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Community-based Prevention of Postpartum Hemorrhage with Misoprostol in Mozambique FINAL REPORT

Associação Moçambicana de Obstetras e Ginecologistas (AMOG) is the Mozambican Society of Obstetricians and Gynecologists. AMOG has a membership of experienced providers and scholars capable of promoting the judicious use of misoprostol, advocating for policy changes, and implementing interventions to increase the demand for and access to misoprostol in the country. They are on the forefront of supporting community-based interventions to improve maternal health, and provide key insight to the Ministry of Health in Mozambique to assist in policy decision-making.

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Executive Summary

In Mozambique, maternal mortality continues to be high at a rate of 599 maternal deaths per 100,000 live-births. Bleeding during and after delivery contributes to over 30% of maternal deaths in Africa, a statistic that holds for Mozambique as well. Focusing on maternal health interventions that can reach women who have limited access to health care services is a high priority in Mozambique, where only a third of births to rural women are attended by a skilled birth attendant.

Since currently recommended uterotonic drugs for prevention of postpartum hemorrhage (PPH), such as oxytocin, require administration by injection and refrigeration to preserve their potency, they are infeasible in many communities in rural Mozambique where the majority of women deliver at home without a skilled provider. Misoprostol is a uterotonic drug that comes in tablet form and has been recognized by the international community for its potential to reduce PPH in resource-poor settings due to its relative efficacy, ease of administration, and stability in field conditions.

In response to a request from the Ministry of Health for research to demonstrate the effectiveness of misoprostol for prevention of PPH at the community level in Mozambique, Associação Moçambicana de Obstetras e Ginecologistas, Venture Strategies Innovations, PSI and the Bixby Center for Population, Health and Sustainability at the University of California, Berkeley commenced operational research to demonstrate that misoprostol distribution during antenatal care (ANC) visits to women and by traditional birth attendants (TBAs) at delivery were appropriate strategies to increase protection against PPH in the context of Mozambique's health system. The goal of the operational research was to reduce maternal deaths due to PPH by educating women on birth preparedness and distributing misoprostol for use at home births.

The research was conducted in three sites - Chokwé, Namacurra and Nacala-Porto/Nacala-a-Velha - that encompassed four districts in Mozambique with approximately one million in population. All facilities in Chokwé and Nacala-Porto/Nacala-a-Velha that provide ANC participated in the operational research. Staff recruited TBAs from across the districts of Namacurra and Nacala-Porto/Nacala-a-Velha. Pregnant women were enrolled in the operational research from November 2009 through October 2010 (12 months) either during an ANC visit or at delivery with a TBA, depending on the site.

The results of the operational research presented in this report are based on data from **Misoprostol Addendum** forms collected on women attending ANC in Chokwé and Nacala-Porto/Nacala-a-Velha (n=5,771) and **TBA Delivery Report Form** filled in by TBAs for women they assisted in delivery in Namacurra and Nacala-Porto/Nacala-a-Velha (n=4,511). Additionally, a **Postpartum Interview Questionnaire** (n=6,758) was used to collect participants' knowledge about PPH and misoprostol, their perspectives on their delivery experience and misoprostol.

A community awareness campaign on birth preparedness and PPH prevention accompanied the education sessions provided at ANC visits as a part of the research. Recall of community awareness messages about excessive bleeding and misoprostol quite high among all women who participated in the postpartum interview. Over 98% of women knew the correct timing, dose and route of misoprostol. Most women who were interviewed mentioned identifying excessive bleeding using the *capulana*,

demonstrating that the *capulana* is a feasible and acceptable tool for assessing blood loss at the community level. Regardless of where the woman was offered misoprostol, ANC providers and health facilities were mentioned most often as sources of information about PPH and misoprostol (77%).

This operational research achieved high coverage of misoprostol distribution to women attending ANC. Over 92% of women in Chokwé and over 97% in Nacala-Porto/Nacala-a-Velha whose ANC records were analyzed in this report took misoprostol home.

Both ANC and TBA distribution resulted in protected births at virtually all home deliveries in the postpartum interview sample. In Chokwé, 99% of the women delivering at home used misoprostol they had received at ANC. TBAs used misoprostol in all of the deliveries they attended in Namacurra. In Nacala-Porto/Nacala-a-Velha, ANC distribution was complemented by TBA distribution of misoprostol, reaching women delivering at home who did not receive misoprostol at ANC, and resulting in over 99% of home births in the postpartum sample protected from PPH.

Nearly all of the women who received misoprostol at ANC correctly self-administered the drug after delivering at home. Additionally, most women delivering with TBAs in Namacurra and Nacala-Porto/Nacala-a-Velha also reported taking the correct dose at the correct time at a home delivery.

Of the women who responded to the postpartum interview from all three sites, similar rates of postpartum symptoms were reported between those who did and did not use misoprostol (22% and 21%, respectively). For women who took misoprostol, the most common symptoms reported were shivering (18%) and a raised body temperature (7%). Over 78% of all women who took misoprostol experienced no symptoms.

Acceptability of misoprostol was very high among both misoprostol users and non-users across all three operational research sites. Over 96% of women who used misoprostol in Chokwé, Namacurra and Nacala-Porto/Nacala-a-Velha reported that they would recommend misoprostol to a friend or use it in a subsequent pregnancy.

The findings from this operational research demonstrate that distributing misoprostol to women through ANC visits and at delivery with TBAs has the potential to increase the number of women who receive a uterotonic drug for prevention of PPH at delivery. We recommend to policy makers and key stakeholders that distribution of misoprostol through ANC visits and at deliveries with TBAs be scaled-up nationwide in Mozambique to address this key cause of maternal mortality.

Acronyms and Local Terms

AMOG	Associação Moçambicana de Obstetras e Ginecologistas (Mozambican Society of Obstetricians and Gynecologists)
ANC	Antenatal care
<i>Capulana</i>	A locally produced pre-cut rectangular piece of cotton cloth worn by women and used to collect blood loss after delivery
FIGO	International Federation of Gynecology and Obstetrics
FGD	Focus group discussion
ICM	International Confederation of Midwives
M&E	Monitoring and evaluation
MISAU	<i>Ministério da Saúde</i> (Ministry of Health)
PI	Principal investigator
PPH	Postpartum hemorrhage
PSI	Population Services International
TBA	Traditional birth attendant
UCB	University of California, Berkeley
VSI	Venture Strategies Innovations

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1. Introduction

1.1 POSTPARTUM HEMORRHAGE IN MOZAMBIQUE

In Mozambique, maternal mortality continues to be high at a rate of 599 maternal deaths per 100,000 live-births (Hogan, *et al.* 2010). The most common causes of maternal death in developing countries include hemorrhage, obstructed labor, hypertensive disorders, sepsis and unsafe abortion. Bleeding during and after delivery is estimated to account for over 30% of maternal deaths in Africa (Khan *et al.*, 2006).

There are no risk factors that consistently predict which women will experience postpartum hemorrhage (PPH), and women who deliver alone or without an attendant who is medically trained for delivery may be unaware of the fatal consequences of any delay in management of obstetric emergencies, especially PPH. Moreover, emergency obstetric care is often not easily available or accessible to pregnant women in rural Mozambique. Even many trained providers, including obstetricians, can underestimate blood loss, which may lead to a delay in diagnosis of PPH (Maslovitz *et al.*, 2008). For untrained providers, who more often rely on subjective assessment, failure to recognize excessive bleeding can be deadly. Due to the difficulty of determining whether a woman's blood loss at delivery is "excessive," there is a need for a simple and effective means of preventing PPH. This is especially true in rural Mozambique, where only 34% of women are attended by a skilled provider at delivery (Instituto Nacional de Estatística e Ministério da Saúde, 2003).

1.2 MISOPROSTOL FOR PREVENTION OF PPH

The use of uterotonic drugs in the management of the third stage of labor reduces the amount of bleeding and the need for additional interventions. However, current recommended uterotonic drugs, such as oxytocin, require administration by injection and refrigeration to preserve their potency. These requirements render them infeasible in many communities in rural Mozambique where the majority of women deliver at home without a skilled provider (Instituto Nacional de Estatística e Ministério da Saúde, 2003). Consequently, there is a need for an alternative means of preventing PPH, especially when deliveries take place at home.

Misoprostol provides an important alternative intervention for the prevention and treatment of PPH. Misoprostol is a prostaglandin analogue in tablet form that has been recognized by the international community for its potential to reduce PPH in resource-poor settings due to its relative efficacy, ease of administration, and stability in field conditions (Derman *et al.*, 2006; Alfirevic *et al.*, 2007).

Where oxytocin is unavailable or infeasible due to lack of refrigeration, supplies (such as syringes), or trained staff, misoprostol can be an essential drug for prevention and treatment of PPH (Geller *et al.*, 2006). The International Federation of Gynecology and Obstetrics (FIGO) and the International Confederation of Midwives (ICM) jointly recommended that in home births without a skilled attendant, misoprostol may be the only available technology to control PPH (ICM/FIGO, 2006). The Pharmaceutical Regulatory Authority in Mozambique approved misoprostol for PPH prevention and treatment in May 2009. And in May 2011, the World Health Organization (WHO) added misoprostol to its Model List of Essential Medicines for the prevention of PPH where oxytocin is not available or cannot be safely used (WHO, 2011).

1.3 HISTORY OF MISOPROSTOL IN MOZAMBIQUE

In 2008, the Ministry of Health requested research to demonstrate the effectiveness of misoprostol for prevention of PPH at the community level in Mozambique. In early 2009, AMOG, VSI, PSI and the Bixby Center for Population, Health and Sustainability at the University of California, Berkeley agreed to carry out operational research to demonstrate that misoprostol distribution during antenatal care (ANC) visits to women and by traditional birth attendants (TBAs) at delivery were appropriate strategies to increase protection against PPH in the context of Mozambique's health system. As implementation of the operational research commenced in 2009, the Ministry of Health initiated the review of all maternal and reproductive health policies where misoprostol has the potential to be included. The documentation remains under review.

The Department of Pharmacy, Ministry of Health, Mozambique approved the importation, sale and distribution of misoprostol for all obstetric indications in May 2009. In 2010, a second research study was requested to demonstrate the effectiveness of training all levels of providers on the use of misoprostol for treatment of incomplete abortion.

1.4 RATIONALE FOR MISOPROSTOL DISTRIBUTION FOR PREVENTION OF PPH AT HOME BIRTHS

While all women should be encouraged to deliver at a facility, numerous barriers (e.g. costs, availability of transport, delays in identifying life-threatening complications) keep women from delivering in health facilities (Cotter *et al.*, 2006). Targeting maternal health interventions to reach women who have limited access to health care services is a high priority in Mozambique, as evidenced by the disparities in access to health care in urban versus rural areas. Approximately one-third (34%) of births among rural women are attended by a trained attendant in contrast to 81% of women in urban areas (Instituto Nacional de Estatística e Ministério da Saúde, 2003). Since over 70% of births in Mozambique occur in rural areas, improvement in the maternal mortality ratio and other maternal health indicators requires interventions targeted toward rural women.

Despite high home delivery rates, 85% of Mozambican women attend at least one ANC visit (Instituto Nacional de Estatística e Ministério da Saúde, 2003). This presents an opportunity to improve maternal health outcomes by capitalizing on existing health-seeking behavior and reaching women with messages about safe motherhood and the importance of delivering in a health facility when they attend ANC. However, because ANC attendance varies by region and by district, utilizing TBAs and other community-based strategies is necessary to reach women with health promotion messages and maternal health interventions such as misoprostol.

Numerous studies have demonstrated the effectiveness of misoprostol in reducing PPH incidence, the need for additional interventions, and the need for referrals to higher level health facilities in community-based settings (Mobeen *et al.*, 2011; Prata *et al.*, 2009). Further, auxiliary nurse-midwives, TBAs, and community volunteers have demonstrated they can administer misoprostol at home births feasibly and effectively (Derman *et al.*, 2006; Prata *et al.*, 2005; Walraven *et al.*, 2005). Recent research also demonstrates that women are capable of safely self-administering misoprostol at home births when educated on the proper use of misoprostol by a community health worker (Rajbhandari *et al.*, 2010; Sanghvi *et al.*, 2010).

When misoprostol is available at home births, higher numbers of women receive a uterotonic for prevention of PPH, especially lower-income women living in remote areas (Rajbhandari *et al.*, 2010). Safety is not compromised by including community health workers in misoprostol distribution; moreover, the incidence of adverse events has been found to be higher in areas *without* misoprostol due to the use of traditional medicines and herbs in attempts to manage postpartum bleeding. In Afghanistan, the proportion of births with skilled providers were found to be higher in areas where misoprostol was made available directly to women, likely due to the reinforcement of messages by community health workers of the importance of delivering in a facility (Sanghvi *et al.*, 2010).

Given the evidence base for community-level provision of misoprostol, it is clear that a strategy that utilizes both ANC visits as well as TBAs as points for distribution of has the potential to reach more pregnant women, especially in areas where ANC attendance is low. The study design described below aimed to reach as many women as possible with a uterotonic drug in order to prevent PPH and maternal morbidity and mortality.

2. Description of Operational Research

2.1 GOALS AND OBJECTIVES

The goal of the operational research was to reduce maternal deaths due to postpartum hemorrhage (PPH) by educating women on birth preparedness and distributing misoprostol for use at home births. By making misoprostol available through ANC visits and TBAs, more women could have access to a uterotonic drug regardless of the place of delivery (home or facility), leading to a reduction in PPH, referrals to higher level facilities, and maternal morbidity and mortality.

The objectives of the operational research were:

1. To assess whether distribution of misoprostol at ANC visits to pregnant women or at home delivery with a TBA were feasible mechanisms to reach women who deliver at home in selected rural areas of Mozambique.
2. To determine if misoprostol distribution during pregnancy via ANC or at delivery with a TBA is effective in increasing protection from PPH among women who deliver at home through increased use of uterotonic drugs at delivery.
3. To understand the implications of scaling up the distribution of misoprostol during pregnancy and delivery for prevention of PPH at home births.

The operational research will provide the Mozambique Ministry of Health with the evidence necessary to inform policy on the use of misoprostol at home births in Mozambique. This operational research will serve as a model that can be scaled up in Mozambique and that can be applicable in settings where many women deliver without the presence of a skilled attendant.

2.2 LOCATION AND PARTICIPANTS

The operational research was conducted in three sites - Chokwé, Namacurra and Nacala-Porto/Nacala-a-Velha - that encompassed four districts in Mozambique with approximately one million in population (Figure 1). All facilities in Chokwé and Nacala-Porto/Nacala-a-Velha that provide ANC participated in the

operational research. Staff recruited TBAs from across the districts of Namacurra and Nacala-Porto/Nacala-a-Velha. Table 1 specifies the population, estimated deliveries, ANC coverage and number of sites in each of the areas where the operational research was conducted for 2010.

Figure 1: Operational research sites in Mozambique

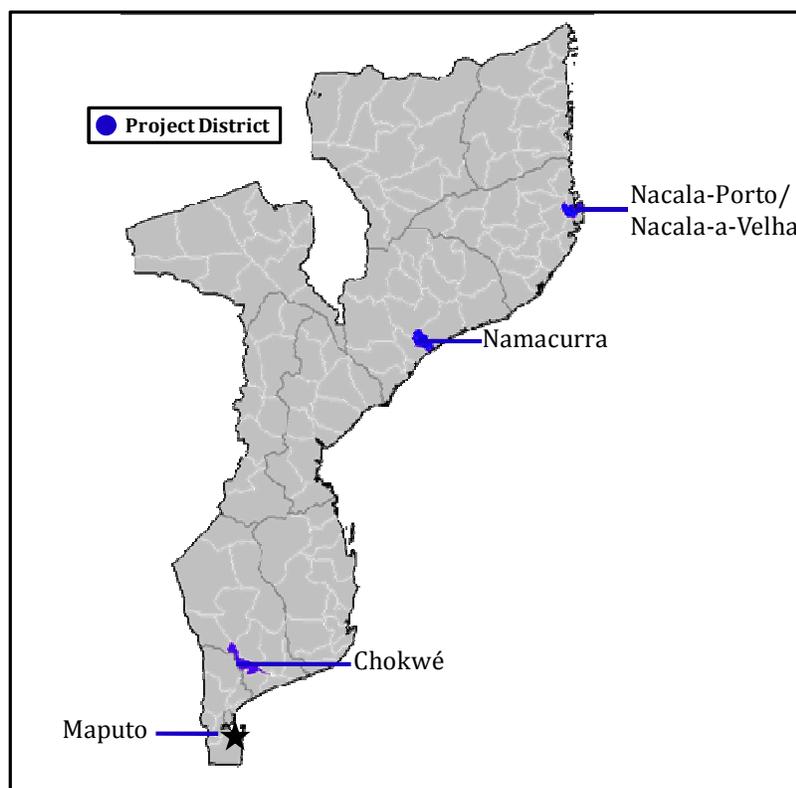


Table 1: Population and delivery characteristics of operational research areas^a

	Population	Estimated Deliveries	Health Facility Deliveries	ANC Coverage	ANC Sites (#)
Chokwé	191,408	8,613	35.7%	59.4%	18
Namacurra	209,187	9,413	37.8%	119.8%	10
Nacala-Porto	223,863	10,074	43.2%	79.1%	8
Nacala-a-Velha	99,519	4,478	23.7%	81.3%	6
Total	723,977	32,578	n/a	n/a	42

^a Projections from the National Census (2007). *Bases de Dados do Censo 2007*. Instituto Nacional de Estatística. Note: Nacala-Porto and Nacala-a-Velha were considered one site for the purposes of this operational research.

2.3 TIMELINE

The development, implementation and analysis of this operational research took place over three and a half years. AMOG and VSI implemented a formative research with TBAs in June 2009, and developed the operational research proposal, community awareness campaign materials, manual of operations and data collection tools between September 2008 and August 2009. Information gathered during the TBA blood loss assessment contributed to the development of the operational research.

The initial operational research training by AMOG and VSI principal investigators occurred in September 2009. Women were enrolled in the operational research from November 2009 through October 2010 (12 months) either during an ANC visit or at delivery with a TBA, depending on the site. The VSI team and an intern from the Bixby Center at UC Berkeley conducted a monitoring and evaluation (M&E) visit in July 2010. Follow-up of women continued until the end of November 2010. The monitoring and evaluation team at VSI completed the final data analysis and wrote the final report in April 2011.

Figure 2: Operational research timeline

2008	2009	2010	2011
September 2008 – August 2009: Development		July: Monitoring and evaluation visit	January – April: Analysis and reporting
	June: TBA Blood loss assessment		
	September: Training		
	November 2009 – October 2010: Implementation, follow-up completed at the end of November 2010		

2.4 ETHICAL REVIEW

Institutional Review Board approval (#2009-1-1) for this operational research was obtained from the University of California, Berkeley and the *Comité Nacional de Bioética*, located at MISAU. Women were asked for their informed consent at enrollment and before conducting the postpartum interview.

3. Methods

3.1 STUDY DESIGN

The study consisted of two phases:

1. Assessment of TBA blood loss awareness
2. Implementation
 - a. Community awareness campaign on birth preparedness and PPH prevention
 - b. Misoprostol distribution

Phase 1: Assessment of TBA blood loss awareness

To gain an understanding of the current birthing practices among TBAs in Mozambique, particularly methods used to identify and manage excessive bleeding, Principal Investigator Dr. Cassimo Bique and two nurse-midwives conducted a focus group discussion (FGD) in Nacala-Porto with TBAs. The primary objectives of this assessment were to learn whether TBAs measure blood loss after delivery and to determine if a culturally appropriate, context-specific method existed for measuring postpartum blood loss to establish a threshold for excessive bleeding. A total of 13 TBAs, seven from Nacala-Porto and six from Nacala-a-Velha, participated in the discussion on June 24, 2009.

While the nurse-midwives provided translation, Dr. Cassimo Bique led the FGD using a guide covering the following topics: current birth practices, PPH identification, PPH management, and relationship with the health care system. All the TBAs participating in the focus group reported routinely using *capulanas*

during delivery to collect and measure postpartum blood loss. A *capulana* is a bright piece of pre-cut cotton cloth of standard size, measuring 1.8 by 1.1 meters. Women may wear a *capulana* as a skirt (sarong), shawl, head wrap, or use it to strap a baby to a woman’s back. In this case, TBAs use *capulanas* as blood collection towels after delivery.

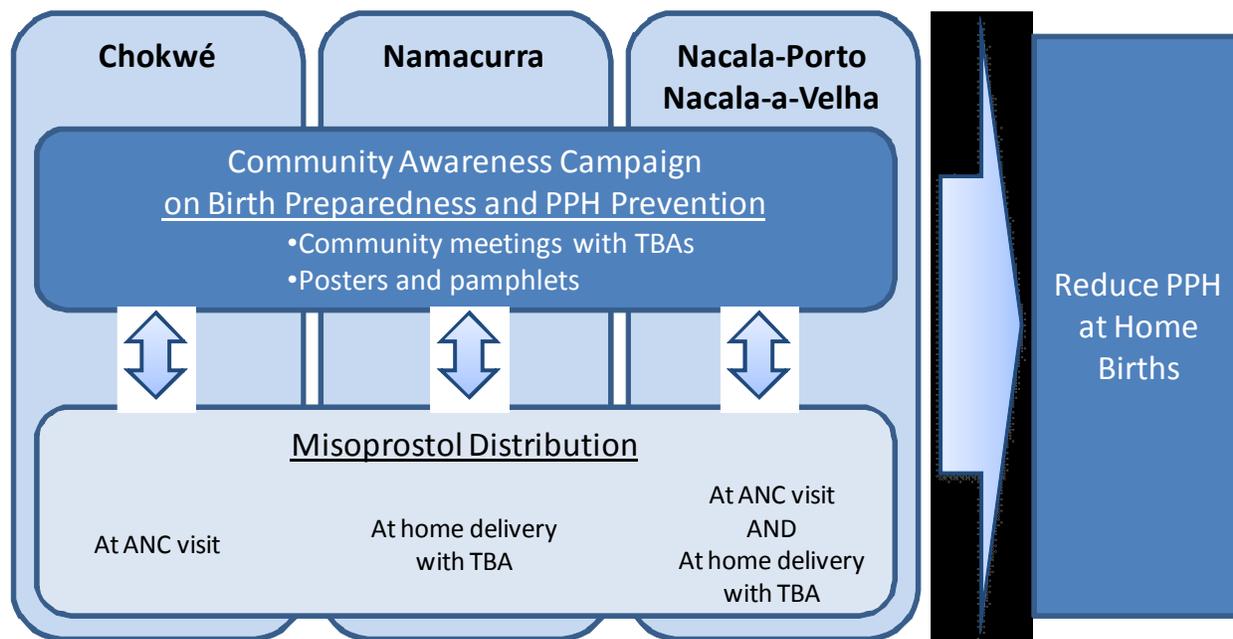
After learning that all TBAs in the focus group used the *capulana* to collect postpartum blood, Dr. Bique assessed the volume of liquid that a *capulana* held using water at the Jose Macamo Hospital in Maputo. He found that one soaked *capulana* holds approximately 700 ml of water; however, the amount of blood that the cloth would hold is assumed to be more or less 600 mL. The assessment concluded that postpartum blood loss measured with one soaked *capulana* will **never be below 500 mL**, the threshold for identifying PPH; therefore, a blood-soaked *capulana* could be used to identify excessive bleeding after birth.

As a result, pregnant women attending ANC and TBAs participating in this operational research were educated to use the *capulana* to measure postpartum blood loss, and that one *capulana* fully soaked with blood indicated the need for immediate referral for additional interventions to treat PPH.

Phase 2: Implementation

Figure 3 presents the components of the implementation in each operational research site.

Figure 3: Operational research components



3.1.1 Community Awareness Campaign on Birth Preparedness and PPH Prevention

In conjunction with the education that women received at ANC visits, a community awareness campaign on birth preparedness and PPH prevention was ongoing in operational research areas to reinforce safe delivery messages.

The community awareness campaign included four key messages:

1. Importance of delivering at a health facility;
2. Birth preparedness and planning early for a safe delivery;
3. PPH identification using the *capulana*; and
4. Misoprostol for the prevention of PPH and its availability at ANC clinics to pregnant women 28 weeks gestation or greater and/or at the time of delivery with a TBA (depending on the site).

All women attending ANC in Chokwé and Nacala-Porto/Nacala-a-Velha participated in an Education Session on birth preparedness and PPH prevention that included information on the four key messages of the awareness campaign. To increase community-level awareness on birth preparedness, PPH and misoprostol, TBAs conducted meetings in Namacurra and Nacala-Porto/Nacala-a-Velha with community leaders and women's groups in their geographic areas, and conducted one-on-one information sessions with pregnant women in their villages.

PSI, AMOG and VSI worked collaboratively to create pictorial print materials for both clinic and community-level education. The partners developed and field-tested pictorial instructions for the use of misoprostol for PPH prevention that were used in the following print materials:

- An informational poster to post in the clinic;
- Pamphlets that ANC providers and TBAs could distribute to women;
- A flip book (a small, spiral bound display book) with a separate page for each picture of the instructions, for TBAs to use while educating women and communities about PPH and misoprostol; and,
- A promotional poster to be placed in key community locations to increase community awareness about PPH and misoprostol.

Throughout the operational research, 200 informational ANC posters and 500 community promotional posters were printed and distributed evenly across the districts. In addition, a total of 85,000 pamphlets were produced and distributed to the districts in proportion to their respective population size. Finally, 250 educational flip books were created and distributed to TBAs participating in the operational research.

Community awareness activities took a number of forms in the three operational research sites. Many of the activities in Namacurra and Nacala-Porto/Nacala-a-Velha consisted of TBAs visiting with women individually or with family units. TBAs also collaborated with *Anciaos* (community elders who are highly respected by community members) and collaborated with them to spread messages about birth preparedness and PPH prevention. Churches were also a forum for PPH awareness: pastors in Namacurra gave TBAs time to speak about PPH after church sermons. TBAs reported that women attending these church-based awareness sessions were praying for misoprostol to stay in their community, and churches were noted as a particularly important place to reach both men and women with birth preparedness messages.

3.1.2 Misoprostol Distribution

Given the diversity of health care access and utilization across Mozambique, each site utilized a different misoprostol distribution strategy:

1. *High ANC Coverage Site (Chokwé)*: Misoprostol was distributed to eligible women¹ once they had reached at least 28 weeks gestation. Many women come to ANC at 28 weeks gestation to receive Niverapine to prevent mother-to-child transmission of HIV; thus, this moment in pregnancy was determined to be the most feasible point to capture as many women as possible. When a woman delivered in a health facility, the provider administered the misoprostol tablets she had received at ANC, as well as oxytocin (if available), for PPH prevention.
2. *Low ANC Coverage Site (Namacurra)*: Misoprostol was distributed at delivery by a TBA trained in operational research protocols instead of at ANC because of the district's low ANC attendance rates.
3. *Average ANC Coverage Site (Nacala-Porto/Nacala-a-Velha)*: Misoprostol was distributed at ANC visits by a health provider once the woman had reached 28 weeks gestation and distributed by trained TBAs at delivery (i.e. both of the above strategies). If women received misoprostol at ANC and subsequently delivered with a TBA, they were instructed to give the misoprostol tablets to the TBA for use during delivery. If a woman delivered in a health facility, the provider administered the misoprostol tablets she had received previously, as well as oxytocin (if available), for PPH prevention.

3.2 PERSONNEL AND TRAINING

3.2.1 Organizational Structure

The lead investigators of this operational research were Dr. Cassimo Bique, Senior Gynecologist & Obstetrician at Jose Macamo Hospital, and Dr. Ndola Prata, Associate Professor in Residence of Maternal and Child Health at the University of California, Berkeley and Medical and Programs Director of VSI.

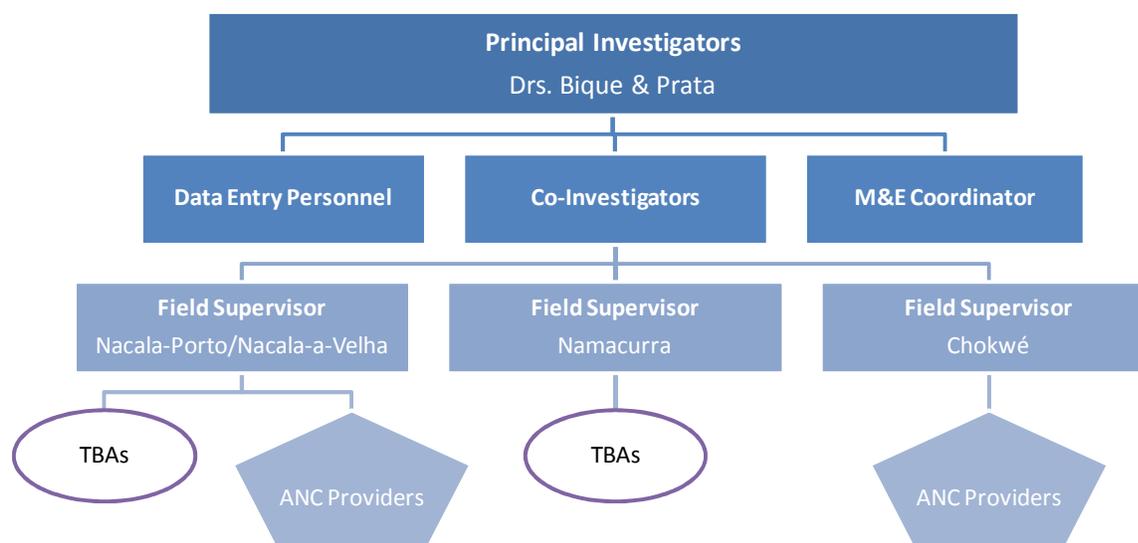
Together, the **AMOG** and **VSI** designed and implemented the operational research. AMOG was responsible for the ongoing management and oversight of the operational research activities. VSI provided financial and technical support, including the development of data collection tools, training materials, monitoring and evaluation design, and data management and analysis. With technical input from VSI, **PSI/Mozambique** created and provided the community awareness materials. In addition, PSI/Mozambique provided the majority of misoprostol tablets. The **Bixby Center for Population, Health and Sustainability**, with VSI, also provided technical assistance to this operational research.

Dr. Cassimo Bique, assisted by co-investigators, provided ongoing supportive supervision throughout operational research implementation. Two co-investigators functioned as master trainers at the beginning of the operational research. In addition, each site had a field supervisor who oversaw the

¹Women were eligible if they were expected to have an uncomplicated vaginal delivery, were not expected to undergo a cesarean section, and did not have a chronic disease (e.g. high blood pressure, diabetes, cardiac diseases, or other chronic conditions).

ANC providers and TBAs (as appropriate) and managed misoprostol distribution and the community awareness activities in the district (Figure 4).

Figure 4: Organizational structure



3.2.2 Training Structure

In September 2009, the AMOG and VSI principal investigators led a one-day training in Nacala-Porto on operational research protocols for the two co-Investigators/master trainers from AMOG and the three field supervisors (Chokwé, Namacurra and Nacala-Porto/Nacala-a-Velha).

Following the master training, the two master trainers and Dr. Cassimo Bique held a main training in each district for all providers (two days) and TBAs (one day) participating in the operational research, and provided ongoing on-the-job trainings as needed. They trained a total of 56 ANC providers and 178 TBAs in the three sites (Table 2).

Table 2: Providers trained by district

	Chokwé	Namacurra	Nacala-Porto/ Nacala-a-Velha	Total
ANC Providers	39	n/a	17	56
TBAs	n/a	113	65	178

3.3 DATA COLLECTION AND MANAGEMENT

3.3.1 Data Collection Tools

Enrollment and Misoprostol Distribution at ANC

Data was collected in Chokwé and Nacala-Porto/Nacala-a-Velha using the **Misoprostol Addendum** on every woman attending ANC during her first visit and at subsequent visits for participants who were enrolled in the operational research. The **Misoprostol Addendum** recorded basic ANC information, enrollment and misoprostol distribution to women who were 28 weeks gestation or greater.

Enrollment and Misoprostol Distribution at Delivery with a TBA

TBAs completed the **TBA Delivery Report Form** for every woman they assisted in delivery in Namacurra and Nacala-Porto/Nacala-a-Velha. The form captured information about enrollment, the delivery, misoprostol use and referrals. Since women in Nacala-Porto/Nacala-a-Velha were able to receive misoprostol either at an ANC visit OR at the time of delivery if they delivered with a TBA, the TBA noted when the woman had received misoprostol.

Postpartum Interview

During enrollment, women were asked to participate in a follow-up postpartum interview either at the health facility during a postnatal visit or in their home. Data collectors used the **Postpartum Interview Questionnaire** to collect participants' views of and experience with misoprostol, knowledge about PPH and misoprostol, and delivery experience, providing data for key outcomes of the operational research. The postpartum interview was conducted before discharge if a participant delivered at a health facility, when the participant returned to the health facility for postnatal care, or through active follow-up.

3.3.2 Data Entry and Management

A research assistant supervised by Dr. Cassimo Bique entered the data collection forms throughout the implementation of the operational research. While collecting data during routine supervisory visits, the team addressed any challenges arising in the data collection and proper documentation, including recording of adverse events. Once the data were entered, Dr. Cassimo Bique sent the data collection forms to VSI's Research and Implementation Director and Data Analyst in California.

3.3.3 Data Analysis

The M&E team conducted the data analysis using *Stata/SE 10* (StataCorp 2007) in April 2011, summarizing the results using frequency tables and cross-tabulations. A criterion of $p < 0.05$ was used to assess the statistical significance of differences between groups.

Delivery characteristics and the results of misoprostol distribution were analyzed separately for each of the sites. The results of the community awareness campaign are presented by distribution strategy, either at the ANC clinic (Chokwé and Nacala-Porto/Nacala-a-Velha) or from a TBA (Namacurra and Nacala-Porto/Nacala-a-Velha) to take into account the difference in information sources across the different sites.

4. Results

4.1 WOMEN REACHED AND DATA FOR ANALYSIS

ANC providers and TBAs collected data on all women in the operational research at the time of enrollment and/or misoprostol distribution from November 2009 through October 2010. Overall, the operational research included 11,927 women: 3,209 in Chokwé through ANC, 6,277 in Nacala-Porto/Nacala-a-Velha through ANC and TBAs, and 2,441 in Namacurra through TBAs (Table 3).

Table 3: Women included in the operational research (November 2009 through October 2010)

	Chokwé	Namacurra	Nacala-Porto/ Nacala-a-Velha	Total
Total	3,209	2,441	6,277	11,927
At ANC	3,209	n/a	6,112	9,321
At delivery with TBA	n/a	2,441	165	2,606

Of the women reached through the operational research, this analysis includes only women with completed data collection forms who gave their informed consent (Table 4). Since women could be enrolled in the operational research at ANC but also deliver with a TBA in Nacala-Porto/Nacala-a-Velha, some women in this district completed both **Misoprostol Addendums** and **TBA Delivery Forms**. Of the 2,070 deliveries attended by TBAs in Nacala-Porto/Nacala-a-Velha, all but 165 women had enrolled in the operational research and received misoprostol at an ANC clinic prior to delivery with a TBA. Since these data collection tools captured different information, they are included in analysis of both ANC and TBA delivery data; however, they are noted as receiving misoprostol from ANC. Postpartum interview data was collected from 6,758 women.

Table 4: Data for analysis (November 2009 through October 2010)

	Chokwé	Namacurra	Nacala-Porto/ Nacala-a-Velha	Total
Misoprostol Addendum	1,958	n/a	3,813	5,771
TBA Delivery Form	n/a	2,441	2,070	4,511
Postpartum Interview Questionnaire	2,218	106	4,434	6,758

4.2 BACKGROUND CHARACTERISTICS OF THE PARTICIPANTS

Socio-demographic information was collected about women in the postpartum interview, and presented by where the women were offered misoprostol (Table 5). The minority of women had their first child during the operational research (21%). Almost all women attended at least one ANC visit during their pregnancy (>99%), with an average number of three visits. A third of women in the postpartum sample delivered at home (35%); significantly more women who received misoprostol at ANC delivered in a health facility. The majority of women who received misoprostol at ANC were delivered by a midwife (60%), whereas the majority of women who received misoprostol from a TBA at delivery were delivered by a TBA (56%). Of note, all of the 56 women who delivered *en route* to a health facility took misoprostol (54 received the tablets from ANC and two from a TBA). In this circumstance, misoprostol filled the gap for women who desired to deliver at a health facility but were unable to reach one due to distance from a facility and lack of transportation.

Table 5: Socio-demographic characteristics

	Offered Misoprostol at ANC Clinic (n=6,420)	Offered Misoprostol by TBA at Delivery (n=338)	Total (n=6,758)
Number of children born alive			
1**	1,341 (20.9%)	54 (16.0%)	1,395 (20.6%)
2	1,144 (17.8%)	60 (17.8%)	1,204 (17.8%)
3	908 (14.1%)	45 (13.3%)	953 (14.1%)
≥4	1,614 (25.1%)	87 (25.7%)	1,701 (25.2%)
No response*	1,383 (21.9%)	122 (28.5%)	1,505 (22.3%)
Attended ANC during last pregnancy*	6,420 (100%)	330 (97.6%)	6,750 (99.9%)
Average number of ANC visits (min;max)**	3.3 (1; 10)	3.1 (1; 8)	3.3 (1; 10)
Location of delivery			
Home ^{1*}	2,215 (34.5%)	172 (50.9%)	2,387 (35.3%)
Health facility*	4,151 (64.7%)	164 (48.5%)	4,315 (63.9%)
En route to facility	54 (0.8%)	2 (0.6%)	56 (0.8%)
Attendant at delivery[^]			
Doctor	28 (0.4%)	1 (0.3%)	29 (0.4%)
Assistant medical officer/clinical officer	33 (0.5%)	0 (0%)	33 (0.5%)
Midwife*	3,827 (59.6%)	125 (37.0%)	3,952 (58.5%)
TBA*	489 (7.6%)	189 (55.9%)	678 (10.0%)
Friend/relative*	1,654 (25.8%)	2 (0.6%)	1,656 (24.5%)
Delivered alone*	155 (2.4%)	0 (0%)	155 (2.3%)
<i>Servente</i> ²	29 (0.5%)	0 (0%)	29 (0.4%)
Cesarean section	93 (1.5%)	3 (0.9%)	96 (1.4%)
Multiple birth	112 (1.7%)	3 (0.9%)	115 (1.7%)

Source: Postpartum Interview

*p<0.01; **p<0.05

¹Includes TBA's house and midwife's house

² Auxiliary staff at a health facility, usually in charged in cleaning, and who is not a skilled provider

[^]No response for attendant at delivery from 3.2% of women offered misoprostol at ANC and 6.2% of women in offered misoprostol by TBA at delivery

4.3 COMMUNITY AWARENESS CAMPAIGN MESSAGE COMPREHENSION

In the postpartum interview, participants were asked if they had received information on PPH and misoprostol, what messages they knew, and the sources from which they learned this information.

Table 6 presents women's comprehension of the community awareness campaign's messages on birth preparedness and PPH prevention with misoprostol.

Overall, the women's recall of the community awareness campaign messages was high. When asked what information they knew about excessive bleeding, most respondents spontaneously said that it can cause death (87%) and that they recognized PPH as when a woman has soaked one or more *capulanas*

with blood (80%). However, only half of the women participating in the postpartum interview mentioned the need for immediate referral of a woman who is bleeding excessively.

Knowledge of the key misoprostol messages was very high amongst postpartum interview respondents: almost all knew the function (98%), correct timing (98%) correct dose (99%), and correct route (99%) of misoprostol (Table 6). Additionally, 91% knew of at least one symptom of misoprostol use, with shivering (83%) and raise of temperature (68%) noted most frequently.

While knowledge of key messages was high overall, women who received misoprostol from ANC were more likely to spontaneously give the key messages about PPH. In addition, women’s knowledge of the correct dose, route and timing of misoprostol was significantly higher among those who were offered misoprostol at ANC than among those who were administered the drug by attending TBAs. Since TBAs administered misoprostol at the time of delivery, they likely provided less information about taking misoprostol correctly.

Table 6: Women’s spontaneous response of information received on excessive bleeding and misoprostol

	Offered Misoprostol at ANC Clinic (n=6,420)	Offered Misoprostol by TBA at Delivery (n=338)	Total (n=6,758)
What information do you know about excessive bleeding?			
PPH can cause death*	5,593 (87.1%)	272 (80.5%)	5,865 (86.8%)
Go to a health facility promptly*	3,212 (50.0%)	133 (39.4%)	3,345 (49.5%)
A woman is bleeding too much when bleeding soaks one <i>capulana</i> or more*	5,149 (80.2%)	223 (66.0%)	5,372 (79.5%)
What does misoprostol do?			
Misoprostol prevents, stops, or reduces the chances of bleeding after childbirth*	6,282 (97.9%)	306 (90.5%)	6,588 (97.5%)
When should you take the tablets?			
Take immediately after baby is born (Correct timing)*	6,318 (98.4%)	306 (90.5%)	6,624 (98.0%)
How many tablets should you take?			
Take three tablets (Correct dose)*	6,355 (99.0%)	311 (92.0%)	6,666 (98.6%)
How should you take the tablets?			
Take by swallowing (Correct route)*	6,360 (99.1%)	311 (92.0%)	6,671 (98.7%)
Knows at least one potential symptom of misoprostol use**	5,836 (90.9%)	295 (87.3%)	6,131 (90.7%)

Source: Postpartum Interview

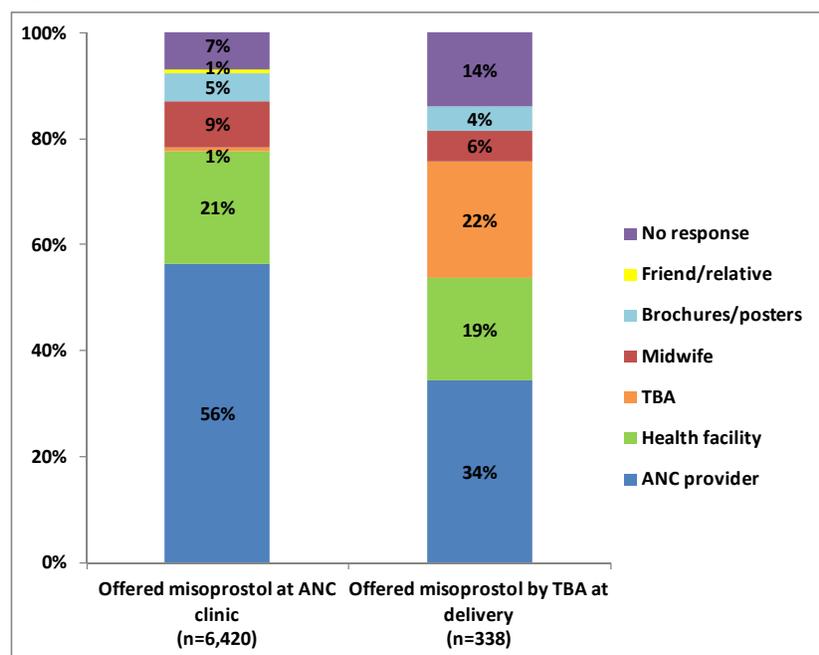
*p<0.01; **p<0.05

Over three-quarters (77%) of women who were offered misoprostol at ANC listed either their ANC provider or the health facility as their most important source of information about misoprostol (Figure 5). ANC providers and health facilities were listed by more than half (53%) of women who were offered misoprostol by a TBA at delivery as their most important source of information about misoprostol.

Twenty-two percent of women who received misoprostol from a TBA mentioned her TBA as the most important source of information on misoprostol (compared to 1% of women who were offered misoprostol at ANC). It is important to note that during pregnancy, women were exposed to community awareness messages, so it could be that at the time of delivery they has already established the source of information for misoprostol.

Almost half (49%) of women reported that the person who attended ANC with them (e.g. spouse, friend, relative) was with them at the time of delivery (data not shown). Thus, ANC is a key opportunity for educating not only pregnant women, but also their social support networks onthe importance of PPH prevention with misoprostol.

Figure 5: Most important source of misoprostol information



Source: Postpartum Interview

4.4 MISOPROSTOL DISTRIBUTION

4.4.1 Namacurra: Distribution of Misoprostol by TBAs

As noted above, in Namacurra misoprostol was only available to women if a TBA participating in the operational research was with them at delivery. Table 7 shows that 2,441 women delivered with these TBAs and they all took misoprostol at the time of delivery. Among these women, almost all (n=2,439) reported taking the correct dose of three tablets, while only two women reported taking two tablets.

Table 7: Misoprostol distribution by TBA and use at home delivery: Namacurra

Deliveries attended by TBAs		n=2,441
Used misoprostol at delivery	2,441	(100%)
Number of misoprostol tablets taken		
2 tablets	2	(0.1%)
3 tablets (Correct dose)	2,439	(99.9%)

Source: TBA Delivery Report Form

Out of 2,441 deliveries, TBAs reported that less than 1% of women soaked one or more *capulanas* (Table 8). Of the six women who soaked one *capulana*, five needed to be referred to a health facility. TBAs noted that only four women were not in good condition (“sick”) at discharge, and there were no maternal deaths at any of the TBAs’ deliveries.

Table 8: Perceived blood loss, referral and condition of mother at deliveries attended by TBAs: Namacurra

Used misoprostol	n=2,441
Perceived postpartum blood loss	
Less than one <i>capulana</i>	2,435 (99.8%)
One <i>capulana</i>	6 (0.3%)
More than one <i>capulana</i>	0 (0%)
Referral	5 (0.2%)
Condition of mother at discharge[^]	
Good condition	2,431 (99.6%)
Sick	4 (0.2%)
Deceased	0 (0%)

Source: TBA Delivery Report Form

[^]No response on condition of mother for 0.3% of women

4.4.2 Chokwé: Feasibility and Effectiveness of Misoprostol Distribution at ANC

Misoprostol Distribution at ANC

Of the 1,958 women with completed *Misoprostol Addendums* in Chokwé, 1,805 (92%) women took misoprostol home from ANC (Table 9). To be eligible to receive misoprostol after enrollment, women had to be greater than or equal to 28 weeks gestation. Of the 153 women who did not take misoprostol home, 107 women were under the 28 weeks gestation requirement and 46 were ineligible for other reasons. Data on gestational age or reason for not taking misoprostol home is missing for the remaining 46 women who were enrolled but did not take misoprostol home. Most women (94%) who accepted misoprostol took it home after 28 weeks gestation.

Table 9: Misoprostol distribution at ANC: Chokwé

Misoprostol Addendum	n=1,958
Clients enrolled in operational research and eligible for misoprostol distribution	1,851 (94.5%)
Misoprostol distribution (of all <i>Misoprostol Addendums</i>)	1,805 (92.2%)
Gestational age (weeks) at receipt of misoprostol[^]	
<13 weeks	35 (1.9%)
13 to 28 weeks	31 (1.7%)
≥28 weeks	1,698 (94.1%)

Source: *Misoprostol Addendum*

[^]Missing gestational age for 2.3% of women

Note: 66 women (or 3.7% of those given misoprostol) were given misoprostol erroneously prior to reaching 28 weeks.

Uterotonic Coverage and Protected Births

All but four of the women who delivered at home used misoprostol (n=494), therefore achieving near universal coverage of uterotonics at home deliveries in this sample. Over three-quarters (78%) of women participating in the **Postpartum Interview** in Chokwé delivered in a health facility (Table 10). Among women who delivered in a facility in Chokwé and completed a postpartum interview (n=1,720), the majority of women received both misoprostol and injection of a uterotonic drug (62%), as indicated by operational research protocol. Over one-third (37%) of women at facilities took misoprostol only, and only 21 women delivering at facilities received no uterotonic. Of the deliveries captured in the **Postpartum Interview** in Chokwé, 99% were considered “protected” from PPH by use of any uterotonic at delivery.

Table 10: Uterotonic coverage at home and facility deliveries: Chokwé

	n=2,218
Home birth[^]	(n=498)
Used misoprostol received during ANC	494 (99.2%)
None	4 (0.8%)
Facility birth	(n=1,720)
Misoprostol only	632 (36.7%)
Injection only	9 (0.5%)
Both misoprostol and injection	1,058 (61.5%)
None	21 (1.2%)
Births protected from PPH¹	2,193 (98.9%)

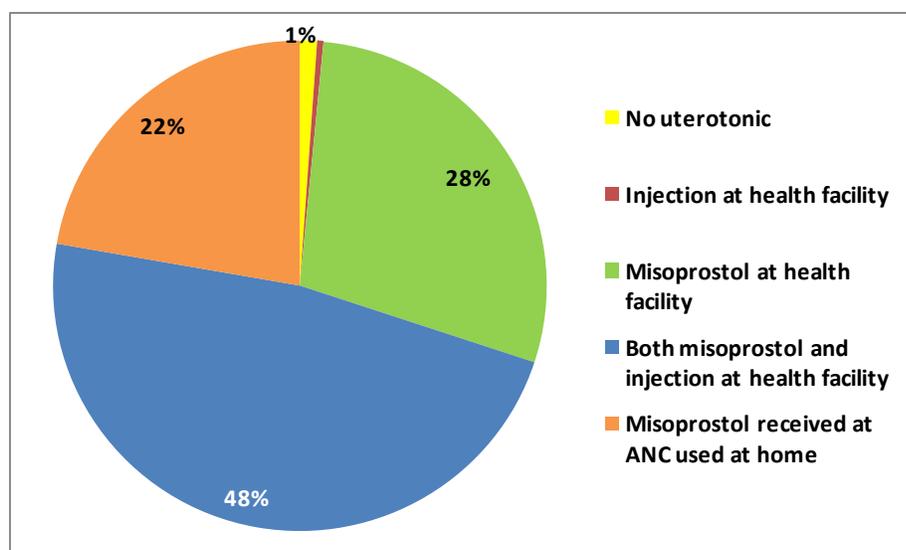
Source: *Postpartum Interview*

¹ Any uterotonic given for PPH prevention.

[^] Includes deliveries en route to the facility

Figure 6 shows the distribution of use of uterotonic for all deliveries in the Chokwé **Postpartum Interview** sample. Almost half (48%) received both misoprostol and injection at a health facility and another 28% received misoprostol only at a health facility. Misoprostol use at home deliveries, distributed at ANC, protected 22% of the deliveries in this sample that would not have otherwise received a uterotonic drug for PPH prevention.

Figure 6: Uterotonic coverage: Chokwé (n=2,218)



Source: Postpartum Interview

Safety: Correct Use of Misoprostol at Home Births

All but four women participating in the postpartum interview who delivered at home used the misoprostol they had received at an ANC visit. As Table 11 shows, of all of the women who used misoprostol at home delivery (n=494), only one women reported taking the wrong dose (taking one tablet instead of three). All women reported correctly taking the drug by swallowing, except for one woman with missing information.

Table 11: Correct use of misoprostol at home births: Chokwé

Used misoprostol at home birth		n=494
Number of tablets		
3 tablets (correct)		493 (99.8%)
1 tablet		1 (<0.1%)
Route		
Oral (correct)		493 (99.8%)
No information		1 (0.2%)

Source: Postpartum Interview

Need for Additional Interventions

According to the postpartum interview, only four women in Chokwé reported being referred to a health facility. Three women were referred for prolonged labor, and one for an emergency cesarean section. No woman reported being referred for excessive bleeding or retained placenta, and none of the women who took misoprostol to prevent PPH required additional interventions for bleeding-related reasons.

4.3.3 Nacala-Porto/Nacala-a-Velha: Distribution of Misoprostol at ANC and by TBAs

Misoprostol Distribution at ANC

Women who participated in the operational research in Nacala-Porto/Nacala-a-Velha could receive misoprostol either during an ANC visit or from a TBA at the time of delivery. According to the **Misoprostol Addendum**, almost all of the women attending ANC in the operational research (n=3,813) took misoprostol home from ANC (99%, Table 12). Therefore most women came to ANC when they were eligible for misoprostol at 28 weeks gestation. Very few women were given misoprostol when they were less than 28 weeks gestation (1.3%), and no woman received the tablets when she was less than 13 weeks gestation (data not shown).

A total of 85 women with **Misoprostol Addendums** did not take misoprostol home from ANC. Of the women who did not take misoprostol home, 41 women were ineligible to receive misoprostol (40 were under 28 weeks gestation and never returned to ANC and one was above 28 weeks gestation but screened as ineligible). Of those who were eligible to receive misoprostol, 44 did not take misoprostol home: 33 did not give a reason, seven stated that misoprostol was not available in the facility, two women said they did not have enough information, one woman said she needed permission from her husband, and one feared the side effects.

Table 12: Misoprostol distribution at ANC: Nacala-Porto/Nacala-a-Velha

Misoprostol Addendum	n=3,813
Enrolled in operational research and eligible for misoprostol distribution	3,772 (98.9%)
Misoprostol distribution (of all <i>Misoprostol Addendums</i>)	3,728 (97.8%)

Source: *Misoprostol Addendum*

Uterotonic Coverage and Protected Births from ANC Distribution

Table 13 presents uterotonic coverage at home and at facility deliveries of women who participated in the **Postpartum Interview** in Nacala-Porto/Nacala-a-Velha. Almost all of the reported home deliveries were protected with misoprostol: 95% of births were protected with tablets received at ANC and 5% were protected with misoprostol administered at delivery with a TBA. Only nine women did not use misoprostol who delivered at home.

At facility deliveries in the **Postpartum Interview** sample, 88% received misoprostol only, 11% received misoprostol and injection, and less than 1% received injection only. The **Postpartum Interview** also showed that women frequently brought the misoprostol they received during ANC with them to the facility: 94% of the women who took misoprostol (only or in conjunction with an injection) during their delivery used the misoprostol from ANC (data not shown).

Overall, 99% of women participating in the postpartum interview received any uterotonic for prevention of PPH at delivery in Nacala-Porto/Nacala-a-Velha.

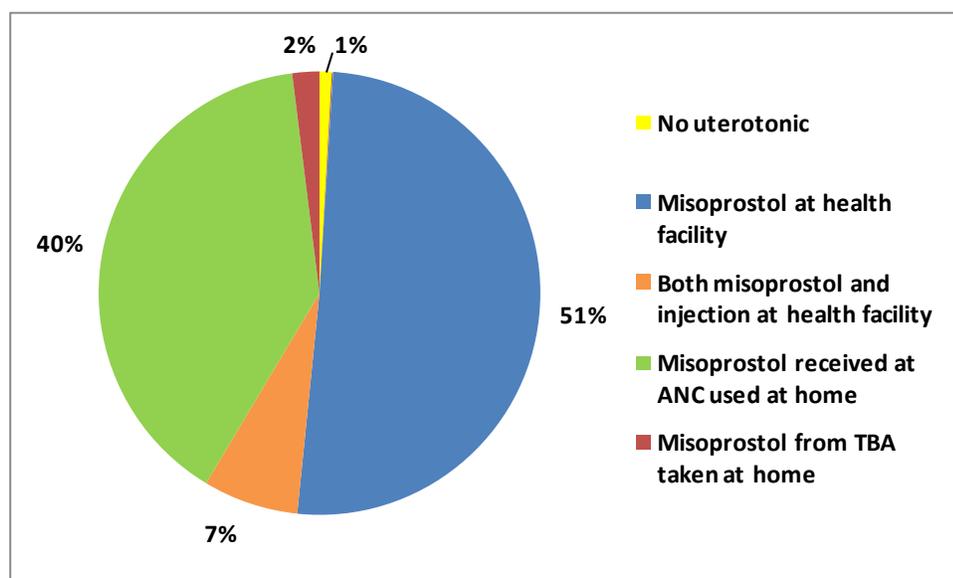
Table 13: Uterotonic coverage at home and facility deliveries: Nacala-Porto/Nacala-a-Velha

	n=4,434
Home birth	n=1,855
Used misoprostol received during ANC	1,761 (94.9%)
Used misoprostol received at delivery with a TBA	85 (4.6%)
None	9 (0.5%)
Facility birth	n=2,579
Injection only	3 (0.1%)
Misoprostol only	2,256 (87.5%)
Both misoprostol and injection	289 (11.2%)
None	31 (1.2%)
Births protected from PPH	4,394 (99.1%)

Source: Postpartum Interview

Figure 7 presents uterotonic use for all births in the Nacala-Porto/Nacala-a-Velha *Postpartum Interview* sample. Misoprostol protected 93% of births in the sample: 51% received misoprostol at a health facility, 40% self-administered misoprostol at home after receiving it at ANC, and 2% received misoprostol from a TBA at a home delivery. An additional 7% of women were treated with both misoprostol and injection.

Figure 7: Uterotonic coverage and protected births: Nacala-Porto/Nacala-a-Velha (n=4,434)



Source: Postpartum Interview

Note: Three women who received an injection at a health facility are excluded

TBAs participating in the operational research attended 2,070 deliveries in Nacala-Porto/Nacala-a-Velha. Misoprostol was used for PPH prevention in 99% of the deliveries attended by TBAs (Table 14). The majority of women (91%) received their misoprostol at an ANC visit, and 8% received misoprostol directly from the TBA at delivery.

Table 14: Uterotonic coverage at deliveries with TBAs: Nacala-Porto/Nacala-a-Velha

Delivered with TBA	n=2,070
Uterotonic at delivery	2,052 (99.1%)
Misoprostol distributed at ANC	1,893 (91.4%)
Misoprostol distributed by TBA	159 (7.7%)
None	18 (0.9%)

Source: TBA Delivery Report Form

Safety: Correct Use of Misoprostol at Home Births

Only two of the 1,846 women participating in the postpartum interview and delivering at home in Nacala-a-Porto/Nacala-Velha reported taking the wrong dose (taking one or two tablets instead of three). All women reported correctly taking the drug by swallowing, except for eight women with missing data on the drug route (Table 15).

Only five women delivering with TBAs reported taking one tablet instead of the correct dose of three. Therefore, more than 99% of women who delivered with TBAs and took misoprostol used it correctly (data not shown).

Table 15: Correct use of misoprostol at home births: Nacala-Porto/Nacala-a-Velha

Used Misoprostol at home birth	N=1,846
Number of tablets	
3 tablets (correct)	1,841 (99.7%)
1 tablet	1 (0.1%)
2 tablets	1 (0.1%)
No information	3 (0.2%)
Route	
Oral (correct)	1,838 (99.6%)
No information	8 (0.4%)

Need for Additional Interventions

Of the 4,434 women participating in the postpartum interview, only two women reported being referred to a health facility, both for prolonged labor. No women were referred for bleeding-related complications after taking misoprostol (data not shown).

Of the women who used misoprostol at home and responded to the number of *capulanas* soaked after delivery (n=1,766), the 24 (1.4%) women who reported soaking more than one *capulana* did not require referral or additional interventions (data not shown).

4.5 REPORTED POSTPARTUM SYMPTOMS

Of the 6,758 women who responded to the postpartum interview from all three sites, similar rates of postpartum symptoms were reported between those who did and did not use misoprostol (22% and 21%, respectively) (Table 16). For women who took misoprostol, the most common symptoms reported

were shivering (18%) and a raised body temperature (7%). Over 78% of all women who took misoprostol experienced no symptoms.

Table 16: Reported postpartum symptoms by users and non-users from all sites (N=6,758)

	Used misoprostol (n=6,681)	Did not use misoprostol (n=77)	Total (n=6,758)
Experienced postpartum symptoms[^]	1,472 (22.0%)	16 (20.8%)	1,488 (22.1%)
Shivering	1,166 (17.5%)	9 (11.7%)	1,175 (17.4%)
Nausea	172 (2.6%)	1 (1.3%)	173 (2.6%)
Vomiting	111 (1.7%)	0 (0%)	111 (1.6%)
Raised body temperature	441 (6.6%)	8 (10.4%)	449 (6.6%)
Diarrhea	50 (0.8%)	1 (1.3%)	51 (0.8%)
No symptoms	5,209 (78.0%)	61 (79.2%)	5,270 (84.6%)

Source: Postpartum Interview

[^]Women could report experiencing more than one symptom.

4.6 ACCEPTABILITY: USER PERSPECTIVES ON MISOPROSTOL USE

Women who participated in the postpartum interview from all three sites and had used misoprostol found it to be significantly more acceptable than women who did not use misoprostol (Table 17). Of women who used misoprostol (n=6,681), over 96% of women would recommend it to a friend and use it in a subsequent pregnancy. Further, 72% of women who used misoprostol said that they would be willing to purchase misoprostol for an average price of 70 meticals (approximately \$2.24 USD). Women who did not use misoprostol reported lower acceptability of the drug; however, 82% still said that they would use misoprostol in a subsequent pregnancy.

Table 17: Acceptability of misoprostol by users and non-users from all sites

	Used misoprostol (n=6,681)	Did not use misoprostol (n=77)
Would recommend misoprostol to a friend*	6,538 (97.9%)	59 (76.6%)
Would use misoprostol in a subsequent pregnancy*	6,471 (96.9%)	63 (81.8%)
Would purchase misoprostol*	4,803 (71.9%)	45 (58.4%)
Average amount willing to pay in meticals (min;max)	70.2 (1; 1500)	98.9 (1; 500)

Source: Postpartum Interview

*p<0.01

5. Conclusions

COMMUNITY AWARENESS OF PPH AND MISOPROSTOL

Recall of community awareness messages about excessive bleeding and misoprostol was quite high among all women who participated in the operational research. Most women who were interviewed mentioned identifying excessive bleeding using the *capulana*, demonstrating that the *capulana* is a feasible and acceptable tool for assessing blood loss at the community level. Regardless of where the woman was offered misoprostol, ANC providers and health facilities were mentioned most often as sources of information about PPH and misoprostol. This highlights their important role in educating women and as trusted information sources. In addition, some women who received misoprostol from a TBA also listed a TBA as their most important source of information about misoprostol. TBAs are an important asset to conveying safe delivery messages in addition to ANC providers and at health facilities.

HIGH COVERAGE OF MISOPROSTOL DISTRIBUTION AT ANC VISITS

This operational research achieved high coverage of misoprostol distribution to women attending ANC. Over 92% of women in Chokwé and over 97% in Nacala-Porto/Nacala-a-Velha whose ANC records were analyzed in this report took misoprostol home. Very few women did not return to ANC once they had reached 28 weeks gestation, when they were eligible to receive misoprostol. Therefore, the gestational restriction did not limit women from obtaining misoprostol at ANC. In Nacala-Porto/Nacala-a-Velha, 91% of women delivering with TBAs used misoprostol that they had received at ANC. This illustrates that ANC is an effective distribution outlet for misoprostol and is capable of reaching women in rural Mozambique who deliver outside of health facilities.

MISOPROSTOL DISTRIBUTION INCREASES BIRTHS PROTECTED FROM PPH

Both ANC and TBA distribution resulted in protected births at virtually all home deliveries in the postpartum interview sample. In Chokwé, 99% of the women delivering at home used misoprostol they had received at ANC. TBAs used misoprostol in all of the deliveries they attended in Namacurra. In Nacala-Porto/Nacala-a-Velha, ANC distribution was complemented by TBA distribution of misoprostol: TBAs gave misoprostol at delivery to the 5% of women delivering at home who did not receive misoprostol at ANC, resulting in over 99% of home births in the postpartum sample protected from PPH.

At facility deliveries, misoprostol also made a significant contribution to protected births. Of note, women delivering in facilities often brought the tablets they had received with them to the facility, and then used them during delivery.

MISOPROSTOL USE AT HOME BIRTHS IS SAFE

Virtually all the women who received misoprostol at ANC correctly self-administered the drug after delivering at home. Additionally, most women delivering with TBAs in Namacurra and Nacala-Porto/Nacala-a-Velha also reported taking the correct dose at the correct time at a home delivery. These results demonstrate that women and TBAs can safely use misoprostol at home deliveries once educated on the drug.

There were no bleeding-related referrals, nor were there any referrals due to use of misoprostol in the postpartum interview sample. There were no maternal deaths reported in the operational research.

WOMEN FIND MISOPROSTOL ACCEPTABLE

Acceptability of misoprostol was very high among both misoprostol users and non-users across all three operational research sites. Over 96% of women who had used misoprostol in Chokwé, Namacurra and Nacala-Porto/Nacala-aVelha reported that they would recommend misoprostol to a friend or use it in a subsequent pregnancy. Further, women who had used misoprostol were significantly more likely to say that they would purchase misoprostol as opposed to women who had not used misoprostol. This indicates that women find misoprostol to be an acceptable intervention for preventing PPH.

6. Recommendations

The findings from this report demonstrate that distributing misoprostol to women through ANC visits and at delivery with TBAs has the potential to increase the number of women who receive a uterotonic drug for prevention of PPH at delivery. We recommend to policy makers and key stakeholders that distribution of misoprostol through ANC visits and at deliveries with TBAs be scaled-up nationwide in Mozambique to address this key cause of maternal mortality.

TRAIN ALL ANC PROVIDERS TO DISTRIBUTE MISOPROSTOL

All ANC providers should be trained to distribute misoprostol to pregnant women during routine ANC care. ANC providers were a main point of misoprostol distribution for this operational research and provided education and information directly to women. Women delivering at home who received misoprostol at an ANC visit used misoprostol correctly almost universally, indicating the high quality of education they received from ANC providers. With comprehensive training and supervision, ANC providers have the skills to integrate misoprostol distribution into regular ANC visits.

TRAIN TBAS TO DISTRIBUTE MISOPROSTOL AT DELIVERIES

TBAs provided misoprostol at delivery for all women that they delivered in Namacurra, and they provided additional uterotonic protection for women they attended in Nacala-Porto/Nacala-a-Velha. In rural areas of Mozambique, where many women do not deliver in a health facility, TBAs serve as a critical opportunity to distribute misoprostol to women. TBAs are an important additional distribution point for misoprostol, as they can reach women who have not attended ANC visits.

CONTINUE COMMUNITY AWARENESS EFFORTS

Community awareness and education on the importance of delivering in facilities, birth preparedness, and the availability and use of misoprostol was integral to community acceptance and utilization of services during this operational research. Engaging members of the community increases awareness of misoprostol and reinforces messages from ANC providers on correct use. By conducting community meetings to reinforce the awareness of birth preparedness, TBAs demonstrated that they are an invaluable component of increasing knowledge in any health intervention and they should be supported in their efforts. Print materials should also continue to be distributed to clinics and key community locations, in order to reinforce safe delivery messages.

MAKE MISOPROSTOL AVAILABLE AT ALL FACILITIES WHERE DELIVERIES OCCUR

To ensure that providers have all the tools available to them to help prevent and manage PPH, both misoprostol and injectable uterotonics should be available in delivery rooms. However, there are situations where oxytocin may not be available due to stock-outs, improper storage or drug expiration. For this reason, we recommend that all facilities where deliveries take place be consistently stocked misoprostol to increase the likelihood that a woman will receive a uterotonic at delivery.

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