TITLE

Supporting Information Appendix for: "The causal impact of a family planning intervention on women's contraceptive use and birth spacing"

AUTHOR NAMES

Mahesh Karra, Daniel Maggio, Muqi Guo, Bagrey Ngwira, David Canning

CORRESPONDING AUTHOR

Correspondence to: Mahesh Karra, Frederick S. Pardee School of Global Studies, Boston University, 152 Bay State Road, Room G04C, Boston, MA 02215, Tel: +1-617-358-0197, E-mail: mvkarra@bu.edu

Appendix S1: Randomization Protocol

The protocol described below was implemented to randomize the baseline sample of 2,143 women to treatment and control groups. Randomization was implemented on a month-by-month basis to the sample of women who were interviewed within each month. Women were first assigned to strata that were generated across a set of balancing characteristics, which included: educational attainment, ever use of family planning, age of sexual debut, number of living children, work status, and place of residence (defined by a woman's sampling cluster). Following stratum assignment, women within each stratum were assigned to treatment and control groups to ensure balance across the stratum-generating covariates. However, a number of women within each month did not match by stratum to any other woman who was interviewed in that month and were therefore assigned to their own stratum. These women were individually randomly assigned to treatment and control groups following the within-stratum treatment assignment.

STEP 1: Assign two random numbers (*random_1* and *random_2*) that are generated from the uniform distribution to each woman (unit of randomization).

STEP 2: Generate strata by following balancing characteristics:
1. Educational attainment (4 levels): none (0) to higher (3)
2. Ever use of family planning (2 levels): never used (0) to ever used (1)
3. Age of sexual debut (2 levels): under 18 (0) versus over 18 (1)
4. Number of living children (8 levels): up to 7 children
5. Work status (2 levels): working (0) or not working (1)
6. Sampling cluster of residence: up to 5 clusters per month

Total potential number of strata per month: 1,280

STEP 2: Within each stratum that has more than one woman, sort women by *random_1* and *random_2* (*random_2* is sorted second in the rare event of ties on *random_1*). Randomize the bottom sorted half of the stratum to treatment (1) and the top sorted half of the stratum to control (0). For strata that have an odd number of women, the woman who is sorted into the middle observation is assigned to the control group. Due to the number of strata that have an odd number of women, we observe larger sample sizes in the control group than in the treatment group.

STEP 3: For all single-unit strata, assign women who have *random_1* less than 0.5 to treatment (1) and women who have *random_1* greater than or equal to 0.5 to control (0).

Results of Randomization by Month:

Month	Number of women to be randomized	Number of single-unit strata	Treatment	Control
August 2016	88	44	41	47
September 2016	408	152	193	215
October 2016	443	158	218	225
November 2016	427	114	210	217
December 2016	342	58	163	179
January 2017	435	90	201	234
Total	**2,143**	**616**	**1,026**	**1,117**

Appendix S2: Postpartum Family Planning in Malawi and the Intervention

S2.1. Postpartum Family Planning in Malawi

Family planning remains a priority for the public sector, development partners, and service providers working in Malawi. As a means to achieve the Millennium Development Goal of reducing maternal and neonatal mortality over the last two decades, the Malawi Ministry of Health (MOH) has made it a central objective to increase utilization of postpartum care through expanding access to a range of services, including the uptake of postpartum family planning. Key provisions that were outlined in the 2007 Roadmap for Reducing Maternal and Neonatal Mortality include recommendations that all women who deliver in a health facility receive postpartum care, which would include integrated postpartum family planning counseling, within the first 24 hours after delivery, with an accelerated 12-hour facility referral process for any women who delivered outside of a health facility (1). As part of this strategy, the proportion of postnatal women who receive family planning services within 6 weeks following their delivery has been adopted by the MOH as a key programmatic indicator. Postpartum family planning services include counseling on birth spacing and the provision of family planning commodities, particularly long-acting and permanent methods, at all levels, with a focus on rural and underserved communities. To meet these goals, the MOH, in collaboration with public and private sector partners, has committed to:

1. Supporting existing health workers (health surveillance assistants, community-based distribution agents) in efforts to track and guide postpartum women to care.
2. Training additional family planning providers in long-term and permanent methods, including emergency contraception, to improve the contraceptive method mix.
3. Strengthening postpartum family planning uptake through community engagement and follow-up through community-based interventions (localized outreach, integration of postpartum family planning with child health and immunization campaigns, etc.) (2).

The public sector is the largest provider of health services in Malawi, with 74 percent of women accessing contraceptives from public facilities, many of which are either provided for free or at very low (subsidized) costs. In addition, there are two not-for-profit, private sector organizations providing free or low-cost FP services. The Christian Health Association of Malawi (CHAM) provides 9 percent of family planning services, and Banja La Mtsogolo (BLM), a Marie Stopes International (MSI) affiliate, also provides 9 percent of services, notably long-acting reversible contraceptive methods and permanent methods; 33 percent of all female sterilizations and 20 percent of all IUD insertions in Malawi are provided by BLM. Finally, Population Services International (PSI) supports contraceptive social marketing through its Tunza Network (3,4).

In Malawi, family planning services through the public sector are delivered at multiple levels (5). Primary-level services are largely comprised of community initiatives that include community-based distributing agents (CBDAs), health surveillance assistants (HSAs), village health committees, health posts, dispensaries, and health centers. CBDAs and HSAs can only provide condoms, pills, and counselling on the Standard Days Method. Health centers, clinics, and dispensaries can provide injectables and implants in addition to short-acting modern methods. Hospitals can provide IUDs, and some provide female and male sterilization. Most family planning methods are provided for free at public sector facilities, although costs related to the provision of some services (e.g. receipt of

pregnancy tests, HIV screening) as well as for the treatment and management of contraceptive-related side effects, may be incurred (3,4). A full range of contraceptive methods, including sterilization and the insertion and removal of long-acting reversible methods, are offered at BLM and Tunza clinics. While these methods and related services are provided at a cost, they are typically subsidized by MSI and PSI and are offered at less than the full commodity price, although additional fees (e.g. pregnancy tests, HIV screening, etc.) may also be incurred at private sector providers (5).

A number of barriers to access and utilization of family planning and reproductive health services have been identified. Distance to service providers has been recognized as a primary barrier to uptake. The Ministry of Health recommends a travel distance of 5 to 8 km to clinics; however, the average distance traveled by women estimated to be between 10 to 15 km, with some traveling as far as 40 km to seek care (4). Moreover, family planning is not considered an urgent health need; as a result, many women are unwilling to travel long distances to access services that are not perceived to be an immediate necessity.

Even when services are available at a reasonable distance, clients can experience poor service due to stock-outs caused by poor supply chain management, lack of human resources for health, and poor integration with other health services (mainly HIV). Evidence from the 2013-14 Service Provision Assessment (SPA) survey in Malawi found that half of facilities that offer any modern methods of family planning had at least one staff member present who had received training in family planning in the 24 months before assessment visit (3). Facilities are frequently understaffed, or staffed with health workers who do not have adequate training to provide the full method mix expected at that level. Even when facilities are adequately staffed, health workers are often overburdened and do not have sufficient time for providing long-acting methods, or even to fully counsel clients.

Stockouts of particular methods are common, with a survey of facilities finding that of all facilities that reported providing any family planning methods in Malawi, only 46 percent actually had every method that they provide available on a given day (3). Long-acting methods, particularly IUDs and implants, are most commonly out of stock. Additionally, family planning services may only be provided on specific days in the most rural areas. Having specific service delivery days may result in missed opportunities to reach women who wish to access services, while highlighting specific days for family planning may also make it more difficult for women to keep their reproductive health choices confidential, particularly from other members in their community (4).

In spite of recent efforts, postnatal care remains low in Malawi. Findings from the 2015-16 Malawi Demographic and Health Survey indicate that although 96 percent of births were delivered in a health facility, with 9 in 10 births attended by a skilled birth attendant, only 42 percent of all women received any postpartum care within two days following delivery. Nationally, half of all women in Malawi did not receive any postpartum care after delivery (6). Utilization of postpartum family planning services has remained low in Malawi, with recent estimates finding that only 28 percent of women had adopted a contraceptive method within 6 months following delivery, and 46 percent of women had adopted a method by 12 months after delivery (7,8). Moreover, contraceptive discontinuation rates have remained high, with more than 37 percent of women reporting that they discontinued their method within the last 12 months, among which half of them reported discontinuing their method for non-fertility related reasons (e.g. method-related reasons, like side effects).

S2.2. The Intervention

Our multicomponent intervention package was specifically designed to reduce key barriers and increase financial and geographic accessibility of family planning services, particularly for the treatment of contraceptive-related side effects and contraindications, for postpartum women in urban Malawi (9,10). Each of the components of the intervention are described below.

Transportation Component

Women were offered a free transportation service from their homes to a local private family planning clinic in Lilongwe. The clinic that was chosen for the study was a high-quality private clinic that offered a full range of family planning services, including insertion and removal of long-acting methods, referral for sterilization, and counseling, and average waiting times at the clinic were low (typically under 15 minutes). The transportation service was provided by a driver who was hired exclusively for the study. Women received the driver's phone number and were instructed to contact the driver to transport them to the clinic at a time of their choosing. In addition to the driver, a female field manager from the study team would accompany the driver at all times; the presence of another woman in the vehicle served to minimize potential stigma associated with a woman traveling alone in the company of another man.

Counselling Component

Women who were assigned to the intervention arm were also offered free, private family planning counseling sessions over the two-year intervention period. Counseling sessions were provided by trained counselors and included a risk assessment for clinical methods and detailed information on methods switching, side effects associated with each method, the benefits of contraception, birth spacing, and dual protection. Consultations were designed to promote informed choice by discussing common misperceptions that surround family planning and use of modern contraceptives. Women received a detailed information brochure on birth spacing and side effects as well as counseling on both modern and natural family planning methods, including fertility-awareness methods (Standard Days Method, Cycle Beads). Strategies on how to communicate family planning messages with partners and on how to increase partner awareness were conveyed during sessions. Counseling sessions were scheduled to last no more than one hour per session and were administered in a private room by a counselor who was trained to provide family planning and reproductive health services. Women in the intervention arm received up to six counseling sessions, one comprehensive session just after administration of the baseline (within one month) and five shorter follow-up sessions that were spaced out over the two-year intervention period. The first session introduced women to the range of available family planning methods and counselled women on side effects. At this first session, counselors also informed women in the intervention arm about the transport service (described above) and side effects management service (described below) that were available to them and provided women with the necessary information on how to access these services.

Financial Reimbursement Component

Finally, women who were assigned to the intervention arm were financially reimbursed for any out of pocket expenditures that they incurred for receiving family planning care at the clinic. Costs that were reimbursed at the clinic included costs related to the procurement of family planning medications and

contraceptive methods, family planning consultation fees, lab test fees, and exam fees. The reimbursement allowance for each woman was in the amount of 17,500 MKW ($25.00 USD) and could be redeemed by the woman over multiple visits at the clinic over the two-year intervention period. For every family planning service that the woman received, the cost of the service was deducted from her 17,500 MKW reimbursement allowance.

Treatment of Side Effects

In addition, women who were assigned to the intervention arm and who experienced any side effects due to contraceptive use over the course of the two-year intervention period received a series of services for the treatment of side effects. In the event that a woman in the intervention arm experienced a side effect or contraindication, she could contact a doctor via telephone and would receive advice on how she can best seek care. The doctor would conduct a preliminary telephone consultation and would refer the woman over the phone to seek care at their nearest public clinic, public hospital, or the partner clinic. All women in the intervention arm also received an "emergency package" during the first counseling visit from the counselor (see above). This "emergency package" consisted of a transport voucher and mobile phone credit. This "emergency package" was given to all women in the intervention arm, regardless of whether they took up any intervention component or not and regardless of whether they experienced a side effect or not. The counselor informed the woman that the woman could use the "emergency package" to cover airtime costs incurred for consultation, any emergency transport costs for travel to a health facility, particularly for treating contraceptive-related side effects. The woman was asked to keep receipts of any costs she incurred at the health facility so that she could be reimbursed later. The reimbursement could apply to covering the cost for treatment for side effects for all family planning methods used by the woman and regardless of where the method or treatment was procured. All reimbursements for an incurred cost were distributed as closely as possible to the time that the reimbursable cost was incurred (typically within one to three days).

S2.2. Intervention Uptake Over the Two-Year Intervention Period

Rollout of the multi-component family planning intervention to women assigned to the intervention group began shortly after the launch of the baseline survey in September 2016. Six family planning counselors (registered nurses and midwives with prior counseling experience in family planning) were identified in mid-September 2016 and were trained through October 2016 to administer six counseling sessions in women's homes over a two-year intervention period. The counselors were then trained in the provision of family planning counseling services from a master trainer from the Malawi Reproductive Health Directorate (RHD), with collaboration and support from the Malawi Ministry of Health (MOH). Counselor training topics included: 1) return to fertility; 2) healthy spacing and timing of pregnancies (HTSP); 3) the links between birth spacing and maternal and child health outcomes; 4) contraceptive methods, including their uses, relative effectiveness, side effects and contraindications, and other related information; 5) myths and misconceptions associated with family planning; and 6) partner engagement and family planning communication strategies. Training materials (counselling flip charts, family planning demo kits, brochures and flyers, etc.) were provided by the RHD, and a family planning brochure that covered the four topics described above was developed in collaboration with the RHD. Counseling of women in the intervention group began in November 2016 and concluded in March 2018.

In addition to hiring six counselors, the research team hired and trained a licensed taxi driver in October 2016 to assist with the implementation of the transportation component of the intervention. The taxi driver was contracted to be dedicated to the study and, in particular, was responsible for working with the management team to respond to clients' transport needs to and from the Good Health Kauma Clinic, or any other family planning clinic or hospital of the client's choosing. In October 2016, the management team also identified an obstetrician at the Kamuzu College of Medicine to be the "medical doctor on call." The obstetrician was asked to be responsible for: 1) answering any calls from clients; 2) providing any support or consultation services over the phone, to the best of his ability; and 3) referring any clients who may be experiencing health concerns, particularly those related to their use of family planning, to the management team for follow-up.

Counseling activities with women in the intervention group concluded in March 2018; however, other intervention activities (providing transportation to women to visit the Kauma Clinic for services, providing financial reimbursements to women for any family planning services that they obtain) continue until the end of January 2019. Due to the staggered rollout of the intervention and follow-up, all women who were reached at the first visit following randomization were eligible to receive intervention services over the full two-year program period.

The table below summarizes utilization of the various intervention components by women assigned to the intervention arm over the two-year program period, from November 6, 2016 (when the first woman was randomized and introduced to the intervention arm) to January 31, 2019 (when the last woman who was randomized was eligible to utilize any of the intervention services). Of the 1,026 women (48 percent of the total study sample) who were randomized to the intervention arm, all but 13 women were successfully re-contacted and introduced to the intervention. Over the two-year period, a total of 468 clients used the taxi service, and 474 women received family planning services either from the Kauma Clinic or from other facilities. A total of 324 women (31.6 percent of all women in the intervention arm) received injectables, while 78 women (7.6 percent of women in the intervention arm) received implants. A small proportion of women (35 women or 3.5 percent of the intervention sample) visited the clinic for the treatment of contraceptive-related side effects over the course of the program period. The average expenditure for services received over the program period was MWK 1,720 (USD $2.34), and no client spent her total reimbursement allowance of MWK 17,500 over the program period.

Table: Intervention Activities and Uptake

Activity / Variable	Obs.	Pct. of N
Total Number of Women, N	**2,139**	**100.0**
Number of women assigned to intervention group, N_1	1,026	48.0
Number of clients contacted	1,013	47.4
START OF INTERVENTION	**6 Nov 2016**	
	Obs.	**Pct. of N_1**
Number of first visits and first counselling sessions	1,038*	
Number of taxi trips/client visits to Kauma Clinic	468	45.6
Services / Methods Received	**Obs.**	**Pct. of N_1**
Number of clients who received services	474	46.2
Average expenditure for services received (MWK)	1720.67 ($2.34 USD)	
No. of clients who received side effects management	36	3.5
Received condoms	6	0.6
Received pills	37	3.6
Received Injectables / Depo-Provera	324	31.6
Received Implants / Jadelle	78	7.6
Received IUD	7	0.7
Received female sterilization	7	0.7
END OF INTERVENTION	**31 Jan 2019**	

Notes: These data are based on field team monitoring logs of clinic visits and intervention activities and may therefore underreport activities if women sought out services without notifying the field team and only reported receipt of services at a later time (e.g. during a follow-up survey). *This statistic is higher than the number of clients contacted because some clients required multiple visits to complete the first visit and counseling session.

Supplemental Figures and Tables

Appendix Figure S1: Histogram of follow-up time after index birth for survival analysis
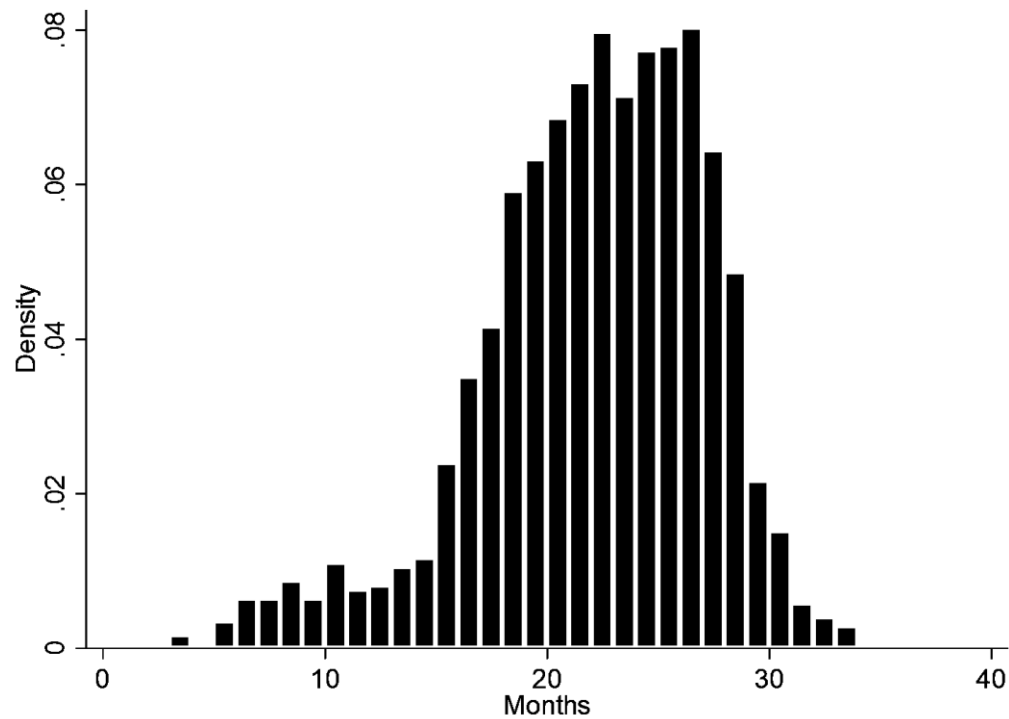
Note: The index birth date varies from date of baseline interview since we recruited women who were either pregnant or had given birth within the last six months from the date of interview. For women who were interviewed at the second year follow up, their follow-up time is calculated as the gap between their two-year interview date and the index birth date, in months. For women who were interviewed at the first year follow-up but not at the second year follow-up, their follow-up time is calculated as the gap between the index birth and the one year follow-up interview date, in months.

Appendix Table S1: Descriptive Statistics, Baseline Sample

Variable	Mean	Variable	Mean
Household-Level Variables		**Woman-Level Variables**	
Household Characteristics		**Pregnancy and Postnatal Care**	
Number of members in HH	3.98	Menstrual cycle returned (1 =yes)	0.64
Has electricity (1 = yes)	0.160	Birthweight from health card (kg)	3.22
Share toilet? (1 = yes)	0.831	Had sex since birth (1 =yes)	0.484
Has a TV? (1 = yes)	0.201	Months after birth before sex	2.22
Has a fridge? (1 = yes)	0.059	Breastfed child (1 = yes)	0.994
Cooking in home? (1 = yes)	0.156	Still breastfeeding (1 = yes)	0.993
Owns a cell phone (1 = yes)	0.765	Age of youngest child (days)	90.5
Own a car / truck? (1 = yes)	0.018		
Own a bicycle? (1 = yes)	0.309	**Marriage and Sexual Activity**	
		Husband living with woman? (1 =yes)	0.972
Follow-Up Information		Husband have other wives? (1 =yes)	0.037
Photo of respondent? (1 = yes)	0.847	How old when live with man? (years)	18.9
Photo of household? (1 = yes)	0.798	How old when first had sex? (years)	17.4
Plans to move in next 6 months (1 = yes)	0.194		
		Fertility Preferences	
Woman-Level Variables		Want more children? (1 =yes)	0.569
Respondent Background		Ideal no. of boys	1.43
Age of respondent (years)	24.58	Ideal no. of girls	1.44
Ever attended school (1 = yes)	0.986	Ideal no. of children	3.19
Can read in English? (1 = yes)	0.561	Heard FP on radio? (1 =yes)	0.395
Can read in Chichewa? (1 = yes)	0.826	Does husband know of FP use? (1 =yes)	0.956
Reproduction		**W8: Husband Background**	
Ever given birth? (1 = yes)	0.896	Husband ever attend school? (1 =yes)	0.976
Total number of births	1.86	Husband works? (1 =yes)	1.00
Total number of children alive	1.74	Covered by health insurance? (1 =yes)	0.023
Currently pregnant (1 = yes)	0.516	**W12: Labor and Employment**	
Months pregnant	5.60	Woman works? (1 =yes)	0.243
Wanted to get pregnant at that time (1 = yes)	0.556	Husband works? (1 =yes)	1.00
Had a miscarriage, stillbirth, abortion (1 = yes)	0.134		
		Time Use	
Contraception		Not busy enough (1 = yes)	0.532
Among non-pregnant, current use FP (1 =yes)	0.492	Children with her while worked? (1 =yes)	0.743
Among pregnant, ever use of FP (1 = yes)	0.692	Respondent took care while worked? (1 =yes)	0.830
Last amount spent on FP (MWK)	250.02	**Woman and Child Anthropometrics**	
Waiting time for FP (mins)	37.85	Woman height (cm)	154.9
Travel time (mins)	31.9	Woman weight (kg)	60.1
Travel distance for FP (km)	3.59	Woman hemoglobin level (g/dl)	11.05
Counselled on FP in last pregnancy (1 = yes)	0.058	Child under 5 height (cm)	73.7
		Child under 5 weight (kg)	9.31
N	**2,139**		

Appendix Table S2: Balance Table of Outcomes and Covariates by Treatment Group

	(1) Full Sample	(2) Treatment	(3) Control	(4) Difference
Baseline				
Values				
Current Use of FP (1 = Yes)	0.237	0.239	0.235	0.003
Long Acting Method Use (1 = Yes)	0.034	0.034	0.033	0.001
Injectable Use (1 = Yes)	0.187	0.189	0.185	0.004
Implant Use (1 = Yes)	0.031	0.031	0.031	0.000
Baseline Covariates				
Ever Use of FP (1 = Yes)	0.755	0.775	0.736	0.039**
Woman's Age (Years)	24.58	24.66	24.51	0.154
Total Number of Children	2.255	2.287	2.226	0.061
Primary Education (1 = Yes)	0.984	0.986	0.982	0.004
Secondary Education (1 = Yes)	0.413	0.414	0.412	0.002
Tertiary Education (1 = Yes)	0.023	0.019	0.028	0.009
Religion (1 = Christian)	0.827	0.838	0.816	0.022
Ethnicity (1 = Chewa)	0.418	0.414	0.421	0.007
Woman Works (1 = Yes)	0.096	0.099	0.093	0.007
Age of First Cohabitation (Years)	18.86	18.90	18.81	0.094
Pregnancy Status (1 = Yes)	0.515	0.515	0.516	0.001
Distance to provider (km)	3.191	3.200	3.184	0.016
Transport Cost (MWK)	193.30	211.74	175.67	36.07
Observations	**2,139**	**1,026**	**1,113**	
Endline (Year 2 Follow-Up)				
Outcomes				
Current Use of FP (1 = Yes)	0.745	0.775	0.718	0.057***
Long Acting Method Use (1 = Yes)	0.257	0.286	0.231	0.055**
Injectable Use (1 = Yes)	0.403	0.399	0.406	0.007
Implant Use (1 = Yes)	0.219	0.240	0.200	0.040**
Pregnant since index birth (1 = Yes)	0.074	0.053	0.093	0.040***
Birth since index birth (1 = Yes)	0.040	0.029	0.051	0.022**
Observations	**1,672**	**782**	**890**	

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Appendix Table S3: Unadjusted and Adjusted Intent-to-Treat Regressions from Table 2

	Current Use of FP		Long-Acting Method Use		Implant Use		Injectable		Pregnant Again Since Index Birth	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
Treatment	0.0570*** [0.0153,0.0986]	0.0587** [0.0168,0.101]	0.0550** [0.0128,0.0971]	0.0543** [0.0133,0.0954]	0.0404** [0.000511,0.0803]	0.0426** [0.00440,0.0809]	-0.00664 [-0.0538,0.0405]	0.000884 [-0.0462,0.0480]	-0.0378*** [-0.0618,-0.0137]	-0.0366** [-0.0621,-0.0111]
Covariates at Baseline										
Age Group (Ref: 31-35 years old)										
18-20		-0.0452 [-0.156,0.0657]		0.165** [0.0580,0.273]		0.261** [0.162,0.359]		-0.194** [-0.315,-0.0732]		0.000344 [-0.0645,0.0652]
21-25		-0.0276 [-0.113,0.0579]		0.0720* [-0.0116,0.156]		0.157** [0.0841,0.229]		-0.0750 [-0.172,0.0216]		0.00966 [-0.0401,0.0594]
25-30		-0.0309 [-0.104,0.0427]		0.00264 [-0.0681,0.0733]		0.0879** [0.0294,0.146]		-0.0259 [-0.109,0.0568]		-0.0172 [-0.0615,0.0271]
Age of Sexual Debut (years)		-0.00514 [-0.0140,0.00371]		0.00524 [-0.00388,0.0144]		0.00622 [-0.00223,0.0147]		-0.0136** [-0.0241,-0.00323]		0.00143 [-0.00306,0.00593]
Total Number of Children Alive		0.0125 [-0.0154,0.0405]		0.0406** [0.0122,0.0691]		0.0281** [0.00168,0.0546]		-0.0255 [-0.0571,0.00602]		0.000807 [-0.0164,0.0180]
Ever use of FP (1 = Yes)		0.00588 [-0.0585,0.0702]		0.00120 [-0.0553,0.0577]		-0.0111 [-0.0667,0.0444]		-0.0620* [-0.129,0.00542]		-0.0254 [-0.0636,0.0128]
Education (1 = Primary or less)		-0.0199 [-0.0679,0.0280]		0.0110 [-0.0342,0.0562]		0.0169 [-0.0257,0.0595]		0.0172 [-0.0354,0.0698]		0.00922 [-0.0187,0.0371]
Woman works (1 = Yes)		0.0461 [-0.0205,0.113]		0.00522 [-0.0626,0.0730]		0.000935 [-0.0613,0.0632]		0.00632 [-0.0723,0.0850]		-0.0190 [-0.0568,0.0188]
Religion (1 = Christian)		0.0532* [-0.00610,0.112]		0.0627** [0.0101,0.115]		0.0391 [-0.0102,0.0884]		-0.0103 [-0.0745,0.0540]		-0.0214 [-0.0592,0.0163]
Ethnicity (1 = Chewa)		-0.00318 [-0.0465,0.0401]		0.0345 [-0.00716,0.0762]		0.0313 [-0.00787,0.0704]		-0.0187 [-0.0674,0.0300]		-0.00674 [-0.0332,0.0197]
Baseline Levels of Outcomes										
Current use of FP (1 = Yes), baseline		0.0423* [-0.00773,0.0923]								
LA method use (1 = Yes), baseline				0.586** [0.487,0.684]						
Injectable use (1 = Yes), baseline						0.632** [0.529,0.735]				
Implant use (1 = Yes), baseline								0.133** [0.0696,0.197]		
Time since index birth (months)										0.0000427 [-0.0001,0.0002]
Pregnancy status (1 = Yes), baseline										-0.0354** [-0.0705,-0.000284]
Constant	0.718*** [0.688,0.748]	0.781** [0.514,1.047]	0.231*** [0.204,0.259]	-0.0940 [-0.367,0.179]	0.200*** [0.174,0.226]	-0.187 [-0.440,0.0657]	0.406*** [0.373,0.438]	0.777** [0.471,1.082]	0.0835*** [0.0648,0.102]	0.0679 [-0.105,0.241]
N	1,672	1,667	1,672	1,667	1,672	1,667	1,672	1,667	1,581	1,475
R-Squared	0.00425	0.0207	0.00394	0.0842	0.00238	0.104	0.0000457	0.0273	0.00578	0.0249
F	7.192	2.001	6.547	10.89	3.946	12.54	0.0763	2.921	9.491	1.888

$** p < 0.05, * p < 0.1$

Notes: Each observation is a woman. The results presented are from intent-to-treat linear probability models, and 95 percent confidence intervals, which are calculated with heteroscedasticity-robust standard errors, are presented in brackets. *(**) denote significance in two-sided hypotheses tests against a null of no effect (zero coefficient). The adjusted regressions include the following covariates at baseline: the woman's total number of children who are alive, her educational attainment (primary or less versus secondary and higher, the reference group), her age (in three age groups), age of sexual debut (in years), ever use of family planning, her religion (Christian versus other), work status, and her tribal ethnicity (Chewa versus other). The adjusted regressions also include neighborhood fixed effects and control for baseline levels of the outcome. In column 10, the time since the index birth (in months) is included as an additional control variable.

Appendix Table S4: Hazard Estimates of Pregnancy within 24 Months after Index Birth

VARIABLES	Hazard of Pregnancy within 24 Months	
	Unadjusted	Adjusted
Treatment	0.565**	0.575**
	[0.387,0.824]	[0.393,0.843]
Covariates at Baseline		
Age Group (Ref: 31-35 years old)		
18-20		0.614
		[0.246,1.532]
21-25		0.858
		[0.430,1.709]
25-30		0.639
		[0.326,1.249]
Age of Sexual Debut (years)		0.981
		[0.914,1.052]
Total Number of Children Alive		0.913
		[0.713,1.169]
Ever use of FP (1 = Yes)		0.736
		[0.472,1.147]
Education (1 = Primary or less)		0.991
		[0.676,1.453]
Woman works (1 = Yes)		0.806
		[0.411,1.579]
Religion (1 = Christian)		0.820
		[0.516,1.303]
Ethnicity (1 = Chewa)		0.986
		[0.680,1.428]
Pregnancy status (1 = Yes)		0.711*
		[0.484,1.043]
Observations	**1,772**	**1,767**
Test of PH Assumption with Schoenfeld residuals (p-value)	**0.3139**	**0.4040**

** $p < 0.05$, * $p < 0.1$

Notes: Each observation is a woman. Columns 1 and 2 respectively report unadjusted and adjusted hazard rates from a Cox proportional hazards model, and 95 percent confidence intervals, which are calculated with heteroscedasticity-robust standard errors, are presented in brackets. *(**) denote significance in two-sided hypotheses tests against a null of no effect (zero coefficient). The adjusted regression, reported in column 2, includes the following covariates at baseline: the woman's total number of children who are alive, her educational attainment (primary or less versus secondary and higher, the reference group), her age (in three age groups), age of sexual debut (in years), ever use of family planning, her religion (Christian versus other), work status, and her tribal ethnicity (Chewa versus other). The adjusted regression also includes neighborhood fixed effects.

Appendix Table S5: Balance Table of Key Baseline Covariates Comparing Women Lost to Follow up

	All Participants		Remaining Participants		Lost to Follow-up		Difference in
	Treatment (N=1,026)	Control (N=1,113)	Treatment (N=782)	Control (N=890)	Treatment (N=245)	Control (N=223)	Loss to Follow-up
Ever Use of FP (1 = Yes)	0.775	0.736	0.801	0.746	0.694	0.695	-0.001
Woman's Age (years)	24.66	24.51	24.93	24.80	23.78	23.33	0.452
Total Number of Children	1.773	1.706	1.824	1.766	1.611	1.484	0.126
Average Education Level (1-3)	1.439	1.449	1.468	1.451	1.261	1.309	-0.048
Woman Works (1 = Yes)	0.099	0.093	0.100	0.100	0.098	0.063	0.035
Age of Sexual Debut (years)	18.90	18.81	19.07	18.82	18.36	18.76	-0.402
Counseled During Last Pregnancy	0.046	0.069	0.050	0.068	0.033	0.072	-0.039
Distance to provider (km)	3.200	3.184	3.213	2.972	3.143	4.125	-0.982
Transport Cost (MWK)	211.74	175.67	206.7	181.2	231.8	151.2	80.63

** p < 0.05, * p < 0.1

Appendix Table S6: Contraceptive Method Mix Among Users over the Study Period

	Baseline		Endline	
	N	**Pct.**	**N**	**Pct.**
Condoms	11	2.2	25	1.8
Female Condoms	0	0.0	1	0.1
Female Sterilization	0	0.0	45	3.2
IUD	4	0.8	18	1.3
Implants	67	13.2	366	26.0
Injectables	400	78.9	833	59.3
Lactational Amenorrhea Method	2	0.4	0	0.0
Male Sterilization	1	0.2	1	0.1
Other Modern Method	8	1.6	1	0.1
Other Traditional Methods	3	0.6	3	0.2
Pills	10	2.0	86	6.1
Rhythm Method	0	0.0	4	0.3
Standard Days Method	0	0.0	11	0.8
Withdrawal	1	0.2	11	0.8
Modern Method Use	503	99.2	1,387	98.7
Traditional Method Use	4	0.8	18	1.3
Total	**507**		**1,405**	

Notes: Traditional methods include withdrawal, the Rhythm Method, and other traditional methods.

Appendix Table S7: Intervention Impact from Intent-to-Treat Regressions, Stratified by Subgroups

Treatment Effects for:	Current Use of FP	Long-Acting Method Use	Implant Use	Injectable	Pregnant Again Since Index Birth
Age subgroups					
18-25 (N = 1,005)	0.0501*	0.0532*	0.0607**	0.00940	-0.0434**
	[-0.00474,0.105]	[-0.000919,0.107]	[0.00746,0.114]	[-0.0515,0.0703]	[-0.0777,-0.00913]
26-35 (N = 665)	0.0694**	0.0561*	0.0152	-0.00871	-0.0232
	[0.00439,0.134]	[-0.00756,0.120]	[-0.0384,0.0687]	[-0.0832,0.0657]	[-0.0608,0.0145]
Education subgroups					
Primary or less (N = 898)	0.0745**	0.0645**	0.0360	0.00999	-0.0423**
	[0.0176,0.131]	[0.00702,0.122]	[-0.0181,0.0901]	[-0.0546,0.0746]	[-0.0784,-0.00623]
Secondary (N = 698)	0.0439	0.0344	0.0487	0.00621	-0.0233
	[-0.0207,0.108]	[-0.0280,0.0967]	[-0.00954,0.107]	[-0.0668,0.0792]	[-0.0610,0.0143]
Pregnancy status subgroups					
Pregnant at baseline (N = 840)	0.0498	0.0246	0.00720	0.0169	-0.0126
	[-0.00976,0.109]	[-0.0353,0.0846]	[-0.0484,0.0628]	[-0.0510,0.0848]	[-0.0433,0.0181]
Postpartum at baseline (N = 827)	0.0716**	0.0791***	0.0786***	-0.000825	-0.0509**
	[0.0113,0.132]	[0.0232,0.135]	[0.0261,0.131]	[-0.0662,0.0645]	[-0.0915,-0.0103]
Baseline contraceptive use subgroups					
Postpartum contraceptive users at baseline (N = 409)	0.0858**	0.0362	0.0254	0.0675	-0.0396
	[0.0172,0.154]	[-0.0283,0.101]	[-0.0352,0.0860]	[-0.00706,0.142]	[-0.0882,0.00903]
Postpartum non-users at baseline (N = 420)	0.0618	0.121***	0.129***	-0.0718	-0.0598**
	[-0.0280,0.152]	[0.0386,0.203]	[0.0514,0.206]	[-0.166,0.0225]	[-0.118,-0.00168]

$** \ p < 0.05, * \ p < 0.1$

Notes: Each observation is a woman. The results presented are the coefficient on treatment from intent-to-treat linear probability models, and 95 percent confidence intervals, which are calculated with heteroscedasticity-robust standard errors, are presented in brackets. *(**) denote significance in two-sided hypotheses tests against a null of no effect (zero coefficient). The adjusted regressions include the following covariates at baseline: the woman's total number of children who are alive, her educational attainment (primary or less versus secondary and higher, the reference group), her age (in three age groups), age of sexual debut (in years), ever use of family planning, her religion (Christian versus other), work status, and her tribal ethnicity (Chewa versus other). The adjusted regressions also include neighborhood fixed effects and control for baseline levels of the outcome. In column 10, the time since the index birth (in months) is included as an additional control variable.

Appendix Table S8: Intervention Impact from Survival Analysis, Stratified by Subgroups

Treatment Effects for:	Hazard of Pregnancy within 24 Months
Age subgroups	
18-25 (N = 992)	0.611**
	[0.397,0.938]
26-35 (N = 775)	0.529**
	[0.328,0.854]
Education subgroups	
Primary or less (N = 1,336)	0.541**
	[0.377,0.775]
Secondary (N = 431)	0.802
	[0.396,1.622]
Pregnancy status subgroups	
Pregnant at baseline (N = 867)	0.634*
	[0.361,1.111]
Postpartum at baseline (N = 900)	0.578**
	[0.386,0.865]
Baseline contraceptive use subgroups	
Postpartum contraceptive users at baseline (N = 444)	0.640
	[0.356,1.150]
Postpartum non-users at baseline (N = 456)	0.530**
	[0.299,0.938]

** $p < 0.05$, * $p < 0.1$

Notes: Each observation is a woman. The results presented are adjusted hazard rates from a Cox proportional hazards model, and 95 percent confidence intervals, which are calculated with heteroscedasticity-robust standard errors, are presented in brackets. *(**) denote significance in two-sided hypotheses tests against a null of no effect (zero coefficient). The adjusted regressions include the following covariates at baseline: the woman's total number of children who are alive, her educational attainment (primary or less versus secondary and higher, the reference group), her age (in three age groups), age of sexual debut (in years), ever use of family planning, her religion (Christian versus other), work status, and her tribal ethnicity (Chewa versus other). The adjusted regressions also includes neighborhood fixed effects.

Appendix Table S9: Preferred Method Attributes among Women at Baseline (N = 2,139)

	N	Pct.
How effective it is at preventing pregnancy	806	37.7
Can be used without anyone else knowing	81	3.8
Protects against HIV / STI	34	1.6
No risk of harming health	481	22.5
No effect on regular monthly bleeding	164	7.7
No unpleasant side effects	245	11.5
Easy to use	518	24.2
Easy to obtain	275	12.9
Can be used for a long time without needing to visit a clinic	369	17.3
Will be able to get pregnant when I want	169	7.9

Notes: The reported results above are based on women's responses to the following question: "In choosing a contraceptive method, what feature(s) would be most important to you?" Multiple responses were possible.

Supplemental Material References

1. Malawi Ministry of Health. Roadmap for Reducing Maternal and Neonatal Mortality, 2007. Lilongwe, Malawi: Ministry of Health; 2007.

2. Government of Malawi. Prioritization of Family Planning Interventions at National and District Levels for 2018-2020: Addendum to the 2015 Malawi Costed Implementation Plan for Family Planning, 2016-2020. Lilongwe, Malawi: Government of Malawi; 2019 p. 12.

3. Government of Malawi, ICF International. Malawi Service Provision Assessment 2013-14. Lilongwe, Malawi: Government of Malawi; 2014 p. 414.

4. Government of Malawi. Malawi Costed Implementation Plan for Family Planning, 2016-2020. Lilongwe, Malawi: Government of Malawi; 2015.

5. Malawi Ministry of Health. Malawi Sexual and Reproductive Health Strategy, 2011-2016. Lilongwe, Malawi: Ministry of Health; 2011.

6. National Statistical Office Malawi, ICF. Malawi Demographic and Health Survey 2015-16. Zomba, Malawi: NSO and ICF; 2017.

7. Dasgupta ANZ, Zaba B, Crampin AC. Postpartum uptake of contraception in rural northern Malawi: A prospective study. Contraception. 2016 Nov 1;94(5):499–504.

8. Kopp DM, Rosenberg NE, Stuart GS, Miller WC, Hosseinipour MC, Bonongwe P, et al. Patterns of Contraceptive Adoption, Continuation, and Switching after Delivery among Malawian Women. PLOS ONE. 2017 Jan 20;12(1):e0170284.

9. Palamuleni ME. Socio-Economic and Demographic Factors Affecting Contraceptive use in Malawi. Afr J Reprod Health. 2013 Jan 1;17(3):91-104–104.

10. Bongaarts J, Bruce J. The Causes of Unmet Need for Contraception and the Social Content of Services. Stud Fam Plann. 1995;26(2):57–75.