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Postpartum Family Planning in Mozambique: Factors for Use, Decision-making, and the Promise of Community-based Distribution

By

Cassandra Blazer

A dissertation submitted in partial satisfaction of the

requirements for the degree of

Doctor of Public Health

in the

Graduate Division

of the

University of California, Berkeley

Committee in charge:

Professor Ndola Prata, Chair
Professor Stefano Bertozzi
Professor Jane Mauldon
Professor Lori Freedman

Spring 2016

Abstract

Postpartum Family Planning in Mozambique: Factors for Use, Decision-making, and the Promise of Community-based Distribution

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The benefits of family planning are well documented and unequivocal. Allowing women to space or limit pregnancies through access to modern contraceptive methods can empower women to achieve their desired fertility, prevent deaths and disability that result from pregnancy and unsafe abortion, and may lead to broader benefits, such as increased education and economic opportunities for women and their children. Postpartum family planning is defined as the prevention of pregnancy during the 12 months after childbirth, and it has the potential to improve the health of women, infants, and children in less developed countries. Research has shown that short birth-to-conception intervals are associated with adverse infant, child, and maternal outcomes. The World Health Organization recommends postpartum family planning as a critical component of health care that has the potential to meet women's desire for contraception, and save millions of lives.

Despite the importance of postpartum family planning, some countries continue to face challenges related to improving contraceptive use. Mozambique has had particular difficulty meeting its family planning goals. The fertility rate in Mozambique increased from 5.5 in 2003 to 5.9 in 2011, with the highest levels of fertility found in rural areas (TFR 6.6) and among the poorest (TFR 7.2) and least educated women (TFR 6.8). Estimates from 2011 show that only 13.2% of married Mozambican women age 15-49 years used modern methods of contraception, and the unmet need for family planning is relatively high at 12.8%.

This dissertation establishes the factors associated with postpartum family planning use in Mozambique. The research then aims to describe the contraceptive decision-making processes of postpartum women participating in a community-based injectables project in rural Mozambique. Finally, this dissertation presents a policy analysis of the strategic financing options for the community-based health services delivery program in Mozambique, which is integrally tied to expanding access to postpartum family planning.

Acknowledgements

I would like to thank my dissertation committee for their guidance throughout the completion of this project. My gratitude to Professor Prata covers everything from supporting my entire doctoral education, to providing an innovative project to which I could make a contribution, to believing I was capable of anything she suggested. Thank you to Professor Mauldon for detailed, generous mentorship and critical course corrections. My heartfelt thanks to Professor Freedman for her deep investment in my work and in me. A special thanks to Professor Bertozzi whose guidance dramatically improved this project, and who invariably appeared as though he had all the time in the world for my work. Thank you also to Professor Maureen Lahiff for countless hours of statistics advice and genuine belief in my ability, and Professor Amani Nuru-Jeter for challenging me to take full advantage of doctoral scholarship, even (and especially) when that meant doing it the hard way.

Thanks to the Bixby Center for Population, Health, and Sustainability and the UC Berkeley Human Rights Center for generous support of this research. Thank you Pathfinder International and the Mozambican Association of Obstetricians and Gynecologists for support during ethics review and data collection.

Thanks to Dr. William Winfrey his kindness in sharing coding guidance in the use of Demographic and Health Survey reproductive calendar data.

I am grateful to Paulo Sabia for translation services during qualitative data collection and Nelson Ramiro Mendu for translation and transcription services. You both exceeded expectations.

Most importantly, thank you to the 47 women and men who were willing to set aside time to share their lives and experiences with me. Thank you for bringing this project to life.

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I. Introduction

The benefits of family planning are well known. Current estimates indicate that contraceptive use has reduced maternal mortality by 40% and infant mortality by 28% globally in the last 20 years (1). The freedom to choose when or whether to reproduce is a right that all women should have (2). Allowing women to space or limit pregnancies through the use of modern contraceptive methods can empower women to achieve their desired fertility, prevent deaths and disability that result from pregnancy and unsafe abortion, and may lead to broader benefits, such as increased education for women and children and enhanced economic opportunities (3).

Postpartum family planning is defined as the prevention of pregnancy during the 12 months after childbirth (4), and it has the potential to improve the health of women, infants, and children in less developed countries (5)(6). Closely spaced pregnancies can have detrimental effects on maternal, infant, and child health. Research has shown that birth-to-conception intervals less than 18 months are associated with fetal death, low birthweight, prematurity, small size for gestational age, and adverse maternal outcomes (7). The World Health Organization (WHO) recommends postpartum family planning as a critical component of health care that has the potential to meet women's desire for contraception, and save millions of lives (8).

Despite the importance of postpartum family planning, some countries continue to face challenges related to improving contraceptive use. Unmet need for family planning is one indicator that can shed light on contraceptive demand and use in a region. Unmet need is defined as the proportion of women who report wanting to delay pregnancy for two years or more, or not have anymore children, but are not currently using any form of contraception (9). The contraceptive prevalence rate is often used in combination with unmet need to guide family planning policy and programs (10), and to understand the relative use of family planning in different countries. Sub-Saharan Africa has the lowest contraceptive prevalence rate, the highest unmet need for family planning, and the highest total fertility rate, or average number of births per woman of reproductive age, of the major global regions (11). The unmet need for family planning is particularly high among women who recently delivered in the developing world (9),(12). Postpartum family planning is defined as using a safe, effective method of contraception to limit or space births for 12 months after delivery (4). In Africa as a whole, 65% of women in their first year postpartum report wanting to space or limit pregnancy but are not currently using contraception (13).

Mozambique, located on the southeastern coast of Africa, has had particular difficulty meeting its family planning goals. While the fertility rate in some sub-Saharan African countries has decreased over the past several decades, the fertility rate in Mozambique increased from 5.5 in 2003 to 5.9 in 2011 (14), with the highest levels of fertility found in rural areas (TFR 6.6) and among the poorest (TFR 7.2) and least educated women (TFR 6.8) (15). Estimates from the 2011 Demographic and Health Survey show that only 11.3% of married Mozambican women age 15-49 years used modern methods of contraception, compared to 32.6% in Eastern Africa and 62%

in less developed countries (11). The unmet need for family planning ranges across Eastern Africa from as low as 6.4% in Mauritius to as high as 35.6% in Uganda. At 23.8%, Mozambique has relatively high unmet need, particularly when compared to the average for developing countries, approximately 12.8% (11).

Mozambique has a highly rural population, with 62% of the population residing in rural areas, and a mere 30-50% of the population estimated to have access to health services (16). As in many African countries, Mozambique is suffering from a severe health workforce shortage. Not only does the country lack sufficient health workers, but the distribution of health workers in terms of geographic coverage and knowledge and skill capacity is not functional (17). The need for innovations that increase access to health services such as family planning in rural areas, and despite the crisis in health workforce, is urgent.

There is currently no published literature on the use of modern contraceptives in the postpartum period, or on family planning programs targeting the postpartum period, in Mozambique. This information is critical to developing family planning interventions that are responsive to the needs and desires of postpartum women. To initiate, test, and bring promising practices to scale in low- and middle-income countries like Mozambique, we must know the region-specific family planning landscape, including existing evidence and ongoing inquiry into what does and does not work to increase uptake of contraception during the critical postpartum period.

The aims of the proposed research are: 1) to identify the factors associated with postpartum family planning use in Mozambique, 2) to describe the experiences of postpartum women participating in a community-based injectables project in rural Mozambique, and 3) to conduct a policy analysis of the strategic financing options for the community-based health services delivery program in Mozambique, which is integrally tied to expanding access to postpartum family planning in that country.

To achieve these aims, this project will employ a mixed methods approach. To accomplish the first aim, we will conduct a secondary data analysis of Mozambique's most recent Demographic and Health Survey (DHS 2011) using a subset of women 12-60 months postpartum, which we will draw from the DHS birth and women's individual calendar data. We will conduct a multivariate analysis of the factors associated with postpartum family planning use in Mozambique.

The project will use qualitative research methods to achieve the second aim. A community-based injectable contraceptive provision project is underway in two rural districts in northern Mozambique. The project employs community health workers and traditional birth attendants to reach women who are interested in injectable contraceptives. In-depth interviews with postpartum women and community-based providers participating in this intervention in rural Mozambique will explore themes derived from existing literature from other sub-Saharan African contexts. We will explore the ways that postpartum women and their providers consider and make decisions about contraceptive use in the year after delivery. This work will

be used to inform policy and programs, particularly those operating at the community level, targeting postpartum family planning in Mozambique and elsewhere in Africa.

Finally, in the third chapter we will conduct a policy analysis to develop recommendations for Mozambique's community health worker program. We will assess strategic financing alternatives for sustaining the community health worker program in terms of effectiveness, efficiency, and equity. The objective of this aim is to chart a path forward for decision-makers to sustain the critical community health worker program. Community-based provision of basic health services, such as family planning, is imperative to the health and wellbeing of women and children in Mozambique.

A review of the literature shows that the evidence for effective postpartum family planning programs is mixed. This research will build on evidence for effective programs, and will provide the first available epidemiologic data on factors associated with postpartum family planning in Mozambique. Postpartum family planning services have historically been provided at facilities. Previous research includes limited evidence for the use of traditional birth attendants in postpartum family planning. This project is a departure from the status quo in several ways: 1) the proposed research will focus on women's and providers' responses to a project that provides contraceptive products at the household level rather than in health facilities; 2) this study will explore the perspectives of traditional birth attendants and other community health workers who may have a large role to play in either enabling or creating additional barriers for postpartum women who want to access contraception; and 3) this study fills a void in the literature on Mozambican community-based health service delivery programs. This information will be used to inform a postpartum family planning distribution system that meets the needs of the most vulnerable women in Mozambique and beyond.

The conceptual model for this research project combines two theoretical frameworks: the Social Ecological Model (18) and the Opportunity Model of Fertility Decline (19). The Social Ecological Model places decisions about health behavior within the social, geographic, economic, cultural, and physical context that individuals inhabit (18). Decisions about the use of family planning can be affected at one or more of the levels in the Social Ecological Model. The Opportunity Model was developed as a shift in conceptualizing fertility, away from the demographic transition theory, which states that typical indices of development, such as education and economic strengthening, are a requirement for declines in fertility rates (20). It emphasizes instead that patterns of fertility decline can follow a reduction of barriers to family planning and safe abortion, even in underdeveloped contexts that have not seen improvements in education, wealth, or governance (19). The Opportunity Model posits that reducing barriers at any or all of the levels in the Social Ecological Model has the potential to increase use of contraception.

Social Ecological Model

McLeroy, Bibeau, Steckler, and Glanz' adaptation of the Social Ecological Model places decisions about health behavior within the social, geographic, economic, cultural, and physical context

that individuals inhabit (18). Decisions about the use of family planning can be affected at one or more of the levels in the Social Ecological Model. Individual level factors include knowledge, attitudes, beliefs, and behaviors. They also include women's education, age, parity, and place of delivery. Though considered individual level factors, these economic and demographic characteristics can inform the way a postpartum woman experiences structural, community, and social forces such as access to healthcare facilities and gender dynamics.

Interpersonal factors cannot be ignored by postpartum family planning interventions. Factors such as a husband's decision-making power, husband's age and education, mother-in-law's relationship with the woman, mother-in-law's decision-making power, whether the woman is in a polygamous household, and the position of a woman in her household compared with other household members can be critical variables in women's ability to use contraception. Interpersonal relationships, including their relative strength or weakness, can be supportive or act as a barrier to contraceptive use.

A woman's community context may affect postpartum contraceptive use decision-making, and may include: religious beliefs, cultural values and norms, status of women within the community, relationship with local health facilities, and the reputation of traditional birth attendants among other women and decision-makers. Additionally, institutions within communities, such as health facilities, have cultures, beliefs, and norms that guide institutional behavior. For example, health facilities may employ specific contraceptive prescribing practices for postpartum women. Providers in the health infrastructure have personal opinions and perspectives that may affect the services postpartum women receive.

Societal level factors include the broad context that women are a part of, including social and cultural norms, economic status of the community, policies, and programs that are in place that address family planning issues. These factors begin at the national level but are relevant to individual decision-making. Societal level factors can determine whether a woman living in a remote area is empowered to leave her home, travel to a facility, and access the method of her choice. Societal factors can be a barrier to household-level provision of products that greatly improve access for poor and hard to reach women.

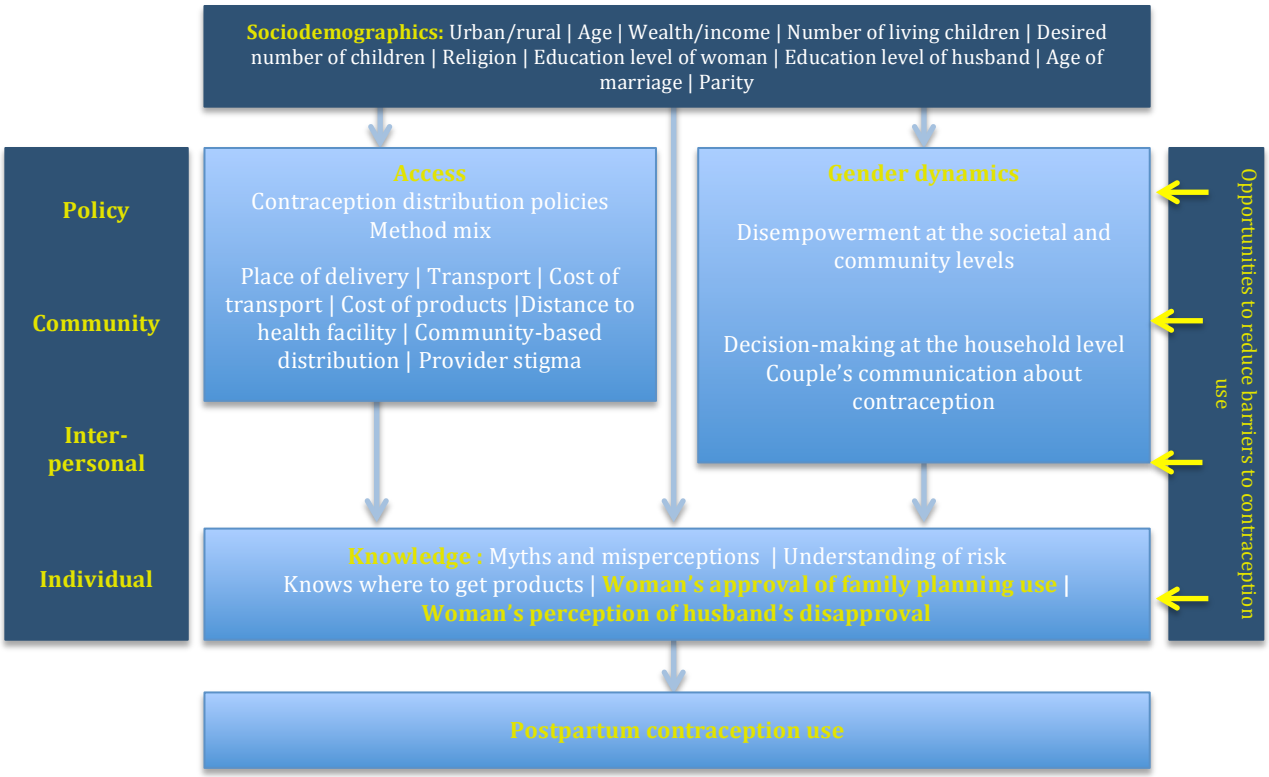
Opportunity Model of Fertility Decline

For several decades, scholars in the fields of economics, demography, and public health have debated the prerequisites for fertility decline. The Opportunity Model was developed as a shift in conceptualizing fertility, away from the demographic transition theory, which states that typical indices of development, such as education and economic strengthening, are a requirement for declines in fertility rates. Campbell, Prata and Potts' Opportunity Model posits instead that patterns of fertility decline can follow increased availability and a reduction of barriers to family planning and safe abortion, even in low-resource underdeveloped contexts that have not seen improvements in education, wealth, or governance (19). In other words, when barriers to contraception are reduced, there will be an increase in contraceptive prevalence, even among poor, illiterate, and uneducated women.

Barriers to family planning products include: cost, transport, infrastructure, status of women, myths, misperceptions, lack of knowledge on behalf of postpartum women and providers, medical barriers such as incorrect eligibility criteria, and provider attitudes toward prescribing contraception to postpartum women (21). Interventions that train traditional birth attendants to provide accurate information, in addition to providing family planning products inside women's homes in the critical period after delivery aim to address many of these barriers. If the Opportunity Model is a useful theory of family planning uptake, then postpartum women who are able to access contraceptive information and products in their villages and homes at low to no cost will choose to initiate family planning at higher rates than postpartum women who do not have this option. According to the Opportunity Model, this should hold true even in the lowest resource, hardest to reach areas of sub-Saharan Africa.

A combination of these two theoretical models guides the factors under study in the proposed project (Figure 1).

Figure 1. Conceptual framework for understanding postpartum family planning use, combining the Social Ecological Model and Opportunity Model of Fertility Decline



II. Association of antenatal care with postpartum family planning use in Mozambique: A cross-sectional study using the Demographic and Health Survey reproductive calendar

Introduction

Postpartum family planning has the potential to improve the health of women, infants, and children in less developed countries through helping women achieve adequate spacing between births and reducing risky pregnancies (5,6,22). Research has shown that birth-to-conception intervals less than 18 months are associated with fetal death, low birth weight, prematurity, small size for gestational age, and adverse maternal outcomes (7). The World Health Organization (WHO) recommends postpartum family planning as a critical component of health care, and key stakeholders recently called for renewed emphasis on postpartum family planning as a global priority (8).

Understanding context-specific factors associated with postpartum family planning use is critical for developing policies and programs that enhance access and allow women to meet their birth spacing desires. The objective of this paper is to describe the factors associated with postpartum family planning use in Mozambique. We are particularly interested in the association between women's interactions with the healthcare system during the prenatal period and postpartum family planning use; namely, whether antenatal care visits are associated with modern family planning use at 12 months postpartum (23). This paper will describe the factors available in the Demographic and Health Survey associated with women's adoption of contraception postpartum.

Background

Overall, just 11.3% of Mozambican women reported using a modern method of contraception in 2011, almost half of the 20.8% of modern contraceptive prevalence found in the 2003 DHS (15). Recent analysis of Mozambique's 2011 DHS data showed that use of modern contraception during the postpartum period at three, six, nine, and 12 months is particularly low compared to its sub-Saharan African neighbors (24). Even at 9-11 months after delivery, when postpartum users should begin to look more like non-postpartum family planning users, Mozambique has the lowest family planning use of the Eastern and Southern African countries included in the analysis.

Antenatal care has been shown to influence postpartum family planning use in other low- and middle-income countries in studies using Demographic and Health Survey reproductive calendar data (25–28). Even though the proportion of women who did not attend any antenatal care visits during pregnancy improved over the last decade, decreasing from 14.6% in 2003 to 9.1% in 2011, the last Demographic and Health Survey (DHS) shows that less than half of Mozambican women received four or more visits as recommended by the World Health Organization (15). In 2008, Mozambique adopted the World Health Organization's recommendations for antenatal care service delivery, which include counseling on birth spacing

and contraception (23). However, Mozambique has struggled to implement antenatal care services as recommended, and quality remains low (29).

Other opportunities to reach women with family planning messages include during labor and delivery at a health facility. The proportion of Mozambican women delivering at a facility increased from 49.1% in 2003 to 57.2% in 2011 (15). By comparison, Mozambique's facility based delivery is one of the lowest in the region compared to neighboring Tanzania (58.7%), Malawi (75.3%), Zambia (70.7%), Zimbabwe (64.1%), and South Africa (84.5%).

Mozambique has a relatively high unmet need for contraception at 23.8%, compared to the average of 12.8% for developing countries (11), and research has shown the unmet need is particularly high during the 12-month period after delivery (13). The total fertility rate in Mozambique increased from 5.5 in 2003 to 5.9 in 2011, while over the same period the mean ideal number of children among all women declined from 5.3 to 4.8 (15). The unmet need for contraception, fertility rate, desired family size, low antenatal care prevalence, and very low use of postpartum family planning indicate opportunities to better meet the reproductive health needs of Mozambican women.

Methods

Data source and sample

We analyzed population-based cross-sectional data from Mozambique's DHS conducted in 2011. Mozambique's 2011 DHS is based on interviews with a nationally representative sample of men (age 15 to 64) and women (age 15-49) living outside of institutions in rural and urban districts (30). Data analyzed for this project is derived from merging individual woman's questionnaire (n=13,745) and the births dataset (n=37,984). The survey used a stratified, multi-cluster sample based on the National Bureau of Statistics Mapping of the Third General Census of Population and Housing (2007). Stage one of the sample included 611 primary sampling units comprised of geographic areas that group a number of households together, with probability of selection for the study equal to the population of the geographic area. Stage two was the random selection of 25 rural and 20 urban households within each primary sampling unit, each with equal probability for selection.

This project uses Winfrey and Rakesh's (2014) method of merging data from the Mozambican 2011 births dataset and women's individual dataset to analyze the reproductive calendar data (24). The reproductive calendar collects information on births and family planning use, month by month, for the 60 months before the survey. We included women's most recent births in the calendar occurring more than 12 months and less than 60 months prior to the survey. A total of 8,878 postpartum women were included in the final sample.

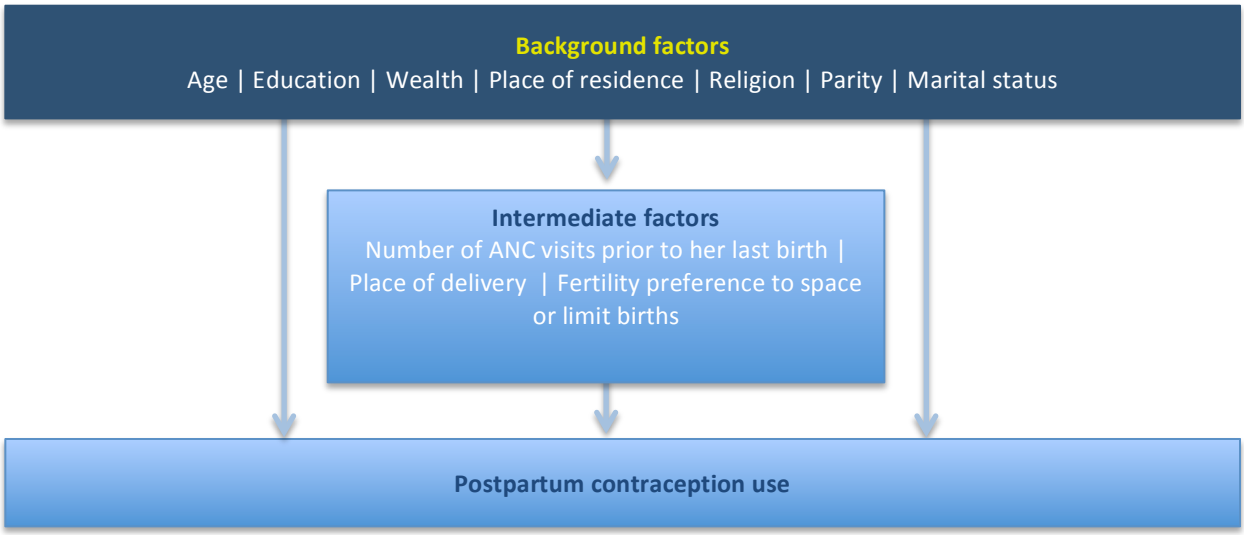
Variables, measure considerations, and data limitations

The outcome variable, postpartum family planning use, is defined as use of a modern method of contraception at any time in the 12-month period after a woman delivers. Pills, IUDs, injections, male and female condoms, male and female sterilization, and implants are considered modern methods for this analysis.

Recent studies have used reproductive calendar data to examine the factors linked to postpartum family planning use in Africa, Latin America, and Asia. These studies demonstrated that several background factors are associated with use of family planning in the 12-month postpartum period, including woman's age, wealth, education, place of residence, fertility preferences, parity, and religion. Modifiable factors, such as use of antenatal services, exposure to media, and facility-based delivery or skilled birth attendance have also predicted postpartum family planning use (25–27,31,32). None of these studies assessed data from Mozambique.

Figure 1 presents factors included in this analysis, including most of those found in the literature. Factors are categorized as background characteristics and the primary independent variable, antenatal care visits.

Figure 1. Factors considered being associated with postpartum family planning use, selected for analysis



This study accounts for several background characteristics that were included in previous literature. We report on the sample mean for woman's age at her last birth. Although women included in DHS data are 15-49, the reproductive calendar goes back to the five years prior to the survey, resulting in a younger cohort for the sample used in this study compared to the DHS data. None of the women in our sample were younger than 11 at last birth. We include age and age-squared in the model to account for the quadratic shape of the age curve (see Appendix A for a graph of age and postpartum family planning use).

Women's education is categorized as no schooling, primary school only, and secondary education or higher. Women's education was assessed at the time of the survey, and is being used here to control for postpartum periods occurring up to five years prior to the survey. Approximately 12% of the sample were less than 18 at the time of their last birth, so we can speculate that for these women there may have been a change in educational status between the last birth and the time of the survey. There is a possibility that for a small proportion of women, education status at time of birth was primary, yet they are categorized as secondary or higher in this sample. Without dates of school attendance, which are unavailable through DHS, we cannot confirm educational status at time of last birth; however, for the vast majority of women in the sample it is reasonable to assume the educational status did not change.

Wealth is defined as the five-category wealth index reported by the DHS for describing the sample. For logistic regression analysis, we collapsed the first ("poorest") and second ("poorer") categories, as their PPFP behavior is relatively similar. We also collapsed the third ("middle") and fourth ("richer") categories for the same reason. The fifth category ("richest") was left as it is defined in the wealth quintile index, as the women in this category are markedly different in terms of PPFP behavior than the other categories (see Appendix B). We assume wealth to be similar at the time of last birth and survey.

We included place of residence (urban/rural), categorized as such by DHS according to the location of the interview at the time of the survey. There is a possibility that between last birth and the time of the survey some women moved. However, it is reasonable to assume a roughly equal number of women moving into and out of rural areas, and for the purpose of this analysis, we consider urban/rural residence fixed.

Religion is another variable available in the DHS and included here (categories include Catholic, Islamic, Zionist/Pentecostal/Evangelical, Protestant/Anglican/other/missing, no religion). Catholic is the majority religion in our sample, and in Mozambique in general, and will serve as the reference category. Other factors selected for analysis include parity (sample mean reported, and parity categorized as 1-2, 3-4, and 5 or more children), and marital status (never/ever in union). We assumed these variables were fixed for the vast majority of the sample between the time of last birth and the date of the survey.

Place of delivery is defined as facility-based and home-based, coded "1" if the woman delivered in any type of public or private health facility and "0" if she delivered at home. Facility-based delivery may serve as a proxy for access to skilled birth attendance.

Women's fertility preference was categorized as wanting another child, not wanting any more children, and undecided. Women's fertility preference is asked contemporaneously at the time of the survey. It is reasonable to assume that some women's preferences at the time of last birth up to five years prior to the survey may change. However, we assume that women will change their minds in roughly equal amount to and from the main categories of wanting another child and wanting no more children.

Previous studies have found antenatal care (ANC) visits to be a significant predictor of postpartum family planning use. We included ANC visits as a continuous variable. Postpartum women with more than six ANC visits prior to her last birth were coded as six (see Appendix C for graph depicting ANC visits against postpartum family planning use). ANC can be considered a proxy for access to health services.

We included a binary indicator representing exposure to media messages about family planning (coded "1" if the woman reported exposure to print, television, or radio messages about family planning).

Finally, we included the variable measuring time since last birth. Because of the way the sample is constructed, the only women in the sample who gave birth in the early years of the sample are those who did not have a subsequent birth. In other words, the longer ago a woman delivered in the sample, the more months of observed infertility she has, and the higher the probability that this observed infertility is due to contraception use rather than random chance or being of relatively advanced age or infecundity. Additionally, the longer ago a woman's last birth, the less likely it was that she had access to contraception during the 12-month postpartum period (see Appendix D). We divided the sample into three cohorts of time since last birth (12-24, 25-42, and 43-60 months) to determine whether the coefficients were similar across groups (see Appendix E). The coefficients are similar across cohorts, indicating that it is appropriate to use the entire sample in our regression. However, to control for the number of months since postpartum women delivered, we included time since last birth in the model.

Table 1 describes the sample according to the background and antenatal care variables included in the analysis.[1]

Other data limitations

Recall bias is an obvious limitation considering that the reproductive calendar, including dates of birth, dates of contraceptive initiation, and types of contraceptive methods used, is based on self-reported memories of respondents. It is likely that more recent memories are more

[1] We considered including exposure to family planning messages through radio, television, or print media as a control variable. The Mozambique DHS asks about whether women have heard or seen such messages "in recent months," which means that exposure to media messages could have no impact on postpartum family planning use that occurred at least 12 months and up to five years prior to the interview date. We also considered variables related to family planning visitors and health facility visits at which women heard about family planning. These questions ask women to recall visits up to 12 months prior to the interview, again posing timing issues for a linkage with postpartum family planning use. Finally, knowledge of contraceptive methods, knowledge of a source for methods, and questions about knowledge of pregnancy risk were considered, but are asked contemporaneously, and so could in fact be an effect of postpartum family planning use prior to the interview rather than associated with its initiation. We considered using the variable describing who women report makes the decision about contraceptive use, though there were not enough decision-making data among the postpartum sample with reproductive calendar data to retain a large sample. Finally, we intended to use postpartum follow-up timing as a second independent variable, but there were no observations related to the time after delivery that a postnatal check took place in the DHS dataset.

accurate than those 60 months ago. However, it was imperative to the definition of "postpartum period" used here that we allow a full 12 months for women to initiate contraception after delivery. Thus, the data described here are based on women's recall of one to five years prior to the survey.

Analysis

To account for the complex DHS sampling design, we created a subpopulation to include postpartum women with a birth more than 12 months and less than five years prior to the survey. Because we hypothesized that factors associated with postpartum family planning use may vary by women's fertility desires, we create two additional subpopulations: one comprised of women who reported wanting another child, or "spacers" (those who would be using family planning for the purpose of spacing pregnancies), and the other comprised of women reporting a preference for stopping childbearing, or "limiters" (women who would be using family planning for the purpose of limiting future pregnancies). We weighted the data during analysis using the survey command in Stata/IC 13.1 for Mac (svy, subpop).

The proportions of postpartum family planning use at three, six, nine, and 12 months are described for the entire sample and both subpopulations (Figure 2 and Table 1). Descriptive statistics for the sample are included in Table 2. Pearson chi-squared bivariate analyses were conducted for each of the variables and the outcome postpartum family planning use during the 12-month period after delivery (Table 3). Bivariate analysis using analysis of variance (ANOVA) and two-group independent sample t-tests were conducted for each of the background variables and mean number of ANC visits (Table 4).

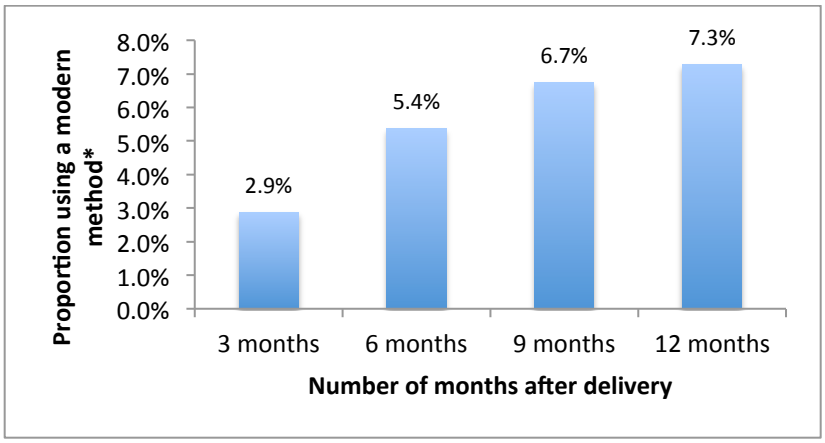
In building our logistic regression models, we included the outcome variable, modern postpartum family planning use at 12 months, with the background characteristics that had a p-value ≤0.20 in bivariate analysis and the antenatal care visits variable. We then ran the same regression among the subpopulation of spacers and the subpopulation of limiters, respectively. We used the Wald test to determine whether the categorical variables included in each model had significant explanatory power (education, religion, parity), and kept those with a p-value ≤0.20. We tested effect modification of antenatal care on poverty, home-based delivery, and rural place of residence. First, we tested each interaction term separately among the entire population, then we tested each interaction individually among spacers and limiters, respectively. We tested the interaction terms with the Wald test, and retained those with a p-value ≤0.05. Although lincom results for each interaction term are presented in Table 6, for the sake of brevity we will only describe and discuss those that are significant at the threshold of ≤0.05.

Logistic regression odds ratios, p-values, and 95% confidence intervals were used to assess associations between each variable, interaction term, and postpartum family planning use. We report on factors that met the threshold for significance with a p-value ≤0.05 and confidence intervals that did not cross 1.0.

Results

Of the 8,878 women in the postpartum sample, 2.9% used a modern method of family planning at three months, 5.4% at six months, 6.7% at nine months, and 7.3% at 12 months (see Figure 2). There were 5,142 women with reproductive calendar data who wanted another child ("spacers"), and 3,008 who did not want another child ("limiters"). At three, six, nine, and 12 months, limiters used family planning at significantly higher rates than spacers (Table 1).

Figure 2. Proportion of postpartum women (age 11-49) using a modern method of contraception at 3, 6, 9, and 12 months after delivery (N=8,878)



**Represents survey-weighted sample proportions*

Table 1. Proportions of postpartum family planning use among the entire sample, spacers, and limiters

Time postpartum	Entire sample (N=8,878) (%)	Spacers (N=5,142) (%)	Limiters (N=3,008) (%)
3 months	2.9	**2.4**	**3.7**
6 months	5.4	**4.7**	**6.7**
9 months	6.7	**6.1**	**7.5**
12 months	7.3	**6.7**	**8.1**

Proportions in bold font are significantly different (two sample test of proportions p≤0.05).

Background characteristics of the sample

The sample is described in Table 2 using chi-squared tests to assess the association between background characteristics, antenatal care visits, and postpartum family planning use. Sixty-one percent of the sample reported wanting another child ("spacers") while 32.5% do not want any more children ("limiters"). The mean age at last birth among the entire sample was 26, with spacers (24) younger than the average age of limiters (29). Over half of the women in the sample had a primary level of education, though 37.3% of women in the sample reported no education. As categorized by the DHS wealth index, the poorest category was the largest, with 23.3% of the entire sample (25.6% of spacers and 20.8% of limiters). The second quintile had 21.9% of the sample, 19.5% in the third, 19.8% in the fourth, and 15.4% in the richest quintile.

The majority of women (72.4%) lived in a rural area, while 27.6% were interviewed in an urban area. Catholics represented 28.3% of the women, while 18.2% were Islamic, 35.6% were Zionist, Pentecostal, or Evangelical, 7.9% were Protestant, Anglican, other or missing, and 10% reported no religion. Only 3.7% of women reported never having been married or living together as if married, while 96.3% either had been or were currently in union. Average parity was 3.9 for the entire sample, 3.3 among spacers, and 4.8 among limiters. About half of the women in the sample delivered their last child at home: 53.4% of the sample, 50.7% of spacers, and 57% of limiters delivered their last baby in a health facility. The mean number of ANC visits for all groups was 3.6.

Table 2. Characteristics of sample of postpartum women (age 15-49) (N=8,878)*, women who want another child ("Spacers") (N=5,142), and women who do not want another child ("Limiters") (N=3,008)

Variable	Category	Proportion (%)		
		Spacers	Limiters	Total
Age at last birth	(Mean)	24.0	29.0	26.0
Education	None	37.3	35.8	37.3
	Primary	51.4	53.2	51.6
	Secondary or higher	11.3	11.0	11.1
Wealth	Poorest	25.6	20.8	23.3
	Poorer	24.0	17.5	21.9
	Middle	20.2	18.6	19.5
	Richer	17.2	23.5	19.8
	Richest	13.1	19.6	15.4
Place of residence	Urban	23.8	35.6	27.6
	Rural	76.2	64.5	72.4
Religion	Catholic	28.5	27.9	28.3
	Islamic	19.3	15.9	18.2
	Zionist, Pentecostal, Evangelical	34.2	38.4	35.6
	Protestant, Anglican, Other, Missing	8.4	7.9	7.9
	No religion	9.6	9.9	10.0
Marital status	Ever in union	96.7	95.7	96.3
	Never in union	3.3	4.3	3.7
Parity	(Mean)	3.3	4.8	3.9
Facility-based delivery	Yes	50.7	57.0	53.4
	No	49.3	43.0	46.6
Fertility preference	Wants another	-	-	61.0
	Does not want another	-	-	32.5
	Undecided	-	-	6.6
Antenatal care visits	(Mean)	3.6	3.6	3.6

**Survey-weighted proportions are reported.*

Table 3 describes the distribution of women in the entire sample, and among spacers and limiters, by postpartum family planning use. This table presents the results of bivariate analyses of each variable and the outcome, modern postpartum family planning use at 12 months postpartum.

Among the entire sample in bivariate analysis, age, number of ANC visits, education level, wealth quintile, urban or rural place of residence, religion, marital status, parity, and facility-

based delivery were significant at a threshold of p-value ≤0.05 with PPFP. This means that postpartum family planning use varies across the categories of each of these variables. Fertility preference also met the threshold of ≤0.20 determined in the analysis plan, so it was included in the model.

All of the variables were significant with a p-value of ≤0.20 in the spacers subpopulation. Each variable except marital status was significant with a p-value of ≤0.20 in the limiters subpopulation, as well. The significance level for marital status was p=0.6481 among the limiters. However, because all of the variables were maintained for the other two populations, we elected to include marital status in regressions run for the limiters subpopulation.

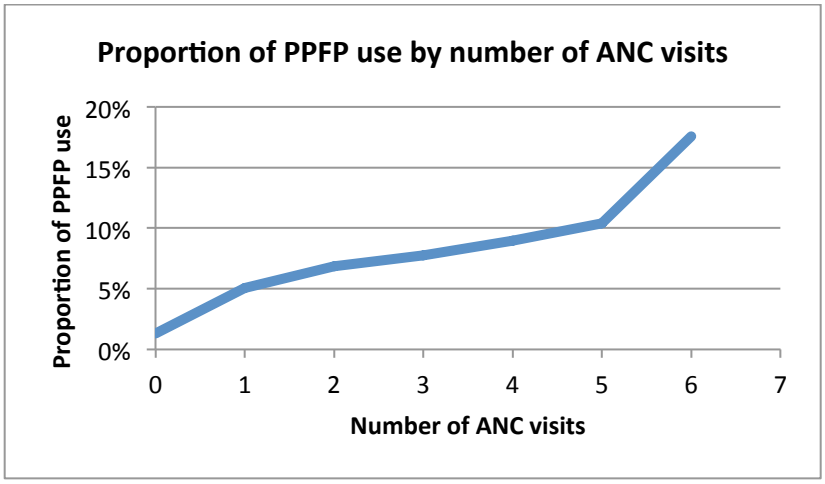
Table 3. Distribution of women by postpartum family planning use at 12 months postpartum and background characteristics among the entire sample (N=8,878), spacers (N=5,142), and limiters (N=3,008)

Variable	Category	Used PPFP (%)	P-value	Spacers (%)	P-value	Limiters (%)	P-value
Total sample		7.3		6.7		8.1	
Education	None	3.2	<0.0005	3.1	<0.0005	3.2	<0.0005
	Primary	6.9		6.1		7.8	
	Secondary or higher	22.6		21.3		25.4	
Wealth	Poorest	2.2	<0.0005	2.2	<0.0005	1.8	<0.0005
	Poorer	3.0		2.9		3.0	
	Middle	5.4		5.5		5.2	
	Richer	8.4		8.9		8.3	
	Richest	21.9		21.6		21.8	
Place of residence	Urban	14.1	<0.0005	14.3	<0.0005	13.8	<0.0005
	Rural	4.7		4.3		5.0	
Religion	Catholic	6.6	<0.0005	5.7	0.0185	8.2	0.0017
	Islamic	4.3		4.9		3.2	
	Zionist, Pentecostal, Evangelical	8.9		8.2		10.1	
	Protestant, Anglican, Other, Missing	7.6		7.3		7.6	
	No religion	8.5		7.5		8.4	
Marital status	Ever in union	7.1	0.0002	6.4	<0.0005	8.0	0.6481
	Never in union	12.2		14.6		9.1	
Parity	1-2	9.6	<0.0005	9.0	<0.0005	13.2	<0.0005
	3-4	7.6		6.3		10.0	
	5 or more	5.0		3.3		6.0	
Facility-based delivery	Yes	11.0	<0.0005	10.3	<0.0005	12.2	<0.0005
	No	3.0		3.0		2.7	
Fertility preference	Wants another child	6.7	0.1585	-	-	-	-
	Does not want another child	8.1		-	-	-	-
	Undecided	7.2		-	-	-	-

Use of antenatal care

The proportion of PPFP use by number of ANC visits is presented in Figure 3. While only 1.3% of women reporting zero ANC visits used a modern method of family planning during the 12-month postpartum period, almost 9% of women who received the World Health Organization-recommended minimum of four visits were using PPFP. Among women with six or more visits, 17.6% reported using family planning in the 12 months postpartum.

Figure 3. PPFP use by ANC visits



Characteristics of postpartum women according to their mean number of antenatal care visits are presented in Table 4. We used ANOVA and t-tests to determine the variation in ANC visits among groups.

The mean number of ANC visits varied significantly by age groups, with the oldest age groups attending the fewest ANC visits. The trend for ANC visits by education was as expected, with women with the highest levels of education attending an average of 1.2 more ANC visits than women with no schooling. ANC visits across wealth quintiles was also predictable, with the number of visits steadily increasing with wealth: the poorest women attended an average of 2.9 ANC visits, while the richest attended an average of 4.2. Women living in rural areas attended significantly fewer ANC visits than women living in urban areas. ANC visits also varied significantly across religious groups. Women who have never been in union were more likely to visits ANC more often than women who had ever been in union, and women with fewer children had significantly more ANC visits than women with higher parity. Women who delivered in a health facility reported an average of 3.9 ANC visits compared to an average of 3.3 visits among women who delivered at home.

Table 4. Results of bivariate analyses: Characteristics of the sample of postpartum women by mean number of ANC visits (N=8,727)

Variable	Category	ANC visits (mean)	P-value
Age at last birth	<20	3.5	<0.0005*
	20-24	3.6	
	25-29	3.6	
	30-34	3.5	
	35-39	3.5	
	40-44	3.3	
	45-49	3.1	
Education	None	3.2	<0.0005*
	Primary	3.6	
	Secondary or higher	4.4	
Wealth	Poorest	2.9	<0.0005*
	Poorer	3.1	
	Middle	3.4	
	Richer	3.8	
	Richest	4.2	
Place of residence	Urban	3.9	<0.0005**
	Rural	3.3	
Religion	Catholic	3.5	<0.0005*
	Islamic	3.3	
	Zionist, Pentecostal, Evangelical	3.6	
	Protestant, Anglican, Other, Missing	3.7	
	No religion	3.4	
Marital status	Ever in union	3.5	<0.0005**
	Never in union	3.8	
Parity	1-2	3.8	<0.0005*
	3-4	3.6	
	5 or more	3.3	
Facility-based delivery	Yes	3.9	<0.0005**
	No	3.3	
Fertility preference	Wants another child	3.5	
	Does not want another child	3.5	<0.0005*
	Undecided	3.1	

* Differences among groups tested with one-way ANOVA

** Differences among groups tested with two independent sample t-test

Factors associated with postpartum family planning use

Several factors were significantly associated with postpartum family planning use in the logistic regression model for the entire sample (Table 5). The odds of postpartum family planning use increased with each additional antenatal care visit (OR 1.17, 95% CI 1.10, 1.26), primary education compared to no education (OR 1.53, 95% CI 1.14, 2.06), secondary education or higher compared to no education (OR 2.66, 95% CI 1.84, 3.85), having no religion compared to Catholic religion (OR 1.83, 95% CI 1.29, 2.59), being in the richest wealth category compared to the middle category (OR 1.89, 95% CI 1.51, 2.38), and facility-based delivery compared to home delivery (OR 1.78, 95% CI 1.37, 2.30). Being poor (OR 0.56, 95% CI 0.41, 0.76) was associated

with decreased odds of postpartum family planning use. Age was significantly associated with postpartum family planning use as well, with a positive effect of age and a negative effect of age-squared, meaning that as women get older the effect of age is lessened (see Appendix A for the quadratic curve of age on probability of postpartum family planning use).

The odds ratio for ANC indicates increased odds for postpartum family planning use with each additional ANC visit among the entire sample, and among the sub-population of spacers (OR 1.20, 95% CI 1.08, 1.33) and limiters (OR 1.18, 95% CI 1.08, 1.30).

Facility-based delivery is associated with increased odds of postpartum family planning use among both spacers (OR 1.49, 95% CI 1.07, 2.08) and limiters (OR 2.26, 95% CI 1.41, 3.62) compared to women who delivered at home.

Table 5. Results of logistic regression model: Odds ratios of modern postpartum family planning use at 12 months controlling for selected variables in the whole sample (N=8,605), spacers (N=5,065), and limiters (N=2,951)

Variable	Category	Total sample			Spacers			Limiters		
		OR	P-value	95% CI	OR	P-value	95% CI	OR	P-value	95% CI
ANC visits		**1.17**	**<0.0005**	**1.10, 1.26**	**1.20**	**<0.0005**	**1.08, 1.33**	**1.18**	**<0.0005**	**1.08, 1.30**
Age at last birth		**1.20**	**0.005**	**1.06, 1.36**	1.17	0.080	0.98, 1.40	**1.40**	**0.002**	**1.14, 1.73**
Age-squared		**0.997**	**0.017**	**0.99, 0.99**	0.997	0.139	0.99, 1.00	**0.99**	**0.005**	**0.99, 0.99**
Education	None	Reference								
	Primary	**1.53**	**0.004**	**1.14, 2.06**	1.47	0.071	0.97, 2.23	1.56	0.061	0.98, 2.47
	Secondary or higher	**2.66**	**<0.0005**	**1.84, 3.85**	**2.43**	**0.001**	**1.43, 4.14**	**3.49**	**<0.0005**	**2.06, 5.90**
Wealth category	Poor	**0.56**	**<0.0005**	**0.41, 0.76**	**0.54**	**0.002**	**0.36, 0.80**	**0.52**	**0.020**	**0.30, 0.90**
	Middle	Reference								
	Richest	**1.89**	**<0.0005**	**1.51, 2.38**	**1.80**	**<0.005**	**1.30, 2.50**	**1.95**	**0.001**	**1.33, 2.87**
Place of residence	Urban	Reference								
	Rural	0.86	0.247	0.67, 1.11	0.79	0.190	0.55, 1.13	0.98	0.926	0.66, 1.50
Religion	Catholic	Reference								
	Islamic	0.83	0.331	0.57, 1.21	1.11	0.636	0.71, 1.74	0.53	0.073	0.26, 1.06
	Zionist, Pentecostal, Evangelical	1.22	0.082	0.97, 1.53	1.32	0.103	0.95, 1.84	1.26	0.216	0.87, 1.83
	Protestant, Anglican, Other, Missing	0.87	0.456	0.61, 1.25	0.98	0.948	0.60, 1.61	0.84	0.557	0.47, 1.50
	No religion	**1.83**	**0.001**	**1.29, 2.59**	**1.81**	**0.012**	**1.14, 2.87**	1.66	0.097	0.91, 3.00
Marital status	Ever in union	1.07	0.708	0.76, 1.49	0.92	0.699	0.60, 1.41	1.35	0.350	0.72, 2.52
	Never in union	Reference								
Parity	1-2	Reference								
	3-4	0.85	0.247	0.64, 1.12	0.90	0.591	0.60, 1.33	0.79	0.315	0.51, 1.25
	5 or more	0.73	0.074	0.52, 1.03	0.64	0.078	0.38, 1.05	0.77	0.339	0.45, 1.32
Facility-based delivery	Yes	**1.78**	**<0.0005**	**1.37, 2.30**	**1.49**	**0.018**	**1.07, 2.08**	**2.26**	**0.001**	**1.41, 3.62**
	No	Reference								
Fertility preference	Wants another child	Reference								
	Does not want another child	1.07	0.537	0.86, 1.34						
	Undecided	1.01	0.961	0.63, 1.63						

**Bold font indicates statistical significance at the threshold of p≤0.05*

Secondary education or higher predicted significantly higher PPFP for spacers (OR 2.43, 95% CI 1.43, 4.14) and limiters (OR 3.49, 95% CI 2.06, 5.90) compared to women with no education.

Living in poverty was associated with half the PPFP use compared to women in the "middle" category (scoring a three or four on the wealth index) ($OR_{spacers}$ 0.54, 95% CI 0.36, 0.80; $OR_{limiters}$ 0.52, 95% CI 0.30, 0.90). Being in the richest category predicted about twice as much use compared to women in the middle category ($OR_{spacers}$ 1.80, 95% CI 1.30, 2.50; $OR_{limiters}$ 1.95, 95% CI 1.33, 2.87).

The lincom results for each interaction term tested are in Table 6. In the entire sample, women who delivered at home experienced a per-visit difference of 1.30 times the odds of postpartum family planning use (p<0.0005, 95% CI 1.16, 1.45) (not shown) while the interaction effect of ANC visits on women who delivered at the health facility was 1.13 (p=0.003, 95% CI 1.04, 1.23). In other words, ANC visits had a bigger effect on postpartum family planning use on women delivering at home than women delivering at the health facility. Among spacers, the effect was the same: for women who delivered at home, postpartum family planning use was 35% higher with each additional ANC visit (p<0.0005, 95% CI 1.15, 1.58) (not shown), though the odds ratio for women delivering at the health facility was insignificant (OR 1.12, 95% CI 0.998, 1.28). For limiters, the effect of each additional ANC visit was not significant for women delivering at home, but women who delivered at the health facility were 18% more like to use postpartum family planning with each additional ANC visit (95% CI 1.07, 1.31).

Among the entire sample and the sub-sample of limiters, additional ANC visits did not have a protective effect for rural or poor women. However, for spacers, each additional ANC visit significantly predicted increased postpartum family planning use for both rural and poor women (OR_{rural} 1.26, 95% CI 1.10, 1.45; OR_{poor} 1.35, 95% CI 1.09, 1.66). These were bigger effects than were seen by their urban (OR 1.12, 95% CI 0.98, 1.28) (not shown) and non-poor (OR 1.15, 95% CI 1.03, 1.28) (not shown) counterparts.

Table 6. Lincom results for interaction terms

Interaction	OR	p-value	95% CI
Interaction effect of ANC visits among the entire postpartum sample			
Among women who delivered at the health facility	**1.13**	**0.003**	**1.04, 1.23**
Among women who live in a rural area	0.97	0.947	0.48, 1.97
Among women who are poor	0.49	0.062	0.23, 1.04
Interaction effect of ANC visits among spacers			
Among women who delivered at the health facility	1.12	0.054	0.998, 1.28
Among women who live in a rural area	**1.26**	**0.001**	**1.10, 1.45**
Among women who are poor	**1.35**	**0.005**	**1.09, 1.66**
Interaction effect of ANC visits among limiters			
Among women who delivered at the health facility	**1.18**	**0.002**	**1.07, 1.31**
Among women who live in a rural area	1.12	0.092	0.98, 1.28
Among women who are poor	1.15	0.193	0.93, 1.41

OR and p-values in bold are significant at a threshold of ≤0.05.

Discussion

The findings suggest that antenatal care use is significantly associated with postpartum family planning, even when controlling for background characteristics and other access-related variables like facility-based delivery. Data drawn from DHS do not elucidate the quality of antenatal care during the years captured by the reproductive calendar during the 2011 survey. However, antenatal care represents an area of opportunity for counseling women on the benefits of birth spacing considering that Mozambique only recently began strengthening its antenatal care program.

Mozambique adopted the World Health Organization's recommended model for antenatal care in 2008, but had difficulty scaling up the full suite of antenatal care offerings due to health workforce shortages and stock outs (29). The WHO guidelines for the antenatal care package include promotion of postnatal birth spacing and family planning (23). In 2014, four years after the data represented in this study, WHO and Mozambique began working together to improve the country's antenatal care program. A stronger antenatal care program may lead to increased proportions of women additional visits during pregnancy, which according to our findings will likely increase postpartum family planning use. We may also expect that with greater integration of the family planning and antenatal care programs, the effect size of the association between ANC and postpartum use will increase.

Antenatal care was a significant factor for postpartum family planning use among the spacer subpopulation. Additionally, the interaction of antenatal care and rural residence and poverty were both significant. These interactions indicate that, at least for spacers, interactions with providers prenatally are even more important for the rural poor than they are for urban and non-poor women.

Among the limiter subsample, ANC visits were significantly associated with postpartum family planning use. The interaction between facility-based delivery and antenatal care indicates a complex interplay between these two proxies for health services access. For women who delivered in a health facility, each additional ANC visit was associated with increased postpartum family planning use. For women who want no more additional children, interacting with the health system is of utmost importance.

Facility-based delivery may be even more important to addressing short birth intervals with postpartum family planning than antenatal care. Fertility-based delivery was significantly associated with higher odds of family planning use post-delivery among the entire sample (OR 1.78, 95% CI 1.37, 2.30), spacers (OR 1.49, 95% CI 1.07, 2.08), and limiters (OR 2.26, 95% CI 1.41, 3.62) with greater effect sizes than ANC in each sample. This may be because facility-based delivery is a proxy for skilled health service access in general. Or it may be that health workers assisting women at the time of labor and delivery are more apt to discuss family planning or provide contraceptive products before discharge. Though successes can be claimed, achieving ubiquitous facility-based delivery in sub-Saharan Africa has been notoriously difficult. In Mozambique, facility-based delivery increased from 49.1% in 2003 to 57.2% in 2011 (15). However, in our sample, facility-based delivery varies significantly by place of residence (rural/urban): while 80.4% of urban women deliver in a health facility, only 43.1% of rural women do. Strengthening health infrastructure, training skilled providers, outreach, and knowledge campaigns are critical to institutionalize facility-based delivery, without disparities based on wealth or geography, over the long term. Additionally, skilled birth attendants should receive continuous training on family planning counseling and product provision for women post-delivery. In the short-term, strategies that mitigate the challenges posed when women deliver at home are essential.

Other factors significantly associated with postpartum family planning use include young age at last birth, education, wealth, and having no religion. Clearly, efforts to improve women and girls' educational attainment and opportunities for economic strengthening are paramount. However, in the context of a low-income country that must make critical decisions about resource allocation, it is important to exhaust more easily achievable options for intervention.

Increasing contraceptive knowledge and understanding of the benefits of birth spacing may represent areas where programs can intervene with relatively low resource investment, compared to far-reaching education, poverty, or modernization investments. Unfortunately, the model presented here did not include knowledge variables reported before, during, or shortly after their last birth. However, we posit that place of residence may be a reasonable proxy for knowledge about family planning for the sake of discussion, where we understand rural women to have substantially less contraceptive knowledge than their urban counterparts.[2] This seems particularly true for knowledge about a source for modern methods, which is notably lower among rural women (8.4%) than urban women (26.7%). Investment in achieving increased knowledge among rural women, which we may consider relatively "low-hanging fruit," could have tremendous impact for meeting postpartum women's contraceptive needs, regardless of whether they want additional children or not.

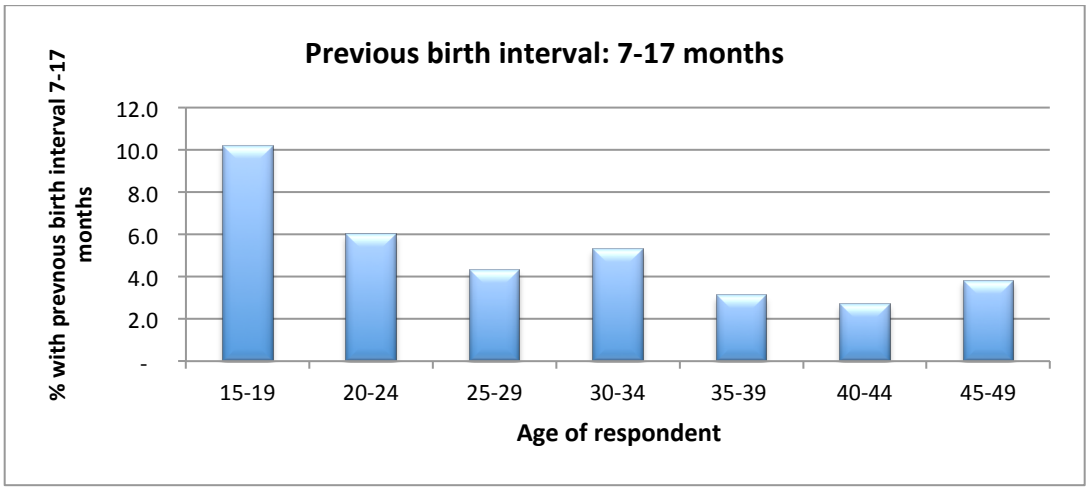
A clear area of focus for postpartum family planning strategies is among adolescent girls and young women. The entire sample included 22.2% 11-19 year olds, while 28.8% of the respondents who reported wanting another child were 11-19 at the time of last birth, and 10.7% of limiters were in the youngest age category. Being young was significantly associated with decreased odds of postpartum family planning use for the entire sample, spacers, and limiters. Pregnancies to women and girls less than 18 years are considered high-risk pregnancies (5,33). In Mozambique, the proportion of 15-19 year olds with children born 7-17 months apart is 10.2%, the highest of any 5-year age category (see Figure 4). If young maternal age is a risk factor for adverse birth outcomes, and 15-19 year olds report the highest rates of the shortest birth intervals, then there is an urgent need to supply girls and adolescents with the knowledge, products, and services they require to lengthen birth intervals to at least 18 months and even postpone first pregnancies until age 19 or older.

[2] Crosstabulations of place of residence and knowledge of a modern contraceptive method, knowledge of a source for a modern method, and knowledge of when during her ovulatory cycle she is at risk of becoming pregnant, respectively, demonstrates that contraceptive and pregnancy risk knowledge at the time of survey varies significantly by urban or rural place of residence (see table below).

Association between knowledge of contraceptives at time of the survey and urban/rural place of residence

Place of residence	Knows modern method (%)	P-value	Knows source for method (%)	P-value	Knows when can become pregnant (%)	P-value
Urban	98.3	0.0272	26.7	<0.0005	3.0	0.0318
Rural	96.3		8.4		2.0	

Figure 4. Proportion of DHS 2011 respondents reporting birth interval prior to their last birth of 7-17 months*



*Derived using the DHS statcompiler (15).

One strategy that may serve to reach adolescents, young women, and adults alike, regardless of where they delivered or how many antenatal care visits they achieved, is community-based distribution of contraceptive products and services. Community-based distribution has seen successes in improving contraceptive access to women in sub-Saharan Africa, including in Mozambique (34–38). More research is needed on the potential of community-based distribution to meet the fertility desires of postpartum women. However, the promise of community-based contraceptives distribution is in its ability to overcome issues of access to services, skilled health workforce shortages, facility penetration in hard-to-reach regions, and possibly client trust. Community-based contraceptives distributors can develop the capacity to simultaneously promote antenatal care and facility-based delivery. In Mozambique, the lowest level cadre of Ministry of Health worker, agentes polivalentes elementares, is being scaled up. Additionally, traditional birth attendants have demonstrated their ability to provide injectable contraceptives in a pilot study (37). The window of opportunity to emphasize the importance of community workers to reach postpartum women with family planning may be now.

Conclusion

The purpose of this paper was to assess the factors associated with postpartum family planning use, identifying potential spaces to improve access and meet the needs of postpartum women. Antenatal care visits and facility-based delivery are two service utilization variables that were significantly associated with increased postpartum family planning use. Other factors associated with use include young age at last birth, education, poverty, rural residence, some religions, and having five or more children. Efforts to improve development indicators like girls' education, economic strengthening, and expanding access to clinic-based health service delivery should continue. In the meantime, there may be a window of opportunity in Mozambique to reach postpartum women with contraceptive knowledge and products through

community health workers. Community strategies have the potential not only to improve postpartum women's access to contraception, but also to diminish the disparities in postpartum family planning use by age, geography, facility access, wealth, and education level.

III. "He does not carry them. I carry them alone": The process of family planning decision-making in the postpartum period

Introduction

The health benefits of birth intervals of at least two years have been well-documented, and the World Health Organization promotes family planning as a way to accomplish optimal birth spacing (7,39). The advantages of postpartum family planning use for improving the health and lives of women, infants, and children are recognized and promoted by government leaders, international and bilateral agencies, and program planners (8).

Women's access to and ability to use family planning is a potential pathway to increased empowerment. In rural sub-Saharan African communities, the decision-making power for contraceptive use typically rests with men (40,41). Kabeer (1999) notes that one definition of power is "the ability to make choices" given the possibility of alternative courses of action that are critical for people to live the lives they want (42). An accurate understanding of how women come to use contraception provides a window through which to understand gender and power in their communities. Empowerment in this context is about creating opportunities for disempowered women to leverage autonomy over decisions that are essential for a healthy life, such as postpartum family planning use.

Understanding cultural beliefs and norms about family planning decision-making is imperative to for family planning programs to extend access to the most remote women in the world. Describing contraceptive decision-making processes post-delivery may reveal potential strategies for improving postpartum women's access to contraception. This paper explores decision-making processes for postpartum women participating in a community-based injectables distribution project in two rural districts of Mozambique, to make visible the decision-making within gendered power structures and discover whether and where there are spaces to intervene.

Background

The benefits of family planning are well known. Current estimates indicate that contraceptive use has reduced maternal mortality by 40% globally in the last 20 years by reducing the number of unintended pregnancies and pregnancies to women with higher risk of adverse outcomes (1). Contraceptive use also contributes to reductions in infant mortality. An analysis of 52 national surveys estimated that infant mortality could fall by as much as 7.5% if women spaced pregnancies at least 24 months apart (43), an accomplishment made easier through access to modern contraceptives. Allowing women to space or limit pregnancies through the use of modern contraceptive methods can empower women to achieve their desired fertility, prevent deaths and disability that result from pregnancy and unsafe abortion, and may lead to broader benefits, such as increased education for women and children and enhanced economic opportunities (3). Despite progress towards increasing access to family planning globally, some countries in sub-Saharan Africa continue to contend with high rates of unintended pregnancy

and unmet need for family planning (44). In 2012, 35% of the 53.8 million pregnancies in Africa were unplanned (44), and 40% of women in sub-Saharan Africa had an unmet need for family planning (45).

Emerging literature on community-based distribution of injectables from sub-Saharan African countries (34)(46), and existing research on community-based distribution of pills and condoms underscores the potential of community health workers to overcome barriers to contraceptive use. Injectables are the fastest growing and most popular method of contraception in sub-Saharan Africa (15,38). Community-based distribution of injectables by trusted community health workers may be an effective approach to addressing the unmet need for family planning use across Africa.

Understanding the reasons for nonuse of contraception is critical to addressing unmet need. Structures of gender and power in sub-Saharan Africa influence who makes decisions about whether or not women use contraception. Indeed, one of the most frequently cited reasons for nonuse among women in Africa is spousal opposition (45). Men's preferences related to family size, birth spacing, and use of contraception influence women's family planning attitudes and behaviors (41,47). The Demographic and Health Surveys have been instrumental in our understanding of women's perceptions of their partners' approval of family planning, and women's reports of who makes decisions about contraception: women, husbands, couples, or other community or family members.

However, we know little of the details of these decision-making processes in the context of the use of injectables, especially in the post-partum period, and, more specifically, when contraceptive access is provided by community-based health workers. Injectables are touted for their potential to overcome challenges with facility access, as they only need to be resupplied every three months and can be distributed by community health workers. They may also be used covertly if necessary, potentially positioning injectable use at the crossroads of family planning, privacy, and autonomy. This raises questions fundamental to women's empowerment: specifically, whether or not there is a paradox in shifting injectable service provision, which we think of as private and confidential, to community-based health workers that embody the values of communities that are historically patriarchal and pronatalist. Research is vitally important to understand how women come to use injectables provided by other community members, and whether we are advancing women's autonomy by shifting injectable service provision to community-based providers.

Study setting

Mozambique, located on the southeastern coast of Africa, is currently piloting innovative approaches to overcome its family planning challenges. While the fertility rate in some sub-Saharan African countries has decreased over the past several decades, the fertility rate in Mozambique increased from 5.5 in 2003 to 5.9 in 2011 (14), with the highest levels of fertility found in rural areas (TFR 6.6) and among the poorest (TFR 7.2) and least educated women (TFR 6.8) (15). The proportion of married women age 15-49 using a modern method of

contraception decreased from 20.8% in 2003 to 11.3% in 2011, again with inverse relationships to rural residence, education, and wealth (14). At 23.9%, Mozambique has relatively high unmet need, particularly when compared to the average for developing countries, approximately 12.8% (11).

In response to the lagging progress in family planning indicators, a project in two districts of rural Mozambique is testing a community-based injectables provision model using community health workers. This community-based injectable contraceptive provision project was implemented from February 2014 – April 2015 in Montepuez and Chiure districts in northern Mozambique (the "parent study")(37). The parent study explored the safety, efficacy, and acceptability of community health workers providing injectable contraceptives at the household level. It employed community health workers known as agentes polivalentes elementares (APEs), who act as the unofficial lowest level cadre of the Ministry of Health workforce, and traditional birth attendants (TBAs), who are important members of their communities, but are not associated with the Ministry of Health. Most of the APEs are men, and thus higher up in the hierarchal structure of village society, and APEs are more educated than TBAs. TBAs are trusted members of their communities who guide women through pregnancy, childbirth, and the postpartum period. The parent study provided an opportunity to interview a subset of postpartum women and their community-based providers about a range of topics, including family planning decision-making, the results of which comprise the study presented here.

Methods

Sampling

The study population for in-depth interviews with postpartum mothers consisted of adult women of reproductive age (18-49) of all races and ethnicities, who delivered 12 months or less prior to enrolling in the injectables provision project, and were receiving injectables from either an APE or TBA as part of the intervention during the data collection period. The study population for in-depth interviews with community-based agents consisted of TBAs and APEs age 18 and above delivering injectables through the intervention. TBAs were female, while APEs were both male and female. All interviews were conducted in the preferred language of the participant, which was either Portuguese or the local language of Macua.

We used a purposive sampling strategy and made an effort to sample similar numbers of each subset of participants. The first author interviewed 15 TBAs, 13 clients of TBAs, 11 APEs, and 8 clients of APEs. All TBAs and APEs in the project were eligible for participation. Eight of nine villages in Montepuez were visited, and we randomly selected five of 11 villages in Chiure to visit. The nurse supervisors in each of the selected villages were called and asked to request that the TBAs and APEs serving those villages travel to the health facility on a pre-determined day. TBAs and APEs were asked to invite one client for the interview as well. This may have influenced the sample in that TBAs and APEs may have invited particular types of women to participate. Despite this limitation, this was the best access the authors had to the client

population as recruitment in these remote areas was challenging. All TBAs, APEs, and clients who were available were interviewed.

Data collection

We conducted in-depth interviews in private spaces where confidentiality was assured, led by the first author and a trained male Macua/Portuguese/English-speaking translator. We were unable to find a female translator with all of the language, education, and transcription requirements, which may have presented limitations for conducting open discussions with participants. A thematic, open-ended interview guide prompted women and providers to tell their stories about postpartum family planning. Interviews lasted 20-60 minutes. Interviews were respondent-driven with an emphasis on the respondent as the expert in the themes and issues the interviews discussed. All interviews were audio recorded. Macua interviews were translated into Portuguese audio files. Audio files were transcribed into Portuguese and translated into English. The author selected a random subset of translated interviews to verify against the Portuguese audio recordings to ensure quality of translation.

Data analysis

All interviews were entered into Atlas.ti for analysis. A modified grounded theory approach was selected as the methodological foundation for conducting analysis (48). We coded all interviews using inductive coding, identifying major categories that emerged from the data. We developed a codebook, entered into atlas.ti for use in coding the data. Codes were agreed upon among the authors after the first author coded five interviews, and discrepancies in assigning codes were resolved with discussion and revisions to the coding scheme when necessary. For this paper, we analyzed codes related to decision-making. We present the results of this analysis illustrating decision-making in the postpartum period and the process of women's and providers experience with postpartum family planning.

Ethics statement

The National Bioethics Committee for Health (Mozambique Ministry of Health) and the University of California, Berkeley's Committee for the Protection of Human Subjects approved the protocol for this study (CPHS/OPHS Protocol ID: 2014-02-6044). All of the respondents for the study provided written or oral informed consent before participating. Personal identifiers were not collected.

Results

Results from interviews with women and their community-based providers are presented together below to demonstrate, first, community norms about postpartum family planning use, and second, the decision-making process for postpartum women. It is important to note that ideas are diffused through conversations and social interactions, and those interactions have been shown to change patterns of contraceptive use and fertility change (13,14,15,17,18).

Social interaction is a driver for fertility change through the exchange of ideas, the joint evaluation of information by social actors, and the impact social influence and perceptions have on encouraging or constraining behavior related to contraceptive use (51).

Community views on postpartum family planning use

Women and providers reported that spacing births has become a community value. Family planning is seen as a tool that can promote the health of women and families through birth spacing, and thus social norms are currently undergoing a shift among respondents and their social networks towards more support for women's use of postpartum family planning.

At its most basic, social interaction, such as discussions between community members, related to family planning can serve to alert members of a social group about the availability of a contraceptive product. In Mozambique, women spoke with providers, other women, and men about the health and social benefits of using family planning. Women and community-based providers reported that men heard about family planning from providers and village leadership. Discussions between community members spread information about who is and is not using contraception, and which key social players approve. They facilitated the exchange of more abstract ideas about contraception, such as when women should become pregnant again after delivery, expectations for the growth of children or the health of mothers in the postpartum period, and the benefits of using contraception, from the ability to work in the field, to the greater good of Mozambican society. As in the example below, discussions may play a role in dispelling myths and misperceptions about contraceptive side effects.

> *I: Amongst themselves, do women talk about family planning?*
> *R: Yes, they usually think about it when they meet. They talk where they meet and tell each other…They make noise; they ask if you took the shot. And one says yes, I have taken it. Did you? And one says yes, I took it. Where did you take it? And the person says at the [clinic]. Those who do not take it say they are also going to take the shot.*
> *(Mama 11)*

> *There are those who do not believe but are not many. They talk about [injectables] as I mentioned earlier. Others say we are not going to have more children. Some who do not understand think they will never have children again when they take the shot. There are those who say I want to take the shot. Now they say look at me, because of this [injectable] I am fat. They tell friends. They even meet among themselves talking about the shot. Then some come and say I did not know about this.*
> *(TBA 9, female)*

The evidence shows that many women consider using injectables after observing peers who benefit from use. Women observed early adopters, carefully noting her side effects, changes to

her body, and any negative responses to the contraceptive. The TBA in the quote above alludes to the positive benefits of injectables for birth spacing when she says women say "I am fat," meaning women enjoy the fact that their bodies have become nourished and strong with the injectable. They evaluated the benefits and drawbacks that they observed in conversations with other community members.

Most importantly, respondents reported noticing that women were spacing subsequent pregnancies, allowing their bodies to recuperate and their babies to grow before becoming pregnant again. Providers emphasized the health benefits of injectable use, and women noted changing community expectations in birth spacing. Mothers and providers evaluated injectables using a health rationale. It was understood that children's health is adversely affected by closely spaced pregnancies, therefore injectables were judged to promote infant and childhood health.

> *The woman gets healthy and strong. It is really a good thing. That is why people come for the shot. They like it. It is like clothing. When you first buy it people say it is not good but when you wear it and it looks good on you, people will say, I want it too. Does it not happen?*
> *(APE 2, female)*

> *Those who do not take the shot ask each other, what is happening with that woman who used to have children every year but she stopped? Then they talk to her about it. She says I went to the APE and I have this method that I am using. After that conversation, they come and say, I want it too. I want to be like my friend.*
> *(APE 8, male)*

> *Now women do not get pregnant while the baby is young.*
> *(TBA 1, female)*

> *Now there is a difference [from before the injectable project] because children grow and many women like it. And many men like it too. They say, if my wife comes by, she should take the shot because the baby grows and there is no suffering…I sleep well with my wife, the baby grows well. My wife would be pregnant by now.*
> *(APE 10, female)*

Respondents underscored the transition in community norms around birth spacing by describing the social stigma that is attached to close birth intervals, which was recognized in interactions with family and friends. For example, one woman reported wanting to use the injectable so that she did not become pregnant quickly after her last delivery. She did not want to feel stigmatized by her social circle for being sexual and not putting her children's needs first. Indeed, several women revealed that because close birth intervals are undesirable for mothers' and children's health, closely spaced births were cause for shame.

I: What does your family think about you doing family planning?
R: They think what I think: that I should be ashamed, pregnancy, after another. You should go there too.
(Mama 3)

I tell myself, let's go to the hospital to take the injectable for my child to grow so my friends do not laugh at me that, look, she is having sex while her child is still young.
(Mama 1)

According to most respondents, community ideas about birth spacing and using injectables to promote women and children's health were undergoing a transition. The direction of this shift supports women's use of postpartum family planning.

Decision-making

The question remains, if postpartum family planning has become a reasonable means to space births, and birth spacing is increasingly desirable, can women simply decide to use the shot? In short, more acceptance for postpartum injectable use has not translated into increased autonomy or decision-making authority for women. There are two scenarios that can result in a woman's use of postpartum contraception evident in the data: husband-initiated and woman-initiated postpartum family planning.

Husband-initiated postpartum family planning

Many respondents reported that as the head of the household, husbands have sole decision-making authority on issues of family planning. For some women, this meant that the husband suggested that she begin using family planning. In line with the changing community values explored above, some men suggested contraception so that the index child could grow strong. Others expressed a desire for the woman to rest, acknowledging the difficulty of pregnancy, childbearing, and caring for young children. When we asked these women about the decision-making process in her household, there was a clear indication that her husband initiated postpartum contraception use. Many providers also discussed family planning as husband-initiated.

[My husband] says, "My wife, let's take a break because [with] this child that I have, I suffered. That is why we should rest having children. We are going to have more in the future. Now you should take a break."
(Mama 5)

My husband told me to go take the injection. The baby will grow well and we can have another child well.
(Mama 7)

R: The one I give the shot? The husbands are the ones who decide. They say, "My wife, you have been having children a long time now. Go take the shot." He believes.
I: If they do not agree with each other?
R: There is no such thing as no agreement. They come when they have already agreed with their husbands.
(TBA 10, female)

Theoretically, women in this scenario could refuse to use contraception. Because this sample only includes women who are currently using postpartum injectables, there are no women in this study who refused her husband's suggestion. However, it is unclear whether women in these communities have the autonomy to refuse.

Woman-initiated postpartum family planning

The second scenario is woman-initiated postpartum family planning use. In some instances, women reported that they were the one who made the decision. In fact, when the woman was the member of a couple who conceived of using family planning in the postpartum period, there ensued a process of approval-seeking, negotiations, and sometimes mediation before she approached a community health worker for the injection. In this scenario, the woman conceives of using family planning during her postpartum period, in some cases because she heard about it from a friend, community-based provider, or at a community meeting. In some instances, she thinks about it, she approaches her husband, and negotiates with him to obtain his approval.

For example, some women reported approaching husbands with a proposal, and allowing him to respond to her suggestion. In the first example below, the woman approaches her husband because "controlling the child," allowing it to grow healthy, is the husband's responsibility. She is making a link between contraception and birth spacing, implying that preventing pregnancy while the child is young will help the child grow strong. She reports that using family planning was her and her husband's idea together. In the second example, the woman presents her husband with a desire; she wants to prevent pregnancy in order for her body to "rest." She encourages his approval by intimating that others are using it and are benefitting from it, again underscoring the importance of shifting community norms about family planning.

R: He does not think anything. His job is to control the child and he can say wait, let the child grow. Other do not agree. That is why I thought, I prefer to go there so the child could grow…It was mine and my husband's idea.
I: If there is no agreement in the family, who decides?
R: The husband has the last decision.
(Mama 2)

I: Explain what you told him and what he told you?
R: I am the one who told him I want to rest. He said, "you want to rest? What do you want? Do you want to take a pill or the shot?" I said I heard people are taking the shot and it does them well, I want to try it too. And he said go.
I: If the husband refused what would you do?
R:I would stay.
I: Stay how?
R: Without taking the shot.
(Mama 13)

These reports indicate three important concepts: one is that though the women initiated the process, she still seeks out her husband's approval to execute her idea. Secondly, obtaining husband approval is a process of negotiation between the couple. Finally, the diffusion of information about family planning benefits is important at the individual level and the interpersonal level when women are negotiating with their husbands.

Community-based providers reinforced male decision-making by requiring it before administering the shot. The language used by providers often referred to "agreement" with the husband, but in fact, almost all providers confirmed that without husband "agreement," injectables could not be delivered. In practice, "agreement" was approval from the husband. Many providers required that the husband be present to give consent prior to the woman receiving her first injection. For all providers, there was an expectation that husbands had authorized injectable use. We can see in these examples that male authority for women's contraceptive decision-making extends beyond the household into the interaction between women and their providers.

I: What do you do if a woman wants the shot without her husband?
R: I cannot accept, only when both husband and wife come.
I: If she brings her husband, what are you going to say to the couple?
R: I will first speak to the woman, ask her what she said the previous day. So she will initiate the conversation. Then I will ask the husband, did you hear your wife? That is why I called you. She wanted to do it alone, but I could not. So I had to call you here to witness and to know that you have accepted.
(APE 5, male)

In another variation of the woman-initiated scenario, the woman approaches her husband with the idea, but he does not allow her to use family planning. Although no women in our sample reported this experience, many told stories about others who faced this obstacle. They reported that if a woman met with disagreement at home, she may have recourse to change his mind. She could appeal to other community members, including the husband's family or the village leader, for mediation. This often took the form of counseling the man about family planning until the woman's decision prevailed.

I: If your husband denies you to do family planning who is the last to decide?
R: There is his uncle, [or] my husband's grandfather.
(Mama 8)

The woman wanting and the man not? If he does not want, you are going to find the people in charge. Then he will no longer say do not go. So, if you go to those in charge, he will end up accepting you to go.
(Mama 17)

There was [in the past men who did not allow injectable use]. Later the village chief criticized [them] during meetings and said that the government organized this to prevent early pregnancy while your baby is still breastfeeding because now the baby should breastfeed for two years. So, family planning defends your baby so the baby does not stop breastfeeding early. The village chief said that he will call those who prohibit their women to go to the APE to take the shot, to say you do not let Mozambique grow. This way you are acting like a criminal. From there, men changed. It happened [men prohibiting injectable use] in the beginning, but they do not prohibit now.
(APE 11, male)

Village leaders may be able to exert additional social pressure due to their role in the community structure. Encouragement or chastising from village leaders could substantially support women to use postpartum family planning. By invoking a nationalist identity and goal of healthy growth, the APE heard the chief do more than sanction contraceptive use for child spacing. The chief's words indicate that for men to prohibit it would be unlawful, or at least unacceptable.

It is clear that the custom of male decision-making about family planning continues to pervade the rural communities where this project was implemented. Perhaps more importantly, norms about women's agency over reproductive decisions are not confined to the household level, but rather reach out into the community, compelling APEs and TBAs to reinforce male decision-making. However, at almost every decision point along the woman-initiated process of decision-making, women may have the option to bypass husband approval and seek out covert contraception.

Covert use

When the woman is the one who conceives of using postpartum family planning there are multiple decision points, and at each one she has the option of approaching her community-based provider and requesting the injection in secret. Covert use of contraception is a well-documented phenomenon (54), though in this context it was not a straightforward service offering. Even after deciding that she will use contraception covertly, a woman must have the support of her provider, and there was substantial variation in providers' approaches to giving the shot in secret.

The primary assumption behind men as decision-makers is cultural: as the head of the household, men are authorized to make determinations about family matters. This premise was evident among providers. When asked about giving injectables covertly, most providers initially said they would refuse, for fear of challenges that would arise with the husband, the police, or local governance.

> *I: Imagine if tomorrow a woman came to your house and says, matron, give the shot, I want to rest but my husband should not know. What can you do?*
> *R: I do not give her the shot because I am afraid of her husband.*
> *I: What do you think is going to happen if you give her the shot without her husband knowing?*
> *R: When she gets home people will know. There is no secret in this world. Someone will tell her husband that I met your wife at the matron's house when she was taking the shot. When he hears that, I am afraid that he will beat me up. (TBA 14, female)*

Other underlying assumptions about women who wanted to use injectables without husband approval drew upon a documented myth about the association between family planning use and promiscuity (55). This is the idea that women who want to have sex outside of marriage are protecting themselves against becoming pregnant by a man other than the husband. There is no evidence to support this link. Despite this, it is a myth that is perpetuated by community-based providers.

> *I: How does a woman do family planning without her husband knowing?*
> *R: What do I think about that? The majority are those women who have relationships. Such woman says, that lover of mine should not impregnate me. So, I rather take the shot. If I know that she is coming from her home, I just do not accept because I am afraid.*
> *I: What are you afraid of?*
> *R: To be beaten up. Sometimes the man may come early in the morning to beat me up, because I will have advised them but the man said, I do not want. I can advise him the second time saying; you will not stop making babies. This does not prohibit you from making babies. The person has to look at themselves and decide to wait at least three years to recover strength, but the husband says, not my wife.*
> *(APE 2, female)*

> *There was one woman who came and I denied her. I told her I do not want because your husband will come fight with me. She insisted that I give her secretly. I said you should let your husband know. If I give the shot, who are you going to sleep with? …Your husband has prohibited you. You have to bring your husband here so he can agree to this. And from then she did not come back. (TBA 11, female)*

On the other hand, some providers stood on the professional mission of their training as health workers to justify overruling husband prohibition. Several providers justified covert use with arguments about the health of mothers, babies, and their position as health workers, the benefits to families, and to Mozambique in general. Respondents reported that as health workers, they know what is best for the health of women and children. Therefore, they were justified in providing covert injectable using a moralistic health framework.

> *I: What will happen if the husbands of those women, who do family planning without their husbands knowing, find out?*
> *R: He will quarrel with his wife. I will not to be blamed because I am doing work for the health department. If they argue, I will tell them not to do it anymore. If she was doing it secretly, I will tell her to stop it.*
> *(APE 3, male)*

Half of the providers reported that if there were an assurance of secrecy between the woman and provider, they would give the shot covertly at the woman's request. This is in contrast to traditional ideas about husband decision-making in family planning. This scenario may be related to the respected position of APEs in the community. It may also be represent power dynamics related to gender or education, as most APEs are men and have met a minimum level of formal education. However, there were female APEs and TBAs who were willing to give injectables secretly in hypothetical situations, using the same reasoning as male APEs.

Allowing women to use injectables covertly affords them the autonomy to choose their own reproductive path. Women and providers justified this breach in the cultural norm with arguments about who *ought to* have the power to decide on a woman's fertility, rather than who *actually does* based on the lived experiences of pregnant, childbearing, and childrearing women. The example below traces the provider's thought process from denying covert use, and the reasons for that decision, through to provision of the injectable in confidence with the client. Both of the examples that follow demonstrate providers' justifications of giving the shot covertly based on a woman's right to defend her health.

> *I: If a woman came and she wanted to take the shot but her husband does not approve, what do you do?*
> *R: I ask her to go back because I am afraid of problems. He will say I did not authorize. I tell her, go talk with your husband. Come together and I will administer it…If I accept what she wants without her husband knowing and give her the card and the husband finds out, he will ask me, why you accepted to administer the medication without my authorization? Because I married her and a married woman is under her husband's responsibility, for he takes care of her. This is our culture…*
> *I: If a woman came tomorrow, for example, to ask you to give her the shot and says, please keep it secret, I will also keep secret, what are you going to do?*
> *R: I will administer it.*
> *I: Why will you administer it?*

R: If she is going to keep it secret and she wants to defend her health, I will feel sorry for her and have to administer it. I should keep her control [her follow up date] in my mind. I will not give her the [follow up] card.
I: What are you going to do if the husband finds out?
R: It is a problem but he will not find out if she keeps it secret. He will not discover.
(APE 8, male)

I: What do you think about a woman that does family planning without the husband knowing?
R: What I think? I think that I cannot impede. It is better to take the shot. She is the one who is going to feel the pain. Because giving birth is hard. It is for her to rest a little. The daughter should grow a little. Now when a man confuses and says you should have children now, say no, this baby is still young, and you want me to get pregnant while this one is young? That is why I tell them keep [hide] this letter [follow up card]; keep [hide] it very well.
(TBA 1, female)

Once the threat of discovery and altercations was reduced by assurances from the woman that she would keep her contraceptive use a secret from her husband, many providers were willing to provide the injectable in secret in hypothetical and real situations. The same providers who first asserted the rigid requirement for husband approval admitted that they would break that cultural code if the risk to their reputation or personal safety were diminished. Most frequently, the reasoning for this breach was due to providers' ideas about who ought to be making the decision about a woman's reproductive health. Providers justified their support of covert use with arguments about the difficulty of childbearing. Among male and female providers, there was a strong suggestion that because women embody the pain and labor of childbearing, they ought to be the ones with decision-making autonomy for avoiding it if they choose.

Postpartum women also justified covert use on the basis of suffering and responsibility for childcare. Many women reported that they used the injectable in order to take a rest from the practice of incessant childbearing. They mentioned many benefits to injectable use, including healthier women and children, having older children help with babies, and the ability to return to work in the field. For some women, there was a clear link between the difficulty of childbearing and the right to make decisions about injectable use, even if that meant using injectables in secret.

One…thinks of saying that he should not know. When he knows, he prohibits me to go. When one goes secretly, on the way back she will hide the prescription from the in-laws. The in-laws like to have grandchildren. So when babies are big one has to go take the injection. The husband prohibits, but when one has two small children, he does not help me carry them. I carry them alone.
(Mama 1)

Discussion

The sample consists of women who successfully initiated injectable use during the 12-month postpartum period, so their perceptions of postpartum family planning and spousal communication practices are not representative of all women in their communities. However, the data are useful for understanding the potential for changing social norms and decision-making processes for postpartum family planning.

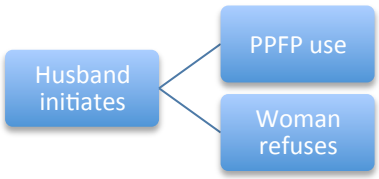
Community-based providers, especially TBAs because of their proximity to pregnant and delivering women, may be well positioned to improve postpartum women's access to contraception. We may already be seeing the effect of having knowledgeable, trained family planning agents and access to injectables in communities through the shifting social norms about birth spacing described above. Community values about birth spacing may present opportunities to support women in their decision to use postpartum injectables.

However, decision-making about postpartum contraceptive use operates within the structures of household and social roles for men and women, which apply to community-based providers as well as couples. The question is whether programs like this one can engender the support women need to make contraceptive choices within existing household and societal structures of dominance.

Many women reported that the husband was the head of the household with sole discretion on issues of family planning. This aligns with much of the literature on decision-making in family planning (Adongo 2013, Farmer 2015). However, there is a discernable process of decision-making that involves a sometimes complicated set of decision points for approval-seeking, negotiations, and mediation. Understanding this process allows us to see the potential spaces to develop a more supportive environment for women.

In the first scenario, depicted in Figure 1, the husband suggests the use of postpartum family planning. In numerous instances, this was prompted by information about the benefits of delaying pregnancy in the postpartum period for women, infants, and children.

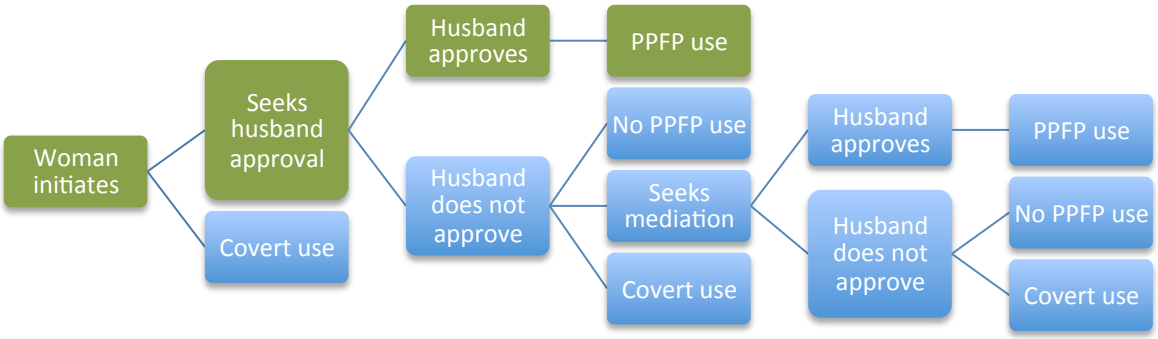
Figure 1. Scenario 1: Husband-initiated postpartum family planning decision-making process



In the second scenario, the woman is the member of the couple who conceives of postpartum family planning use. She then has two options: she can either seek out husband approval, or bypass husband approval and request covert injection from her community-based provider. If she seeks her husband's approval, he can either allow her to use contraception or not, in which

case she can either decide not to use the shot, seek out the shot covertly, or seek our mediation from another community member. If mediation is successful, the woman may seek out the injectable. If it is not, she can either decide not to use family planning, or request it in secret from her provider.

Figure 2. Scenario 2: Woman-initiated postpartum family planning decision-making process



The green boxes in Figure 2 above represent a series of interactions that women in this sample reported as joint decision-making. This is critical information for policymaking, programs, and research that rely on survey data about decision-making for contraceptive use. If the woman seeks approval and receives it, that was often considered by the women in our sample to be a jointly made decision. However, if she seeks approval without receiving it, decision-making is a more complex process, potentially involving families, community members, and village leadership. The categories for decision-making that we currently employ in national surveys may be inadequate for capturing the sophisticated interactions that may or may not lead to contraceptive use.

In a context of constricted autonomy for women, it is critical to investigate fissures in the process where programs can support women to live the lives they choose. In scenario two, there are opportunities for promoting women's decisions to use postpartum family planning through supporting community-based providers as agents of change, involving men, and educating communities. There are opportunities for intervention that could ignite this process to unfold, and assist women to be able to use family planning at each of the decision points along the continuum.

Implications for programs

The postpartum period may be the path of least resistance to broad acceptability of family planning in rural Mozambique. The postpartum period holds tremendous potential for spreading information and ideas about family planning as a mechanism for promoting health. Leveraging community-based providers as sources of information and education may prompt women and men to initiate postpartum family planning. Providers may focus on why family

planning is important in the postpartum period to generate community support for women when they require mediation in the decision-making process. The concept of "suffering" – of women enduring the discomfort, pain, and commitment of pregnancy, delivery, and childrearing – is well understood in the community. Providers may be able to dispel myths that women seek family planning in order to have sex outside of marriage. At the same time, the idea of allowing a child to grow before becoming pregnant with another is taking hold among women and men, and is propelling a change in social norms about birth spacing that may support women to use postpartum family planning. Programs should promote the health and social benefits of postpartum family planning through community health workers.

Education campaigns in communities emphasizing the importance of birth spacing are a powerful tool. It may not change community views on decision-making authority for family planning, but can immediately begin to create support for women to use family planning if they choose to. It is crucial to engage society leaders to endorse postpartum family planning use, encourage individuals to adapt this new behavior, and show a willingness to facilitate conversations between couples. Community-based providers can be trained to engage community leaders, facilitate community meetings, and provide ongoing counseling for individuals and couples to have all the information they need to make a decision about contraception.

Male involvement is imperative. Village leaders can exert social influence on men by publicly approving of female decision-making, including in cases of women's covert use when husbands disapprove. Providers should be trained and supported to speak with husbands, provide couples and individual counseling, and enlist the support of community members when mediation is needed.

Finally, training for community-based providers could include information and support for seeing each client as an individual, with individual needs and challenges. Community-based providers navigate complex decisions between individual autonomy and cultural norms. As we see in Mozambique, providers often limit contraception to those who can prove husband compliance, often to reduce perceived physical and social risks to themselves. This issue has real life ramifications for women who want to space or limit pregnancy, but do not meet the "eligibility criteria" imposed by community-based providers. Because they work and live in the communities they serve, community-based providers need additional skills in provider-client privilege, facilitation, and negotiation. Community-based providers should be trained in how to best solicit and get husband approval, and they should have a clear idea of what the program expects of them regarding covert use.

Implications for future research

To our knowledge, a mapping of the postpartum family planning decision-making process has not been conducted in the literature. A key finding of these data is the importance of social mediation in husband approval-seeking. Understanding more about mediation and negotiation in family planning decision-making could reveal program strategies that enhance community

support for women who choose to use postpartum contraception. This may include asking different questions about the specific components of woman-reported "joint decision-making," husband approval-seeking, key community influencers, social mediation in couples' decision-making processes, and counseling and negotiation facilitated by other community members.

More research is needed to understand the way gender, education, and other structures interplay with women's autonomy. For example, in our small sample we found that more APEs than TBAs were willing to provide women with covert injections in real and hypothetical situations. More research is needed to investigate this potential difference between APEs and TBAs. However, if APEs are truly more apt to allow women to make their own contraceptive decisions, policy makers and programmers may want to invest more resources on scaling up community-based injectable distribution by APEs. If the mechanism for APE facilitation of women's autonomy is based on perceived institutional support from the Ministry of Health, perhaps there is an argument for incorporating TBAs into the MOH structure and providing the same sanctum to allow for TBAs to breach the traditional power framework.

The difference found between APEs than TBAs in terms of secret-keeping may be related to role in the community, gender dynamics, and education. Most of the APEs are men, and thus higher up in the hierarchal structure of village society, and APEs are more educated than TBAs. It is possible that rather than highlighting a potential area to expand women's autonomy, this phenomenon is an extension of gendered power structures, where men (in this case APEs rather than husbands) make contraceptive decisions for women. However, there were certainly exceptions: several female APEs and TBAs were willing to provide covert contraception, citing the same justifications as male APEs. The sample was not large enough to make generalizations or explain the exceptions, though it is worth investigating whether gendered structures of societal power, differential levels of education, or something else can explain the willingness of community-based providers to give injectables covertly. These mechanisms are an area for further study that could have implications for creating community-based programs that are able to shift the power imbalance in favor of women's autonomy.

Conclusion

This study demonstrates how the power dynamics in households affect both women's contraceptive decision-making and the provision of contraception through community-based providers. The information presented here highlights that in many cases, women who want to use family planning have a complicated series of decision points to navigate that deviate from the way researchers and program planners typically understand "joint decision-making." The DHS survey questions related to household decision-making ask "who has the final say" in a series of household and health related questions, with the responses being "respondent," "husband/partner," "respondent & husband/partner jointly," "someone else," "respondent & someone else jointly," or "decision not made." In the case of our sample in Mozambique, it is clear that most women would respond that her husband has the final say. However, the process of female decision-making, negotiation, and community involvement that some women traverse in getting to the "final say" is much more complicated than this response on a survey

could elucidate. Before we categorize women as either joint decision-makers or women at the whim of their husband's final say, it is critical to know what steps women take to get to the last decision point, and at which points along the process we may create a more supportive or enabling environment for women's reproductive choice.

It is clear that there is immense opportunity for programs and policies to support women in their decision to use family planning in the postpartum period. Community members understand the link between close birth intervals and infant morbidity and mortality. They support the use of contraceptives in order to promote the health of mothers, children, and infants. In regions like rural Mozambique, where the fertility rate is high and access to basic health services relatively low, family planning programs can capitalize on communities' desire for strong, healthy children.

One way to create communities that are supportive of postpartum family planning is to equip community health workers with the knowledge and the skills to spread information about birth spacing. Creating community-based programs that offer women information plus access to contraception is a valuable way to meet the fertility desires of some of the hardest-to-reach women in Mozambique and elsewhere in sub-Saharan Africa. Ensuring that these programs have components that maximize support for women at each point along the decision-making process is the next step in promoting reproductive choice during the postpartum period.

IV. Strategic options for Mozambique's revitalized community health worker program

Introduction

Mozambique, located on the southeastern coast of Africa, is a former Portuguese colony that gained independence in 1975. According to Mozambique's National Institute of Statistics, the population of 26.5 million inhabitants is comprised of 8.5 million living in urban areas and 18 million in rural areas (56). It is a poor, rural country with low access to facility-based health services.

To address this, Mozambique's Ministry of Health (MOH) re-launched their community health worker (CHW) program in 2010 in collaboration with international funders and non-governmental organizations (NGOs) (57). CHWs in Mozambique, known as *Agentes Polivalentes Elementares* (APEs), provide critical health promotion, prevention, and some limited curative services to hard-to-reach communities across the country. The goal of the program is to extend basic primary care services to communities, in particular those for whom health facility access is a challenge. The "APE Revitilization Programme" is considered by the MOH and international partners to be vital to improving public health, especially for the rural poor.

In previous iterations of the program, APEs were considered volunteers, and were reliant on donations of money, time, and services from community members; however, this arrangement waned over time and APEs were not compensated for their efforts (16). Under the current program, APEs provide services and products that are free to community members (16), while funding for all aspects of the program are supported by international partners (16,58).

There is the possibility of waning external funding support for the APE program in the coming years (59). The MOH is considering strategic options that could bridge a gap in funding in the unfortunate event that external support declines. This paper aims to assess three strategic options recommended by stakeholders for addressing potential declines in external funding for consideration by the MOH.

Problem Statement

This paper aims to address the challenge of how to sustainably fund Mozambique's APE program in the context of waning partner support and a critical health workforce shortage.

Diagnosing the problem

Mozambique is ranked 180 of 188 on the United Nations Development Program's Human Development Index, due to low life expectancy at birth of just 55.1 years compared to an average of 58.5 in sub-Saharan Africa generally; 3.2 mean years of school attendance compared to 5.2 in sub-Saharan Africa; and low gross national income per capita of 1,123 compared to 3,363 in sub-Saharan Africa (60). It suffers from tremendously low population health outcomes. The neonatal mortality rate is 27.1 per 1,000 live births and the maternal mortality ratio is 489

per 100,000 live births (61). The under-5 mortality rate in Mozambique is 79 per 1,000 live births, compared to 76 deaths per 1,000 live births in low-income countries (which is 11 times the rate in high-income countries) (62).

In 2013, UNICEF's Eastern and Southern Africa Regional Office ranked Mozambique a "very high" priority country for progress towards the millennium development goals. In 2011, 53% of the population obtained drinking water from improved sources, and 39% practice open defecation, with disparities between urban and rural populations (63). The key causes of child mortality include malaria (28%), pneumonia (16%), HIV/AIDS (14%), and diarrheal diseases (12%) (64).

Mozambique is primarily rural, with 62% of the population residing in rural areas (16). In the three years preceding the 2011 Demographic and Health Survey (DHS), 9.1% of women did not attend an ANC visit (3.4% urban, 11.3% rural); 4.8% attended ANC once (4.1% urban, 5.0% rural); 35.7% of women attended twice (32.4% urban, 37.0% rural); and 49.5% had the recommended four or more ANC visits (58.1% urban, 46.1% rural). In the three years preceding the survey, 57.2% of women delivered in a health facility. These data indicate that efforts are needed to reach the poorest, rural Mozambicans with least access to skilled healthcare.

As in many African countries, Mozambique is suffering from a severe health workforce shortage. Not only does the country lack sufficient health workers, but the distribution of health workers in terms of geographic coverage, knowledge, and skill capacity is not functional (17), and the vast majority of clinicians are located in cities rather than rural areas, where most of the population reside. The need for delivery systems that increase access for the underserved despite health workforce challenges is urgent, and the APE program seeks to address this critical gap in access to basic primary and preventive care.

Some partner support for the APE program may be coming to an end in the near future. For example, the World Bank has indicated that their funding will expire in December 2016. The World Bank provides funding for the APE program in three high-need provinces – Cabo Delgado, Niassa, and Nampula. The MOH has applied for a grant from the Islamic Development Bank to cover the costs of the APE program in the World Bank provinces, which is not guaranteed. Other funders operate on project life cycles that indicate possible gaps in funding during re-application periods and periods of "no-cost extensions" of contracts. For example, a Save the Children project that helps to fund parts of the APE program in Zambézia ends in March 2017, and Malaria Consortium funding that supports partial costs of the program in Inhambane is scheduled to continue through 2017. Other than the World Bank support, which will certainly pose a funding gap for the APE program in three provinces, the other external funding streams will not necessarily lapse. Ideally, though, the MOH would have strategic options for funding the APE program during times of financial hardship based on donor funding schedules.

The APE program has considerable political support from the Mozambican government and national and international partners. However, though partners say the MOH is vocal in its

support for the program, they have not seen enhanced financial commitment to the program over time. Although specific public and external contributions to the APE program have not been identified, it is clear that the program is fully supported by funders, not the MOH. According to a multilateral partner in Mozambique, the fact that the MOH is not allocating internal funds to cover those costs is cause for concern for some partners, who see it as a lack of commitment to the program.

However, as Table 1 demonstrates, estimated government spending as a percentage of GDP and in current US dollars increased substantially in Mozambique between 2009 and 2013. In 2013, Ethiopia had three times the gross domestic product (GDP) of Mozambique, and the government spent 1.6 times as much on health, but estimated government spending on health was just 1.57% of GDP compared to Mozambique's 2.93% (65). On the other hand, in the same year, Rwanda, which has less than half the GDP of Mozambique, spent 77% less in terms of US$, but estimated government spending on health was 4.81% of GDP. In other words, there is room for the Mozambican government to potentially allocate increased resources to health, but spending on health has increased in the recent past, and government spending is not unreasonably low compared to other countries with health programs that donors favor.

Table 1. Estimated government spending on health 2009-2013 in Mozambique*

Indicators	2009	2010	2011	2012	2013
Gross domestic product (GDP) in billions current US$	10.91	10.15	13.13	14.53	16.02
Total expenditure on health in current US$	583,070,927	554,535,658	825,592,306	839,482,130	1,039,950,117
External Resources on Health as % of Total Health Expenditure (THE)	65.0	65.06	71.54	59.46	48.39
External Resources on Health in current US$	379,020,507	360,776,336	590,588,836	499,136,776	503,187,088
Out of Pocket Expenditure (OOPS) as % of Total Health Expenditure (THE)	7.13	7.84	6.87	7.52	6.41
Out of Pocket Expenditure (OOPS) in current US$	41,582,949	43,486,448	56,730,229	63,141,743	66,618,597
Estimated government spending** on health in current US$	162,467,471	150,272,875	178,273,241	277,203,611	470,144,431
Estimated government spending** on health as % of GDP	1.49%	1.48%	1.36%	1.91%	2.93%

* All figures come from National Health Accounts data available through the World Health Organization Global Health Expenditure database (see http://apps.who.int/nha/database), except for GDP, which is sourced from the World Bank.

** These figures are likely an overestimate as they include an unknown level of private spending on health. See Appendix F for definitions of indicators, the formula for reaching government spending estimates, and limitations.

The question then is what does Mozambique need to do to sustainably and reliably fund its APE program? In the unfortunate but feasible event that external funding is reduced for the APE program, the MOH is considering strategic financing options. What follows are three alternatives that have been suggested by current APE program stakeholders in Mozambique. These alternatives are: user fees paid by clients into the APE system in exchange for services rendered, performance-based financing for APEs, and MOH investment in the APE program. Following a description of each alternative is an analysis of each alternative against the following evaluative criteria:

- Effectiveness – the capacity to solve the problem of potentially reduced external funding for the APE program
- Efficiency – the potential for each alternative to address the problem with an efficient use of resources without creating distortions in program delivery
- Equity – the ability of the alternative to equitably serve the poor and non-poor, rural and urban populations.

Where useful, examples from other contexts serve to highlight lessons learned or strategies for successful implementation. Finally, the author will present the preferred solution in light of the evaluative criteria: effectiveness in bridging gaps in APE program funding due to reduced donor support, efficiency through minimization of wasteful spending and distortions to program delivery, and equity for even the hardest-to-reach Mozambicans.

Background: The APE program

Mozambique's APE program started in 1978, shortly after the country gained independence from Portugal and the Alma Ata conference promoted primary healthcare through community-based provision of health services (16,66). The original program was discontinued due to numerous challenges, including "vertical" program implementation by various non-governmental organizations and bi-lateral and multi-lateral donors, system weaknesses that led to stock-outs of the kits and medicines APEs needed to function, and a civil war that devastated the health system, the APE program, and general social and economic health of the country from 1976-1992 (16,67). The program lapsed in the 1990s, but in 2010 the government, alongside international partners, aimed to revitalize the program once again (57).

The role of APEs is to provide health promotion and prevention activities for HIV, TB, malaria, nutrition, integrated community case management of pneumonia, malaria, and diarrhea in children, family planning, counseling for pregnant women, and community mobilization for vaccination. They are intended to extend primary health services to underserved parts of the country.

APEs serve 500-2,000 community members, depending on population density (68). They are drawn from communities that are far enough from facilities to make access a challenge, but close enough that APEs are able to visit the facility once per month to deliver their monitoring data to the facility-based supervisor, and supervisors are able to make community visits to

provide feedback and supervision to APEs. APE training is conducted in four blocks for a total of 18 weeks, plus refresher training at health facilities. The MOH expects that APEs will dedicate 80% of their time to health promotion and disease prevention and 20% to curative services. APEs are provided with a bicycle, backpack with items necessary for work in the community, a medicines kit, and a stipend of 1200 meticais per month, equivalent to about $27 USD.[3] Training, commodities, medicines, and the stipend are funded by partners, with various mechanisms operating in the different regions that each partner oversees.

The APE program in 2016

The APE revitalization program initiated in 2010 aims to expand the APE cadre to 6,343 human resources by 2016 (57), and 7,394 APEs by 2020 (59). By December 2013, the MOH reported 2,270 trained APEs in 117 districts (58). More recently, an MOH advisor reported that there were over 3,600 APEs in December 2015.

The MOH has had success in strategic planning for the revitalized framework; creating policy to remunerate APEs, collaborating with NGOs and donors to plan for program roll-out and scale-up, developing APE curriculum, and implementing training for "old" APEs – those who were part of the system before it dissolved in the 1990s – and "new" APEs under the revitalized program (58).

Figure 1. APE program in 2016

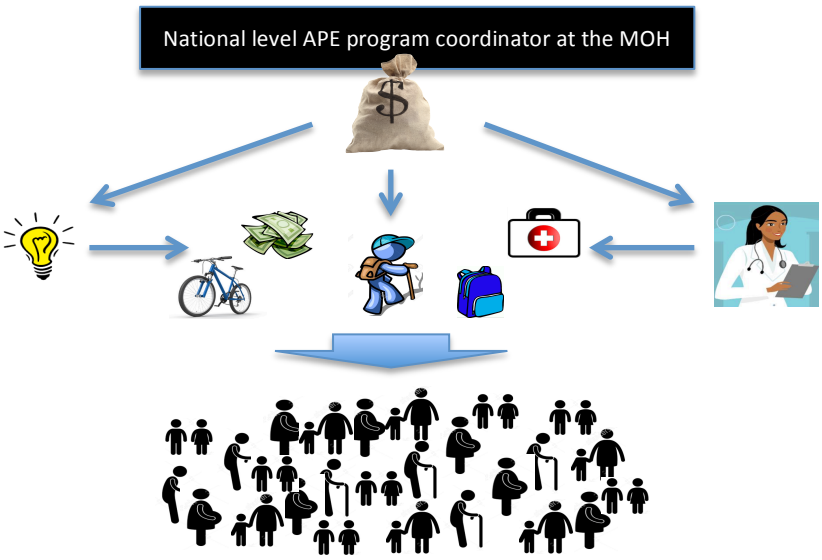


Figure 1 depicts the current functioning of the APE program.[4] A central coordinator at the national level within the Ministry of Health is responsible for overseeing the various partners

[3] Currency converted using oanda.com on January 31, 2016.

[4] See also a thorough description of the program that was conducted by a group of in-country stakeholders in 2013 (16).

that fund the program. Those partners are outlined in Table 1, by province (59). Partners support a range of activities, including: training and refresher training, bicycles, APE stipends, working kits (backpacks with items necessary for APEs to conduct their work), and the medicines kit (which includes first aid items and treatments), and supervision conducted by a nurse stationed at the local health facility. The APEs use the bicycle, working kit, and medicines to provide health education, preventive, and curative services for 500-2,000 households (16). The APE supervisor based at the health center should make monthly visits to the field to conduct oversight. According to an MOH advisor, they are mandated to cover all of the APEs within their catchment area in one year. APEs visit the health center on a monthly basis, when supervisors should review and provide feedback on monitoring forms and conduct case simulations.

Table 1. Partners that fund the APE program, by province

Province	Partners
Niassa	World Bank, UNICEF, Central Medical Stores*
Cabo Delgado	World Bank, UNICEF, Central Medical Stores
Nampula	World Bank, UNICEF, Central Medical Stores, Save the Children
Zambézia	Save the Children, UNICEF, USAID, World Vision, GFATM, Central Medical Stores
Tete	USAID (through Clinical HIV/AIDS Services Strengthening (CHASS) Project), HelpAge International, UNICEF, GFATM, Central Medical Stores
Manica	UNICEF, USAID, GFATM, Central Medical Stores, Save the Children
Sofala	UNICEF, USAID, Parque de Gorongosa Project (financed by USAID and Mt. Sinai School of Medicine), UNFPA, Central Medical Stores
Inhambane	Malaria Consortium, UNICEF, UNFPA, Central Medical Stores
Gaza	UNICEF, USAID, Save the Children, GFATM, Central Medical Stores
Provincial Maputo	UNICEF, UNFPA, Central Medical Stores

*Central Medical Stores is funded by World Bank, the Global Fund to Fight AIDS, Tuberculosis, and Malaria (GFATM) and others (59)

At present, the public healthcare system of facility-based services claims to cover 60% of the country, while the APE system reportedly covers an additional 20% (69). As of December 2015, there were coverage plans within the MOH to cover the final 20%. Additionally, the APE program is implementing five new modules into training: family planning with oral contraceptives and injectables, postpartum hemorrhage prevention, vitamin A, TB adherence support, and HIV defaulter tracing. APEs will be tasked in 2016 with taking a census of their coverage area to clarify monitoring indicators.

APE reportedly work an average of eight hours a day, five days per week, across rough terrain that is difficult to access even with a bicycle (16). Despite the long hours and little compensation, APEs are highly committed, according to partners and an MOH advisor. A stakeholder from a partner that funds part of the APE program reported that out of 1,400 APEs trained in their provinces, just 30 left the position, resulting in only a 2% attrition rate. Key

informants attributed the commitment and motivation of APEs to the way they are selected – APEs are nominated by community leadership, facility staff, and community members. APEs feel empowered and motivated by this selection process, and communities are generally happy with services provided by APEs (16).

The current system for providing stipends is for partners to deposit their share into a MOH fund. However, they do not use a standard fund, like the Sector-Wide Approach (SWAp) common fund, and so the MOH is tasked with navigating an added layer of administration associated with accessing the funds before they can be automatically deposited into APE's bank accounts. Although it is common and critical for partners to support the program while the MOH plans to allocate funds internally, there is risk associated with relying on donors for a national program.

A recent investigation of the sustainability of the revitalized program details the facilitators and barriers to long-term functioning according to a conceptual framework proposed by Schell et al. (2013) (58). The authors conclude that several challenges limit the sustainability of the program at national scale. It continues to be unclear exactly how APEs will or will not be involved in the official MOH structure. APEs are poorly and unreliably compensated, and the MOH is reliant on donors for program funding (16), even as external funding in Mozambique wanes (58). Concerns about supervision, monitoring, evaluation, and standardization across provinces and districts persist (16,58). The APE cadre is currently mostly male (16). Only one of five APEs is female (58), which has implications in Mozambican society for building rapport with women seeking reproductive health services, particularly pregnant and postpartum women.

However, the current program has the political support of both MOH and partners. The Minister and Vice Minister of Health are in favor of an APE program that extends primary health services to the last mile. Despite the strong support of government, and the perpetuity of the revitalized program for more than five years, there has not yet been evidence generated demonstrating the impact on the APE program on public health outcomes (58).

Alternative 1: Fee-for-service user fee model

Officially mandated client fee-for-service payments paid directly to APEs at the time of community-based services rendered are one potential financing alternative for the APE program, recommended for consideration by an NGO partner. User fees for services have been in place in Africa since the 1980s as a way to raise revenue for the public health system, enhance compliance, address poor mechanisms for mobilizing resources for providers, and to improve efficiency of demand and use for health services (70).[5] More recent debates have led

[5] The Bamako Initiative, sponsored by UNICEF and WHO and adopted by many African Ministers of Health in 1987, was a noteworthy "user fee" initiative that aimed to improve the quality of and access to primary health care, based in part on community financing. The idea was that households were already purchasing drugs and services in the private sector, so improved services and a reliable drug supply in public facilities could re-capture some of those funds. Select services were free, such as immunization and oral rehydration therapy. Sliding scale payments and exemptions for the most vulnerable were established locally (71,72).

donor agencies and the World Health Organization to call for limiting user fees (73), as evidence demonstrates they may be an important barrier to care, especially for highly vulnerable populations (70). However, there are some settings in which the implementation of user fees led to increased utilization, due to improvements in quality, primarily through more consistent drug availability (74–77).

Charging official user fees at the point of service could be an effective mechanism for closing funding gaps in the event external funding is reduced in Mozambique, as it is one way to increase revenue for the community health program. However, some studies have shown that user fees are a very small share of the total funding needed to deliver healthcare (71,78). A user fee issue paper lists the percent of healthcare budget covered by user fees for 19 African countries in the 1980s and 1990s, reporting proportions ranging from 2% in Botswana, Kenya, and Swaziland to 20% in Benin and Guinea (78).

The first issue to consider in the case of the APE program is which services could realistically elicit user fees from a largely poor population. Over half of Mozambicans live below the national poverty line (79), and 60.7% of the population lives on less than $1.25 per day (80). User fees have been shown to be most effective in increasing utilization when they correspond to a reliable supply of drugs at health facilities. It is reasonable to expect that people will be willing to pay for drugs and curative services, but not educational, health promotion, or preventive activities such as those that are slated to comprise 80% of the APE's workload.

The average cost of the APE program per province in Mozambique is estimated at $1.5 million in 2016. There are 3,660 APEs, or an average of 366 per province (not including Maputo City), and each APE is responsible for 500-2,000 households, which they are encouraged to visit at least twice per year. The primary curative services provided by APEs include treatment for childhood malaria, diarrhea, and pneumonia. Table 2 outlines the potential for capturing estimated user fees for these services.[6]

A key aspect of the Bamako Initiative was community co-management of health facility financing through the establishment of health committees. Health committees monitored facilities and had a say in setting coverage and spending targets (71).

UNICEF and WHO note successes in improving quality of care. However challenges included providing services to the poorest, despite exemptions.

[6] These costs will need to be verified using willingness to pay studies and/or average estimates of the cost of the same or equivalent drugs at private drug stores in areas the APEs serve. The costs presented here are estimations based on averages found in the cited programmatic and peer-reviewed literature, and not necessarily specific to rural areas of Mozambique.

Table 2. Potential for capturing user fees for curative services

Treatment	Probable disease burden in APE households	Number of households needing treatment*	Cost per treatment	Potential user fee remission per APE
Artemisinin combination therapy for malaria	60%	1200	$0.50 (81,82)	$600.00
Oral rehydration salts and zinc tablets for diarrhea	30%	600	$0.40 (83,84)	$240.00
Cotrimoxizole for pneumonia	20%	400	$0.25 (85)	$100.00
Total per APE				$940.00
Total per province**				$344,040.00

* Assumption is one individual per household in need of treatment. Based on upper limit of 2,000 households served per APE.
** Based on assumption of an average of 360 APEs per province.

There may also be an opportunity to capture fees for family planning services. A recent study of community-based depo-provera distribution using APEs and traditional birth attendants (TBAs) showed that 64% of the women in the study were willing to pay for the shot (37). The mean amount women were willing to pay was approximately 34 meticais ($0.73). However, the investigators found substantial differences in both the proportions of women willing to pay and the amount women were willing to pay by provider. At six months, 87% of TBA clients were willing to pay an average of 40 meticais ($0.86), while only 32% of APE clients were willing to pay, and among those willing, APE clients reported a willingness to pay an average 7 meticais ($0.15). This discrepancy based on type of provider may be due to the fact that women are used to paying for services from TBAs, while APE services are free. Clearly this has meaningful implications for implementing user fees for curative services as well.

In summary, there is a possibility of charging user fees for certain curative services, but even if each APE served the upper limit of 2,000 households and charged each client the same amount, this alternative would result in only $344,040.00 of revenue per province, well short of the $1.5 million needed to run the program. What's more, this estimation does not take into consideration the proportion of clients who would need to be charged on a sliding scale based on ability to pay.

There are other important considerations as well, such as potential distortions to the program. It is reasonable to expect community members would be willing to pay for curative products and services and possibly family planning products. However, the majority of the APE's mandate is the delivery of health promotion and prevention activities, which are not likely to compel community members to pay fees. This could lead to distortions in service delivery, where APEs increasingly provide curative rather than preventive services. In addition to distorting program implementation, using APEs to increasingly provide curative services is likely an inefficient use of health system resources. If user fees were implemented in the APE

program, there would have to be a system in place to encourage APEs to continue to provide the crucial preventive services that community members need but for which they may not be willing to pay, or risk major distortions to the program as APEs shift from provision of free preventive services to paid curative services.

This alternative also bears equity considerations. There is evidence that implementing user fees have disproportionate adverse effects on rural, poor, and other vulnerable populations (70), and that payment exemptions for the poor have not functioned well in other African contexts (86). In the APE program, a negative effect on equity could arise through two pathways. On one hand, the application of user fees could reduce utilization by the poor who do not perceive themselves as able to pay, or are unable to pay. Alternately, user fees could create a situation where APEs disproportionately provide services to those they perceive as able to pay. In short, user fees may have the effect of distorting the program so that APEs target the non-poor rather than the poor, who are the primary intended beneficiaries of the program. If user fees are initiated, programmers should consider how to provide high quality services for the poorest and hardest to reach without creating a cost barrier for those groups or distortions in service delivery.

Unfortunately, this alternative not a realistic mechanism for effectively funding the APE program at the level currently supported by external partners, should any of those partners eliminate their contributions. Cost-share from community members could contribute to the revenue stream for the APE program; however the reliance on community members for APE remuneration makes this alternative less equitable and potentially less efficient, and it is not a realistic option for covering the entire cost of the program.

Alternative 2: Performance-based financing

Performance-based financing (PBF) (also called pay-for-performance or results-based financing), refers to providing monetary or material incentives for results achieved (87). The results are most often determined prior to commencing health service activities, and the workers agree to the output-based expectations they must attain if they are to receive compensation. PBF is a contractual agreement wherein health workers understand that if their work results in specified, measureable outcomes, they will be rewarded with money or material goods (88). Once the contract and performance expectations are clearly defined, PBF assumes a certain level of autonomy on the part of the health service provider, who is able and indeed encouraged to adapt service provision to more efficiently or effectively meet the needs of the clientele.

PBF has received increasing levels of interest and support from governments and partners in low- and middle-income countries, and several donors in Mozambique have promoted PBF as an alternative financing strategy. As of 2011, more than 20 African countries were in the process of testing or scaling up this type of incentive mechanism at various levels of the health system (89). A partner in Mozambique suggested that there is interest from his organization to see performance-based financing tested among the APEs. There may be increased interest in

this model by Ministry of Finance and international partners, as it directly links financing to outcomes (89).

A good PBF program can have many positive effects. PBF can improve performance through increased quality or coverage or both; align goals and incentives for different teams of health workers; increase verification and accurate documentation of results; and potentially catalyze increased investment in the health system based on improved performance and documentation thereof. Moreover, in a functional PBF program where efficiency is improved, the cost per beneficiary should be reduced. However, there are additional costs associated with implementing a PBF system. One study in Rwanda[7] found that the cost of the fundholder, responsible for holding and management of the performance incentive funds, contract negotiation, and fund disbursement, was 25% of the total contracting costs (90). Additionally, the incentive payments provided for performance were over and above the regular compensation for health workers. In general, verifying outcomes is administratively burdensome and potentially costly. An MOH advisor in Mozambique noted that in a previous

[7] Rwanda has utilized a system of rewarding health facilities for achieving results to great effect since 2001 (90). Rwanda was an incredibly poor country aiming to overcome the destabilizing effects of civil war and genocide. As it sought to rebuild its devastated health infrastructure, Rwanda decentralized health service management to the district level. In 2001, several contracting projects were being tested (90). The performance-based financing structure that was established in Cyangugu Province in 2001 resulted in key learnings for what would later be Rwanda's national contracting model, and for consideration by the Mozambican MOH.

Firstly, the Cyangugu model created an independent entity operating at the district level, called a fundholder, which was responsible for holding and management of the performance incentive funds, contract negotiation, and fund disbursement (90). This is in contrast to similar mechanisms where contracts and disbursement, in addition to management and quality assurance of health services, are managed through the district health management team (91). In Cyangugu, the district health team was responsible for purchasing, service delivery, regulation, and quality reviews. This separation of roles and responsibilities, with the contract management and fundholding being the mandate of a non-public, independent agent, reportedly lowered the risk of conflicts of interest for low-paid public health managers (90).

The system operated on continual competition for renewed contracts – both at facility and fundholder level. Every three months, managers reviewed quality, outputs, and patient satisfaction to determine whether health facilities' contracts would be renewed. Likewise, the Ministry of Finance and Ministry of Health reviewed fundholders' performance as a prerequisite for possible renewal of contracts.

Performance-based financing in Rwanda positively impacted facility-based deliveries (90,92), preventive care for children (92), child health (93), and provider productivity and efficiency (89,92,93). It can also lead to greater accountability for providers (89), it may increase the pay for those providing incentivized services (88), and may improve quality of care (92). At present, performance-based financing is being used in Rwanda to incentivize CHWs, where premiums are paid to networked CHW cooperatives through a pooled fund comprised of donor and government funding (94).

Finally, Gertler et al (2013) found that performance-based financing in Rwanda was associated more strongly with improved quality among higher skilled providers than lower skilled providers (93). This points to the critical role of training and refreshers for APEs, and underscores the value of operations research that tests this issue among groups of low-skilled community-based workers.

three-month pay-for-performance pilot, verifying results was as expensive as the incentive payments themselves.

PBF programs may provide opportunities for distortions to intended service delivery. There are concerns that providing incentives for some activities or outcomes may encourage providers to abandon some activities for those that are rewarded, or those that are more easily measured (87). Some outcomes are hard to measure, such as activities related to health promotion or disease prevention. Some PBF pilots have found that providers have committed fraud to obtain compensation for services not rendered (87).

On the other hand, performance-based financing could be used to encourage activities that are particularly desirable from an equity or health disparity perspective, but are especially challenging for APEs. For instance, higher financial incentives could be assigned to delivering services to communities that are furthest away from health facilities but still within APE catchment areas; to providing health education sessions for vulnerable populations or hard-to-reach regions; for following up on HIV or TB treatment defaulters or depo-provera users who have missed their follow-up appointments; or for providing escorted referrals for facility-based delivery or other time-consuming tasks. A PBF system could either hinder or enhance equity, depending on the incentive structure.

PBF is an alternative that could potentially enhance productivity and performance in the APE program in Mozambique. Although a more expensive option than business as usual, performance-based financing is an alternative with potential for catalyzing domestic and international investment. PBF holds the possibility not only of improving productivity and program efficiency, but also documentation of the impact of the APE program. If the Ministry of Finance or external partners can rely on documentation demonstrating the effectiveness of the APE program, they may be more willing to contribute toward the program's sustainability. Indeed, the performance-based contracting experience in Rwanda suggests that when that government realized the demonstrated effects of PBF on health outcomes and documentation of impact, it was more inclined to increase its investment in the health system (95). We might expect the same willingness from donors, particularly those who promote PBF as a way to enhance efficiency and effectiveness, like USAID and the World Bank.

Alternative 3: Ministry of Health investment in the APE program

Willingness on the part of the Government of Mozambique to invest money into the APE workforce will be seen as a measure of commitment to this model of health service delivery, and as such is the most likely way to garner external donor support. We consider two main ways that the government may invest in the program: through regularizing APEs, incorporating them as the lowest level of official MOH healthcare worker, or through incremental investment into some aspect of the APE program.

First, the MOH might consider incorporating APEs as the lowest level, but salaried, cadre of health worker. Currently, APEs are partners of the MOH, but they are not official employees,

and the monthly stipend they receive is lower than the lowest official MOH salary, and does not include benefits. A recent qualitative analysis of APEs showed that the idea of becoming a member of the official MOH structure, and of having a long-term career trajectory, was motivating for APEs. APEs reported a "willingness or even eagerness" to be folded into the MOH system (16). Under this alternative, the MOH would commit to a long-term, community-based strategy for providing basic primary care through the APE program.

The community-based Health Extension Program in Ethiopia is well known, and can serve as a model for Mozambique's consideration. Ethiopia's Health Extension Program was launched in 2003 in the four most rural regions of the country with the ambitious goal of improving health outcomes by targeting communities. In 2013, the country had trained 38,000 Health Extension Workers (HEWs), most of whom are young and female. Over 35,000 were recruited, trained, and deployed within three years of program launch (96). Between the 2005 and 2011 Demographic and Health Survey, Ethiopia had made major achievements in health, including reducing under-five mortality by 28%, infant mortality by 23%, stunting by 14%, anemia among women by 37%, and the total fertility rate by 11%. The contraceptive prevalence rate increased 83% during the same time period (96). Without assigning causality specifically to the Health Extension Program, those are remarkable gains in health over the same period that Ethiopia quickly initiated and scaled up a massive community health campaign.

Like APEs, HEWs are selected by and from their communities. HEWs must be at least 18, female, and a 10th grade education. Training lasts one year. They are posted in teams of two to health posts, which serve about 5,000 people each (97), and that is the base of operations for all of their community-based work. They divide their time into about 51% at the health post, 37% in the community, and 11% elsewhere (98). The HEW package of services contains 17 items, grouped into four main areas: hygiene and environmental sanitation, disease prevention and control, family health, and health education and communication (97). Their MOH salary is approximately $35 per month. HEWs report to the Health Center, which is responsible for five health posts, or 25,000 people.

A key tenet of the HEW system is the transfer of ownership of community health outcomes from health workers to community members, and the program accomplishes this through the promotion of model families, a strategy that the MOH in Mozambique is emulating, rolling out this practice with the expanded service package in 2016. Model families are role models in the community. They often already have some status amongst community members for success in another area, such as agriculture. After they complete training with the HEW and demonstrate health-positive behaviors, they receive a certificate and acknowledgement in the community, and are asked to mentor five more households (96,97). HEWs also work closely with community organizations, schools women's groups, and religious organizations.

The Ethiopia example underscores the importance of critical implementation considerations: first, leadership and commitment from the government is paramount, both in terms of advocacy and championship and also resource allocation. Ethiopia's official policies and strategies are clearly committed to the Health Extension Program, and serve as a roadmap for

collaboration with international partners, the Ministry of Education, Ministry of Finance, Ministry of Works and Urban Development, and in-country organizations. The program is a clear priority of the MOH, and takes center stage at the national level working group that includes Ministry and development partners and regional level health bureaus and partner agencies (97). Ethiopia's MOH underlined their commitment to the project through progressive cost-sharing with international partners: partners funded training, training materials, insecticide-treated nets, contraceptives, and other supplies, and the government allocated funds for HEW salaries, stipends during training, and the cost of building health posts (97).

It synchronously underlines the enormous cost of implementing such a program. The cost of the APE program would double in 2017 if Mozambique's approach were to mirror that of Ethiopia. In terms of raising revenue to bridge gaps in funding, it is an ineffective alternative. There are also considerations for efficiency. There is the possibility that with entitlements – not linked to any results or outcomes – APE performance could suffer. Finally, there is the possibility that choosing to incorporate APEs into the public employment system, while attractive to some donors, would repel others, which could serve to exacerbate the current problem of reduced external funding.

Creating an official MOH APE cadre that emulates the Ethiopian structure for community health workers would double the current cost of the APE program. The estimated cost of this alternative is $253.7 million, or a little less than half of all estimated government spending on health in 2013. It would be unreasonable to expect the Mozambican government to fund this program alone. However, Mozambique received $2.1 billion in official development assistance in 2014, 27% of which went toward health and 15% to other social infrastructure and services (99), both of which could feasibly be attributed to the APE program. The United States, a large funder of Ethiopia's HEW program, gave $471.7 million in development aid alone. The World Bank – another generous donor to the HEW program in Ethiopia – gave $355.5 million to Mozambique in 2014. A fully scaled replica of the HEW program in Mozambique would cost approximately 31% of the funding from these two sources. This is not a negligible amount, but neither is it impossible to conceive of reallocation of some external funding to a more robust, impactful program. It would require, as has happened for over a decade in Ethiopia, a re-prioritization of health spending that emphasizes the critical importance of community-based preventive and promotive healthcare. It would also require some level of domestic investment to convince partners that there is both the political will and the intent to own and manage the program.

The second variant of this alternative is for the MOH to invest some incremental but significant amount into the APE program to cover some portion of program costs. If the MOH paid APE the equivalent of HEW workers in Ethiopia, a stipend of $35 per month, covering the cost of stipends in 2016 with the current roster of 3,660 APEs would cost the MOH about $1.5 million, or 0.33% of the current government spending on health in Mozambique. At scale with a roster of 7,394 APEs, covering the cost of stipends would be about $3.1 million. The cost of APE stipends at scale is still only 0.66% of current levels of government spending. Domestic funding could be reallocated to meet the costs of APE stipends, or some small fraction of external funds

currently delivered elsewhere could be reprogrammed. The reallocation of funds from the government would prime donors for expanding their investment, and may incentivize increased external funding. The program would maintain the same levels of efficiency and equity.

Of the two ways the government might invest in the APE program, allocating money towards APE stipends is far less expensive than absorbing thousands of employees into the MOH. While failure to invest will signal to donors that the government is not intent on the success of the program, a contribution of less than 1% of current levels of government spending on health will catalyze additional resources from external partners.

Recommendations

This paper has assessed three alternatives. User fees are not the appropriate tactic in this situation, as they present equity and efficiency issues without meeting effectiveness criteria for raising substantial funds for the sustained program. Prevention and health promotion-based community services aiming to expand basic health to the rural, poor, and most vulnerable is not the best point of care for user fees across the health system.

PBF has demonstrated utility in other settings, and may result in notable gains in efficiency, equity, and increased donor commitments. However, given the administrative and implementation burdens that correspond with PBF programs, it is unclear whether implementing a national PBF program for APEs is a worth the effort and resources that will be required. PBF is as much a management solution as it is a response to improving health outcomes, and it can be challenging to implement. We recommend piloting PBF in a variety of contexts across the country to assess those challenges and measure the impact of efficiency and equity enhancements.

Creating an official MOH cadre of APEs, like Ethiopia's HEW program, is an expensive alternative that does not seem worth the cost as recruitment and retention of APEs that meet the current standards of numeracy and literacy has not been an issue to date. If the current system is functional, and APEs are for the most part satisfied, as demonstrated by low attrition rates of around 20%, this alternative is unnecessary. Rather, expansion to all needy populations, demonstration of impact on health outcomes, and documentation of that impact are higher level priorities to meet the needs of the entire population and ensure sustained investment from external partners over time.

However, the experience of Ethiopia is incredibly important to consider – with enormous political will, financial commitment, intersectoral consultation and collaboration across ministries and partners, and crystal clear guidelines that created a roadmap for Government of Ethiopia over the long term, international partners have been willing to support the HEW program for over a decade. Funding stability is a key reason why the will of the Government of Mozambique and partners must be considered. When the government is in strong support of an alternative, political will, advocacy, and domestic commitment will be greater. When

partners are in support, funding stability and implementation assistance through development agencies and the non-governmental organizations through which they operate will be greater.

Our recommendation is that the MOH make a serious investment in the APE program that covers stipends, and use that investment as leverage to request additional commitments from external partners. The MOH ought to choose a way forward that they believe is worth a domestic financial commitment and continued advocacy from the highest national level decision-makers. Regardless of the programmatic alternative, it is time for the government to demonstrate their support of the community-based program through a relatively small but sustained financial investment. Domestic funding will convince external partners that the MOH is serious about this program, who will likely cover the remaining cost, as they do in Ethiopia – a program that is far more expansive than the APE program in Mozambique. Domestic investment will also assuage partners' perceptions that some within the MOH feel as though the APE program is a temporary measure until Mozambique's skilled health workforce reaches capacity. It is imperative that MOH leadership demonstrate their understanding that even when Mozambique's clinical human resources are sufficient for the population, there will be a need for a frontline community health workforce to operate as health educators, provide basic preventive and curative services that keep demand at health facilities at reasonable levels, and provide referrals.

Even with increased domestic investment, it is important that the program begin demonstrating some positive changes in community health. For this reason, and because it can also stimulate further investment, the PBF alternative should be considered. PBF can be used to increase worker productivity, document successes, target vulnerable groups with services, and reward prevention or health promotion activities. Partners endorse PBF, increasing the likelihood for investment. However, the MOH should not implement a PBF program without full funding support, either domestically, internationally, or through a mix of both sources.

Ownership of the community health program at the central level must be absolute. The current Minister and Vice Minister of Health are proponents of the APE program, though it is unclear how these two figures prioritize the program in advocacy with partners and meetings with other ministries. The National Director for the APE program recently left that post for a non-governmental position. The incoming Director should be a person of high regard among the MOH and other government agencies, and should be able to passionately advocate on behalf of the APE program among decision-makers, the Ministry of Finance, and funders. To be successful, the APE program should have an outspoken champion within the Ministry, and it should be the dominion of the Government of Mozambique.

Finally, in terms of government ownership, the alternative should not be owned solely by the MOH, but also by the Ministries of Finance; Education and Culture; Women and Social Welfare Coordination; and Transport and Communication. Intersectoral collaboration has been called for by in-country stakeholders, and has seen success in community health worker programs elsewhere (97). Depending on the alternative, this may include more than merely obtaining buy-in from the Ministry of Finance to redistribute existing funds: There may be opportunities

for other ministries to actively participate in the development of training programs, creating career trajectories, setting performance-based financing structures, construction, and communication strategies.

Conclusion

The Mozambican MOH is facing potential funding cuts to their APE program from external partners. Though seemingly an unfortunate event, donor disinvestment may be an opportunity for the Mozambican government to demonstrate their commitment to the community health worker program, and move forward with more ownership and possibly increased partner funding. Data from the national health accounts demonstrates that there is plenty of money spent on health by the government and international donors to fund some part of the APE program. The only remaining question is whether or not the government wants to make the APE program a priority. If so, reprogramming less than 1% of current levels of government spending on health to the APE program could reap rewards beyond maintaining the program – it could be the beginning of building a well-documented, effective program that catalyzes donors and domestic partners to invest further.

Regardless of the alternatives explored, ownership of the APE program must be the mandate of the Government of Mozambique. Partners must feel confident that the MOH is invested in the program – both politically and financially – over the long term. The best course of action for the MOH at this point is to demonstrate ownership not merely through words, but through reasonable domestic investment.

V. Conclusion

The goals of this research were to lay the groundwork for expansion of access to postpartum contraception in Mozambique. This dissertation identified the factors associated with postpartum family planning use, explored the contraceptive decision-making processes traversed by women participating in a community-based distribution program in two rural districts, and recommended strategic options for the sustainability of the community health worker program, which is critical to expanding access to postpartum contraception in rural areas of Mozambique.

The findings of the first paper suggest that antenatal care use is significantly associated with postpartum family planning, even when controlling for background characteristics and other access-related variables like facility-based delivery. Data drawn from the Demographic and Health Survey do not elucidate the quality of antenatal care during the years captured by the reproductive calendar during the 2011 survey. However, antenatal care represents an area of opportunity for counseling women on the benefits of birth spacing considering that Mozambique only recently began strengthening its antenatal care program.

Other factors significantly associated with postpartum family planning use include young age at last birth, education, wealth, and having no religion. Clearly, efforts to improve women and girls' educational attainment and opportunities for economic strengthening are paramount. However, in the context of a low-income country that must make critical decisions about resource allocation, it is important to exhaust more easily achievable options for intervention. However, programmatic focus on young women and girls is needed.

Increasing contraceptive knowledge and understanding of the benefits of birth spacing may represent areas where programs can intervene with relatively low resource investment, compared to far-reaching education, poverty, or modernization investments. Investment in achieving increased knowledge among rural women could have tremendous impact for meeting postpartum women's contraceptive needs, regardless of whether they want additional children or not.

One strategy that may serve to reach adolescents, young women, and adults alike, regardless of where they delivered or how many antenatal care visits they achieved, is community-based distribution of contraceptive products and services. The findings from the second paper suggest that women navigate a complicated path toward postpartum contraceptive use, and community-based providers are not immune from the pressures of gendered structures of power that operate around them. It also suggests that community-based providers have the potential to dispel myths, promote ideas about the health benefits of birth spacing, and liaise with village leadership to create a more enabling environment for women to use contraception if they choose to.

More research is needed on the potential of community-based distribution to meet the fertility desires of postpartum women. However, the promise of community-based contraceptives

distribution is in its ability to overcome issues of access to services, skilled health workforce shortages, facility penetration in hard-to-reach regions, and possibly client trust. Community-based contraceptives distributors can develop the capacity to promote antenatal care and facility-based delivery.

Additionally, understanding more about mediation and negotiation in family planning decision-making could reveal program strategies that enhance community support for women who choose to use postpartum contraception. This may include asking different questions about the specific components of woman-reported "joint decision-making," husband approval-seeking, key community influencers, social mediation in couples' decision-making processes, and counseling and negotiation facilitated by other community members. More research is also needed to understand the way gender, education, and other structures interplay with women's autonomy. The ways power interacts with women's contraceptive decision-making is an area for further study that could have implications for creating community-based programs that are able to shift the power imbalance in favor of women's autonomy.

The third paper makes recommendations for the Mozambican Ministry of Health in terms of financing the community health worker program, but is it linked to the case of postpartum family planning. A thriving, sustainable community health worker program is critical to expanding access to contraception in the postpartum period. Our recommendation is for a serious investment in the APE program from the government. We also recommend piloting a performance-based financing project to demonstrate and document effectiveness of the APE program. These investments could then be used as leverage to request additional commitments from external partners, effectively raising revenue and interest in the community health worker program. It is imperative that MOH leadership demonstrate its understanding that there continues to be a need for a frontline community health workforce to operate as health educators, provide basic preventive and curative services that keep demand at health facilities at reasonable levels, and provide referrals.

It is clear that there is immense opportunity for programs and policies to support women in their decision to use family planning in the postpartum period in Mozambique. People understand the link between close birth intervals and infant morbidity and mortality. They support the use of contraceptives in order to promote the health of mothers, children, and infants. An understanding of the factors associated with postpartum family planning including the contraceptive decision-making process, and a commitment to community-based primary care, can form the foundation for family planning programs that meet Mozambicans' desire for strong, healthy families.

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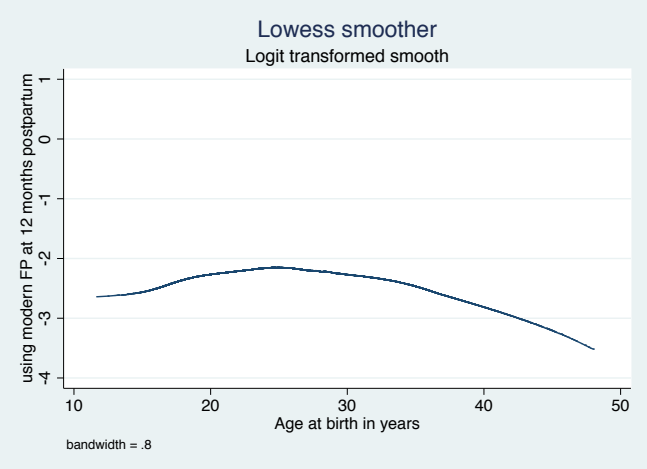
Appendices

Appendix A. Age curve and log odds of PPFP use

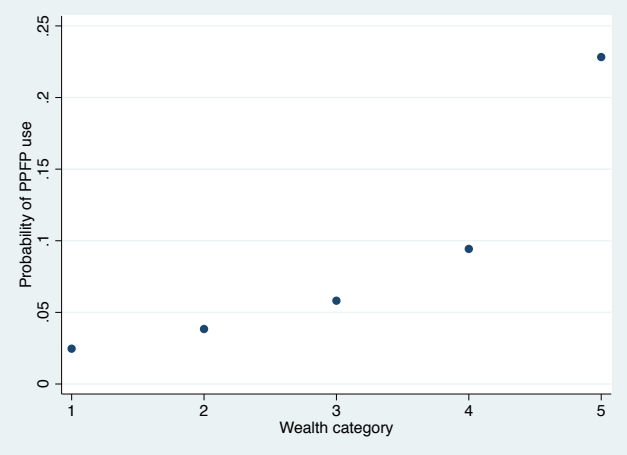


Appendix B. Wealth variable

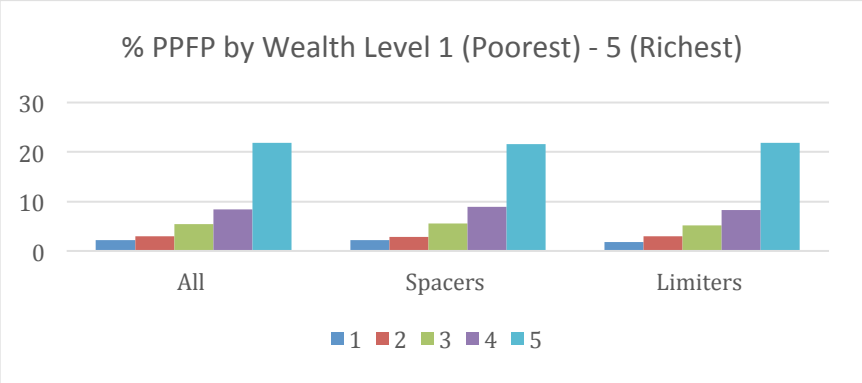
See Table 3 for proportions of PPFP use among the entire sample by wealth quintile. PPFP use varies significantly by wealth quintiles, and appears to be more similar for women in categories one and two, three and four, and five as a separate category. Collapsing the wealth quintiles into these categories allowed us to combine groups that are behaviorally similar without the loss of statistical power corresponding to using each of the five categories as covariates.

Figures below show the relationship between PPFP use by women in each of the five wealth quintiles.

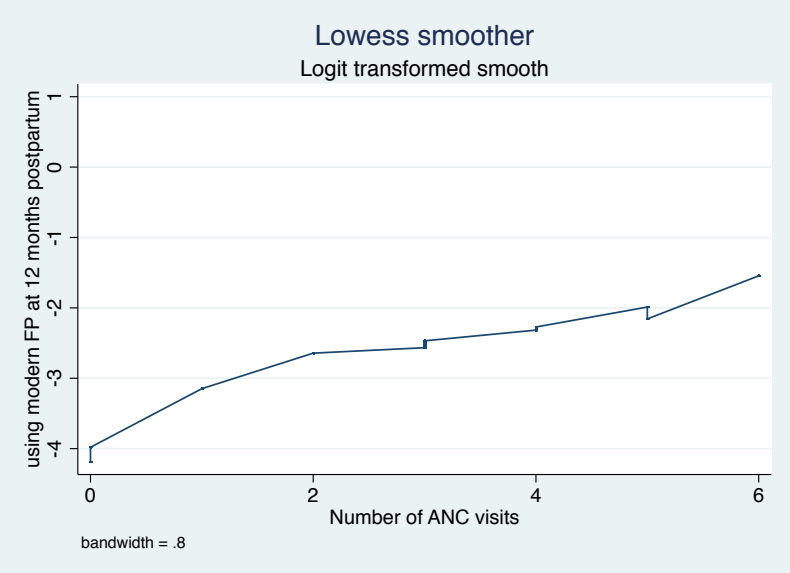
Probability of PPFP use by wealth category



Proportion of PPFP use by wealth category among the whole sample, spacers, and limiters

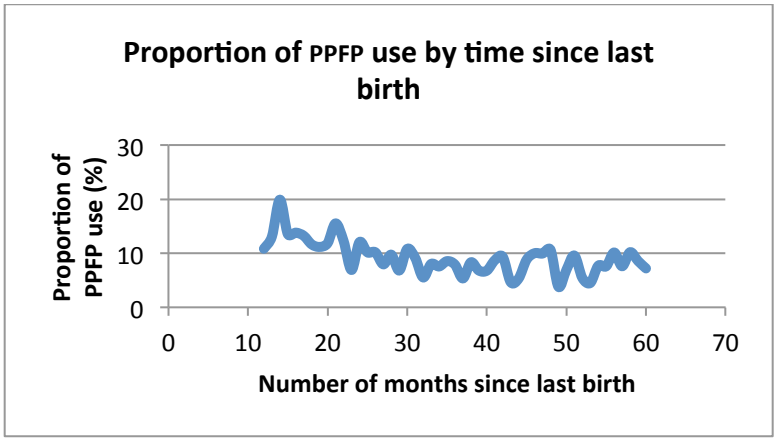


Appendix C. Number of ANC visits and log odds of PPFP use in the 12 month postpartum period

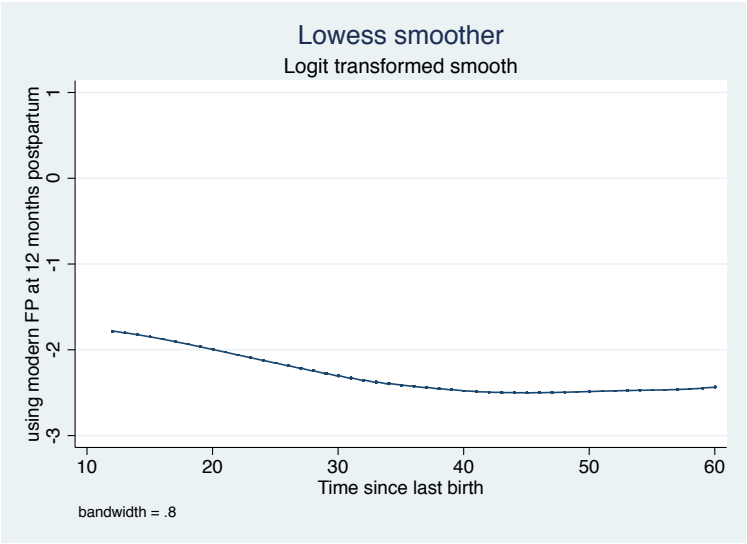


Appendix D. PPFP use by time since last birth

Proportion of PPFP use by number of months since last birth



Log odds of PPFP use by months since last birth



Appendix E. Odds ratios for entire sample and samples separated into three cohorts by time since last birth

ORs from general models with whole sample and samples separated by time since birth

	12-24 months	25-42 months	43-60 months	All time periods
Age at last birth	1.0	1.3**	1.4**	1.2**
age_sq	1.0	.99**	.99**	0.999**
Education: Primary	1.3	1.9**	1.5	1.5**
Education: Secondary plus	2.3**	3.5***	2.4**	2.7***
Wealth: poor	0.5**	0.6**	0.7	0.6***
Wealth: richest	1.74**	1.7**	2.2**	1.8***
Rural place of residence	0.76	1.04	0.86	0.88
Islamic	0.63	1.14	0.93	0.83
Zionist/Pentacostal/Evangelical	1.0	1.6**	1.4	1.2
No religion	1.5	2.3**	1.98	1.8**
Protestant/Anglican/Other/Missing	0.96	0.85	0.89	0.85
Marital Status	1.30	0.82	1.12	1.04
ANC	1.15**	1.16**	1.24**	1.2***
Health facility based delivery	1.91**	1.5	2.1**	1.9***
Undecided	0.69	1.13	1.40	0.99
Wants no more children	0.95	1.4	0.9	1.04
Parity: 3-4	1.0	0.8	0.6	0.76
Parity: 5 or more	0.9	0.8	0.4**	0.64**

** <0.05

*** <0.0005

ORs from models with SPACERS by time since birth

	12-24 months	25-42 months	43-60 months	All time periods
Age at last birth	1.04	1.30	1.33*	1.19
age_sq	1.0	1.0	1.0	1.0
Education: Primary	1.40	1.61	1.53	1.47
Education: Secondary plus	2.28**	3.4**	2.07	2.48**
Wealth: poor	0.41**	0.69	0.59	0.54**
Wealth: richest	1.96**	1.33	2.05**	1.75**
Rural place of residence	0.76	0.63	1.19	0.82
Islamic	0.86	1.43	1.48	1.13
Zionist/Pentacostal/Evangelical	1.05	1.52	1.73	1.35*
No religion	1.49	2.72**	1.73	1.84**
Protestant/Anglican/Other/Missing	1.23	0.83	0.94	1.0
Marital Status	1.15	0.68	0.91	0.90
ANC	1.13	1.21**	1.35**	1.19**
Health facility based delivery	1.70	1.25	1.60	1.56**
Parity: 3-4	1.17	1.07	0.42**	0.79
Parity: 5 or more	0.61	0.92	0.27**	0.54**

** <0.05

*** <0.0005

ORs from models with LIMITERS by time since birth

	12-24 months	25-42 months	43-60 months	All time periods
Age at last birth	1.15	1.69**	1.67**	1.41**
age_sq	1.0	0.99**	0.99**	0.99**
Education: Primary	1.05	2.08**	1.98	1.56*

Education: Secondary plus	2.88**	4.23**	3.47**	3.47***
Wealth: poor	0.42*	0.42*	0.90	0.52**
Wealth: richest	1.41	2.06**	2.51**	1.91**
Rural place of residence	0.84	1.69	0.47**	0.99
Islamic	0.40*	0.84	0.45	0.51*
Zionist/Pentacostal/Evangelical	1.04	1.81*	1.10	1.22
No religion	1.27	1.68	2.72**	1.61
Protestant/Anglican/Other/Missing	0.53	0.95	1.08	0.76
Marital Status	2.19	1.02	1.15	1.32
ANC	1.20**	1.14*	1.22*	1.17**
Health facility based delivery	2.68**	1.67	3.0**	2.47***
Parity: 3-4	0.99	0.48**	1.16	0.74
Parity: 5 or more	1.14	0.52	0.85	0.69

** <0.05

*** <0.0005

Appendix F. National Health Accounts – definitions (65)

National Health Accounts data: Mozambique

Indicators	2009	2010	2011	2012	2013
	Mozambique				
GDP	10,910,000,000	10,150,000,000	13,130,000,000	14,530,000,000	16,020,000,000
External Resources on Health as % of Total Health Expenditure (THE)	65%	65%	72%	59%	48%
External Resources on Health in current US$	379,020,507	360,776,336	590,588,836	499,136,776	503,187,088
Out of Pocket Expenditure (OOPS) as % of Total Health Expenditure (THE)	7%	8%	7%	8%	6%
Out of Pocket Expenditure (OOPS) in current US$	41,582,949	43,486,448	56,730,229	63,141,743	66,618,597
Total expenditure on health in current US$	583,070,927	554,535,658	825,592,306	839,482,130	1,039,950,117
Estimated government spending on health	162,467,471	150,272,875	178,273,241	277,203,611	470,144,431
Estimated government spending on health as % of GDP	1.49%	1.48%	1.36%	1.91%	2.93%

National Health Accounts data: Ethiopia

Indicators	2009	2010	2011	2012	2013
	Ethiopia				
GDP	32,440,000,000	29,930,000,000	31,950,000,000	43,310,000,000	47,640,000,000
External Resources on Health as % of Total Health Expenditure (THE)	33%	37%	50%	41%	32%
External Resources on Health in current US$	414,194,365	482,400,444	780,745,827	835,004,194	745,272,975
Out of Pocket Expenditure (OOPS) as % of Total Health Expenditure (THE)	39%	39%	34%	36%	35%
Out of Pocket Expenditure (OOPS) in current US$	485,632,627	507,945,988	527,775,658	728,383,801	816,352,930
Total expenditure on health in current US$	1,251,302,975	1,301,231,577	1,566,048,077	2,042,330,857	2,307,223,519

Estimated government spending on health	351,475,982	310,885,145	257,526,591	478,942,863	745,597,615
Estimated government spending on health as % of GDP	1.08%	1.04%	0.81%	1.11%	1.57%

National Health Accounts data: Rwanda

Indicators	2009	2010	2011	2012	2013
	Rwanda				
GDP	5,310,000,000	5,700,000,000	6,410,000,000	7,220,000,000	7,520,000,000
External Resources on Health as % of Total Health Expenditure (THE)	48%	48%	46%	45%	38%
External Resources on Health in current US$	256,172,953	298,701,816	328,867,116	361,332,832	315,865,691
Out of Pocket Expenditure (OOPS) as % of Total Health Expenditure (THE)	21%	20%	19%	19%	18%
Out of Pocket Expenditure (OOPS) in current US$	114,484,739	124,632,049	136,700,906	150,757,720	152,739,796
Total expenditure on health in current US$	533,363,887	627,348,751	716,389,164	800,827,247	830,377,165
Estimated government spending on health	162,706,195	204,014,886	250,821,143	288,736,696	361,771,679
Estimated government spending on health as % of GDP	3.06%	3.58%	3.91%	4.00%	4.81%

External resources for health as a percentage of total expenditure on health. This is a core indicator of health financing systems. Most indicators presented in NHA involve a measurement at the level of purchaser/payer of health services. This is, however, an indicator that refers to the origin of the resources used to purchase health services. It is the only information about the sources of funds provided in these tables. The other indicators are financing agents, the entities where the use of the funds are controlled. Some of these external sources will be channeled through the government's budget, some through insurance agencies, some through the private or NGO sectors. As such, these funds cannot simply be added to those reported in the earlier breakdowns.

Out-of-pocket expenditure as a percentage of total expenditure on health. This is a core indicator of health financing systems. It contributes to understanding the relative weight of direct payments by households in total health expenditures. High out-of-pocket payments are strongly associated with catastrophic and impoverishing spending. Thus it represents a key

support for equity and planning processes.

Formula

Total health expenditure (THE) - External resources for health as a percentage of total expenditure on health - Out-of-pocket expenditure as a percentage of total expenditure on health = Domestic spending on health*

* This is likely an overestimate because it will include private expenditures on health, such as direct payments for health by corporations, non-profits, and for-profit companies that do not come from external resources.