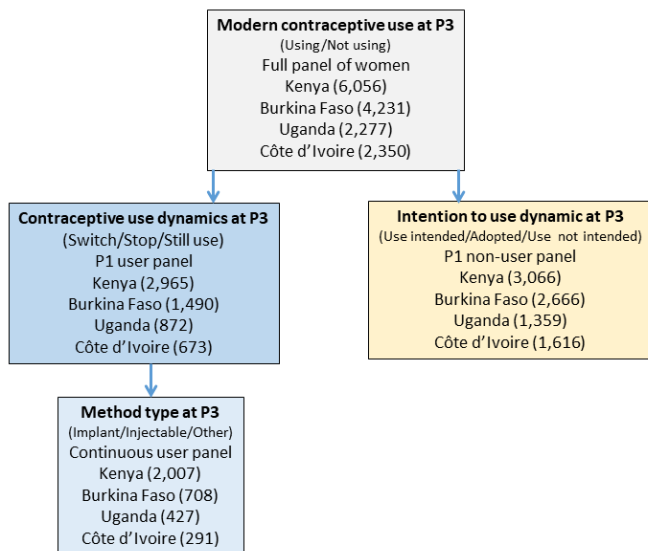
3.3 Independent variables: Key FP indicators

Since many indicators have been studied as determinants in family planning research, we first reviewed those that have been consistently measured in national DHS and PMA surveys and programmatically included in FP2030 or SDG. We cross-checked all

measures covered in the family planning chapters of DHS final reports and in FP2030's measurement report with what PMA measured in P1. Our final selection of six indicators represents the overlap between these data sources, with a few exceptions noted below. The full list of indicators and definitions are provided in Table A-2, which also specifies whether an indicator is jointly or singularly tracked by DHS and FP2030.[11] These six key indicators are of two types: (1) exposure to FP programmatic practice indicators and (2) demand-related factors, reflecting contraceptive motivations.

Exposure to family planning programmatic practice indicators include four measures, one asked of all reproductive-age women, two asked of only the P1 user subsample, and one asked of only the P1 non-user subsample. For the first indicator, FP message exposure in the media, women were asked if they had heard or seen a family planning message via various media channels (radio, television, mobile phone, newspaper, magazine or other print, and social media) in the previous 12 months. A composite measure of exposure to any of the first four media channels is constructed as well.

Two additional indicator measures are available for the subsample of P1 users, specifically those who were using a modern method. First is the quality of FP service delivery at the initiation of the current method, represented by an informed choice measure – that is, whether the user was told about side effects and what to do if she experienced any; whether she was told about other methods she could use; and whether she was told she could switch to another method if she wanted. The sum of "yes" responses to these four questions is used to define MII+, which is included as a tracking indicator by FP2030. The second program exposure measure is the source of the current method among P1 modern method users, categorized as public or private/other sector.

For the P1 non-user subsample, one additional measure of program exposure beyond media messaging is available: exposure to FP information from the health care system through contacts with a fieldworker, health facility, or both.

FP demand indicators are represented by two measures. Both DHS and FP2030 monitor the unmet need measure, which requires knowing the woman's fertility preferences – whether she would like to have a future birth and, if so, when. Our analysis does not address unmet need as an outcome; instead we extract the fertility preferences component for analysis across all outcomes.

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[11] UNFPA's most recent reproductive health strategy identifies one indicator for performance monitoring: the proportion of women aged 15–49 who make their own informed decisions regarding sexual relations, contraceptive use, and reproductive health care. Only one of the three dimensions in the composite indicator directly measures family planning and relies on the same family planning decision-making measure included by both DHS and FP2030.

The second motivation measure tracked by DHS and FP2030 is FP decision-making, categorized as done mainly by the woman, done by her partner, or done jointly; this is measured among P1 users.[12]

The standard DHS final report's FP chapter includes additional measures that were not addressed in our analysis, including knowledge of contraceptive methods, knowledge of the fertile period, timing of sterilization, and reason for discontinuation. Although measured in PMA surveys, knowledge of FP methods is universally high across the four countries, and use of male or female sterilization is nominal. Thus both had limited predictive power for this analysis. PMA does not measure knowledge of the fertile period, and reason for discontinuation was not included due to sample size requirements of users who had terminated between rounds.

3.4 Outcome variables

Figure 1 provides a flow chart with outcome measures and sample sizes across the four sites. Four contraceptive use behaviors are measured and examined as dependent outcomes in relation to the baseline key indicators. One outcome, probability of modern contraceptive use at a subsequent round, is modeled for the full panel, while for the user and non-user subsamples, we look at contraceptive use and intentions status and change over time.

For the P1 user panel, we examined whether the woman (1) continued use of the same method used at P1, (2) continued use but switched to a method different from that used at P1, or (3) stopped use altogether. Among the continuous user panel, the outcome of interest was subsequent type of method used. Method type was categorized in polytomous form: implant use, injectable use, or use of other modern/traditional methods.

For the P1 non-user panel, we examined whether the woman (1) remained a non-user and did not intend to use contraception in the future, (2) remained a non-user but expressed an intention to use contraception in the future, or (3) had adopted contraception by the later round.

3.5 Background covariates

In our fully adjusted models, we included the following sociodemographic and sexual activity covariates, which are known to influence contraceptive use: parity, urban–rural

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[12] A fourth option, "other," is also available as an answer category for this question, but because less than 2% of women in Burkina Faso and less than 1% of women in Kenya, Uganda, and Côte d'Ivoire report this response, we exclude this answer category from respective models.

residence, highest level of schooling, household wealth tertile, age, marital status, and sexual activity. All covariates were measured at P1 except for marital status and sexual activity, which were time-varying – that is, measured at the time of the P2 or P3 survey for those respective outcomes. (An alternative covariate of the woman having a recent pregnancy – if she was pregnant at P3 or had a birth between P1 and P3 – was also explored but did not have strong associations and thus was not included.)

3.6 Analytic approach

First we calculated descriptive statistics of the panel samples at P1 across sites (shown in Table A-3). Second we calculated the percentages of women who experienced each outcome at P3 for the relevant subsample (Table 1). Third we compared bivariate distributions of P2 and P3 outcomes by their P1 indicator status (not shown here). Finally we conducted bivariate and multivariable regression models (logistic for binary outcomes and multinomial for polytomous outcomes), where each outcome was regressed on each relevant FP indicator alone and adjusted for background covariates in the full models (Tables 2–5 and Figures 2–5). We modeled P1–P2 and P1–P3 transitions and found the results to be similar; we present P1–P3 results here. (P1–P2 results are provided in Tables A-4 through A-7.) We tested whether the coefficients over the P1–P2 period were different from those over the P1–P3 period using model-based F statistics, noting when the values exceeded the critical threshold for $p < 0.05$, allowing us to reject the null hypothesis of no difference (Table 6).

In all analyses we used design-based logistic regressions to adjust for higher design effects (DEFF > 1) due to the multistage stratified cluster survey design and the use of weighting. We applied survey weights adjusted for differential loss to follow up for the cohort of women interviewed across all three survey rounds (P1, P2, and P3) using inverse probability weighting methods (Howe et al. 2016), with age, marital status, parity, education, household wealth, and urban–rural residence as predictors of attrition.

4. Results

Table 1 shows the distributions of P1–P3 changes in contraceptive use dynamics outcomes across the study countries. In Kenya, most users at P1 remained users at P3, but in other countries, nearly two-fifths of users had stopped by then. Less than a quarter of women had switched to another method. Except in Côte d'Ivoire, P1 injectable and implant users accounted for a majority of use by P3.

Table 1: **Percent distribution of change in contraceptive outcomes from P1 to P3 among panel samples for Kenya, Burkina Faso, Uganda, and Côte d'Ivoire**

Panel transition	Current modern contraceptive use among full panel			Use dynamics among P1 user panel				Method type among continuous user panel				Intention dynamics for P1 non-user panel			
	N	Not using	Using	N	Continued use	Switched	Stopped	N	Injectable	Implant	Other modern/ traditional	N	Remained non-users and state no intention to use	Remained non-users; state intention to use	Adopted contraception use
KENYA P1–P3 outcome	6,056	49.6	50.4	2965	53.0	24.6	22.4	2,007	31.4	39.8	28.8	3,066	29.8	36.7	33.5
BURKINA FASO P1–P3 outcome	4,223	69.6	30.5	1490	40.9	16.5	42.6	708	16.4	51.0	32.6	2,666	33.3	42.0	24.7
UGANDA P1–P3 outcome	2,277	63.1	36.9	872	39.7	23.7	36.6	427	29.4	32.3	38.2	1,359	23.0	43.2	33.8
CÔTE D'IVOIRE P1–P3 outcome	2,350	71.7	28.3	673	33.1	24.1	42.9	291	18.4	28.3	53.4	1,616	36.1	35.1	28.8

Among the full panel of women, current use of modern contraception was highest in Kenya in P3 (50%) and lowest in Burkina Faso (30%) and Côte d'Ivoire (28%). Among the non-users at P1, change to adoption/use or intention to use varied by country. Across the four countries, adoption or intention to adopt in P3 was greater than continued non-use with no intention to use. In Burkina Faso and Uganda, around 42% of women remained non-users at P3 but stated an intention to use. Adoption by P3 was highest in Kenya and Uganda, where around one-third were users compared to one-quarter in Burkina Faso and 29% in Côte d'Ivoire.

Full panel. Table 2 and Figure 2 address the question of how available and applicable key indicators at P1 predict subsequent use of modern contraception at P3 among the full panel of all women. Only two key indicators – recent media exposure and fertility preferences – are measured for all reproductive-age women, as opposed to the subsamples based on user status. Logistic regression model results of adjusted odds ratios (aORs) show overall exposure to any media channel at baseline to be positively predictive of subsequent use by P3 in all four countries, although Uganda's aOR, while similar in magnitude to the others, has a wide confidence interval that crosses 1.0. Strong predictive effects on modern contraceptive use in P3 from baseline exposure to TV, radio, and social media channels are sporadically observed.

Table 2: **Adjusted odds ratios of baseline indicators on likelihood of using modern contraceptive method, compared to no method, at time of P3: Full panel of women**

P1 indicator	KENYA	BURKINA FASO	UGANDA	CÔTE D'IVOIRE
Media exposure				
TV	0.96 (0.82,1.13)	1.07 (0.85,1.34)	0.97 (0.45,2.10)	**1.58 (1.05,2.37)**
Radio	1.19 (1.00,1.40)	**1.29 (1.01,1.64)**	1.27 (0.67,2.39)	0.91 (0.70,1.19)
Mobile	0.81 (0.64,1.01)	1.17 (0.77,1.76)	0.90 (0.28,2.92)	1.21 (0.62,2.38)
Magazine/newspaper	1.19 (1.00,1.43)	1.20 (0.76,1.88)	1.37 (0.61,3.08)	1.39 (0.68,2.84)
Social media (PMA only)	**1.26 (1.01,1.57)**	0.99 (0.68,1.45)	0.97 (0.22,4.41)	0.99 (0.61,1.62)
Any media exposure: TV, radio, mobile, or magazine/newspaper	**1.30 (1.08,1.58)**	**1.36 (1.08,1.73)**	1.35 (0.65,2.80)	**1.63 (1.22,2.17)**
N	6,040	4,157	2,269	2,304
Fertility preferences				
Want in ≥ 2 years; reported infecund	**2.11 (1.64,2.73)**	**1.42 (1.15,1.75)**	1.76 (0.98,3.16)	**2.75 (1.84,4.11)**
Want no more	**3.57 (2.79,4.57)**	**2.60 (1.95,3.46)**	**2.98 (1.66,5.34)**	**4.96 (2.61,9.43)**
N	6,032	4,149	2,260	2,295

Notes: Models adjusted for the following P1 covariates: parity, urban–rural residence, schooling, wealth tertile, age, marital status, and sexual activity. All are measured at P1 except for marital status and sexual activity, which are measured at the follow-up survey (P2 or P3). Models weighted for sample attrition and complex survey design. Boldfaced values show confidence intervals for aORs or aRRRs that do not include 1.0.

Figure 2: **Adjusted odds ratios (log scale) of baseline indicators on likelihood of using modern contraceptive method, compared to no method, at time of P3: Full panel of women**
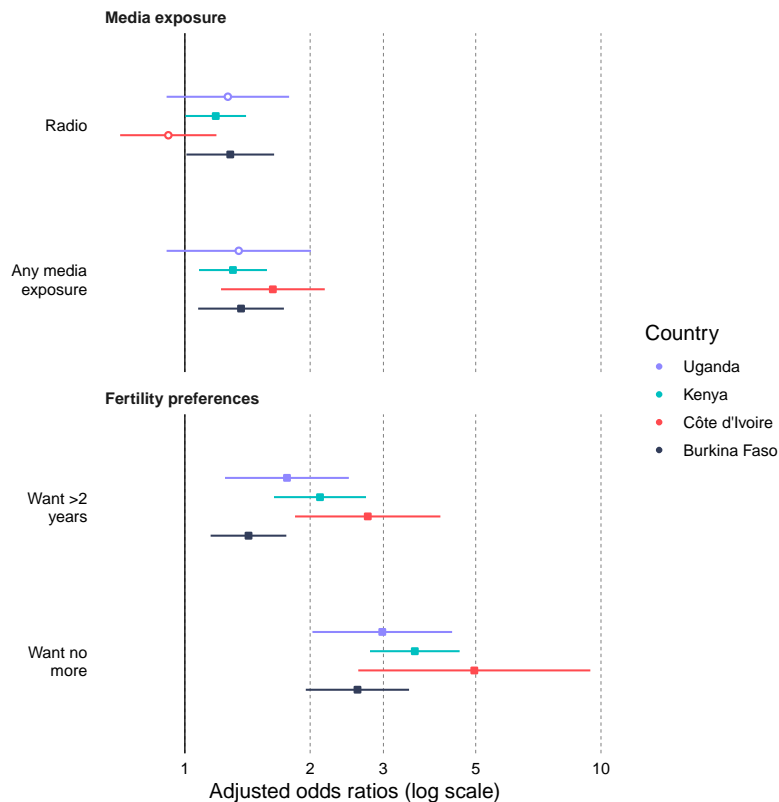
Notes: These data correspond to those in Table 2. Models adjusted for the following P1 covariates: parity, urban–rural residence, schooling, wealth tertile, age, marital status, and sexual activity. All are measured at P1 except for marital status and sexual activity, which are measured at the P3 survey. Models weighted for sample attrition and complex survey design.

Baseline fertility preferences, on the other hand, whether for spacing or for limiting births compared to wanting births soon, consistently raise the adjusted odds of subsequent modern contraceptive use by P3 in all four countries, with larger effects from wanting no more births, indicative of a strong association over time. The aORs are particularly large for wanting no more children in all countries, exceeding 2.0 for predicting later modern contraceptive use.

P1 user panel. Table 3 and Figure 3 show the results for the predictive utility of the key indicators (media exposure, MII+, source of contraception, fertility preferences, and decision-making) on P1–P3 contraceptive use dynamics (switching methods and stopping use, compared to continuing use of the same method) among the panel of P1 users. Figure 3 presents the results for a subset of the full group of indicators for summary purposes, with the full table of results presented in Table 3. Among women using contraception at P1 across the four countries, very few of these indicators consistently and substantially influenced the likelihood of switching methods in P3 relative to continuing use. Among the programmatic indicators, only reporting being told at P1 that they could switch was associated with users' increased risk of switching by P3 in Kenya (aRRR 1.33 [95% confidence interval (CI) 1.04,1.71]). Among the demand indicators, the desire to space births reduced the risk of switching in Côte d'Ivoire (aRRR 0.38, CI 0.16,0.89), while the desire to limit births reduced the risk of switching in Kenya (aRRR 0.56, CI 0.34,0.93).

Among those using a modern method at baseline, several indicators were related to stopping use by P3. Recent exposure to FP messages on the radio in Burkina Faso or through any media channel in Côte d'Ivoire at P1 was associated with a reduced risk of stopping (aRRRs 0.54 [0.36,0.80] and 0.55 [0.34,0.91], respectively). Informed choice elements variously predicted the woman's adjusted relative risk of stopping – women who reported at P1 that they were told about side effects were less likely to stop by P3 in Burkina Faso, Uganda, and Côte d'Ivoire (aRRRs 0.67 [0.44,1.03], 0.61 [0.36,1.04], 0.58 [0.38,0.88], respectively), although the confidence intervals crossed 1 in the first two country samples. The composite MII+ measure – answering yes to all four elements compared to none – lowered the risk for discontinuation over P1–P3 in Burkina Faso and Uganda (0.58 [0.40,0.85] and 0.63 [0.38,1.05], respectively). Using a public sector source, relative to a private or other type of source, increased the aRRR of P1–P3 discontinuation in Burkina Faso (1.87 [1.09,3.21]).

The desire to limit births, compared to wanting a birth within two years, was predictive of lower risks for discontinuing contraceptive use, relative to continuing use, over P1–P3 in all four countries. The desire to space births was also predictive of a reduced risk for discontinuation in Kenya, Burkina Faso, and Côte d'Ivoire.

Table 3: **Adjusted relative risk ratios of baseline indicators on likelihood of switching or stopping contraceptive use at P3, compared to continued use of same method: P1 user panel**

P1 indicator	KENYA		BURKINA FASO		UGANDA		CÔTE D'IVOIRE	
	Switched	Stopped	Switched	Stopped	Switched	Stopped	Switched	Stopped
Media exposure (no = ref)								
TV	1.07	1.14	1.19	**1.50**	0.67	0.80	0.68	**0.54**
	(0.81,1.40)	(0.87,1.49)	(0.70,2.02)	**(1.03,2.19)**	(0.36,1.25)	(0.43,1.48)	(0.39,1.20)	**(0.35,0.83)**
Radio	1.06	0.94	0.64	**0.54**	0.79	0.73	1.46	1.21
	(0.79,1.42)	(0.71,1.26)	(0.40,1.05)	**(0.36,0.80)**	(0.43,1.45)	(0.41,1.31)	(0.67,3.18)	(0.68,2.13)
Mobile	0.84	**1.57**	0.60	0.83	1.39	1.43	0.73	0.80
	(0.62,1.13)	**(1.11,2.22)**	(0.31,1.16)	(0.46,1.50)	(0.67,2.85)	(0.59,3.46)	(0.32,1.67)	(0.21,3.02)
Magazine/newspaper	1.23	0.83	0.82	0.99	1.20	0.68	1.16	1.25
	(0.97,1.57)	(0.62,1.11)	(0.47,1.43)	(0.56,1.73)	(0.55,2.61)	(0.31,1.47)	(0.42,3.23)	(0.34,4.60)
Social media	1.05	0.95	0.94	0.93	1.02	0.89	1.34	0.79
	(0.79,1.41)	(0.68,1.32)	(0.44,2.01)	(0.55,1.59)	(0.32,3.25)	(0.40,1.98)	(0.55,3.30)	(0.35,1.77)
Any media exposure: TV, radio, mobile, or magazine/newspaper	1.13	1.06	0.69	0.66	0.93	0.62	0.74	**0.55**
	(0.85,1.50)	(0.77,1.46)	(0.38,1.25)	(0.43,1.02)	(0.41,2.10)	(0.29,1.30)	(0.45,1.22)	**(0.34,0.91)**
N	2,961		1,476		871		653	
Informed choice among modern users (no to any = ref)								
1. Told about side effects	0.94	0.86	0.89	0.67	0.71	0.61	0.51	**0.58**
	(0.73,1.20)	(0.67,1.12)	(0.55,1.42)	(0.44,1.03)	(0.42,1.20)	(0.36,1.04)	(0.26,1.02)	**(0.38,0.88)**
2. Told what to do if experiencing side effects (n = 1,853)	0.74	0.76	0.66	1.49	0.55	0.57	1.57	1.20
	(0.49,1.13)	(0.45,1.29)	(0.28,1.59)	(0.83,2.69)	(0.22,1.41)	(0.22,1.50)	(0.49,5.00)	(0.40,3.62)
3. Told about other methods	0.80	0.99	0.76	**0.50**	1.24	0.96	0.99	1.05
	(0.62,1.04)	(0.76,1.28)	(0.51,1.15)	**(0.31,0.80)**	(0.70,2.20)	(0.58,1.59)	(0.55,1.77)	(0.61,1.80)
4. Told you could switch	**1.33**	**1.35**	1.08	**0.58**	1.28	1.02	1.12	1.25
	(1.04,1.71)	**(1.04,1.74)**	(0.63,1.86)	**(0.39,0.85)**	(0.68,2.39)	(0.62,1.66)	(0.62,2.03)	(0.55,2.84)
MII+ (yes to 1 + 2 + 3 + 4)	1.07	1.08	0.74	**0.58**	0.86	0.63	0.75	0.72
	(0.85,1.34)	(0.85,1.38)	(0.44,1.24)	**(0.40,0.85)**	(0.49,1.52)	(0.38,1.05)	(0.35,1.63)	(0.42,1.22)
N	2,759		1,327		730		516	
Most recent source among modern users (private/other = ref)								
Public	1.00	1.00	1.55	**1.87**	0.74	1.05	1.02	0.96
	(0.79,1.28)	(0.77,1.28)	(0.94,2.53)	**(1.09,3.21)**	(0.42,1.29)	(0.54,2.06)	(0.34,3.05)	(0.47,1.97)
N	2,759		1,208		674		483	
Fertility preferences (want in < 2 years = ref)								
Want in ≥ 2 years; reported infecund	0.70	**0.64**	1.39	**0.60**	0.90	0.55	**0.38**	**0.26**
	(0.40,1.22)	**(0.42,0.97)**	(0.69,2.79)	**(0.39,0.91)**	(0.26,3.06)	(0.25,1.22)	**(0.16,0.89)**	**(0.12,0.54)**
Want no more	**0.56**	**0.30**	0.76	**0.26**	0.29	**0.19**	0.50	**0.24**
	(0.34,0.93)	**(0.19,0.47)**	(0.35,1.63)	**(0.15,0.44)**	(0.06,1.37)	**(0.05,0.81)**	(0.14,1.75)	**(0.11,0.49)**
N	2,958		1,475		871		655	
FP decision-making among women with partners (own decision = ref)								
Husband/partner decision	0.85	1.09	0.72	1.40	1.85	1.14	1.75	1.42
	(0.62,1.16)	(0.78,1.53)	(0.36,1.43)	(0.89,2.23)	(0.92,3.74)	(0.59,2.22)	(0.90,3.44)	(0.71,2.85)
Joint decision	1.08	1.21	0.78	0.82	0.77	1.25	0.62	0.80
	(0.85,1.38)	(0.92,1.58)	(0.46,1.34)	(0.54,1.25)	(0.47,1.26)	(0.76,2.05)	(0.29,1.36)	(0.47,1.36)
N	2,926		1,453		856		647	

Notes: Models adjusted for the following P1 covariates: parity, urban–rural residence, schooling, wealth tertile, age, marital status, and sexual activity. All are measured at P1 except for marital status and sexual activity, which are measured at the follow-up survey (P2 or P3). Models weighted for sample attrition and complex survey design. Boldfaced values show confidence intervals for aORs or aRRRs that do not include 1.0.

Figure 3: **Adjusted relative risk ratios (log scale) of baseline indicators on likelihood of switching or stopping contraceptive use at P3, compared to continued use of same method: P1 user panel**
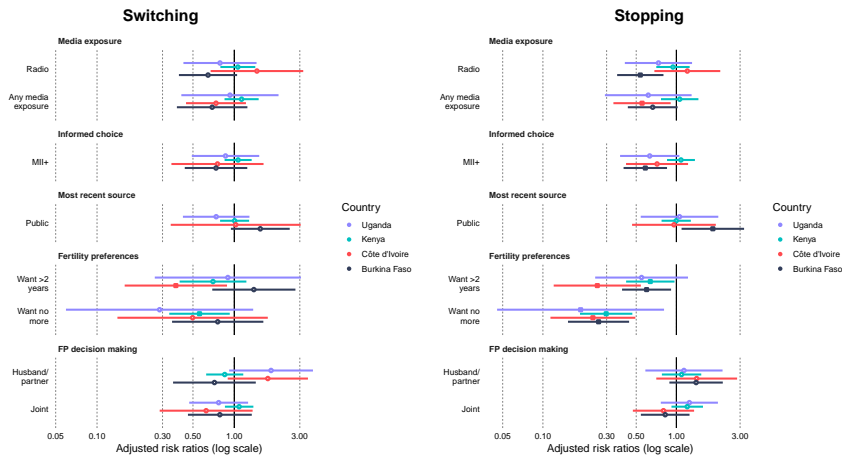
Notes: These data correspond to those in Table 3. Models adjusted for the following P1 covariates: parity, urban–rural residence, schooling, wealth tertile, age, marital status, and sexual activity. All are measured at P1 except for marital status and sexual activity, which are measured at the P3 survey. Models weighted for sample attrition and complex survey design. Square markers indicate covariates with aORs or aRRRs where confidence intervals do not cross 1.0.

Continuous user panel. Table 4 and Figure 4 examine the predictive utility of the key indicators (media exposure, MII+, source of contraception, fertility preferences, and decision-making) on contraceptive method choices by P3 among the panel of continuous users. Estimating a multinomial regression model for three outcome categories – injectable use, implant use, other modern/traditional use (reference), we observe some patterns between indicators and subsequent method choice. Only in Kenya was baseline exposure to FP messaging on the radio positively associated with subsequent injectable and implant use compared to other modern and traditional methods (aRRRs 1.62 [1.13,2.31] and 1.49 [1.03,2.15], respectively). On the other hand, baseline exposure to FP messages on any media channel was associated with a reduced risk of injectable use at P3 in Côte d'Ivoire (aRRR 0.32 [0.13,0.78]). Many of the baseline informed choice elements, in contrast, were positively associated with subsequent implant use compared to other modern/traditional methods, indicating a robust connection. For example, being told about side effects at P1, being told about other methods, and being told about switching at baseline were associated with subsequent use of implants in Kenya, Uganda, and Côte d'Ivoire. Receiving MII+ care at baseline was associated with greater implant use in P3 in Kenya and Côte d'Ivoire (aRRRs 1.81 [1.35,2.44] and 2.80 [1.19,6.58], respectively).

Table 4: **Adjusted relative risk ratios of baseline indicators on likelihood of using specific types of modern contraceptive methods at P3 compared to other modern/traditional methods: Continuous user panel**

P1 indicator	KENYA		BURKINA FASO		UGANDA		CÔTE D'IVOIRE	
	Injectable	Implant	Injectable	Implant	Injectable	Implant	Injectable	Implant
Media exposure (no = ref)								
TV	1.21	0.93	0.63	0.59	0.96	3.01	0.37	0.94
	(0.84,1.73)	(0.66,1.32)	(0.32,1.23)	(0.32,1.07)	(0.39,2.39)	(0.69,13.15)	(0.14,1.01)	(0.35,2.55)
Radio	**1.62**	**1.49**	0.86	1.01	1.48	1.02	2.22	0.68
	(1.13,2.31)	**(1.03,2.15)**	(0.40,1.82)	(0.54,1.91)	(0.74,2.96)	(0.43,2.40)	(0.80,6.16)	(0.22,2.17)
Mobile	0.90	1.10	0.66	1.62	1.01	0.98	0.48	0.18
	(0.61,1.31)	(0.73,1.67)	(0.20,2.16)	(0.75,3.47)	(0.37,2.74)	(0.33,2.94)	(0.09,2.57)	(0.01,2.31)
Magazine/newspaper	0.80	0.83	0.41	1.37	1.13	1.08	0.70	4.12
	(0.53,1.20)	(0.58,1.18)	(0.14,1.25)	(0.66,2.81)	(0.45,2.85)	(0.41,2.85)	(0.13,3.74)	(0.52,32.74)
Social media	1.09	1.19	0.39	0.52	0.18	0.48	0.64	1.76
	(0.78,1.53)	(0.79,1.79)	(0.14,1.07)	(0.20,1.34)	(0.02,1.76)	(0.10,2.26)	(0.23,1.81)	(0.46,6.73)
Any media exposure: TV, radio, mobile, or magazine/newspaper	1.28	1.29	0.51	0.67	0.65	0.72	**0.32**	0.71
	(0.83,1.96)	(0.89,1.87)	(0.22,1.19)	(0.35,1.27)	(0.26,1.66)	(0.27,1.89)	**(0.13,0.78)**	(0.33,1.53)
N	2,003		703		427		288	
Informed choice among modern users (no to any = ref)								
1. Told about side effects	1.34	**1.53**	1.75	1.43	0.69	1.72	0.89	**3.68**
	(1.00,1.80)	**(1.14,2.04)**	(0.84,3.67)	(0.84,2.42)	(0.35,1.34)	(0.90,3.29)	(0.33,2.45)	**(1.74,7.79)**
2. Told what to do if experiencing side effects (n = 1,282)	**2.14**	**3.16**	1.05	**4.56**	0.61	0.98	1.34	**6.88**
	(1.19,3.85)	**(1.80,5.56)**	(0.32,3.40)	**(1.44,14.48)**	(0.11,3.32)	(0.30,3.19)	(0.29,6.30)	**(1.22,38.82)**
3. Told about other methods	1.36	1.38	0.86	0.80	0.97	**2.33**	1.73	**2.90**
	(0.95,1.95)	(0.96,1.98)	(0.42,1.75)	(0.41,1.56)	(0.54,1.74)	**(1.11,4.88)**	(0.69,4.32)	**(1.23,6.84)**
4. Told you could switch	**2.95**	**2.20**	1.52	1.10	1.18	**2.97**	1.16	**4.23**
	(2.18,4.01)	**(1.55,3.13)**	(0.69,3.33)	(0.62,1.95)	(0.59,2.38)	**(1.53,5.76)**	(0.45,2.98)	**(1.76,10.19)**
MII+ (yes to 1 + 2 + 3 + 4)	**1.87**	**1.81**	1.85	1.70	0.69	1.56	0.81	**2.80**
	(1.39,2.50)	**(1.35,2.44)**	(0.86,3.95)	(0.87,3.31)	(0.34,1.40)	(0.91,2.65)	(0.26,2.53)	**(1.19,6.58)**
N	1,890		640		376		241	
Most recent source among modern users (private/other = ref)								*
Public	**1.41**	**3.15**	**6.64**	**4.67**	1.30	**3.64**	18.31	35.84
	(1.02,1.95)	**(2.21,4.50)**	**(2.67,16.48)**	**(2.46,8.84)**	(0.61,2.75)	**(1.50,8.81)**	(4.62,72.54)	(11.51,111.57)
N	1,890		585		354		220	
Fertility preferences (want in < 2 years = ref)								
Want in ≥ 2 years; reported infecund	0.74	0.77	1.57	3.18	**		**	
	(0.27,1.99)	(0.34,1.72)	(0.45,5.43)	(0.94,10.71)				
Want no more	0.71	0.90	1.74	1.59	0.76	**4.02**	1.35	0.39
	(0.27,1.86)	(0.41,1.99)	(0.47,6.41)	(0.49,5.15)	(0.32,1.56)	**(2.00,8.07)**	(0.64,2.85)	(0.14, 1.09)
N	2,001		703		427		289	
FP decision-making among women with partners (own decision = ref)								
Husband/partner decision	**0.46**	**0.51**	0.50	1.53	0.83	1.57	3.94	0.23
	(0.31,0.69)	**(0.35,0.74)**	(0.19,1.31)	(0.73,3.22)	(0.26,2.60)	(0.68,3.61)	(1.00,15.63)	(0.05,1.03)
Joint decision	0.76	0.76	0.79	0.92	0.66	1.45	1.54	0.96
	(0.57,1.01)	(0.56,1.03)	(0.38,1.67)	(0.47,1.78)	(0.34,1.27)	(0.77,2.71)	(0.75,3.15)	(0.48,1.93)
N	1,982		692		419		287	

Notes: Models adjusted for the following P1 covariates: parity, urban–rural residence, schooling, wealth tertile, age, marital status, and sexual activity. All are measured at P1 except for marital status and sexual activity, which are measured at the follow-up survey (P2 or P3). Models weighted for sample attrition and complex survey design. Boldfaced values show confidence intervals for aORs or aRRRs that do not include 1.0.
* Note unstable results due to very small cell sizes.
** Due to small cell sizes for the "want in < 2 years" group in Uganda and Côte d'Ivoire (n < 10), in this model those who want more children or are infecund serve as the reference group.

Figure 4: **Adjusted relative risk ratios (log scale) of baseline indicators on likelihood of using specific types of modern contraceptive methods at P3 compared to other modern/traditional: Continuous user panel**
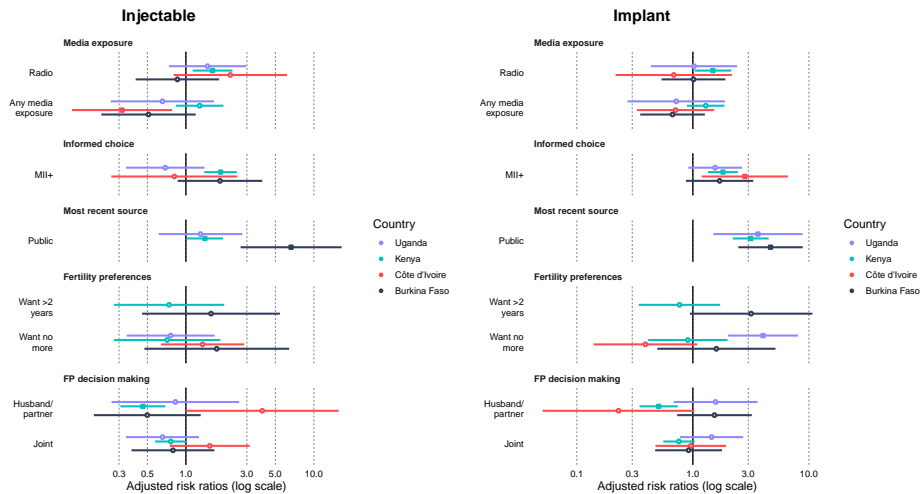

Notes: These data correspond to those in Table 4. Models adjusted for the following P1 covariates: parity, urban–rural residence, schooling, wealth tertile, age, marital status, and sexual activity. All are measured at P1 except for marital status and sexual activity, which are measured at the P3 survey. Models weighted for sample attrition and complex survey design. Due to small cell sizes for the "want in < 2 years" group in Uganda and Côte d'Ivoire (n < 10), for this model those who want more children or are infecund are the reference group.

Accessing contraception from a public sector source raised the aRRRs for P3 implant use compared to other methods in all countries and for injectable use in Kenya, Burkina Faso, and Côte d'Ivoire. (Note that the effects of small cell sizes on indicator aRRRs are observed in the wide confidence intervals in some models.)

Baseline motivation to space or limit births, relative to having a child soon, was not associated with P3 method choice. Finally, decision-making jointly or by the partner only, compared to the wife, was associated with the type of method subsequently used by P3 in Kenya and Côte d'Ivoire. If the husband/partner was the primary FP decision-maker, there was a reduced chance of implant use at P3 compared to using other modern or traditional methods. (In Kenya there was also a reduced chance of injectable use.)

P1 nonuser panel. Table 5 and Figure 5 show the predictive utility of applicable indicators for P1 nonusers – media exposure, contact with health providers, and fertility preferences at baseline – on the subsequent behaviors and intentions around using contraception by P3. Again estimating a multinomial regression model for three outcome categories – continued non-use with no intention to use (reference), continued non-use with an intention to use, and adoption – we observe baseline media exposure, exposure

to FP information through contact with the health care system, and fertility preferences to have predictive utility for P3 intentions to use and adoption in Kenya, Burkina Faso, and Côte d'Ivoire among women who were non-users at P1.

Table 5: **Adjusted relative risk ratios of baseline indicators on likelihood of subsequent intention to use or adopt at P3, compared to continued intention not to use: P1 non-user panel**

P1 indicator	KENYA		BURKINA FASO		UGANDA		CÔTE D'IVOIRE	
	Now intends to use	Adopted	Now intends to use	Adopted	Now intends to use	Adopted	Now intends to use	Adopted
Media exposure (no = ref)								
TV	1.16	0.99	0.99	1.37	1.12	0.84	1.04	1.18
	(0.84,1.60)	(0.73,1.34)	(0.69,1.44)	(0.95,1.98)	(0.71,1.79)	(0.44,1.62)	(0.71,1.54)	(0.71,1.94)
Radio	1.64	1.53	1.55	1.36	1.25	0.86	0.86	0.92
	(1.16,2.34)	(1.10,2.13)	(1.09,2.20)	(0.95,1.93)	(0.71,2.19)	(0.47,1.55)	(0.54,1.39)	(0.59,1.44)
Mobile	0.97	0.86	1.45	1.81	1.40	1.48	0.97	0.78
	(0.59,1.58)	(0.54,1.37)	(0.64,3.32)	(0.70,4.71)	(0.45,4.29)	(0.71,3.09)	(0.38,2.47)	(0.36,1.71)
Magazine/newspaper	1.33	1.32	1.17	1.49	1.18	1.74	0.75	1.25
	(0.97,1.81)	(0.95,1.85)	(0.65,2.11)	(0.83,2.65)	(0.62,2.24)	(0.80,3.82)	(0.40,1.40)	(0.67,2.34)
Social media	0.84	1.17	0.66	0.81	0.54	1.10	2.32	1.04
	(0.57,1.24)	(0.81,1.70)	(0.20,2.17)	(0.24,2.82)	(0.24,1.21)	(0.54,2.22)	(0.81,6.63)	(0.52,2.06)
Any media exposure: TV, radio, mobile, or magazine/newspaper	1.67	1.63	1.58	1.71	1.21	1.12	1.03	1.09
	(1.19,2.34)	(1.16,2.29)	(1.14,2.18)	(1.17,2.49)	(0.69,2.14)	(0.65,1.94)	(0.75,1.41)	(0.81,1.47)
N	3,054		2,618		1,353		1,593	
Contact of non-users with FP providers								
Visited by health worker who talked about FP (3,065)	1.12	1.05	1.21	1.72	1.09	1.34	1.54	0.93
	(0.71,1.75)	(0.68,1.62)	(0.71,2.04)	(1.01,2.90)	(0.54,2.21)	(0.73,2.45)	(0.86,2.73)	(0.43,1.99)
Discussed FP at health facility (1,762)	1.57	1.62	1.64	2.39	1.83	2.44	1.42	2.10
	(1.09,2.25)	(1.16,2.25)	(1.10,2.46)	(1.56,3.66)	(1.04,3.24)	(1.58,3.76)	(0.74,2.71)	(0.99,4.47)
Visited by health worker who talked about FP or discussed FP at health facility	1.53	1.61	1.65	2.47	1.39	2.42	1.58	2.30
	(1.11,2.11)	(1.20,2.17)	(1.16,2.35)	(1.75,3.49)	(0.89,2.15)	(1.56,3.74)	(0.87,2.85)	(1.17,4.52)
N	3,056		2,626		1,353		1,599	
Fertility preferences (want in < 2 years = ref)								
Want in ≥ 2 years; reported infecund	1.24	2.56	1.65	1.79	1.63	1.99	1.93	4.98
	(0.88,1.76)	(1.79,3.67)	(1.21,2.26)	(1.22,2.63)	(0.84,3.17)	(1.24,3.21)	(1.39,2.66)	(2.58,9.59)
Want no more	0.90	3.42	0.59	2.00	0.87	2.49	1.88	9.83
	(0.59,1.38)	(2.36,4.95)	(0.38,0.91)	(1.19,3.35)	(0.38,2.00)	(1.18,5.27)	(0.97,3.66)	(3.12,30.94)
N	3,049		2,613		1,345		1,581	

Notes: Models adjusted for the following P1 covariates: parity, urban–rural residence, schooling, wealth tertile, age, marital status, and sexual activity. All are measured at P1 except for marital status and sexual activity, which are measured at the follow-up survey (P2 or P3). Models weighted for sample attrition and complex survey design. Boldfaced values show confidence intervals for aORs or aRRRs that do not include 1.0.

Figure 5: **Adjusted relative risk ratios of baseline indicators (log scale) on likelihood of subsequent intention to use or adoption compared to continued intention not to use: P1 non-user panel**
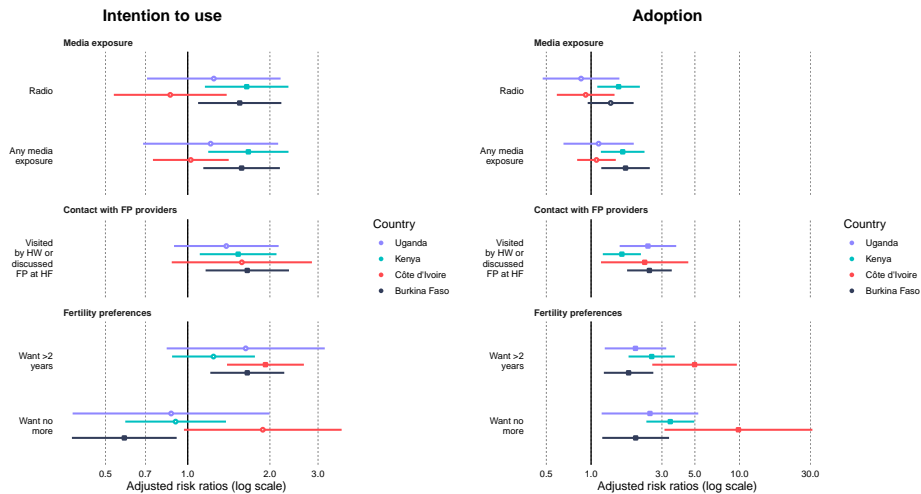
Notes: These data correspond to those in Table 5. Models adjusted for the following P1 covariates: parity, urban–rural residence, schooling, wealth tertile, age, marital status, and sexual activity. All are measured at P1 except for marital status and sexual activity, which are measured at the P3 survey. Models weighted for sample attrition and complex survey design.

P1 exposure to FP messaging through radio or any media channel positively increased the aRRRs for subsequent P3 intention to use among continuous non-users in Kenya and Burkina Faso (aRRRs for radio 1.64 [1.16,2.34] and 1.55 [1.09,2.20], respectively; aRRRs for any media 1.67 [1.19,2.34] and 1.58 [1.14,2.18], respectively). Baseline exposure to FP messaging through any media channel in Kenya and Burkina Faso was also associated with subsequent adoption of contraception (aRRRs 1.63 [1.16,2.29] and 1.71 [1.17,2.49], respectively).

Baseline non-users' exposure to FP information through contact with the health care system, either through a fieldworker or at a health facility, predicted their subsequent intentions to use and to adopt contraception compared to remaining a non-user with no intention to use, indicating a strong and longer-term association with these dynamics. Of note, the aRRR values for adoption were above 2.0 in all countries except for Kenya. P1 motivation to space births after two years or to limit births, relative to wanting a birth soon, predicted non-users' probability of adoption by P3 in all four countries.

Last, and importantly, we were interested in whether the size and direction of the effects of the indicators on the outcomes change with the follow-up period of one year (e.g., P1–P2) or two years (e.g., P1–P3). This is captured in Table 6, which visually

depicts the aORs or aRRRs with confidence intervals not crossing 1.0 in color. Blue shading indicates a positive relationship between the indicator and outcome, and red shading indicates a negative one. Where an indicator is shaded for both P1–P2 and P1–P3 effects, we conducted a Wald test of coefficient differences and report the p value of the F statistic. We show the p value in the cell of the pair of effects that had the larger regression coefficient. For example, in the first outcome of subsequent modern contraceptive use among the full panel of women (Table 6, Panel A), we observe blue cells for the effects of exposure to TV (over the P1–P2 period) and social media (over the P1–P3 period) and exposure to any media over both the P1–P2 and P1–P3 periods in the Kenya models. The model results for the two time periods for any media effects between them are not different from one another (p value of 0.986). On the other hand, fertility preferences are both predictive indicators for subsequent modern contraceptive use over the P1–P2 and P1–P3 periods, indicated by blue shading in both cells, yet the effect sizes are notably different. (The p values are 0.012 and 0.013.) This latter pattern is also observed in Burkina Faso models; and across the four countries, fertility preferences exercise fairly consistent positive effects on subsequent contraceptive use. The period differences are weak in Uganda and marginally strong in Côte d'Ivoire (p values of 0.057 and 0.085, respectively).

Table 6: Comparison of longitudinal effects (P1–P2 versus P1–P3) of key indicators on modern contraceptive use outcomes in four countries

Blue-shaded boxes show that the indicator's aOR (or aRRR) is positively related to the contraceptive outcome and that the 95% confidence intervals do not include 1.0. Red-shaded boxes indicate a negative relationship with a confidence interval that does not include 1.0. P values are based on an F test statistic comparing the model-adjusted P1–P2 effect to the model-adjusted P1–P3 effect. All p values shown are placed in the cell that had the larger effect (P1–P2 or P1–P3). The actual effects for P1–P3 are available in Tables 2–5. Those for P1–P2 are available in Tables A-4 through A-7.

Panel A. Modern contraceptive use (using/not using)

Full panel of women	Kenya		Burkina Faso		Uganda		Côte d'Ivoire	
	P1–P2	P1–P3	P1–P2	P1–P3	P1–P2	P1–P3	P1–P2	P1–P3
P1 indicator								
Media exposure								
TV	▨						0.826	
Radio				▨				
Mobile			▨					
Magazine/newspaper								
Social media		▨						
Any of first four	0.986			▨			0.970	
Fertility preferences								
Want in ≥ 2 years; infecund	0.012		0.000		▨		0.057	
Want no more	0.013		0.020		0.778		0.085	

Note: Based on model results provided in Table 2 and Table A-4.

Panel B. Use dynamic (switched/stopped/still using)

P1 User panel	Kenya				Burkina Faso				Uganda				Côte d'Ivoire			
	P1–P2		P1–P3		P1–P2		P1–P3		P1–P2		P1–P3		P1–P2		P1–P3	
P1 indicator	Sw	Stp	Sw	Stp	Sw	Stp	Sw	Stp	Sw	Stp	Sw	Stp	Sw	Stp	Sw	Stp
Media exposure																
TV								▨								▧
Radio		▨				▧										
Mobile		0.804		▨												
Magazine/newspaper																
Social media																
Any of first four																▧
Informed choice (no = ref)																
Told about side effects						▧										▧
Told what to do if experiencing side effects						▧										
Told about other methods						0.959										
Told could switch	0.206			▨		0.980		▧				▨				
MMI (yes to any above four)						0.685		▧								
Most recent source																
Public						▨		▨								
Fertility preferences																
Want in ≥ 2 years; infecund		0.012		▧		0.026		▧						0.927		▧
Want no more		0.208		▧		0.081		▧		0.958		▧		0.645		▧
FP decision-making (own = ref)																
Husband/partner																
Joint						▧										

Note: Based on model results provided in Table 3 and Table A-5.

Table 6: (Continued)

Panel C. Method type (implant/injectable/other)

Continuous user panel	Kenya				Burkina Faso				Uganda				Côte d'Ivoire			
	P1–P2		P1–P3		P1–P2		P1–P3		P1–P2		P1–P3		P1–P2		P1–P3	
P1 indicator	Inj	Imp	Inj	Imp	Inj	Imp	Inj	Imp	Inj	Imp	Inj	Imp	Inj	Imp	Inj	Imp
Media exposure																
TV																
Radio		0.944														
Mobile																
Magazine/newspaper																
Social media					0.436											
Any of first four																
Informed choice (no = ref)																
Told about side effects		0.802												0.471		
Told what to do if experiencing side effects		0.654				0.880								0.760		
Told about other methods														0.520		
Told could switch	0.502	0.584								0.785				0.785		
MMI (yes to any above four)	0.364	0.797												0.941		
Most recent source																
Public		0.483			0.627	0.701				0.700			0.059			0.020
Fertility preferences																
Want in ≥ 2 years; infecund																
Want no more										0.298						
FP decision-making (own = ref)																
Husband/partner	0.953	0.595												0.473		
Joint	0.197	0.034														

Note: Based on model results provided in Table 4 and Table A-6.

Panel D. Intention to use dynamic (now intends/adopted/no intention)

P1 non-user panel	Kenya				Burkina Faso				Uganda				Côte d'Ivoire			
	P1–P2		P1–P3		P1–P2		P1–P3		P1–P2		P1–P3		P1–P2		P1–P3	
P1 indicator	Now Int	Adopted	Now Int	Adopted	Now Int	Adopted	Now Int	Adopted	Now Int	Adopted	Now Int	Adopted	Now Int	Adopted	Now Int	Adopted
Media exposure																
TV																
Radio	0.967	0.825		0.863												
Mobile																
Magazine/ newspaper																
Social media																
Any of first four	0.622	0.609		0.683	0.278											
Contact with FP providers																
Visited by health worker; talked about FP																
Discussed FP at health facility	0.246	0.134			0.208				0.888	0.706						
Either of the above	0.574	0.087		0.407	0.471				0.998				0.359			
Fertility preferences																
Want in ≥ 2 years; infecund		0.280			0.004				0.598		0.299	0.406				
Want no more		0.631			0.245				0.998					0.057		

Note: Based on model results provided in Table 5 and Table A-7.

Overall, the results in Table 6 are weak with respect to the predictive utility of the key measures with the contraceptive outcomes. They also show little evidence of substantial change in the effect of particular indicators with time. Of 76 pairs of models tested, only 14 show substantial differences in P1–P2 versus P1–P3 effects (based on p values below 0.10). These differences are (1) observed primarily in Kenya and Burkina Faso results, (2) largely attenuating – that is, the P1–P2 effect is greater than the P1–P3 one – and (3) mostly constrained to the fertility preferences indicator (spacing) on dynamics of use.

5. Discussion

For more than a half century, the family planning field has benefited from a legacy of strong measurement of individual-level factors influencing fertility and contraceptive behaviors at the population level. Measurement and monitoring efforts have matured across less resourced regions of the world, and service delivery approaches, contraceptive method options, and engagement with the private health sector have evolved operationally. National fertility and contraceptive use levels have trended together (Dasgupta et al. 2022). However, a full reconsideration and standardization of performance indicators has received less attention and lagged, with the exception of defining and revising unmet need (Bradley et al. 2012) and satisfied demand (Fabic et al. 2015). Renewed efforts to address future areas for deriving indicators with improved predictive utility are needed, such as with respect to contraceptive dynamics, female and youth-centered agency and empowerment, integration with postpartum care, and self-care. Determinants more proximate to a woman's decision to use, as well as stop using, contraception and reflective of male partner involvement warrant greater exploration.

The measurement of key indicators has relied primarily on cross-sectional data collected periodically through national household surveys. This analysis has been similarly constrained to empirical associations rather than causal connections. This has limited our understanding of longitudinal change and relationships between person-level exposure variables and outcomes of interest. A unique strength of this analysis is its reliance on national-level longitudinal data collected between late 2019 and early 2023 on four large panels of women who participated in the first, second, and third annual rounds of PMA surveys in Kenya, Burkina Faso, Uganda, and Côte d'Ivoire – two countries situated in East Africa and two in West Africa. Although levels of contraceptive use are modest in some settings, the total panel samples number from approximately 2,300 in Côte d'Ivoire and Uganda to more than 6,000 in Kenya. By assessing the predictive utility of key contraceptive supply and demand indicators as determinants of contraceptive behaviors, we capitalize on the reduced variance obtained by measuring

the same unit (woman) over time through longitudinal data for a more robust inference (Rindfleisch et al. 2008).

Our paper's analytic scope has been limited to survey-based key indicators routinely published and monitored by donor and country stakeholders to assess their predictive utility in determining contraceptive use status, intentions, and the dynamics of both. The number of exposure indicators is limited, with no more than ten identified in chapters on family planning in final DHS reports. A few of these (e.g., the MII and FP decision-making) are also monitored by FP2030 and by UNFPA for the Sustainable Development Goals (5.6.1), that is, women's informed decision-making using a composite measure based on DHS data. Of the ten identified indicators, we were not able to evaluate four for reasons of data availability or lack of variance. In addition to examining subsequent modern contraceptive use and type of method used, we constructed and analyzed two dynamic outcomes – change in contraceptive use and change in FP intentions – for the two transition periods, P1–P2 and P1–P3. Only two key indicators – media channel for FP messaging and fertility preferences – could be consistently assessed across all four outcomes.

Our results add to the evidence of the effectiveness of FP media exposure on contraceptive use dynamics, particularly the effects on adoption and intention to use. In line with previous research (Benson et al. 2018; Kincaid 2000; Measurement, Learning and Evaluation Project Nigeria Team 2017; Sharan and Valente 2002; Speizer et al. 2014), we observe that exposure to FP messaging through any media channel, particularly radio, was predictive of subsequent adoption and intention to use among P1 non-users, primarily in Kenya and Burkina Faso. Baseline FP media exposure was also associated with discontinuation among P1 users, although less consistently.

MII+ is meant to serve as a proxy of the quality of family planning counseling received, and counseling is often considered one of the primary strategies to facilitate contraceptive continuation and switching (Danna et al. 2021). Our results indicate that in some countries, informed choice received from a provider plays this role, supporting the very limited body of prospective evidence on counseling and subsequent use dynamics and choice (Chakraborty et al. 2019; Jain et al. 2019). For example, among baseline users, elements of informed choice were associated with switching behavior in Kenya and reduced discontinuation in Kenya, Burkina Faso, and Côte d'Ivoire. In the continuous user panel, measures of informed choice were also consistently associated with P3 use of the implant method in all countries (compared to other modern/traditional methods) and injectables in Kenya, another signal that counseling has predictive effects on contraceptive outcomes.

Source of method also was predictive of subsequent contraceptive use dynamics among P1 users, most notably that obtaining a method from the public sector in P1 enabled subsequent switching and stopping, primarily among Burkinabe users. Among

the continuous user panel, public source was associated with P3 implant use in all countries and with injectables in Kenya, Burkina Faso, and Côte d'Ivoire. Because implants obtained through the private sector are costly, public sources for the multiyear method are, not surprisingly, predictive of use.

Among P1 non-users, contact and discussions with providers about FP was associated with subsequent intention to use and adoption across all four countries, adding to a rich literature connecting interactions and information exchange with FP cadres on subsequent use (Scott et al. 2015).

Fertility desires and timing preferences were consistently associated with contraceptive use dynamics. In all four countries, among baseline non-users, P1 motivations to space or limit births were consistently associated with women's intentions to use or adoption by the subsequent round. In the continuous user panel, women who wanted no more births in P1 were more likely to choose implants in Uganda, and women wanting to space births in P1 opted for implants in Burkina Faso, but no significant patterns were observed elsewhere.

Autonomous decision-making had relatively few predictive patterns on use dynamics. Among the continuous user panel, having less autonomy in FP decision-making lowered the probability of using implants or injectables in Kenya only. While we found no prospective studies using this measure of autonomous decision-making to examine subsequent use dynamics or method choice, other longitudinal studies have found associations between elements of partner relationships (e.g., support for family planning) and subsequent adoption and discontinuation (Sarnak et al. 2021).

In sum, we have observed some predictive utility from all six key indicators on one or more of the four contraceptive use outcomes as applicable to the analytic samples. At the same time the effects, especially for supply and autonomy indicators, are weaker than expected and not consistently large across all settings or equal in magnitude over time. This is especially true for effect patterns in Uganda and Côte d'Ivoire. Some of this variation could reflect differential strength of family planning programmatic efforts across countries, as well a longer history of contraceptive acceptance behind motivations to use in Kenya. At the same time, with more than 300 population-level surveys having been conducted in more than 90 countries among the different historic survey programs, there has been a major missed opportunity to understand the predictive value of the many indicators collected on demographic and health outcomes, including contraceptive behaviors.

The results of this analysis do not suggest that survey measurement of any of the key indicators should be discontinued. In fact, their predictive utility is now better revealed when examined in relation to dynamic contraceptive outcomes, signaling the importance of longitudinal data. A reconsideration of what indicators warrant large-scale population-level monitoring is called for instead. The limited number of indicators

assessed through our analysis is a result of survey questions and measures pertinent only to users and non-users and less to all women. Given a growing interest in measurement improvement and moving the field toward more patient-centered measures and outcomes (Speizer, Bremner, and Farid 2022; Senderowicz and Maloney 2022), we believe our findings emphasize the importance of developing the next generation of measures that encompass direct information from partners about their roles and perceived influences; more nuance around each partner's preferences for and successful use of contraception and achieving childbearing goals, autonomy, respect, and agency; and building their predictive value through longitudinal measurement and assessment.

As an example, we included in our study a standard measure of reproductive agency – the decision to *use* contraception – but new evidence has shone light on the importance of agency in decision-making around the *non-use* of contraception (Fabic et al. 2023). While our results show associations between MII+ and subsequent reproductive behavior, new measures, such as the QCC-10 scale (Karp et al. 2023), are showing promise in measuring the quality of FP care, incorporating person-centeredness and negative elements of care in family planning and demonstrating predictive utility over the short term.

We recognize several limitations of our study. First, user status is defined at yearly P1, P2, and P3 surveys and may miss more dynamic changes between surveys, such as short-term adoption, switching, and discontinuation. This is common when current use status is obtained from cross-sectional surveys. Second, our analysis does not account for explicit contraceptive need reported by respondents, which would influence dynamics such as adoption or discontinuation. This is the result of using contraceptive intentions as an outcome variable. We do approximate some dimensions of need by adjusting for respondents' round-specific marital status and sexual activity. Third, there are unobserved confounders in our adjusted models. For example, we do not control for partner relationship traits or country-level contextual measures. These more causally oriented questions go beyond the scope of this paper but are important for future in-depth investigations into the emergent relationships seen here.

Our analysis, while informative, thus has not taken full advantage of the longitudinal structure of PMA panel data that can support in-depth causal analysis with more advanced dynamic modeling on specific subsamples of women, users, and non-users. This will be the focus of future causally oriented analytic efforts. The objective of our present analysis has been to simply determine if and how strongly the existing structure of commonly measured supply and demand indicators influence contraceptive behaviors, adjusted for basic background covariates. The availability of four national longitudinal samples of women, some contracepting and others not, has provided a unique opportunity to assess long-standing program performance indicators and fertility motivations as determinants

of dynamic change in contraceptive intentions and behaviors over time, a situation not possible heretofore.

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Appendix

Table A-1: Percent of P1 full sample followed up by P3

| | | Kenya (31% attrition) | | Burkina Faso (34% attrition) | | Uganda (40% attrition) | | Côte d'Ivoire (41% attrition) | |
		P1 full sample (interviewed + consented for follow-up); P1 weight (8826)	P1–P2–P3 panel sample (weighted for LFU) (6057)	P1 full sample (interviewed + consented for follow-up); P1 weight (6418)	P1–P2–P3 panel sample (weighted for LFU) (4231)	P1 full sample (interviewed + consented for follow-up); P1 weight (3820)	P1–P2–P3 panel sample (weighted for LFU) (2277)	P1 full sample (interviewed + consented for follow-up); P1 weight (3989)	P1–P2–P3 panel sample (weighted for LFU) (2350)
Age	Years (mean)	28.8	28.7	29.0	29.1	27.6	28.0	28.6	28.3
Parity	Number of births (mean)	2.4	2.4	3.1	3.1	2.8	2.8	2.4	2.4
Education	None/primary	50.2	49.1	77.3	77.74	61.9	58.2	66.9	65.9
	Secondary+	49.8	50.9	22.7	22.26	38.1	41.8	33.1	34.1
Household wealth tertile	Lowest	36.2	35.1	34.0	33.58	30.9	27.2	29.4	28.5
	Middle	35.4	35.0	32.7	32.79	33.2	31.0	31.3	29.6
	Highest	28.4	29.9	33.3	33.62	35.9	41.8	39.3	41.9
Residence	Urban	28.6	30.5	23.0	23.52	28.8	29.0	60.5	62.2
	Rural	71.4	69.5	77.1	76.48	71.2	71.0	39.5	37.8
Marital status	Married/living with partner	59.9	58.6	76.0	75.97	59.6	60.2	62.6	61.1
	Divorced	8.6	8.5	3.5	4.363	13.4	14.6	5.0	5.2
	Never married	31.4	32.9	20.5	19.67	27.0	25.3	32.4	33.7

Table A-2: **Standard FP indicators selected from DHS final report chapters and FP2030 measurement report**

FP program exposure indicators	Indicator identified by		Definition	Denominator sample
	DHS	FP2030		
Media exposure in last 12 months	X		Respondent says yes to exposure to the following in last 12 months: 1) Heard about FP on the radio 2) Saw anything about FP on television 3) Read about FP in a newspaper/magazine 4) Received voice/text message about FP on mobile phone 5) Saw anything about FP on social media 6) Saw anything about FP on poster, leaflet, or brochure 7) Saw anything about FP on outdoor sign/billboard 8) Heard anything about FP at community meetings/events	All women 15–49
Exposure to FP on TV	X			
Exposure to FP on radio	X			
Exposure to FP on mobile phone	X			
Exposure to FP in social media	X			
Exposure to FP in newspaper/magazine	X			
Contact of non-users with FP providers	X	X	Women who report interaction with the health care system (via a fieldworker, health facility, or both) and received information on FP at the time of contact with a health service provider (fieldworker, staff member at health facility, or both) in last 12 months	All women 15-49 not using contraception
Visited by fieldworker who discussed FP	X			
Visited a health facility in past 12 months and discussed FP	X			
Visited a health facility in past 12 months and did not discuss FP	X			
Did not discuss FP either with fieldworker or at a health facility	X			
Informed choice	X	X	Among current users, women who report yes to the following questions: 1) At that time (when you first started using current method), were you told about side effects or problems you might have with the method? 2) Were you told what to do if you experienced side effects or problems? 3) At that time, were you told about other methods of family planning that you could use? 4) At that time, were you told that you could switch to another method if you wanted to or needed to?	Current modern method users who started last episode of use within the five years preceding survey
Informed about side effects or problems of method used	X			
Informed about what to do if side effects were experienced	X			
Informed by a health or FP worker of other methods that could be used	X			
Informed by a health worker that switching to another method was possible		X	Answers yes to all four for MII+	

Table A-2:   (Continued)

FP program exposure indicators	Indicator identified by		Definition	Denominator sample
	DHS	FP2030		
FP2030 Method Information Index (MMI)		X	Among current users of a method, the extent to which women report that they received specific information from an FP service provider when they began that method. Women reporting yes to all the above four questions.	Current users of modern methods
Most recent source	X	X	Most recent source (private, public, and other) reported by women using modern contraception (where they obtained their current method)	Users of modern methods
Public sector	X	X	Includes government hospital, government health center, government health dispensary, other public facility	
Private medical sector	X	X	Includes private hospital/clinic, pharmacy/chemist, nursing/maternity home, faith-based church, mission hospital/clinic, other private facility	
Other source	X	X	Includes shop, mobile clinic, community-based distributor, community health worker, friend/relative, other	
Motivation				
Fertility preferences	X	X	Woman responds to questions: Would you like to have a(nother) child or would you prefer not to have more children? How long would you like to wait before the birth of a(nother) child?	All women 15–49
Want soon or in < 2 years	X			
Want later, in > 2 years	X			
Want no more	X			
FP decision-making		X	Female user of contraception answers question on decision to use: Was using contraception mainly your decision, mainly your husband's/partner's decision, or did you both decide together?	Current contraceptive users
Use behaviors				
Current use	X	X	Woman reports yes to question about whether she or her partner is doing something or using a method to delay or avoid getting pregnant	All women 15–49
Any modern method	X	X	Modern method use includes female/male sterilization, pill, IUD, injectable, implant, male/female condom, lactational amenorrhea, emergency contraception	All women 15–49
Contraceptive method currently used	X	`X	Type of method reported by current female user (all modern and traditional methods except injectables and implants) grouped into one category	Current contraceptive users
Injectable				
Implant				
Other modern or traditional				
Future use intention	X		Woman's response to question: Do you think you will use a contraceptive method to delay or avoid pregnancy at any time in the future? Dynamic intention outcome identifies women who continue to intend (or not intend) future use and those who adopted since the last round.	Women not currently using a contraceptive method
Intends to use	X			
Unsure	X			
Does not intend to use	X			

Table A-2:   (Continued)

FP program exposure indicators	Indicator identified by		Definition	Denominator sample
	DHS	FP2030		
Dynamic contraceptive use	X	X	In DHS, 60-month calendar data used to identify change in use status; in PMA, panel data used to measure change in annual use status	Women reporting contraceptive use (recent for DHS and current for PMA)
Continued use	X	X		
Switched method	X	X		
Stopped use	X	X		

Sources: FP2030 indicators: https://fp2030.org/sites/default/files/Data-Hub/Framework-20220603-EXTERNAL.pdf.
Note: DHS FP indicators are those identified in chapters on family planning in final survey reports.

Table A-3: **Background demographic and socioeconomic composition of analytic panel samples for Kenya, Burkina Faso, Uganda, and Côte d'Ivoire**

P1 demographic indicator	KENYA Users at P1	KENYA Users at P1, P2, P3	KENYA Non-users at P1	KENYA Full panel of women P1, P2, P3	BURKINA FASO Users at P1	BURKINA FASO Users at P1, P2, P3	BURKINA FASO Non-users at P1	BURKINA FASO Full panel of women P1, P2, P3	UGANDA Users at P1	UGANDA Users at P1, P2, P3	UGANDA Non-users at P1	UGANDA Full panel of women P1, P2, P3	CÔTE D'IVOIRE Users at P1	CÔTE D'IVOIRE Users at P1, P2, P3	CÔTE D'IVOIRE Non-users at P1	CÔTE D'IVOIRE Full panel of women P1, P2, P3
Age																
15–24	24.9	21.6	52.2	39.4	30.2	25.1	40.8	37.7	30.7	23.3	48.3	41.8	34.6	39.2	42.0	39.9
25–34	41.6	41.1	22.6	31.4	36.6	32.7	28.0	30.5	42.8	43.9	26.3	32.4	38.7	37.9	29.6	32.2
35+	33.6	37.3	25.3	29.1	33.1	42.2	31.2	31.8	26.5	32.8	25.4	25.8	26.7	23.0	28.4	27.9
Parity																
0–1 children	25.3	20.5	60.0	43.9	26.2	20.7	38.7	35.0	25.4	16.6	51.4	41.8	38.0	40.9	47.4	44.6
2 children	18.7	17.9	9.9	14.0	13.7	11.4	12.4	12.8	18.2	18.0	10.8	13.5	16.4	15.7	13.7	14.5
3+ children	56.0	61.6	30.0	42.1	60.1	67.9	48.9	52.2	56.4	65.4	37.8	44.7	45.6	43.4	38.9	40.9
Residence																
Urban	66.1	66.5	72.5	69.5	70.6	67.6	78.9	76.5	66.5	62.8	73.7	71.0	35.6	29.5	38.7	37.8
Rural	33.9	33.5	27.5	30.5	29.4	32.4	21.1	23.5	33.5	37.2	26.3	29.0	64.4	70.5	61.3	62.2
School																
None/primary	50.8	51.9	47.6	49.1	74.5	75.4	79.1	77.7	57.0	57.0	58.8	58.2	60.8	56.2	68.0	65.9
Secondary plus+	49.2	48.1	52.4	50.9	25.5	24.6	20.9	22.3	43.0	43.0	41.2	41.8	39.2	43.8	32.0	34.1
Wealth tertile																
Lowest	31.5	31.3	38.3	35.1	29.0	27.8	35.5	33.6	21.0	17.3	30.9	27.2	20.3	16.2	31.9	28.5
Middle	36.0	37.2	34.1	35.0	32.3	29.3	33.0	32.8	31.5	29.6	30.6	30.9	34.2	35.1	27.7	29.6
Highest	32.5	31.6	27.6	29.9	38.7	42.9	31.5	33.6	47.6	53.1	38.5	41.8	45.4	48.7	40.4	41.9
Marital status																
Married/in union	77.4	79.9	42.2	58.6	84.7	83.4	72.3	76.0	75.2	77.8	51.3	60.2	60.4	53.6	61.4	61.1
Unmarried	22.6	20.1	57.8	41.4	15.3	16.6	27.7	24.0	24.8	22.2	48.7	39.8	39.6	46.4	38.6	38.9
Sexual activity																
Never sex or 6+ months ago	4.6	3.7	49.1	28.4	7.9	10.7	43.3	32.9	4.9	3.2	43.0	28.8	7.8	7.6	33.8	26.2
Sex < 1 month	83.6	85.0	39.4	60.0	81.7	78.3	43.2	54.6	85.7	88.1	40.5	57.3	78.3	74.3	53.5	60.8
1 month < sex < 6 months	11.8	11.4	11.4	11.6	10.4	11.0	13.4	12.5	9.4	8.7	16.5	13.9	13.9	18.2	12.7	13.0
N	2,965	2,007	3,063	6,057	1,490	708	2,606	4,231	872	427	1,353	2,277	673	291	1,677	2,350

Note: Distributions weighted for loss to follow-up in the full P1–P2–P3 sample.

Table A-4: **Adjusted odds ratios of baseline indicators on likelihood of using modern contraceptive, compared to P2 and P3; full panel of women**

	KENYA		BURKINA FASO		UGANDA		CÔTE D'IVOIRE	
P1 indicator	P1–P2	P1–P3	P1–P2	P1–P3	P1–P2	P1–P3	P1–P2	P1–P3
Media exposure								
TV	**1.21**	0.96	0.97	1.07	0.81	0.97	**1.66**	**1.58**
	(1.02,1.44)	(0.82,1.13)	(0.79,1.21)	(0.85,1.34)	(0.50,1.32)	(0.45,2.10)	**(1.13,2.43)**	**(1.05,2.37)**
Radio	1.11	1.19	1.27	**1.29**	1.14	1.27	0.97	0.91
	(0.91,1.35)	(1.00,1.40)	(0.99,1.62)	**(1.01,1.64)**	(0.86,1.52)	(0.67,2.39)	(0.71,1.33)	(0.70,1.19)
Mobile	1.03	0.81	**1.55**	1.17	1.57	0.90	0.93	1.21
	(0.81,1.30)	(0.64,1.01)	**(1.02,2.33)**	(0.77,1.76)	(0.94,2.61)	(0.28,2.92)	(0.51,1.68)	(0.62,2.38)
Magazine/newspaper	1.00	1.19	0.99	1.20	1.07	1.37	1.05	1.39
	(0.83,1.21)	(1.00,1.43)	(0.71,1.36)	(0.76,1.88)	(0.78,1.47)	(0.61,3.08)	(0.53,2.07)	(0.68,2.84)
Social media (PMA only)	1.23	**1.26**	0.84	0.99	1.41	0.97	0.79	0.99
	(0.98,1.55)	**(1.01,1.57)**	(0.52,1.37)	(0.68,1.45)	(0.70,2.82)	(0.22,4.41)	(0.41,1.53)	(0.61,1.62)
Any media exposure: TV, radio,	**1.26**	**1.30**	1.23	**1.36**	1.30	1.35	**1.69**	**1.63**
mobile, or magazine/newspaper	**(1.03,1.55)**	**(1.08,1.58)**	(0.96,1.58)	**(1.08,1.73)**	(0.82,2.06)	(0.65,2.80)	**(1.34,2.12)**	**(1.22,2.17)**
N	6,041	6,040	4,162	4,157	2,266	2,269	2,303	2,304
Fertility preferences								
Want in ≥ 2 years; reported	**2.88**	**2.11**	**2.86**	**1.42**	**2.15**	1.76	**3.86**	**2.75**
infecund	**(2.24,3.70)**	**(1.64,2.73)**	**(2.09,3.92)**	**(1.15,1.75)**	**(1.39,3.32)**	(0.98,3.16)	**(2.32,6.43)**	**(1.84,4.11)**
Want no more	**4.47**	**3.57**	**3.80**	**2.60**	**3.52**	**2.98**	**7.81**	**4.96**
	(3.34,5.98)	**(2.79,4.57)**	**(2.46,5.87)**	**(1.95,3.46)**	**(2.17,5.69)**	**(1.66,5.34)**	**(3.05,19.96)**	**(2.61,9.43)**
N	6,033	6,032	4,154	4,149	2,257	2,260	2,295	2,295

Notes: Models adjusted for the following P1 covariates: parity, urban–rural residence, schooling, wealth tertile, age, marital status, and sexual activity. All are measured at P1 except for marital status and sexual activity, which are measured at the follow-up survey (P2 or P3). Models weighted for sample attrition and complex survey design. Boldfaced values show confidence intervals for aORs or aRRRs that do not include 1.0.

Table A-5: **Adjusted relative risk ratios of baseline indicators on likelihood of switching or stopping contraceptive use at P2 and P3, compared to continued use of same method: P1 user panel**

P1 indicator	KENYA			
	P1–P2		P1–P3	
	Switched	Stopped	Switched	Stopped
Media exposure (no = ref)				
TV	1.01 (0.79,1.29)	1.13 (0.84,1.52)	1.07 (0.81,1.40)	1.14 (0.87,1.49)
Radio	**1.49 (1.04,2.14)**	1.07 (0.78,1.46)	1.06 (0.79,1.42)	0.94 (0.71,1.26)
Mobile	0.95 (0.69,1.31)	**1.38 (1.01,1.87)**	0.84 (0.62,1.13)	**1.57 (1.11,2.22)**
Magazine/newspaper	1.10 (0.84,1.45)	0.91 (0.68,1.22)	*1.23 (0.97,1.57)*	0.83 (0.62,1.11)
Social media	1.17 (0.88,1.57)	0.83 (0.55,1.24)	1.05 (0.79,1.41)	0.95 (0.68,1.32)
Any media exposure: TV, radio, mobile, or magazine/newspaper	1.18 (0.83,1.69)	*1.30 (0.96,1.78)*	1.13 (0.85,1.50)	1.06 (0.77,1.46)
N	2,962		2,961	
Informed choice among modern users (no to any = ref)				
1. Told about side effects	1.27 (0.94,1.72)	1.01 (0.77,1.32)	0.94 (0.73,1.20)	0.86 (0.67,1.12)
2. Told what to do if experiencing side effects (n = 1,853)	0.89 (0.55,1.43)	0.73 (0.46,1.17)	0.74 (0.49,1.13)	0.76 (0.45,1.29)
3. Told about other methods	1.03 (0.78,1.37)	0.93 (0.69,1.24)	*0.80 (0.62,1.04)*	0.99 (0.76,1.28)
4. Told you could switch	**1.63 (1.19,2.24)**	1.28 (0.90,1.83)	**1.33 (1.04,1.71)**	**1.35 (1.04,1.74)**
MII+ (yes to 1 + 2 + 3 + 4)	**1.36 (1.04,1.78)**	1.19 (0.92,1.52)	1.07 (0.85,1.34)	1.08 (0.85,1.38)
N	2,760		2,759	
Most recent source among modern users (private/other = ref)				
Public	1.02 (0.77,1.36)	*0.78 (0.59,1.03)*	1.00 (0.79,1.28)	1.00 (0.77,1.28)
N	2,760		2,759	
Fertility preferences (want in < 2 years = ref)				
Want in ≥ 2 years; reported infecund	0.96 (0.61,1.51)	**0.34 (0.24,0.50)**	0.70 (0.40,1.22)	**0.64 (0.42,0.97)**
Want no more	0.90 (0.57,1.43)	**0.24 (0.16,0.35)**	**0.56 (0.34,0.93)**	**0.30 (0.19,0.47)**
N	2,959		2,958	
FP decision-making among women with partners (own decision = ref)				
Husband/partner decision	1.09 (0.78,1.54)	1.23 (0.86,1.77)	0.85 (0.62,1.16)	1.09 (0.78,1.53)
Joint decision	1.09 (0.87,1.37)	1.19 (0.89,1.60)	1.08 (0.85,1.38)	1.21 (0.92,1.58)
N	2,926		2,926	

Table A-5:   (Continued)

| P1 indicator | BURKINA FASO | | | |
| | P1–P2 | | P1–P3 | |
	Switched	Stopped	Switched	Stopped
Media exposure (no = ref)				
TV	1.42 (0.84,2.38)	*1.42 (0.96,2.08)*	1.19 (0.70,2.02)	**1.50 (1.03,2.19)**
Radio	0.87 (0.49,1.57)	*0.66 (0.44,1.01)*	*0.64 (0.40,1.05)*	**0.54 (0.36,0.80)**
Mobile	0.85 (0.49,1.47)	0.81 (0.43,1.52)	0.60 (0.31,1.16)	0.83 (0.46,1.50)
Magazine/newspaper	1.05 (0.55,1.99)	1.06 (0.62,1.82)	0.82 (0.47,1.43)	0.99 (0.56,1.73)
Social media	0.68 (0.38,1.22)	0.92 (0.46,1.86)	0.94 (0.44,2.01)	0.93 (0.55,1.59)
Any media exposure: TV, radio, mobile, or magazine/newspaper	0.97 (0.54,1.75)	0.81 (0.52,1.25)	0.69 (0.38,1.25)	*0.66 (0.43,1.02)*
N	1,471		1,476	
Informed choice among modern users (no to any = ref)				
1. Told about side effects	0.93 (0.50,1.70)	**0.56 (0.40,0.78)**	0.89 (0.55,1.42)	*0.67 (0.44,1.03)*
2. Told what to do if experiencing side effects (n = 1,853)	**0.37 (0.17,0.82)**	0.66 (0.25,1.78)	0.66 (0.28,1.59)	1.49 (0.83,2.69)
3. Told about other methods	0.75 (0.47,1.19)	**0.51 (0.33,0.79)**	0.76 (0.51,1.15)	**0.50 (0.31,0.80)**
4. Told you could switch	1.23 (0.76,1.99)	**0.61 (0.40,0.95)**	1.08 (0.63,1.86)	**0.58 (0.39,0.85)**
MII+ (yes to 1 + 2 + 3 + 4)	*0.66 (0.39,1.14)*	**0.53 (0.35,0.78)**	0.74 (0.44,1.24)	**0.58 (0.40,0.85)**
N	1,323		1,327	
Most recent source among modern users (private/other = ref)				
Public	**2.38 (1.37,4.12)**	0.75 (0.49,1.16)	*1.55 (0.94,2.53)*	**1.87 (1.09,3.21)**
N	1,204		1,208	
Fertility preferences (want in < 2 years = ref)				
Want in ≥ 2 years; reported infecund	0.94 (0.56,1.59)	**0.29 (0.19,0.45)**	1.39 (0.69,2.79)	**0.60 (0.39,0.91)**
Want no more	1.16 (0.61,2.18)	**0.15 (0.07,0.32)**	0.76 (0.35,1.63)	**0.26 (0.15,0.44)**
N	1,471		1,475	
FP decision making among women with partners (own decision = ref)				
Husband/partner decision	0.71 (0.39,1.32)	1.36 (0.90,2.04)	0.72 (0.36,1.43)	1.40 (0.89,2.23)
Joint decision	**0.63 (0.42,0.93)**	**0.61 (0.44,0.84)**	0.78 (0.46,1.34)	0.82 (0.54,1.25)
N	1,448		1,453	

Table A-5:   (Continued)

| | UGANDA | | | |
| | P1–P2 | | P1–P3 | |
P1 Indicator	Switched	Stopped	Switched	Stopped
Media exposure (no = ref)				
TV	1.00 (0.60,1.67)	0.68 (0.31,1.49)	0.67 (0.36,1.25)	0.80 (0.43,1.48)
Radio	0.83 (0.44,1.59)	1.17 (0.64,2.12)	0.79 (0.43,1.45)	0.73 (0.41,1.31)
Mobile	1.28 (0.74,2.23)	0.70 (0.25,1.93)	1.39 (0.67,2.85)	1.43 (0.59,3.46)
Magazine/newspaper	*1.76 (0.91,3.37)*	1.55 (0.84,2.84)	1.20 (0.55,2.61)	0.68 (0.31,1.47)
Social media	0.82 (0.35,1.94)	0.91 (0.29,2.78)	1.02 (0.32,3.25)	0.89 (0.40,1.98)
Any media exposure: TV, radio, mobile, or magazine/newspaper	0.85 (0.48,1.52)	0.89 (0.48,1.67)	0.93 (0.41,2.10)	0.62 (0.29,1.30)
N	870		871	
Informed choice among modern users (no to any = ref)				
1. Told about side effects	0.88 (0.55,1.41)	1.02 (0.60,1.75)	0.71 (0.42,1.20)	*0.61 (0.36,1.04)*
2. Told what to do if experiencing side effects (n = 1,853)	0.76 (0.34,1.68)	1.05 (0.35,3.16)	0.55 (0.22,1.41)	0.57 (0.22,1.50)
3. Told about other methods	1.10 (0.63,1.91)	0.86 (0.52,1.43)	1.24 (0.70,2.20)	0.96 (0.58,1.59)
4. Told you could switch	*1.73 (0.92,3.25)*	**1.64 (1.03,2.62)**	1.28 (0.68,2.39)	1.02 (0.62,1.66)
MII+ (yes to 1 + 2 + 3 + 4)	0.94 (0.55,1.61)	1.01 (0.60,1.70)	0.86 (0.49,1.52)	*0.63 (0.38,1.05)*
N	728		730	
Most recent source among modern users (private/other = ref)				
Public	*0.56 (0.30,1.04)*	0.76 (0.43,1.34)	0.74 (0.42,1.29)	1.05 (0.54,2.06)
N	672		674	
Fertility preferences (want in < 2 years = ref)				
Want in ≥ 2 years; reported infecund	0.65 (0.23,1.85)	0.64 (0.27,1.50)	0.90 (0.26,3.06)	0.55 (0.25,1.22)
Want no more	**0.27 (0.09,0.80)**	**0.19 (0.09,0.41)**	0.29 (0.06,1.37)	**0.19 (0.05,0.81)**
N	870		871	
FP decision making among women with partners (own decision = ref)				
Husband/partner decision	1.02 (0.51,2.05)	0.91 (0.48,1.72)	*1.85 (0.92,3.74)*	1.14 (0.59,2.22)
Joint decision	0.71 (0.44,1.15)	1.48 (0.86,2.56)	*0.77 (0.47,1.26)*	1.25 (0.76,2.05)
N	855		856	

Table A-5: (Continued)

	CÔTE D'IVOIRE			
	P1–P2		P1–P3	
P1 indicator	Switched	Stopped	Switched	Stopped
Media exposure (no = ref)				
TV	1.13 (0.63,2.03)	0.79 (0.46,1.37)	0.68 (0.39,1.20)	**0.54 (0.35,0.83)**
Radio	0.82 (0.42,1.59)	1.13 (0.63,2.02)	1.46 (0.67,3.18)	1.21 (0.68,2.13)
Mobile	0.89 (0.23,3.37)	0.90 (0.33,2.41)	0.73 (0.32,1.67)	0.80 (0.21,3.02)
Magazine/newspaper	0.68 (0.21,2.26)	1.06 (0.37,3.08)	1.16 (0.42,3.23)	1.25 (0.34,4.60)
Social media	0.67 (0.31,1.44)	0.74 (0.37,1.47)	1.34 (0.55,3.30)	0.79 (0.35,1.77)
Any media exposure: TV, radio, mobile, or magazine/newspaper	0.90 (0.53,1.52)	0.70 (0.44,1.11)	0.74 (0.45,1.22)	**0.55 (0.34,0.91)**
N	651		653	
Informed choice among modern users (no to any = ref)				
1. Told about side effects	1.44 (0.71,2.93)	1.14 (0.64,2.02)	*0.51 (0.26,1.02)*	**0.58 (0.38,0.88)**
2. Told what to do if experiencing side effects (n = 1,853)	0.63 (0.22,1.84)	1.10 (0.41,2.96)	1.57 (0.49,5.00)	1.20 (0.40,3.62)
3. Told about other methods	1.22 (0.64,2.33)	0.89 (0.59,1.36)	0.99 (0.55,1.77)	1.05 (0.61,1.80)
4. Told you could switch	1.45 (0.76,2.79)	1.33 (0.64,2.77)	1.12 (0.62,2.03)	1.25 (0.55,2.84)
MII+ (yes to 1 + 2 + 3 + 4)	0.93 (0.42,2.03)	1.10 (0.63,1.93)	0.75 (0.35,1.63)	0.72 (0.42,1.22)
N	513		516	
Most recent source among modern users (private/other = ref)				
Public	1.03 (0.48,2.21)	0.89 (0.51,1.57)	1.02 (0.34,3.05)	0.96 (0.47,1.97)
N	481		483	
Fertility preferences (want in < 2 years = ref)				
Want in ≥ 2 years; reported infecund	0.79 (0.32,1.96)	**0.28 (0.13,0.58)**	**0.38 (0.16,0.89)**	**0.26 (0.12,0.54)**
Want no more	0.67 (0.17,2.64)	**0.20 (0.10,0.41)**	0.50 (0.14,1.75)	**0.24 (0.11,0.49)**
N	653		655	
FP decision making among women with partners (own decision = ref)				
Husband/partner decision	1.50 (0.62,3.65)	0.85 (0.34,2.09)	1.75 (0.90,3.44)	1.42 (0.71,2.85)
Joint decision	1.68 (0.80,3.52)	0.96 (0.51,1.78)	0.62 (0.29,1.36)	0.80 (0.47,1.36)
N	645		647	

Notes: Models adjusted for the following P1 covariates: parity, urban–rural residence, schooling, wealth tertile, age, marital status, and sexual activity. All are measured at P1 except for marital status and sexual activity, which are measured at the follow-up survey (P2 or P3). Models weighted for sample attrition and complex survey design. Boldfaced values show confidence intervals for aORs or aRRRs that do not include 1.0.

Table A-6: **Adjusted relative risk ratios of baseline indicators on likelihood of using specific types of modern contraceptive methods at P3, compared to other modern/traditional: Continuous user panel**

	KENYA			
	P1–P2		P1–P3	
P1 indicator	Injectable	Implant	Injectable	Implant
Media exposure (no = ref)				
TV	1.04 (0.74,1.46)	0.90 (0.64,1.26)	1.21 (0.84,1.73)	0.93 (0.66,1.32)
Radio	1.30 (0.93,1.82)	**1.45 (1.02,2.05)**	**1.62 (1.13,2.31)**	**1.49 (1.03,2.15)**
Mobile	0.68 (0.40,1.14)	0.93 (0.56,1.54)	0.90 (0.61,1.31)	1.10 (0.73,1.67)
Magazine/newspaper	0.92 (0.61,1.40)	0.90 (0.64,1.27)	0.80 (0.53,1.20)	0.83 (0.58,1.18)
Social media	0.85 (0.58,1.26)	0.96 (0.62,1.48)	1.09 (0.78,1.53)	1.19 (0.79,1.79)
Any media exposure: TV, radio, mobile, or magazine/newspaper	1.08 (0.70,1.64)	1.14 (0.76,1.72)	1.28 (0.83,1.96)	1.29 (0.89,1.87)
N	2,005		2,003	
Informed choice among modern users (no to any = ref)				
1. Told about side effects	1.21 (0.86,1.70)	**1.51 (1.09,2.11)**	1.34 (1.00,1.80)	**1.53 (1.14,2.04)**
2. Told what to do if experiencing side effects (n = 1,282)	1.51 (0.79,2.89)	**2.86 (1.59,5.13)**	**2.14 (1.19,3.85)**	**3.16 (1.80,5.56)**
3. Told about other methods	1.15 (0.78,1.69)	1.39 (0.97,1.99)	1.36 (0.95,1.95)	1.38 (0.96,1.98)
4. Told you could switch	**2.74 (1.91,3.93)**	**2.38 (1.63,3.46)**	**2.95 (2.18,4.01)**	**2.20 (1.55,3.13)**
MII+ (yes to 1 + 2 + 3 + 4)	**1.62 (1.12,2.35)**	**1.80 (1.26,2.57)**	**1.87 (1.39,2.50)**	**1.81 (1.35,2.44)**
N	1,892		1,890	
Most recent source among modern users (private/other = ref)				
Public	1.30 (0.90,1.86)	3.38 (2.27,5.03)	**1.41 (1.02,1.95)**	**3.15 (2.21,4.50)**
N	1,892		1,890	
Fertility preferences (want in < 2 years = ref)				
Want in ≥ 2 years; reported infecund	1.08 (0.58,2.01)	0.96 (0.51,1.80)	0.74 (0.27,1.99)	0.77 (0.34,1.72)
Want no more	1.04 (0.52,2.06)	1.06 (0.55,2.05)	0.71 (0.27,1.86)	0.90 (0.41,1.99)
N	2,003		2,001	
FP decision making among women with partners (own decision = ref)				
Husband/partner decision	**0.49 (0.31,0.75)**	**0.49 (0.34,0.70)**	**0.46 (0.31,0.69)**	**0.51 (0.35,0.74)**
Joint decision	**0.66 (0.49,0.89)**	**0.63 (0.48,0.84)**	0.76 (0.57,1.01)	0.76 (0.56,1.03)
N	1,984		1,982	

Table A-6:   (Continued)

P1 indicator	BURKINA FASO			
	P1–P2		P1–P3	
	Injectable	Implant	Injectable	Implant
Media exposure (no = ref)				
TV	1.03 (0.45,2.33)	0.69 (0.39,1.22)	0.63 (0.32,1.23)	0.59 (0.32,1.07)
Radio	1.10 (0.50,2.40)	1.05 (0.62,1.77)	0.86 (0.40,1.82)	1.01 (0.54,1.91)
Mobile	0.98 (0.26,3.61)	1.57 (0.82,3.04)	0.66 (0.20,2.16)	1.62 (0.75,3.47)
Magazine/newspaper	0.47 (0.15,1.43)	1.23 (0.60,2.52)	0.41 (0.14,1.25)	1.37 (0.66,2.81)
Social media	**0.25 (0.06,0.95)**	0.97 (0.43,2.19)	0.39 (0.14,1.07)	0.52 (0.20,1.34)
Any media exposure: TV, radio, mobile, or magazine/newspaper	0.83 (0.35,1.93)	0.87 (0.49,1.54)	0.51 (0.22,1.19)	0.67 (0.35,1.27)
N	701		703	
Informed choice among modern users (no to any = ref)				
1. Told about side effects	1.06 (0.44,2.54)	1.28 (0.71,2.29)	1.75 (0.84,3.67)	1.43 (0.84,2.42)
2. Told what to do if experiencing side effects (n = 1,282)	0.80 (0.27,2.32)	**3.99 (1.20,13.31)**	1.05 (0.32,3.40)	**4.56 (1.44,14.48)**
3. Told about other methods	0.67 (0.30,1.49)	0.71 (0.40,1.25)	0.86 (0.42,1.75)	0.80 (0.41,1.56)
4. Told you could switch	0.94 (0.41,2.18)	0.83 (0.46,1.53)	1.52 (0.69,3.33)	1.10 (0.62,1.95)
MII+ (yes to 1 + 2 + 3 + 4)	0.99 (0.39,2.48)	1.26 (0.66,2.40)	1.85 (0.86,3.95)	1.70 (0.87,3.31)
N	639		640	
Most recent source among modern users (private/other = ref)				
Public	**9.55 (2.78,32.80)**	**3.36 (1.70,6.65)**	**6.64 (2.67,16.48)**	**4.67 (2.46,8.84)**
N	584		585	
Fertility preferences (want in < 2 years = ref)				
Want in ≥ 2 years; reported infecund	1.26 (0.33,4.79)	3.15 (0.87,11.44)	1.57 (0.45,5.43)	3.18 (0.94,10.71)
Want no more	2.60 (0.60,11.35)	1.72 (0.52,5.67)	1.74 (0.47,6.41)	1.59 (0.49,5.15)
N	701		703	
FP decision making among women with partners (own decision ref)				
Husband/partner decision	0.57 (0.21,1.57)	1.67 (0.75,3.70)	0.50 (0.19,1.31)	1.53 (0.73,3.22)
Joint decision	0.65 (0.35,1.23)	0.90 (0.49,1.65)	0.79 (0.38,1.67)	0.92 (0.47,1.78)
N	690		692	

Table A-6:   (Continued)

	UGANDA			
	P1–P2		P1–P3	
P1 Indicator	Injectable	Implant	Injectable	Implant
Media exposure (no = ref)				
TV	1.17 (0.38,3.61)	2.94 (0.68,12.80)	0.96 (0.39,2.39)	3.01 (0.69,13.15)
Radio	1.62 (0.61,4.33)	1.12 (0.49,2.57)	1.48 (0.74,2.96)	1.02 (0.43,2.40)
Mobile	1.77 (0.64,4.89)	0.95 (0.35,2.55)	1.01 (0.37,2.74)	0.98 (0.33,2.94)
Magazine/newspaper	1.52 (0.67,3.46)	1.35 (0.55,3.30)	1.13 (0.45,2.85)	1.08 (0.41,2.85)
Social media	**0.14 (0.03,0.68)**	0.42 (0.11,1.63)	0.18 (0.02,1.76)	0.48 (0.10,2.26)
Any media exposure: TV, radio, mobile, or magazine/newspaper	0.85 (0.30,2.44)	1.09 (0.44,2.67)	0.65 (0.26,1.66)	0.72 (0.27,1.89)
N	427		427	
Informed choice among modern users (no to any = ref)				
1. Told about side effects	0.70 (0.31,1.58)	1.65 (0.95,2.86)	0.69 (0.35,1.34)	1.72 (0.90,3.29)
2. Told what to do if experiencing side effects (n = 1,282)	3.17 (0.54,18.50)	1.99 (0.65,6.06)	0.61 (0.11,3.32)	0.98 (0.30,3.19)
3. Told about other methods	0.75 (0.36,1.57)	1.92 (0.97,3.79)	0.97 (0.54,1.74)	**2.33 (1.11,4.88)**
4. Told you could switch	0.77 (0.37,1.60)	**2.43 (1.31,4.51)**	1.18 (0.59,2.38)	**2.97 (1.53,5.76)**
MII+ (yes to 1 + 2 + 3 + 4)	0.89 (0.40,1.96)	**1.72 (1.04,2.85)**	0.69 (0.34,1.40)	1.56 (0.91,2.65)
N	376		376	
Most recent source among modern users (private/other = ref)				
Public	0.77 (0.30,2.01)	**2.79 (1.25,6.21)**	1.30 (0.61,2.75)	**3.64 (1.50,8.81)**
N	354		354	
Fertility preferences (want in < 2 years = ref)				
Want in ≥ 2 years; reported infecund				
Want no more	1.64 (0.65, 4.13)	**5.04 (2.57,9.88)**	0.76 (0.32,1.56)	**4.02 (2.00,8.07)**
N	427		427	
FP decision making among women with partners (own decision ref)				
Husband/partner decision	0.45 (0.15,1.31)	1.05 (0.43,2.60)	0.83 (0.26,2.60)	1.57 (0.68,3.61)
Joint decision	0.84 (0.45,1.59)	1.62 (0.92,2.84)	0.66 (0.34,1.27)	1.45 (0.77,2.71)
N	419		419	

Table A-6: (Continued)

| P1 indicator | CÔTE D'IVOIRE | | | |
| | P1–P2 | | P1–P3 | |
	Injectable	Implant	Injectable	Implant
Media exposure (no = ref)				
TV	1.60 (0.48,5.28)	1.37 (0.43,4.43)	0.37 (0.14,1.01)	0.94 (0.35,2.55)
Radio	0.34 (0.10,1.16)	1.06 (0.30,3.73)	2.22 (0.80,6.16)	0.68 (0.22,2.17)
Mobile	2.54 (0.55,11.79)	0.36 (0.05,2.47)	0.48 (0.09,2.57)	0.18 (0.01,2.31)
Magazine/newspaper	0.71 (0.12,4.38)	6.32 (0.90,44.20)	0.70 (0.13,3.74)	4.12 (0.52,32.74)
Social media	0.45 (0.12,1.65)	0.40 (0.10,1.60)	0.64 (0.23,1.81)	1.76 (0.46,6.73)
Any media exposure: TV, radio, mobile, or magazine/newspaper	0.68 (0.26,1.75)	1.47 (0.55,3.93)	**0.32 (0.13,0.78)**	0.71 (0.33,1.53)
N	288		288	
Informed choice among modern users (no to any = ref)				
1. Told about side effects	2.94 (0.96,8.97)	**4.86 (1.87,12.63)**	0.89 (0.33,2.45)	**3.68 (1.74,7.79)**
2. Told what to do if experiencing side effects (n = 1,282)	**0.25 (0.06,0.98)**	**5.54 (1.57,19.57)**	1.34 (0.29,6.30)	**6.88 (1.22,38.82)**
3. Told about other methods	1.82 (0.55,5.99)	**3.08 (1.44,6.59)**	1.73 (0.69,4.32)	**2.90 (1.23,6.84)**
4. Told you could switch	0.95 (0.29,3.12)	**4.51 (1.76,11.56)**	1.16 (0.45,2.98)	**4.23 (1.76,10.19)**
MII+ (yes to 1 + 2 + 3 + 4)	1.35 (0.48,3.77)	**3.45 (1.42,8.40)**	0.81 (0.26,2.53)	**2.80 (1.19,6.58)**
N	241		241	
Most recent source among modern users (private/other = ref)				
Public	**3.22 (0.75,13.82)**	**15.88 (4.79,52.72)**	**18.31 (4.62,72.54)**	**35.84 (11.51,111.57)**
N	220		220	
Fertility preferences (want in < 2 years = ref)				
Want in ≥ 2 years; reported infecund				
Want no more	2.47 (0.60, 10.27)	0.55 (0.24,1.30)	1.35 (0.64,2.85)	0.39 (0.14, 1.09)
N	289		289	
FP decision making among women with partners (own decision ref)				
Husband/partner decision	0.80 (0.17,3.86)	**0.17 (0.04,0.77)**	3.94 (1.00,15.63)	0.23 (0.05,1.03)
Joint decision	0.87 (0.30,2.51)	1.35 (0.56,3.23)	1.54 (0.75,3.15)	0.96 (0.48,1.93)
N	287		287	

Notes: Models adjusted for the following P1 covariates: parity, urban–rural residence, schooling, wealth tertile, age, marital status, and sexual activity. All are measured at P1 except for marital status and sexual activity, which are measured at the follow-up survey (P2 or P3). Models weighted for sample attrition and complex survey design. Boldfaced values show confidence intervals for aORs or aRRRs that do not include 1.0.

Table A-7: **Adjusted relative risk ratios of baseline indicators on likelihood of subsequent intention to use or adopt at P3, compared to continued intention not to use: P1 nonuser panel**

P1 indicator	KENYA			
	P1–P2		P1–P3	
	Now intends to use	Adopted	Now intends to use	Adopted
Media exposure (no = ref)				
TV	1.14 (0.82,1.58)	1.27 (0.95,1.69)	1.16 (0.84,1.60)	0.99 (0.73,1.34)
Radio	1.65 (1.22,2.22)	1.51 (1.06,2.14)	1.64 (1.16,2.34)	1.53 (1.10,2.13)
Mobile	0.58 (0.36,0.94)	0.89 (0.57,1.41)	0.97 (0.59,1.58)	0.86 (0.54,1.37)
Magazine/newspaper	1.17 (0.81,1.68)	1.08 (0.77,1.52)	1.33 (0.97,1.81)	1.32 (0.95,1.85)
Social media	1.35 (0.90,2.01)	1.40 (0.96,2.02)	0.84 (0.57,1.24)	1.17 (0.81,1.70)
Any media exposure: TV, radio, mobile, or magazine/newspaper	1.84 (1.39,2.44)	1.80 (1.24,2.61)	1.67 (1.19,2.34)	1.63 (1.16,2.29)
N	3,050		3,054	
Contact of non-users with FP providers				
Visited by health worker who talked about FP(3,065)	1.04 (0.68,1.58)	1.26 (0.82,1.93)	1.12 (0.71,1.75)	1.05 (0.68,1.62)
Discussed FP at health facility (1,762)	1.96 (1.40,2.74)	2.26 (1.58,3.24)	1.57 (1.09,2.25)	1.62 (1.16,2.25)
Visited by health worker who talked about FP or discussed FP at health facility	1.65 (1.21,2.25)	2.16 (1.63,2.85)	1.53 (1.11,2.11)	1.61 (1.20,2.17)
N	3,052		3,056	
Fertility preferences (want in < 2 years = ref)				
Want in ≥ 2 years; reported infecund	1.24 (0.87,1.78)	3.02 (1.96,4.65)	1.24 (0.88,1.76)	2.56 (1.79,3.67)
Want no more	0.76 (0.46,1.25)	3.36 (2.16,5.21)	0.90 (0.59,1.38)	3.42 (2.36,4.95)
N	3,045		3,049	

Table A-7:   (Continued)

P1 indicator	BURKINA FASO			
	P1–P2		P1–P3	
	Now intends to use	Adopted	Now intends to use	Adopted
Media exposure (no = ref)				
TV	1.27 (0.93,1.74)	1.15 (0.80,1.66)	0.99 (0.69,1.44)	1.37 (0.95,1.98)
Radio	1.53 (1.12,2.10)	1.49 (0.99,2.26)	1.55 (1.09,2.20)	1.36 (0.95,1.93)
Mobile	1.08 (0.58,2.01)	2.61 (1.34,5.11)	1.45 (0.64,3.32)	1.81 (0.70,4.71)
Magazine/newspaper	0.81 (0.43,1.53)	0.67 (0.33,1.39)	1.17 (0.65,2.11)	1.49 (0.83,2.65)
Social media	1.20 (0.40,3.62)	1.21 (0.41,3.60)	0.66 (0.20,2.17)	0.81 (0.24,2.82)
Any media exposure: TV, radio, mobile, or magazine/newspaper	1.69 (1.22,2.35)	1.58 (1.07,2.33)	1.58 (1.14,2.18)	1.71 (1.17,2.49)
N	2,564		2,618	
Contact of non-users with FP providers				
Visited by health worker who talked about FP (3,065)	1.18 (0.67,2.07)	1.18 (0.62,2.27)	1.21 (0.71,2.04)	1.72 (1.01,2.90)
Discussed FP at health facility (1,762)	1.40 (0.90,2.17)	1.90 (1.16,3.11)	1.64 (1.10,2.46)	2.39 (1.56,3.66)
Visited by health worker who talked about FP or discussed FP at health facility	1.48 (1.01,2.18)	2.16 (1.37,3.41)	1.65 (1.16,2.35)	2.47 (1.75,3.49)
N	2,571		2,626	
Fertility preferences (want in < 2 years = ref)				
Want in ≥ 2 years; reported infecund	1.03 (0.74,1.43)	3.30 (2.16,5.06)	1.65 (1.21,2.26)	1.79 (1.22,2.63)
Want no more	0.66 (0.39,1.11)	2.38 (1.24,4.54)	0.59 (0.38,0.91)	2.00 (1.19,3.35)
N	2,559		2,613	

Table A-7:   (Continued)

P1 Indicator	UGANDA			
	P1–P2		P1–P3	
	Now intends to use	Adopted	Now intends to use	Adopted
Media exposure (no = ref)				
TV	0.84 (0.45,1.57)	0.72 (0.36,1.46)	1.12 (0.71,1.79)	0.84 (0.44,1.62)
Radio	1.08 (0.66,1.76)	0.98 (0.59,1.64)	1.25 (0.71,2.19)	0.86 (0.47,1.55)
Mobile	1.17 (0.35,3.90)	2.45 (1.10,5.45)	1.40 (0.45,4.29)	1.48 (0.71,3.09)
Magazine/newspaper	0.90 (0.48,1.70)	1.26 (0.60,2.65)	1.18 (0.62,2.24)	1.74 (0.80,3.82)
Social media	1.14 (0.36,3.63)	1.67 (0.41,6.78)	0.54 (0.24,1.21)	1.10 (0.54,2.22)
Any media exposure: TV, radio, mobile, or magazine/newspaper	0.97 (0.62,1.53)	1.13 (0.68,1.87)	1.21 (0.69,2.14)	1.12 (0.65,1.94)
N	1,345		1,353	
Contact of non-users with FP providers				
Visited by health worker who talked about FP (3,065)	0.63 (0.34,1.15)	0.96 (0.46,1.97)	1.09 (0.54,2.21)	1.34 (0.73,2.45)
Discussed FP at health facility (1,762)	1.94 (1.05,3.57)	2.93 (1.45,5.91)	1.83 (1.04,3.24)	2.44 (1.58,3.76)
Visited by health worker who talked about FP or discussed FP at health facility	1.35 (0.82,2.22)	2.27 (1.29,3.96)	1.39 (0.89,2.15)	2.42 (1.56,3.74)
N	1,345		1,353	
Fertility preferences (want in < 2 years = ref)				
Want in ≥ 2 years; reported infecund	1.33 (0.70,2.51)	2.87 (1.43,5.76)	1.63 (0.84,3.17)	1.99 (1.24,3.21)
Want no more	0.77 (0.48,1.23)	2.21 (1.04,4.71)	0.87 (0.38,2.00)	2.49 (1.18,5.27)
N	1,337		1,345	

Table A-7:   (Continued)

P1 indicator	CÔTE D'IVOIRE			
	P1–P2		P1–P3	
	Now intends to use	Adopted	Now intends to use	Adopted
Media exposure (no = ref)				
TV	1.00 (0.76,1.32)	0.87 (0.55,1.37)	1.04 (0.71,1.54)	1.18 (0.71,1.94)
Radio	1.13 (0.76,1.66)	1.72 (1.07,2.77)	0.86 (0.54,1.39)	0.92 (0.59,1.44)
Mobile	0.95 (0.43,2.10)	0.43 (0.14,1.29)	0.97 (0.38,2.47)	0.78 (0.36,1.71)
Magazine/newspaper	0.84 (0.42,1.66)	0.93 (0.41,2.12)	0.75 (0.40,1.40)	1.25 (0.67,2.34)
Social media	1.88 (1.00,3.53)	2.02 (1.03,3.95)	2.32 (0.81,6.63)	1.04 (0.52,2.06)
Any media exposure: TV, radio, mobile, or magazine/newspaper	1.23 (0.90,1.67)	1.24 (0.86,1.79)	1.03 (0.75,1.41)	1.09 (0.81,1.47)
N	1,587		1,593	
Contact of non-users with FP providers				
Visited by health worker who talked about FP (3,065)	1.07 (0.56,2.04)	1.05 (0.57,1.94)	1.54 (0.86,2.73)	0.93 (0.43,1.99)
Discussed FP at health facility (1,762)	1.19 (0.62,2.27)	1.85 (0.83,4.11)	1.42 (0.74,2.71)	2.10 (0.99,4.47)
Visited by health worker who talked about FP or discussed FP at health facility	1.26 (0.81,1.95)	2.10 (1.14,3.88)	1.58 (0.87,2.85)	2.30 (1.17,4.52)
N	1,593		1,599	
Fertility preferences (want in < 2 years = ref)				
Want in ≥ 2 years; reported infecund	1.41 (1.03,1.91)	3.94 (2.33,6.67)	1.93 (1.39,2.66)	4.98 (2.58,9.59)
Want no more	1.53 (0.91,2.58)	7.27 (2.38,22.21)	1.88 (0.97,3.66)	9.83 (3.12,30.94)
N	1,576		1,581	

Notes: Models adjusted for the following P1 covariates: parity, urban–rural residence, schooling, wealth tertile, age, marital status, and sexual activity. All are measured at P1 except for marital status and sexual activity, which are measured at the follow-up survey (P2 or P3). Models weighted for sample attrition and complex survey design. Boldfaced values show confidence intervals for aORs or aRRRs that do not include 1.0.