



Saving Mothers, Giving Life

Emergency Obstetric and Newborn Care Access and Availability

Phase 1 Monitoring and Evaluation Report



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Phase 1 Monitoring and
Evaluation Report
2014

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Thousands of individuals participated in activities to monitor and evaluate Phase 1 of the Saving Mothers, Giving Life (SMGL) initiative, including staff affiliated with country SMGL teams and implementing organizations; district and national-level Ministry of Health officials; Village Health Teams and community health workers; headquarters representatives of all US Government agencies involved; the Government of Norway; and private-sector SMGL partners. Because those involved in this momentous effort are too numerous to name individually, the organizations they represent are acknowledged below.

Uganda

Government of Uganda	STRIDES for Family Health
Ministry of Health of Uganda	Health Care Improvement Project (HCI)
District Medical/Health Officers	Uganda Health Marketing Group (UHMG)
Uganda Village Health Teams	Uganda Episcopal Conference (UEC)
CDC Country Office	Health Initiatives for the Private Sector (HIPS)
US Agency for International Development (USAID) Mission in Uganda	Strengthening Decentralization for Sustainability (SDS)
Baylor Children's Foundation	Uganda Blood Transfusion Services (UBTS)
Uganda Infectious Diseases Institute (Makerere University, Uganda)	Makerere University School of Public Health
Marie Stopes Uganda (MSU)	Securing Uganda's Right to Essential Medicines (SURE)

Zambia

Government of Zambia	Center for Infectious Disease Research in Zambia (CIDRZ)
Zambia Ministry of Community Development, Mother and Child Health (MCDMCH)	Zambia Center for Applied Health Research and Development (ZCAHRD) (Boston University)
Zambia Central Statistics Office	Maternal and Child Health Integrated Program (MCHIP)
District and Provincial Medical/Health Officers	Zambia Integrated Systems Strengthening Program (ZISSP)
Community Health Workers and Safe Motherhood Action Groups (SMAGs)	Communication Support for Health (CSH)
CDC Country Office	University of Zambia (UNZA), Department of Population Studies
US Agency for International Development (USAID) Mission in Zambia	

Global Partners

American College of Obstetricians and Gynecologists	US Government Agencies:
Every Mother Counts	Centers for Disease Control and Prevention (CDC)
Merck for Mothers	US Agency for International Development (USAID)
Government of Norway	Peace Corps
Project CURE	US Department of Defense (DOD)
	Office of the US Global AIDS Coordinator (OGAC)

Contents

Summary of Key Findings	1
Introduction	2
SMGL Monitoring and Evaluation	4
Assessing SMGL's Impact on Emergency Obstetric and Newborn Care Availability and Access	7
Data Sources	8
Access and Availability of Obstetric and Newborn Care	10
General Facility Requirements	10
Communication and Transportation	16
Emergency Referrals	18
Human Resources	18
Routine Care	22
Community Involvement	28
Life-Saving Emergency Obstetric and Newborn Care	29
Availability of Basic and Comprehensive EmONC per 500,000 population	39
Geographic Distribution of CEmONC Facilities	40
Availability of Drugs, Equipment, and Supplies for Obstetric Care	42
Availability of Medicine and Safe Blood	42
Availability of Essential Equipment	45
Availability of HIV Tests and ARV Medication	46
Availability of Family Planning Supplies	47
Use of Maternal Health Services	49
Institutional Deliveries	49
Antenatal Care	50
Postpartum Care	51
HIV Testing, Prophylaxis and Anti-retroviral Treatment	51
Conclusions	54
References	56
Appendix	57

List of Acronyms

AMDD	Averting Maternal Death and Disability program
AMTSL	Active Management of the Third Stage of Labor
ANC	Antenatal Care
ARV	Anti-retroviral Medication
AVD	Assisted Vaginal Delivery
BEmONC	Basic Emergency Obstetric and Newborn Care
CDC	Centers for Disease Control and Prevention
CEmONC	Comprehensive Emergency Obstetric and Newborn Care
CFR	Case Fatality Rate (for direct obstetric complications receiving care, in this report)
DHIS	District Health Information System
ELMIS	Electronic Logistics Management Information System
EmONC	Emergency Obstetric and Newborn Care
HC	Health Center
HFA	Health Facility Assessment
HMIS	Health Management Information System
ICD-10	International Classification of Diseases – 10th edition
M&E	Monitoring and Evaluation
MCH	Maternal and Child Health
MOH	Ministry of Health
PEPFAR	President’s Emergency Plan for AIDS Relief
PMTCT	Prevention of Mother-to-Child Transmission
PMR	Perinatal Mortality Rate (in facilities, at discharge)
RAMOS	Reproductive Age Mortality Study
RAPID	Rapid Ascertainment of Pregnancy-Induced Deaths
SMAG	Safe Motherhood Action Group
SMGL	Saving Mothers, Giving Life
SMS	Short Message Service
VHT	Village Health Team
WHO	World Health Organization
WRA	Women of Reproductive Age

Summary of Key Findings

Saving Mothers, Giving Life (SMGL) is a 5-year initiative designed to aggressively reduce deaths related to pregnancy and childbirth through a comprehensive approach that strengthens maternal health services in high mortality settings.

The Phase 1 pilot year of the initiative resulted in sharp reductions in maternal mortality in the eight pilot districts in Uganda and Zambia. The improvements in health facility infrastructure and access to, availability of, and quality of maternity care in the participating districts saved the lives of many women who experienced major obstetric complications. SMGL also contributed to lower rates of stillbirths in these districts.

- **Infrastructure improved** in health facilities at all levels in both countries, with particular improvements in the regular availability of water and electricity, 24-hour services, and communication between facilities. Increased numbers of beds at facilities and the construction of mothers' shelters contributed to improved delivery experiences for women giving birth in facilities.
- Access to and innovation in community **transportation** (such as transportation vouchers in Uganda) increased.
- The enhancements under SMGL in transportation, communication, and system functioning generally led to important **increases in referrals** of women with obstetric complications to higher levels of care, and increased the met need for obstetric care.
- The Ministries of Health and SMGL partners **trained health care staff** in the management of obstetric emergencies which contributed to greater access to emergency obstetric care and improved quality of care.
- ◇ **Increased staffing levels** at delivery facilities substantially reduced the overall shortages of skilled care providers, although some gaps remain.
- ◇ Most aspects of **routine delivery care**, such as use of partographs and active management of the third stage of labor, showed substantial improvement in Phase 1.
- Improved availability of necessary medications and equipment contributed to greater **capacity to carry out basic and comprehensive emergency obstetric functions**, necessary to save women's lives.
- Great strides were made toward providing **adequate numbers of both Basic and Comprehensive Emergency Obstetric and Neonatal Care facilities**.
- More facilities conducted rapid **HIV tests** in maternity wards, provided antiretroviral therapy to mothers with HIV, and provided HIV prophylaxis to exposed newborns.
- Trained community health workers contributed to substantially **increased demand for skilled birth attendance** in facilities.
- Improved management and supply chains contributed to **better access to life-saving medications**. There were substantial improvements in availability of most of these medications, though stock-outs still remain a problem. In Uganda there was great improvement in the availability of key emergency obstetric and neonatal care equipment.

Introduction

Saving Mothers, Giving Life (SMGL) is a 5-year initiative designed to aggressively reduce deaths related to pregnancy and childbirth through a coordinated approach that strengthens maternal health services in high-mortality settings. SMGL's evidence-based interventions are focused primarily on the critical period of labor, delivery, and the 48 hours postpartum, when most maternal deaths and about half of newborn deaths occur. SMGL works to improve the existing health network within each district to ensure that women can receive quality facility-based care within 2 hours of the onset of labor or obstetric emergencies.

Coordinated and funded by a public-private partnership,¹ SMGL strives to improve access to, demand for, and the quality of basic and comprehensive Emergency Obstetric and Newborn Care (EmONC).² It also seeks to strengthen links to other essential services for women and children, including family planning and HIV prevention, care, and treatment.

SMGL began in June 2012 in eight pilot districts, four each in Uganda and Zambia (see Figure 1 for demographic and population data). Phase 1 (the pilot phase) activities took place from June 2012 through May 2013 and were preceded by a planning and start-up period of about 8 months.

The SMGL Model

SMGL's essential components and concepts include the following:

A comprehensive approach. Maternal deaths cannot be prevented by any one intervention alone. Reducing maternal mortality requires a solution that addresses multiple health system issues at multiple levels. SMGL uses evidence-based interventions that are designed to address three dangerous delays that pregnant women face in childbirth: delays in deciding to seek care for an obstetric emergency, delays in reaching a health facility in time, and delays in receiving quality care at health facilities.

An adequate number of high-quality delivery facilities, including EmONC, that are accessible within 2 hours of the onset of labor or obstetric emergencies.

An integrated communication-transportation system that functions 24 hours a day/7 days a week to encourage and enable pregnant women to use delivery care facilities. This system should include community outreach and interventions that increase awareness of these facilities.

An adequate number of skilled birth attendants who can provide quality care for normal delivery and who are able to identify and refer obstetric emergencies.

A functional supply chain system to ensure that facilities have the equipment, supplies, commodities, and drugs they need to deliver high-quality obstetric care.

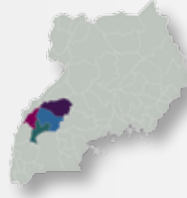
A system that accurately records every birth and maternal and neonatal death.

1. Current partners are the American College of Obstetricians and Gynecologists, Every Mother Counts, Merck for Mothers, the Government of Norway, Project CURE, and the US Government [Centers for Disease Control and Prevention (CDC), US Agency for International Development (USAID), Peace Corps, US Department of Defense, and US Office of the Global AIDS Coordinator (OGAC)]. The governments of Uganda and Zambia were central to the partnership and all activities.

2. EmONC facilities are those that have recently performed specific life-saving obstetric interventions called "signal functions" that are recommended by the World Health Organization. Basic care interventions include administration of parenteral antibiotics, uterotonics, or anticonvulsants; manual removal of placenta; removal of retained products; assisted vaginal delivery; and basic neonatal resuscitation. Comprehensive care interventions include two additional services: ability to perform obstetric surgery (e.g., Cesarean section) and blood transfusion.

Figure 1. Demographic and Population Data for Uganda, Zambia, and Their SMGL-Supported Districts

Uganda

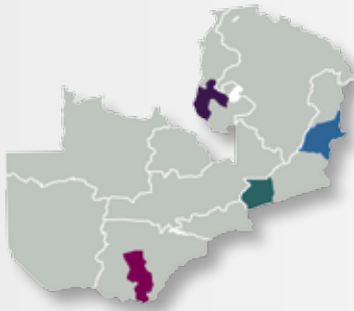


Uganda	
Population of the country (2014 Uganda Bureau of Statistics projection)	36,615,600
Total fertility rate (2011 DHS)	6.2

SMGL-Supported Districts in Uganda

Total population of the 4 SMGL-supported districts (2011 Uganda Bureau of Statistics projection)	1,750,000
Estimated number of births in the 4 SMGL-supported districts during Phase 1 (2012–2013 endline data and DHS age-specific fertility rates)	78,261
Combined area of the 4 SMGL-supported districts	13,079 sq km
Population density of the 4 SMGL-supported districts	26.2 WRA per sq km

Zambia



Zambia	
Population of the country (2010 national census)	13,092,666
Total fertility rate (2007 DHS)	6.2

SMGL-Supported Districts in Zambia

Total population of the 4 SMGL-supported districts (Projected from 2010 national census data for 2011)	925,198
Estimated number of births in the 4 SMGL-supported districts during Phase 1 (crude birth rate combined with census projection)	37,267
Combined area of the 4 SMGL-supported districts	49,412 sq km
Population density of the 4 SMGL-supported districts	3.9 WRA per sq km

SMGL = Saving Mothers, Giving Life; DHS = Demographic and Health Survey; WRA = women of reproductive age.

Note: The total fertility rate indicates the average number of births a woman would have in her lifetime at current age-specific fertility rates.

Participating US Government agencies, along with partner governments and multiple partner organizations, built on existing district maternal and child health services. SMGL-supported staff conducted routine monitoring during the first year of the project, including baseline and endline assessments³ before and after Phase 1.

Results from monitoring and evaluation indicate that SMGL interventions are effective, because of a combination of the following factors:

- Greater **supply** of services, including increased availability of and improved access to obstetric services.
- Increased **demand** for obstetric and HIV services, due to voucher programs and intensified activities to increase community awareness, as well as to women's growing recognition of the importance of facility delivery and skilled attendance at birth.
- Improved **quality of care** at facilities that hired more staff, trained and mentored more staff in EmONC, stocked necessary equipment and supplies, and had reliable supplies of medicines.

The first year of SMGL was designed to provide “proof of concept” in the eight pilot districts to determine (1) if the SMGL interventions could improve health outcomes for women and their infants and (2) how these interventions could be scaled up as SMGL expands. The declines in mortality achieved in both countries are extraordinary given the short timeframe of Phase 1 (12 months).

This report, which focuses on Maternal and Perinatal Health Outcomes in Health Facilities, is one of five SMGL documents prepared by the Centers for Disease Control and Prevention (CDC) and by the Uganda and Zambia CDC country offices. The other documents are an Executive Summary and reports on the following topics: Monitoring and Evaluation Overview, Maternal and Perinatal Outcomes in Health Facilities, and Emergency Obstetric and Newborn Care Access and Availability.

CDC, in collaboration with the US Agency for International Development and the US Office of the Global AIDS Coordinator, led the monitoring and evaluation efforts for the SMGL initiative. These activities were conducted in close collaboration with the governments of Uganda and Zambia and partner organizations.

SMGL Monitoring and Evaluation

Extensive monitoring and evaluation (M&E) of SMGL during Phase 1 was essential to assess potential changes in the key indicators closely related to maternal and neonatal mortality. SMGL M&E efforts drew upon the experience of existing global initiatives designed to standardize data-collection methods for monitoring interventions, making decisions, and developing health policies related to maternal and neonatal outcomes and care.

The SMGL M&E Framework included a range of indicators designed to measure program achievements in Phase 1. These indicators can be grouped into four broad categories:

- **Impact**—such as changes in the number of maternal and newborn deaths.
- **Outcomes**—such as percentage of deliveries in health facilities and rates for Cesarean sections (C-sections).
- **Outputs**—such as the number of EmONC signal functions performed, HIV tests conducted, and PMTCT (prevention of mother-to-child HIV transmission) services provided.
- **Processes**—such as hiring and training personnel, upgrading facilities, and stockpiling life-saving medicines.

Several M&E methods were used to assess the various aspects of SMGL during Phase 1. The most important of these processes were

- **Health Facility Assessments (HFAs):** HFAs were conducted before and after Phase 1 at all facilities that provide delivery services in

3. SMGL baseline assessments generally covered the period before SMGL interventions started in June 2012. Endline assessments covered the first year of SMGL implementation, but varied by data source. Details are provided when data methods are presented.

SMGL-supported districts in both Uganda and Zambia. In Uganda, HFAs were conducted in 16 hospitals or Level IV health centers (high-level advanced care facilities), 72 Level III health centers (middle-level facilities), and 19 Level II health centers (lower-level primary care facilities), for a total of 107 facilities. In Zambia, HFAs were conducted in 6 hospitals, 91 health centers (middle-level facilities), and 16 health posts (lower-level facilities), for a total of 113 facilities.

The HFAs gathered baseline and endline data on maternity care infrastructure; EmONC availability and use; human resources; and drugs, equipment, and supplies. (See later sections of this report, Emergency Obstetric and Newborn Care Access and Availability, for more detail.)

■ **Routine Health Information Systems:**

Existing Health Management Information Systems (HMIS), which collect monthly statistics from health facilities, were used to monitor access to and quality, efficiency, and use of maternal and child health (MCH) services. For example, one health information system supported by the President's Emergency Plan for AIDS Relief (PEPFAR) monitors MCH and HIV-related indicators. (See later sections of this report, Emergency Obstetric and Newborn Care Access and Availability, for more detail.)

■ **Facility-Based Pregnancy Outcome**

Monitoring: To track key facility indicators, Uganda and Zambia intensified existing efforts to document maternal and neonatal outcomes accurately and completely. These outcomes included maternal complications, the use of life-saving interventions such as C-sections, and more thorough identification and investigation of maternal deaths.

In Zambia, reductions in maternal mortality were monitored through routine identification and investigation of deaths that occurred in facilities before and during SMGL Phase 1. (See the Maternal and Perinatal Outcomes in Health Facilities report, for more detail.)

■ **Community-Based Maternal Mortality**

Identification: In Uganda, SMGL built on the existing data-collection infrastructure of the Village Health Teams (VHTs) to collect information on maternal deaths in the four SMGL-supported districts. To obtain baseline information, one member of the VHT visited each household in his or her village. If any households reported deaths of women of reproductive age (WRA) during the baseline period, health personnel at the parish level followed up. If the deceased woman had been pregnant at the time of her death or in the 3 months preceding it, a verbal autopsy interview was conducted in the household, followed by death certification and classification of cause of death.

After the SMGL initiative began in June 2012, monitoring switched to a prospective approach. VHTs reported on any death of WRA in the village, and the same procedure was followed. In October 2013, the SMGL partners conducted a second retrospective data collection to identify all deaths of WRA during Phase 1.

Zambia did not have a community-based system to collect health data in place before the SMGL initiative began. It set up a new system of community key informants, who tracked each pregnant woman until the end of the 42-day postpartum period. However, logistical challenges limited the coverage and completeness of the data gathered.

In addition, although a March 2012 census of the four SMGL-supported districts identified maternal deaths during the baseline period, an endline census did not occur. As a result, Zambia only monitored maternal deaths that occurred in health facilities. (See the Maternal Mortality report for more detail.)

Selected Key Findings from SMGL Phase 1

- **Maternal mortality fell sharply** (by 30%) in Uganda’s four SMGL-supported districts. (The equivalent population-based maternal mortality ratios could not be calculated for SMGL-supported districts in Zambia.) Maternal mortality also declined by 35% in health facilities that implemented SMGL interventions in both Uganda and Zambia. These improvements are likely due to women’s increased access to emergency obstetric care and the effective care they receive once they arrive at health facilities. (See the Maternal Mortality report for more detail.)
- **The percentage of all births in SMGL-supported districts that occurred at health facilities increased** from 46% to 74% in Uganda (a 62% increase) and from 63% to 84% in Zambia (a 35% increase). (See the Maternal and Perinatal Outcomes in Health Facilities report for more detail.)
- **The percentage of all facilities performing specific life-saving interventions called “signal functions” increased.** By the end of Phase 1, both countries had an adequate number of facilities (relative to each district’s population) to provide Basic and Comprehensive EmONC. In particular, middle-level health clinics in both countries made substantial gains in their ability to perform more life-saving interventions. The percentage of middle-level facilities that were providing four or more of the recommended seven signal functions increased from 31% to 57% in Uganda and from 27% to 44% in Zambia. (See later sections of this report, Emergency Obstetric and Newborn Care Access and Availability, for more detail.)
- **SMGL-supported districts showed improvement in treatment for HIV-positive mothers and prophylaxis for their infants.** In Uganda, 28% more HIV-positive women received treatment and 27% more infants received prophylaxis. Increases in Zambia were 18% and 29%, respectively. (See later sections of this report, Emergency Obstetric and Newborn Care Access and Availability, for more detail.)

Assessing SMGL’s Impact on Emergency Obstetric and Newborn Care Availability and Access

This report focuses on indicators of overall performance and effectiveness of SMGL interventions related to improving availability of and access to emergency obstetric care in Uganda and Zambia. Data sources for these indicators were selected to capture changes in the availability, utilization and quality of care provided in delivering facilities.

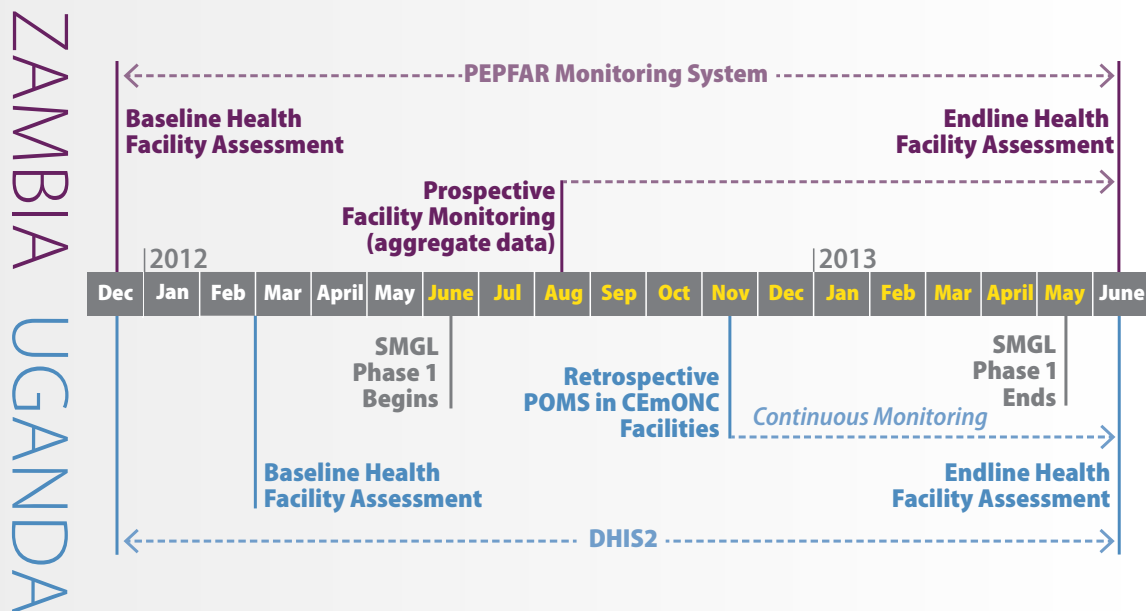
Data presented in this report come from several sources. To measure the status of EmONC before SMGL was implemented, SMGL country teams and partners conducted extensive baseline needs assessments, called Health Facility Assessments (HFA). They followed up with an endline HFA when Phase 1 ended, approximately one year after the onset

of the interventions (Figure 2). The routine health information system provided additional information when district data were available.

To determine whether changes between the baseline and endline periods were significant, SMGL evaluation staff calculated a z-statistic for the observed change, which is used to determine the significance levels of the change. These significance levels are presented in Tables A and C in the Appendix (pages 58 and 62).

The data presented in this report are not subject to sampling error because they are complete counts, not samples. However, the data may be affected by random variation. That is, the number of events that actually occurred can be considered as one possible result among many possible results that could have arisen under the same circumstances. Thus, when a change is labeled as significant, it means that the difference is extremely unlikely to be due to random variability.

Figure 2. Data Collection for Assessing Obstetric and Newborn Care Services in SMGL-Supported Districts in Uganda and Zambia



Note: Baseline period is June 2011–May 2012. Endline period is June 2012–May 2013.
 SMGL = Saving Mothers, Giving Life; PEPFAR = President’s Emergency Plan for AIDS Relief; POMS = Pregnancy Outcomes Monitoring Survey;
 CEmONC = Comprehensive Emergency Obstetric and Newborn Care; DHIS2 = District Health Information System 2

Data Sources

Health Facility Assessments

In both Uganda and Zambia, the first phase of SMGL interventions was bookended by Health Facility Assessments (HFA). These assessments examined:

- Maternity care infrastructure.
- EmONC availability and utilization.
- Human resources.
- Drugs, equipment, and supplies.

The assessments covered all health facilities that were identified as caring for women during labor and delivery. The assessment instrument used in both countries was adapted from a tool originally developed by the Averting Maternal Death and Disability program at Columbia University (AMDD, 2009).

During the SMGL interventions, a small percentage of health facilities that cared for at least some deliveries were added or dropped, or changed functional level. In order to isolate the effects of the facility interventions, the analyses presented in this report only consider those facilities that provided delivery care at baseline and also at endline, and considered only the functional designation at baseline. Analyses showed very minor differences between this

analytic method and an alternative approach using all facilities at baseline and endline.

Uganda

A total of 107 facilities providing delivery services in Uganda are represented in the HFA analysis (Table 1). Over half (61%) are government facilities and the rest are privately owned. The facilities were divided into 3 categories:

- **Hospital/Health Center IV:** provide comprehensive emergency obstetric and newborn care (including surgery and blood transfusions), as well as care for normal deliveries. Health Centers IV have the functional capacity of hospitals, but with smaller staffs, and are sometimes referred to as mini-hospitals. In this report, references to hospitals include Health Centers IV.
- **Health Center III:** provide basic maternity and newborn care and some emergency obstetric care.
- **Health Center II:** primarily outpatient facilities, provide antenatal and post-partum care. Although they typically do not provide delivery services, there are 19 included in this assessment (out of a total of 95) that do handle emergency situations when women are not able to reach higher level facilities.

Table 1. Number of Health Facilities in Uganda by District and Operating Agency, Uganda SMGL-Supported Districts: Kabarole, Kamwenge, Kibaale, Kyenjojo

Operating Agency	Total	Type of Facility		
		Hospital/HC IV	HC III	HC II
Government	65	11	47	7
Private, for Profit	11	1	4	6
Private, Not for Profit	31	4	21	6
District				
Kabarole	32	6	24	2
Kamwenge	16	2	12	2
Kibaale	33	5	24	4
Kyenjojo	26	3	12	11
TOTAL	107	16	72	19

Zambia

A total of 113 facilities providing delivery services in Zambia are represented in the HFA analysis (Table 2). Most (94%) are government facilities and 7 are run by religious missions. They are divided into 3 categories:

- **Hospitals** provide comprehensive EmONC, including surgery and blood transfusion.
- **Health Centers** provide routine maternity and newborn care for normal deliveries. Some health centers have additional limited capacity to perform essential obstetric care,

including parenteral injections, newborn resuscitation, and manual removal of the placenta and retained products of conception.

- **Health Posts** are generally rural outpatient facilities; the level of service varies in each district. Health posts do not typically provide routine delivery services, but the 16 included in this assessment at least occasionally handle deliveries and emergency situations when women are not able to reach higher level facilities.

Table 2. Number of Health Facilities in Zambia By District and Operating Agency, Zambia SMGL-Supported Districts: Kalomo, Lundazi, Mansa, and Nyimba

Operating Agency	Total	Type of Facility		
		Hospital	Health Center	Health Post
Government	106	4	87	15
Religious Mission	7	2	4	1
District				
Kalomo	32	2	30	0
Lundazi	35	2	21	12
Mansa	29	1	28	0
Nyimba	17	1	12	4
Total	113	6	91	16

Routine Health Information Systems (HMIS and PEPFAR)

The Health Management Information System (HMIS), which collects monthly facility-based statistics, is used to monitor the access to and the quality, efficiency, and use of maternal and child health (MCH) services. In Uganda, the Ministry of Health (MOH) began updating its HMIS in 2010, resulting in the District Health Information System 2 (DHIS2) which included:

- New data-collection tools.
- Better guidelines for data collection, reporting and analyses.
- An electronic transmission system from the district to a central location.

In the pilot districts, the Uganda DHIS2 was further strengthened during the initial SMGL year to track maternal and neonatal health services and outcomes in all facilities that manage deliveries. District health management information staff were trained to use DHIS2, and the system has become more timely, complete and reliable.

In Zambia, the implementing partners did not use the HMIS data for routine reporting. Instead, they conducted routine monthly or quarterly facility-level data collection, focusing on the availability of EmONC functions and minimum requirements of staff, drugs, equipment, and supplies. Trained M&E teams and mentoring midwives were responsible for

routinely collecting data from clinical registers and facility administrative documents. The MOH has also reviewed various indicators related to maternal and child health and updated the recording registers. The SMGL M&E team provided training and performed quality improvement exercises to strengthen the district's data-collection system.

The PEPFAR routine reporting system was used to track the Zambia HIV/AIDS indicators presented in this report. The PEPFAR-supported Zambia Partners Reporting System, which is a web-based program used by Zambia partners, can be disaggregated to yield results at the district level.

Access and Availability of Obstetric and Newborn Care

From the beginning, SMGL interventions placed a great deal of emphasis on improving the ability of health facilities to provide quality maternity services. Although not all facilities can provide advanced obstetric care, all facilities should provide at least a minimum level of care. All obstetric care requires:

- Adequate infrastructure (e.g., water, electricity, latrines).
- Skilled personnel available 24 hours per day, 7 days a week (24/7).
- Communication and transport for emergency referrals.
- Delivery beds, equipment and supplies.
- Routine procedures and practices that are easily available, known, and followed.

In addition, the life-saving interventions that form both basic and comprehensive EmONC require:

- Additional infrastructure (e.g., operating theater for CEmONC).
- Staff available to perform specialized tasks.

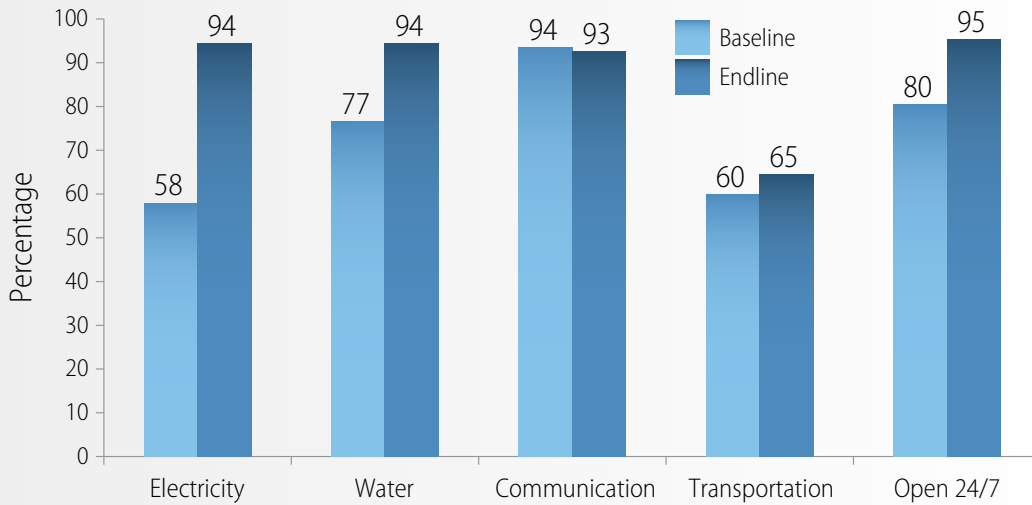
- Equipment and supplies, including essential medicines.
- Safe blood availability (for CEmONC).

To achieve its goals, SMGL invested in human resources, equipment, renovations for emergency obstetric care, improved surgical capacity and safe blood supplies, supply chains, data systems, and communication and transportation networks. These improvements were meant to ensure access to quality obstetric care within 2 hours for all women, particularly those with severe obstetric complications (such as obstetric hemorrhage, which unattended may lead to death within hours).

General Facility Requirements

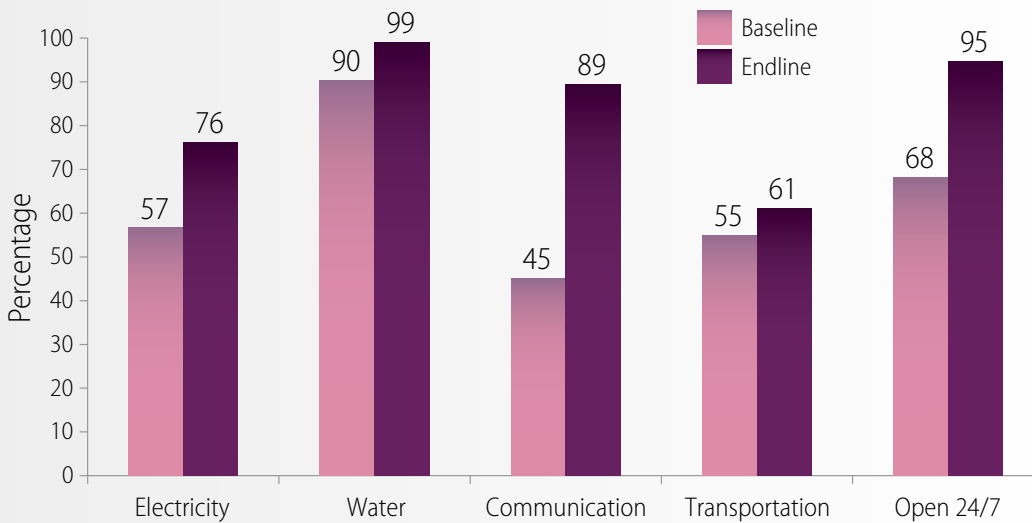
During the project year, the general maternal health facility infrastructure requirements needed to provide EmONC services measured by SMGL improved or remained at a high level in both Uganda and Zambia (Figures 3 and 4).

Figure 3. Percentage of Health Facilities that Improved Selected Infrastructure, SMGL-Supported Districts in Uganda



SMGL = Saving Mothers, Giving Life.

Figure 4. Percentage of Health Facilities that Improved Selected Infrastructure, SMGL-Supported Districts in Zambia



SMGL = Saving Mothers, Giving Life.

Without a reliable source of **electricity**, it is very difficult for health staff to carry out obstetric procedures safely and well. Thanks largely to SMGL investments in solar technologies, significant gains were made in the availability of electricity at facilities. In Uganda, the percentage of facilities with reliable electricity increased from just over half (58%) to nearly all (94%), with hospitals/HC IVs reaching 100%. In Zambia, three-quarters of all facilities had electricity by endline. All hospitals had electricity at both baseline and endline (Figure 5).

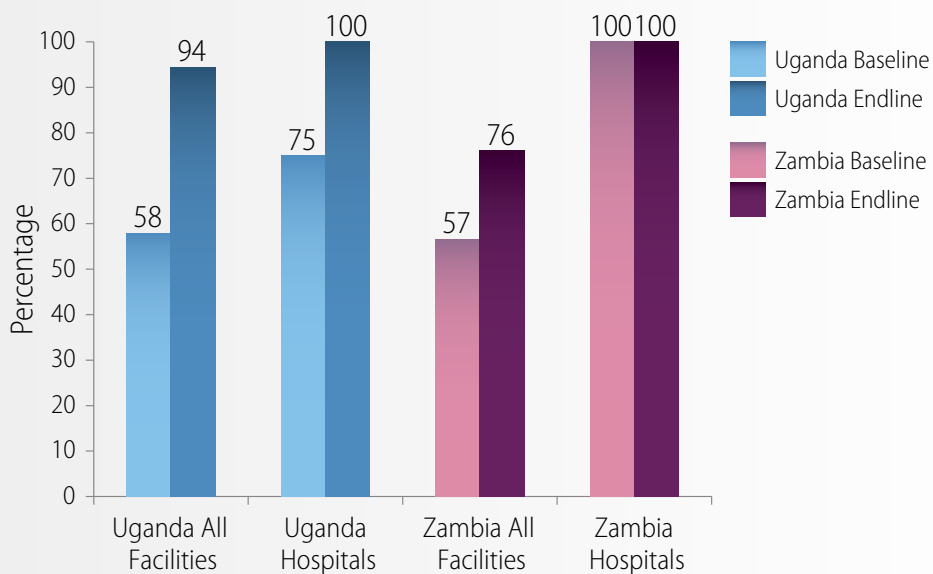
In case of a power grid failure, delivering facilities must have a back-up generator to provide uninterrupted services. In Uganda, the percentage of facilities with back-up electricity more than doubled during the intervention year. All hospitals/HC IVs now have functional generators, compared to only 56% at baseline.

Health Centers III and II also showed improvements (Figure 6). Similarly, all hospitals in Zambia reported having backup generators by the endline, but this resource was largely unavailable in health centers and health posts.

It is essential that all health facilities have a reliable supply of **safe water** for sanitation and hydration. Health staff must be able to wash their hands to prevent the spread of infection. Patients need access to toilets in the maternity ward. In Uganda, considerable gains were made in the percentage of facilities that had regular water supply, with 100% of hospitals/HC IVs and over 94% of all health facilities reporting they had water available by the endline (Figure 7).

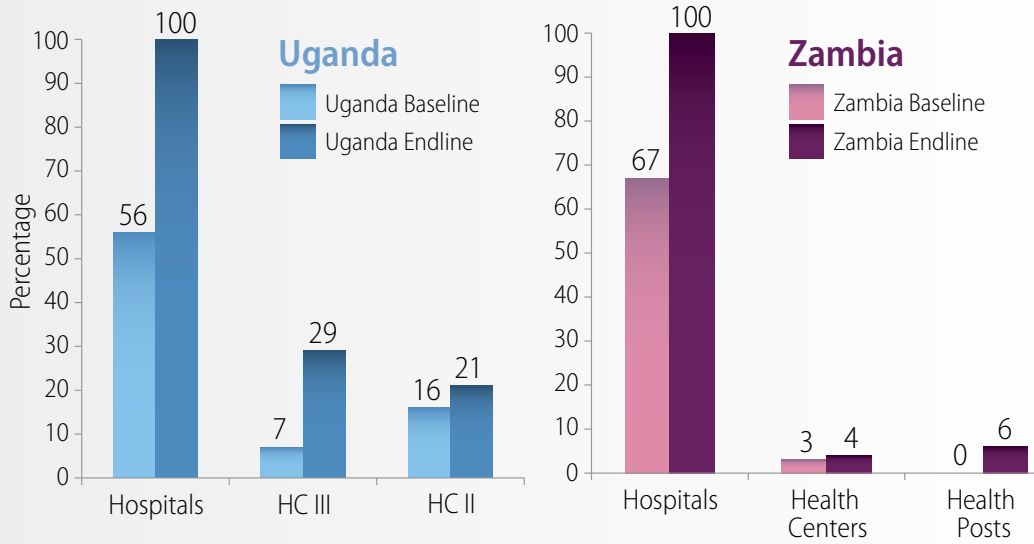
In Zambia, the great majority of facilities (91%) began the project with water available, and increased to 99% by endline.

Figure 5. Percentage of Facilities That Have Electricity Before and After SMGL, SMGL-Supported Districts in Uganda and Zambia



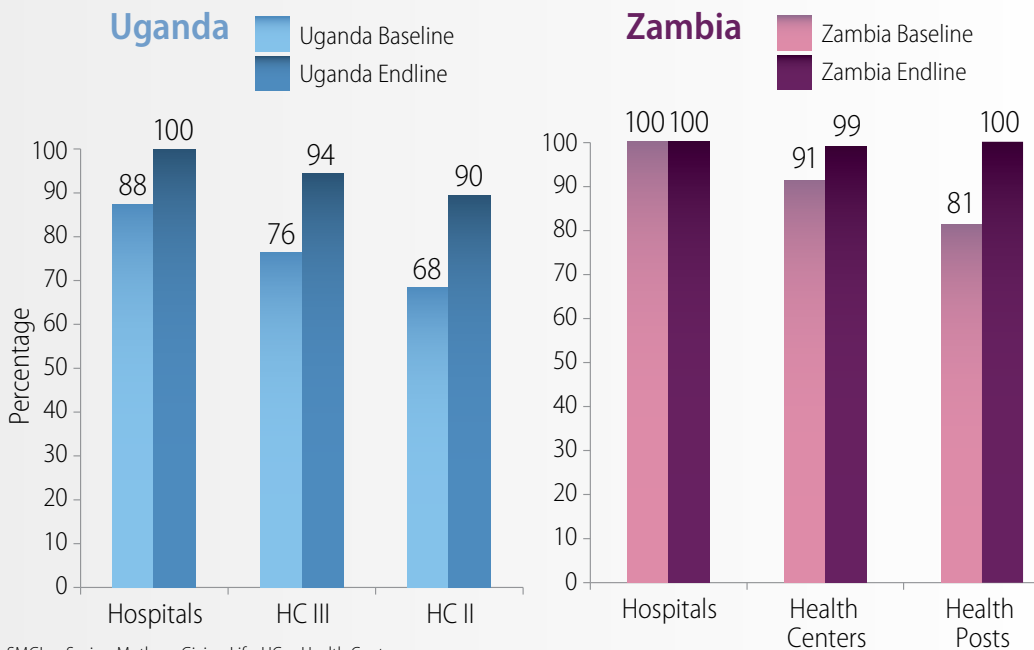
SMGL = Saving Mothers, Giving Life.

Figure 6. Percentage of SMGL Facilities with Backup Generator, SMGL-Supported Districts in Uganda and Zambia



SMGL = Saving Mothers, Giving Life; HC = Health Centers.

Figure 7. Percentage of SMGL Facilities with Water, SMGL-Supported Districts in Uganda and Zambia



SMGL = Saving Mothers, Giving Life; HC = Health Centers.

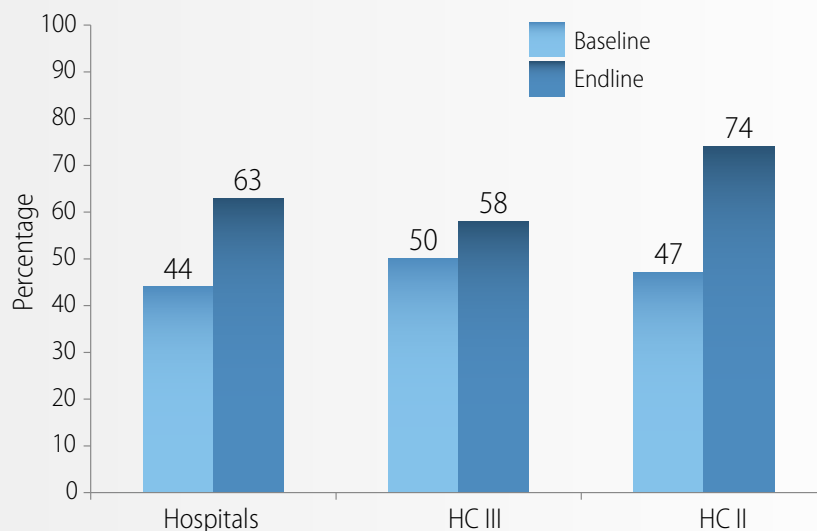
Although almost all facilities in Uganda reported having a source of water, only approximately half have piped or pumped water. About 40% of facilities reported collecting and using rain water (data not shown). Sporadic water supplies may disrupt the ability to provide safe delivery care. A large proportion of facilities had experienced at least one day without water in the month prior to the baseline HFA (Figure 8). Availability of uninterrupted water improved during Phase 1 but requires further improvement, for instance only 63% of hospitals had uninterrupted water supply at the endline.

An obstetric emergency can happen at any time of the day or night; therefore, obstetric services must be available around the clock. All hospitals/HC IV in Uganda began Phase 1 providing **services 24 hours a day** and maintained that level of service. Health Centers III began with 75% open 24 hours, and improved to 93% by the end of the project. The majority of Health Centers II were open 24 hours at baseline, and increased to all facilities by endline (Figure 9). In Zambia, only 68% of facilities were open 24 hours a day at baseline, but this increased to

95% at endline. Health Centers saw the greatest increase, from 65% at baseline to 93% at endline.

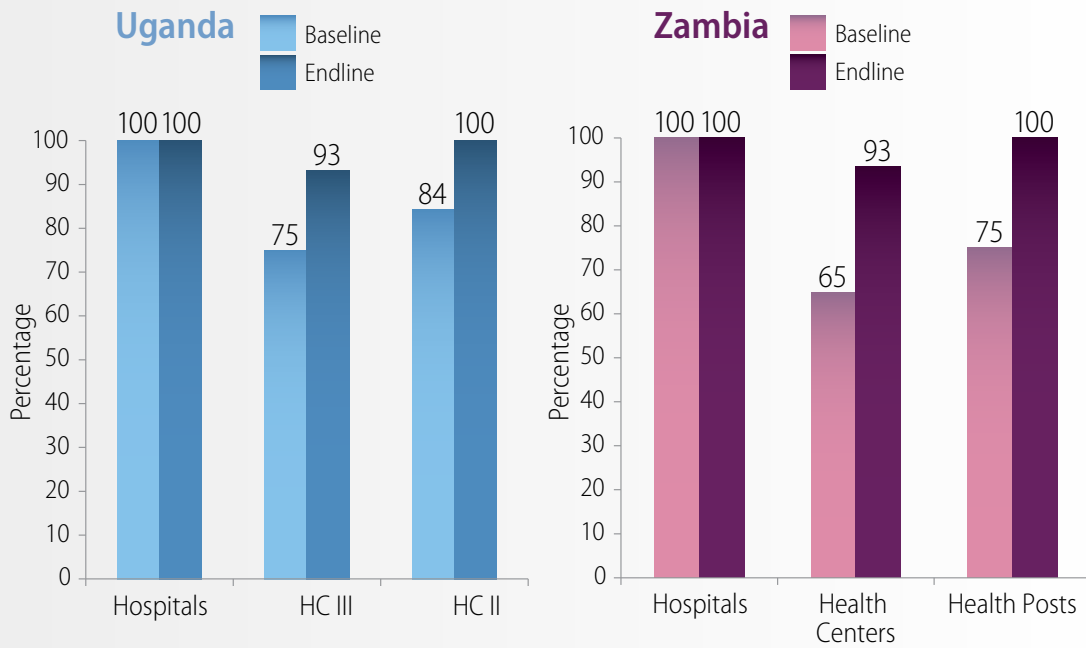
A **sufficient number of delivery beds** is essential not only to provide sanitary and high quality maternity care, but because women who have to deliver on the floor of a maternity center or share a bed may not wish to return for future deliveries, thus putting them at greater risk for a poor outcome. In both countries, additional beds were provided to many facilities. In Uganda at baseline, 86% of facilities reported that women never delivered on the floor, increasing to 91% at endline (Figure 10). Hospitals particularly improved, increasing from 63% at baseline to 88% at endline. In Zambia, the overall percentage of facilities reporting that women never deliver on the floor increased from 72% to 82% (Figure 11). Overall, 74% of facilities in Uganda reported that obstetric patients never shared beds at endline, up significantly from 36% at baseline. In Zambia, 67% of facilities reported that obstetric patients never shared beds, relatively unchanged from the baseline of 64%, a finding that may be associated with the substantial increase in the number of facility deliveries.

Figure 8. Percentage of SMGL Facilities with Uninterrupted Water Supply in the Past Month, SMGL-Supported Districts in Uganda



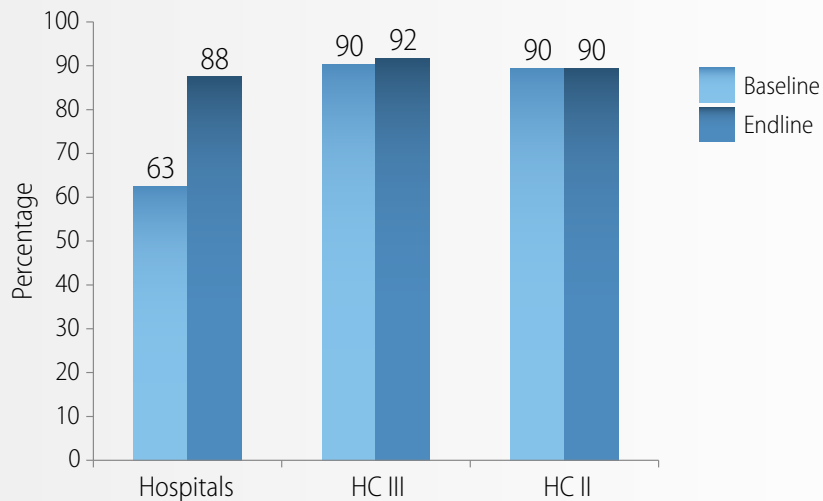
SMGL = Saving Mothers, Giving Life.

Figure 9. Percentage of SMGL Facilities Open 24/7, SMGL-Supported Districts in Uganda and Zambia



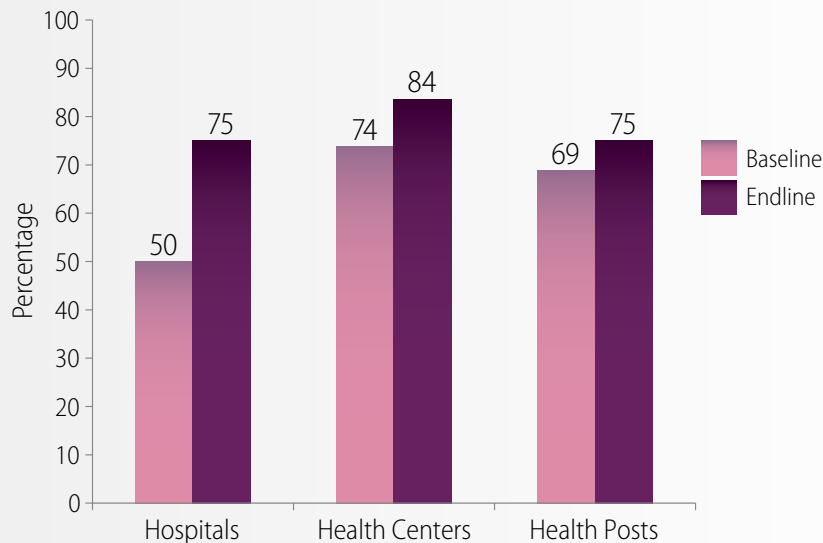
SMGL = Saving Mothers, Giving Life; HC = Health Centers.

Figure 10. Percentage of Facilities Where Women Never Deliver on the Floor, SMGL-Supported Districts in Uganda



SMGL = Saving Mothers, Giving Life; HC = Health Centers.

Figure 11. Percentage of Facilities Where Women Never Deliver on the Floor, SMGL-Supported Districts in Zambia^a



SMGL = Saving Mothers, Giving Life.
^a Excludes Kalomo district where data were not available

Communication and Transportation

Communication

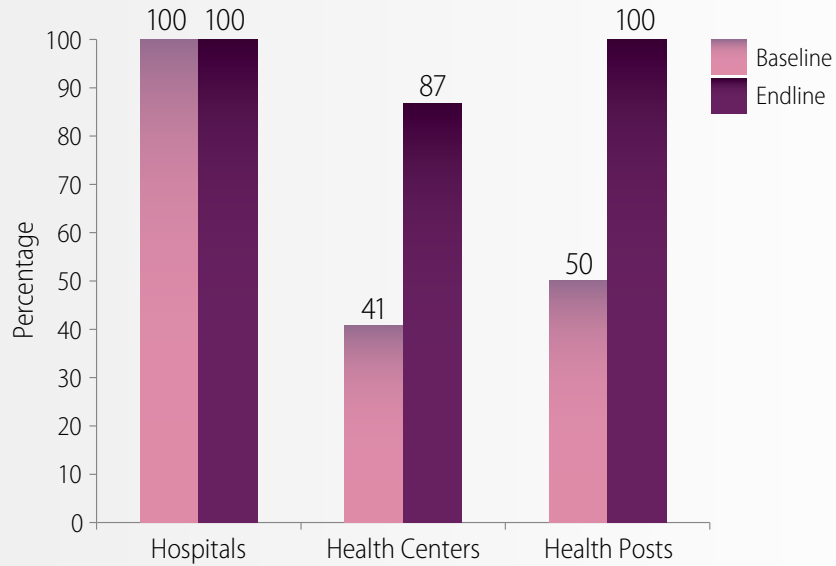
For emergency referrals, it is crucial that lower-level facilities have **functional communication systems** (i.e. two-way radio, landline telephone, or cell phones with service) to communicate with referral facilities. In Uganda, around 90% of HC III and HC II facilities had functional communication systems at baseline and endline. Among the hospitals, although the number with landlines or hospital-owned cell phones increased, the number with phones owned by staff decreased, so that the percentage of hospitals/HC IVs with functioning communications fell to 88% at endline, from 100% at baseline.

In Zambia, the percentage of facilities with functioning communication doubled from 45% at baseline to 89% at endline. All hospitals had functional communication

systems at baseline and endline (Figure 12). The 91 health centers especially benefited from communications improvements, more than doubling their communication services (from 41% to 87% with a functioning communication system) during the SMGL intervention period.

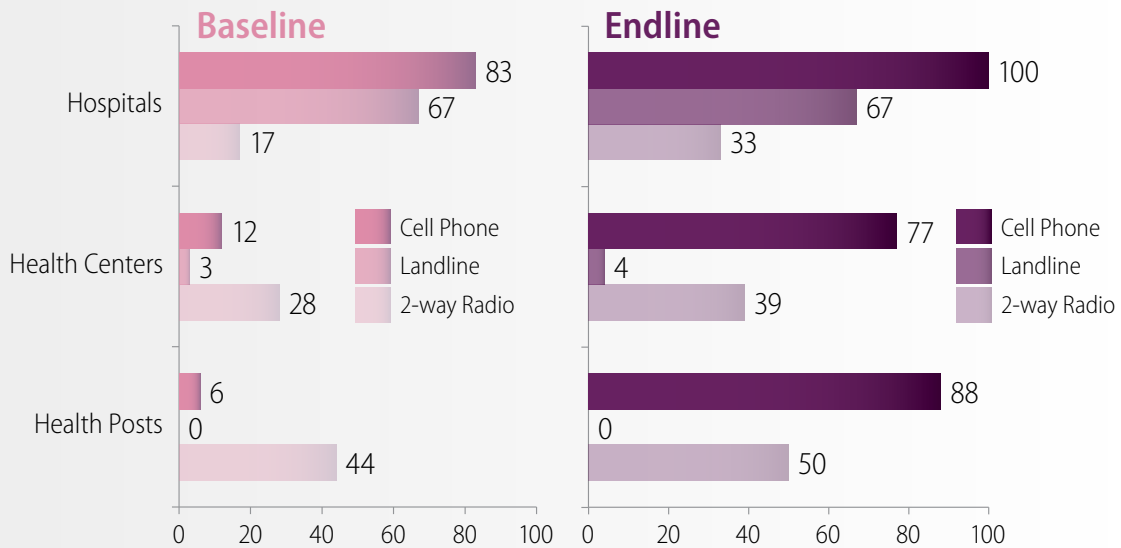
Almost all communication, however, is by cell phone (often owned by health workers or other facility staff); if there is no phone signal, communications may be greatly delayed. A radio system is an excellent back-up option for communicating with communities, ambulances, and facilities when the cell signal is poor. Unfortunately, less than one third of facilities are equipped with 2-way radio systems in Zambia, and less than 1% in Uganda. In Zambia, there has been a substantial increase in all communication systems at all levels of care, but particularly at the lowest level, the Health Posts (Figure 13).

Figure 12. Percentage of Facilities with at Least One Functional Communication System, SMGL-Supported Districts in Zambia



SMGL = Saving Mothers, Giving Life.

Figure 13. Percentage of Facilities with Selected Communication Systems, SMGL-Supported Districts in Zambia



SMGL = Saving Mothers, Giving Life.

Transportation

Transportation is a complex issue, involving not only vehicles but also drivers, fuel, road conditions, and sometimes transportation charges. Availability of motorized transport is critical for referring women with obstetric emergencies that require higher levels of service. While the Health Center II facilities with **adequate transportation** (i.e. functional motorized vehicle available) in Uganda declined (from 68% to 47%), marked increases in adequate transportation were seen for hospitals and Health Centers III. One possible explanation is the impact of “*boda-boda*” (motorcycle) vouchers, subsidized by SMGL, which contributed to important gains in access to all levels of care. *Boda-boda* subsidized transport freed up motorized transport controlled by facilities, and allowed better availability of ambulances for emergency referrals. Transportation was somewhat less likely to be available in Zambia, though the percentage of facilities that had functional transportation available increased slightly, from 55% to 61% of facilities.

SMGL looked for innovative ways to overcome the transportation barriers that women face in accessing health services. In Uganda, pregnant women receive subsidized transport vouchers during antenatal care (ANC) visits. Vouchers for subsidized health care in private clinics are also available. In Zambia, Short Message Service (SMS) technology is used to transfer funds to cover the costs of transportation, and women and their partners are advised during ANC classes to put aside funds for transportation or communication in case there is a need to go to a facility for urgent care.

Emergency Referrals

Complications in pregnancy and soon after birth can be unpredictable, a situation which is particularly difficult for women living in rural settings often far from emergency obstetric care. Lower-level facilities thus need formal referral systems to ensure that women with complications are able to reach facilities that can provide appropriate emergency obstetric care.

In Uganda, in-referrals to obstetric care facilities from other facilities increased slightly in Mid-Western (non-SMGL) districts during the project year, but the number of referrals to facilities in SMGL districts more than doubled because of the strengthened referral and transportation systems (Figure 14).

Mothers' Shelters

With women often living far from skilled obstetric care and emergency transportation not always available, a mother's shelter (housing next to a clinic or hospital where women can go to await labor or recover from delivery) can be a good approach. Overall, the proportion of facilities associated with a mother's shelter increased slightly in Zambia from 28% to 31% (Figure 15).

As facilities are more centrally located in the SMGL districts in Uganda than in Zambia, there is less of a need for mother shelters, and only 4 were renovated in Uganda. All were located in one district (Kibaale), the largest SMGL district and the one with the worst road conditions.

Human Resources

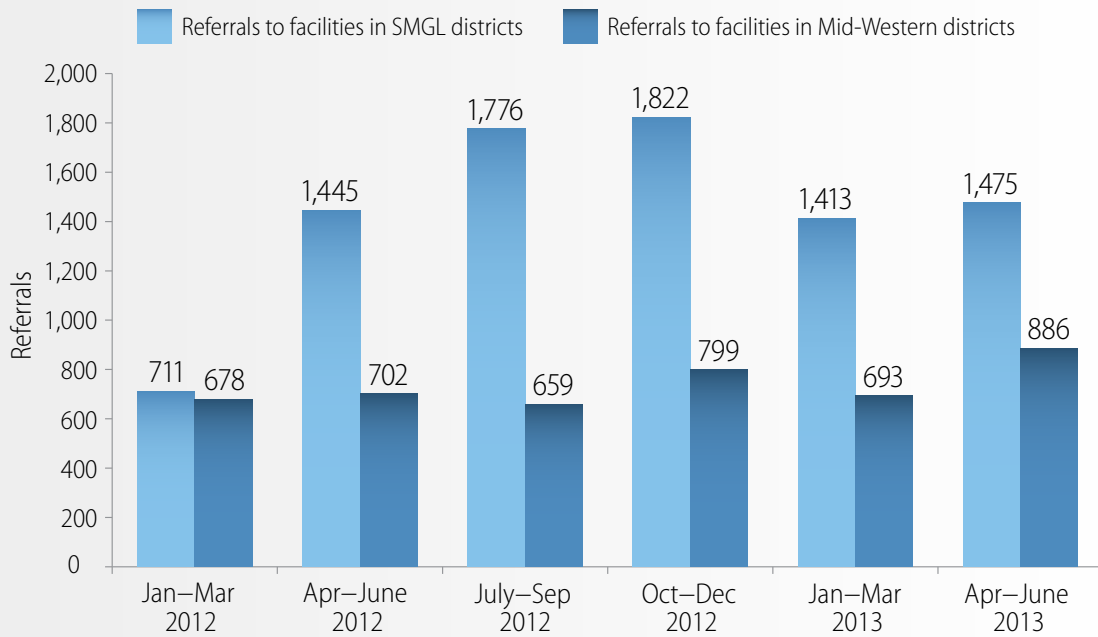
Staffing

In Uganda and Zambia, both the SMGL initiative and the government ministries committed themselves to increasing the quantity as well as the quality of medical staff in the SMGL districts.

In August 2010, the Uganda MOH published the “Health Unit Procedural Manual,” which specifies the number of staff members, by cadre, that each level of facility should employ. By the end of Phase 1 Uganda had achieved the recommended staffing for Ob-gyns and registered nurses/midwives (Figure 16). However, three of the categories had not yet reached 100%:

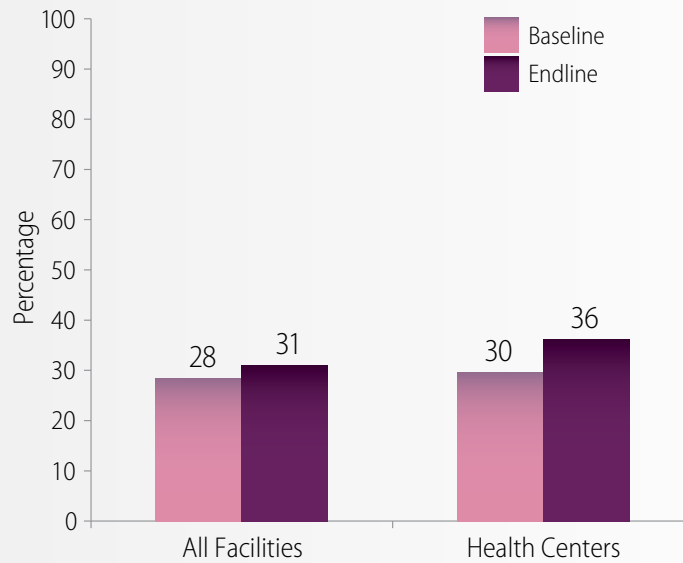
- Medical officers were at 53% of recommended staff.
- Clinical officers were at 77%.
- Enrolled nurses/midwives were at 55%.

Figure 14. Maternal In-referrals to Facilities in SMGL-Supported Districts in Uganda Compared with Mid-Western Districts by Quarter



SMGL = Saving Mothers, Giving Life;
Source: Uganda Ministry of Health, Health Management Information System data, 2012–2013.

Figure 15. Percentage of Facilities with an Associated Mother Shelter, SMGL-Supported Districts in Zambia^a



SMGL = Saving Mothers, Giving Life;
^a Excludes Kalomo district where data were not available.

Figure 16. Gap in Human Resources by Cadre Type Before and After SMGL, SMGL-Supported Districts in Uganda

Cadre	Total Number of Employees			Percent Endline Gap ^a
	Recommended	Baseline	Endline	
Medical	85	29	45	47.1
Specialists (Ob-Gyns)	7	5	7	0
Clinical Officers	209	139	161	23.0
Registered Nurses/Midwives	245	204	257	0
Enrolled Nurses/Midwives	937	355	514	45.1
Assistant Nurses	413	365	348	15.7

SMGL = Saving Mothers, Giving Life;

^a Rate of missing cadre per 100 recommended cadre (MOH, 2009).

In Zambia, the District Health Offices provided district-level staffing data. Based on the number of employees in each cadre recommended by the MOH, no staffing gaps remain in the SMGL districts. The number of doctors/medical licentiates and nurses was already at or near the recommended level at baseline, but the number of midwives increased during Phase 1 to meet the Government's staffing goals (Figure 17).

Training of Health Personnel

Before the SMGL initiative, few Zambian health care workers had completed either the 3-week EmONC in-service certification training or the Helping Babies Breathe neonatal resuscitation curriculum. During Phase 1 staff were trained according to these national and international standards with concomitant improvements in quality of care.

The Zambia MOH's annual district-level health worker training data reveal that a significant investment in staff EmONC and newborn resuscitation training occurred between 2011 and 2012 (Figure 18). However, the information is collected by calendar year (January through December) and cannot be disaggregated into pre-SMGL and post-SMGL intervention periods.

In addition to clinical training, SMGL worked to improve the HMIS in both Uganda and Zambia. In both countries, SMGL provided training to health providers and district level personnel to improve data collection and health information systems at the facility, community, and district levels. In Uganda, biostatisticians at the district level were trained to use DHIS2, the new electronic health information system introduced in the four districts with SMGL support.

Numerous health providers and M&E personnel were trained to conduct health facility assessments, pregnancy outcome monitoring, and maternal death reviews by protocol in both countries. In Uganda, district level staff were trained to collect, manage, and interpret the data on maternal mortality reported in communities through the Maternal Death Surveillance and Response efforts. Sixteen district medical officers were trained in certifying and coding deaths due to maternal causes, using the International Classification of Disease—10th edition for Maternal Mortality (World Health Organization, 2012).

In Zambia, the number of health care workers trained in facility-based maternal death review tripled from 16 before to 48 after the SMGL interventions.

Figure 17. Staffing Changes during SMGL Phase 1, SMGL-Supported Districts in Zambia

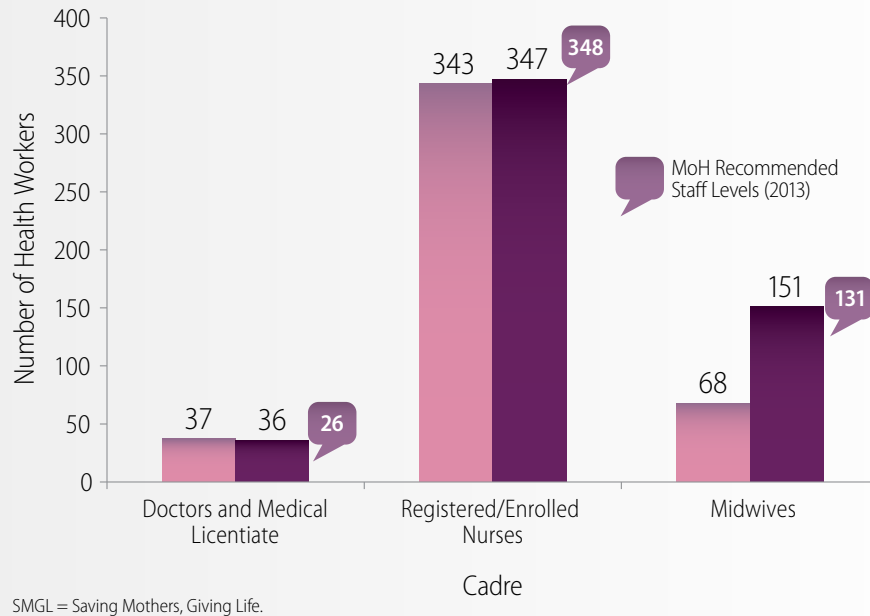
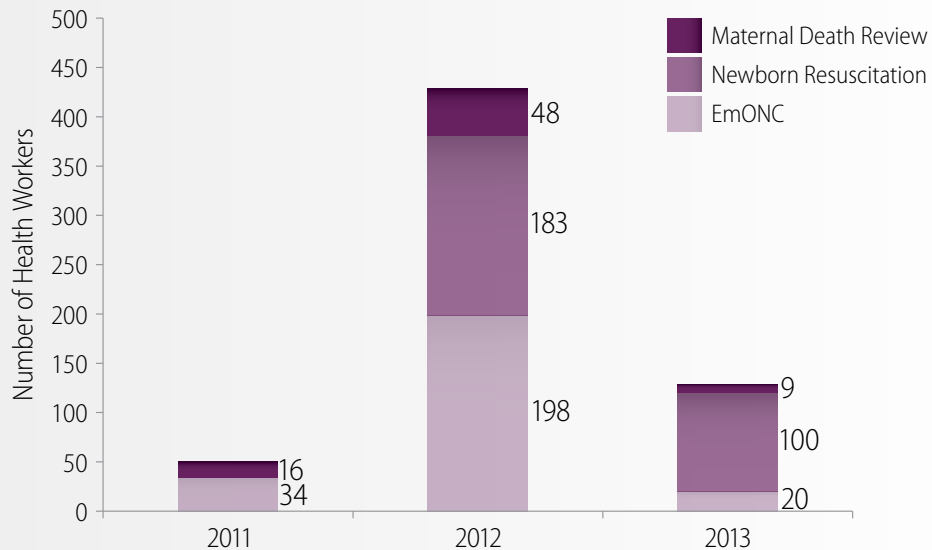


Figure 18. Number of Health Workers Trained Annually by Training Content, SMGL-Supported Districts in Zambia



SMGL = Saving Mothers, Giving Life; EmONC = Emergency Obstetric and Newborn Care;
Source: SMGL implementing partners' report, end of Phase 1.

Routine Care

Skilled Attendance

Every facility needs at least one **skilled attendant** (i.e. doctor, nurse, or midwife) on duty at all times so that all women in labor are able to receive the care they need. All 107 Ugandan facilities had at least one skilled attendant on staff at baseline and endline. The great majority of facilities in Zambia had at least one skilled attendant on staff. While this situation did not change over the project period for hospitals (100%) or Health Centers (90%), staffing at Health Posts improved, going from 88% with at least one skilled attendant to 100%. (This does not include Kalomo district, whose baseline data in this area is not complete.)

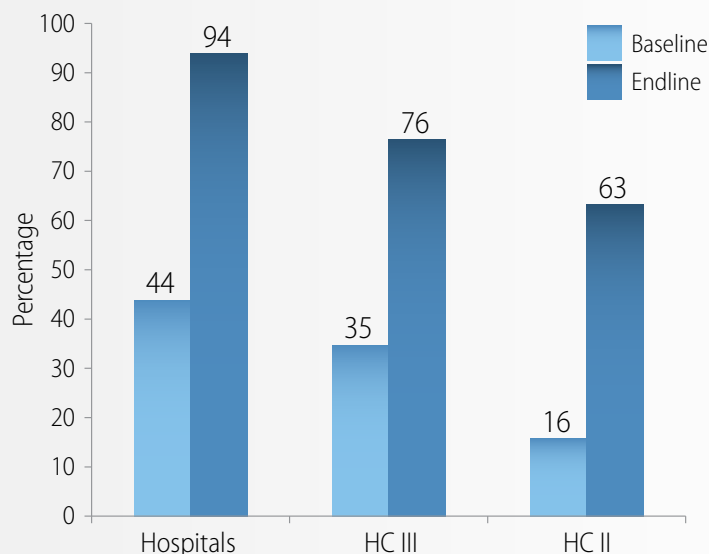
Facilities involved in the SMGL project made great strides in using tools and techniques to improve routine delivery care. Using a partograph⁴ and providing active

management of the third stage of labor (AMTSL) are elements of routine obstetric care that should be provided to all women to improve maternal and neonatal outcomes. In Zambia, the SMGL team, in collaboration with the MOH Quality Improvement division, provided refresher courses to nurses and midwives on documentation (including partograph use) and timely interventions for obstetrical complications to improve maternal and neonatal care.

Partograph Use

The percentage of facilities in Ugandan SMGL districts using a **partograph** (a tool for monitoring the first stage of labor) increased substantially, from 33% to 77% of facilities over the course of the project year (Figure 19). Use of this tool especially increased in hospitals, from 44% to 94%. (Partograph data were not collected in Zambia.)

Figure 19. Percentage of Facilities That Used a Partograph in the Past 3 Months, SMGL-Supported Districts in Uganda



SMGL = Saving Mothers, Giving Life; HC = Health Centers.

4. A tool for monitoring the progress of labor (duration and dilation) that alerts the provider to the need for medical intervention if labor is not progressing well.

Active Management of the Third Stage of Labor (AMTSL)

AMTSL is an evidence-based, three-step intervention that should be practiced routinely to prevent postpartum hemorrhage, a leading cause of maternal death. Nearly all SMGL-supported facilities now report routine practice of AMTSL: in Uganda the increase was from 76% to 93% and in Zambia from 71% to 91% (Figure 20).

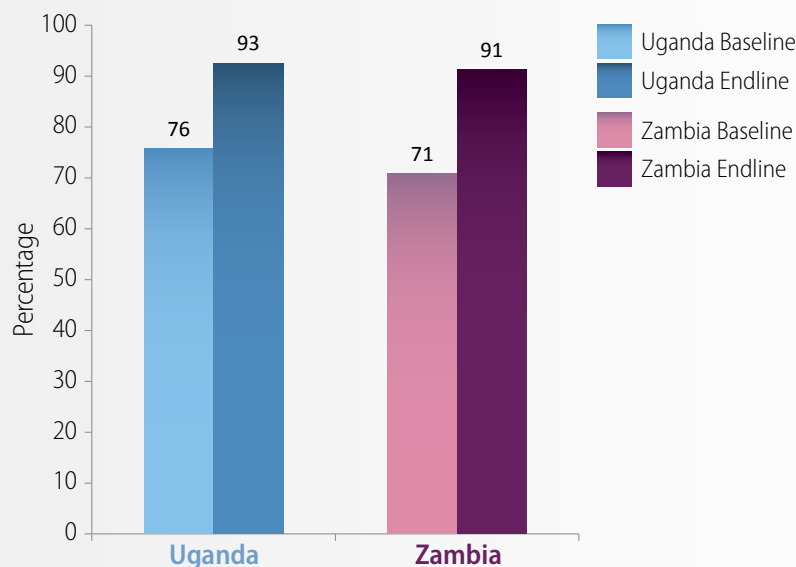
Protocols and Guidelines

One component of the SMGL initiative in Uganda was to make sure that the health facilities had **protocols and guidelines** on various aspects of maternal and newborn care, and displayed them in the facilities as a reference for the

staff. The percentage of facilities that had these guidelines on display increased significantly by endline; over 75% of all facilities had posted protocols on preventing mother-to-child transmission of HIV and on immediate newborn care, and over half displayed guidelines on obstetric and newborn complications, postpartum hemorrhage, ante- and postnatal care, eclampsia, and family planning (Figure 21).

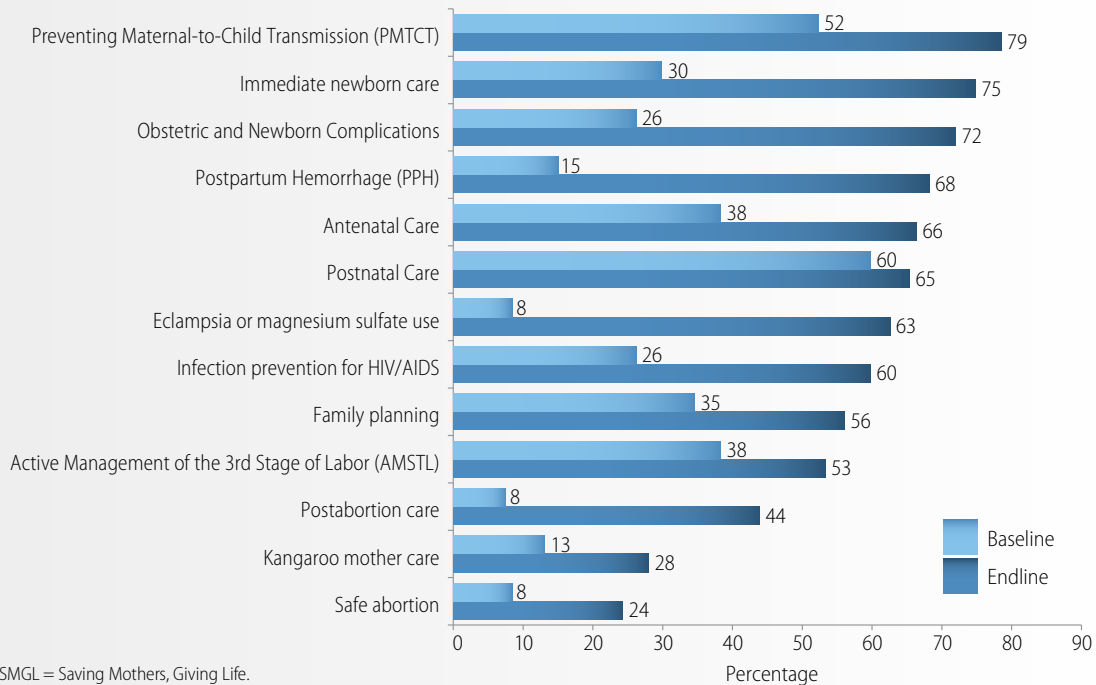
There were particularly large increases in the percentage of Health Centers III displaying guidelines on postpartum hemorrhage, eclampsia, obstetric and newborn complications, and immediate newborn care. Standardized protocol/guideline information was not collected in Zambia.

Figure 20. Percentage of Facilities That Routinely Practice Active Management of Third Stage of Labor, SMGL-Supported Districts in Uganda and Zambia



SMGL = Saving Mothers, Giving Life.

Figure 21. Percentage of Facilities with Protocol Guide Available and Displayed, SMGL-Supported Districts in Uganda



HIV Tests and Anti-retroviral Medication in Maternity Wards

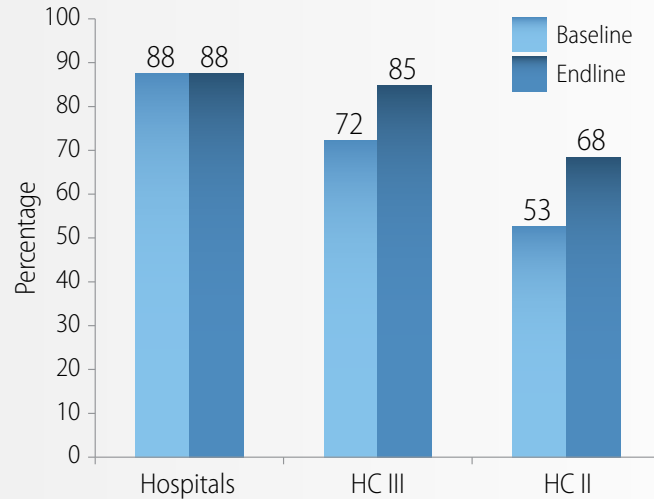
HIV is a significant contributor to maternal illness and often an indirect cause of death. An increased number of health care facilities are providing HIV testing and management. The SMGL interventions were carried out by PEPFAR implementing partners and synergies between the two programs contributed to improved results.

Facilities should conduct a **rapid HIV** test in the maternity ward if the mother's HIV status is unknown, so that anti-retroviral medication (ARV) can be given to the mother and neonate in time to prevent perinatal transmission to the infant. In Uganda, the percentage of health care facilities that had recently conducted rapid HIV tests increased from 71% to 83% (Figure 22). The Health Centers II saw the biggest

increase from 53% to 68%; the percentage of hospitals/HC IVs providing the test remained constant at 88%. In Zambia, overall the percentage of facilities using the rapid HIV test in the maternity ward fell from 66% to 59%. Mansa and Nyimba Hospitals did not report using the rapid test in the past 3 months.

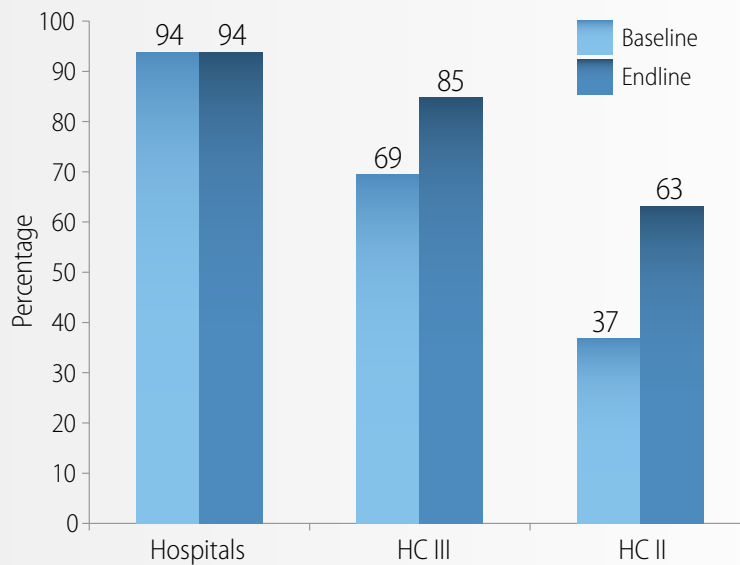
Similar increases were seen in the percentage of facilities in Uganda that had recently provided ARV to HIV-positive mothers; overall, the percentage increased from 67% to 82%, with the largest increase occurring in Health Centers II (37% to 63%); the percentage of hospitals did not change (94%) (Figure 23). All hospitals (100%) in Zambia gave ARV to HIV-positive mothers in the maternity ward in the last 3 months, but overall 69% of all facilities provided ARV to HIV-positive mothers in the maternity ward in the past 3 months, the same as at baseline.

Figure 22. Percentage of Facilities Using Rapid HIV Tests in the Maternity Ward in the Past 3 Months, SMGL-Supported Districts in Uganda



SMGL = Saving Mothers, Giving Life; HC = Health Center.

Figure 23. Percentage of Facilities Giving ARVs to HIV-Positive Mothers in the Maternity Ward in the Past 3 Months, SMGL-Supported Districts in Uganda



ARV = Anti-retroviral medication; SMGL = Saving Mothers, Giving Life.

The percentage of facilities providing **HIV prophylaxis to exposed newborns** increased in both countries (Figure 24). In Uganda, it increased from 67% of facilities to 83%. At endline, all hospitals reported administering ARVs in the previous 3 months (up from 94%). All hospitals in Zambia had given ARVs to newborns in the maternity ward in the last 3 months, and overall 74% of facilities had at endline, up from 65% at baseline.

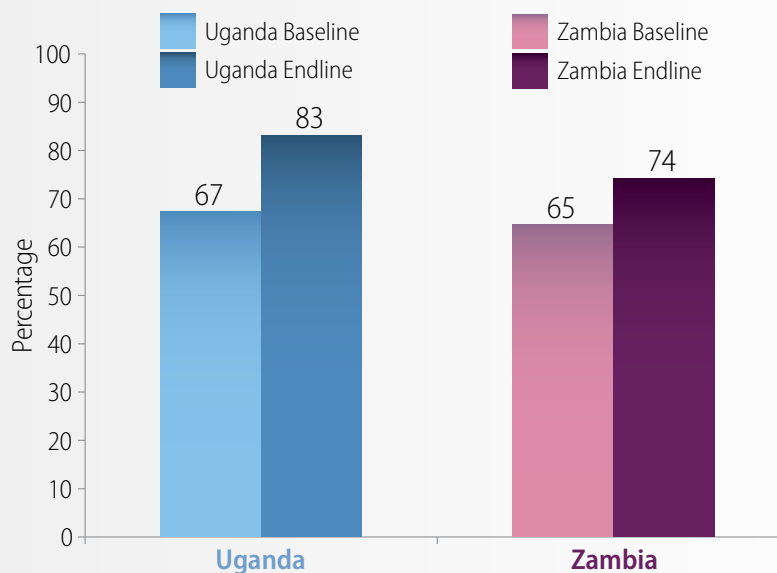
Maternal Death Reviews

A key part of monitoring and improving clinical outcomes and services is conducting **maternal death reviews** (also known as audits). Reviews identify factors that contributed to the woman's death and findings are used to develop recommendations and guide actions that can prevent similar deaths in the future, for example by improving transportation, quality of care, etc. In Uganda, the MOH mandates maternal death notification and review as a measure to reduce

maternal deaths. While this initiative has not yet been fully introduced at all health facilities, SMGL ensured that the government policy was implemented in all SMGL-supported facilities. As a result, striking increases were seen in Uganda. Among all facilities the percentage performing maternal death reviews increased from 7% to 34% and among hospitals the percentage increased from 31% to 100% (Figure 25). Some Health Centers II also began conducting reviews, though the numbers are small because they refer patients with complications.

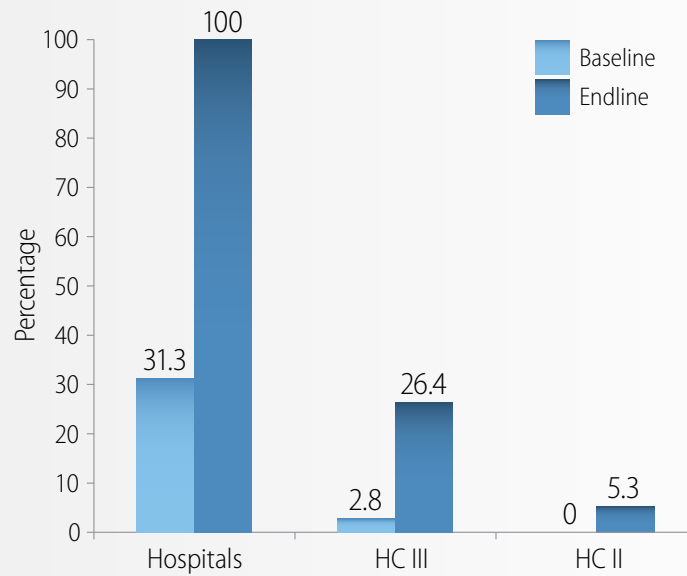
Routine maternal death reviews were also an SMGL goal in Zambia. Overall, the percentage of health facilities in Zambia that now perform these audits increased from 42% to 56% (Figure 26). The increase is particularly striking in hospitals, which increased from 50% conducting reviews at baseline to 100% at endline.

Figure 24. Percentage of Facilities Providing ARVs to Exposed Newborns in past 3 months, SMGL-Supported Districts in Uganda and Zambia^a



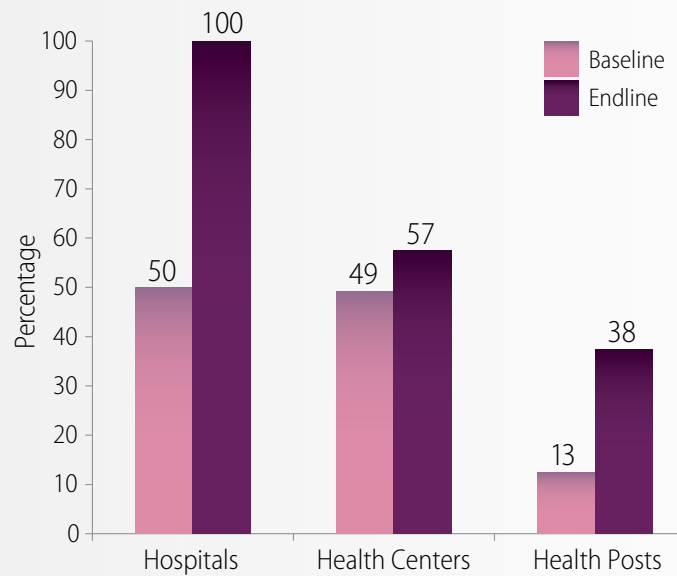
ARV = Anti-retroviral Medication; SMGL = Saving Mothers, Giving Life.
^a Excludes Kalomo district in Zambia where data were not available.

Figure 25. Percentage of Facilities Performing Maternal Death Reviews, SMGL-Supported Districts in Uganda



SMGL = Saving Mothers, Giving Life; HC = Health Centers.

Figure 26. Percentage of Facilities Performing Maternal Death Audits, SMGL-Supported Districts in Zambia^a



SMGL = Saving Mothers, Giving Life;

^a Excludes Kalomo district in Zambia where data were not available.

Community Involvement

At the community level in Zambia, SMGL worked to increase the number of Safe Motherhood Action Groups (SMAGs), which are made up of people who live in communities within a health facility's catchment area. They encourage pregnant women to attend ANC and to deliver in health facilities. By the end of Phase 1 the proportion of all facilities with an associated SMAG had increased from 63% to 85% (Figure 27). Health Centers showed the greatest increase, rising from 66% with a SMAG to 89%. The percentage of Health Posts also increased significantly, from 56% to 88%.

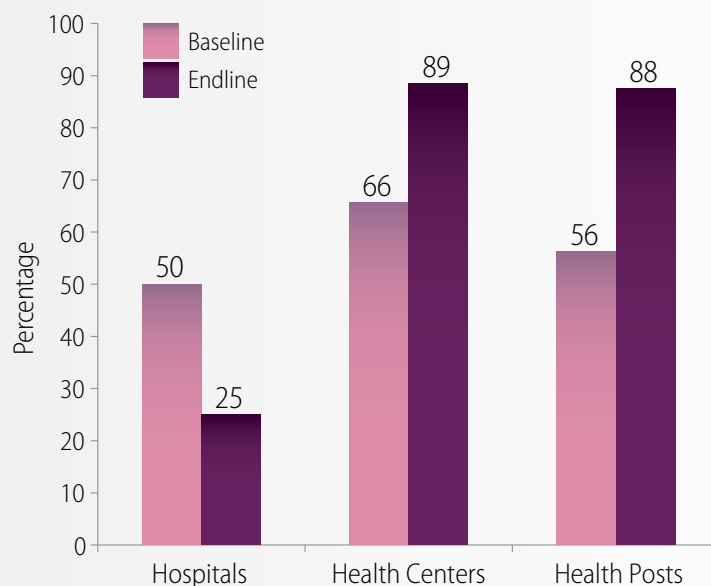
In Uganda, the SMGL initiative revitalized the **Village Health Team (VHT)** program in the pilot districts. A VHT consists of 5-6 community volunteers who provide maternal, newborn, and child services. They create a bridge between community care and the health facilities serving their villages. As part of the community efforts to increase access to delivering facilities, approximately 4,000 VHTs (one per village) were trained to provide preventive MCH services, such as—

- Emphasize the importance of facility deliveries.
- Record births that take place at home.
- Identify and record newborn danger signs.
- Encourage routine postnatal checks at the health facility.
- For babies born at home, practice immediate essential newborn care.
- Make home visits to the newborn after delivery.
- Advise the mother and the family on healthy newborn and maternal care.

These workers were also trained in how to report the deaths of women of reproductive age and deaths of children under 5 years of age. In an innovative approach, some VHTs were given cell phones and identifiers to enter these deaths via SMS/text message directly into the DHIS2 system.

At the end of Phase 1, 98% of villages in Kabarole, 100% of villages in Kamwenge, 99% of villages in Kyenjojo, and 97% of villages in Kibaale had a functional VHT cadre that were conducting surveillance activities (98% overall coverage).

Figure 27. Percentage of Facilities with an Associated Safe Motherhood Action Group, SMGL-Supported Districts in Zambia^a



SMGL = Saving Mothers, Giving Life;
^a Excludes Kalomo district in Zambia where data were not available.

Life-Saving Emergency Obstetric and Newborn Care

Emergency Obstetric and Newborn Care (EmONC) consists of a set of life-saving interventions provided in—

- Basic emergency obstetric care facilities (BEmONC), usually health centers.
- Comprehensive EmONC facilities (CEmONC), usually hospitals and well-equipped health centers with surgical capabilities.

Basic Emergency Obstetric and Newborn Care (BEmONC) signal functions include

- Administering parenteral antibiotics.
- Administering uterotonics.
- Administering anticonvulsants.
- Manually removing the placenta.
- Removing the retained products of conception.
- Assisted vaginal delivery.
- Newborn resuscitation.

Comprehensive EmONC (CEmONC) include all 7 BEmONC functions and

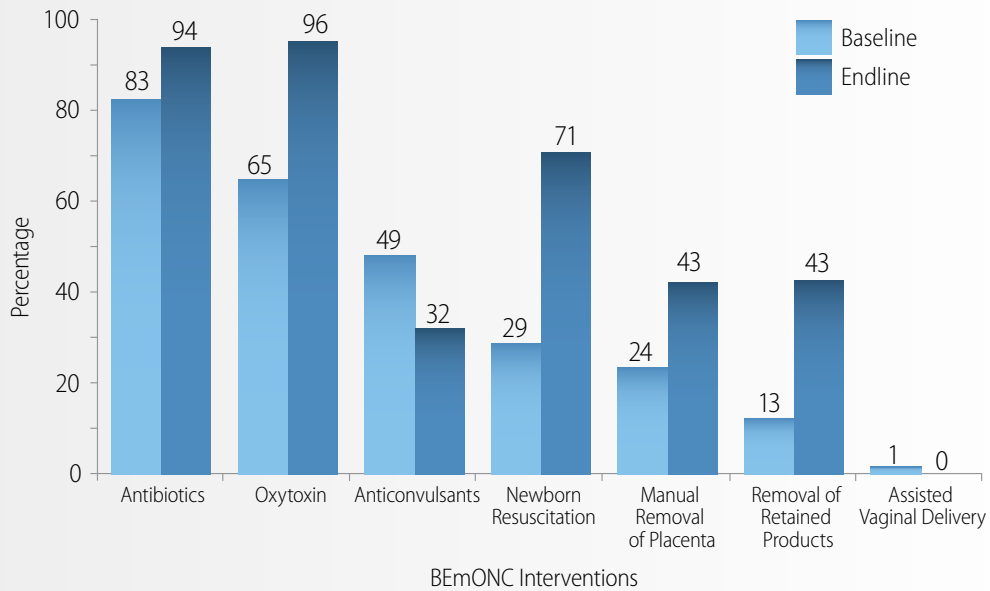
- Cesarean delivery.
- Blood transfusion.

The facilities in SMGL districts were classified as either BEmONC or CEmONC based on whether each facility had, within the previous 3 months, performed each of the “signal functions” as defined by the World Health Organization (WHO) (World Health Organization, 2009). The analysis that follows assessed whether facilities actually carried out each obstetric function, not whether they were capable of carrying them out. The analysis reports the percentage of facilities that reported carrying out each signal function, not the number of patients receiving that treatment.

Most hospitals are designated to perform all of the comprehensive obstetric “signal functions”, and the lowest level facilities (Uganda: Health Center II and Zambia: Health Post) are supposed to provide essential delivery care and refer any complicated births to higher level facilities. The middle level facilities (Uganda: Health Center III and Zambia: Health Center) were designated to provide basic emergency obstetric care in both countries, but their BEmONC capacity was often lacking. Thus, the greatest efforts to improve obstetric signal function performance were focused on the middle-level facilities.

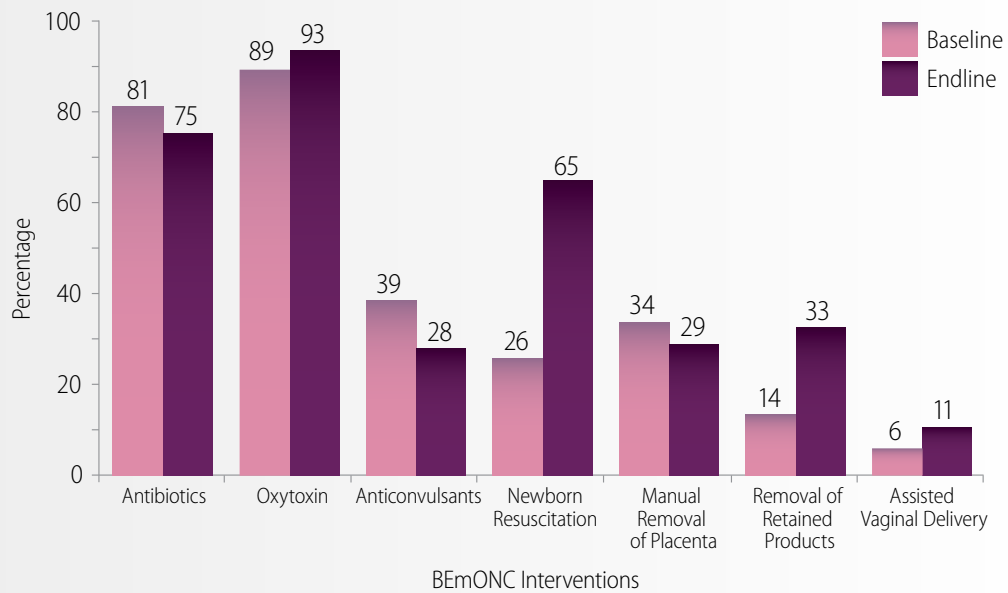
During Phase 1 the number of deliveries occurring in facilities increased substantially, as did the percentage of all facilities performing emergency obstetric care functions in the previous 3 months. In Uganda, the percentage of facilities performing the necessary interventions increased for all but one of the seven BEmONC functions, and in Zambia they increased for 4 of the 7 functions (Figures 28-31). These findings are conservative since they are based on the performance of life-saving interventions over a short period of time (3 months). Had longer periods of observation been used, there might have been more opportunity to carry out these interventions.

Figure 28. Percentage of Health Centers III that Performed BEmONC Interventions in the Previous 3 Months, SMGL-Supported Districts in Uganda



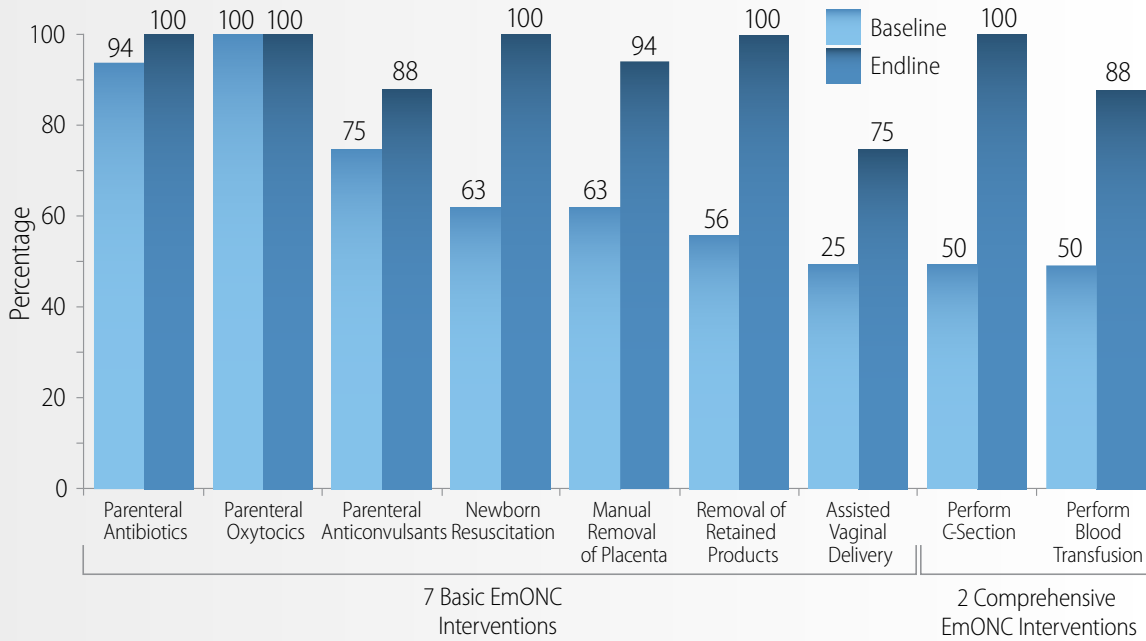
BEmONC = Basic Emergency Obstetric and Newborn Care; SMGL = Saving Mothers, Giving Life.

Figure 29. Percentage of Health Centers that Performed BEmONC Interventions in the Previous 3 Months, SMGL-Supported Districts in Zambia



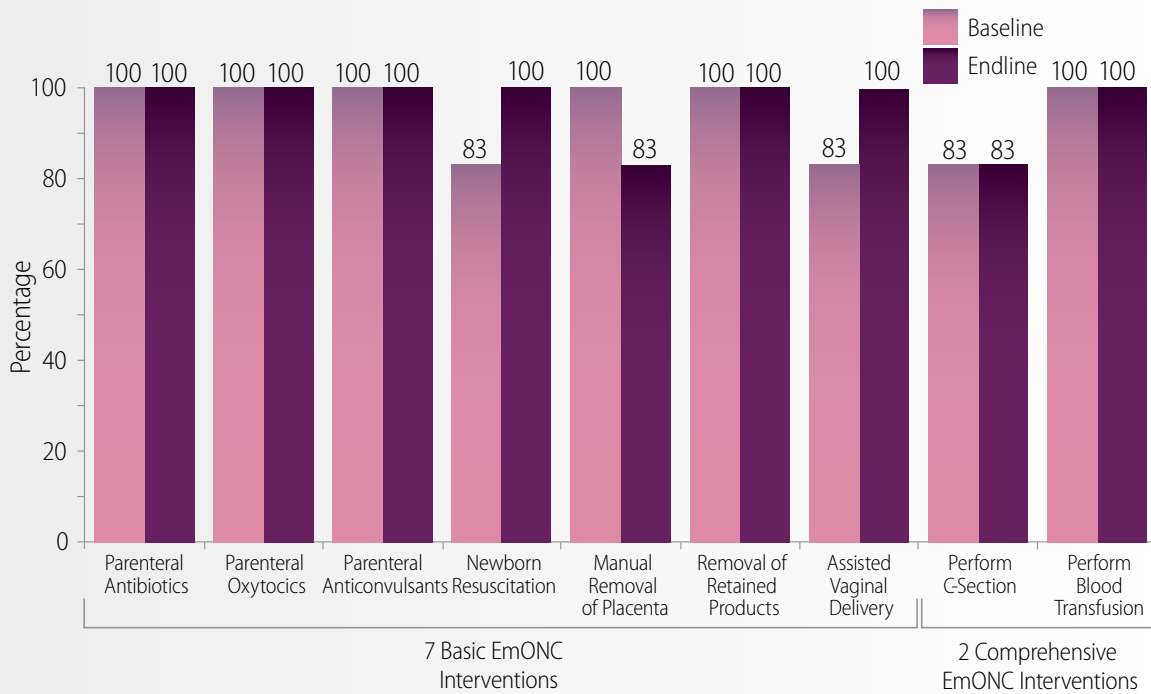
BEmONC = Basic Emergency Obstetric and Newborn Care; SMGL = Saving Mothers, Giving Life.

Figure 30. Percentage of Hospitals and Health Centers IV that Performed EmONC Interventions in the Previous 3 Months, SMGL-Supported Districts in Uganda



EmONC = Emergency Obstetric and Newborn Care; SMGL = Saving Mothers, Giving Life.

Figure 31. Percentage of Hospitals that Performed EmONC Interventions in the Previous 3 Months, SMGL-Supported Districts in Zambia

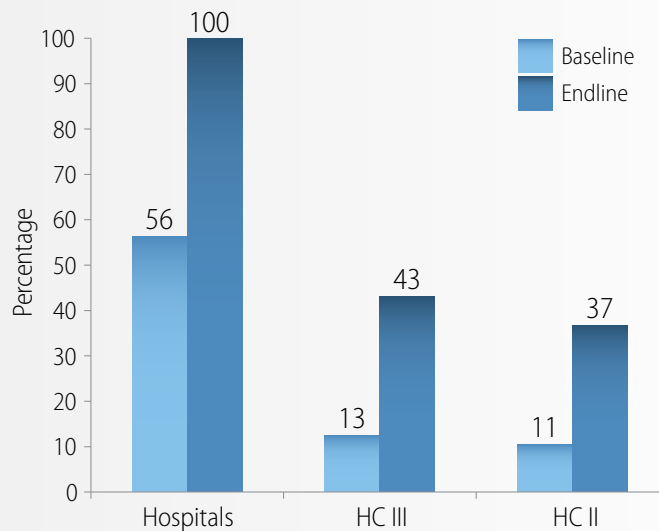


EmONC = Emergency Obstetric and Newborn Care; SMGL = Saving Mothers, Giving Life.

Improvements in the facilities' abilities to perform life-saving interventions were uneven. An incomplete abortion (spontaneous or induced) can lead to life-threatening complications, such as sepsis or hemorrhage, if the **retained products of conception** are not removed. In Uganda, the percentage of facilities providing post-abortion care by removing retained products of conception increased from

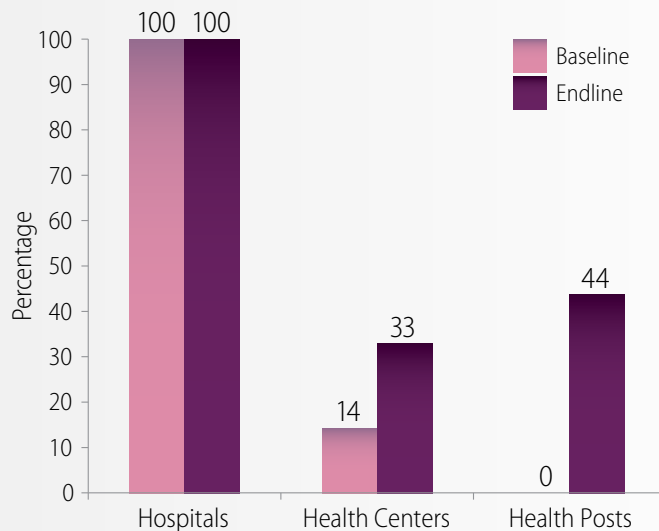
19% to 51% of facilities (Figure 32). While over half (56%) of hospitals/HC IVs had done this procedure at baseline, all had performed it by endline. Higher increases occurred in Health Centers III (from 13% to 43%) and Health Centers II (from 11% to 37%). The percentage of facilities removing the retained products of conception in Zambia also increased, particularly among Health Posts, which went from 0% to 44% (Figure 33).

Figure 32. Percentage of Facilities that Removed Retained Products of Conception in the Past 3 Months, SMGL-Supported Districts in Uganda



SMGL = Saving Mothers, Giving Life; HC = Health Centers.

Figure 33. Percentage of Facilities that Removed Retained Products of Conception in the Previous 3 Months, SMGL-Supported Districts in Zambia

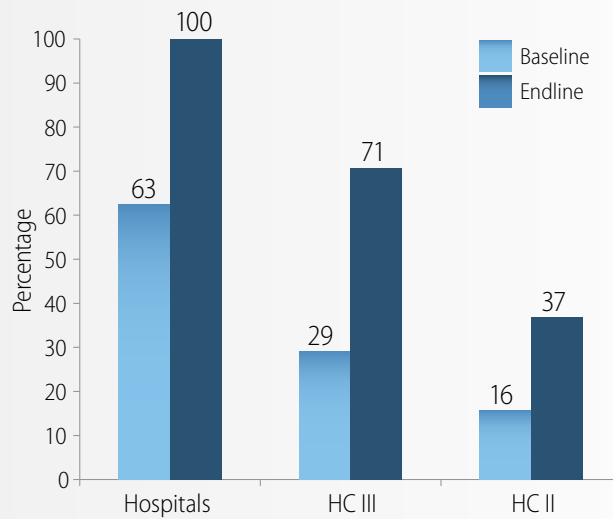


SMGL = Saving Mothers, Giving Life.

As many as one of every ten newborns do not breathe spontaneously immediately after birth and require simple assistance to initiate breathing. Without resuscitation, they will die. The SMGL initiative provided standard resuscitation training to all delivery personnel. Uganda showed great improvements in **newborn resuscitation**, with all (100%) hospitals/HC IVs having performed it by endline (up from

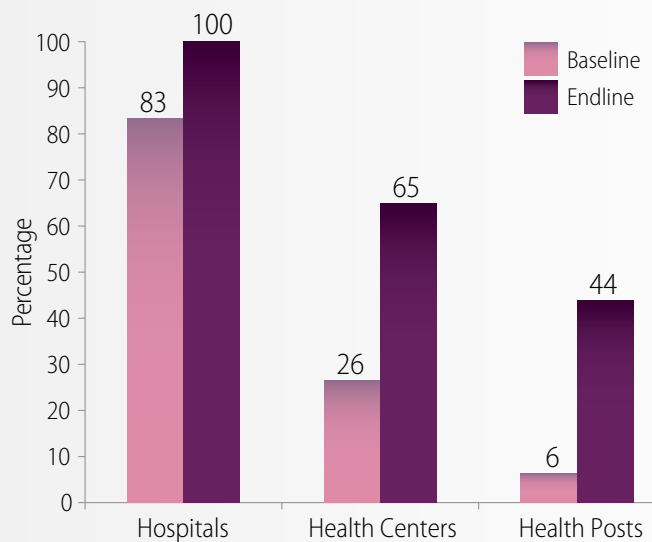
63%; all hospitals created newborn resuscitation corners in their labor wards). There were large increases among Health Centers III (from 29% to 71%) and Health Centers II (from 16% to 37%) (Figure 34). In Zambia, the percentage of facilities conducting newborn resuscitation increased greatly, from 26% of Health Centers to 65%, and from 6% to 44% at Health Posts, a seven-fold increase (Figure 35).

Figure 34. Percentage of Facilities that Performed Newborn Resuscitation in the Previous 3 Months, SMGL-Supported Districts in Uganda



SMGL = Saving Mothers, Giving Life.

Figure 35. Percentage of Facilities that Performed Newborn Resuscitation in the Previous 3 Months, SMGL-Supported Districts in Zambia



SMGL = Saving Mothers, Giving Life.

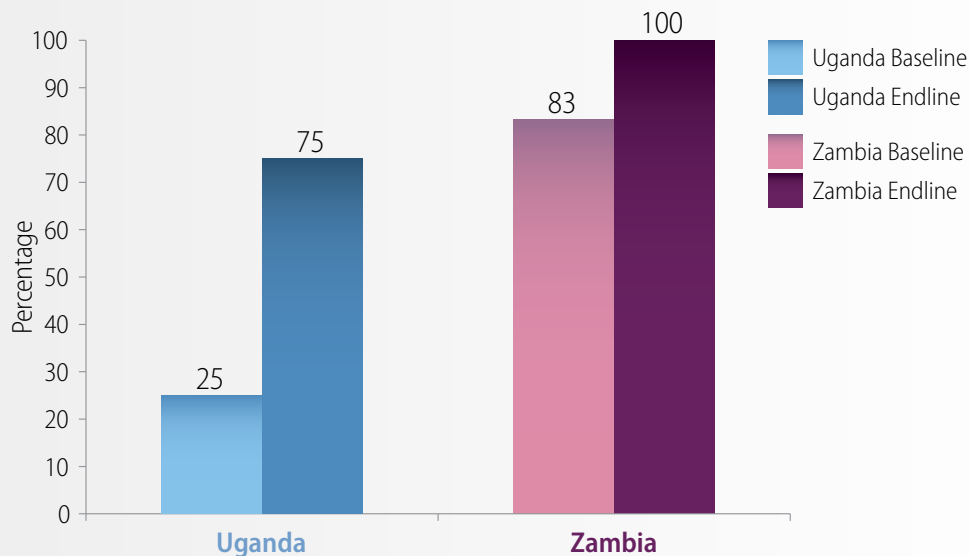
In some cases, when delivery is not progressing, clinicians may use forceps or vacuum extractors to assist with delivery. There was a large increase in the percentage of hospitals/HC IVs performing assisted **vaginal delivery** (AVD) in Uganda, from 25% to 75% of hospitals performing this function in the 3 months prior to the HFA (Figure 36). In Zambia, availability of assisted vaginal delivery increased from 83% to 100% in hospitals. In both countries, AVD is seldom used outside hospitals.

When the placenta does not deliver after a birth, massive hemorrhage can result, rapidly leading to maternal death. Manual removal is life-saving. In Uganda, many more facilities had recently performed **manual removal of the placenta** by the end of Phase 1, with hospitals/HC IVs increasing from 63% to 94%, Health Centers III increasing from 24% to 43%, and

Health Centers II increasing sixfold from 5% to 32% (Figure 37). In Zambia, manual removal of placenta fell slightly from 38% to 33% in all facilities.

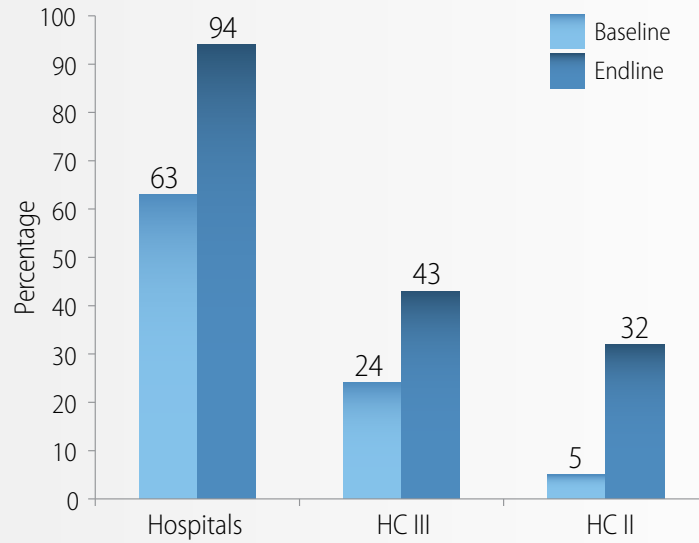
Injection of the drug oxytocin decreases post-partum hemorrhage, which is the leading cause of maternal mortality. Oxytocin is also the essential component of the Active Management of Third Stage of Labor, an effective intervention to prevent postpartum hemorrhage (discussed on p. 23). In Uganda, administration of **parenteral oxytocin** in the previous three months was already at 100% in hospitals at baseline and remained at that level. It increased greatly during Phase 1 among Health Centers III (from 65% of facilities to 96%) and Health Centers II (from 63% to 90%) (Figure 38). In Zambia, parenteral oxytocin administration started at a higher level, increasing from 90% to 95% in all facilities.

Figure 36. Percentage of Hospitals that Performed Assisted Vaginal Delivery In the Previous 3 Months, SMGL-Supported Districts in Uganda and Zambia^a



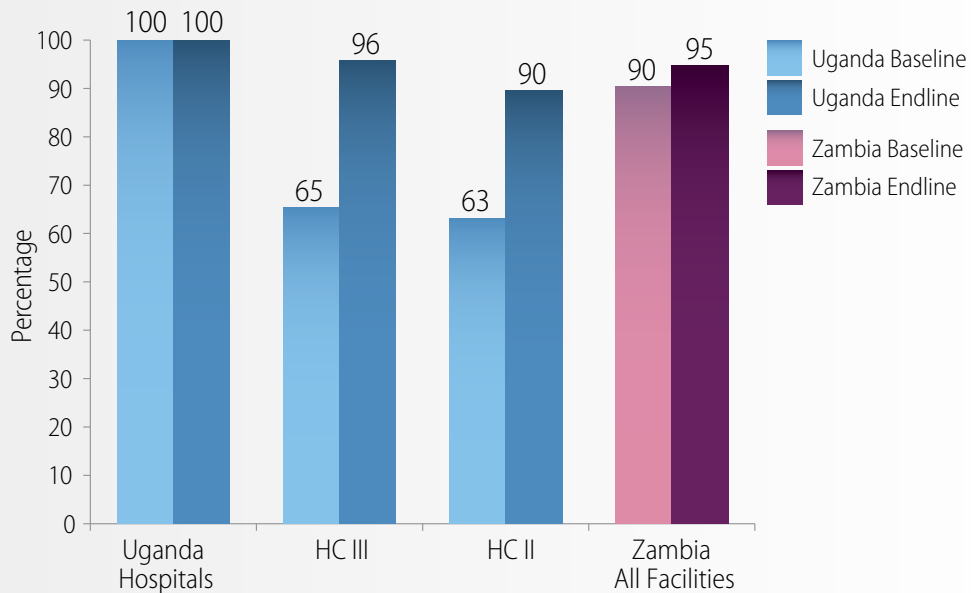
SMGL = Saving Mothers, Giving Life;
^a Excludes Kalomo district in Zambia where data were not available.

Figure 37. Percentage of Facilities That Performed Manual Removal of the Placenta in the Previous 3 Months, SMGL-Supported Districts in Uganda



SMGL = Saving Mothers, Giving Life; HC = Health Centers.

Figure 38. Percentage of Facilities that Administered Parenteral Oxytocin in the Previous 3 Months, SMGL-Supported Districts in Uganda and Zambia



SMGL = Saving Mothers, Giving Life; HC = Health Center.

Parenteral antibiotics are needed when a woman develops sepsis, also a major cause of maternal death. Administration of parenteral antibiotics in Uganda increased for both hospitals/HC IVs (94% to 100%) and Health Centers III (83% to 94%), but decreased among Health Centers II, from 84% to 79%. In Zambia 100% of hospitals had administered antibiotics at baseline and remained at that level at endline. Slightly fewer Health Centers administered parenteral antibiotics at endline (from 81% to 75%) while the number of Health Posts carrying out this function increased (56% to 69%).

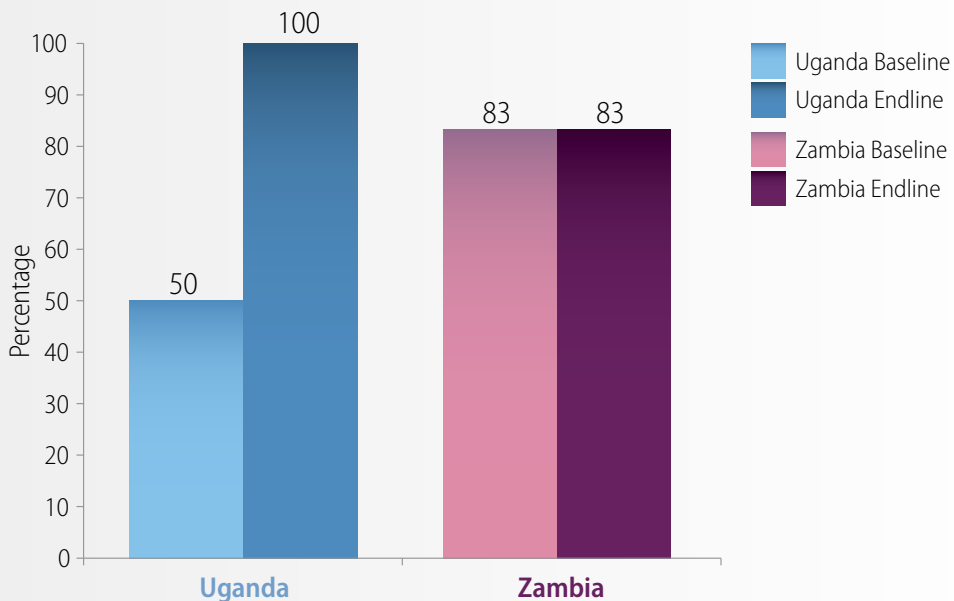
Anticonvulsants are used to treat women who are suffering from eclampsia and pre-eclampsia caused by pregnancy. Although the percentage of hospitals/HC IVs administering **parenteral anticonvulsants** in Uganda increased from 75% to 88%, it declined among Health Centers III (from 49% to 32%) and even more so among Health Centers II (from 32% to 16%). The reasons for this are not clear. In

Zambia, although all hospitals had administered anticonvulsants at both baseline and endline, administration declined in both Health Centers (39% to 28%) and Health Posts (56% to 44%).

Two of the life-saving obstetric procedures (cesarean sections and blood transfusions) are advanced medical procedures that are only carried out in hospitals and selected health centers with surgical capacity that are designated as CEmONC facilities.

Cesarean sections are a life-saving procedure for both mother and child when certain delivery complications occur. While half of Ugandan hospitals/HC IVs **performed cesarean sections** (C-sections) in the previous 3 months at baseline, all (100%) had done so by endline (Figure 39). In Zambia, 5 of the 6 hospitals had performed C-sections in the past 3 months at baseline and also at endline. (The single hospital that does not perform C-sections continues to lack a functional operating theater due to structural problems of the surgical ward.)

Figure 39. Percentage of Hospitals that Performed Cesarean Sections in the Previous 3 Months, SMGL-Supported Districts in Uganda and Zambia^a



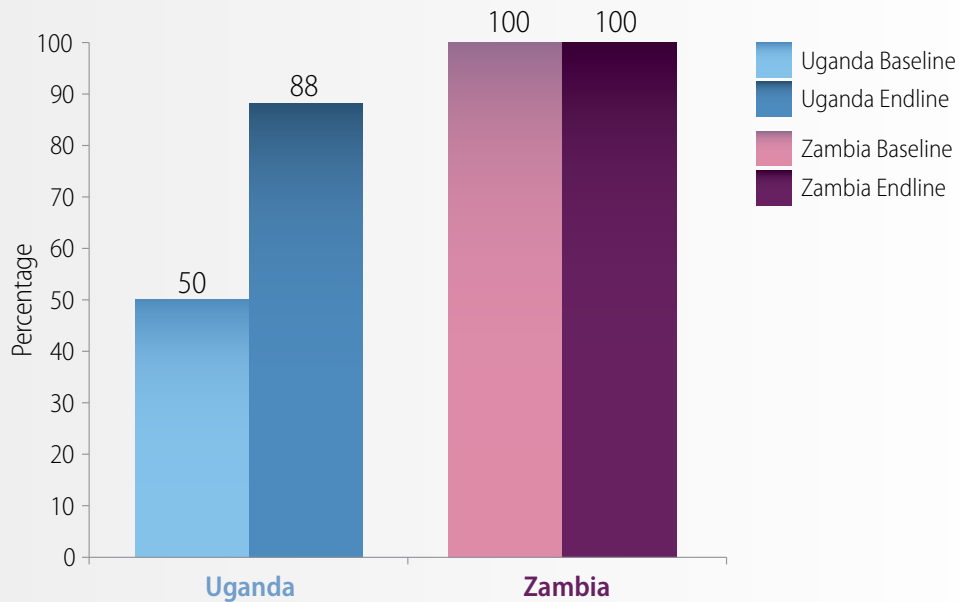
SMGL = Saving Mothers, Giving Life;
^a Excludes Kalomo district in Zambia where data were not available.

When a woman has hemorrhaged significantly during delivery, a **blood transfusion** may be needed to save her life. The percentage of the highest-level facilities in Uganda that had recently transfused blood increased from 50% to 88% (Figure 40). In Zambia, all hospitals had transfused blood in the previous 3 months at baseline and also at endline.

In Uganda, district hospitals and HC IVs are designated as CEmONC facilities, able to perform each of the 9 signal functions. The MOH promotes a functional CEmONC hospital or HC IV in each sub-district (which has approximately 100,000 people) (HSSIP, 2010). However, C-sections and blood transfusions were only provided by roughly one fifth of Ugandan hospitals and HC IVs at baseline. During Phase 1, hospitals and HC IV facilities in Uganda increased their capacity to carry out all comprehensive care functions to over 75%.

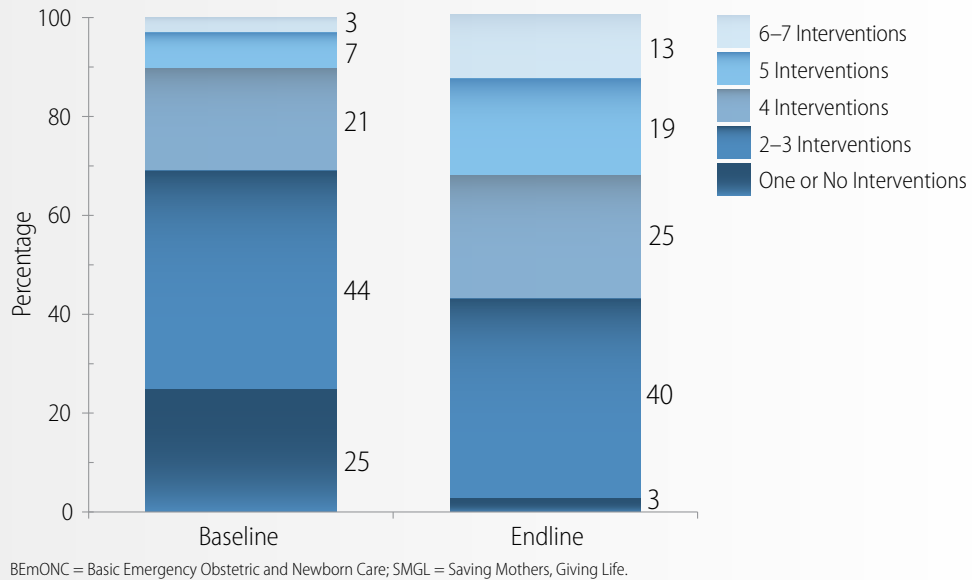
Higher-functioning HC IIIs (Uganda) and Health Centers (Zambia) may be designated as BEmONC facilities, depending on patient load. In Uganda, the percentage of HC IIIs performing at least 6 out of the 7 BEmONC functions at the endline increased from 3% to 13%. All HC IIIs in Uganda showed great gains in the number of BEmONC functions they performed with 44% providing 4–5 signal functions at endline compared to 31% at baseline (Figure 41). Whereas 69% had performed fewer than three functions at baseline, by the end of Phase 1 this number decreased to 41%. HC IIIs performing only 0 or 1 signal functions (representing one quarter of HC IIIs before SMGL) have been essentially eliminated—so all but 3% are performing at least two BEmONC functions.

Figure 40. Percentage of Hospitals that Performed a Blood Transfusion in the Previous 3 Months, SMGL-Supported Districts in Uganda and Zambia^a



SMGL = Saving Mothers, Giving Life;
^a Excludes Kalomo district in Zambia where data were not available.

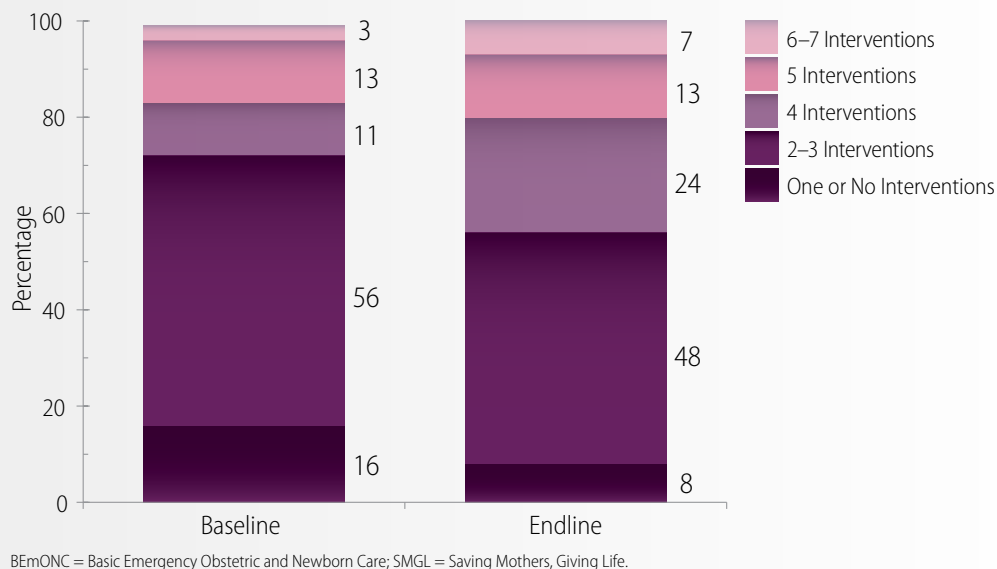
Figure 41. Distribution of Health Centers III by the Number of Basic EmONC Interventions Performed in the Previous 3 Months, SMGL-Supported Districts in Uganda



In Zambia, 4 of the 6 hospitals (67%) performed all 9 CEmONC signal functions in the 3 months prior to assessment at baseline, improving to 5 of the 6 at endline. At baseline, none of the mid- to lower-level facilities in Zambia—Health Centers and Health Posts—had performed 6 or 7 basic EmONC signal functions

within the last 3 months, and this had changed little at the time of the endline assessment (3% to 7%). Health centers showed gains in performing more life-saving interventions, with 37% of health centers able to provide 4–5 signal functions at the end of Phase 1 (Figure 42).

Figure 42. Distribution of Health Centers by the Number of Basic EmONC Interventions Performed in the Previous 3 Months, SMGL-Supported Districts in Zambia



Availability of Basic and Comprehensive EmONC per 500,000 population

The World Health Organization (WHO) recommends that, at a minimum, 5 EmONC facilities—including at least one CEmONC—are available per 500,000 population (World Health Organization, 2009).

One basic obstetric intervention—the assisted vaginal delivery (AVD) using either forceps or vacuum extractor—is relatively uncommon in both Uganda and Zambia. Training and equipment are not actively supported by the Ministries of Health, particularly in lower-level facilities (Health Centers III and II in Uganda, Health Centers and Posts in Zambia). This means that many of

the lower-level facilities would not qualify as BEmONC according to the WHO criteria and even some of the hospitals may not qualify, since the procedure is rarely performed. For this analysis, therefore, we decided not to discount EmONC facilities that routinely perform all other life-saving functions but have not performed AVD in the past 3 months. These facilities are labeled CEmONC minus one (CEmONC-1) and BEmONC minus one (BEmONC-1).

Figure 43 shows the minimum recommended number of EmONC facilities in each district in Uganda and Zambia, according to the estimated population at the baseline. Using this as a guide, the actual availability of EmONC facilities (may include CEmONC-1 and BEmONC-1) is presented before and after the SMGL interventions.

Figure 43. Availability of Basic and Comprehensive EmONC Before and After SMGL Interventions in Uganda and Zambia

District	Population in 2011 ^a	Recommended Number of EmONC [*]	Actual Baseline Number of EmONC [†]			Actual Endline Number of EmONC [†]		
			CEmONC	BEmONC	Total	CEmONC	BEmONC	Total
UGANDA								
Kabarole	415,600	5	3	0	3	6	2	8
Kibaale	681,300	7	3	0	3	5	0	5
Kamwenge	332,000	4	0	3	3	2	3	5
Kyenjojo	383,600	4	1	0	1	3	4	7
ZAMBIA								
Mansa	233,940	3	1	1	2	1	0	1
Lundazi	334,401	4	1	1	2	2	3	5
Nyimba [‡]	86,656	1	1	0	1	1	0	1
Kalomo	270,201	3	1	1	2	1	3	4

EmONC = Emergency Obstetric and Newborn Care; BEmONC = Basic Emergency Obstetric and Newborn Care; SMGL = Saving Mothers, Giving Life

^a Estimated from the endline 2013 mini-census in Uganda and the national 2010 Census in Zambia.

^{*} Using the WHO minimum recommended level of 5 EmONC per 500,000 population.

[†] Includes CEmONC and BEmONC facilities that may not have provided assisted vaginal delivery in the past 3 months; a few CEmONCs in Uganda reported shortage of blood at the endline in the previous 3 months, but were still classified as CEmONC facilities.

[‡] Nyimba had not performed manual removal of placenta in the previous 3 months at endline and was still classified as CEmONC.

Source: SMGL Uganda and Zambia Health Facility Assessments, 2012 and 2013

At the baseline, none of the Uganda districts had adequate coverage of EmONC. Sustained efforts were made to ensure that at least a minimum number of facilities are able to provide life-saving emergency obstetric interventions in each district. As a result of the “big push” investments in human resources, training, drugs, equipment, supplies, renovation of operation theaters, and safe blood, a sufficient number of EmONC facilities became functional in all the districts except Kibaale.

Zambia had slightly better EmONC coverage at the onset of Phase 1, with one district having the recommended number of EmONC. Since then, Lundazi and Kalomo districts have made great progress in EmONC coverage, surpassing the recommended number of EmONC facilities, while Mansa saw a decline in the EmONC coverage at the end of Phase 1 and Nyimba remained unchanged. Nyimba hospital only performed 8 out of 9 functions at endline (no manual removal of placenta in the previous 3 months), but was still classified as a CEmONC facility because it has the ability to do all 9 interventions.

Geographic Distribution of CEmONC Facilities

The EmONC facility density per 500,000 population does not give complete information on the proportion of the population with good geographical accessibility to emergency services. In resource poor settings, some women die because they have not sought facility-based care, or they die en route to a health facility, or they die after arriving too late for timely obstetric care. All SMGL districts are predominantly rural, so geographic distance and terrain play a major role in determining how accessible EmONC services are and in the subsequent health outcomes.

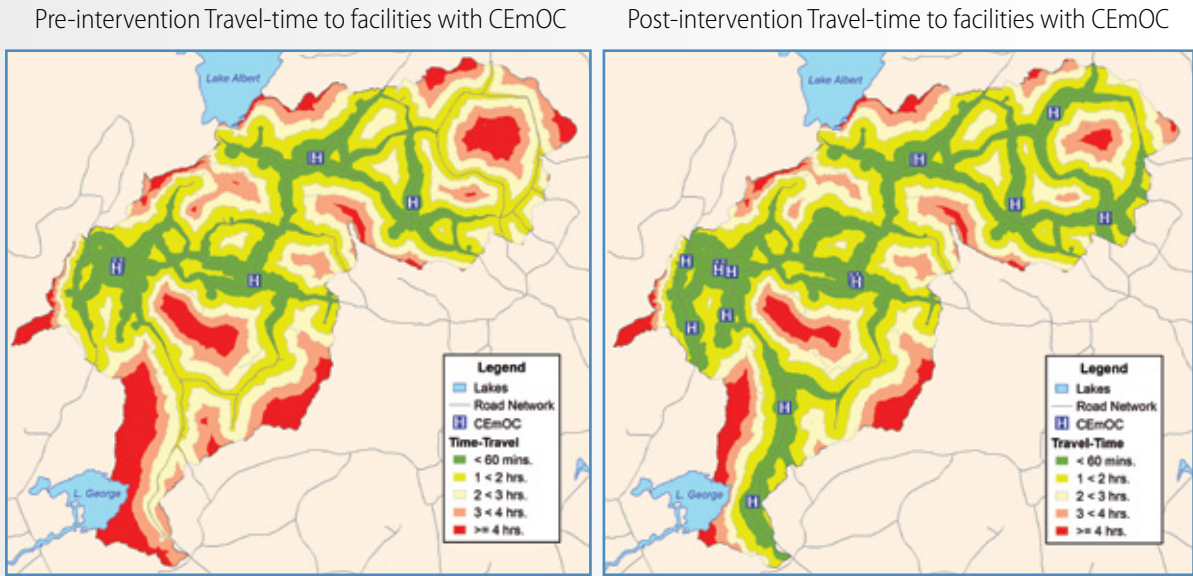
In Uganda, SMGL undertook a separate analysis of the population coverage of health facilities, going beyond a simple approach that uses a straight-line distance (typically 10 or 15 km radius around each facility). Actual landscape and the availability of different means

of transport were taken into account for detailed measurement of geographical access to obstetric care at birth. Time-cost surface modeling was employed using Geographic Information Systems (GIS) and was based on terrain (slope and land-cover), physical barriers (lakes, rivers), and transportation networks to allow for more realistic estimates of time-travel to health facilities, and estimates of population coverage and accessibility (World Health Organization, 2008). “Travel-time” contour-like boundaries are overlaid on population density maps (derived from population projections and satellite imagery and freely available [AfriPop Project]) to assess women’s travel-time accessibility to health services (AfriPop Project, 2013). This analysis demonstrates great improvements in geographic accessibility to CEmONC services as a result of SMGL interventions.

Before the SMGL intervention, only 30% of births were to women who lived within 1 hour (dark green color) and 62% within 2-hour (light green color) travel time of 7 existing CEmONC facilities (Figure 44). This proportion increased to 44% and 77%, respectively after 9 more hospitals and health centers IV were upgraded to provide CEmONC care.

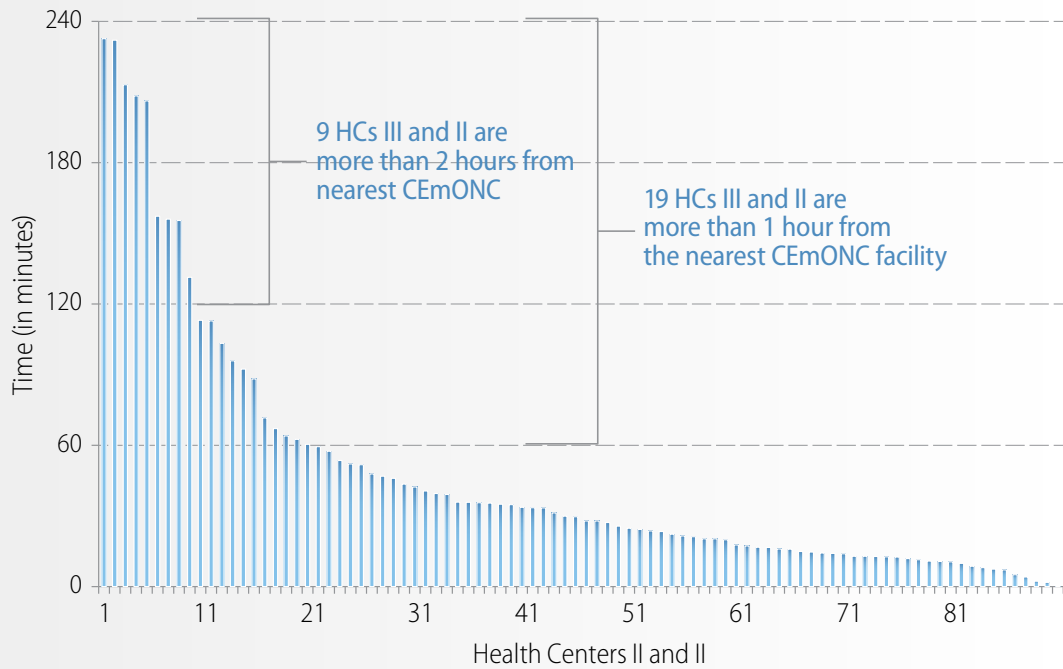
GIS analyses were performed to assess geographical distances between facilities with lower level of care and CEmONC facilities. As more women who live in remote areas decide to seek care at nearby lower-level health centers (HC II/III), their access to CEmONC is also improved. The analysis shows that 90% of 89 lower level facilities are within 2 hours of the post-intervention CEmONC facilities (Figure 45).

Figure 44. Improved Geographical Access to Comprehensive EmONC after SMGL Interventions, SMGL-Supported Districts in Uganda



SMGL = Saving Mothers, Giving Life; CEmOC = Comprehensive Emergency Obstetric Care; SMGL.

Figure 45. Travel Time (in minutes) from Lower Levels of Care to the Nearest CEmONC Facility after Uganda SMGL Interventions



CEmONC = Comprehensive Emergency Obstetric and Newborn Care; SMGL = Saving Mothers, Giving Life; HC = Health Center.

Availability of Drugs, Equipment, and Supplies for Obstetric Care

The Health Facility Assessments (HFAs) included taking stock of the medications and supplies that are essential to obstetric care. Although, generally speaking, the hospitals began and remained well supplied, many Health Centers and Health Posts in Zambia experienced shortages of these items, although the situation overall had improved by the end of the project period. For Kalomo District in Zambia, stock-out data was not captured at baseline for several supplies/drugs; for these indicators the tables in the annex are footnoted that Kalomo was removed from the comparative analysis.

Availability of Medicine and Safe Blood

The capacity of the health facilities to respond to serious obstetric complications was further assessed by observing the presence of several “tracer items” that are necessary to perform basic and comprehensive signal functions.

The availability of the drugs (magnesium sulfate, oxytocin and gentamicin) and equipment needed to perform these functions has generally improved in both countries.

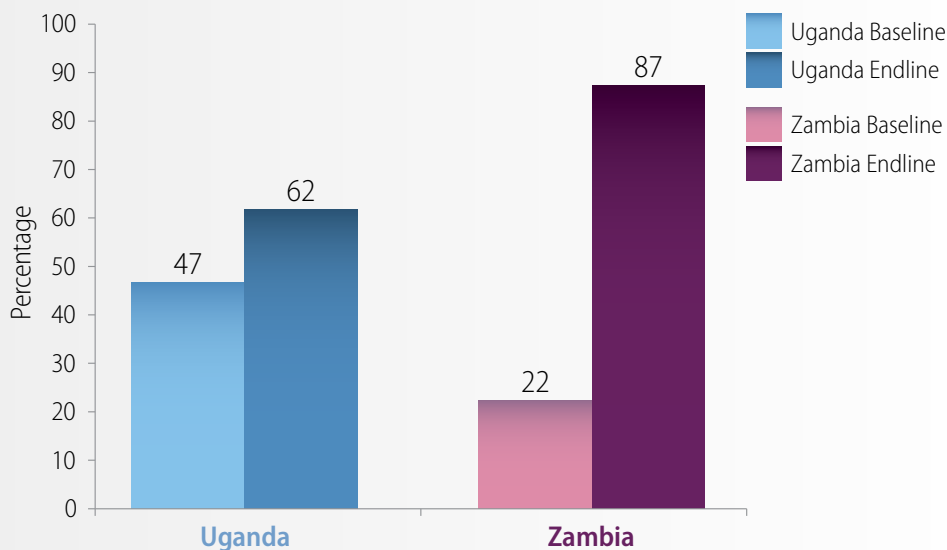
In Uganda, the availability of oxytocin improved in Health Centers III and II, and remained unchanged at hospitals (with 81% reporting no stock-outs in the past year). However, although more of the lower level facilities reported the presence of supplies of magnesium sulfate, availability in hospitals declined somewhat (from 69% to 63% reporting no stock-outs) during Phase 1 (Appendix Table A).

In Zambia, the availability of magnesium sulfate and oxytocin became almost universal in health centers and hospitals that provided at least basic EmONC (Appendix Table C).

SMGL also aimed to eliminate stock-outs of essential drugs and supplies.

Overall in Uganda, the percentage of facilities with no stock-outs in **supplies of magnesium sulfate** (used to prevent or stop eclamptic

Figure 46. Percentage of Facilities with No Stock-outs of Magnesium Sulfate in the Past 12 Months, SMGL-Supported Districts in Uganda and Zambia^a



SMGL = Saving Mothers, Giving Life;

^a Excludes Kalomo district in Zambia where data were not available.

seizures) over the 12 months of the SMGL intervention period increased from 47% to 62% (Figure 46). The situation also improved in Health Centers III (increasing from 49% to 69% reporting no stock-outs) and Health Centers II (21% to 32%).

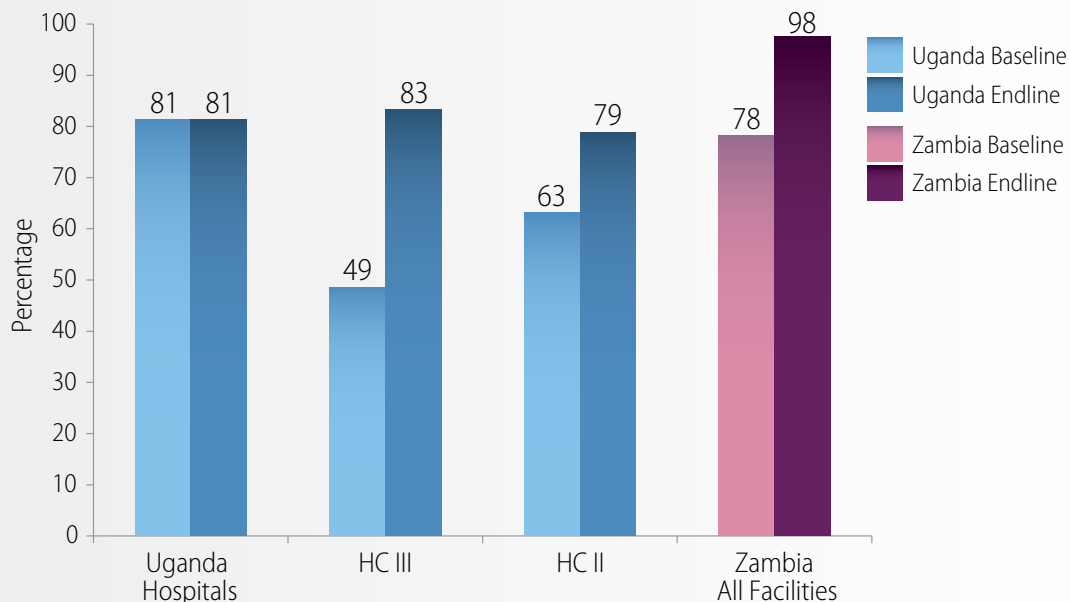
In Zambia, no hospitals experienced a stock-out of magnesium sulfate in the previous 12 months at baseline and endline. Overall, at baseline 22% of all facilities reported no stock-out of magnesium sulfate, which increased to 87% by endline (Figure 46). The introduction of an Electronic Logistics Management Information System (ELMIS) in the SMGL districts may be credited with the reduction of magnesium sulfate stock-outs in Zambia.

In Uganda **supplies of oxytocin** (a uterotonic used to prevent hemorrhage) improved overall,

with 56% of facilities reporting no stock-outs in the previous 12 months at baseline and 82% at the end of Phase 1. The number of facilities not experiencing stock-outs remained at 81% for hospitals/HC IVs, increased from 49% to 83% for Health Centers III, and increased from 63% to 79% for Health Centers II (Figure 47).

In Zambia, 75% of hospitals had experienced no oxytocin stock-outs in the previous 12 months. The situation improved to 100% of hospitals without stock-outs by the endline. By the end of Phase 1, 98% of all facilities reported no oxytocin stock-out in the previous 12 months (Figure 47). ELMIS implementation likely contributed to this achievement.

Figure 47. Percentage of Facilities with No Oxytocin Stock-outs in the Previous 12 Months, SMGL-Supported Districts in Uganda and Zambia^a



SMGL = Saving Mothers, Giving Life; HC = Health Centers.
^a Excludes Kalomo district in Zambia where data were not available.

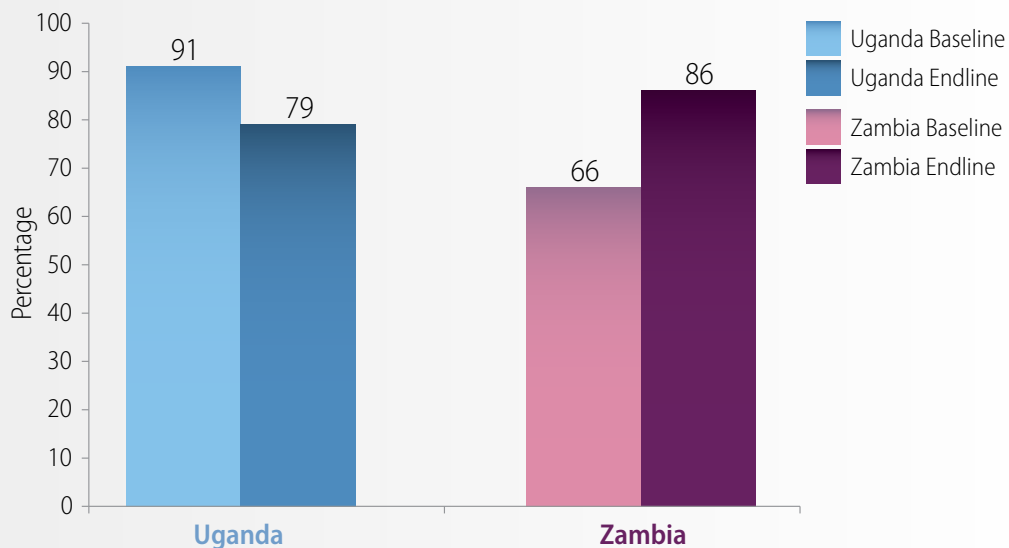
A drug supply chain that needs improvement in Uganda is for gentamicin, an **essential antibiotic** for preventing and treating sepsis. In Uganda, the availability of gentamicin in all facilities decreased from 91% at baseline to 79% at endline (Figure 48). It also fell in hospitals from 94% to 69%.

In Zambia, availability of gentamicin in all facilities improved from 66% to 86%, and in hospitals from 67% to 100% (Figure 48).

Hospitals need to have a supply of blood available at all times for emergency transfusions, such as to treat hemorrhage. In Uganda, **blood availability** improved during Phase 1, increasing from 50% to 75% of hospitals with blood available.

Improvements in the supply of blood in Uganda were facilitated by the opening of a Blood Bank in the Fort Portal regional hospital in Kabarole district in April 2013. The newly opened blood bank serves Western Uganda and was constructed with funding and technical assistance from PEPFAR. Since 2004, approximately 60% of the total budget of the Ugandan Blood Transfusion Service comes from PEPFAR to support the provision of safe blood and blood products to health facilities throughout the country.

Figure 48. Percentage of Facilities with Gentamicin Currently in Stock, SMGL-Supported Districts in Uganda and Zambia



SMGL = Saving Mothers, Giving Life; HC = Health Center.

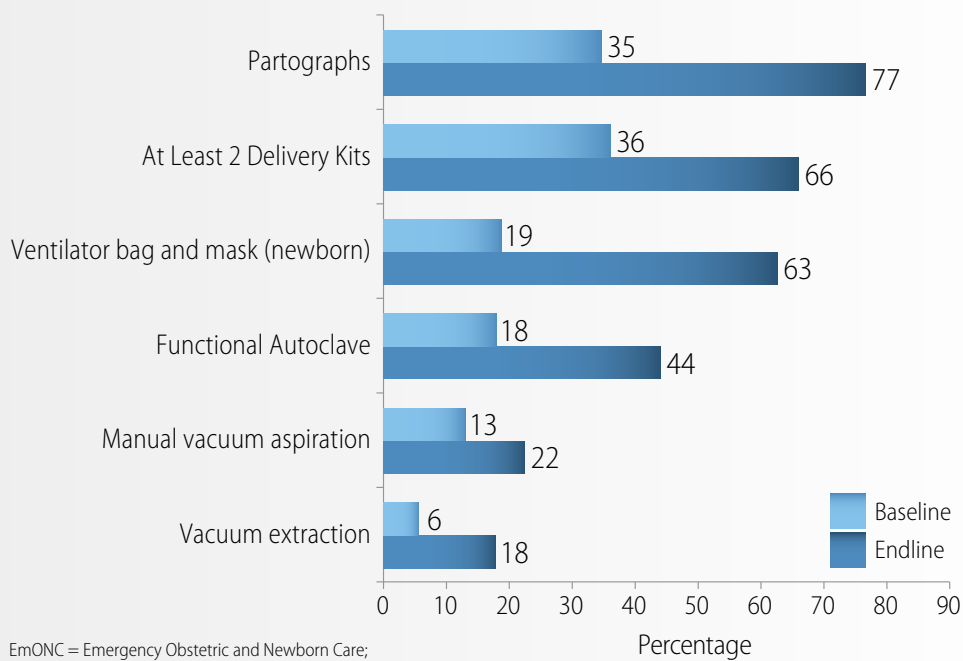
Availability of Essential Equipment

Several life-saving interventions require the availability of equipment and supplies, in addition to training and skills among health workers.

Data from Zambia are not available for the endline, but the assessments conducted in Uganda demonstrate important investments in equipment for emergency obstetric care (Figure 49). **Neonatal resuscitation equipment** became available in 2/3 of all facilities (from 19% at the baseline) and almost universal in facilities

providing comprehensive CEmONC (from 25% to 94%). The percentage of facilities with at least 2 **delivery kits** and those with functional **autoclaves** doubled during Phase 1. However, equipment for **vacuum extraction** and **manual vacuum aspiration** is still lacking. While both are now available in most CEmONC facilities (75% have vacuum extraction equipment and 63% have manual vacuum aspiration), the increases among facilities as a whole have been small. At endline, 22% of all facilities had vacuum extraction equipment, and 18% had manual vacuum aspiration equipment.

Figure 49. Availability of Essential Equipment for EmONC Interventions, SMGL-Supported Districts in Uganda

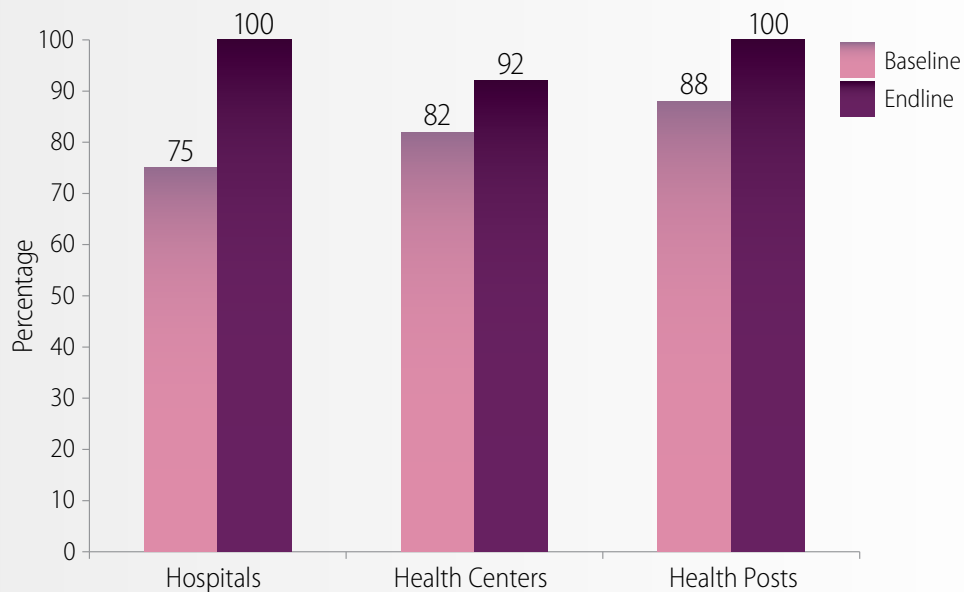


Availability of HIV Tests and ARV Medication

The PEPFAR program supports HIV testing in all maternity wards, so women whose HIV status is unknown can be screened and offered ARV medication. Although most facilities have this routine policy in place, some may not have HIV test kits available. In Zambia, the availability of HIV test kits became almost universal (Figure 50). Again, ELMIS was likely a contributory factor.

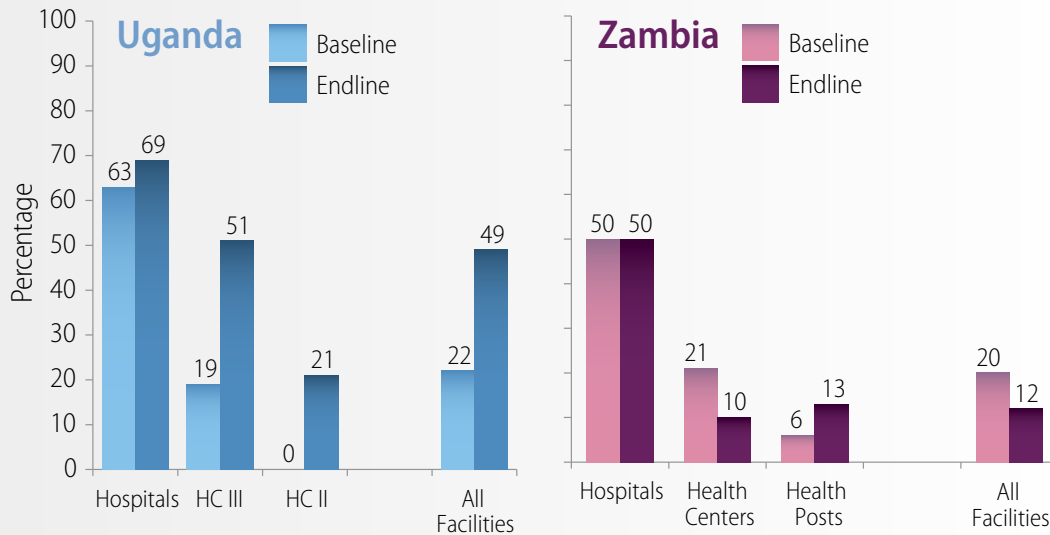
In both countries, but especially Zambia, few facilities had a full range of **ARVs** in stock (Figure 51). In Uganda, 69% of hospitals/ HC IVs had ARV medications at endline, up from 63% at baseline and 51% of HC IIIs had ARVs available, up from 19% at baseline. In Zambia, 50% of hospitals had ARVs available at both baseline and endline. Availability was low in both health centers and health posts.

Figure 50. Percentage of SMGL Facilities with HIV Test Kits Available in Maternity Wards, SMGL-Supported Districts in Zambia^a



SMGL = Saving Mothers, Giving Life;
^a Excludes Kalomo district in Zambia where data were not available.

Figure 51. Availability of ARV^a Medication in SMGL Facilities, SMGL-Supported Districts in Uganda and Zambia^b



ARV = Anti-retroviral medication; SMGL = Saving Mothers, Giving Life; HC = Health Center;
^a ARV medication includes ART for mother and infant and ARV prophylaxis for infant.
^b Excludes Kalomo district in Zambia where data were not available.

Availability of Family Planning Supplies

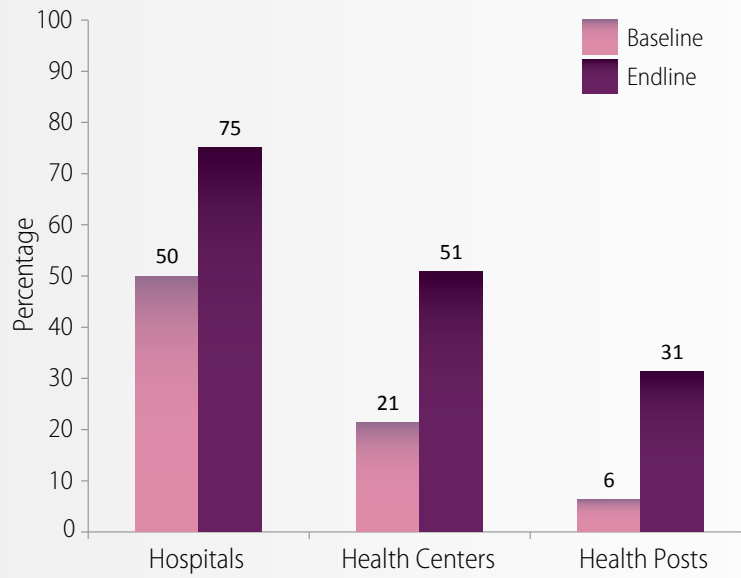
Family planning can reduce maternal deaths by preventing unwanted or high risk pregnancies. Many facilities improved their family planning supplies during the project period.

In Zambia, all health centers and nearly all health posts had **short-term family planning** methods (including oral contraceptives, condoms, 3-month injectables) available at both baseline and endline, as did 75% of hospitals. Availability in Uganda did not change significantly and was

maintained at around 90% in hospitals, 84% in HC III and 50% in HCII (Appendix Table A).

Long-term family planning methods, such as the IUD and implants, require clinical provider training. Nevertheless, in Zambia all facilities saw an increase in availability of those methods: from 50% of hospitals at baseline to 75% at endline; from 21% to 51% of health centers, and from 6% to 31% of Health Posts (Figure 52). In Uganda, there were no substantial changes in the availability of family planning methods (Appendix Table A).

Figure 52. Percentage of Facilities with a Long-Term Family Planning Method in Stock, SMGL-Supported Districts in Zambia^a



SMGL = Saving Mothers, Giving Life;
^a Excludes Kalomo district in Zambia where data were not available.

Use of Maternal Health Services

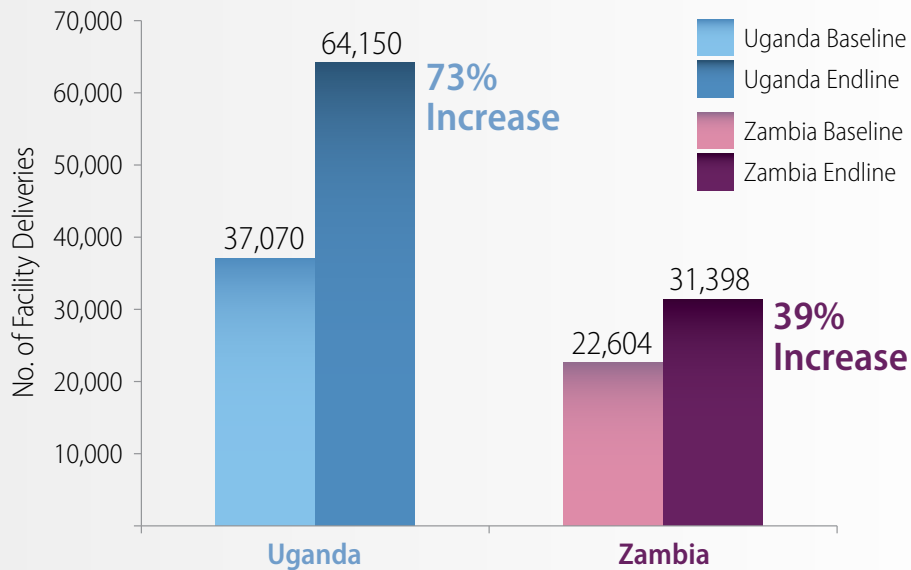
Institutional Deliveries

The SMGL interventions in both countries created an unprecedented demand for facility delivery care. Adequate supply of MCH services was achieved through renovating and upgrading facility infrastructure, hiring doctors and nurses, providing extensive training and mentoring, distributing equipment and medicines, expanding surgical capacity (in Uganda), providing subsidies for transport and incentives (such as Mama Kits/Packs), and community mobilization efforts. These initiatives created a motivating environment, and resulted in most deliveries in SMGL supported districts occurring in health facilities in both countries.

In Uganda, the number of facility deliveries increased by 73% (Figure 53). Most of this change was due to an increase in the number of deliveries in Health Centers II and III, which increased 126%. The EmONC facilities saw a 32% increase in deliveries. As a result, the institutional delivery rate rose sharply from 46% before the SMGL interventions to 74% at the end of Phase 1 (detailed in the Maternal and Perinatal Outcomes report).

Similarly, there has been significant progress in Zambia, where the number of facility deliveries increased by 39% in the four districts and the institutional delivery rate rose from 63% to 84% (Figure 53) (detailed in the Maternal and Perinatal Outcomes report).

Figure 53. Number of Facility Deliveries at Baseline and Endline SMGL-Supported Districts in Uganda and Zambia

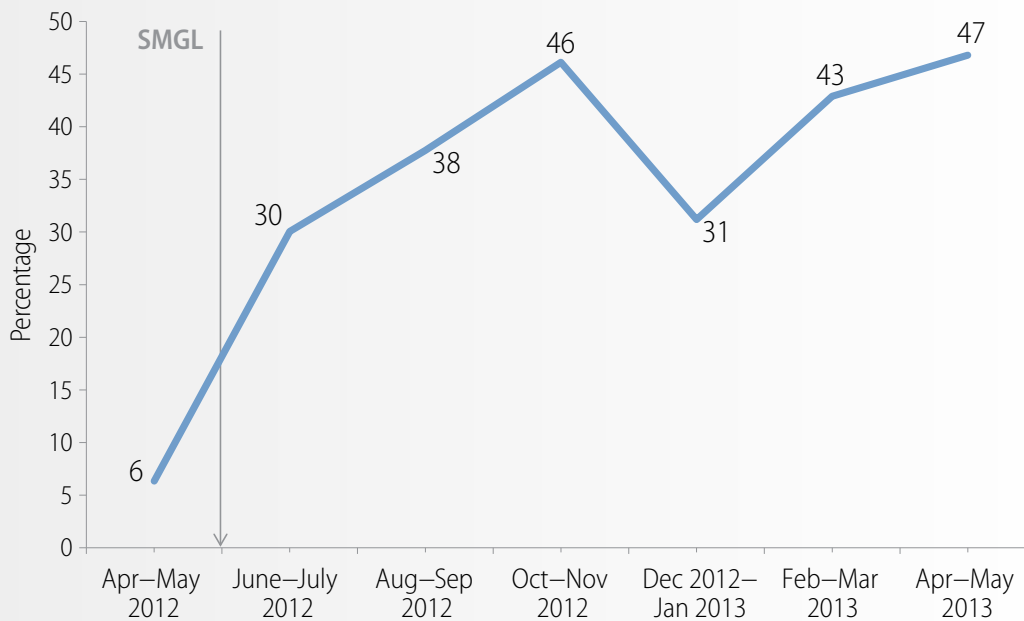


SMGL = Saving Mothers, Giving Life;
Source: Partner's routine monitoring reports (Zambia) and pregnancy outcomes monitoring (POM) survey (Uganda).

One of the chief contributors to increased institutional delivery care in Uganda seems to be the transportation voucher system. Pregnant women were able to buy subsidized vouchers during ANC and use them to get to a delivery facility at minimal cost. The percentage of

delivering women who used transportation vouchers (“boda for mothers”) increased rapidly after the vouchers were introduced in April 2012 (from 3% in the first month to 47% 12 months later) (Figure 54).

Figure 54. Percentage of Facility Deliveries Supported by Transportation Vouchers, SMGL-Supported Districts in Uganda

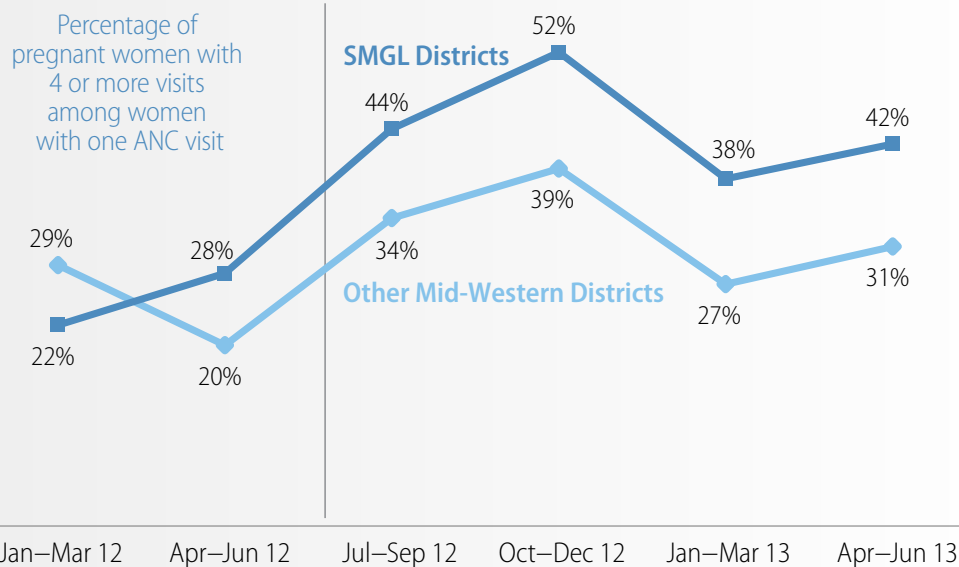


Antenatal Care

WHO recommends that pregnant women attend ANC at least 4 times during a normal pregnancy. A key component of the SMGL implementation strategy was for community health workers to encourage women to seek ANC and to develop birth plans, in case emergency obstetric care is needed. Uganda HMIS data shows that

since the initiation of SMGL in mid-2012, the adherence to ANC (proportion of pregnant women making 4 or more ANC visits among those receiving any ANC) doubled in SMGL districts and is now significantly higher than a comparison group of 5 non-SMGL districts in mid-Western Uganda (Ntoroko, Hoima, Bundibugyo, Kasese, and Kyegegwa) (Figure 55).

Figure 55. Adherence to ANC in SMGL-Supported Districts in Uganda Compared with Adherence to ANC in Mid-Western Districts



ANC = Antenatal Care; SMGL = Saving Mothers, Giving Life;
Source: Uganda Ministry of Health, Health Management Information System data, 2012–2013.

Postpartum Care

Postpartum care is still underutilized in SMGL districts, though recent investments have improved access to it.

In Uganda, for example, the percentage of mothers accessing postpartum care (who also received any ANC during pregnancy) almost doubled between the third quarter of 2012 and second quarter of 2013 in the SMGL districts (Figure 56). In the non-SMGL comparison districts, this proportion increased by only 18%. However, postpartum care services remained underutilized in the SMGL districts, with only 55% of women who attended ANC reporting postpartum visits.

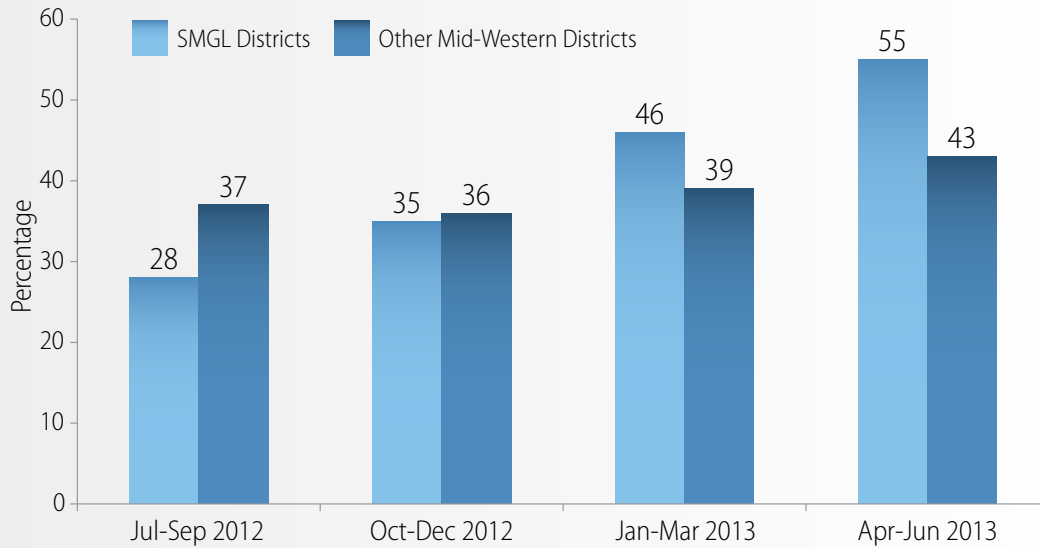
HIV Testing, Prophylaxis and Anti-retroviral Treatment

PEPFAR partners implemented the SMGL interventions and it was expected that the two interventions would produce mutually beneficial results in areas where the two initiatives overlap, especially for care and treatment of pregnant women and their newborns.

In Uganda, the numbers and proportion of mothers with HIV and their infants who received ARV prophylaxis had already been increasing in 2011. However, both indicators increased further in the first half of 2012 in CEmONC facilities. As a result, 1,620 mothers and 1,415 babies received ARVs during Phase 1 in CEmONC facilities, an increase of 28% and 27%, respectively, compared to the baseline (Figure 57).

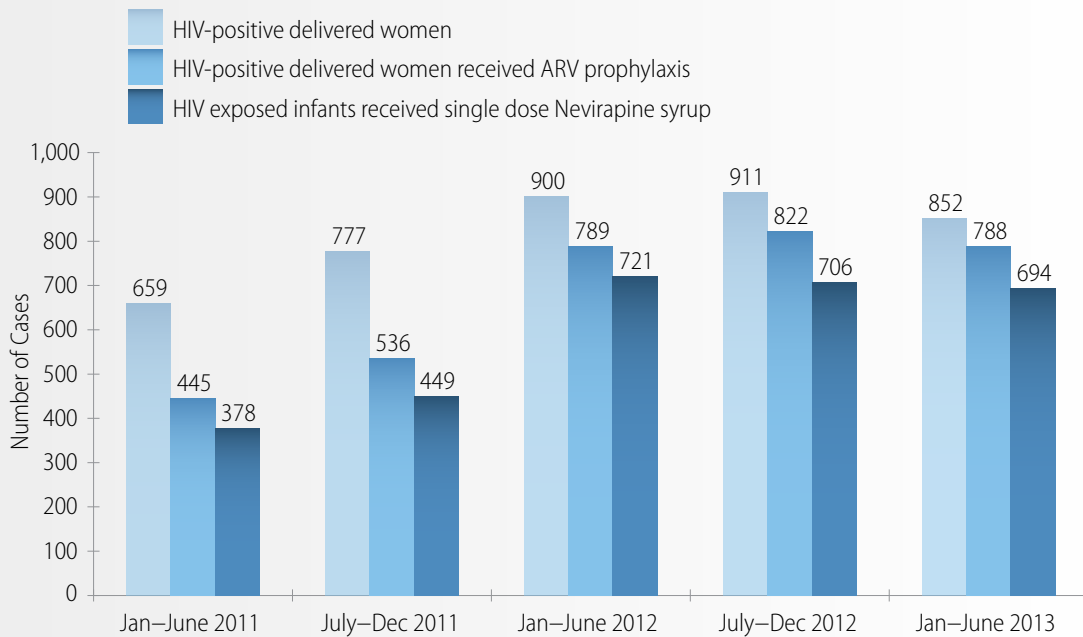
In Zambia, results are available from a combination of HMIS reports and PEPFAR Semi-Annual Results from 2012 and 2013. A comparison of the number of pregnant women with HIV and their newborns receiving ARVs in CEmONC facilities during the 6-month period before SMGL began and in the 6 months before the end of Phase 1 shows that the treatment coverage increased after SMGL implementation (Figure 58). For example, 1,095 women and 674 babies received ARVs during October 2012–March 2013, increasing by 18% and 29% respectively as compared to the baseline.

Figure 56. Percentage of Women in Uganda Receiving any ANC Who Also Received Postpartum Care in SMGL-Supported Districts in Uganda Compared to Mid-Western Districts



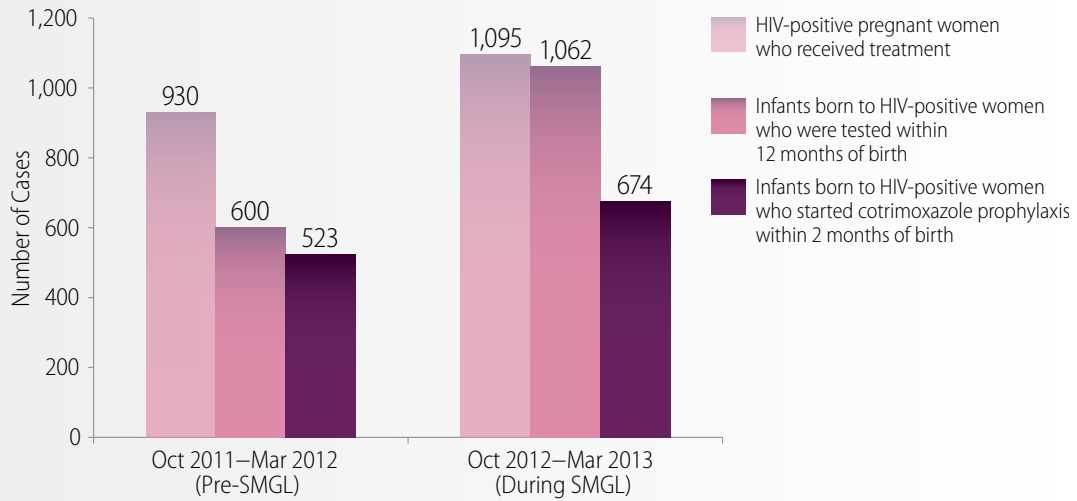
ANC = Antenatal Care; SMGL = Saving Mothers, Giving Life.

Figure 57. Treatment Coverage in CEmONC Facilities of Pregnant Women with HIV and their Infants, SMGL-Supported Districts in Uganda



CEmONC = Comprehensive Emergency Obstetric and Newborn Care; SMGL = Saving Mothers, Giving Life; ARV = Anti-retroviral medication;
Source: SMGL Uganda CEmONC Pregnancy Outcomes Survey, 2012-2013.

Figure 58. Number of HIV-Positive Pregnant Women and Their Infants Who Received Testing and Treatment in CEmONC Facilities, SMGL-Supported Districts in Zambia



CEmONC = Comprehensive Emergency Obstetric and Newborn Care; SMGL = Saving Mothers, Giving Life;
Source: PEPFAR Semi-Annual Performance Reporting 2012-2013.

Conclusions

SMGL invested in a comprehensive district-wide approach with many separate interventions that all contributed to a sharp increase in the use of health facilities by women during childbirth and in improvements in the quality of care they received. These in turn contributed to improvements in maternal and perinatal health outcomes.

There are several reasons for the large **increase in facility births** in both Uganda and Zambia. Interventions focused on improving access to good quality obstetric services as well as increasing demand for them. Key findings during Phase 1 include:

- **Improved infrastructure**, such as enhanced availability of water and electricity, increased numbers of beds at facilities, and the construction of mothers' shelters contributed to improved delivery experiences for women giving birth in facilities.
 - Improved availability of services (24/7), of emergency obstetric functions contributed to **ready access to care** for women in labor and for those with obstetric emergencies.
 - Access to and innovation in **transportation** in the community (e.g., vouchers) has increased access to health facilities for all women, particularly in Uganda.
 - Trained community health workers contributed to substantially **increased demand for skilled birth attendance** in facilities.
 - Great strides were made toward providing **adequate availability of BEmONC and CEmONC facilities** in both countries. In Uganda, improvements in access were quantified using a GIS approach.
- At the same time as access to and demand for obstetric services increased, the **quality of the obstetric care improved**. Key findings during Phase 1 include:
- Improved management and supply chains contributed to **better access to life-saving medications**. There were substantial improvements in availability of most of these drugs, though stock-outs still remain a problem. In Uganda there was also great improvement in the availability of key EmONC equipment.
 - Greatly increased **training of staff** contributed to greater access to emergency obstetric care and improved quality of care. **Increased staffing levels** at delivery facilities substantially reduced the overall shortages of care providers, though some gaps remain.
 - Most aspects of **routine delivery care**, such as use of partographs and active management of the third stage of labor, showed substantial improvement under SMGL.
 - Improved emergency blood supplies contributed to reductions in mortality due to hemorrhage.
 - Increased availability of transportation at facilities led to **more referrals of women with obstetric complications** to higher levels of care that were better able to resolve their problems.
 - Functional communication systems, enabling facilities to be in contact with each other, exist in the vast majority of facilities, with particularly great improvement in Zambia. These also contributed to **improvements in referral networks** for women with complications.
 - Substantial increases in maternal death reviews, particularly at hospitals which were reviewing 100% of all maternal deaths by the end of Phase 1, contributed to improvements in care.

In addition to increases in facility deliveries, SMGL in both Uganda and Zambia was also associated with greater utilization of several important services related to improved maternal outcomes, including ANC, postpartum care, and HIV testing, treatment and prophylaxis.

SMGL contributed significantly to improvements in access to and availability of EmONC services in the SMGL districts.

Nevertheless, there is still much to be accomplished including reducing stock-outs to zero, increasing the number of basic emergency obstetric functions carried out in mid- and lower level facilities, closing the remaining gap in human resources, and further improving access to emergency obstetric services for women in rural areas. These tasks will be tackled in the second phase of SMGL.

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Appendix

**Table A: Key SMGL Findings of the Health Facility Assessments
Percent of Facilities, by Facility Level, Providing each Service/Function
Uganda SMGL Districts: Kabarole, Kamwenge, Kibaale, and Kyenjojo
All Facilities Surveyed at Baseline (February 2012) and
Endline (June 2013) with Deliveries in the Previous 12 Months**

	Facility Type						All Facilities		Sig. Level ¹
	Hospitals/ Health Centers IV		Health Centers III		Health Centers II		Baseline	Endline	
	Baseline	Endline	Baseline	Endline	Baseline	Endline			
Core Infrastructure Indicators									
Electricity available	75.0	100.0	56.9	93.1	47.4	94.7	57.9	94.4	***
Water available	87.5	100.0	76.4	94.4	68.4	89.5	76.6	94.4	***
Functional communications available ²	100.0	87.5	91.7	94.4	94.7	89.5	93.5	92.5	NS
Transportation available ³	81.3	93.8	52.8	62.5	68.4	47.4	59.8	64.5	NS
Facility open 24/7	100.0	100.0	75.0	93.1	84.2	100.0	80.4	95.3	***
Obstetric patients never share beds	12.5	68.8	38.9	76.4	42.1	68.4	35.5	73.8	***
Women never deliver on floor	62.5	87.5	90.3	91.7	89.5	89.5	86.0	90.7	NS
At least one skilled attendant on staff ⁴	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	NS
Maternal death audits performed	31.3	100.0	2.8	26.4	0.0	5.3	6.5	33.6	***
Uganda Specific Indicators: Protocols and Guidelines are available and displayed⁵									
Antenatal care	25.0	62.5	40.3	65.3	42.1	73.7	38.3	66.4	***
Postnatal care	50.0	56.3	62.5	66.7	57.9	68.4	59.8	65.4	NS
Active management of the 3rd stage of labor (AMTSL)	43.8	43.8	37.5	54.2	36.8	57.9	38.3	53.3	**
Postpartum hemorrhage (PPH)	31.3	81.3	11.1	70.8	15.8	47.4	15.0	68.2	***
Eclampsia or MgSO4 use	18.8	68.8	6.9	66.7	5.3	42.1	8.4	62.6	***
Obstetric and newborn complications	25.0	87.5	27.8	70.8	21.1	63.2	26.2	72.0	***
Immediate newborn care	31.3	87.5	27.8	73.6	36.8	68.4	29.9	74.8	***
Preventing maternal-to-child transmission (PMTCT)	50.0	75.0	58.3	83.3	31.6	63.2	52.3	78.5	***
Infection prevention for HIV/AIDS	25.0	56.3	26.4	63.9	26.3	47.4	26.2	59.8	***
Safe abortion	6.3	43.8	6.9	20.8	15.8	21.1	8.4	24.3	***
Postabortion care	6.3	43.8	6.9	43.1	10.5	47.4	7.5	43.9	***
Family planning	43.8	50.0	31.9	59.7	36.8	47.4	34.6	56.1	***
Signal Functions⁶									
Parenteral antibiotics	93.8	100.0	83.3	94.4	84.2	78.9	85.0	92.5	NS
Parenteral oxytocin	100.0	100.0	65.3	95.8	63.2	89.5	70.1	95.3	***
Parenteral anticonvulsants	75.0	87.5	48.6	31.9	31.6	15.8	49.5	37.4	NS
Newborn resuscitation	62.5	100.0	29.2	70.8	15.8	36.8	31.8	69.2	***
Manual removal of placenta	62.5	93.8	23.6	43.1	5.3	31.6	26.2	48.6	***
Remove retained products	56.3	100.0	12.5	43.1	10.5	36.8	18.7	50.5	***
Assisted vaginal delivery (AVD)	25.0	75.0	1.4	0.0	0.0	0.0	4.7	11.2	**
Perform surgery (c-section)	50.0	100.0	N/A	N/A	N/A	N/A	7.5	15.0	***
Perform blood transfusion	50.0	87.5	N/A	N/A	N/A	N/A	7.5	13.1	**

	Facility Type						All Facilities		Sig. Level ¹
	Hospitals/ Health Centers IV		Health Centers III		Health Centers II		Baseline	Endline	
	Baseline	Endline	Baseline	Endline	Baseline	Endline			
BEmONC and CEmONC Classification⁶									
Comprehensive Emergency Obstetric and Newborn Care (CEmONC)	18.8	50.0	N/A	N/A	N/A	N/A	2.8	7.5	NS
CEmONC without assisted vaginal delivery (AVD) [8/8 signal functions]	6.3	18.8	N/A	N/A	N/A	N/A	0.9	2.8	NS
Basic Emergency Obstetric and Newborn Care (BEmONC) [7/7 signal functions]	N/A	N/A	0.0	0.0	0.0	0.0	0.0	0.0	NS
BEmONC without AVD [6/6 signal functions]	N/A	N/A	1.4	12.5	0.0	0.0	0.9	8.4	**
Standard Practice									
Routine Practice: Active management of 3rd stage of labor (AMTSL)	93.8	93.8	73.6	93.1	68.4	89.5	75.7	92.5	***
Routine Practice: Use of partograph	43.8	93.8	34.7	76.4	15.8	63.2	32.7	76.6	***
Breech delivery performed in last 3 months	56.3	93.8	33.3	44.4	26.3	47.4	35.5	52.3	**
Rapid HIV test used in maternity ward in last 3 months	87.5	87.5	72.2	84.7	52.6	68.4	71.0	82.2	*
ARVs given to HIV+ mothers in maternity ward in last 3 months	93.8	93.8	69.4	84.7	36.8	63.2	67.3	82.2	***
ARVs given to newborns in maternity ward in last 3 months	93.8	100.0	69.4	84.7	36.8	63.2	67.3	83.2	***
Key Drug Availability									
No stock out last 12 months: 5 antibiotics	43.8	25.0	15.3	38.9	15.8	36.8	19.6	36.4	***
No stock out last 12 months: Magnesium sulfate	68.8	62.5	48.6	69.4	21.1	31.6	46.7	61.7	**
No stock out last 12 months: Oxytocin	81.3	81.3	48.6	83.3	63.2	78.9	56.1	82.2	***
Essential antibiotics - Currently Available ⁷	68.8	56.3	34.7	51.4	36.8	52.6	40.2	52.3	*
Gentamicin - Currently Available	93.8	68.8	94.9	83.3	73.7	68.4	90.7	78.5	**
ANC routine medications - Always Available ⁸	81.3	62.5	54.2	65.3	47.4	52.6	57.0	62.6	NS
ARV medications - Always Available ⁹	62.5	68.8	19.4	51.4	0.0	21.1	22.4	48.6	***
At least 1 short-term family planning method - Currently Available ¹⁰	93.8	87.5	83.3	84.7	47.4	52.6	78.5	79.4	NS
At least 1 long-term family planning method - Currently Available ¹¹	62.5	68.8	38.9	40.3	26.3	26.3	40.2	42.1	NS
Number of Facilities	16	16	72	72	19	19	107	107	

¹ Asterisks indicate significance level of the difference between baseline and endline outcomes for all facilities combined using McNemar's exact test, as follows: ***p<.01, **p<.05, *p<.1, NS=Not significant.

² Facility owned landline, cell, two-way, or radio, or individual had cell phone.

³ Available and functional motorized vehicle with fuel today funds generally available.

⁴ Skilled attendants include a nurse, midwife, or doctor.

⁵ Availability and display of ENMI 2001 or Uganda MoH 2010 Guidelines and Protocols.

⁶ Signal functions and EmONC classification is based on performance of each signal function in the last 3 months and not on the capacity to perform signal function.

⁷ Essential Antibiotics include Gentamicin, Metronidazole and either Ampicillin, Penicillin G or Procaine benzylpenicillin.

⁸ ANC routine medications include: iron, folic acid, mebendazole and Fansidar (IPT).

⁹ ARV medications include: ARV prophylaxis for mother, ART for mother and infant.

¹⁰ Short-term family planning methods include: oral contraceptives, male/female condoms, and 3-month injectables.

¹¹ Long-term family planning methods include: intrauterine devices, implants.

**Table B: Key SMGL Findings of the Health Facility Assessments
Percent of Facilities, by District, Providing each Service/Function
Uganda SMGL Districts: Kabarole, Kamwenge, Kibaale, and Kyenjojo
All Facilities Surveyed at Baseline (February 2012) and Endline (June 2013)
with Deliveries in the Previous 12 Months**

	District								All Facilities	
	Kabarole		Kamwenge		Kibaale		Kyenjojo		Baseline	Endline
	Baseline	Endline	Baseline	Endline	Baseline	Endline	Baseline	Endline		
Core Infrastructure Indicators										
Electricity available	75.0	90.6	25.0	87.5	63.6	97.0	50.0	100.0	57.9	94.4
Water available	90.6	93.8	62.5	87.5	66.7	97.0	80.8	96.2	76.6	94.4
Functional communications available ¹	81.3	96.9	100.0	75.0	97.0	97.0	100.0	92.3	93.5	92.5
Transportation available ²	59.4	59.4	56.3	75.0	36.4	57.6	92.3	73.1	59.8	64.5
Facility open 24/7	78.1	87.5	87.5	100.0	66.7	97.0	96.2	100.0	80.4	95.3
Obstetric patients never share beds	46.9	100.0	18.8	31.3	27.3	84.8	42.3	53.8	35.5	73.8
Women never deliver on floor	90.6	100.0	87.5	75.0	81.8	93.9	84.6	84.6	86.0	90.7
At least one skilled attendant on staff ³	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Maternal death audits performed	15.6	28.1	6.3	50.0	3.0	30.3	0.0	34.6	6.5	33.6
Uganda Specific Indicators: Protocols and Guidelines are available and displayed⁴										
Antenatal care	28.1	40.6	50.0	87.5	33.3	66.7	50.0	84.6	38.3	66.4
Postnatal care	62.5	46.9	50.0	81.3	54.5	66.7	69.2	76.9	59.8	65.4
Active management of the 3rd stage of labor (AMTSL)	31.3	34.4	25.0	68.8	36.4	39.4	57.7	84.6	38.3	53.3
Postpartum hemorrhage (PPH)	9.4	62.5	6.3	87.5	18.2	48.5	23.1	88.5	15.0	68.2
Eclampsia or MgSO4 use	9.4	56.3	0.0	81.3	6.1	45.5	15.4	80.8	8.4	62.6
Obstetric and newborn complications	21.9	71.9	50.0	81.3	21.2	54.5	23.1	88.5	26.2	72.0
Immediate newborn care	21.9	75.0	50.0	93.8	21.2	51.5	38.5	92.3	29.9	74.8
Preventing maternal-to-child transmission (PMTCT)	62.5	90.6	75.0	87.5	42.4	57.6	38.5	84.6	52.3	78.5
Infection prevention for HIV/AIDS	25.0	78.1	50.0	62.5	21.2	36.4	19.2	65.4	26.2	59.8
Safe abortion	3.1	28.1	18.8	31.3	6.1	9.1	11.5	34.6	8.4	24.3
Postabortion care	3.1	37.5	18.8	62.5	6.1	18.2	7.7	73.1	7.5	43.9
Family planning	37.5	59.4	43.8	68.8	30.3	39.4	30.8	65.4	34.6	56.1
Signal Functions⁵										
Parenteral antibiotics	78.1	96.9	93.8	93.8	87.9	87.9	84.6	92.3	85.0	92.5
Parenteral oxytocin	65.6	93.8	93.8	93.8	66.7	93.9	65.4	100.0	70.1	95.3
Parenteral anticonvulsants	56.3	34.4	50.0	43.8	60.6	27.3	26.9	50.0	49.5	37.4
Newborn resuscitation	25.0	75.0	62.5	87.5	21.2	63.6	34.6	57.7	31.8	69.2
Manual removal of placenta	18.8	62.5	37.5	43.8	33.3	33.3	19.2	53.8	26.2	48.6
Remove retained products	15.6	50.0	18.8	50.0	30.3	48.5	7.7	53.8	18.7	50.5
Assisted vaginal delivery (AVD)	9.4	15.6	6.3	12.5	0.0	6.1	3.8	11.5	4.7	11.2
Perform surgery (c-section)	12.5	18.8	0.0	12.5	9.1	15.2	3.8	11.5	7.5	15.0
Perform blood transfusion	9.4	12.5	6.3	12.5	6.1	15.2	7.7	11.5	7.5	13.1

	District								All Facilities	
	Kabarole		Kamwenge		Kibaale		Kyenjojo		Baseline	Endline
	Baseline	Endline	Baseline	Endline	Baseline	Endline	Baseline	Endline		
BEmONC and CEmONC Classification⁵										
Comprehensive Emergency Obstetric and Newborn Care (CEmONC)	6.3	6.3	0.0	12.5	0.0	3.0	3.8	11.5	2.8	7.5
CEmONC without assisted vaginal delivery (AVD) [8/8 signal functions]	0.0	0.0	0.0	0.0	3.0	9.1	0.0	0.0	0.9	2.8
Basic Emergency Obstetric and Newborn Care (BEmONC) [7/7 signal functions]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BEmONC without AVD [6/6 signal functions]	0.0	6.3	6.3	18.8	0.0	0.0	0.0	15.4	0.9	8.4
Standard Practice										
Routine Practice: Active management of 3rd stage of labor (AMTSL)	71.9	87.5	87.5	87.5	72.7	93.9	76.9	100.0	75.7	92.5
Routine Practice: Use of partograph	40.6	68.8	18.8	81.3	6.1	78.8	65.4	80.8	32.7	76.6
Breech delivery performed in last 3 months	28.1	53.1	43.8	75.0	33.3	36.4	42.3	57.7	35.5	52.3
Rapid HIV test used in maternity ward in last 3 months	68.8	87.5	75.0	87.5	72.7	78.8	69.2	76.9	71.0	82.2
ARVs given to HIV+ mothers in maternity ward in last 3 months	68.8	90.6	68.8	87.5	57.6	63.6	76.9	92.3	67.3	82.2
ARVs given to newborns in maternity ward in last 3 months	62.5	90.6	81.3	87.5	54.5	66.7	80.8	92.3	67.3	82.2
Key Drug Availability										
No stock out last 12 months: 5 antibiotics	21.9	28.1	12.5	25.0	24.2	42.4	15.4	46.2	19.6	36.4
No stock out last 12 months: Magnesium sulfate	53.1	40.6	37.5	75.0	57.6	66.7	30.8	73.1	46.7	61.7
No stock out last 12 months: Oxytocin	46.9	78.1	81.3	75.0	57.6	87.9	50.0	84.6	56.1	82.2
Essential antibiotics - Currently Available ⁶	43.8	56.3	37.5	43.8	42.4	51.5	34.6	53.8	40.2	52.3
Gentamicin - Currently Available	96.9	81.3	93.8	75.0	90.9	75.8	80.8	80.8	90.7	78.5
ANC routine medications - Always Available ⁷	56.3	84.4	43.8	56.3	63.6	42.4	57.7	65.4	57.0	62.6
ARV medications - Always Available ⁸	43.8	53.1	18.8	68.8	15.2	27.3	7.7	57.7	22.4	48.6
At least 1 short-term family planning method - Currently Available ⁹	84.4	87.5	87.5	87.5	75.8	72.7	69.2	73.1	78.5	79.4
At least 1 long-term family planning method - Currently Available ¹⁰	28.1	37.5	50.0	56.3	33.3	33.3	57.7	50.0	40.2	42.1
Number of Facilities	32	32	16	16	33	33	26	26	107	107

¹ Facility owned landline, cell, two-way, or radio, or individual had cell phone.

² Available and functional motorized vehicle with fuel today funds generally available.

³ Skilled attendants include a nurse, midwife, or doctor.

⁴ Availability and display of ENMI 2001 or Uganda MoH 2010 Guidelines and Protocols.

⁵ Signal functions and EmONC classification is based on performance of each signal function in the last 3 months and not on the capacity to perform signal function.

⁶ Essential Antibiotics include Gentamicin, Metronidazole and either Ampicillin, Penicillin G or Procaine benzylpenicillin.

⁷ ANC routine medications include: iron, folic acid, mebendazole and Fansidar (IPT).

⁸ ARV medications include: ARV prophylaxis for mother, ART for mother and infant.

⁹ Short-term family planning methods include: oral contraceptives, male/female condoms, and 3-month injectables.

¹⁰ Long-term family planning methods include: intrauterine devices, implants.

**Table C: Key SMGL Findings of the Health Facility Assessments
Zambia SMGL Districts: Lundazi, Kalomo, Mansa, and Nyimba
Percent of Facilities, by Type, Providing each Service/Function
All Facilities Surveyed¹ at Baseline (October 2011) and
Endline (June 2013) with Deliveries in Previous 12 Months**

	Facility Type						All Facilities		Sig. Level ²
	Hospital		Health Center		Health Post		Baseline	Endline	
	Baseline	Endline	Baseline	Endline	Baseline	Endline			
Core Infrastructure Indicators									
Electricity available	100.0	100.0	54.9	74.7	50.0	75.0	56.6	76.1	***
Water available	100.0	100.0	91.2	98.9	81.3	100.0	90.3	99.1	***
Communication available ³	100.0	100.0	40.7	86.8	50.0	100.0	45.1	89.4	***
Transportation available ⁴	83.3	100.0	53.8	58.2	50.0	62.5	54.9	61.1	NS
Facility open 24/7	100.0	100.0	64.8	93.4	75.0	100.0	68.1	94.7	***
Obstetric patients never share beds	50.0	50.0	62.6	70.3	75.0	56.3	63.7	67.3	NS
Women never deliver on floor ⁵	50.0	75.0	73.8	83.6	68.8	75.0	71.6	81.5	NS
At least one skilled attendant ^o on staff ⁵	100.0	100.0	90.2	90.2	87.5	100.0	90.1	92.6	NS
Maternal death audits performed ⁵	50.0	100.0	49.2	57.4	12.5	37.5	42.0	55.6	*
Zambia-specific Infrastructure Indicators									
Formal written referral protocol	66.7	100.0	65.9	63.7	56.3	75.0	64.6	67.3	NS
Safe Motherhood Action Group associated with facility ⁵	50.0	25.0	65.6	88.5	56.3	87.5	63.0	85.2	***
Mothers shelter associated with facility ⁵	75.0	50.0	29.5	36.1	12.5	6.3	28.4	30.9	NS
Signal Functions⁶									
Parenteral antibiotics	100.0	100.0	81.3	74.7	56.3	68.8	78.8	75.2	NS
Parenteral oxytocin	100.0	100.0	89.0	93.4	93.8	100.0	90.3	94.7	NS
Parenteral anti-convulsants	100.0	100.0	38.5	27.5	56.3	43.8	44.2	33.6	NS
Manual removal of placenta	100.0	83.3	34.1	28.6	37.5	43.8	38.1	33.6	NS
Remove retained products	100.0	100.0	14.3	33.0	0.0	43.8	16.8	38.1	***
Assisted vaginal delivery (AVD)	83.3	100.0	5.5	11.0	6.3	0.0	9.7	14.2	NS
Newborn resuscitation	83.3	100.0	26.4	64.8	6.3	43.8	26.5	63.7	***
Perform surgery (c-section)	83.3	83.3	0.0	0.0	0.0	0.0	4.4	4.4	NS
Perform blood transfusion	100.0	100.0	0.0	1.1	0.0	0.0	5.3	6.2	NS
BEmONC and CEmONC Classification⁶									
Comprehensive Emergency Obstetric and Newborn Care (CEmONC) [9/9 signal functions]	66.7	66.7	N/A	N/A	N/A	N/A	3.5	3.5	NS
Basic Emergency Obstetric and Newborn Care (BEmONC) [7/7 signal functions]	N/A	N/A	0.0	1.1	0.0	0.0	3.5	5.3	NS
BEmONC without assisted vaginal deliver (AVDt) [6/6 signal functions]	N/A	N/A	2.2	4.4	0.0	6.3	6.2	8.8	NS

	Facility Type						All Facilities		Sig. Level ²
	Hospital		Health Center		Health Post		Baseline	Endline	
	Baseline	Endline	Baseline	Endline	Baseline	Endline			
Standard Practice									
Routine practice: Active management of 3rd stage of labor (AMTSL)	100.0	100.0	69.2	89.0	68.8	100.0	70.8	91.2	***
Breech delivery performed in last 3 months	100.0	100.0	33.0	47.3	31.3	56.3	36.3	51.3	**
Rapid HIV test used in maternity ward in last 3 months	100.0	66.7	64.8	57.1	62.5	68.8	66.4	59.3	NS
ARVs given to HIV+ mothers in maternity ward last 3 months	100.0	100.0	70.3	69.2	50.0	56.3	69.0	69.0	NS
ARVs given to newborns in maternity ward in last 3 months	100.0	100.0	65.9	71.4	43.8	81.3	64.6	74.3	NS
Key Drug Availability									
No stock out last 12 months: Magnesium sulfate ⁵	100.0	100.0	21.4	86.4	6.3	87.5	22.4	87.3	***
No stock out last 12 months: Oxytocin ⁵	75.0	100.0	75.9	96.6	87.5	100.0	78.2	97.5	***
Available ⁷ : ANC routine medications ⁷	50.0	33.3	58.2	36.3	50.0	37.5	56.6	36.3	***
HIV rapid test kits available in maternity today ⁵	75.0	100.0	82.0	91.8	87.5	100.0	82.7	93.8	**
Currently available: Gentamicin	66.7	100.0	63.7	84.6	81.3	87.5	66.4	85.8	***
Available ⁷ : ARV medications ⁽⁵⁾⁽⁸⁾	50.0	50.0	21.3	9.8	6.3	12.5	19.8	12.3	NS
Available ⁷ : At least 1 short-term family planning method ^{†5}	75.0	75.0	100.0	100.0	93.8	100.0	97.5	98.8	NS
Available ⁷ : At least 1 long-term family planning method ^{‡5}	50.0	75.0	21.3	50.8	6.3	31.3	19.8	48.1	***
Number of Facilities	6	6	91	91	16	16	113	113	

¹ Only facilities that did not change functional level between baseline and endline included in table.

² Asterisks indicate significance level using the McNemar test as follows: ***p<.01, **p<.05, *p<.1, NS=Not significant.

³ Communication includes 2-way radio, landline, or cell phone with service.

⁴ Transportation includes motor vehicle, motorcycle, or bicycle.

⁵ Data not available for Kalomo District at baseline-- removed from analysis.

⁶ Skilled attendant includes doctor, nurse, or midwife.

⁶ Signal Function and EmONC Classification based on performance of each signal functions in past 3 months, not capacity to perform each signal function.

⁷ Availability is defined as always or sometimes available.

⁷ ANC routine medications include: iron, folic acid, mebendazole, Fansidar (IPT).

⁸ ARV medications include: ARV prophylaxis for mother, ART for mother and infant.

[†] Short-term family planning method includes: oral contraceptives, male/female condoms, and 3-month injectables.

[‡] Long-term family planning method includes: intrauterine devices, implants.

Caesarean delivery and blood transfusion services define the difference between a CEmONC and BEmONC site.

Assisted Vaginal Delivery in Health Centers not promoted by Zambia MoH.

**Table D: Key SMGL Findings of the Health Facility Assessments
Zambia SMGL Districts: Lundazi, Kalomo, Mansa, and Nyimba
Percent of Facilities, by District, Providing each Service/Function
All Facilities Surveyed¹ at Baseline (October 2011) and
Endline (June 2013) with Deliveries in Previous 12 Months**

	District								All Facilities		Sig. Level ²
	Nyimba		Lundazi		Mansa		Kalomo		Baseline	Endline	
	Baseline	Endline	Baseline	Endline	Baseline	Endline	Baseline	Endline			
Core Infrastructure Indicators											
Electricity available	76.5	82.4	51.4	71.4	58.6	79.3	50.0	75.0	56.6	76.1	***
Water available	88.2	100.0	88.6	100.0	89.7	100.0	93.8	96.9	90.3	99.1	***
Communication available ³	58.8	94.1	62.9	88.6	41.4	96.6	21.9	81.3	45.1	89.4	***
Transportation available ⁴	76.5	64.7	42.9	77.1	72.4	58.6	40.6	43.8	54.9	61.1	NS
Facility open 24/7	58.8	100.0	88.6	94.3	17.2	100.0	96.9	87.5	64.6	67.3	NS
Obstetric patients never share beds	70.6	47.1	37.1	48.6	86.2	86.2	68.8	81.3	68.1	94.7	***
Women never deliver on floor ⁵	82.4	94.1	57.1	65.7	82.8	93.1	N/A	N/A	63.7	67.3	NS
At least one skilled attendant ^o on staff ⁵	70.6	94.1	94.3	91.4	96.6	93.1	N/A	N/A	71.6	81.5	NS
Maternal death audits performed ⁵	23.5	47.1	34.3	60.0	62.1	55.2	N/A	N/A	42.0	55.6	*
Zambia-specific Infrastructure Indicators											
Formal written referral protocol	47.1	100.0	65.7	65.7	34.5	17.2	100.0	96.9	64.6	67.3	NS
Safe Motherhood Action Group associated with facility ⁵	41.2	82.4	65.7	85.7	72.4	86.2	N/A	N/A	63.0	85.2	***
Mothers shelter associated with facility ⁵	41.2	52.9	40.0	37.1	6.9	10.3	N/A	N/A	28.4	30.9	NS
Signal Functions⁶											
Parenteral antibiotics	52.9	58.8	65.7	71.4	96.6	72.4	90.6	90.6	78.8	75.2	NS
Parenteral oxytocin	82.4	94.1	91.4	94.3	93.1	96.6	90.6	93.8	90.3	94.7	NS
Parenteral anti-convulsants	52.9	35.3	45.7	48.6	62.1	13.8	21.9	34.4	44.2	33.6	NS
Manual removal of placenta	35.3	11.8	51.4	48.6	27.6	24.1	34.4	37.5	38.1	33.6	NS
Remove retained products	11.8	29.4	17.1	54.3	27.6	20.7	9.4	40.6	16.8	38.1	***
Assisted vaginal delivery (AVD)	17.6	5.9	11.4	11.4	6.9	6.9	6.3	28.1	9.7	14.2	NS
Newborn resuscitation	5.9	35.3	34.3	54.3	27.6	75.9	28.1	78.1	26.5	63.7	***
Perform surgery (c-section)	5.9	5.9	5.7	5.7	3.4	3.4	3.1	3.1	4.4	4.4	NS
Perform blood transfusion	5.9	5.9	5.7	8.6	3.4	3.4	6.3	6.3	5.3	6.2	NS
BEmONC and CEmONC Classification⁶											
Comprehensive Emergency Obstetric and Newborn Care (CEmONC) [9/9 signal functions]	5.9	0.0	2.9	5.7	3.4	3.4	3.1	3.1	3.5	3.5	NS
Basic Emergency Obstetric and Newborn Care (BEmONC) [7/7 signal functions]	5.9	0.0	2.9	5.7	3.4	3.4	3.1	9.4	3.5	5.3	NS
BEmONC w/o assisted vaginal delivery (AVD†) [6/6 signal functions]	5.9	0.0	5.7	14.3	6.9	3.4	6.3	12.5	6.2	8.8	NS
Standard Practice											
Routine practice: Active management of 3rd stage of labor (AMTSL)	64.7	94.1	74.3	85.7	72.4	96.6	68.8	90.6	70.8	91.2	***
Breech delivery performed in last 3 months	5.9	41.2	51.4	62.9	27.6	55.2	43.8	40.6	36.3	51.3	**

	District								All Facilities		Sig. Level ²
	Nyimba		Lundazi		Mansa		Kalomo		Baseline	Endline	
	Baseline	Endline	Baseline	Endline	Baseline	Endline	Baseline	Endline			
Rapid HIV test used in maternity ward in last 3 months	41.2	58.8	71.4	65.7	48.3	37.9	90.6	71.9	66.4	59.3	NS
ARVs given to HIV+ mothers in maternity ward last 3 months	58.8	70.6	68.6	60.0	58.6	65.5	84.4	81.3	69.0	69.0	NS
ARVs given to newborns in maternity ward in last 3 months	58.8	76.5	65.7	71.4	55.2	69.0	75.0	81.3	64.6	74.3	NS
Key Drug Availability											
No stock out last 12 months: Magnesium sulfate⁵	26.7	81.3	11.8	85.3	33.3	93.1	N/A	N/A	22.4	87.3	***
No stock out last 12 months: Oxytocin⁵	62.5	100.0	85.3	97.1	78.6	96.6	N/A	N/A	78.2	97.5	***
HIV rapid test kits available in maternity today⁵	88.2	100.0	88.6	91.4	72.4	93.1	N/A	N/A	82.7	93.8	**
Currently available: Gentamicin	82.4	64.1	82.9	85.7	62.1	93.1	43.8	75.0	66.4	85.8	***
Available⁷: ANC routine medications⁷	58.8	47.1	40.0	22.9	75.9	48.3	56.3	34.4	56.6	36.3	***
Available⁷: ARV medications⁵⁾⁽⁸⁾	5.9	5.9	22.9	22.9	24.1	3.4	N/A	N/A	19.8	12.3	NS
Available⁷: At least 1 short-term family planning method⁵	100.0	100.0	100.0	97.1	96.6	100.0	N/A	N/A	97.5	98.8	NS
Available⁷: At least 1 long-term family planning method⁵	17.6	47.1	8.6	51.4	34.5	44.8	N/A	N/A	19.8	48.1	***
Number of Facilities	17	17	35	35	29	29	32	32	113	113	

¹ Only facilities that did not change functional level between baseline and endline included in table.

² Asterisks indicate significance level using the McNemar test as follows: ***p<.01, **p<.05, *p<.1, NS=Not significant.

³ Communication includes 2-way radio, landline, or cell phone with service.

⁴ Transportation includes motor vehicle, motorcycle, or bicycle.

⁵ Data not available for Kalomo District at baseline-- removed from analysis.

⁶ Skilled attendant includes doctor, nurse, or midwife.

⁶ Signal Function and EmONC Classification based on performance of each signal functions in past 3 months, not capacity to perform each signal function.

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⁷ ANC routine medications include: iron, folic acid, mebendazole, Fansidar (IPT).

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[†] Short term family planning method includes: oral contraceptives, male/female condoms, and 3-month injectables.

[‡] Long-term family planning method includes: intrauterine devices, implants.

Caesarean delivery and blood transfusion services define the difference between a CEmONC and BEmONC site.



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