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*Applying Science to Strengthen
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USAID ASSIST Project

Botswana Country Report FY15

Cooperative Agreement Number:

AID-OAA-A-12-00101

Performance Period:

October 1, 2014 – September 30, 2015

DECEMBER 2015

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DISCLAIMER

This country report was prepared for review by the United States Agency for International Development (USAID) by University Research Co., LLC (URC). The views expressed do not necessarily reflect the views of USAID or the United States Government.

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For more information on the work of the USAID ASSIST Project, please visit www.usaidassist.org or write assist-info@urc-chs.com.

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Abbreviations

AIDS	Acquired immunodeficiency syndrome
AMTSL	Active management of the third stage of labor
ANC	Antenatal care
APC	USAID Advancing Partners and Communities Project
ART	Antiretroviral therapy
ASSIST	USAID Applying Science to Strengthen and Improve Systems Project
CMS	Central Medical Stores
HAART	Highly active antiretroviral therapy
HIV	Human immunodeficiency virus
M&E	Monitoring and evaluation
MMRI	Maternal Mortality Reduction Initiative
MOH	Ministry of Health
OB-GYN	Obstetrics and gynecology
OVC	Orphans and vulnerable children
PDSA cycle	Plan-Do-Study-Act cycle
PE/E	Pre-eclampsia/eclampsia
PEPFAR	U.S. President's Emergency Plan for AIDS Relief
PPH	Post-partum hemorrhage
QI	Quality improvement
URC	University Research Co., LLC
USAID	United States Agency for International Development

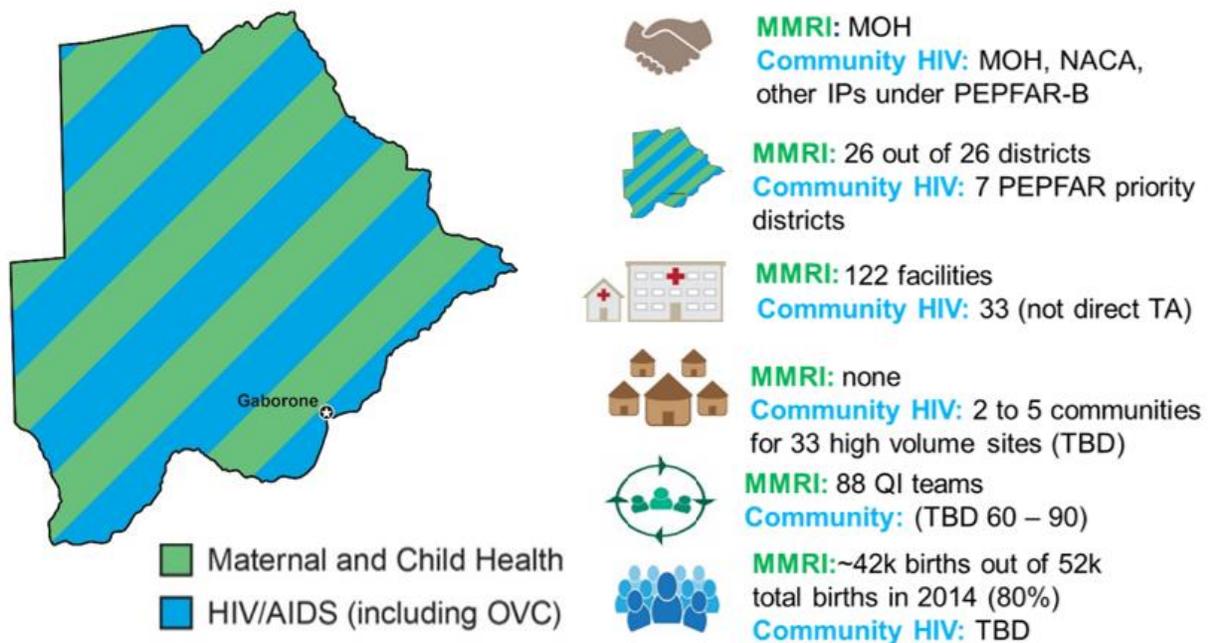
1 Introduction

The USAID Applying Science to Strengthen and Improve Systems (ASSIST) Project started working in Botswana in January 2013, building on planning activities conducted in 2012 through the USAID Health Care Improvement Project. In 2013, the Ministry of Health (MOH) in Botswana designed and launched the national Maternal Mortality Reduction Initiative (MMRI). Technical assistance for this initiative was provided by the USAID ASSIST Project. The objective of the MMRI was to develop a system-level strategy to achieve the Millennium Development Goal 5 target (to reduce maternal mortality by 75% between 1990 and 2015) by identifying gaps in the public health system and implementing improvements in a timely and efficient way.

The project operated in all 26 districts in Botswana, establishing quality improvement (QI) teams in 72% of the 122 facilities providing inpatient maternity services. The focus of the QI activities was the implementation of evidence-based, high-impact interventions including: reduction of postpartum hemorrhage through active management of the third stage of labor; promotion of monitoring of the fourth stage of labor to identify early onset of complications that require immediate intervention; immediate administration of magnesium sulphate in patients with pre-eclampsia/eclampsia; and the immediate uterine evacuation of products resulting from complicated incomplete abortion within two hours of the diagnosis.

In FY16, ASSIST Botswana, at the request of USAID, will shift its focus to contributing to the goal of epidemic HIV control through the application of quality improvement approaches to the community health system response to HIV. Improving how existing community platforms interact and link with clinical service providers is seen as key to the achievement of PEPFAR 3.0 goal and targets. Preparation for this shift in focus began in Q4 of FY15.

Scale of USAID ASSIST's Work in Botswana



2 Program Overview

What are we trying to accomplish?	At what scale?
1. National Maternal Mortality Reduction Initiative (MMRI)	
<ul style="list-style-type: none"> Reduce maternal mortality through implementation of evidence-based, high-impact interventions Contribute to improving maternal outcomes of HIV-positive women through improving maternity care and prevention of mother-to-child transmission of HIV for HIV-positive women and their newborns 	<ul style="list-style-type: none"> Districts: All 26 health districts 122 facilities (90%) providing obstetric services: 2 referral hospitals, 28 district and primary hospitals, and 92 clinics with maternity services. QI teams formed in 88 facilities with maternity services (72% of total)
2. Strengthen the Community Health System Response to HIV/AIDS	
<ul style="list-style-type: none"> Improve community and facility referrals and linkages and increase retention for HIV-positive patients. 	<ul style="list-style-type: none"> 7 PEPFAR priority districts (out of a total of 26) with highest HIV burden facilities 33 facilities (not direct support) 2-5 communities per facility in 33 high-volume facilities

= Improvement Activity

3 Key Activities, Accomplishments, and Results (October 2014-September 2015)

Activity 1. National Maternal Mortality Reduction Initiative

BACKGROUND

The focus of QI activities under the MMRI was the implementation of evidence-based, high-impact interventions to reduce maternal mortality. The top three causes of maternal death identified in the country in 2012 were severe pre-eclampsia/eclampsia, postpartum haemorrhage (PPH), and post-abortion complications (MOH Maternal Mortality Report 2007-2011). By targeting these three major causes of mortality, we worked towards a measurable reduction in the maternal mortality in Botswana.

High-impact interventions included:

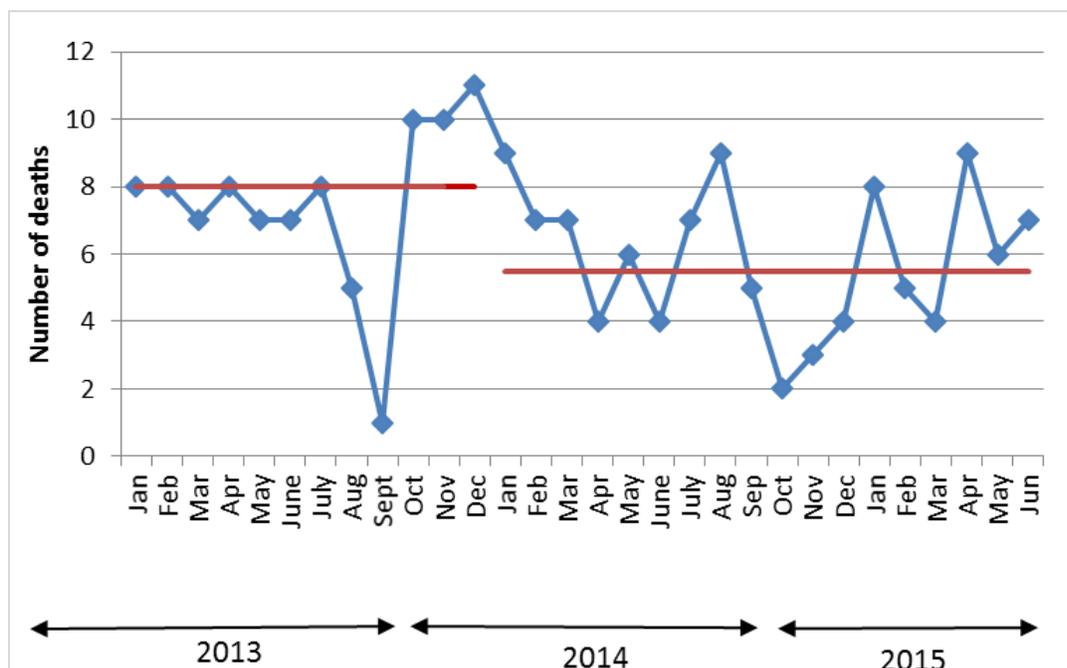
1. Immediate administration of magnesium sulfate in patients with severe pre-eclampsia/eclampsia (PE/E);
2. Promotion of monitoring fourth stage of labor to identify early onset of complications that require immediate intervention;
3. Active management of the third stage of labor (AMTSL); and
4. Immediate uterine evacuation in cases of complicated incomplete abortion.

Below are listed the accomplishments and results for FY15. The latest data provided by the MOH was July 2015.

ACCOMPLISHMENTS AND RESULTS

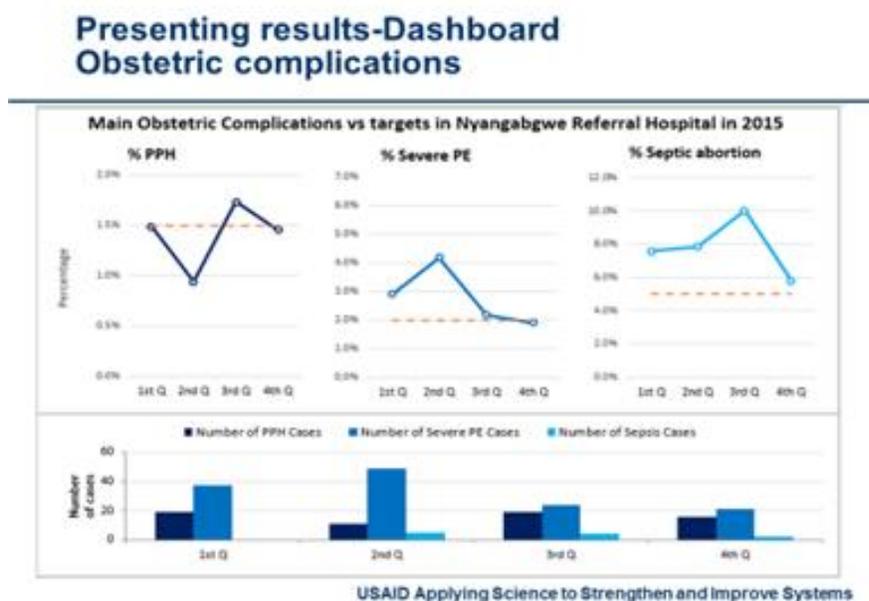
- **Reduction in maternal deaths:** The number of maternal deaths in Botswana was reduced from 90 deaths in 2013 to 69 deaths in 2014. **Figure 1** indicates the improving trend in the reduction of maternal mortality. The median number of deaths to June 2015 was reduced to 5.5 deaths/month, compared to eight deaths per month experienced in 2013.

Figure 1: Number of maternal deaths per month, nationwide (Jan 2013 – June 2015)



- Developed an electronic tool for surveillance and analysis of obstetric complications (Form MH 3123).** The MOH requested technical advice from ASSIST (Dr. Maria Insua) to support the Sexual and Reproductive Health Monitoring and Evaluation System by adapting their paper-based perinatal surveillance reporting tool (MH 3123) to an electronic format. At the time, the paper form of the MH 3123 was used to collect data on obstetric and neonatal complications in health facilities and was sent by fax or mail to the central level for analysis. Reporting was inconsistent, with some facilities reporting only quarterly or annually instead of monthly, and other facilities not reporting at all. Central-level data analysis often caused a significant delay (often years) in producing results. In February 2015, ASSIST adapted the existing MOH paper tool MH 3123 to an Excel format that will allow for more timely reporting via email and will facilitate timely analysis by removing the data entry step at the central level. To promote the use of the data at the facility and district levels, the new electronic form contains an embedded a dashboard of indicators and graphs that are automatically generated based on the data entered into the data sheet. The indicators dashboard was provided to each hospital

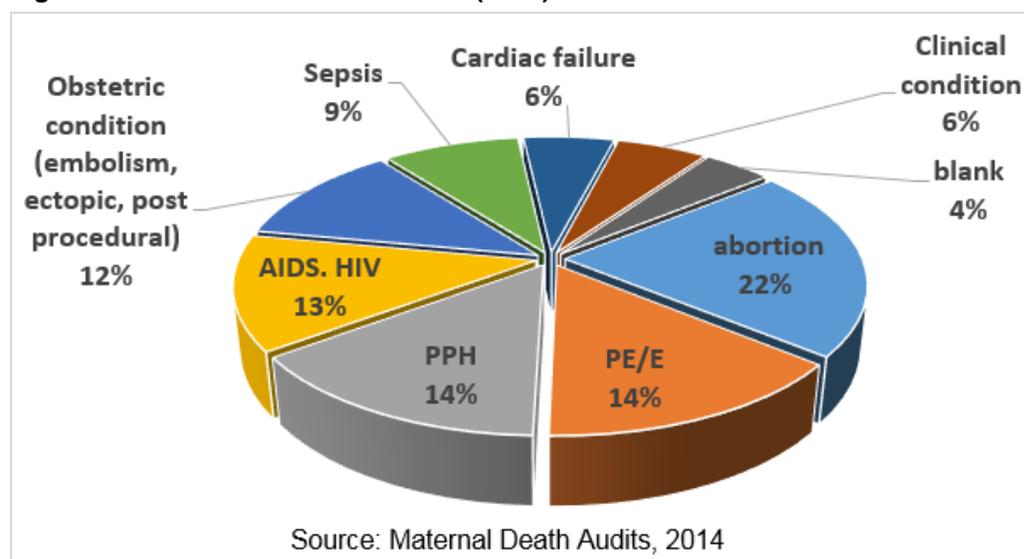
Figure 2: Example of dashboard of obstetric complications for one hospital



in slide format to facilitate reporting by hospital superintendents in national quarterly reporting meetings (see **Figure 2**).

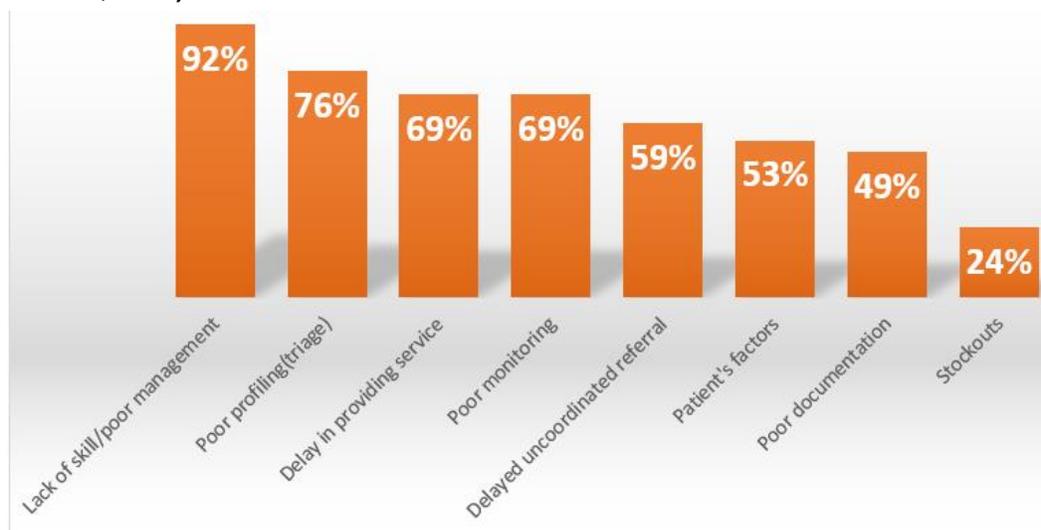
- **Conducted capacity-building sessions in the use of the new electronic MH 3123 form for district monitoring and evaluation (M&E) officers and district MMRI coordinators.** Sessions took place in Gaborone (May 25-26, 2015) for the southern districts and in Francistown (May 28-29) for the central and northern districts. The trainings were organized and funded by the MOH. Approximately 20-25 district M&E, information technology, and medical data officers, as well as 11 MMRI district coordinators were updated on the use of MMRI tools which were developed at the beginning of the project and the new perinatal surveillance tool. The sessions lasted two days and focused on the practical use of the tools. The framework for data analysis was presented and pilot tested during each training session. Specific recommendations for measuring indicators and sources of data collection were provided, which were to be incorporated in an updated version of the tool.
- **Presentation of the new electronic MH 3123 tool to the Prime Secretary and relevant MOH officers.** A high-level meeting was conducted by ASSIST and the MOH in Gaborone on June 2, 2015 to present the new perinatal surveillance tools developed for data collection, reporting, and analysis. The Prime Secretary welcomed the adaptation of the MH 3123 form following the format of the previously developed MMRI tools and recommended the tool be pilot tested and included in the Integrated Patient Management System.
- **Provided capacity building for data analysis and project management for MOH officers (Oct 2014-August 2015).** Dr. Insua provided continuous support to the central level on data analysis and coaching to prepare for the complete handover of MMRI activities to the MOH at the end of August 2015.
- **ASSIST conducted weekly monitoring of near misses and immediate audit of near misses (Oct 2014-August 2015).** Through this process as well as a review of the national maternal mortality audits, the project supported the MOH to develop a more nuanced understanding of the causes of near misses and maternal deaths, allowing for more targeted follow-up of potential complications and the development of strategies to address ongoing process failures. For example, a review of the maternal mortality audits in 2014 revealed that the majority of cases of PPH in Botswana are now not due to uterine atony (as previously thought) but to poor clinical practices during and after C-sections. As a result, district coordinators were asked by the project to report all incidents of PPH to Dr. Sinvula, the National Coordinator, on a weekly basis, with specific details on the cause of bleeding, the estimated quantity of bleeding, how the patient was managed, and the fate of the patient. Dr. Sinvula has subsequently been responding to reports of inadequate management of PPH by paying visits to specific facilities for immediate follow-up on clinical and process issues. In addition, a surgical checklist was developed by Dr. Sinvula with technical teams from the hospitals to improve compliance with best practices and better management of surgical patients.
- **ASSIST conducted an analysis of the maternal mortality audits for 2014 (Jul-Aug 2015).** The analysis included 51 (74%) maternal audits conducted from a total of 69 maternal deaths in 2014. With this timely analysis of maternal death audits, ASSIST provided evidence of gaps to support decision making at higher levels. Findings from this analysis are presented below:
 - **81% of maternal deaths in 2014 were considered avoidable.**
 - **HIV status.** HIV-positive status was reported in 51% (35 out of 69) of the deaths, HIV-negative in 36%, and unknown in 13% of deaths. HIV-related complications (AIDS) were responsible for 13% of all maternal deaths.
 - **Clinical causes of death.** 71% of the causes of maternal death in 2014 were due to direct obstetric causes, 25% to indirect causes, and 4% were unknown causes. Main causes of maternal deaths were abortion complications (22%), PPH (14%), PE/E (14%), HIV-related complications (13%), other obstetric complications (embolism, postprocedural, ectopic pregnancy) (12%), sepsis (9%), cardiac failure (6%), and other clinical conditions (6%) (**Figure 3**).

Figure 3: Causes of maternal deaths (2014)



- **Contributory causes of deaths.** The MOH Maternal Audit Committee outlined contributory causes of deaths due to patient factors and health system factors (**Figure 4**):
 1. **Patient factors:** Patient factors contributed to 53% of the maternal deaths. Of those, 35% were due to delay in seeking care. Default in taking highly active anti-retroviral (HAART) treatment was documented in 6% of cases.
 2. **Health system factors** were identified in 92% of maternal deaths. The most frequent of these factors related to lack of provider knowledge and skills to diagnose and manage conditions as per quality standards.
 - Lack of provider skills were identified in 92% of maternal deaths. Areas of deficient provider skills included providing the wrong medication for the condition or wrong dosage (including overdose), poor diagnostic skills, and failure to recognize the clinical condition and/or reach a correct clinical diagnosis.
 - Poor patient profiling (triage) and failure to recognize a patient with a clinical emergency was identified in 76% of maternal deaths.
 - Delay in providing service was identified in 69% of maternal deaths. Delay in provision of care includes: delay in seeing the patient once in the facility, delay in the provision of treatment (magnesium sulfate), delay in taking the patient to theatre to conduct a C-section or uterine evacuation, delay in prescribing lab test, and delays retrieving the test results.
 - Poor monitoring was reported in 69% of maternal deaths. Poor monitoring includes poor or lack of monitoring a patient's vitals and urine output, no monitoring for adverse events to medications, poor post-operative monitoring, and poor postpartum monitoring.
 - Referral issues were reported in 59% of maternal deaths. These included delay in transferring a patient to the hospital, lack of transport, attempting to transport an unstable patient, poor coordination of referral, and poor communication on the status of the patient from the referring doctor to the receiving doctor.
 - Poor documentation was reported in 49% of cases.
 - Stock-outs and lack of availability/disrepair of lab machines were reported in 24% of maternal death cases.

Figure 4: Health system contributory factors to maternal deaths (2014) (74% maternal deaths audited, n=51)



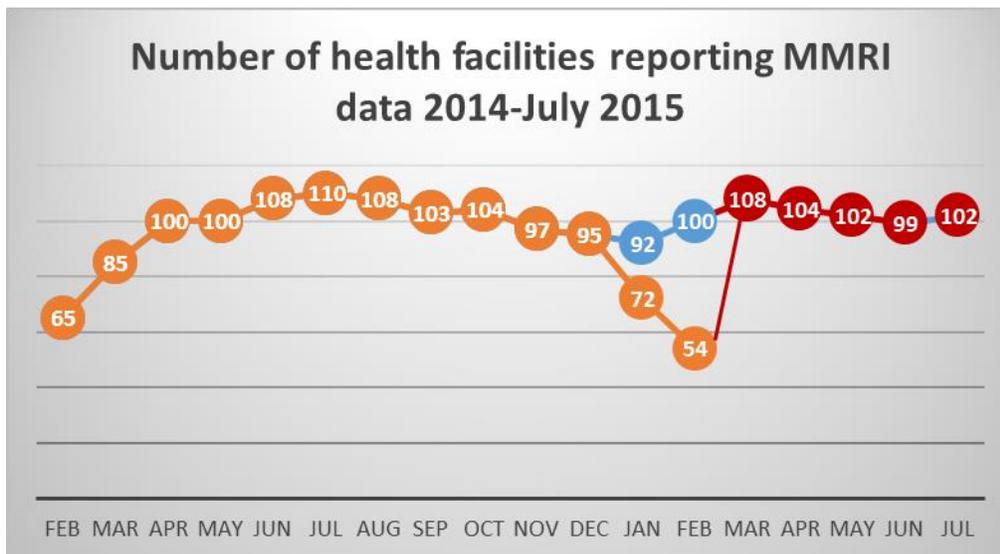
Source: Maternal Death Audits, 2014

- **Provided ongoing QI support at the facility level (Oct 2014 – August 2015)**
 - **District coordinators conducted QI coaching visits to the QI teams twice a month.** MMRI district coordinators continued to provide regular and ongoing support to QI teams at the facility level. These visits included a review of the data collected by the teams, coaching in problem identification and analysis, and support with running Plan-Do-Study-Act (PDSA) cycles to test changes in their chosen areas of improvement.
 - **Coaching support was provided by an external QI specialist.** Between October 2014 and March 2015, an ASSIST consultant, Ms. Cathy Green, made two visits to Botswana to provide a total of 7 days of intensive coaching support to three of the district coordinators in the districts of Ngami, Palapye and Tutume. These visits covered:
 - Good preparation for a QI meeting; building on previous meetings, having a clear agenda and objectives
 - Working systematically through priority topics; testing change ideas until improvement has been secured
 - Increasing the pace of the QI work
 - Sustaining improvements
 - **A two-day QI training program was provided to five midwife district coordinators by the ASSIST consultant in Gaborone (Dec 2014).**
- **ASSIST and the MOH conducted a third QI learning/sharing workshop, Kansane (Feb 22-28, 2015).**
 - Participants included MMRI district coordinators, MOH officers (Deputy Permanent Secretary, Director of Sexual and Reproductive Health Department, Director of Maternal Services), and the ASSIST team.
 - Participants reviewed the importance of utilizing PDSA cycles and were coached to review data reported through the MMRI M&E system.
 - The learning sessions provided a forum for QI coordinators to share progress on their improvement work and discuss improvement strategies and barriers to implementation.
 - Performance results were shared, and discussions addressed analysis of the factors leading to maternal deaths in each facility as per the maternal mortality audits conducted.
 - Coordinators worked on developing a work plan to support QI teams in moving forward with QI activities.
- **Daily participation in the morning clinical rounds at the National Referral Hospital Princess Marina.** Dr. Sinvula attended the daily morning rounds of the OB-GYN department at Princess Marina

Hospital in Gaborone, the country's main referral hospital. System issues such as overcrowding in the ward were discussed during these rounds. The hospital often reported up to 20+ patients waiting in a single day to have an elective C-section and occupying beds usually held for emergencies. ASSIST, in turn, worked with hospital managers and coordinated with other referral hospitals to absorb the backlog in elective C-sections at the hospital. This is expected not only to improve the overcrowding of patients in the hallways but also to improve infection control and post-operative monitoring and bring about a reduction in post-operative sepsis.

- **Supported the Sexual and Reproductive Health Department of the MOH with data analysis** (Oct 2014 – Aug 2015). The project presented to the MOH a preliminary analysis of referral patterns during obstetric emergencies that subsequently resulted in a maternal death, as well as provided quarterly M&E reports and a project annual report. ASSIST's analysis of all the data captured has informed the MOH decisions on the needed staff allocation per delivery in maternity facilities that could lead to a more adequate distribution of staff based on the demand for services and complexity of pathologies treated at each facility. In addition:
 - There has been weekly monitoring and reporting on the availability of essential drugs and commodities in the facilities by the MOH district coordinators to the MMRI Coordinator to inform the MOH and the Central Medical Stores about stock-outs.
 - As a result of improved monitoring and reporting of stock-outs, the MOH and Central Medical Stores (CMS) are taking immediate action to address the availability of essential drugs and commodities. ASSIST has been working directly with facilities in which stock-outs have been reported to develop a contingency plan to make those drugs available, coordinate with the facility pharmacy to improve procurement, and in some cases arranging for drugs from one facility to be sent immediately to the facility with a stock-out to make treatment available to patients.
 - The MMRI Coordinator met weekly with the CMS to compare data from their inventories and the data on drug availability collected by the MMRI district coordinators to prioritize those facilities with stock-outs or with minimum availability of essential drugs.
 - ASSIST worked closely with the National Blood Transfusion Services to improve the availability of blood at the facility level.
- **Facilities reporting MMRI data.** The number of facilities reporting data decreased from 95 in December 2014 to 54 in February 2015 (**Figure 5**). This was as a result of a massive transfer of 759 midwives throughout the country that disrupted the QI teams. District coordinators have been working on reforming QI teams in the facilities since March 2015 and have trained new personnel as focal points for data collection. As a result, data reports in March included data collection for the missing months of January-March 2015. The retroactive number of facilities reporting data is presented below in blue.

Figure 5: Number of facilities reporting MMRI data per month in each district (Feb 2014 – July 2015)



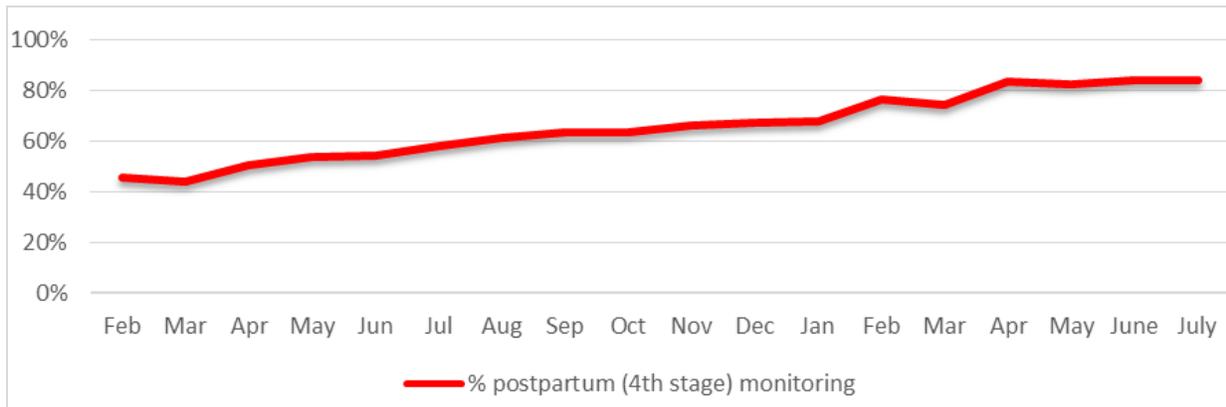
- QI teams established.** A total of 88 QI teams were formed in the facilities, which represents 72% of the 122 facilities included in the initiative having a QI team. QI teams were not organized in private hospitals and in some remote maternity clinics. Eighty-nine percent (78 out of 88) of the QI teams formed were functional; only 10 QI teams failed to implement QI activities in the areas of improvement selected. We considered a QI team to be functional if they met regularly (weekly/biweekly), used QI methodology to identify gaps, proposed solutions or changes that were tested (following PDSA), and used performance data to evaluate if the changes tested were successful in achieving the established targets. **Table 1** presents number of teams and functional teams by type of facility.

Table 1: QI teams established per type of facility

Type of facility	QI teams established	QI teams functional
Maternity clinic	63	55
District hospital	6	6
Primary hospital	17	15
Private hospital	0	0
Referral hospital	2	2
Total	88	78

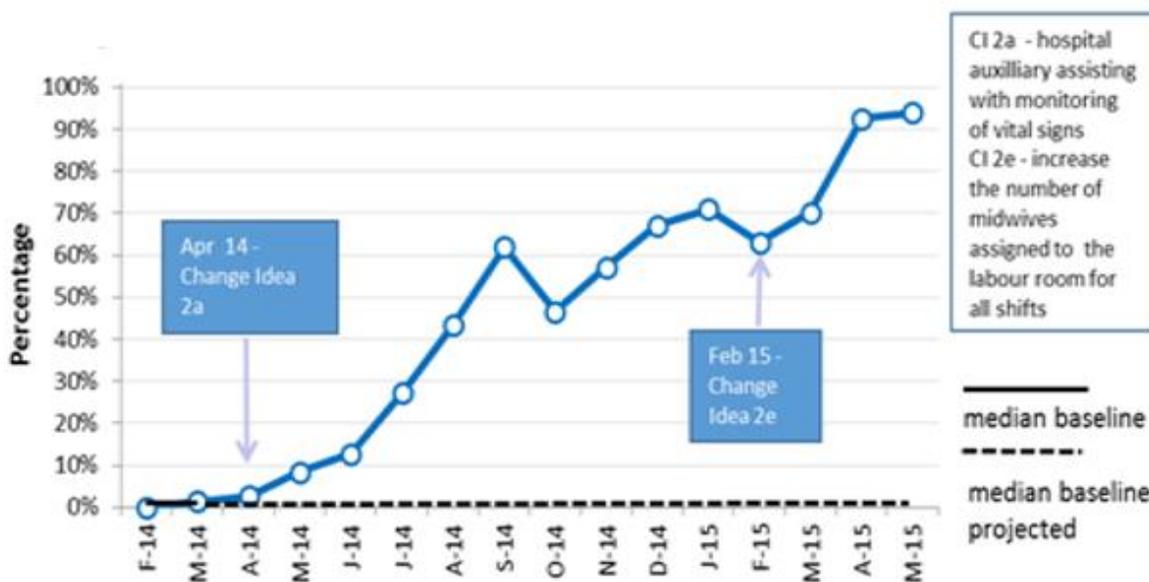
- QI teams' improvement aims.** Each QI team selected one or more areas of improvement based on baseline data and audits of patient files. Of the 78 QI teams actively working on improvement, 68% worked on improving monitoring of 4th stage of labor, 55% on adherence to AMTSL, 6% on PE/E management during labor, 16% on management of incomplete abortions, 6% on management of septic abortions, and 14% on other topics (improving partogram use, promoting hospital delivery, checking for cervical tears, FP counselling, and supply management).
- Monitoring postpartum vitals (4th stage of labor).** Monitoring postpartum vitals was a main focus of improvement for 68% of QI teams. As a result, compliance with this indicator increased from a baseline of 46% in February 2014 to 84% in July 2015 (**Figure 6**).

Figure 6: Compliance with postpartum monitoring (4th stage of labor), n= 43,899 deliveries (Feb 2014 – Jul 2015)



- **An example of improvement in monitoring women during the immediate postpartum period (4th stage of labor) in the Athlone Hospital is presented in Figure 7.** Two changes were tested: Use of hospital auxiliaries to assist with the monitoring in April 2014 and increasing the number of auxiliaries in the labor room in all shifts in February 2015. Both changes contributed to the achievement of 93% compliance with the indicator by May 2015.

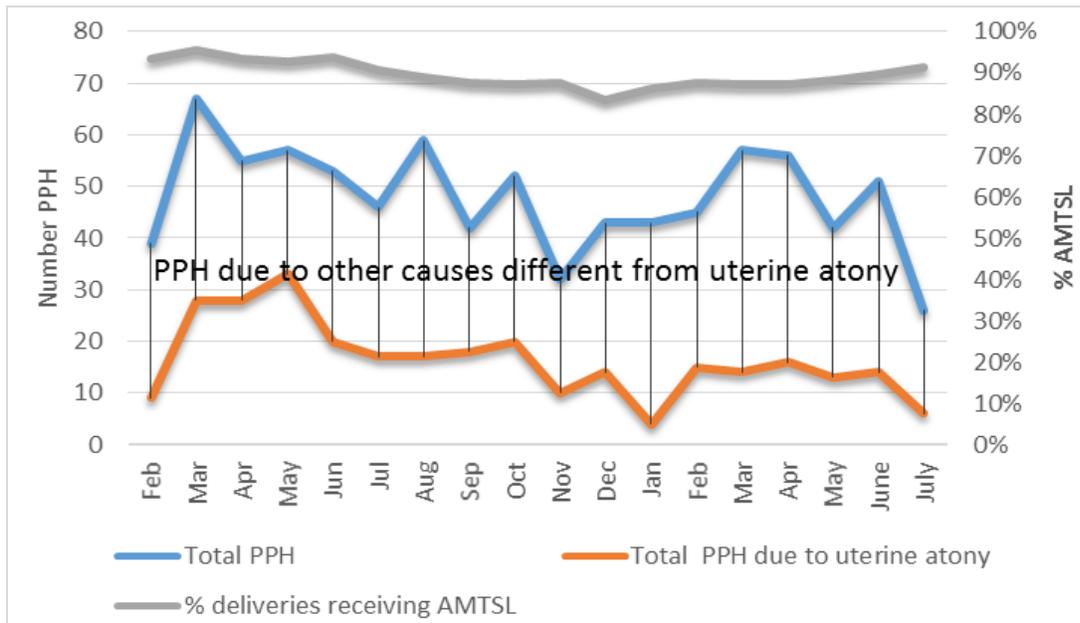
Figure 7: Compliance with postpartum monitoring (4th stage of labor), Athlone Hospital, n=1,205 (Feb 2014 – May 2015)



- **Active management of 3rd stage of labor.** Of the 780 PPH cases documented from Feb 2014-May 2015, 35% were due to uterine atony, 22% to retained placenta, and 43% to other causes (cervical tears, uterine laceration, uterine rupture, coagulopathy, post-procedural C-section complications). The MMRI has introduced additional indicators to gather more data on the others causes contributing to PPH, such as lacerations or PPH after intervention (C-sections) that are playing a significant role as causes of PPH.

Compliance with the provision of a uterotonic (oxytocin 10 units intramuscular or misoprostol or ergometrine if oxytocin is unavailable) within the first minute after delivery has remained steady, around 90% since February 2014. Subsequently the percentage of PPH due to uterine atony was reduced from 51% in April 2014 to 23% in July 2015 (**Figure 8**).

Figure 8: Percentage compliance with AMTSL vs incidence of PPH due to uterine atony or other causes (n=44,064 vaginal deliveries) (Feb 2014 – July 2015)

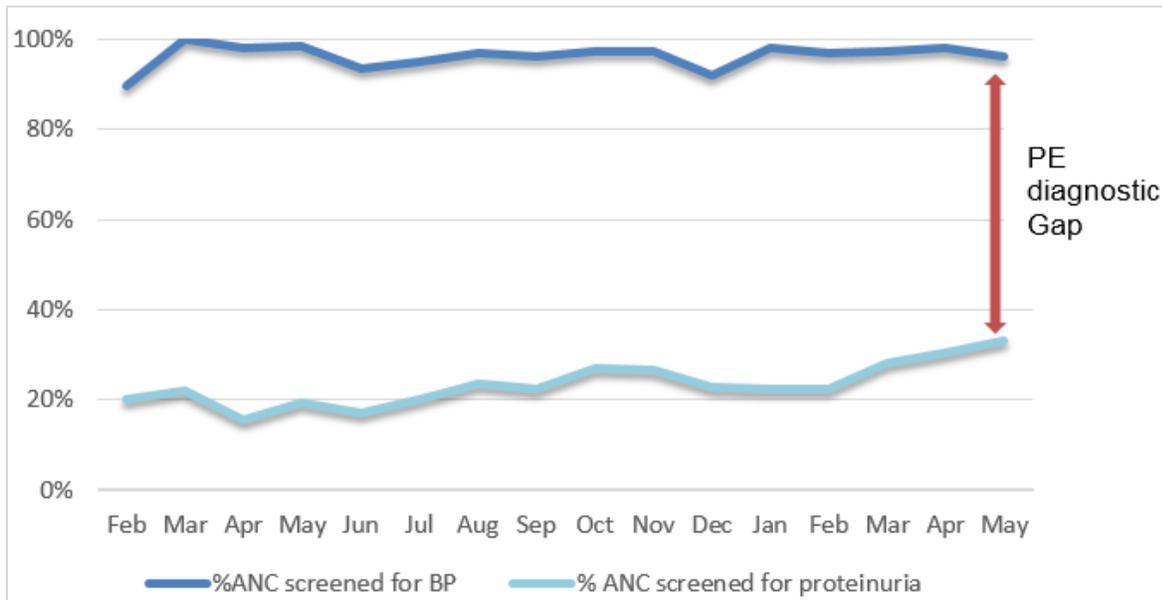


- Screening and diagnosis of pre-eclampsia and eclampsia.** Every pregnant women should be monitored for blood pressure and presence of protein in urine at each antenatal visit to identify early onset of pre-eclampsia. This is a severe condition that requires immediate treatment to avoid severe maternal and fetal complications and/or death. Pre-eclampsia and eclampsia were the second cause of maternal mortality in Botswana during 2014.

Data indicates that while 97% of pregnant women had their blood pressure measured during at least one antenatal care (ANC) visit, only 23% of them were screened for presence of protein in urine. Measurement of protein in a simple ambulatory method that consists of dipping the uristick in the woman’s urine, with the result of proteinuria ready in minutes. As a result of the screening gap, we assume that there is a severe under-diagnosis of pre-eclampsia complications in Botswana (**Figure 9**). The number of pre-eclampsia cases decreased from 95 (4.8%) cases in February 2014 to 27 (1.1%) in May 2015. The incidence of pre-eclampsia reported in May fell below what would be expected (international studies¹ found a 2% to 8% global incidence of pre-eclampsia in pregnancies).

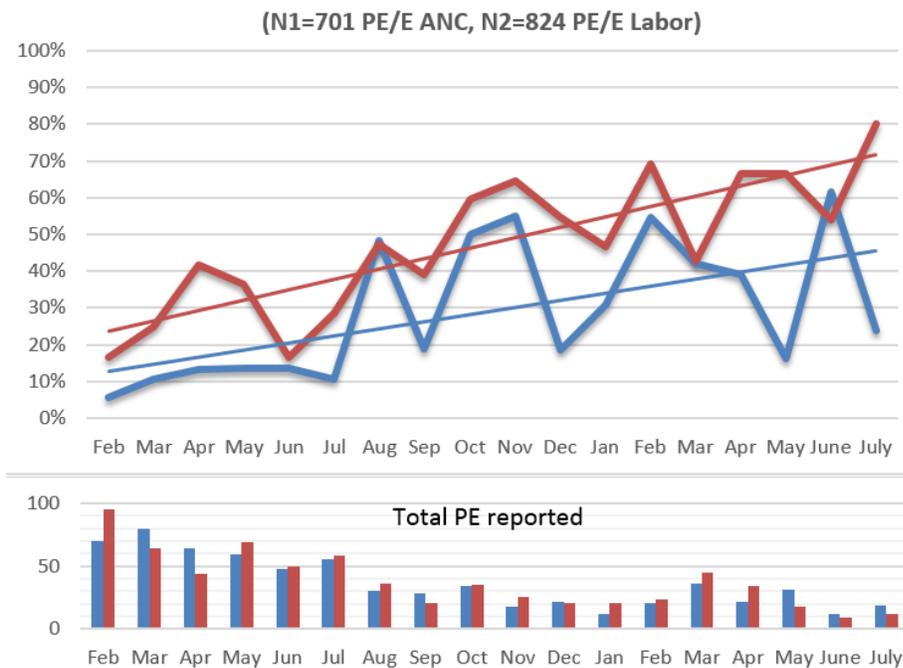
¹ The Global Impact of Pre-eclampsia and Eclampsia. Lelia Duley, MD. Seminars in Perinatology. Volume 33, Issue 3, June 2009, Pages 130–137. Available at <http://www.sciencedirect.com/science/article/pii/S0146000509000214>

Figure 9: Percentage of pregnant women screened for hypertensive disorders of pregnancy (PE/E) during the antenatal period, n= 42,399 (Feb 2014 – May 2015)



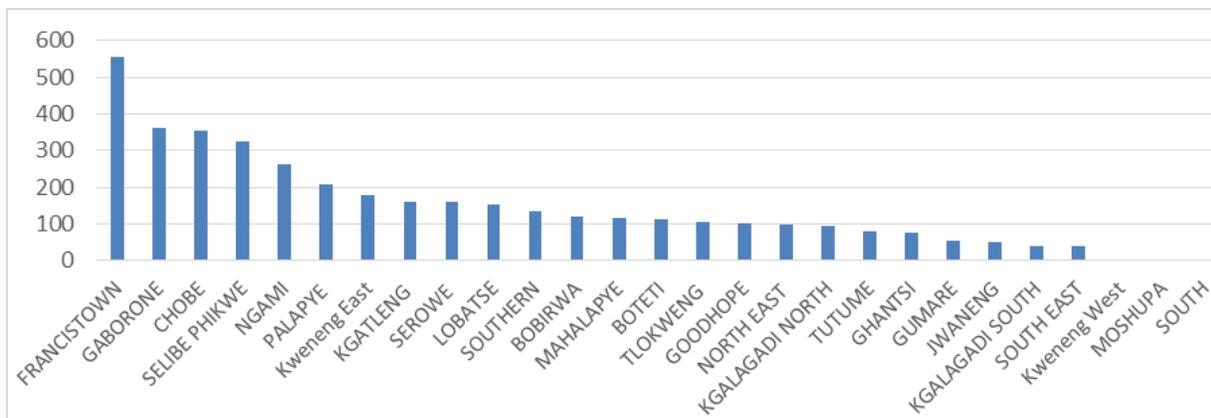
- Management of severe pre-eclampsia/eclampsia.** Figure 10 shows that compliance with management of pre-eclampsia as per protocol was very low at the beginning of the project with only 6% of cases demonstrating adequate management of PE/E identified during ANC and 18% of PE/E cases managed per protocol when diagnosed in the facility during labor. Despite a low number (only 3%) of QI teams working on improving the management of PE/E during ANC and 6% during labor, compliance with PE management increased both during ANC and labor. The reasons for this are unclear.

Figure 10: Compliance with management of PE/E during ANC (blue) compared to during labor (red) (Feb 2014 – July 2015)



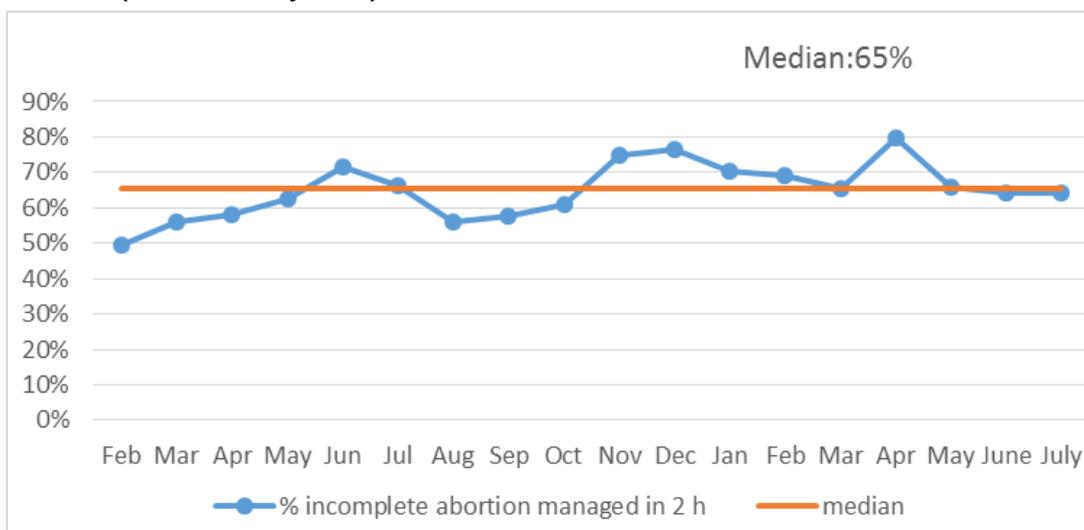
- **Abortion complications.** Seventy-one percent (71%) of reported abortion complications were due to incomplete abortions, and 10% were septic abortions. The abortion/live births ratio was higher in the Northeast districts (**Figure 11**).

Figure 11: Ratio of abortions to live births. Average abortion ratio: 205 abortions (complications)/1000 live births (Feb 2014-May 2015)



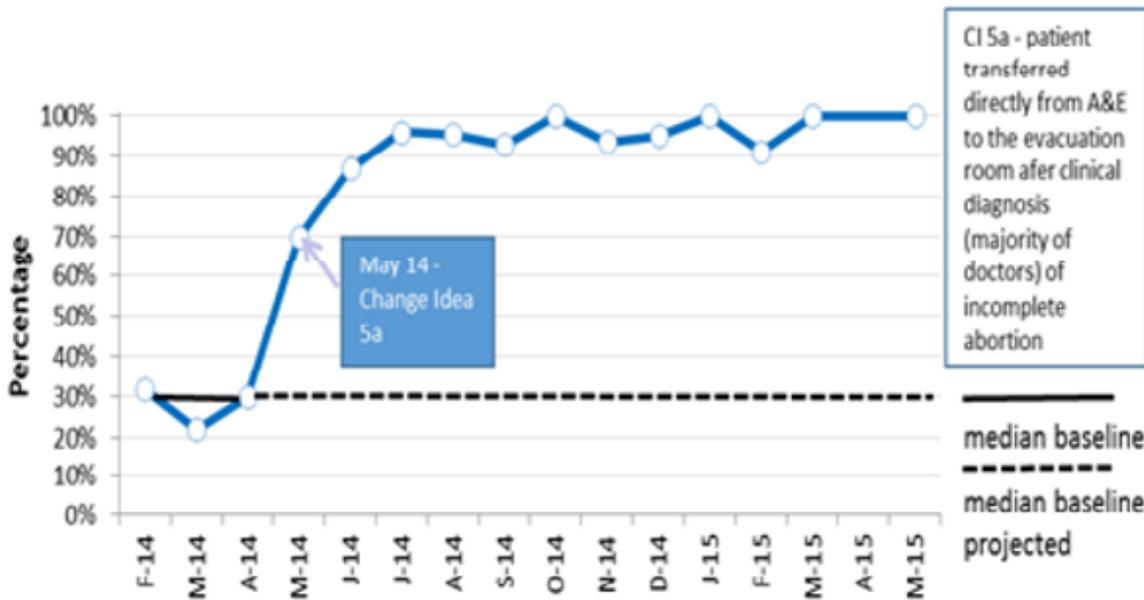
- **Performance in the management of incomplete abortions within two hours of diagnosis** improved from 50% in February 2014 to 64% in July 2015 in the 26 facilities reporting management of abortions (data on this indicator is only collected in hospitals, as clinics in Botswana do not perform uterine evacuation of retained products of conception). **Figure 12** presents aggregated data of all facilities performing evacuation of incomplete abortions since February 2014 until July 2015. The figure shows a positive increase in compliance with prompt uterine evacuation with five consecutive performance points above the median since November 2014.

Figure 12: Performance with prompt evacuation (within two hours of diagnosis) of incomplete abortion (Feb 2014-July 2015)



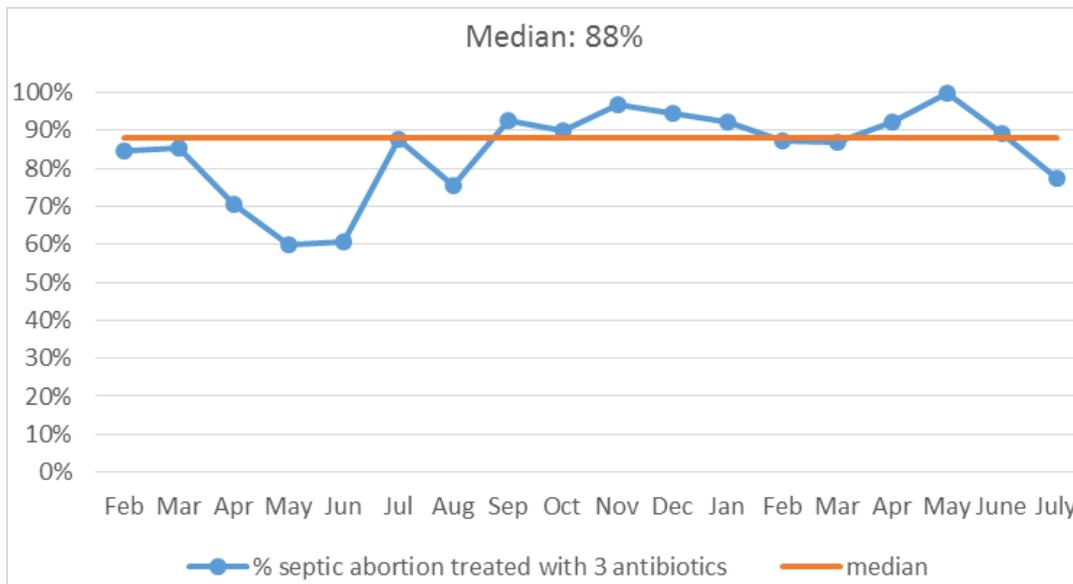
- An example of improvement in compliance with management of incomplete abortion within two hours of diagnosis in Sekgoma Memorial Hospital is presented in **Figure 13**. In May 2014, the following change was introduced and tested – transferring patients with incomplete abortions directly from the admission and evaluation department to the theatre for evacuation. Compliance with the indicator reached 100% in May 2015.

Figure 13: Performance with prompt evacuation (within two hours of diagnosis) of incomplete abortion, Sekgoma Memorial Hospital, n=307 (Feb 2014-May 2015)



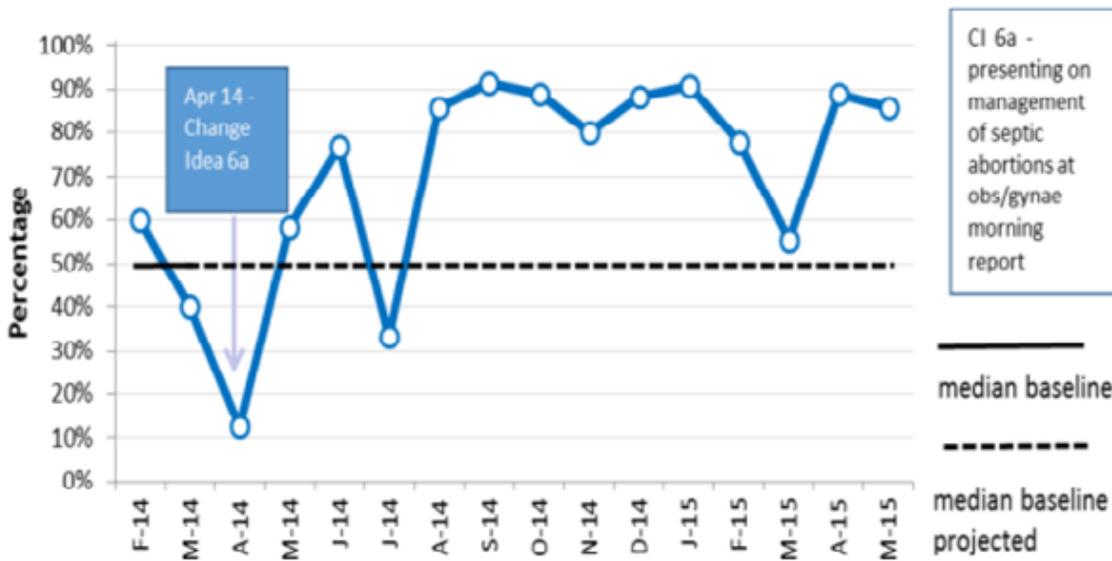
- Performance in management of septic abortions with triple intravenous antibiotherapy was initially high at 85% compliance in February 2014. Performance seemed to be increasing slightly after September 2014 to reach 100% in May 2015 (Figure 14).

Figure 14: Compliance with management of septic abortion with three antibiotics IV (Feb 2014-July 2015)



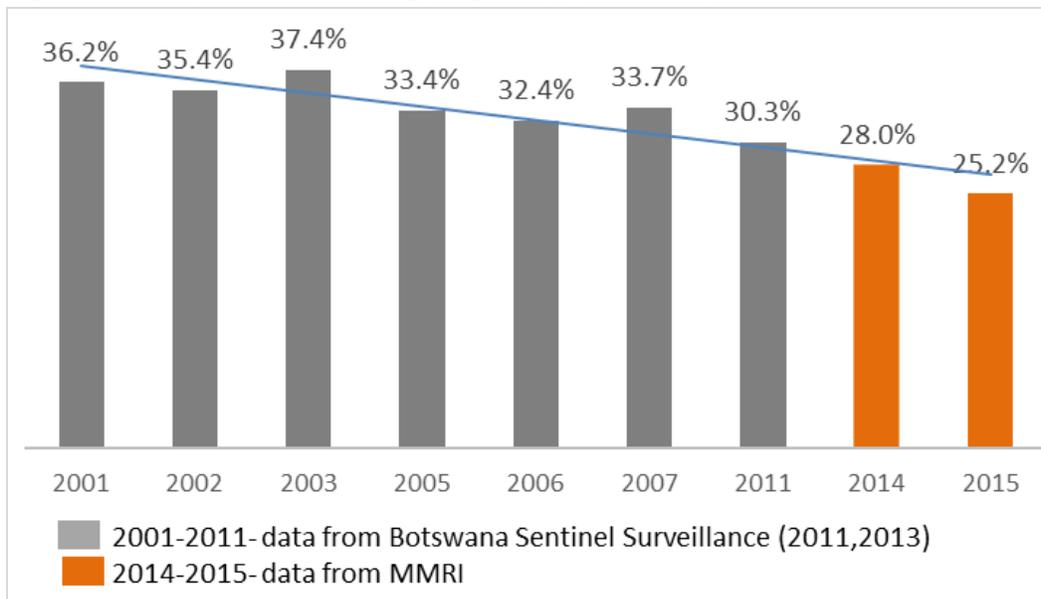
- An example of compliance with management of septic abortion with provision of triple antibiotic intravenous therapy in the Nyangabwe Referral Hospital is presented in Figure 15. After the introduction and further implementation of the change idea – presenting each case of abortion, including septic abortion, for peer review during the Ob/Gyn morning sessions – improvement in the percentage of women with septic abortion who received the antibiotics increased.

Figure 15: Percentage of women with septic abortion who received triple antibiotics IV, Nyangabwe Hospital, n=170 (Feb 2014 – May 2015)



- HIV prevalence during pregnancy.** From February 2014 to May 2015, we found that 11,598 pregnant women were identified as HIV-positive during ANC visits and 374 (0.8%) were newly diagnosed during labor. This translates into a prevalence of HIV among pregnant women of 28% in 2014 and 25% from January to May 2015. The prevalence of HIV among pregnant women that ASSIST identified is higher than the 18.5% HIV prevalence in general population (aged 18 weeks and over), with females at 19.2% and males 14.1% as documented by the Botswana AIDS Impact Survey IV (BAIS IV, 2013).
- Figure 16** presents the downwards evolution of HIV prevalence in Botswana from data reported by the 2011 Botswana Sentinel Surveillance (grey color) and data reported by the MMRI on 57,436 deliveries from February 2014-May 2015 (orange color). We observe a decreasing trend in the prevalence of HIV among pregnant women in Botswana from 36.2% in 2001 to 25.2% in May 2015.

Figure 16: HIV prevalence during pregnancy (2001-2015)



- **ART coverage of HIV-positive pregnant women.** Data from February 2014 to May 2015 found that 94% of women diagnosed with HIV during ANC visits received antiretroviral treatment during the antenatal period. This coverage remained constant. This represents an improvement from data reported in 2013 by the MOH (National Eligibility Guidelines) where only 67% of the total HIV-infected pregnant women were reported to have received ART. We assume that the improvement in coverage is due in part to the more inclusive eligibility criteria set by the MOH to receive ART. Now every HIV-positive pregnant woman qualifies for ART, while in 2013, national guidelines established a cutting point of CD4 count lower than 350 cells/μl to qualify for antiretroviral treatment.

IMPROVEMENT IN KEY INDICATORS

Activity	Key Indicators	Baseline (Feb 2014)	Last value (July 2015)	Change (percentage points)
National Maternal Mortality Reduction Initiative	% of delivering women administered oxytocin in the 1st minute after delivery	82% (67 facilities, 2031 deliveries)	91% (48 QI teams working on AMTSL)	9
	% of women monitored during the 4th stage labor per protocol	39% (67 facilities, 2031 deliveries)	84% (59 QI teams working on 4 th stage)	45
	% of women in ANC with severe pre-eclampsia managed per protocol	6% (68 facilities, 72 PE cases during ANC)	26%* (3 QI teams working on ANC PE management)	20
	% of women in labor with severe PE managed per protocol	18% (69 facilities reporting, 97 PE cases in labor)	(100%)* (5 QI teams working on this topic)	82
	% of incomplete abortions managed per protocol	45% (20 facilities reporting abortions)	58% (14 QI teams working on incomplete abortion management)	13

* Since August 2014 there was a significant reduction on the number of cases of severe PE reported. The high percentage of compliance with management of PE per protocol may be artificially inflated due to underreporting of PE overall.

SPREAD OF IMPROVEMENT

After the baseline data collection in February 2014, the formation of QI teams in the facilities was initiated and increased throughout the life of the project. There were 8 teams formed in March 2014, 41 in April, 53 in May, 70 in June, 75 in July, 77 in August, 81 in September and October, 82 in November and 85 in December 2014. Since January 2015, we maintained 87 QI teams in the facilities. Referral, district and primary hospitals were the initial focus for the QI team formation. Since June 2014, the increase in the number of teams was due to formation of teams in maternity clinics.

Activity 2. Strengthening the Community Health System Response to HIV/AIDS

OVERVIEW

It is widely recognized that community-level actors need to play a critical role in the Botswana HIV response, specifically in reaching the global UNAIDS 90-90-90 targets for people living with HIV. At the request of the USAID Mission in Botswana, ASSIST has shifted its programmatic focus to contribute to the PEPFAR Botswana goal of epidemic control through the application of quality improvement approaches to the community level response to HIV. Improving how existing community platforms interact and link with clinical service providers is seen as key to the achievement of the PEPFAR 2017 goals and targets.

ASSIST will work closely with a range of other partners, especially the USAID Advancing Partners and Communities (APC) Project, in applying quality improvement to engage with some of Botswana's most affected communities across seven priority scale-up districts in Botswana. ASSIST will work with select communities to increase access to and uptake of services, create strong linkages with care, spread health promotion messages, and reduce barriers and stigma related to testing and seeking treatment. Smaller groups of community actors can assist with patient self-management, treatment support, addressing barriers to care such as food insecurity, and tracing of patients lost to follow-up. Keeping patients living with HIV in care and on treatment will lead to healthier patients, reduced morbidity and mortality, more productive community members, and fewer vulnerable children.

Preparatory work for the programmatic shift to strengthen the community health system's response to HIV/AIDS in Botswana began in July 2015. USAID has mandated ASSIST under the overall Botswana PEPFAR strategy to improve community and facility referrals and linkages and increase retention for HIV-positive patients. Specifically, ASSIST's work will focus on addressing key processes of care delivery, support, and linkage toward achieving PEPFAR's 90-90-90 targets.

In consultation and coordination with PEPFAR partners, affected districts, communities, and others stakeholders, ASSIST is developing specific improvement aims. Generally, these aims will focus on progress towards epidemic control in partnering communities through:

- Improved approaches and processes that raise the share of people in communities who are aware of their status, linked to care, and retained in treatment over time, thus improving their own health and reducing the risk of transmission to others;
- Improved two-way communication and referral practices between existing community platforms and relevant health facilities.

There are three broad categories of relevant processes that are the focus of ASSIST's work at community and district levels:

1. **Processes within communities** themselves, i.e., how different community groups can come and work together to support the HIV response and related services;
2. **Processes that link community and facility activities**, including referrals, appointment management, other communications, and follow-up mechanisms to improve retention and reduce loss to follow-up;
3. **Processes with and within community-based organizations** (supported by APC) and their coordination of service delivery in communities.

KEY ACCOMPLISHMENTS AND RESULTS

- **Contributed to PEPFAR-Botswana planning** (June–Aug 2015). The ASSIST Regional Director for Southern Africa met with USAID Botswana to discuss and inform the development of a scope of work for ASSIST-supported community-based QI in support of the PEPFAR Botswana strategy. In July and August 2015, Kim Stover and Cecil Haverkamp participated in district consultations organized by USAID with all seven PEPFAR priority districts. The primary purpose was to inform the design of the USAID APC work plan, but also offered an opportunity to explore the role of ASSIST in community-based improvement work.
- **Developed work plan and overall scope of work for ASSIST** (Aug–Sept 2015). Following APC district consultations and broad coordination with other partners, ASSIST worked with USAID Botswana to develop an initial work plan and other elements toward a detailed improvement plan.
- **Put in place a new ASSIST project team** (from Aug 2015). A new Chief of Party was hired in July 2015 (Cecil Haverkamp) and underwent initial ASSIST orientation at URC HQ before taking his post in Botswana. He began building a new team and developing the new ASSIST programmatic focus in August 2015.

4 Sustainability and Institutionalization (MMRI)

Since its inception, ASSIST's role in supporting Botswana's national MMRI was designed to be managed by the Ministry of Health. Through ASSIST, the initiative received technical assistance from a National Coordinator, an outside consultant with extensive QI experience who provided coaching and capacity building through monthly visits to different districts in the country, and a senior technical advisor based at

URC headquarters. In turn, and critical to the institutionalization of the improvement work under MMRI, the Ministry appointed a total of 11 midwife coordinators to oversee quality improvement activities throughout Botswana's 26 health districts and provide logistical support for the implementation of MMRI activities.

ASSIST's support to the Ministry of Health and the MMRI ended in August 2015, when technical activities and related tools were handed over.

During the duration of ASSIST's support to the MMRI, the project was involved in a range of activities meant to directly support the institutionalization, sustainability, and gradual scale-up of improvement activities directed at maternal care. These included:

- Capacity building at the central level of the Ministry to continue the monitoring and evaluation of MMRI-related activities. ASSIST developed a manual for MMRI data collection and data analysis to facilitate further knowledge transfer to the MOH. ASSIST also provided ongoing capacity building in data management and analysis with designated MOH personnel from the beginning of the project.
- Tool development to facilitate data reporting and analysis of maternal complications, including the electronic adaptation of an existing paper-based MOH perinatal surveillance tool (MH 3123). The tool was developed in Excel to facilitate timely electronic reporting and reduce data entry errors, facilitating better analysis of routine data by linking to a master database that pulls from other data sources.
- Capacity building to M&E district officers and MMRI district coordinators in the use of the electronic perinatal surveillance tool and the MMRI QI performance tool to support the integration of both reporting systems.
- Support to MMRI district coordinators in the development of work plans to guide the implementation of QI activities at the facility level and monitor progress towards activities planned.
- Development of a data extraction tool for maternal mortality audit qualitative data, including capacity building within the Maternal Mortality Unit to analyze maternal mortality audits in a timely way.
- Development of a change package of successfully proven changes that lead to improvement, to facilitate scaling up improvement in facilities throughout the country.

Challenges for sustainability

As in many focused projects receiving external technical assistance, there were a range of challenges related to achieving sustainability of the intense and important work under the Maternal Mortality Reduction Initiative. The most significant challenges included:

- **The need for a critical mass of QI-trained coordinators.** Under the MMRI, the implementation structure was very lean due to budget constraints, relying to a large degree on the National Coordinator and eleven regional coordinators. Each coordinator had very specific functions that in theory should continue in order to ensure sustainability. During the one and a half years of ASSIST support to the MMRI, implementation efforts were mostly focused on the training and mentoring of the selected QI coordinators as well as direct support to activities. In order to ensure sustainability, a larger pool of MOH staff and professionals should have been trained in QI methods to achieve a critical mass and broader foundation.
- **The existence of a broader quality improvement framework** would help in integrating improvement efforts conducted by several programs in the country and to ensure coordination of methods and reporting activities. One immediate priority for extending the impact of QI activities beyond maternal mortality reduction should have been around efforts to decrease neonatal mortality. Other initiatives to introduce QI methods in HIV prevention and other relevant areas could have further contributed to a broader emergence of an organizational improvement culture in the health system.
- **The presence of an operational QI/QA department in the Ministry of Health at the central level would help to support QI activities across different health areas.** Coordination with other areas of care and departments (clinical services, pharmacy and procurement, pre-service training, and continuous medical education) would have contributed to broader sustainability of QI activities.
- **The lack of a multi-year commitment, budget, and work plan for the MMRI work and its expansion poses a major challenge to its sustainability.**

5 Knowledge Management Products and Activities

- Developed and pilot-tested two tools to assist MMRI district coordinators to document the essential information arising from a QI team meeting, use this information to prepare for subsequent team meetings, and provide a basic agenda for the QI team meeting.
- As requested by the MOH, ASSIST adapted a paper-based MOH surveillance perinatal reporting tool (MH 3123) to follow the model developed for the MMRI reporting system. Data are captured in an excel tool that contains an automatically calculated dashboard of indicators presented in time series charts. The indicators' dashboard is presented in slide format to facilitate reporting by hospital superintendents in national quarterly reporting meetings.
- A change package was developed summarizing changes introduced by participating QI teams that have made a demonstrable contribution to improving performance in specific MMRI topic areas. The change package will support the scale-up efforts of maternal-neonatal interventions and health system process changes that contribute to the reduction of the maternal mortality in the country (see Appendix).

Appendix: Maternal Mortality Reduction Initiative Change Package

ASSIST PROJECT SUPPORT TO THE BOTSWANA NATIONAL MATERNAL MORTALITY REDUCTION INITIATIVE

2013-2015

Change Package

This document summarizes the changes developed and implemented under the national initiative to reduce maternal mortality with support from the ASSIST project between early 2013 and August 2015. Change packages are completed at the end of a quality improvement intervention and summarize the changes that have been introduced by participating teams as they were found to have made a demonstrable contribution to improving performance. The purpose of developing a change package is to compile the evidence-based learning from an improvement effort in a format that can readily inform broader discussions, including on the potential geographic and programmatic scale up. The package can also be shared with other stakeholders for the purpose of stimulating similar changes and trigger comparable improvement efforts.

ASSIST aims in support of the National Maternal Mortality Reduction Initiative (MMRI)	
<ul style="list-style-type: none"> • Reduce maternal mortality through implementation of evidence-based, high-impact interventions • Contribute to improving maternal outcomes of HIV-positive women through improving maternity care and prevention of mother-to-child transmission of HIV for HIV-positive women and their newborns 	<ul style="list-style-type: none"> • Districts: All 26 health districts • 122 facilities (90%) providing obstetric services: 2 referral hospitals, 28 district and primary hospitals, and 92 clinics with maternity services. • QI teams formed in 88 facilities with maternity services (72% of total)

Review of change ideas under ASSIST

For this particular change package, focused on changes teams tested in specific maternal care processes that would contribute to the Botswana Maternal Mortality Reduction Initiative’s overall goal of reducing maternal mortality, the criteria used to establish if changes led to improvement were rigorously applied (see “Methodology” section below).

Time series charts for all facilities visited by the 6 (of 11) midwife coordinators supporting the Maternal Mortality Reduction Initiative that participated in the change package development were analyzed and commented upon, ranging from 54 facility-specific time series charts for monitoring the mother during the 4th stage of labor to 2 facility-specific time series charts for administration of magnesium sulfate to treat severe pre-eclampsia during labor. Several examples of these site-specific time series charts are included in the USAID ASSIST Botswana Country Report FY15 (see Figures 7, 13, and 15).

For each change idea, a value was assigned indicating the “strength of evidence” of the idea’s efficacy in helping secure improvement based on applying time series chart interpretation rules.

The value was determined by analyzing the relevant time series charts and using the following six-point scale:

- 0 – No evidence**
- 1 – Anecdotal/possible evidence of improvement**
- 2 – Signs of improvement**
(≥3 consecutive data points above or below the median
OR 4 consecutive data points ascending or descending
but not sustained or insufficient data to meet time series chart rules)
- 3 – Time series chart rules met** – (in 1-4 facilities)
- 4 – Time series chart rules met** – (in ≥5 facilities)
- 5 – Time series chart rules met** – (in ≥10 facilities)

Improvement topics

In the following tables, change ideas for each of eight improvement topics addressed by facility improvement teams in Botswana are listed in order of the strength of evidence and the number of facilities demonstrating improvement using that idea. The eight topics covered in the change package are:

1 Practicing active management of the third stage of labor to prevent post-partum hemorrhage	2 Monitoring the mother during the fourth stage of labor	3 Giving Oxytocin IV to all women during the fourth stage of labor	4 Puerperal checks of all women before discharge
5 Evacuation of the uterus in patients with incomplete abortion	6 Treating septic abortions with triple antibiotics IV	7 Treating severe pre-eclampsia with Magnesium Sulfate	8 Monitor all women in active labor using a partograph

Change ideas that showed no evidence of improvement are listed but are assigned a zero. They have been included because lack of evidence does not necessarily mean they did not work. Sometimes performance prior to the introduction of the change was already excellent so it was not possible to detect an improvement if it had occurred. On other occasions, several ideas were introduced around the same time so it was impossible to determine which was contributing what to any improvement seen.

In addition to providing information about the strength of evidence in support for a given change idea (including the number of facilities with strong evidence of improvement as a result of the change idea), the change package describes any modifications made by individual teams.

Methodology for the development of the Change Package

Telephone interviews were conducted with six of the 11 midwife coordinators. For each of their

facilities and for each improvement topic their QI teams had worked on, coordinators were asked to describe the changes each team had introduced and when. They were also asked if the changes had been tested on a small scale before they were implemented. For the majority of change idea, there had not been testing on a small scale before implementation.

For each facility, performance across a range of maternity-related indicators for the period February/March 2014 to May 2015 was sourced from the national MMRI comprehensive database. Performance data from individual facilities that introduced changes for the process area in question were analyzed in the form of time series charts. Charts were annotated to show what changes were made and when using the information provided by the coordinators. These charts were then fed back to the coordinators to verify their correctness.

For each time series chart, the median performance of the facility prior to the introduction of the change idea was calculated and plotted on the chart; this median became the reference point for determining whether a “shift” had occurred. Two run chart rules were then applied: the shift and the run. **A shift** is six or more consecutive data points falling either above or below the median line. **A run** is five or more consecutive points ascending or descending irrespective of the position of the median.

When these rules are observed in a time series chart, there is clear evidence that the process producing this section of the data has changed. If this change is in a positive direction, improvement has occurred. Once improvement has been demonstrated, it is then necessary to note whether it coincided with the introduction of a new change idea. If improvement starts before or a period of time after the introduction of the change, it is not possible to argue that the change led to the improvement.

Strictly speaking, baselines should comprise 10 or more data points. This was never achieved, and the fewer the number of data points included in the baseline, the less confidence that the median truly reflected the usual performance of the process prior to the introduction of the change. Where one or less data points had been recorded before testing/implementing the change idea, a median was calculated across all data points. This is a legitimate way to assess whether improvements are evident in any part of the graph but it makes them harder to detect.

Five coordinators’ facilities and data were not included in the change package. The reasons for excluding these data were two-fold:

- a) Either they were considered potentially unreliable due to changes in the facility improvement team and/or periods of sickness, or
- b) because of delays in the quality improvement teams being formed.

For improvement to be demonstrated using time series chart rules, at least five data points are needed after establishing baseline performance. Where teams formed late in 2014, there was insufficient data to be able to determine if changes were leading to improvement.

Topic-specific Change Packages

Change Topic 1: 10 IU Oxytocin Given Intramuscular Injection within 1 Minute of Birth (Active Management of the Third Stage of Labor)

Related outcome measure: Percentage of women in active labor who were given 10 iu oxytocin IM within 1 minute of delivery

Rank	Change idea	Comment	No. of facilities introducing the change idea	Strength of evidence
1	Write the time patient received oxytocin on their record	Prior to the introduction of this change idea most midwives were writing on the records that oxytocin had been given, noting the dosage but not stating the actual time. After the change, the measurement became more stringent; unless the time had been written and it was within one minute of the delivery, most facilities did not count it. Consequently, a deterioration in performance immediately after the introduction of this change could be attributed to more rigorous measurement	27	Strength: 2 – Baseline performance was close to 100% in many facilities; in such cases it is difficult to demonstrate improvement. Also, several changes were introduced at the same time as this one.
2	Pre-fill syringe with oxytocin and keep cool to maintain the cold chain	Some facilities had already introduced this change before getting involved in the MMRI. However, six facilities were not maintaining the cold chain so they implemented this element of the change idea. This change would only contribute to the efficacy of the drug, not time delivered.	24	Strength: 1 – Baselines often 100% and several changes introduced at the same time
3	Ask a nursing auxiliary or non-midwife to fetch the oxytocin from the refrigerator if the patient arrives in the second stage of labor	Sometimes the refrigerator in which the oxytocin is stored is some distance away from the labor ward. The cold chain was maintained either by keeping the syringe on an ice pack or by	2	Strength: 0 – Baselines often 100% and several changes introduced at the same time

Rank	Change idea	Comment	No. of facilities introducing the change idea	Strength of evidence
		leaving it in a cooler box. Usually the syringe is drawn by the delivering midwife but sometimes another midwife or nurse assisted.		
4	Keeping the oxytocin in a cooler box in the labor ward		2	Strength: 0 – Baselines often 100% and several changes introduced at the same time
5	Focal lead for MMRI checks randomly selected files to ensure the time oxytocin was given is written; feedback given to midwives on their performance	In-charge checks records and gives feedback.	2	Strength: 0 – Introduced at the same time as other change ideas
6	On-coming shift checks whether the time oxytocin was written has been documented in the patients' files		1	Strength: 0 – Change idea introduced at the same time as others
7	MMRI focal lead emphasizes importance of doing all three elements of AMTSL		1	Strength: 0 – Early evidence of a shift but no baseline

Change Topic 2: Monitoring the Mother During the Fourth Stage of Labor

Related outcome measure: Percentage of women who are monitored in 4th stage of labor: 8 prescribed checks done 6 times over a period of hours (4 in first hour, 2 in the second)

Rank	Change Idea	Comment	No. of facilities introducing the change idea	Strength of evidence
1	Non-midwives assigned to take vital signs	Non-midwives included hospital orderlies,	36	Strength: 4 – Eight

Rank	Change Idea	Comment	No. of facilities introducing the change idea	Strength of evidence
		auxiliary nurses, and registered nurses. Midwives often need support while they are suturing the women who delivered.		facilities
2	Duty manager checks patient files to see if monitoring has been done; feeds back to matron who feeds back to staff. Other senior personnel, including focal lead for MMRI, also provided feedback on performance. This is sometimes done at the morning report.		8	Strength: 4 – Five facilities
3	Midwives pair up for a delivery and support each other in doing all the essential elements, including 4 th stage of labor monitoring. Sometimes pairing only continued for an hour until suturing was complete.	Midwives often need support while they are suturing the women who delivered. Some facilities just advocated that all midwives needed to contribute to 4th stage of labor monitoring without formally assigning them in pairs. Sometime support staff were requested to help in addition.	18	Strength: 3 – Four facilities
4	On-coming shift checks if monitoring of previous shift has been done during shift handover. Patient records are brought to the shift handover for review. Sometimes the checking takes place during the morning report. For small teams, the non-delivering midwife may do the checking. In a hospital, the post-natal staff checked on receiving the patient.		17	Strength: 3 – Two facilities
5	Additional midwives assigned to work in labor ward	This change was only feasible in district or regional hospitals.	1	Strength: 2
6	More midwives assigned to night duty without reduction in numbers during the day		1	Strength: 1
7	Location of night watchman changed so that he can hear the midwife calling for additional help.	This change idea was bundled with the midwives and/or nurses assisting each other. At night and when other staff were not in the	3	Not applicable; bundled with another change idea

Rank	Change Idea	Comment	No. of facilities introducing the change idea	Strength of evidence
		facility, the night watchman was needed to alert them to the delivering midwife's request for assistance.		
8	Involve all midwives and nurses in checking files to see if 4th stage of labor monitoring has been performed during the shift handover and in preparing data for monthly MMRI report.		1	Strength: 0
9	Document why monitoring of 4th stage is not done		1	Strength: 0

Change Topic 3: 20/40 IU Oxytocin Given IV in Fourth Stage of Labor

Related outcome measure: Incidence of post-partum hemorrhage

Rank	Change Idea	Comment	No. of facilities who introduced the change idea	Strength of evidence
1	Staff informed they should be giving 20 iu IV oxytocin in ringers lactate or normal saline to all women during the 4th stage of labor. Women at high risk of post-partum hemorrhage to receive 40 iu IV oxytocin.		1	Strength: 1
2	Lecture given to doctors, midwives, and ward managers on importance of giving 40 iu oxytocin IV to women gravida 5 or at risk of uterine atony.		1	Strength: 1

Change Topic 4: Puerperal Checks

Related outcome measure: Percentage of women who have puerperal checks completed before discharge

Rank	Change Idea	Comment	No. of facilities introducing the change idea	Strength of evidence
1	Focal lead for project reviews patients' files after discharge to see if puerperal checks were done. Feeds back to team and delivering midwife. Feedback given in morning report or shift handover. In a small facility, the midwife not performing the delivery checks her colleagues' work.	This topic was only championed by one of the midwife coordinators.	5	Strength: 3 – One facility Strength: 2 – Three facilities

Change Topic 5: Evacuation of Uterus within Two Hours for Patients with Incomplete Abortion to Prevent Septic Abortion

Related outcome measure: % of women with incomplete abortion who have management/uterine evacuation within 2 hours of diagnosis

Rank	Change Idea	Comment	No. of facilities introducing the change idea	Strength of evidence
1	Evacuate the patient diagnosed with incomplete abortion prior to admitting her onto the Gynecology ward.	Most patients present via Accident & Emergency (A&E) but some present in Outpatient Department (OPD). Some hospitals explored using different theatres to avoid congestion. Many facilities were not recording the time the	10	Strength: 3 – One facility; often no baseline has been recorded or performance was at 100% prior to the introduction of the change idea

Rank	Change Idea	Comment	No. of facilities introducing the change idea	Strength of evidence
		patient was diagnosed or when the procedure was performed before working on this topic, so there was rarely a baseline from which to establish evidence of improvement.		
2	Senior doctors teach others how to clinically diagnosis incomplete abortion rather than waiting for an ultrasound to confirm. Directions were given to doctors that they did not need to confirm diagnosis with ultrasound.		2	Strength: 3 – One facility
3	The ward doctor or hospital superintendent makes other doctors aware of the policy of evacuation of incomplete abortions within 2 hours		1	Strength: 3 – One facility
4	Produce a recording tool in which the time of diagnosis and time of evacuation are recorded	Doctors did not always use the tool for documentation but it did help improve documentation in the patient record.	3	Strength: 0
5	Feed back to the doctors how well they are doing in evacuating incomplete abortions within 2 hours. In one facility, doctors were invited to join the QI team so that they would routinely have feedback on performance.	In one facility this was primarily to encourage the doctors to record the time they diagnosed the patient and when they performed the procedure.	2	Strength: 0
6	During the morning report, notifying OB/GYN staff of the admission of a patient with an incomplete abortion and whether an evacuation has been completed.		1	Strength: 0
7	Increase the number of A&E doctors to two		1	Strength: 0

Change Topic 6: Treat Septic Abortions with Triple Antibiotics IV

Related outcome measure: % of women with septic abortion who are treated with triple antibiotics IV

Rank	Change Idea	Comment	No. of facilities introducing the change idea	Strength of evidence
1	Performance in treating septic abortion is shared during shift handover. Feedback given to OB/GYN staff during morning report.	Health facilities with maternity beds would be expected to initiate treatment and then refer a case of septic abortion.	2	Strength: 3 – One facility
2	Management and staff are made aware of protocol for treating septic abortion.		2	Strength: 1 – Septic abortion is a rare event so it is difficult to detect an improvement.
3	Produce a recording tool on which the treatment of septic abortion with triple antibiotics is recorded.		2	Strength: 1
4	Doctors who do not follow protocol are given feedback on their performance.		1	Strength: 1

Change Topic 7: Treat Severe Pre-eclampsia on Diagnosis with Magnesium Sulfate to Prevent Eclampsia

Related outcome measure: Percentage of women diagnosed with severe pre-eclampsia during labor who are managed with Mg SO4

Rank	Change Idea	Comment	No. of facilities who introduced the change idea	Strength of evidence
1	All patients with severe pre-eclampsia to be seen		1	Strength: 1 – Evidence of

	by a specialist within one hour of admission and started on MgSO4			improvement but two ideas introduced at the same time
2	All severe pre-eclampsia cases discussed in the morning report for team handover, peer review, and learning		1	Strength: 1 – Evidence of improvement but two ideas introduced at the same time
3	Midwife not admitting patient checks that admitting midwife gave MgSO4 on diagnosis of severe pre-eclampsia.	Patients presenting with severe pre-eclampsia in labor should already have been identified as “at risk” and referred to the care of a primary/district or regional hospital. However, if they do present at a health center with maternity beds, the protocol to treat with MgSO4 should be followed.	1	Strength: 1 – Baseline performance already 100%

Change Topic 8: Women in Active Labor Monitored Using a Partograph

Related outcome measure: Percentage of women in active labor who were monitored with a partograph

Rank	Change Idea	Comment	No. of facilities introducing the change idea	Strength of evidence
1	In-charge checks partographs for completeness and provides feedback.		2	Strength: 2 – One facility; early evidence of improvement but tested with other change ideas
2	All nurses review partographs for MMRI reporting.		1	Strength: 2 – One facility; early evidence of improvement but tested with another change idea
3	Patients’ records are brought to shift handovers.		1	Strength: 2 – One facility; early evidence of improvement but tested

				with other change ideas
4	The two midwives delivering the woman check each others' documentation on the partograph and sign off their own section. Assistant nurse and other staff check delivering nurses' partograph.		4	Strength: 1 – Two facilities; early evidence of improvement but tested with other change ideas
5	The focal lead for MMRI checks records to see if they have been signed off.		2	Strength: 0
6	Midwives check their own partographs for completeness and to identify gaps.		2	Strength: 0

Strength of evidence

0 – No evidence

1 – Anecdotal/possible evidence of improvement

2 – Signs of improvement (≥3 consecutive data points above the median OR 4 consecutive data points ascending or descending but not sustained or

insufficient data to meet time series chart rules)

3 – Time series chart rules met – (1-4 facilities)

4 – Time series chart rules met – (≥5 facilities)

5 – Time series chart rules met – (≥10 facilities)

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