External Evaluation of

Saving Mothers, Giving Life

Saving Mothers giving life

FINAL REPORT

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External Evaluation of Saving Mothers, Giving Life: Final Report

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Executive Summary

Saving Mothers, Giving Life (SMGL) is a $200 million initiative that seeks to reduce maternal mortality through a public-private partnership between the governments of the United States, Norway, Uganda, and Zambia, Merck for Mothers, Every Mother Counts, the American College of Gynecology and Obstetrics, and Project CURE. The first phase (2012-2013) focused on eight rural districts in Uganda and Zambia. The maternal mortality ratio in Uganda is estimated to be 310 and, in Zambia, 440 per 100,000 live births. The barriers to reducing maternal mortality in Uganda and Zambia include poor quality health facilities, long distances to facilities, a shortage of qualified workers, cultural preferences, and high HIV prevalence. Prior to 2012 in both countries, less than 60% of deliveries occured in a health facility.

The SMGL initiative encompasses a wide scope of activities that fall into four categories: generating demand, improving access, improving quality, and health systems strengthening. These range from mobilizing community health workers, to providing incentive kits for mothers who deliver in health facilities, to training providers in obstetric and newborn care, to equipping and upgrading facilities.

This independent external implementation evaluation was commissioned by the SMGL Leadership Council and carried out by researchers at Columbia University and New York University. We assessed the reach, extent, fidelity, and dynamic effects of SMGL in order to identify best practices and remaining barriers to reducing maternal mortality in Uganda and Zambia, and to inform future efforts of SMGL. We also examined the functioning of the SMGL partnership and engagement of various stakeholders. This report covers SMGL's Phase 1, the first 12-18 months of SMGL implementation. A separate internal evaluation done by the CDC and USAID will assess care utilization and mortality reduction.

Data for this evaluation came from several sources. To measure the extent of implementation (dose delivered), we interviewed implementing partners and district health teams using a structured questionnaire. We explored the response of the community to SMGL and effects on the health system through interviews and focus group discussions with policymakers, community health workers, facility managers, and women. Finally, we conducted surveys with women with recent facility deliveries and with health providers in SMGL and comparison districts to examine differences between program and non-program areas. All human subjects activities received clearance from research ethics committees in the United States, Uganda, and Zambia. In total, we conducted:

- 17 interviews with SMGL global partners
- 60 interviews with implementers and policymakers
- 80 focus groups with women, leaders and community health workers in SMGL districts
- 81 in-depth interviews with facility managers of SMGL-supported facilities
- 655 provider obstetric knowledge tests (in SMGL and non-SMGL districts)
- 1,267 provider satisfaction surveys (in SMGL and non-SMGL districts)
- 2,488 exit interviews with postpartum women (in SMGL and non-SMGL districts)

RESULTS

1. Dose delivered

We collected 41 indicators regarding the dose delivered in the SMGL districts in Uganda and 39 indicators in Zambia. We found that a large number of activities were carried out within the first year of SMGL. In Zambia and Uganda, demand creation activities were among the most extensively implemented activities. Over 4,000 Village Health Team members were trained in Uganda and over 1,500 Safe Motherhood Action Group members were trained in Zambia. Over 15,000 incentive kits (Mama Kits/Packs) were distributed in Uganda and over 2,000 were distributed in Zambia. Health worker trainings were an important quality improvement activity: 316 providers were trained in EmONC in Uganda and 199 in Zambia. In Uganda, large investments in hiring of new health workers (147 new doctors, nurses, and midwives) substantially increased the number of skilled providers in SMGL districts, and transportation vouchers improved access to facilities. Both countries upgraded a number of clinics to provide basic emergency obstetric and newborn care (36 in Uganda; 94 in Zambia); Uganda additionally increased the number of facilities that provide comprehensive emergency

obstetric and newborn care by building operating theaters in 11 facilities. However, at the end of year 1, implementers and managers cited ongoing human resource shortages, inadequate infrastructure, and ongoing transportation difficulties as remaining barriers to expanding quality maternal care.

2. Reach and uptake

SMGL was generally well received by women in communities, although there was anxiety about continuation of the program after the end of year 1. Nearly 90% of surveyed Ugandan women who delivered at health facilities had heard of SMGL; approximately half of women in the Zambian districts had heard of SMGL. The most common sources of information about SMGL were radio in Uganda and Safe Motherhood Action Group members in Zambia, followed by health providers in both countries. More than half of women surveyed in intervention districts in both countries used at least one SMGL intervention. In Uganda, where they were offered, transport vouchers were especially popular: they were used by 25% of respondents. In Zambia, 31% of respondents reported meeting with a volunteer from a Safe Motherhood Action Group. Trainings were implemented extensively in both countries: twice as many providers in SMGL districts received obstetric training during the past year as their counterparts in non-SMGL comparison districts.

3. Fidelity

We assessed the fidelity of the intervention, that is, if the intervention succeeded in improving quality and perception of quality, using six metrics: provider knowledge, provider confidence, provider rating of quality, women's rating of quality, women's receipt of key services, and women's rating of satisfaction with care.

In both Uganda and Zambia, providers in SMGL districts scored modestly better than their counterparts in comparison districts on a **test of obstetric knowledge**. The difference in scores was approximately 10%.

In Uganda, there were positive, moderate to large differences in **provider confidence** between SMGL and non-SMGL districts. There were no differences in Zambia.

Providers' and women's ratings of quality of care were consistently higher in SMGL districts than in non-SMGL districts in Uganda. Health care providers in Uganda's SMGL districts were more satisfied with continuing medical education, supervision, mentoring, and workplace relationships than their counterparts in comparison districts. In Zambia, health care providers in SMGL districts were more likely to state that they had sufficient human resources than providers in non-SMGL districts. Facility managers in both countries identified additional infrastructure, more health providers, higher salaries, and incentives as unmet needs, while women emphasized the need for cleaner facilities, better supply of medicines, and more respectful treatment by providers.

There were few differences in **care received** by women in SMGL versus comparison districts. There were no differences in receipt of services such as postpartum exams, newborn care counseling, or newborn exams in either country. However, in Uganda, women in intervention districts were much more likely to report having received a Caesarean section and family planning services than those in comparison districts.

There was a marginally significant positive difference in **women's satisfaction** with care in Zambia in SMGL districts compared to non-SMGL districts.

Judging by the positive differences between Uganda's SMGL and non-SMGL districts on a range of metrics, including objective measures (provider knowledge scores) and subjective measures (provider confidence, provider ratings, women's ratings), we conclude that the SMGL initiative in Uganda had a measurable effect on quality of obstetric care. There was less evidence of an SMGL effect on quality of care in Zambia.

4. Dynamic and emergent properties

The majority of implementers, national stakeholders, and community respondents felt that SMGL was instrumental in raising awareness of maternal mortality in the focus districts. Overall, SMGL was reported to have had more positive effects on the broader health system than negative effects, particularly in the areas of service delivery, medicine procurement, information systems, and health system governance. However, the health system effects will need to be carefully monitored as SMGL continues to ensure that provision and quality of non-maternal services does not suffer.

Women in the community were overall very enthusiastic about the SMGL program—women particularly appreciated the work of the Safe Motherhood Action Groups in Zambia, and the availability of vouchers and Mama Kits in Uganda. Most women who delivered at home reported that they had intended to deliver in facilities but were prevented from doing so by the sudden onset labor, lack of transportation to distant facilities, and in, some cases, concerns about disrespectful treatment. Women also reported substantial social pressure to deliver in facilities, which in some cases resulted in the community stigmatizing women who delivered at home. In Zambia, women and local leaders confirmed that some women who delivered at home were fined up to $40 by community leaders.

5. Functioning of the partnership and national ownership

We assessed the functioning of the SMGL global partnership through interviews with global SMGL leaders. In general, SMGL's global leaders agreed that the SMGL partnership was greater than the sum of its parts because it leveraged more resources and garnered creative new ideas for action on maternal health from a broad and non-traditional group

of constituents. However the lack of clear roles and lack of an agreed-upon operational and financing plan hindered the effectiveness of global partnership and complicated planning for the future. This in turn created anxiety and confusion about next steps among country implementers and health providers.

With regards to national ownership, most respondents—both from US agencies and host governments—reiterated that national governments were very supportive of SMGL but were not truly in charge of the program. This was in part due to the reliance on US government resources and the channeling of those resources outside of government budgets. Internal factors such as understaffing in Ministries of Health, particularly senior levels, and reorganization of the Ministry of Health in Zambia were also cited. Ideas proposed to increase national government role in SMGL included greater direct oversight, larger domestic funding commitment, and hiring and capacity building within senior ranks of Ministries. Finally, one of the innovations of the project was the involvement of the private sector in Uganda, which included accreditation and contracting of private health providers and distribution of vouchers for private care. Respondents felt that this was an effective model to expand access while bolstering quality of care. Identifying opportunities to involve the private sector should be a key component of future SMGL programs.

Final assessment

Our evaluation confirms that SMGL was successful in delivering a large portfolio of activities to increase demand and improve the quality of care at health facilities. In SMGL districts, providers reported higher satisfaction and appreciation for new equipment; women and local leaders credited SMGL with increasing the sense of urgency about maternal health. The increased political priority for maternal survival and the sense that action is possible may be among the most potent legacies of SMGL.

Given limited resources and the plan to scale up SMGL activities, a key question for SMGL is: which of the many SMGL activities implemented had the greatest impact on improving maternal survival? What were the "active ingredients"? While the most robust answer would require a head-to-head comparison of different intervention packages, we conducted an exploratory analysis of SMGL interventions most closely linked to better quality ratings by providers and women. Below are the active ingredients that emerged from our analysis in Uganda and Zambia:

Potential active ingredients of SMGL in Uganda and Zambia

- Subsidies and incentives to offset costs of care
- Community health worker outreach
- Health care providers: more doctors, nurses, midwives
- Knowledge and support: training and mentoring
- Tools to do the job: infrastructure and equipment

These active ingredients will vary across countries. In areas with higher density of health facilities, the demand-side activities may not be required. However, investments in human resources, tools and knowledge will likely be required in most, if not all, countries struggling with high levels of maternal mortality. Where density of health facilities is low, sequencing matters: investments in health system improvements should be made ahead of demand-generation activities. National governments are the "natural owners" of some of the active ingredients, such as hiring health care providers. Donors may be better suited for activities such as provision of equipment and should work together with national governments to create packages of interventions.

A key finding from Uganda, which succeeded in improving quality in SMGL districts, was that active ingredients are most powerful when delivered in combination. For example, in Uganda, hiring of doctors and nurses, extensive training and mentoring, distribution of equipment and medicines, and expansion of surgical capacity together combined to create a culture of competence that enabled providers to provide high quality care. On the community side, the combination of vouchers, material incentives, and community-level outreach created a motivating environment that contributed to a surge in demand for facility delivery.

RECOMMENDATIONS

1) Commit to five years—with a clear transition plan: SMGL partners should make minimum commitments of five years to enable appropriate planning, engagement of local ministries, sequencing of interventions, and planning for sustainability. In addition, the role of national governments and district authorities should be clearly outlined. From the outset, this should include government investments in core areas such as infrastructure and human resources, as well as a transition plan detailing how countries will assume responsibility for the program moving forward.

2) Think in terms of health system packages and not isolated interventions: Investments in surgically-equipped facilities, medicine supply chains, health workers, and clinical skill acquisition are mutually-reinforcing and essential for creating a culture of competence necessary for high quality care. Packages of health system investments—with funding shared between development partners and host governments—are also more likely to have beneficial "spill-over" effects into non-maternal health services.

3) Training is not enough—consider other cost-effective models for improving care quality: Trainings were the most rapidly and extensively implemented activities of SMGL. Yet, our analysis showed a relatively modest 10% difference in knowledge between providers in SMGL and non-SMGL

districts, most of whom did not receive in-service training. In addition to short trainings, partners should explore and test innovative approaches to improving quality of care that have shown promise in similar settings such as performance-based financing, quality competitions, and public sharing of quality metrics.

4) Focus on "last mile" women: Even with expansion of obstetric facilities and transport solutions, many women in rural areas will live too far to reach facilities for delivery. SMGL should continue testing innovations to provide good care for these women, including maternity waiting homes and telemedicine for providers in first-level facilities. Some women are dissuaded from coming to facilities for fear of disrespectful treatment. Efforts to promote dignified maternal care must go hand in hand with technical quality improvements. Careful attention must be paid to the unintended consequences of efforts to promote facility delivery, such as penalties for home delivery.

5) Clarify the SMGL governance structure—globally and in host countries: At the global level, the SMGL Leadership Council should define a governance structure with clear roles and responsibilities for funding and implementation. This will enhance the effectiveness of the partnership and clarify its value added to individual members. Within countries, national governments should take on a central role in oversight of SMGL and, over time, increase investments in core SMGL functions, particularly those related to strengthening health systems.

6) Test future intervention packages using rigorous evaluation methods: SMGL has produced important insights, including that existing development assistance platforms, such as PEPFAR and MCH assistance, can be used to rapidly scale new programs. However, there remain mission critical knowledge gaps. One of these is the content of the minimum essential SMGL package required to improve maternal survival. Defining such a package is required to scale up the program in the context of limited resources. Going forward, combinations of promising interventions (active ingredients) customized to country needs should be tested in head-to-head comparisons. Prospective, randomized or quasi-random evaluations, which can be done alongside program implementation, will provide the most credible answers on what constitutes the essential package.

Acronyms & Abbreviations

AIDS	Acquired Immune Deficiency Syndrome
ANC	Antenatal Care
AOGU	Association of Obstetricians and Gynecologists of Uganda
BEmONC	Basic Emergency Obstetric and Neonatal Care
CDC	U.S. Centers for Disease Control and Prevention
CEmONC	Comprehensive Emergency Obstetric and Neonatal Care
CHW	Community Health Worker
CIDRZ	Center for Infectious Disease Research in Zambia
CSH	Communications Support for Health (Chemonics, Zambia)
DAQS	Demand, Access, Quality, and Health Systems Strengthening
DHIS	District Health Information System
DHO	District Health Officer
DMO	District Medical Officer
DHS	Demographic and Health Survey
DHT	District Health Team
EGPAF	The Elizabeth Glaser Pediatric AIDS Foundation
EmONC	Emergency Obstetric and Neonatal Care
FGD	Focus Group Discussion
HBB	Helping Babies Breathe
HIV	Human Immunodeficiency Virus
IDI	Infectious Diseases Institute (Makerere University, Uganda)
IHME	Institute for Health Metrics and Evaluation
IP	Implementing Partner
JHPIEGO	An affiliate of Johns Hopkins University
JSI	John Snow, Inc.
MCDMCH	Ministry of Community Development, Mother and Child Health (Zambia)
MCH	Maternal and Child Health
MCHIP	Maternal and Child Health Integrated Program
MMR	Maternal Mortality Ratio
MNCH	Maternal, Newborn and Child Health
MoH	Ministry of Health
MSU	Marie Stopes Uganda
OB	Obstetric
PACE	Program for Accessible Health, Communication and Education
PEPFAR	U.S. President's Emergency Plan for AIDS Relief
PMTCT	Prevention of Mother to Child Transmission (of HIV)
RST	Rapid Syphilis Test
SDS	Strengthening Decentralization for Sustainability
SMAG	Safe Motherhood Action Group (Zambia)
SMGL	Saving Mothers, Giving Life
TBA	Traditional Birth Attendant
UHMG	Uganda Health Marketing Group
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USG	United States Government
VHT	Village Health Team (Uganda)
WHO	World Health Organization
ZCAHRD	Zambia Center for Applied Health Research and Development (Boston University)
ZISSP	Zambia Integrated Systems Strengthening Project (Abt Associates)

1 Introduction

Mom and baby in Lundazi District, Zambia

Saving Mothers, Giving Life (SMGL) is a $200 million, five-year initiative of the United States Government (USG), in collaboration with the Governments of Uganda, Zambia, and Norway, Merck for Mothers, Every Mother Counts, the American College of Obstetricians and Gynecologists, and Project CURE. Phase 1 of the initiative (2012-2013), introduced in eight focus districts of Uganda and Zambia, aimed to reduce maternal mortality by 50%, and to demonstrate that simultaneous investments in demand creation at the community level and health facility improvements focused on the intrapartum and immediate postpartum period could dramatically improve maternal survival.[1] Phase 2 will include additional districts and/or countries.

Maternal mortality remains a complex global health challenge, with over 250,000 maternal deaths per year, almost all in low- and middle-income countries.[2,3] The majority of maternal deaths are caused by postpartum hemorrhage and hypertensive disorders of pregnancy, which are both treatable with timely and appropriate medical care.[4] The high HIV burden in Uganda and Zambia also contributes to maternal mortality and requires skilled medical attention.

According to 2010 estimates from UNFPA, the maternal mortality ratio (MMR)—primarily a measure of the safety of childbirth—is approximately 310 per 100,000 live births in Uganda and 440 per 100,000 live births in Zambia. The proportion of facility births are below 60% in both countries.[3] To place these rates in context, 2012 MMRs in the United States and Norway, where skilled birth attendance is universal, were 21 and 7 per 100,000 live births, respectively.[3] At the individual and household levels, education, wealth, parity, and distance to facilities influence utilization of skilled care, as do community level factors such as health facility awareness, perceptions of health facility quality, and various cultural norms.[5]

SMGL is a public-private partnership, designed to engage governments, non-governmental organizations, and the private sector in an effort to address maternal mortality in multiple activities addressing community-level awareness and facility-level quality. SMGL is led by a global secretariat with representatives from each global partner organization, which works directly with partners in Uganda and Zambia to implement the program in the selected districts.

An *internal* impact evaluation of SMGL, measuring the outcomes of the program—maternal mortality, utilization, and cost-effectiveness—is being led by the Centers for Disease Control and Prevention (CDC) and the United States Agency for International Development (USAID), with results expected in Fall 2013. This *external* evaluation report, led by a research team at Columbia University, is a strategic implementation evaluation. The specific aims of the external evaluation are to: 1) assess the extent and fidelity of implementation of SMGL interventions; 2) assess functioning of the partnership and engagement of stakeholders; and 3) identify best practices and barriers to success in order to improve effectiveness in Phase 2.

Research for this evaluation was collected in 2 waves. Wave 1 assessed the first six months of SMGL and provided early lessons from the perspective of national- and district-level implementers. The Columbia team released an interim external evaluation report in March 2013 presenting findings from Wave 1.[6] This final report (Wave 2) provides an assessment of the entire first year of SMGL, revisiting implementers, but also assessing the effects of the program on health workers, women and communities, and the health system overall. Additionally, this report addresses the functioning of the partnership at the national and global levels.

2 Methods

Institutions involved in SMGL external evaluation.

2.1 Research team

The external evaluation team was led by Dr. Margaret E. Kruk from the Department of Health Policy and Management and Dr. Sandro Galea of the Department of Epidemiology at Columbia University's Mailman School of Public Health. Dr. Miriam Rabkin (Columbia University, Medicine and Epidemiology) and Dr. Karen Grépin (New York University, Health Economics) were co-investigators. The research team included eight additional researchers with expertise in public health, health systems, anthropology, and quantitative and qualitative methods. This team led the study design, conducted the in-depth interviews with SMGL stakeholders, and global partners, collected the "dose delivered" data in the eight SMGL intervention districts, and supported local survey and focus group data collection teams. During Wave 2, the US-based research team spent 190 person-days collecting data in Uganda (75 person-days) and Zambia (115 person days).

The team partnered with researchers in Uganda and Zambia who supported instrument development, translation and back-translation into local languages, sampling design, finalization of the research protocol, and local ethical clearances. Additionally, research partners recruited, trained, and supervised skilled local data collectors (28 research assistants in Uganda, 26 in Zambia) to assist with district-level focus group discussions, exit interviews, and provider surveys. Following data collection, they supervised data translation and transcription and supported interpretation and contextualization of the key results. In Uganda, we collaborated with a team led by Dr. Lynn Atuyambe from Makerere University School of Public Health and his co-investigators, Mr. Simon Kibira, and Dr. Stella Neema. In Zambia, we worked with a team led by Professor Mubiana Macwan'gi from the Institute of Economic and Social Research (INESOR) at the University of Zambia and her co-investigators, Mr. Joseph Simbaya, Ms. Mutinta Moonga, and Mr. Richard Zulu.

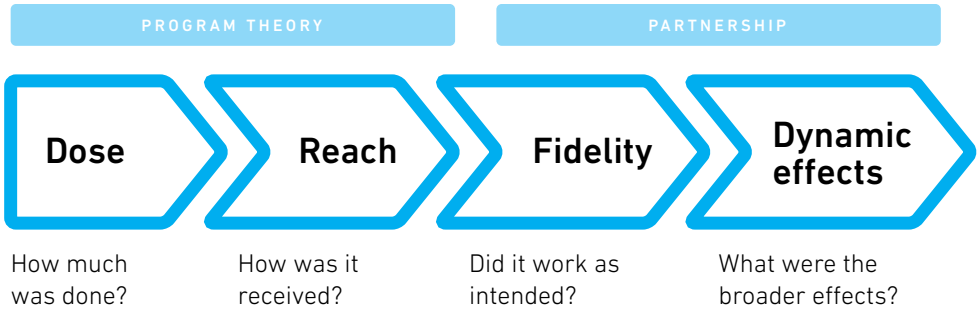
2.2 Evaluation design

As per Figure 1, the external evaluation focused on the implementation and dynamic effects of the SMGL program. In the interim report, we identified the program theory and associated logic model for the intervention (Appendix C). We also explored the "dose delivered" by six months into the program and conducted 143 key informant interviews (89 in-depth) with in-country stakeholders, assessing experiences and lessons learned about dose, fidelity, and broader effects during the *first* six months of SMGL implementation.

In Wave 2 of our evaluation, which is the focus of this report, we reassessed the dose delivered and examined the partnership, reach, fidelity, and dynamic effects of SMGL at the conclusion of its first phase. Because implementation began at different times in each country, the first phase of SMGL was 12-18 months long.

Wave 2 data collection took place from May-July 2013 and

FIGURE 1:
Evaluation design



included a second round of dose delivered data and interviews with in-country stakeholders, this time focusing primarily on the *second* six months of SMGL implementation (December 1, 2012 through May 31, 2013). As we did in the first wave, we conducted interviews with multiple SMGL stakeholders in Uganda and Zambia.

In addition, to assess the partnership, reach, and dynamic effects of SMGL, we broadened the scope of data collection in Wave 2 to include:

- In-depth interviews with SMGL global partnership members
- Focus group discussions (FGDs) with women, local leaders, and VHT and SMAG members in SMGL districts
- In-depth interviews with health facility managers in SMGL districts
- Quantitative exit interviews of women with recent facility deliveries in SMGL and non-SMGL comparison districts
- Quantitative health care provider knowledge and satisfaction surveys in SMGL and non-SMGL comparison districts

Our quantitative surveys of women with recent facility deliveries and of providers were used to inform our evaluation of fidelity. Our fidelity assessment centered on the quality of care provided to women in SMGL-supported facilities, and on effects on health workers. Quality of care measures included obstetric knowledge, receipt of obstetric services, as well as a range of perceived quality indicators. We also sought to identify gaps in effectiveness of SMGL interventions. Identifying the effect of SMGL on quality of care required the use of comparison groups, so as not to attribute secular trends to SMGL.

Data collectors learn to use electronic tablets for quantitative data collection in Lusaka, Zambia

Because SMGL did not select comparison districts at baseline, we used a post-test only comparison group evaluation design. This quasi-random design is useful for comparing absolute performance achieved by the end of an intervention, although it cannot be used to compare change in performance. (In other words, we can compare performance of SMGL versus comparison districts as of May 2013, but we cannot assess whether there was change in the SMGL districts during the year of program implementation). The comparison districts we selected were similar to SMGL districts but without a major maternal health program. Comparison districts met the following criteria: similar to the SMGL districts in terms of health infrastructure, geography/weather, health utilization trends, patterns of morbidity and mortality, and economic and cultural contexts; not contiguous with any SMGL districts; and no large-scale MNCH interventions in the past three years. The comparison districts were: Kiryandongo and Masindi in Uganda; Kabwe and Kapiri Mposhi in Zambia.

The fidelity assessment was thus conducted in six districts in each country and included structured exit surveys with women being discharged after delivery from facilities, provider surveys on clinical skills and satisfaction, and obstetric knowledge tests conducted with maternal health providers. Figure 2 shows the comparison districts and the facilities that the research teams visited to conduct exit and provider surveys.

2.3 Ethics clearance

All human subjects research activities were approved by the Columbia University Institutional Review Board and by two ethical review boards in each country: ERES Converge Research Ethics Committee and the Ministry of Health in Zambia, and the Uganda National Council of Science and Technology and the Higher Degrees Research and Ethics Committee at the Makerere University College of Health Sciences, School of Public Health as well as the Uganda National Council of Science and Technology.

2.4 Data collection and descriptive statistics

GLOBAL AND NATIONAL DATA

Table 1 summarizes the data collected from implementers and policymakers at global and national levels in both waves of this evaluation.

TABLE 1: Stakeholder data collected at global and national levels

	NATIONAL STAKEHOLDER INTERVIEWS WAVE 1	NATIONAL STAKEHOLDER INTERVIEWS WAVE 2	DOSE DELIVERED: ALL INDICATORS COLLECTED WAVE 1	DOSE DELIVERED: TRACER INDICATORS COLLECTED WAVE 2	GLOBAL PARTNER INTERVIEWS
Uganda	**47**	**34**	**178**	**41**	**N/A**
Zambia	**42**	**26**	**166**	**39**	**N/A**
Global	N/A	N/A	N/A	N/A	17
TOTAL	**89**	**60**	**344**	**80**	**17**

i. Interviews with national implementers and global SMGL partners

In this second wave of the external evaluation, the research team conducted 60 in-depth interviews with national stakeholders in Uganda and Zambia (34 central-level, 26 district-level), and 17 in-depth interviews with global partners in the US and in Norway. The interviews were conducted in person (n=68) and via telephone (n=9) from mid-May to mid-August, 2013. Interviews lasted between 45 and 90 minutes and were conducted in English.

Country-level stakeholders interviewed included SMGL leads from USAID and CDC in Zambia and Uganda, Ministry of Health focal persons, and a wide range of implementing partners (IPs) at the central and district levels. District-level respondents included all eight SMGL district medical and health officers, all six district SMGL coordinators, and two provincial medical officers in Zambia. These interviews assessed, among other things, perceptions of SMGL program successes, challenges, effects on health systems, and views regarding Phase 2.

To assess the functioning of the SMGL global partnership we interviewed SMGL Leadership Council members and program leaders from USAID, CDC, and OGAC; and SMGL leads from ACOG, Every Mother Counts, Merck for Mothers, Project CURE, and members of the SMGL Secretariat. Interviews with global partners primarily assessed their views on the effectiveness of SMGL, the "value added" of the global partnership, directions for Phase 2, and key lessons learned.

ii. Dose delivered data

Using the logic model developed for Wave 1 (Appendix C), the research team collected data on tracer indicators reflecting performance in each of the 28 SMGL intervention activities. We categorized these activities into four dimensions: demand, access, quality, and health system strengthening (i.e., the DAQS framework). For Wave 2, the research team collected these dose delivered data on the district-level activities and inputs actually implemented during the second six months of SMGL (December 1, 2012 to May 31, 2013) as reported by the district medical officers and district-level implementing partners. For each district, we specifically assessed the extent of implementation along the four DAQS dimensions. Data were cross-checked against program documents provided to the evaluation team by the Ministries of Health and implementing partners and shared with district-level partners for their review and additional input.

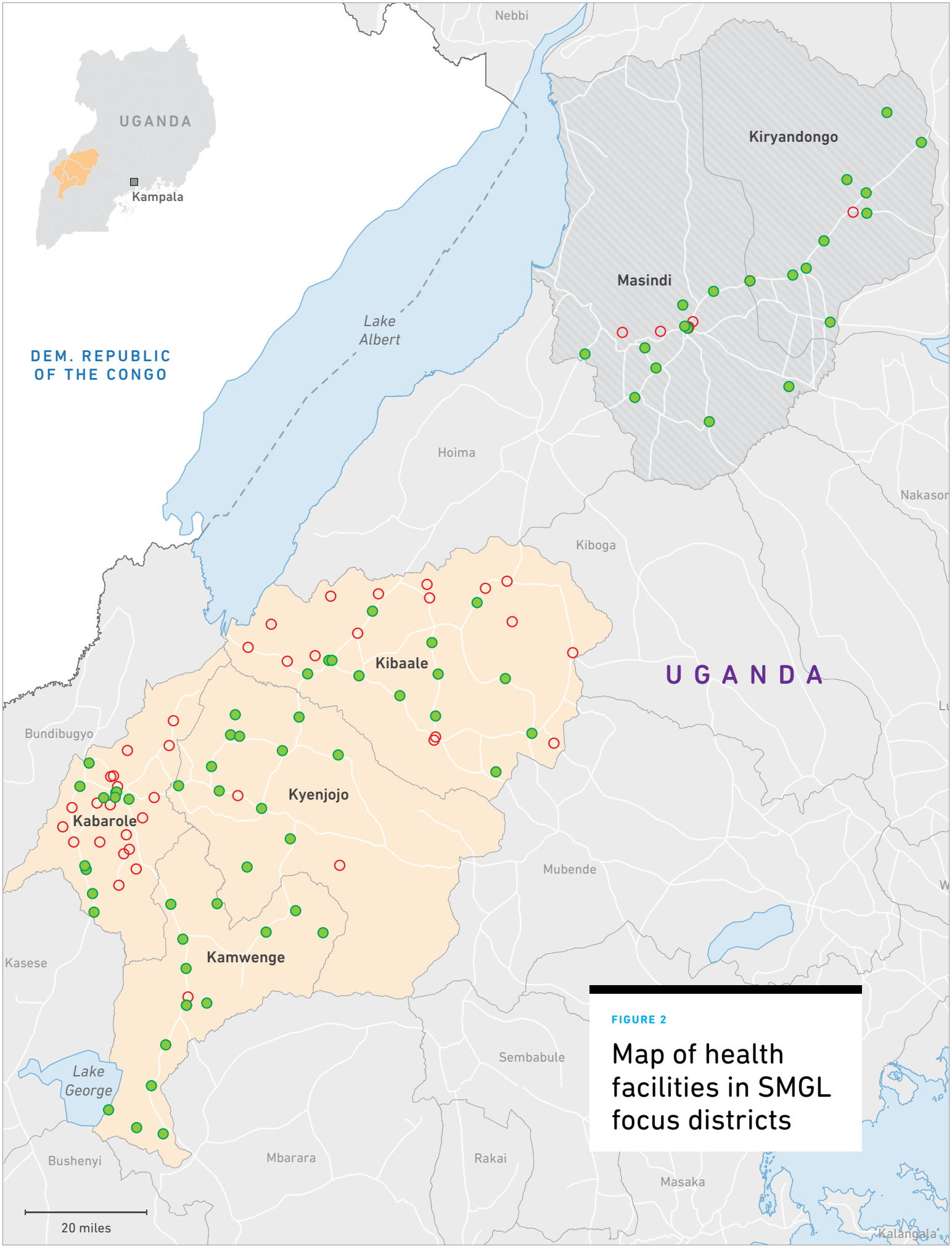
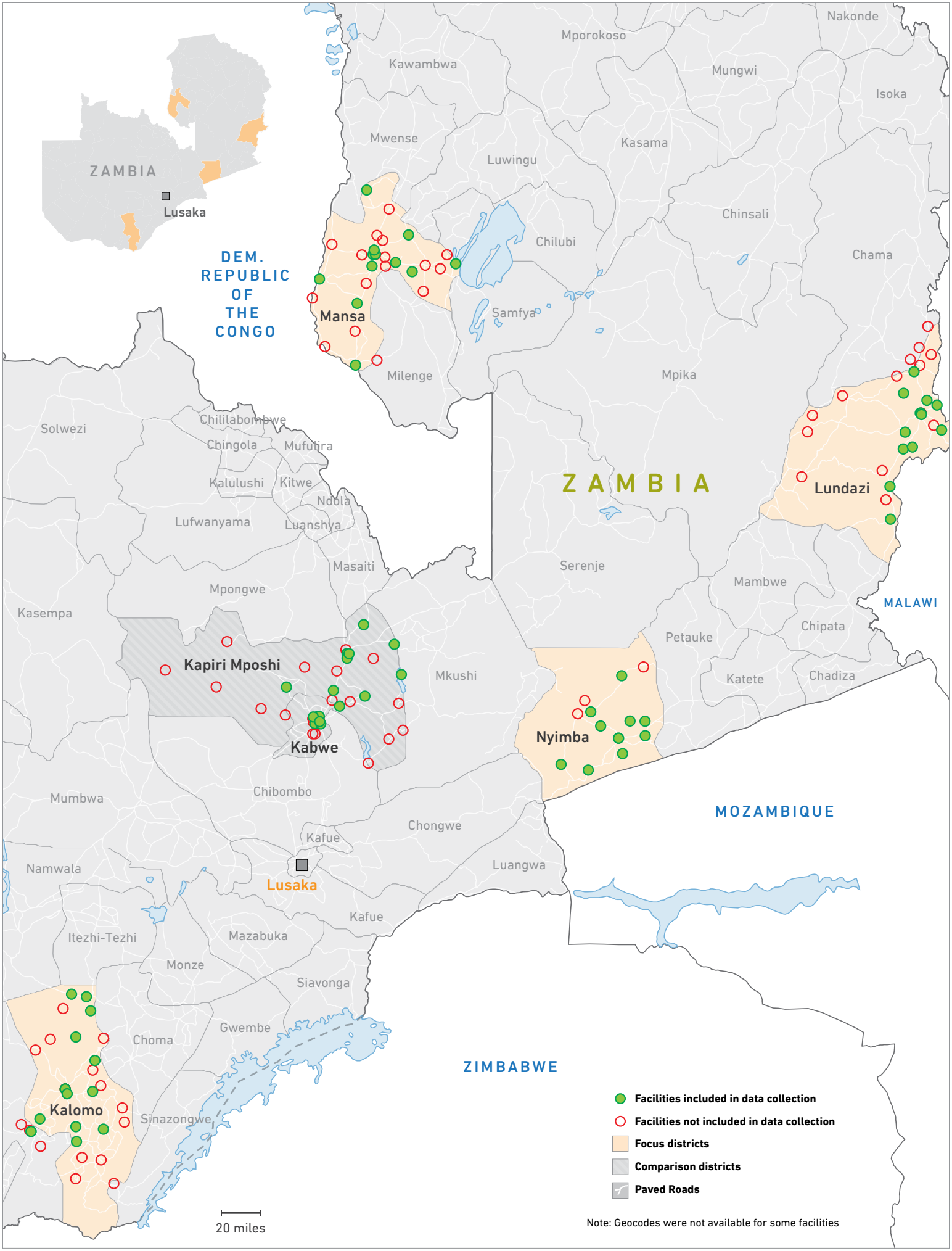


FIGURE 2

Map of health facilities in SMGL focus districts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Mambwe
MALAWI
Kasempa
Chipata
Petauke
Kapiri Mposhi
Mkushi
Katete
Chadiza
Nyimba
Kabwe
Chibombo
Mumbwa
MOZAMBIQUE
Chongwe
Kafue
Namwala
Luangwa
Lusaka
Kafue
Itezhi-Tezhi
Mazabuka
Monze
Siavonga
Gwembe
Choma
ZIMBABWE
Kalomo
Sinazongwe
20 miles
Facilities included in data collection
Facilities not included in data collection
Focus districts
Comparison districts
Paved Roads
Note: Geocodes were not available for some facilities

iii. Data from SMGL and comparison districts

Table 2 shows the data collected from women, providers, community health workers and leaders who were the users and beneficiaries of SMGL. These data were used to inform the evaluation of the dose received, reach, fidelity, and dynamic effects of SMGL.

TABLE 2: Sample sizes for community, women, and provider data

	EXIT INTERVIEWS WITH POSTPARTUM WOMEN	PROVIDER SATISFACTION SURVEYS	PROVIDER KNOWLEDGE ASSESSMENTS	IN-DEPTH INTERVIEWS WITH FACILITY MANAGERS	FOCUS GROUP DISCUSSIONS WITH WOMEN LOCAL LEADERS AND CHWS
Uganda total	**1,241**	**710**	**328**	**41**	**40**
Kabarole	202	105	51	11	10
Kamwenge	190	116	50	10	10
Kibaale	192	111	50	10	10
Kyenjojo	206	103	50	10	10
Kiryandongo	202	132	56	N/A	N/A
Masindi	249	143	71	N/A	N/A
Zambia total	**1,247**	**557**	**327**	**40**	**40**
Kalomo	204	100	59	10	10
Lundazi	233	100	49	10	10
Mansa	204	105	66	10	10
Nyimba	202	52	47	10	10
Kabwe	206	100	53	N/A	N/A
Kapiri Mposhi	198	100	53	N/A	N/A
TOTAL	**2,488**	**1,267**	**655**	**81**	**80**

iv. Women's facility exit interviews

Exit interviews with women who had just delivered in health facilities were conducted to assess the reach of SMGL interventions and to compare women's perception of the quality of care in health facilities in SMGL versus non-SMGL districts. Using a structured questionnaire, demographic information was collected and women were asked which SMGL services they had used and about their satisfaction with and perceptions of the quality of care they received, as well as their suggestions for improvement. All instruments were translated, back translated, and pre-tested to ensure accuracy. Women's facility exit interviews were conducted in the Runyoro/Rutooro and Runyankole/Rukiga languages in Uganda and in Nyanja, Tonga, and Bemba in Zambia. Data were collected electronically using Galaxy Nexus™ tablets and SurveyCTO™ software. Exit interviews were conducted with 2,488 women in the two countries (1,241 in Uganda, 1,247 in Zambia).

To ensure the results represented an accurate depiction of delivery care in the district, in each district we selected 8 to 15 facilities that accounted for a majority of deliveries in the past year. We chose a mix of BEmONC and CEmONC facilities and public and private facilities (where applicable). Interviews were conducted in 67 facilities in Uganda and in 52 facilities in Zambia. All CEmONC facilities and all hospitals were included in the study as well as most of the larger BEmONC facilities. In Uganda, study facilities accounted for approximately 70% of all deliveries in the intervention districts, and 93% of all deliveries in the comparison districts based on the 2012 HMIS. In Zambia, study facilities accounted for 77% of all deliveries in the intervention districts and 56% of deliveries in comparison districts.

In both countries, participants in the exit surveys were broadly similar between

Data collectors practice an exit interview prior to data collection in Lundazi District, Zambia

intervention and comparison districts in terms of key demographics, namely, age, marital status, education, and occupation (Appendix D, Table D1). Statistical analyses controlled for these characteristics.

v. Health provider obstetric knowledge test and satisfaction survey

A multiple-choice test was used to assess knowledge of emergency obstetric and newborn care among health provider who were involved in maternal care (doctors, nurses, midwives) at facilities in SMGL versus non-SMGL districts. The assessment was a 60-question multiple-choice test on basic obstetric and neonatal care derived from an assessment developed by Jhpiego, and was given in English. A total of 655 health providers took the test (328 in Uganda, 327 in Zambia).

Structured surveys were used to assess job satisfaction, attrition intent, and provider confidence in clinical skills among facility health providers. Non-maternal care providers were included in this survey to permit assessment of spillover effects—positive or negative—on health providers not targeted by SMGL. Satisfaction surveys were administered to 1,267 health providers (710 in Uganda, 557 in Zambia). The survey was conducted in English.

Providers in intervention and comparison districts in each country were broadly similar in terms of their professional cadres, educational backgrounds, and facilities (Appendix D, Table D2). A majority of survey participants were enrolled nurses or enrolled midwives. In Uganda, 60% of respondents in intervention districts were permanent employees, compared to 90% of respondents in comparison districts. Respondents in Ugandan intervention districts were also slightly younger, on average, than their comparison district counterparts, and had fewer years of experience. These differences were likely driven by the presence of new health providers on temporary contracts hired by SMGL. In Zambia, there were no significant differences between providers in intervention and comparison districts. Participant characteristics were included as confounders in all statistical models.

vi. In-depth interviews with facility managers

To gain insight into the fidelity of SMGL in improving obstetric care in facilities, 10 in-depth interviews were conducted with facility managers familiar with SMGL in each intervention district (11 in Kabarole; 81 total). Respondents were selected from facilities where provider surveys were conducted and at additional facilities in the district as necessary. The researchers only interviewed managers at facilities that had received support from SMGL. In-depth interviews with facility managers were conducted in English in both countries.

The majority (89%) of facility managers interviewed in each country (35 in Uganda, 36 in Zambia) were "in-charges" (e.g., maternity ward managers at larger facilities and general managers at smaller facilities), with small numbers being MCH Coordinators, Hospital Administrators, and Chief Medical Officers. Only a few managers were trained as doctors (5 in Uganda, 4 in Zambia), and the rest were nurses (8 in Uganda, 21 in Zambia), clinical officers (14 in Uganda, 6 in Zambia), or midwives (10 in Uganda, 6 in Zambia). Managers in Uganda were employed at their facilities for an average of 3.7 years, while in Zambia they were employed for an average of 4.5 years. Most (75%) worked at BEmONC facilities (27 in Uganda, 33 in Zambia) (Appendix D, Table D3).

Interviews with facility managers explored, among other things, the effect of SMGL on provider workload, provider morale and motivation, the quality of care provided to women at their facilities, managers' perceptions of SMGL successes and limitations at their facilities, and managers' views on remaining challenges to safe motherhood in the districts.

vii. Focus group discussions

Focus group discussions (FGDs) were conducted to provide assessments of community experiences of SMGL. A total of 80 FGDs were held with the following: women who recently (within the last year) delivered at home (3 FGDs/district), women who recently delivered at a health facility (3 FGDs/district), community health workers (2 FGDs/district), and local leaders (2 FGDs/district). In order to reach a broad cross-section of women with better and worse access to advanced health facilities, participants were sampled from locations of varying distances from the district capital or district/regional hospital: women who lived near, at a medium distance, and far from the capital. Focus group guides were translated, back translated, and pre-tested prior to use. Focus group discussions were audio-recorded, transcribed, and translated into English.

A total of 393 women with recent home and facility deliveries participated in the focus group discussions (192 in Uganda, 201 in Zambia). The average age among women with facility deliveries across the two countries was 25.3 years while among women with recent home deliveries it was 27.3 years. Most women (91%) were married or cohabiting, were employed as farmers (82%), and were multiparous (Appendix D, Table D4).

A total of 119 community health workers participated in focus group discussions (54 in Uganda, 65 in Zambia). Over half (56%) of community health workers in Zambia were female, while in Uganda more were male (54%). The average age of community health workers was 39.7 years in Uganda and 43.9 years in Zambia; and across the two countries most had lived in their current villages for an average of 27.6 years (Appendix D, Table D5).

A total of 105 local leaders participated in the focus group discussions (50 in Uganda, 55 in Zambia). In Zambia, most were traditional leaders (n=26), while in Uganda most were Local Council members (n=23). In both countries, a few of the participants were religious leaders (3 in Uganda, 5 in Zambia). The majority of local leaders in both countries were male (72% in Uganda, 78% in Zambia). The average age of local leaders was 46.5 years in Uganda and 51.4 years in Zambia (Appendix D, Table D6).

Focus group discussion with women in Kabarole District, Uganda

2.5 Data management and analysis

Qualitative data (in-depth interviews and FGDs) were entered, cleaned, and analyzed using the NVivo Software Package (Version 10). Audio recordings from in-depth interviews with facility managers, stakeholders, and global partners were transcribed verbatim. Those from focus group discussions were translated to English from the local language and transcribed by bilingual research assistants and reviewed for completeness by the respective principal investigators in each country. Data were then coded by question. The research team used content analysis to analyze data from in-depth interviews and focus group discussions.[7] Team members met regularly to discuss and reach consensus on data interpretation. Issues that were unclear were clarified by in-country research partners to ensure accuracy.

Quantitative data (from exit interviews and provider surveys) were entered, cleaned, and analyzed using STATA statistical analysis package (Version 12). Further detail on regression analyses is presented in Section 5.

3
Dose delivered

SECTION SUMMARY

- In Zambia and Uganda, health worker trainings, community mobilizations by village health teams (VHTs) and Safe Motherhood Action Groups (SMAGs), and "Mama Kit/Pack" distribution were among the most extensively implemented activities in the first year.
- Uganda made large investments in hiring health workers, substantially increasing the number of physicians and nurses in SMGL districts.
- Both countries upgraded a number of clinics to BEmONC; Uganda also increased the number of CEmONC facilities.
- Key remaining challenges identified by stakeholders included: persisting human resource shortages, inadequate infrastructure, and ongoing transportation difficulties.

3.1 Dose delivered to districts

Dose delivered data are counts of specific SMGL inputs and activities received by districts by a particular time point. We collected dose delivered data to measure the extent to which SMGL activities were implemented at district level. Table 3 presents the dose delivered for the first six months, the second six months, and the cumulative one-year total for each country. Understanding which program activities were actually implemented is critical to an understanding of outcomes, and helps to identify the "active ingredients" of program success; activities that are not implemented cannot affect results.

Using the logic model developed for Wave 1 (Appendix C), the research team collected data on tracer indicators reflecting performance in each of the 28 SMGL intervention activities. We categorized these activities into four dimensions: demand, access, quality, and health system strengthening (i.e., DAQS framework). Data were collected at 6 and 12 months into SMGL implementation. The 6-month data were collected in December 2012 and the 12-month data in June 2013, to coincide with the original end-point of Phase 1 (May 31, 2013). The tracer indicators were selected from an initial set of over 200 indicators based on: 1) the extent to which the variable was representative of the activity; 2) availability of data across all districts for the variable; and 3) the reliability of the available data. In Wave 2, we collected data for 41 tracer indicators in Uganda and 39 in Zambia; data were vetted with SMGL implementing partners to ensure accuracy.

Mothers' shelter next to Kagadi Hospital in Kibaale District, Uganda

In Uganda, the activities implemented in SMGL's first year included:

- **Demand**-related activities consisted of training and mentoring just over 4,000 Village Health Team (VHT) members between June 2012 and June 2013. During the same period, 15,655 Mama Kits (consisting of gauze, cotton wool, razor blades, disposable tetracycline eye ointment, disposable gloves, umbilical cord tie, soap, polyethylene sheeting, child growth card, polythene bag for keeping records, syringes, baby shawl, baby sheets) were distributed.

Uganda

COMBINED DISTRICT POPULATION: 1,750,000

		409,400			324,400			646,500			369,700			
		KABAROLE			KAMWENGE			KIBAALE			KYENJOJO			ALL
	ACTIVITY / TRACER INDICATOR	JUN-NOV	DEC-MAY	TOTAL	JUN-NOV	DEC-MAY	TOTAL	JUN-NOV	DEC-MAY	TOTAL	JUN-NOV	DEC-MAY	TOTAL	TOTAL
DEMAND	**PROMOTE FACILITY DELIVERY** / VHT members trained	750	64	**814**	624	0	**624**	1,912	0	**1,912**	718	8	**726**	4,076
DEMAND	**PROMOTE FACILITY DELIVERY** / VHT mentorship meetings held	N/A	144	**144**	N/A	139	**139**	N/A	*	*	N/A	100	**100**	383 §
DEMAND	**RUN MASS MEDIA CAMPAIGNS** / Radio spots broadcast (# of times)	***	151	***	***	1,860	***	***	1,625	***	***	5,119	***	36,146
DEMAND	**ENGAGE COMMUNITY DRAMA GROUPS** / Drama skits conducted	***	24	***	***	60	***	***	0	***	***	117	***	701
DEMAND	**PROVIDE BIRTH SUPPLIES TO WOMEN** / Mama Kits distributed	3,707	1,223	**4,930**	5,021	585	**5,606**	0	0	**0**	4,137	982	**5,119**	15,655
ACCESS	**INCREASE EmONC CAPACITY** / Facilities upgraded to BEmONC	6	0	**6**	2	12	**14**	0	0	**0**	3	13	**16**	36
ACCESS	**INCREASE EmONC CAPACITY** / Facilities upgraded to CEmONC	3	0	**3**	2	0	**2**	5	0	**5**	1	0	**1**	11
ACCESS	**EXPAND/REFURBISH FACILITIES** / Improved maternity wards	10	0	**10**	2	2	**4**	4	4	**8**	1	0	**1**	23
ACCESS	**EXPAND/REFURBISH FACILITIES** / Improved pharmacies	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0
ACCESS	**EXPAND/REFURBISH FACILITIES** / Improved labs	0	0	**0**	0	0	**0**	0	0	**0**	0	2	**2**	2
ACCESS	**RENOVATE MOTHERS' SHELTERS** / Renovated mothers' shelters	0	0	**0**	0	0	**0**	4	1	**5**	0	0	**0**	5
ACCESS	**RENOVATE MOTHERS' SHELTERS** / Shelters under renovation	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0
ACCESS	**BUY VEHICLES** / Vehicle ambulances provided	2	2	**4**	2	0	**2**	2	0	**2**	1	0	**1**	9
ACCESS	**BUY VEHICLES** / Motorcycle ambulances provided (E-Rangers)	3	0	**3**	3	0	**3**	8	0	**8**	2	0	**2**	16
ACCESS	**BUY VEHICLES** / Other vehicles provided	0	0	**0**	0	0	**0**	0	0	0	0	0	**0**	0
ACCESS	**VOUCHERS TO INCREASE ACCESS** / Baylor vouchers to women	17,192	4,873	**22,065**	5,340	3,998	**9,338**	0	0	0	7,360	5,030	**12,390**	43,793
ACCESS	**VOUCHERS TO INCREASE ACCESS** / Baylor vouchers redeemed	8,649	5,906	**14,555**	2,207	5,145	**7,352**	0	0	0	4,128	3,401	**7,529**	29,436
ACCESS	**VOUCHERS TO INCREASE ACCESS** / Healthy baby vouchers to women	**10,887** (Dec 1, 2012 – May 31, 2013)												27,518
ACCESS	**VOUCHERS TO INCREASE ACCESS** / Healthy baby vouchers redeemed	*												*
ACCESS	**VOUCHERS TO INCREASE ACCESS** / Other vouchers given	0	0	**0**	0	0	**0**	0	0	0	***	***	**6,219**	6,219
ACCESS	**VOUCHERS TO INCREASE ACCESS** / Private facilities in program	***	12	***	***	11	***	***	8	***	***	12	***	85
ACCESS	**BUY EmONC EQUIPMENT** / Facilities receiving EmONC equipment	37	9	**46**	26	7	**33**	0	0	0	26	6	**32**	111
QUALITY	**HIRE PROVIDERS WITH MoH** / New doctors hired	5	0	**5**	3	0	**3**	9	1	**9†**	4	3	**7**	24
QUALITY	**HIRE PROVIDERS WITH MoH** / New nurses hired	0	0	**0**	0	0	**0**	0	0	**0**	20	0	**20**	20
QUALITY	**HIRE PROVIDERS WITH MoH** / New midwives hired	19	0	**19**	12	9	**12†**	48	9	**57**	15	0	**15**	103
QUALITY	**TRAIN PROVIDERS IN EmONC** / Providers trained	90	18	**108**	44	27	**71**	29	53	**82**	14	41	**55**	316
QUALITY	**TRAIN PROVIDERS IN EmONC** / Doctors trained in OB surgery	7	0	**7**	3	0	**3**	0	12	**12**	5	0	**5**	27
QUALITY	**TRAIN IN NEWBORN RESUSCITATION** / Providers trained	90	13	**103**	44	27	**71**	29	4	**33**	60	41	**101**	308
QUALITY	**TRAIN ON MATERNAL DEATH REVIEWS** / Providers trained	12	15	**27**	8	13	**21**	29	33	**62**	10	13	**23**	133
QUALITY	**PROVIDE ESSENTIAL MEDS** / Facilities receiving essential meds			**37**			**26**			*			**26**	89 §
QUALITY	**MENTOR PROVIDERS** / Providers mentored (DHT & IP)	120	73	**193**	110	44	**154**	41	67	**108**	*	59	**59**	514
QUALITY	**MENTOR PROVIDERS** / Providers mentored (AOGU)	93	25	**118**	94	77	**171**	*	*	*	58	97	**155**	444 §
STRENGTHENING	**IMPROVE SUPPLY CHAINS** / Workers trained in supply chain	7	35	**42**	0	6	**6**	30	4	**34**	14	3	**17**	99
STRENGTHENING	**BUILD HEALTH TEAM CAPACITY** / SMGL coordinators in district	1	0	**1**	1	0	**1**	1	0	**1**	1	0	**1**	2‡
STRENGTHENING	**TRAIN IN DATA COLLECTION AND HIS** / Staff trained	73	0	**73**	38	80	**118**	11	58	**69**	40	0	**40**	300
STRENGTHENING	**TRAIN IN DATA COLLECTION AND HIS** / Facilities enrolled: DHIS2**			**55**			**14**			**71**			**27**	167
STRENGTHENING	**STRENGTHEN FACILITIES** / Blood banks in district	1	0	**1**	0	1	**1**	0	0	**0**	1	0	**1**	3
STRENGTHENING	**STRENGTHEN FACILITIES** / Blood bank refrigerators provided	1	0	**1**	1	0	**1**	4	0	**4**	2	0	**2**	8
STRENGTHENING	**STRENGTHEN FACILITIES** / Plasma freezers provided	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0
STRENGTHENING	**STRENGTHEN FACILITIES** / Refrigerated centrifuges provided	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0
STRENGTHENING	**STRENGTHEN FACILITIES** / Staff trained in blood safety	*	0	*	*	0	*	*	22	**22**	*	0	*	22 §

* Data not available.

** Only District Health Offices and 5 hospitals (not included in number enrolled) in all 4 districts have direct access to DHIS2. All other facilities report data to DHOs for data entry

*** Data only avaialble at aggregate level, which is reflected in total.

† Total is unchaged because staff hired in second six months were replacement staff.

‡ Same SMGL coordinator for 3 SMGL districts (Kabarole, Kamwenge, & Kyenjojo)

§ Total for available data.

Zambia

COMBINED DISTRICT POPULATION: 887,711

	ACTIVITY / TRACER INDICATOR	KALOMO 254,211			LUNDAZI 314,281			MANSA 217,603			NYIMBA 101,616			ALL
		JUN-NOV	DEC-MAY	TOTAL	JUN-NOV	DEC-MAY	TOTAL	JUN-NOV	DEC-MAY	TOTAL	JUN-NOV	DEC-MAY	TOTAL	TOTAL
DEMAND	**PROMOTE FACILITY DELIVERY** / SMAG members trained	250	300	**550**	160	158	**318**	450	20	**470**	150	60	**210**	1,548
	PROMOTE FACILITY DELIVERY / SMAGs trained	10	0	**10**	6	15	**21**	21	3	**24**	5	7	**12**	67
	IMPROVE BIRTH PREPAREDNESS / Birth plans distributed	50,000	4,000	**54,000**	46,000	38,779	**84,779**	56,000	5,150	**61,150**	31,000	5,554	**36,554**	236,483
	PRODUCE SAFE MOTHERHOOD DOCUMENTARY / Documentary airings	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0
	RUN MASS MEDIA CAMPAIGNS / Radio spots broadcast (# of times)	0	1,269	**1,269**	0	1,269	**1,269**	0	1,269	**1,269**	0	0	**0***	3,807
	ENGAGE COMMUNITY DRAMA GROUPS / Drama skits conducted	0	0	**0**	0	0	**0**	0	0	**0**	0	6	**6**	6
	ENGAGE COMMUNITY INFLUENCERS / Change Champions trained	25	0	**25**	25	0**	**25**	22	0	**22**	17	4**	**21**	93
	PROVIDE BIRTH SUPPLIES TO WOMEN / Mama Packs distributed	0	0	**0**	0	1,403	**1,403**	0	0	**0**	0	624	**624**	2,027
ACCESS	**INCREASE EmONC CAPACITY** / Facilities upgraded to BEmONC ‡	28	0	**28**	34	0	**34**	0	26	**26**	6	0	**6**	94
	INCREASE EmONC CAPACITY / Facilities upgraded to CEmONC ‡	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0
	EXPAND/REFURBISH FACILITIES / Improved maternity wards	0	0	**0**	0	0	**0**	0	11	**11**	0	0	**0**	11
	EXPAND/REFURBISH FACILITIES / Improved pharmacies	0	0	**0**	0	0	**0**	0	0	**0**	1	0	**1**	1
	EXPAND/REFURBISH FACILITIES / Improved labs	0	0	**0**	0	0	**0**	0	0	**0**	0	2	**2**	2
	RENOVATE MOTHERS' SHELTERS / Renovated mothers' shelters	0	0	**0**	0	0	**0**	0	11	**11**	0	0	**0**	11
	BUY VEHICLES / Vehicle ambulances provided	1	0	**1**	1	0	**1**	3	0	**3**	0	0	**0**	5
	BUY VEHICLES / Motorcycle ambulances provided	0	0	**0**	0	0	**0**	12	0	**12**	0	2	**2**	14
	BUY VEHICLES / Other vehicles provided	3	0	**3**	0	0	**0**	0	0	**0**	0	43	**43**	46
	BUY EmONC EQUIPMENT / Facilities receiving EmONC equipment			**34**			**39**			**30**			**19**	122
QUALITY	**HIRE PROVIDERS WITH MoH** / New doctors hired	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0
	HIRE PROVIDERS WITH MoH / New nurses hired	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0
	HIRE PROVIDERS WITH MoH / New midwives hired	12	0	**12**	0	0	**0**	0	7	**7**	0	0	**0**	19
	TRAIN PROVIDERS IN EmONC / Providers trained	38	0	**38**	40	0	**40**	80	20	**100**	21	0	**21**	199
	TRAIN ON NEWBORN RESUSCITATION / Providers trained	22	0	**22**	24	0	**24**	100	20	**120**	22	0	**22**	188
	TRAIN ON RAPID SYPHILIS TESTING (RST) / Providers trained	31	0	**31**	50	0	**50**	35	0	**35**	26	0	**26**	142
	TRAIN ON RST / Providers in refresher training	20	26	**46**	36	36	**72**	40	0	**40**	32	36	**68**	226
	TRAIN ON MATERNAL DEATH REVIEWS / Providers trained	0	0	**0**	0	0	**0**	3	22	**25**	9	8	**17**	42
	PROVIDE ESSENTIAL MEDS / Facilities receiving essential meds	†	†	**†**	†	†	**†**	†	†	**†**	†	†	**†**	†
	MENTOR PROVIDERS / Providers mentored	***	151	**151**	14	5	**19**	30	80	**110**	15	7	**22**	302
STRENGTHENING	**IMPROVE SUPPLY CHAINS** / Workers trained in supply chain	54	0	**54**	56	7	**63**	49	0	**49**	28	2	**30**	196
	BUILD HEALTH TEAM CAPACITY / SMGL coordinators in district	1	1	**1**	1	1	**1**	1	1	**1**	1	1	**1**	4
	BUILD HEALTH TEAM CAPACITY / Staff trained in CHW supervision	13	0	**13**	0	0	**0**	3	0	**3**	26	2	**28**	44
	TRAIN ON SMARTCARE / Computers provided to facilities	35	0	**35**	39	0	**39**	30	0	**30**	17	0	**17**	121
	TRAIN ON SMARTCARE / Staff trained	74	0	**74**	53	0	**53**	78	5	**83**	46	0	**46**	256
	TRAIN ON SMARTCARE / Staff in refresher training	33	17	**50**	40	15	**55**	30	21	**51**	17	17	**34**	190
	STRENGTHEN FACILITIES / Blood banks in district	1	1	**1**	0	1	**1**	1	1	**1**	1	1	**1**	4
	STRENGTHEN FACILITIES / Blood bank refrigerators provided	1	0	**1**	0	1	**1**	0	1	**1**	0	1	**1**	4
	STRENGTHEN FACILITIES / Plasma freezers provided	1	0	**1**	0	1	**1**	0	1	**1**	0	1	**1**	4
	STRENGTHEN FACILITIES / Refrigerated centrifuges provided	0	0	**0**	0	0	**0**	0	1	**1**	0	1	**1**	2
	STRENGTHEN FACILITIES / Staff trained in blood safety	0	0	**0**	0	0	**0**	0	2	**2**	5	0	**5**	7

TABLE 3:

"Dose delivered": SMGL activities implemented in districts throughout Phase 1

* Nyimba has not had any radio spot broadcast, due to challenges in radio reception

** Existing Change Champions were mentored

*** Data not available

† All facilities received essential medications through EMLIP

‡ These numbers were provided by district health offices and implementing partners, however further information shows that many of these facilities cannot perform vacuum assisted delivery, one of the 7 BEmONC signal functions

- In an effort to increase **access**, facility refurbishments and additions were implemented mainly in the first six months, while voucher distribution continued throughout the year. Between December 2012 and June 2013, one implementing partner sold 13,901 vouchers, which included the sale of "boda boda" (motorcycle) vouchers and private service vouchers, while another implementing partner sold 10,887 "Healthy Baby" vouchers in the same period. Construction of mothers' shelters took place in only one of the four districts (Kibaale), with five shelters completed in the first year. However, inputs from the district government, (e.g., provision of electricity and water), had not been completed by the year's end, limiting utilization.

- The majority of activities aimed at improving **quality** (e.g., hiring new doctors, nurses, and midwives and providing training in EmONC and newborn resuscitation) occurred in the first six months. In the first year as a whole, 24 doctors and 123 nurses and midwives were hired, dramatically increasing the health provider pool. The CEmONC capacity in SMGL districts more than doubled under SMGL with 11 facilities receiving operating theaters. In the second six months, a strong focus on training and mentorship continued; of the 316 health providers trained in EmONC, 139 health providers were trained in the second half of the year.

- **Health system strengthening** activities included training of health providers in data collection and health information systems with a total of 300 health providers trained throughout the year, 138 of these trained in the second six months. Biostatisticians at the district MoH level were trained in the use of DHIS2, a new electronic health information system introduced in the four SMGL districts.

"[With EmONC training, health workers] are able to identify at-risk mothers, they are able to deal with emergencies and stabilize quickly before they refer to the next level."

— CENTRAL LEVEL IMPLEMENTING PARTNER, ZAMBIA

In Zambia, activities implemented during the first year of SMGL included:

- **Demand** creation activities centered on training 1,548 Safe Motherhood Action Group (SMAG) members throughout the year; of these, 538 were trained in the second six months. Lundazi saw the continued distribution of "Mama Packs" (containing cloth diapers, diaper fasteners, traditional *chitenge* cloth, laundry bars, bath soap, and baby hat), Nyimba District received its first Mama Packs in May 2013 and Mansa and Kalomo Districts did not receive any in the first year of SMGL. Existing "Change Champions" were mentored in two districts (Nyimba and Lundazi) with Nyimba being the only district to have additional Change Champions trained between December 1, 2012 and May 31, 2013. One implementing partner created and implemented SMGL radio spots and programs in the second half of SMGL, with 3,807 radio spots on maternal health aired.

- Activities dedicated to improving **access** to health services focused on BEmONC upgrades to 94 facilities across all four districts and the renovation of 11 mothers' shelters in Mansa district throughout the year. There were no facilities upgraded to CEmONC capacity in any of the four districts during the first year. With regard to transport, Kalomo and Mansa received SMGL vehicles in the first six months; Nyimba did not receive any vehicle ambulances and Lundazi was still waiting for an additional two vehicle ambulances to add to the one received in the first six months.

SMAG member and pregnant woman at facility in Lundazi District, Zambia

- **Quality**-related activities focused on training of health providers and were significantly front-loaded in the first six months of the program. Every district trained providers in EmONC and Helping Babies Breathe (HBB), and implementing partners provided intensive onsite mentorship to health providers in all four districts throughout the year, but most notably in Kalomo and Mansa. In terms of increasing the health workforce, SMGL facilitated the recruitment of 7 new midwives in Mansa and 12 new midwives in Kalomo district.

- Activities dedicated to **health system strengthening** concentrated on supply chain management and SmartCare training, and were implemented more during the first six months. In the second half of the year, a blood bank refrigerator and plasma freezer were procured for each district hospital and SmartCare refresher courses were provided to 70 health care workers.

Funding flows and logistical challenges influenced the timing and intensity with which activities were implemented in each country. In Uganda, implementing partners received full funding at program launch and spent funds quickly; the geographic accessibility of SMGL districts from the capital and their contiguous nature facilitated more rapid implementation. In Zambia, some implementing partners faced funding delays and/or interruptions and the long distances between the non-contiguous SMGL districts made implementation challenging. Stakeholders in Uganda and Zambia generally described the second six months of SMGL implementation as being more "settled" than the first as the busy start-up period was largely completed and most project systems and processes were in place. Implementing partners, in particular, noted that the first six months had felt "chaotic" and "rushed," but that they were able to focus more on program implementation during the second half of the year. They also reported that coordination of partners had improved substantially. Uncertainty regarding Phase 2 funding grew during the second half of the project year and implementing partners and MoH officials in both countries expressed anxiety about program sustainability. This uncertainty affected perception and quality of services delivered. In Uganda there were threatened strikes and low morale among SMGL health providers.

"When we were beginning SMGL, I was very skeptical…I didn't know the magic of turning around mothers' attitudes from traditional birth attendants to come and deliver at the facilities."

— DISTRICT HEALTH OFFICER, UGANDA

3.2 Implementers' assessment of Phase 1

SMGL IMPLEMENTATION SUCCESSES IN PHASE 1

To identify implementation successes, we asked 60 SMGL implementers and policymakers (34 in Uganda and 26 in Zambia) for their views on the "top three most successful SMGL activities implemented in Phase 1." Respondents included USG members, implementing partners, providers, and Ministry of Health officials. As illustrated in Figure 3, the three most frequently mentioned implementation successes were investments in **human resource strengthening** (i.e., health provider recruitment, training, and mentorship), **demand creation** via the efforts of VHTs/SMAGs, and **facility improvements**.

Research team with IDI staff in Kibaale District, Uganda

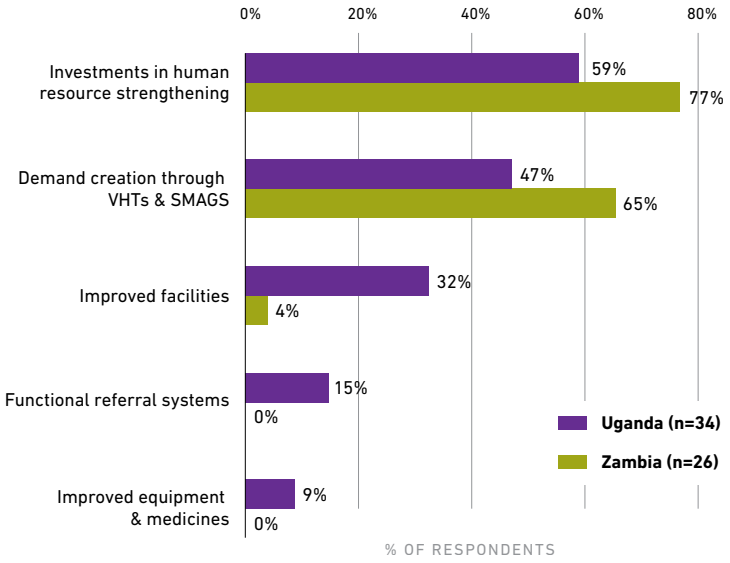
Investments in human resource strengthening (recruitment, training, and mentorship)

The recruitment of additional health staff (mainly in Uganda) and training and mentorship of health staff (in both countries) were mentioned the most in each country (by 59% of respondents in Uganda and 77% in Zambia). Respondents

observed that these investments substantially improved the skills of health providers, the overall quality of services provided at health facilities, and women's confidence in providers and the health care system, more generally. In Uganda, respondents highlighted the importance of the mentorship program in improving staff capabilities, while in Zambia, respondents highlighted the importance of EmONC and HBB trainings. Respondents in Zambia commended the inclusion of non-MCH health workers in the EmONC and HBB training, and explained that these cadres could now be relied upon to provide appropriate assistance during obstetric emergencies.

FIGURE 3: Stakeholder perspectives on the top three most successful activities implemented in Phase 1

What would you consider to be the top three most successful activities implemented by SMGL in Phase 1 and why?



Demand creation via VHTs and SMAGs

The second most frequently mentioned implementation success was the demand creation and community mobilization activities undertaken by the VHTs and SMAGs. These were mentioned by 47% and 65% of respondents in Uganda and Zambia, respectively. Respondents felt strongly that facility deliveries would not have increased without the awareness-raising and mobilization done by VHTs and SMAGs. VHTs and SMAGs were felt to have successfully changed negative community attitudes concerning facility deliveries, particularly those of mothers. In Zambia, respondents explained that SMAG members assisted in the identification and referral of complications during pregnancy and home deliveries. Respondents in both countries noted that the VHTs and SMAGs had been instrumental in collecting data on maternal deaths that occurred in the communities, and had thus contributed to the strengthening of health information systems at the district level.

Facility improvements (Uganda)

The third most frequently mentioned successful SMGL activity implemented in Phase 1 was facility improvements. This was mentioned by approximately one-third of respondents in Uganda (32%) and by a small minority (4%) in Zambia. Respondents in Uganda highlighted the positive effect of facility upgrades, particularly the upgrading of operating theaters, which they said permitted facilities to provide comprehensive emergency obstetric care. A central-level implementing partner in Uganda explained that it was gratifying to "see facilities that had theaters but never ever had performed a C-section suddenly being able to do C-sections and the community gaining confidence in that." Respondents in both countries appreciated that facilities had been equipped with more beds, were cleaner, and that supplies of essential drugs and blood had improved.

SMGL IMPLEMENTATION WEAKNESSES IN PHASE 1

To identify implementation weaknesses, we asked national stakeholders for their opinions on the "three least successful SMGL activities implemented in Phase 1." Interestingly, although respondents appreciated the substantial investments made by SMGL in human resource strengthening and facility improvements, they

"You can't have a BEmONC facility with no referral system and you can't have a referral system without a working transportation and connection system and you can't create demand without keeping up with supply."

— UGANDA UNITED STATES GOVERNMENT OFFICIAL

felt that major challenges remained in these two areas. Consequently, ongoing staff shortages and the slow pace of infrastructural improvements were among the top three "least successful" SMGL activities. The third was ongoing transportation challenges. These three activities were mentioned by over one-third of respondents per activity, the majority of whom were from Zambia (Figure 4). Many stakeholders in Uganda, however, interpreted the question more broadly as asking about the "challenges" faced in Phase 1, hence some of the most frequent responses given were "poor coordination of partners" and the "narrow focus of SMGL," rather than on specific SMGL activities. We report only on the latter.

Persisting human resource shortages

Over half (54%) of respondents in Zambia and a quarter (26%) of respondents in Uganda reported the need for additional health workers to meet the increased demand for facility delivery generated by SMGL. Respondents in Zambia also noted that staff at many facilities had not received any clinical skills training and that there was a subsequent shortage of providers trained in maternal and newborn care. Lack of staff housing was also said to be a barrier to recruiting and retaining skilled staff in the SMGL focus districts.

In Uganda, respondents highlighted ongoing challenges with staff retention and low morale among health workers. The perception that SMGL was "ending" on May 30, 2013, was said to have created confusion and uncertainty about the future of the program, particularly among SMGL-supported implementation staff. DHOs stated that they were having frequent meetings with central MoH officials, implementing partners, and their district health teams to strategize on next steps, in the event of SMGL termination. However, in an effort to ensure continuity of services, DHOs reported that they had asked some staff hired under SMGL to continue working beyond May 30, even with no salaries, until there was more clarity on the fate of the program. Most DHOs were hopeful that there would be a Phase 2 of SMGL and that, at a minimum, current staffing levels would be maintained. However, anxiety was expressed at all levels, particularly at the district health office and among district-level SMGL implementing partners.

Prior to publication of this report, an SMGL implementing partner in Uganda informed us two major developments regarding human resources that occurred after June 1, 2013. These were: (a) all medical officers hired by SMGL in Kabarole, Kamwenge, and Kyenjojo were transitioned to the government payroll and provided with a "top up" amount to maintain their SMGL salaries and; (b) the government absorbed approximately half of the SMGL midwives in these three districts and was paying them the same salaries they had earned as SMGL employees.

Inadequate health infrastructure (e.g., health facilities, mothers' shelters telecommunications)

Sixty-two percent of respondents in Zambia and 18% of respondents in Uganda noted the need for more infrastructural improvements. Zambian respondents highlighted the fact that expected renovations of mothers' shelters had only occurred in Mansa, which saw eleven shelters being refurbished. As discussed earlier in the dose delivered section, 94 Zambian health facilities were upgraded to BEmONC capacity in Phase 1 and none were upgraded to CEmONC capacity. The slow pace of facility improvements was mentioned by a variety of stakeholders in both countries. Dysfunctional radio systems at facilities and the lack of telephone network coverage were also mentioned as weaknesses by stakeholders in Zambia who noted that these made communication to a higher-level facility during obstetric emergencies nearly impossible.

"If you don't have a mothers' shelter, how do you convince a woman coming from a distant place to come to that facility? ...there is no balance between demand creation and what we are offering the mothers."

— ZAMBIA DISTRICT-LEVEL MINISTRY OF HEALTH OFFICIAL

Maternity ward in Nyimba District, Zambia

Respondents in Uganda lamented the lack of electricity and water, poor telephone network coverage, and poor blood supply management in many facilities. While acknowledging that infrastructural improvements "will take time," respondents in Uganda believed that "not enough" had been done in this area and that facility congestion remained a challenge, despite some improvements.

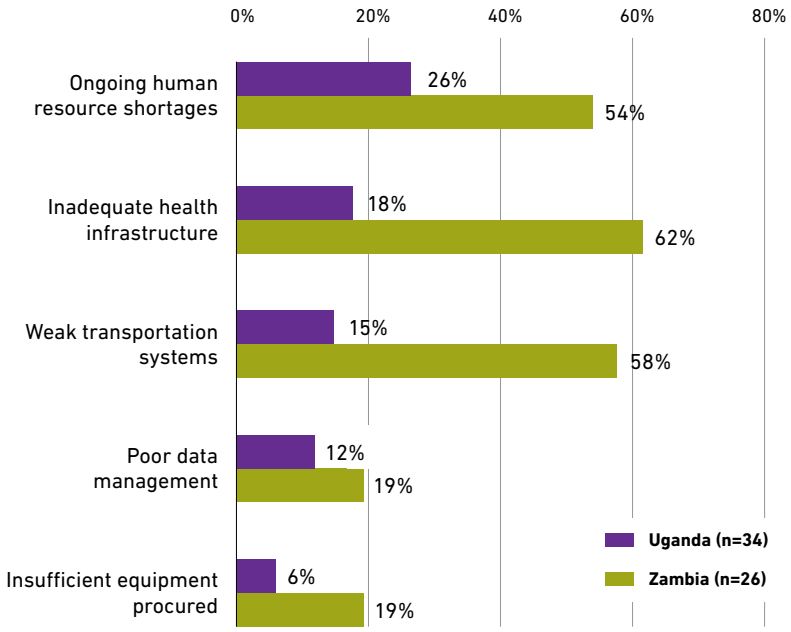
Weak transportation infrastructure

In Zambia, there was a high degree of frustration with the lack of progress in the transport domain, particularly among central and district Ministry of Health officials. Weak transportation infrastructure was the third most frequently mentioned (by 58% of Zambian respondents and 15% of Ugandan respondents) "least successful" activity implemented by SMGL in Phase 1. In Zambia, this reflects the fact that one district received no vehicle ambulances during the 12 months of Phase 1, while another district received only one of the three they were anticipating.

In Uganda, respondents at both central and district levels noted that emergency transport systems had been implemented, but expressed fear that they would be difficult to sustain post-SMGL. They also noted that E-Rangers (bicycle ambulances) were not ideal as emergency vehicles since they could not handle the terrain. One DHO reported that there have been two incidents where pregnant women fell off an E-Ranger.

FIGURE 4: Stakeholder perspectives on the three least successful activities implemented in Phase 1

What would you consider to be the three least successful activities implemented by SMGL in Phase 1 and why?



"Some of the most successful activities are also the least sustainable…for example, staffing of the health facilities, because there is no point in doing behavior change and trying to get people to come, and making a facility nice if there's nobody to staff it."

— UGANDA UNITED STATES GOVERNMENT OFFICIAL

4

Reach and uptake

SECTION SUMMARY

- In SMGL districts, nearly 90% of Ugandan women who delivered at health facilities had heard of SMGL; half of Zambian women had heard of SMGL.
- The most common sources of information about SMGL were radio in Uganda and SMAGs in Zambia, followed by health providers in both countries.
- More than half of women in SMGL districts used at least one SMGL intervention. Transport vouchers were used by 25% of respondents in Uganda; 31% of respondents in Zambia reported meeting with a SMAG member.
- Twice as many providers in SMGL districts received in-service obstetric training during the past year as their counterparts in non-SMGL comparison districts.

4.1 Dose received: awareness and use of SMGL interventions

Dose received represents the penetration of the program in communities and stakeholder participation in SMGL interventions. We assessed awareness and use of SMGL interventions in the community and especially among direct beneficiaries: pregnant women who were encouraged to use the enhanced obstetric services. To measure awareness of SMGL, the researchers investigated how SMGL was described locally and used that terminology in the interview. We further examined the uptake of training among health workers by the end of SMGL Year 1. Both qualitative and quantitative data informed this assessment.

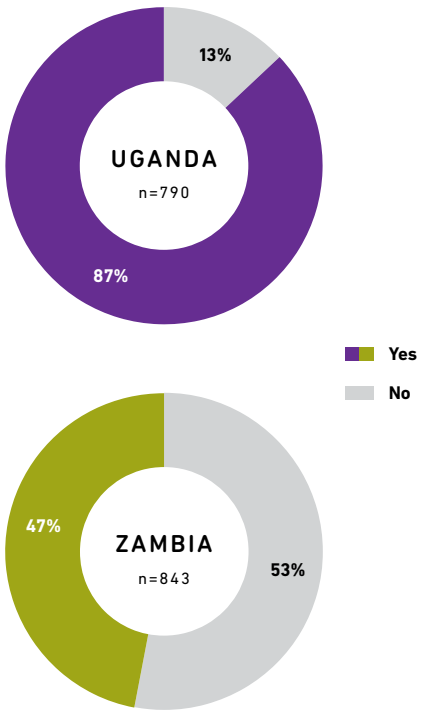
i. Women's awareness of SMGL

There was widespread awareness of SMGL in focus districts in both countries. In Uganda, 87% of women who completed exit interviews after delivery had heard of SMGL, while in Zambia 47% of respondents had heard of the program (Figure 5).

As Figure 6 shows, over half of women (58%) who had heard of SMGL in Uganda reported familiarity with transportation vouchers compared to only 3% of women in Zambia. The contrast is unsurprising, as the SMGL program in Zambia did not provide transportation vouchers. A majority of women (56%) who had heard of SMGL in Zambia reported familiarity with SMAGs compared to 14% who mentioned VHTs in Uganda. As Figure 7 shows, radio programs (45%) and SMAGs (47%) were the most commonly reported sources

FIGURE 5: Percent of women who had heard of SMGL

Exit survey: Have you heard of the Saving Mothers, Giving Life program? (Intervention districts only)



of SMGL information among women in Uganda and Zambia, respectively. Health providers were the second most commonly reported sources of SMGL information in both countries.

Our focus group discussion findings echoed the quantitative data. In Uganda, women in all 24 focus group discussions (i.e., those conducted with women with recent home and facility deliveries) were familiar with SMGL and could refer to a range of individual SMGL activities. The three most commonly reported sources of SMGL information among these women were radio programs, VHT members, and antenatal care (ANC) facility visits. In Zambia approximately half of women in the focus group discussions reported knowledge of SMGL, which they primarily associated with SMAGs. When asked where they had heard of SMGL, most women in Zambia mentioned SMAG members, ANC facility visits, and word of mouth.

SMAG member and pregnant women at antenatal care clinic in Lundazi District, Zambia

FIGURE 6: Women's awareness of SMGL components

Exit survey: If you have heard of SMGL, which of the following SMGL activities are you aware of or familiar with? (Intervention districts only)

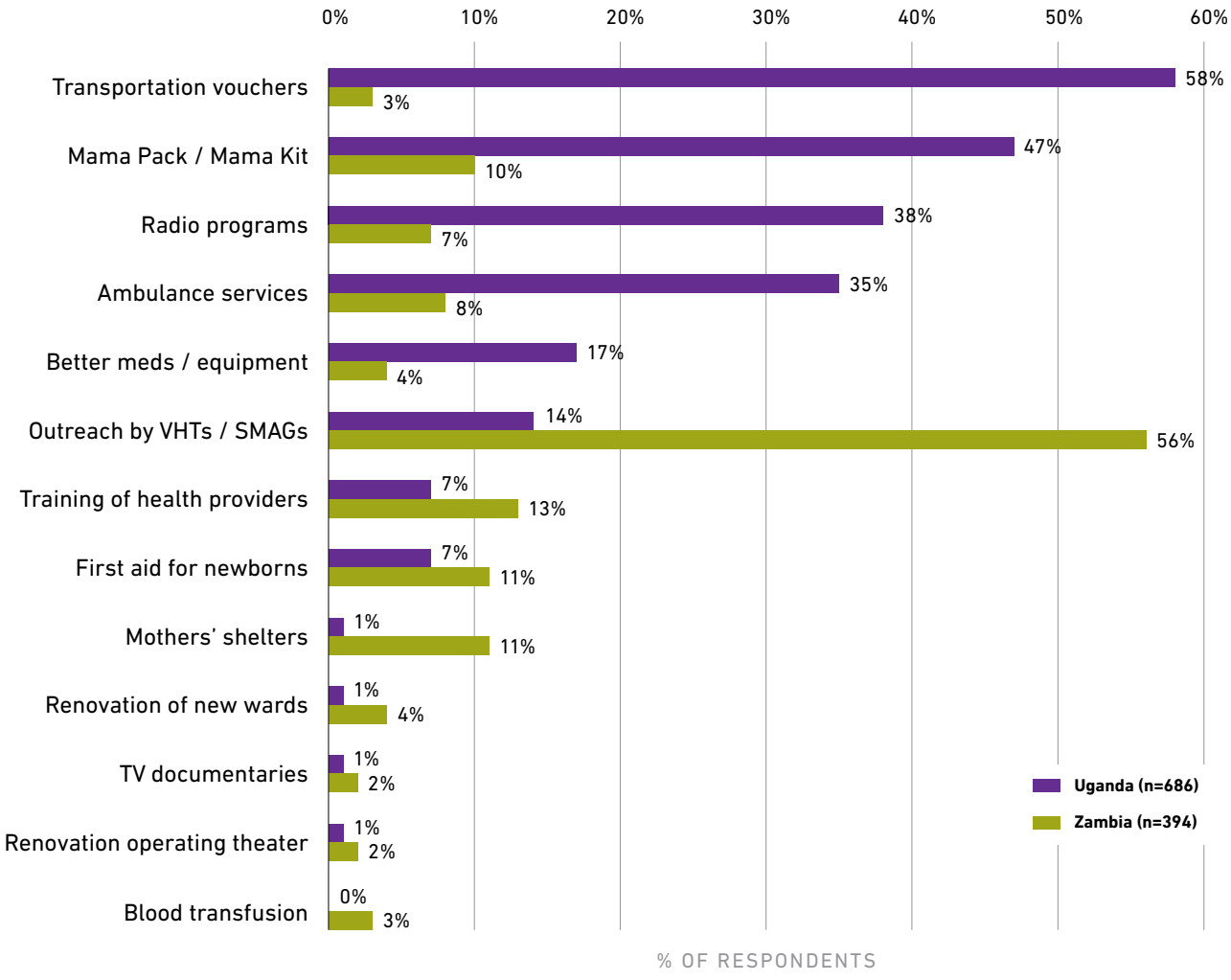
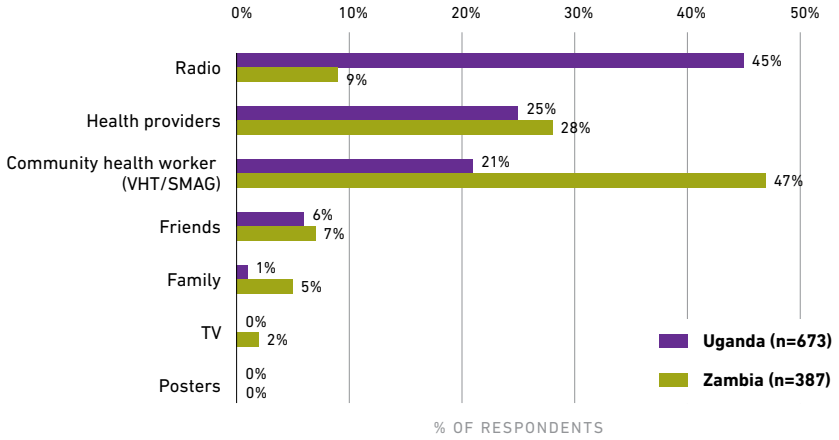


FIGURE 7: **Women's sources of SMGL information**

Exit survey: If you have heard of the SMGL program, where did you hear about it? (Intervention districts only)

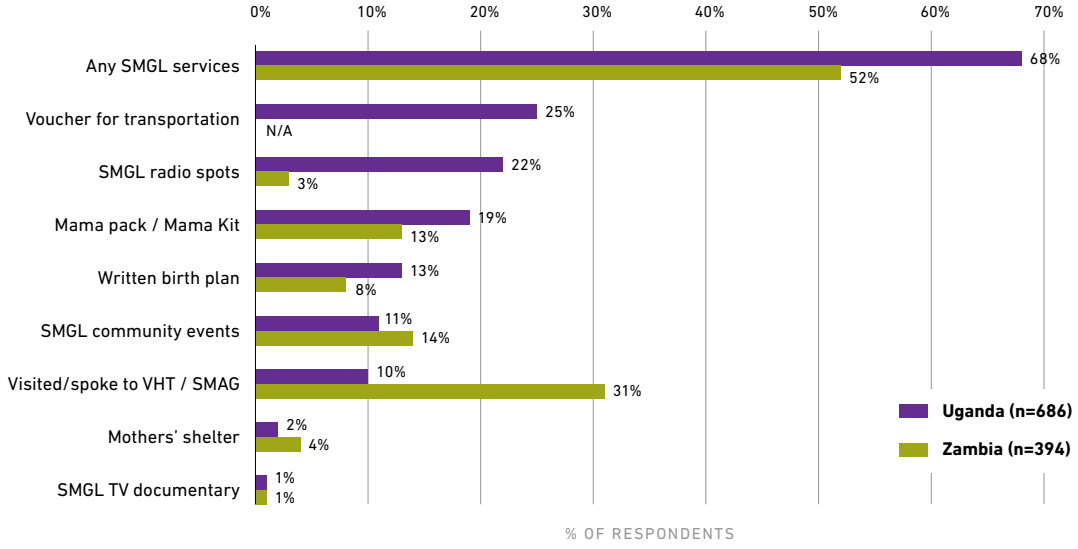


ii. Women's use of SMGL interventions

In terms of women's use of SMGL interventions, a majority of exit interview respondents who had heard of SMGL in Uganda and Zambia (68% and 52%, respectively) indicated that they had used at least one SMGL service (Figure 8). SMGL activities that women were most aware of, such as the SMAGs in Zambia and transportation vouchers in Uganda, continued to feature prominently in women's reports of SMGL services that they used. Over 30% of Zambian respondents reported "use" of SMAGs while 25% of Ugandan women reported using transportation vouchers.

FIGURE 8: **Women's use of SMGL interventions**

Exit survey: Which of the following SMGL services did you receive or use before, during, and after delivery? (Intervention districts only, among women who heard of SMGL)

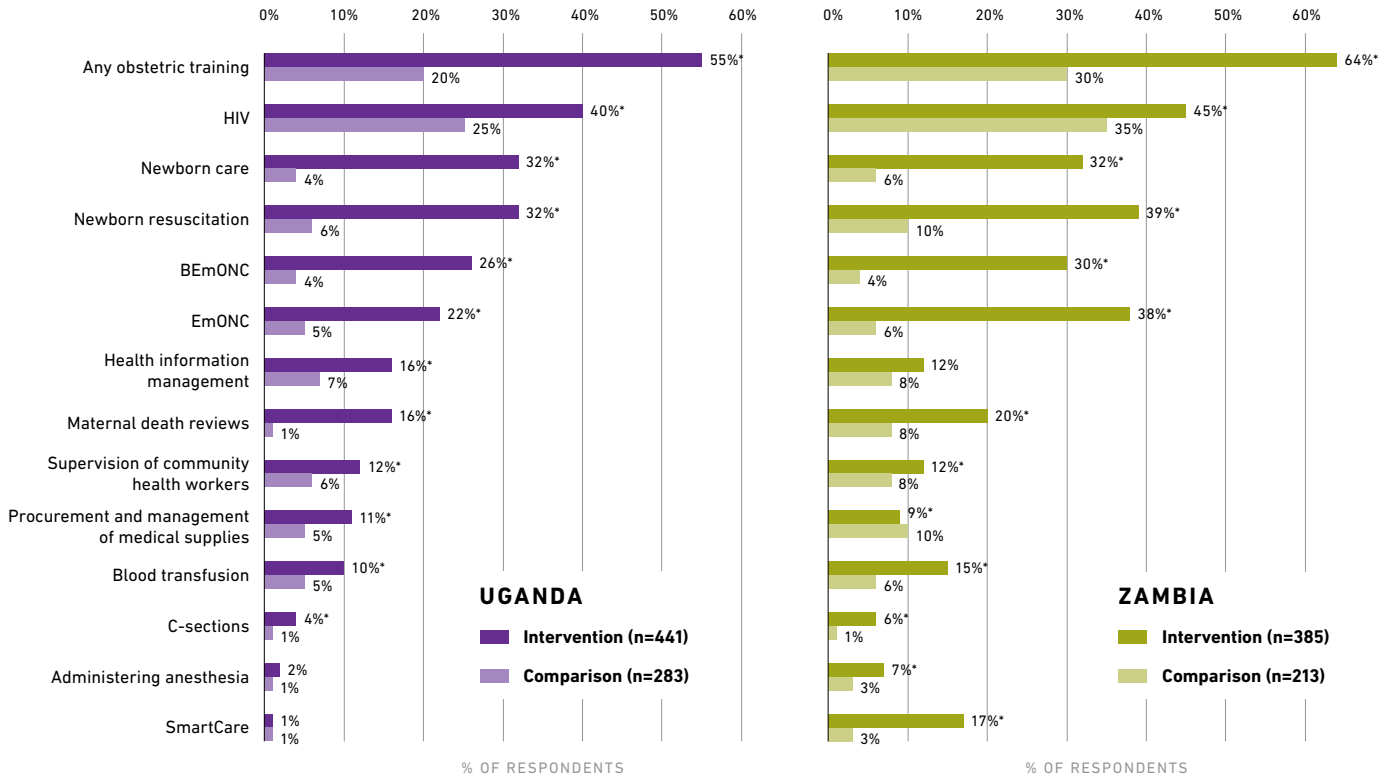


iii. Uptake of training by providers

Figure 9 shows the receipt of obstetric, newborn, HIV, or other related training by health providers. In both countries, more than half of respondents reported participating in one or more training course (55% in Uganda, 64% in Zambia) compared to providers in comparison districts (20% in Uganda, 30% in Zambia). In Uganda, 32% of respondents reported newborn care/resuscitation training compared to 4% and 6%, respectively, of respondents in comparison districts. In Zambia, newborn resuscitation training was also much higher in intervention than in comparison districts (39% vs. 10%), as was EmONC training (38% vs. 6%). Interestingly, both SMGL and comparison district providers also received a substantial amount of HIV training in the past year, likely reflecting PEPFAR and other HIV/AIDS investments in both countries. These data showing large exposure to trainings, particularly in the intervention districts, support the earlier finding from the dose delivered data that health worker trainings were extensively implemented in both countries, and confirm that training volume was greater than what health workers would typically receive.

FIGURE 9: Provider training received

Provider survey: In the past year, have you received trainings or refresher courses in any of the following areas?



* Significant at p≤0.05

5 Fidelity

SECTION SUMMARY

- Providers in SMGL districts scored modestly better than providers in comparison districts on a test of obstetric knowledge in both countries.
- In Uganda, there were consistent positive moderate to large differences in provider confidence, and providers' and women's ratings of quality of care between SMGL and comparison districts.
- In Uganda, women in intervention districts were more likely to report having received Caesarean sections and family planning services than those in comparison districts.
- In Uganda, health care workers in SMGL districts were more satisfied with continuing medical education, supervision, mentoring, and workplace relationships than their counterparts in comparison districts.
- In Zambia, health care workers in SMGL districts were more likely to state that they had sufficient human resources than providers in non-SMGL districts.
- In terms of issues remaining after one year of SMGL, facility managers identified additional infrastructure, more health workers, and better salaries and incentives as unmet needs. Women emphasized the need for cleaner facilities, better supply of medicines, and more respectful treatment by providers.

Our assessment of fidelity focused on three elements: 1) quality of delivery care in SMGL facilities; 2) impact of SMGL on facilities and health workers; and 3) remaining gaps in quality. Our assessment was designed to make inferences based on a comparison group, but was not designed to measure change over time.

5.1 Quality of delivery care

METHODS

We evaluated the scope and quality of care experienced by women delivering in SMGL-supported facilities in SMGL districts compared to women in non-SMGL districts. We assessed six metrics of quality of care: 1) provider knowledge of emergency obstetric and newborn care, 2) provider confidence in performing a range of basic and emergency obstetric skills, 3) women's reported receipt of key delivery and postpartum services, 4) providers' rating of quality of delivery care, 5) women's rating of quality of delivery care, and 6) women's satisfaction with delivery care (Figure 10).

Taken together, these elements give a nuanced picture of the quality of care in SMGL district facilities and the degree to which it differs from comparison districts. These elements capture both some aspects of technical quality (provider knowledge of obstetric care, receipt of services, women's ratings of medical inputs and competence) and interpersonal quality of care (women's ratings of supportive environment, women's satisfaction, provider confidence). While these indicators give an assessment of quality from the perspectives of users and providers, this is a partial measure of quality of care. Due to the large scope and short timeframe of the external evaluation, we were not able to conduct time-intensive clinical observations and we did not measure quality-related health outcomes, such as case-fatality rates, which were the province of the internal evaluation. The latter, in particular, would be an important complement to the data we present here.

Our assessment of quality of care relies on data collected using three quantitative instruments: 1) exit interviews with women who recently delivered at health facilities, 2) structured surveys conducted with health workers, and 3) an obstetric knowledge test given to health workers active in maternal and newborn care. Figure 11 shows sample questions from the knowledge test. The measures (variables) for each quality metric are described in Figure 10.

The effect of SMGL on quality of care was assessed using multivariate regression with intervention/comparison status as the key predictor. This allowed us to quantify the impact of SMGL on each individual quality variable adjusting for baseline differences in characteristics between SMGL and similar non-SMGL districts. We conducted separate regressions for data from women's exit interviews and provider knowledge

FIGURE 10:

Elements of fidelity

Percent of providers rating measures of input quality as "strongly agree" versus "somewhat agree," "somewhat disagree," or "strongly disagree" on:

- Consistent availability of supplies and medications
- Functioning equipment and infrastructure

Percent of providers rating quality of delivery care as "excellent" versus "good," "fair," and "poor" on:

- Overall quality of delivery care
- Care for women with obstetric complications
- Newborn care

- Percent score on a 60-question multiple-choice test on emergency obstetric care by MCH providers

Percent of 26 obstetric skills for which MCH providers rated themselves "very confident" in their ability versus "not very confident" or "I cannot perform this skill":

- Managing malaria in pregnancy
- Managing hypertension in pregnancy
- Managing HIV-positive patients in pregnancy
- Managing normal childbirth
- Managing severe pre-eclampsia and eclampsia
- Monitoring labor using a partograph
- Augmentation of labor
- Administering injectable antihypertensive
- Administering oxytocin
- Administering injectable antibiotics
- Manual removal of retained products
- Managing breech presentation
- Managing shock
- Active management of third stage labor
- Episiotomy and repair
- Bimanual compression of the uterus
- Manual removal of placenta
- Repair of cervical tears
- Repair of perineal tears
- Endotracheal intubation of the mother
- Vacuum extraction of baby
- Performing breech delivery
- Manual vacuum aspiration of retained products
- Performing C-sections
- Administering anesthesia for C-sections
- Newborn resuscitation for non-breathing infant

Percent of women rating quality as "very good" or "excellent" versus "good," "fair," or "poor" on:

- Overall quality of delivery care
- Knowledge and competence of health workers
- Respect shown by health workers
- Availability of drugs
- Availability of medical equipment
- Privacy given during delivery
- Communication skills of providers
- Cleanliness of facility

- Percent of women rating themselves as "very satisfied" with overall experience with their delivery versus "somewhat satisfied," "somewhat dissatisfied," and "very dissatisfied"
- Percent of women "very likely" to recommend this facility to others for general health services versus "somewhat likely," "somewhat unlikely" or "not at all likely"

- Percent of women receiving C-sections
- Percent of women receiving blood transfusion
- Injection or any other drugs by IV drip (antibiotics, oxytocin, etc.)
- Percent of women receiving postpartum examination before discharge
- Percent of women receiving counseling on family planning
- Percent of women receiving method of family planning
- Percent of newborn care topics on which women received counseling, out of 7 total topics:
  - Breastfeeding exclusively
  - Care of the umbilical cord
  - Need to avoid chilling of baby
  - When to return for immunizations
  - Hand washing with soap/water before touching the baby
  - Danger signs
  - When to come back for postnatal visit

and satisfactions surveys. We adjusted provider regressions for the following confounders: provider cadre, gender, CEmONC/BEmONC facility, and urban/rural facility. In our analysis of women's data we controlled for: age, education, self-reported health, total births, wealth index, visits to health facility in past year, delivery in CEmONC/BEmONC facility, and delivery in urban/rural facility. For categorical data (e.g., very satisfied versus other) we used logistic regression. For continuous data (e.g., provider scores, provider confidence) we logged the dependent variable to improve normality and used least-squares linear regression. Finally, for count data (i.e., number of newborn health topics a woman was counseled on) we used negative binomial regression. In all analyses, we estimated robust standard errors, clustering on facility, to account for dependence of data at that level.

FIGURE 11: Sample questions from the provider knowledge test

8. Postpartum hemorrhage is defined as:

a) Vaginal bleeding of any amount after childbirth
b) Sudden bleeding after childbirth
c) Vaginal bleeding in excess of 300 mL after childbirth
d) Vaginal bleeding in excess of 500 mL after childbirth

9. Immediate postpartum hemorrhage can be due to:

a) Atonic uterus
b) Trauma to the genital tract
c) Retained placenta
d) All of the above

16. The presenting signs and symptoms of eclampsia include:

a) Convulsions, diastolic blood pressure of 90 mm Hg or more after 20 weeks gestation and proteinuria of 2+ or more
b) Headache, still neck, blurred vision, and diastolic blood pressure of 90 mm Hg or more
c) Headache, stiff neck, photophobia and diastolic blood pressure of 90 mm Hg or more
d) None of the above

17. An antihypertensive drug should be given for hypertension in severe pre-eclampsia or eclampsia if diastolic blood pressure is:

a) Between 100 and 110 mm Hg
b) 100 mm Hg or more
c) 115 mm Hg or more
d) 120 mm Hg or more

RESULTS

Existing quality of care

Appendix E shows the mean values for each of the key quality indicator measures for each country. These summaries are aggregated means for SMGL and comparison districts. They provide a general snapshot of quality of care across all 12 districts in which we collected data. In brief, in both countries, providers' mean scores on a 60-question obstetric knowledge test were between 50 and 60%. In Zambia, mean scores were slightly higher than in Uganda. Providers' confidence in their ability to perform 26 obstetric skills was also slightly higher in Zambia. On average, providers in Zambia rated themselves "very confident" in their ability to perform 17 skills—an average of two more skills than Ugandan providers.

On average across SMGL and non-SMGL districts, women with recent deliveries surveyed in Uganda were significantly more likely than women in Zambia to report having received a Caesarean section (13% vs. 9%), and were also more likely to report having received antibiotics or an injection during delivery (86% vs. 78%). More Zambian women, on average, reported that a health worker checked on their health and that of their newborn before discharge. Zambian women were also more likely than Ugandan women to have received counseling on an array of newborn issues (including breastfeeding, immunizations, and recognition of danger signs), and to have received counseling and services related to family planning. On average, Zambian women rated the quality of care they received more highly than Ugandan women did—approximately 65% of Zambian respondents rated the overall quality of delivery care they received as "very good" or "excellent" on a 5-point Likert scale, compared to only 45% of Ugandan respondents. This difference in perceived quality across countries did not extend to providers—approximately 20% of providers surveyed in both countries rated the overall quality of delivery care provided in their facilities as "excellent" on a 4-point quality scale.

Sign for rural health center in Kalomo District, Zambia

Effect of SMGL on quality of care

Regression results assessing the effect of SMGL on quality of care are shown in Table 4. These are expressed as differences between SMGL and non-SMGL districts that could be attributed to SMGL after adjusting for baseline differences between districts. We show all differences significant at the p≤0.05 level and indicate marginally significant results (up to p=0.1) in parentheses. All non-significant results are labeled N.S. These results are discussed in more detail below the table.

Table 4 indicates that there were modest differences in knowledge scores between intervention and comparison districts in both countries (7.8% higher in Uganda and 8.6% higher in Zambia). The differences were greater in a sub-analysis of providers who reported being trained in EmONC over the course of the year in SMGL districts versus all comparison providers (10.7% higher in Zambia and 13.5% higher in Uganda). This suggests that SMGL was likely successful at influencing obstetric knowledge, although the magnitude of these differences were not large. Furthermore, knowledge does not always equal better performance. Other research suggests that provider performance lags knowledge.[8] If this is the case here, the differences in actual clinical care between SMGL and comparison districts are likely to be small.

In Uganda, providers in SMGL districts were more confident in their clinical skills—they considered themselves "very confident" in 38% more clinical skills than providers in comparison districts. There were no significant differences in provider confidence between SMGL and comparison districts in Zambia.

There were few differences in the receipt of important maternal and newborn health services between SMGL and comparison districts, with the exception of Caesarean section and family planning products in Uganda. Women in SMGL intervention districts in Uganda were 4.1 times more likely to receive a C-section than women in comparison districts and were 4.7 times more likely to receive family planning products and services than women in comparison districts. However, there were no significant differences between intervention and comparison groups in either country for women reporting a health worker checking on them and their newborn prior to discharge or receipt of counseling on newborn health or postpartum family planning. In Zambia, the lack of difference in the provision of mother and newborn checks prior to discharge was likely due to the high overall provision of these services (ceiling effect).

In terms of women's ratings of quality of care during labor and delivery, women in SMGL districts in Uganda had higher quality ratings on several measures, including knowledge and competence of providers, availability of medical equipment, privacy, providers' communication skills, and cleanliness of facility than similar women in comparison districts. Ugandan women in SMGL districts were also nearly three times as likely to rate overall quality of delivery care as "very good" or "excellent" than their counterparts in non-SMGL districts. In Zambia, there was a significant difference in women's ratings of quality in two areas: availability of medicines and medical equipment.

Providers were also asked to rate the quality of care that their facility provided to women. Like women, Ugandan providers in SMGL districts rated equipment as "excellent" more often than providers in non-SMGL districts. Ugandan SMGL providers were also much more likely than providers in comparison districts to rate delivery care, care for obstetric emergencies, and newborn care as "excellent." There were no significant differences between SMGL and non-SMGL providers in Zambia.

Finally, there was a marginally significant positive difference in satisfaction with care among women in Zambian SMGL districts compared to women in

Midwife in Nyimba District, Zambia

TABLE 4: Multivariate regression results assessing effect of SMGL on quality of care

INDICATOR		UGANDA	ZAMBIA
QUALITY METRIC	MEASURE	ADJUSTED DIFFERENCES BETWEEN INTERVENTION AND COMPARISON DISTRICTS	
Provider knowledge: (PERCENT SCORE ON A 60-QUESTION MULTIPLE CHOICE TEST)	—	7.8% higher	8.6% higher
		10.7% higher among SMGL-trained providers	13.5% higher among SMGL-trained providers
Provider confidence:[1]	—	38.0% more skills	N.S.
Receipt of services: (PERCENT OF WOMEN REPORTING RECEIPT)	Caesarean section	4.1 times more likely	N.S.
	Antibiotics/IV drip	N.S.	N.S.
	Health worker checked on mothers' health	N.S.	N.S.
	Health worker checked on newborn's health	N.S.	N.S.
	Newborn topics women couseled on (out of 7)	N.S.	N.S.
	Receipt of counseling on family planning	N.S.	N.S.
	Receipt of family planning products/services	4.7 times more likely	N.S.
Women's rating of quality of: (PERCENT RATING "VERY GOOD" OR "EXCELLENT" VERSUS "GOOD," "FAIR," OR "POOR")	Delivery care	2.7 times more likely	N.S.
	Knowledge & competence of health workers	1.9 times more likely (p=0.053)	N.S.
	Respect shown by health workers	N.S.	N.S.
	Availability of drugs	N.S.	1.9 times more likely (p=0.06)
	Availability of medical equipment	2.0 times more likely (p=0.064)	2.6 times more likely (p=0.058)
	Privacy given during delivery	2.0 times more likely	N.S.
	Communication skills of providers	2.5 times more likely	N.S.
	Cleanliness of facility	3.4 times more likely	N.S.
Providers' rating of input quality: (PERCENT RATING "STRONGLY AGREE" VERSUS "SOMEWHAT AGREE," SOMEWHAT DISAGREE," OR "STRONGLY DISAGREE")	Consistent availability of supplies and medications	N.S.	N.S.
	Functioning equipment and infrastructure	2.0 times more likely	N.S.
Providers' rating of quality of: (PERCENT RATING "EXCELLENT" VERSUS "GOOD," "FAIR," OR "POOR")	Delivery care	3.8 times more likely	N.S.
	Care for women with obstetric complications	4.0 times more likely	0.6 times as likely
	Newborn care	1.8 times more likely	N.S.
Women's satisfaction with care[2]	—	N.S.	1.9 times more likely (p=0.08)
Likely to recommend this facility to others[3]	—	N.S.	N.S.

Note: N.S. = Non-significant findings

1 (Percent of 26 obstetric skills rated "very confident" versus "not very confident"; "I cannot perform this skill" or "does not apply")
2 (Percent rating: "very satisfied" versus "somewhat satisfied," "somewhat dissatisfied," or "very dissatisfied")
3 (Percent of women rating "very likely" versus "somewhat likely," "somewhat unlikely," or "not at all likely")

Positive result

non-SMGL districts. This was not the case in Uganda. There were no significant differences in likelihood of recommending the facility to others in either country.

Table 5 below synthesizes the data above to show the magnitude of SMGL's effect on multiple metrics of quality of care. The plus signs indicate the size and consistency of the effect across indicators, with one plus sign suggesting some effect, two suggesting a moderate effect, and three suggesting a large and consistent effect.

TABLE 5: Magnitude of SMGL effect on quality

QUALITY METRIC	UGANDA	ZAMBIA
Provider knowledge	+	+
Provider confidence	++	No effect
Receipt of services	+	No effect
Providers' rating of quality	+++	No effect
Women's rating of quality	+++	+
Women's satisfaction	No effect	+

In comparison with non-SMGL districts, Ugandan SMGL districts showed higher quality of care across a range of measures, most notably in women's and providers' perceptions of quality. There were fewer and smaller differences in provider knowledge and receipt of important clinical care. In Zambia the effects of SMGL on these metrics of quality were modest, with knowledge scores and two of eight quality ratings by women higher in SMGL districts.

New operating theater at Ntara HC IV in Kamwenge District, Uganda

Plaque acknowledging renovated maternity ward at Ntara HC IV in Kamwenge District, Uganda

5.2 Impact of SMGL on facilities and health workers

Providers were asked to rate their satisfaction with different elements of their work environment. Satisfaction, motivation, and morale of health care workers are important elements in the provision of quality care. In addition, attrition of skilled health workers, especially in remote areas, remains a threat to quality care provision. We administered a satisfaction survey to skilled providers at health facilities in both SMGL and non-SMGL districts. We asked about various aspects of the work environment and working relationships at their current facility, as well as their desire to stay employed at that location. As before, we compared answers of providers in SMGL districts to providers in similar districts without SMGL. The measures for the variables are listed below:

Providers' satisfaction

Percent of providers rating "strongly agree" versus "somewhat agree," "somewhat disagree," or "strongly disagree," with the following aspects:

- I am satisfied with this job
- Workload is manageable
- There are enough staff to provide quality care
- All health workers have good working relationships
- District health managers support and value health workers
- My opinions are respected at work
- I am satisfied with the pay
- I have adequate continuing education
- I have adequate clinical supervision
- I have adequate mentoring and support
- If it were up to me, I would continue to work for this facility for quite some time

Table 6 shows that SMGL had a limited effect on provider satisfaction overall. There were no significant differences between providers' views in intervention versus comparison districts on overall job satisfaction, workload manageability, intent to stay in their current position, or in their relationships with the district health managers. Providers in SMGL districts were more likely to report satisfaction with specific aspects of their jobs. In Zambia, providers in SMGL districts were more likely to "strongly agree" with the statement that their facility had enough staff to provide adequate care, and in Uganda, providers in SMGL districts strongly agreed that health workers in their facility had good working relationships and that they had adequate opportunities for continuing education. In both countries, providers in SMGL districts were more likely than providers in comparison areas to "strongly agree" that they had adequate clinical supervision, mentoring and support. The focus of SMGL in both countries on training and mentoring of health workers could account for the difference in this specific aspect of job satisfaction.

TABLE 6: Provider satisfaction: percent who "strongly agree" with statement versus "somewhat agree," "somewhat disagree," or "strongly disagree"

	ADJUSTED DIFFERENCES BETWEEN INTERVENTION AND COMPARISON DISTRICTS	
MEASURE	**UGANDA**	**ZAMBIA**
I am satisfied with this job	N.S.	N.S.
The workload is manageable	N.S.	N.S.
There are enough staff to provide quality care	N.S.	3.1 times more likely (p=0.053)
All health workers have good working relationships	2.8 times more likely	N.S.
District health managers support and value health workers	N.S.	N.S.
Opinions are respected at work	N.S.	N.S.
Satisfied with pay	N.S.	N.S.
Adequate continuing education	2.2 times more likely	N.S.
Adequate clinical supervision	1.7 times more likely	0.4 times as likely
Adequate mentoring & support	2.1 times more likely	0.5 times as likely
If it were up to me, I would continue to work for this facility for quite some time	N.S.	N.S.

Note: N.S. = Non-significant findings **Positive result**

The limited effect of SMGL on health worker satisfaction can be explained in part by findings from the in-depth interviews we conducted with 81 facility managers (41 in Uganda, 40 in Zambia). The majority (89%) of facility managers interviewed in each country were the administrator or health worker "in-charge" of the facility (smaller facilities) or the maternity unit (hospitals). Facility managers were employed at their facilities for an average of 3-5 years. A few facility managers in both countries reported a positive effect on provider motivation which they attributed to fewer supply shortages, additional staff hires, more training opportunities for staff, and the fact that many more women are now

"Our theater has received new equipment and you can get operations. It is better than it was before."

— HEALTH WORKER, KYENJOJO, UGANDA

delivering in facilities. In Nyimba, a manager stated: "On our side, we are not resting, but there is motivation because the health education we give is working. Most women now come to the facility for their deliveries." The perception of fewer maternal deaths and better results for mothers and babies was said to be a powerful motivator as providers felt that they were "helping out women" and had "done what [was] expected" of them as providers. Despite this, most health facility managers noted that workloads had increased markedly in the past year and that there were too few health workers to keep up with the increased demand generated by SMGL. Facility managers in both countries also expressed concern that health workers were fatigued from working "around the clock," often for no extra pay or without breaks for tea, food, or rest. Facility managers opined that the increased workloads would negatively affect provider motivation and morale.

5.3 Remaining gaps in quality

FACILITY MANAGER PERSPECTIVES

Facility managers were asked which inputs would be required to further improve the quality of care for women and newborns at their facilities. In both countries, additional improvements in human resources and infrastructure were mentioned most frequently. With regard to human resources, respondents in Uganda spoke about the need for staff accommodation to retain workers and for more staff with specialized training in obstetrics (i.e., obstetricians and midwives). In Zambia, facility managers pointed to the need for more health workers, continued health worker training, and "staff incentives because of the huge workload."

As shown in Figure 12, in Uganda, additional and/or expansion of operating theaters, post-op wards, and maternity wards to accommodate more patients were the most common infrastructural improvement desired by facility managers. This was followed by transportation, which facility managers noted was an ongoing barrier, both in terms of referrals between facilities and continued provision of vouchers for transport from home. In Zambia, transport was the most common infrastructural improvement desired by facility managers. Several

"You reach a point whereby you are using ghost staff—they are here physically but mentally they are looking for green pastures, which is bad for me because I invest a lot in my staff."

— FACILITY MANAGER, KYENJOJO, UGANDA

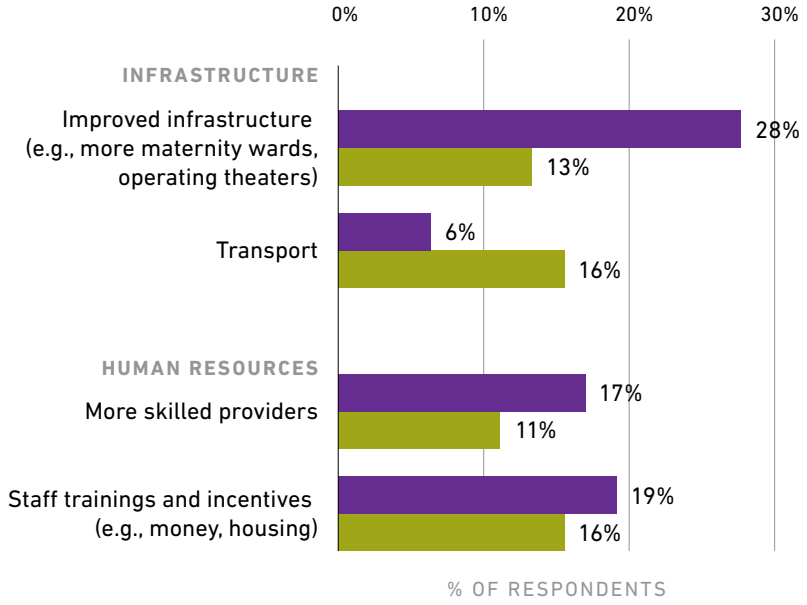


FIGURE 12:
Facility manager priorities for facility improvement

In-depth interview: What one improvement would you like to see implemented in this health facility as the SMGL program grows?

felt that having an ambulance (either motorcycle or vehicle) at their facility would make it much easier to reach women living in the outskirts of the often-large facility catchment areas. In terms of facility improvements, facility managers in Zambia felt that space continued to be a challenge, with some facilities using the same room for women waiting to go into labor (instead of a mothers' shelter), deliveries, and postnatal care. A facility manager in Kalomo noted: "At present we do not have a mothers' shelter, a postnatal ward, nor delivery room so those are of the utmost importance because with those three units the numbers of women coming to the facility will increase."

WOMEN'S PERSPECTIVES

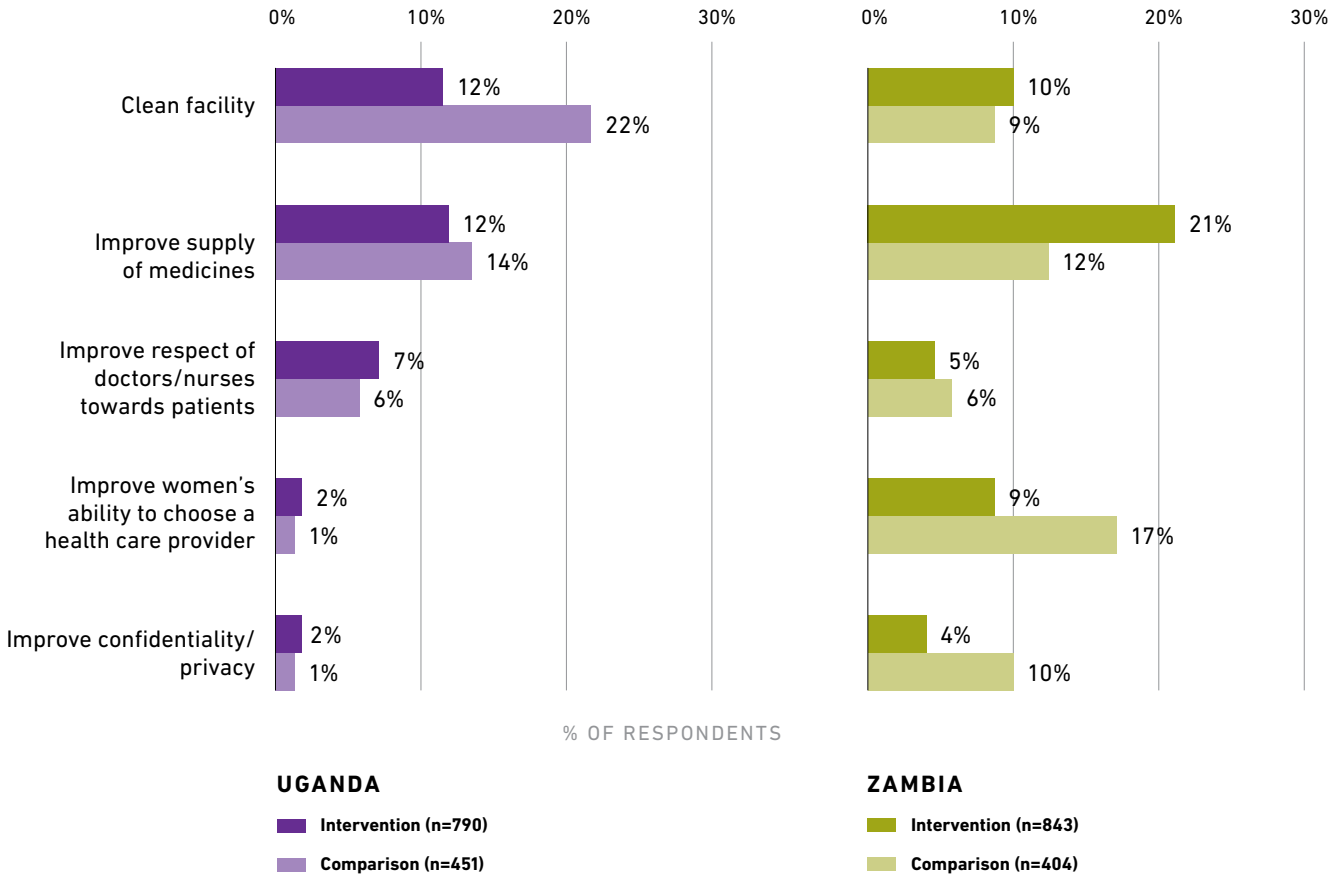
In facility exit surveys, recently delivered women were asked what one thing they would do to improve care for women in the facilities. As shown in Figure 13, in Uganda, women in both intervention and comparison districts desired cleaner facilities and improved supplies of medicines, with women in comparison districts much more likely to mention the former and women in intervention districts more likely to mention the latter. In Zambia, women in intervention districts also wanted clean facilities and improved supplies of medicines, while women in comparison districts were more likely to mention "women's ability to chose a provider" and "improved privacy and confidentiality."

"Imagine someone being on duty for 24 hours in a day and yet solely getting the same salary at the end of the month, so this...can be demotivating."

— FACILITY MANAGER, MANSA, ZAMBIA

FIGURE 13: Women's priorities for facility improvements

Exit survey: If you were a manager and could choose to do one thing to improve the care women get in this facility for childbirth, what would it be?



In both countries, women who participated in focus group discussions and had delivered in a facility both before and during SMGL reported that the experience was better "now than before." When women were asked which aspect of their facility delivery they liked the most, provider attentiveness—including frequent monitoring—accounted for more than half the responses in each country. Women who had experienced a complication were especially grateful for the care they received. A number spoke of the "peace of mind" that facility deliveries provided in the event of an obstetric emergency and noted the benefits of facility deliveries over home deliveries, such as better treatment by their birth attendant (e.g., professional midwife or nurse versus TBA). A woman in Zambia described the exceptional care she received: "The nurses took time to talk to new mothers about family planning methods and to avoid early pregnancies while breastfeeding. We learned about exclusive breastfeeding for the first six months. All these lessons I wouldn't have learned them if I delivered at home. The nurses also gave me iron tablets because I bled a lot during my delivery."

Women with recent facility deliveries in the focus groups were also asked for their suggestions for facility improvements. In Zambia, women mentioned the need for more nurses and new maternity wards. In both countries, but especially in Uganda, women spoke of the need to improve provider attitudes toward patients and called for increased capacity to avoid overcrowding and rushed discharges. Interestingly, some women in Uganda felt that more "doctors" or male providers should be hired instead because "nurses" (female providers) were perceived to be "harsher" on patients. Furthermore, some women in Uganda believed that SMGL-hired nurses had better attitudes than preexisting staff and worried that older staff would be a bad influence on these new hires. There was considerable confusion in both countries regarding the need for women to bring their own supplies during delivery (e.g., baby clothing, gloves, cleaning solution, etc.). Several women reported being scolded by nurses when they did not have them, even though some had been told that the supplies would now be provided by the facility. In Zambia, women in the focus groups were of the view that requiring women to bring supplies was a substantial barrier to delivering in a facility and requested that these be provided by the facility.

Women with recent facility deliveries were also asked in focus group discussions about additional services that they would like to see provided in their communities more generally. A few women in Uganda desired comprehensive health care, not only focused on maternity care. One woman stated, "this program should start caring about our children like they care about us when we are pregnant." Other suggestions were that the SMAG program in Zambia be continued and that the transportation system be additionally improved. Many women also wanted greater fairness in the distribution of Mama Packs/Kits; some felt that nurses were lying when they reported running out of Mama Packs/Kits and others said nurses expected something in return from the mothers such as money or refreshments (e.g., soda).

Example of a Mama Kit in Uganda

Example of a Mama Pack in Zambia

"It makes my job difficult because the doctors and the nurses are always complaining and that has caused a bad working relationship since some want to go on leave but can't."

— FACILITY MANAGER, KALOMO, ZAMBIA

6

Dynamic and emergent properties of SMGL

SECTION SUMMARY

- The majority of implementers, national stakeholders, and community respondents believed that SMGL had a positive impact on raising awareness of maternal mortality both within and beyond the focus districts.
- Overall, SMGL was perceived to have had more positive spillover effects on the broader health system than negative effects, particularly in the areas of service delivery, medicine procurement, information systems, and health system governance.
- Women in the community were very enthusiastic about the SMGL program—specifically with the work of the SMAGs in Zambia, and the availability of vouchers and Mama Kits in Uganda.
- Most women who delivered at home reported that they had intended to deliver in facilities but were prevented from doing so by the sudden onset labor, lack of transportation to distant facilities, and in, some cases, concerns about disrespectful treatment.
- Women also reported substantial social pressure to deliver in facilities; while some of this pressure was perceived as positive, some women who delivered at home reported being stigmatized. In Zambia, women and local leaders confirmed that women who delivered at home were made to pay financial penalties.

6.1 National effects of SMGL

To assess the broader effects of the SMGL intervention on the general health system, we asked the central MoH and USG stakeholders in each country (13 in Uganda, 6 in Zambia) if they believed SMGL had a national effect (i.e., beyond the focus districts) and any spillover effects on the countries' health systems, more generally.

The majority of respondents believed that SMGL had a positive impact beyond the focus districts. For example, SMGL was credited with raising awareness of MCH as a national priority and for showing that it was possible to do something about maternal deaths. Respondents in Uganda stated that women from neighboring districts were traveling to intervention districts to use SMGL services. Officials in both countries saw SMGL as a catalyst for future expansion and planned to use lessons from SMGL in other districts moving forward. The perceived success of some SMGL activities were seen to have had an effect at the national level. For instance, SMGL vouchers and the longstanding Marie Stopes Uganda Healthy Baby voucher program were seen to have spurred the roll-out of an emerging national voucher scheme spearheaded by the MoH and World Bank by serving as "proof of concept." Further, some attributed the introduction of the wage bill to increase physician salaries in HC III and IV facilities to the success of increased SMGL salaries for health workers.

In Zambia, an implementing partner introduced rapid syphilis tests (RST) as an additional activity in SMGL districts, and used this experience to work with the MoH to launch RST nationally in a very short time. An implementing partner explained, "it's really taking something that we've learned from a study, leveraging it in SMGL and now going nationally, which is incredible."

Of note, there were differing opinions about how much of the national emphasis on maternal health could be attributed to SMGL in either Uganda or Zambia, especially as each country had been selected for SMGL in part because of the existing priority placed on MCH at the national level. Additionally, respondents in Uganda noted that the movement to increase health worker salaries had begun prior to the launch of SMGL. Concerns about negative impacts were rare, but two were noted: 1) that service providers fought for SMGL jobs and some left their home districts to work in SMGL districts; and that 2) the artificially high remuneration to health workers would not be affordable if expanded to other districts.

6.2 SMGL's effects on the health system

To assess any spillover effects that SMGL may have had

on the broader health systems in each country, we asked all 60 national stakeholders comprising central MoH, USG officials, district medical/health officers and implementing partners to describe any positive or negative effects they believed the program had beyond MCH. We specifically examined how SMGL was perceived to have affected the six health systems "building blocks" identified by the World Health Organization.[9] Table 7 identifies some key implementer insights on the effects of SMGL on the broader health system.

Service delivery: Although respondents stated that SMGL had a positive effect on general health service delivery, the specific effects reported in each country were markedly different. In Uganda, the main effect reported was in relation to the improved transport and referral system: SMGL referral vouchers streamlined the referral system leading to decongested lower level facilities and ambulances purchased by SMGL were sometimes used for other emergencies, while an exclusive SMGL obstetric ambulance freed up a hospital's other ambulance for non-obstetric emergencies. District-level respondents noted that quality improvements, as well as the work of community health workers had increased the level of trust in the health care system overall. While an increase in patient load was mostly seen as a positive, a few respondents highlighted the challenge of increased demand that could not be adequately met by the health system.

In Zambia, positive spillovers related to service delivery were mainly in the area of improved service quality due to investments in provider skills and attitudes, equipment, and increased attention to infection control and blood supply. Increased utilization of non-MCH services by women was another example of positive spillover given: "Women are not just coming for maternal issues, once they are at our facilities we do integrated services concentrating on the general health of the mother and child," recounted one DMO. While overall responses were positive, one concern raised was that the intense focus on SMGL detracted from other MoH or clinical responsibilities. The increased demand for services was also said to put extra pressure on scarce resources, such as electricity, water, and fuel.

Human resources: The majority of respondents in Uganda stated that the increase in human resources due to SMGL had a positive spillover effect on other areas of the health system, citing both the increase in number of health workers and improvement in health worker performance due to training and mentorships. Zambian respondents, including facility managers, complained of negative effects on human resources, noting that providers were overwhelmed with workload due to the increased number of facility deliveries generated by SMGL, which have taken them away from non-MCH duties. Respondents in both countries characterized their governments' staffing plans as out of date and in need of review. They noted that while SMGL helped to increase the number of health workers, and had "open[ed up] a political dialogue" on staffing levels with the MoH, many facilities were still below the required staffing levels.

In both countries, national and implementing partner respondents felt that SMGL had generally improved health worker morale by providing onsite mentorship, increased pay, and general facility upgrades that enhanced working conditions for all, not just for staff working directly for SMGL, although facility managers reported that the actual impact on health workers and morale was mixed. Ugandan respondents further noted that the training of lab technicians, biostatisticians, and records assistants benefitted the clinics generally, providing improved service to non-maternal health patients.

Access to essential medicines: Respondents in both Zambia and Uganda stated that implementing partner investments in drug and supply chain management that occurred as part of SMGL improved the management of drug

Women wait with their families in the outpatient department in Kamwenge, Uganda

SMGL midwife in the pharmacy she opened in remote Kamwenge, Uganda

supply more generally. These partners were largely credited with streamlining the ordering process for medications, though some challenges and confusion with the new process was reported in Zambia. The supply chain strengthening programs in both countries predated SMGL and so supply chain investments may have occurred irrespective of SMGL, though not all SMGL districts were previously enrolled in the programs.

Although respondents noted improvements in supply chain management, some Ugandan respondents reported that an increased overall demand on the health system due to SMGL sometimes led to drug stock-outs in non-MCH areas. A USG official in Uganda critiqued SMGL's provision of buffer stocks for maternal health and argued that it increases the country's dependence on donor funds since it was an activity carried out by implementing partners, outside of government health offices.

Health information systems: Respondents in Uganda categorized SMGL's influence on health information systems in three ways. Firstly, respondents noted that community surveillance and grassroots data collection had improved beyond MCH due to SMGL's investment in the VHT reporting structure. Secondly, respondents stressed that training and mentorship had improved and strengthened HMIS accuracy and quality across districts. Thirdly, respondents at all levels noted that the districts' ability to send data directly to the District Health Information System (DHIS2) via mobile technology had improved the capacity for data reporting at the district level beyond MCH indicators. Although DHIS2 is a system that exists on a national scale, it was introduced early in SMGL districts and is thus associated by many respondents with SMGL. Furthermore, a district MoH official explained that while training on HMIS collection and management had improved, there remained a gap in how to translate this knowledge into meaningful action outside of record keeping and beyond MCH domains.

The majority of respondents in Zambia identified the comprehensive implementation of SmartCare in the SMGL districts as having a positive effect on the broader health system. EGPAF provided each health facility in the four focus districts with a computer (along with a supporting solar panel) and trained at least one provider per facility in the electronic medical records system. While several respondents reported barriers to the consistent use of SmartCare to manage data in all facilities (i.e., low computer literacy of health care workers, HMIS as a parallel system), the majority felt that SmartCare improved data collection beyond MCH. Some respondents in Zambia credited SMGL with fostering a greater appreciation for systematic data collection within facilities, which in turn led to improved data quality.

Health financing: SMGL was seen as a facilitator for important financing reforms in Uganda. Ugandan respondents at the district level felt that SMGL influenced the passage of the national Wage Bill (passed in February 2013, which promised to increase physician salaries) by demonstrating the feasibility and benefit of increasing physician salaries at Health Center IIIs and IVs. For this reason, various respondents credited SMGL with playing a large role in increasing salaries for physicians. Secondly, some respondents also noted that SMGL transport vouchers reduced individual out-of-pocket expenditures. While many respondents in Zambia spoke about SMGL funding, none reported impact beyond the SMGL program itself.

Leadership and governance: In both countries implementers believed that frequent SMGL planning activities offered an opportunity to coordinate in other areas of the health system as well. SMGL was also credited with improving communication and coordination between district MoH and implementing partners thereby creating streamlined services. In Uganda, implementers across all

> "There are a lot of programs that come, but chiefs are not involved, but when this came, they invited the chiefs to attend the workshop because they are the owners of the people."
>
> — LOCAL LEADER, LUNDAZI, ZAMBIA

levels indicated that the visibility of and support for SMGL from local politicians resulted in greater interest and support for health care services overall. Some respondents stated that SMGL enhanced leadership and accountability of health facility managers, which has had an effect on areas beyond MCH. At the district level, one MoH official explained: "...you find that as a district we have learned to work faster than we used to because now I feel like we can make decisions faster and take action because of this project [SMGL]."

TABLE 7: SMGL effects on the broader health system: insights from implementers

	POSITIVE	NEGATIVE	ILLUSTRATIVE QUOTES
SERVICE DELIVERY	Infrastructural improvements (e.g., refurbished theaters, and new equipment & supplies) are also used for non-MCH services. Perception of increased utilization of non-MCH services for mothers and their families due to attendance of SMGL related services. **Functionalized referral system improved lower level facilities and decongested non-MCH wards in Uganda.**	Increased demand overwhelmed staff and other resources (i.e., supplies and equipment), which was thought to compromise quality of non-MCH services. **Due to intense SMGL focus, implementing partners in Zambia had reduced capacity to participate in other MoH activities such as technical working groups.**	**"SMGL gave the entire health system increased credibility. Everyone that worked in it wanted to be attached to it because the facility looked good, they were able to do their jobs and there was a guaranteed service. It gave the average woman confidence to go to a facility." —Central-level implementing partner, Uganda**
HUMAN RESOURCES	Increased health worker morale from mentorship and improved facilities. SMGL highlighted deficiencies of out-of-date facility staffing norms and contributed to the national dialogue on human resource allocation.	**Managers noted that facility health workers in Zambia were overwhelmed with heavy workloads and thus sometimes neglected their responsibilities outside of MCH.** Many offsite SMGL trainings exacerbated staff shortages in some facilities. **Tensions between SMGL and non-SMGL hired staff over discrepant wages in Uganda.**	**"Beyond maternal health, health workers are now skilled to work on other issues. We are excited to focus on maternal health, but what we are really doing is building a health system" –Central-level implementing partner, Uganda** **"As health workers, when you are in an environment where you can't practice your skills, it is very demotivating. So with SMGL the environment was attended to...in terms of medical equipment, in terms of trainings, so this motivated our staff." —District-level MoH official, Zambia**
ESSENTIAL MEDICINES	Supply chain management improvement benefits both MCH and non-MCH drugs.	**In Uganda, SMGL increased overall demand on the health system thus increasing demand for drugs (including non-MCH drugs), but supply was not increased accordingly.**	**"SMGL positively affected coordination in terms of essential medicines, ordering stock, and other management activities of supply chain management overall" —USG official, Uganda**
HEALTH INFORMATION SYSTEMS	**Training of VHTs, data clerks and provision of monitoring and evaluation staff in data collection and management improved data quality of all health indicators.** **Early introduction of DHIS2 in SMGL districts in Uganda improved all health data reporting at the district level.** **SmartCare roll-out in Zambia (with computers, solar panels, and trainings) improved data collection, quality, and transmission overall.** Phones and dedicated phone network for community health workers is a model for community-health system communication.	**Electronic patient record data capture increases waiting times for outpatients at facilities in Zambia.**	**"A number of areas that were not captured before are now being captured because SMGL demands that information be provided. Information is easily captured and channeled so that it is used for decision-making and other services." —District-level implementing partner, Zambia**
HEALTH FINANCING	**SMGL was perceived to play an influential role in Uganda in the national movement to increase salaries for physicians.** **SMGL generated national dialogue in Zambia on maternal health and additional funding for health facilities.** SMGL model is not financially sustainable without continued donor assistance; uncertainty about source and amount of future funding limits ability to integrate program into national health strategy.	SMGL model is not financially sustainable without continued donor assistance; uncertainty about source and amount of future funding limits ability to integrate program into national health strategy.	**"With the coming of SMGL we've seen the government directing their interests toward SMGL. We've seen government talking more about saving women and talking about finances coming to health facilities." —District-level implementing partner, Zambia**
LEADERSHIP & GOVERNANCE	SMGL meetings gave partners an opportunity to discuss, plan and strategize other areas of the health system. **SMGL support from local politicians in Uganda resulted in greater interest in and perceived support for health sector.**	Ministry of Health (central/district) staffs strained in balancing SMGL with other health policy priorities. Rapid timeframe and 100% external funding limited Ministry of Health's ability to direct and shape activities and reduced sense of ownership.	**"It has had a positive impact. Now all of the meetings that happen because of SMGL also foster planning for other medical services, so by managing SMGL programs, we are also managing other areas of the health system." —District-level MoH official, Uganda**

6.3 Community response to SMGL

PERCEPTIONS OF SMGL

To determine community perception of and response to SMGL, we asked 105 local leaders (50 in Uganda, 55 in Zambia), 119 community health workers (54 in Uganda, 65 in Zambia), and 393 women with home and facility deliveries within the preceding year (192 in Uganda, 201 in Zambia) for their views on how the program had been received in their communities. The majority of local leaders in Zambia were traditional leaders (n=26) while in Uganda they were mostly Local Council members (n=23). In both countries, community health workers were predominantly SMAG and VHT members.

In both countries, community respondents agreed that SMGL had accelerated change in community norms around childbirth in favor of facility delivery and helped create the overall expectation that safe delivery should happen at a facility. Community respondents were aware of and receptive to the increased attention around maternal health. One result of widespread community sensitization was increased male involvement and a sense of responsibility around safe delivery. Some respondents also noted that the provision of Mama Packs/Kits and voucher schemes had helped households save substantial sums of money that would otherwise have gone towards paying for a facility delivery. Inability to afford baby clothes, maternity dress, and other supplies were said to be key deterrents to facility deliveries among poor women in the communities. A local leader in Kabarole District in Uganda explained, "Initially, I would spend money to hire transport to take my wife for delivery and at the same time pay for her treatment. But when SMGL came in I do not have to do all these, would you not be happy?"

In Uganda, focus group participants mentioned the expansion of the VHT program as one of the major successes of SMGL in their communities. Respondents commended the VHT members for their dedication and passion and credited their efforts for getting more women to deliver at facilities. Furthermore, there was a widespread perception that SMGL had improved service provision at facilities, due in part to the increased number of health providers and enhanced availability of drugs and medication. Respondents in Uganda also expressed appreciation for SMGL, noting that the transport voucher scheme had created a regular income stream for boda boda (motorcycle) drivers while the provision of "free services" had saved families money. It is likely, however, that respondents were not referring to Uganda's public sector free delivery policy but to the associated costs of facility delivery such as transportation and required provisions such as sheets and gloves.

Respondents in Zambia echoed similar sentiments, attributing SMGL's success to the dedication and passion of the SMAGs and to the free amenities offered by the program. Among other things, respondents in Zambia noted that SMAGs had successfully taught women how to calculate their delivery dates, and hence when to move to a mothers' shelter. Respondents believed that these activities contributed to a decrease in maternal deaths in their communities. Local leaders in Zambia were appreciative of the fact that communities were able to choose SMAG members, rather than having members chosen for them.

In both countries, it was noted that other organizations had community health worker training programs and some individuals received both SMGL and non-SMGL trainings. In both countries, a number of community health workers had been exposed to malaria education and were involved in distribution of or counseling on bed nets.

Despite the generally positive reception of SMGL, some local leaders and

> "If they have to perform surgery, doctors ask the patient to pay for fuel to operate the generator. Scans [sonograms] are not free either."
>
> — LOCAL LEADER, KAMWENGE, UGANDA

Village health team members in Kamwenge District, Uganda

community health workers in both countries noted that there had been some initial skepticism and resistance to SMGL. A local leader from Nyimba, Zambia, for instance, reported that some people in his village believed that SMGL was "a satanic group" because "they tell our women to deliver from the clinic so that they [the clinic] can get their blood." Another misconception was that SMGL encouraged women to have C-sections, whether or not they were needed. In Uganda, local leaders reported the belief that ambulance services were not free and that women would be charged at a later point for use.

When asked about weaknesses of SMGL, local leaders in Uganda mentioned the lack of focus on family planning ("women continue to have many babies"), inadequate consultation of local leaders at the start of SMGL, shortages of Mama Kits and vouchers, negative attitudes among some health providers and the fact that not all delivery services were free as some women were "charged" (e.g., had to buy gloves or pay for fuel, etc.) when they got to health facilities. VHTs, in turn, noted additional challenges, such as uncomfortable mothers' shelters, inadequate health facilities in remote areas, and lack of food in hospitals. VHT members also complained about practical problems that made their jobs more difficult, such as lack of lunch stipends, maintenance for bicycles (in some cases) or rain boots. Our focus group discussions in Uganda were conducted at a time when continued SMGL funding was uncertain at the end of Year 1, hence some women expressed disappointment that when they delivered at facilities they did not receive the Mama Kits they had been promised or that their vouchers were refunded instead of redeemed. Women with recent home and facility deliveries therefore highlighted the shortages of Mama Kits and uncertainty about continuation of the program as major concerns.

In Zambia, respondents across all 40 focus groups mentioned "too few" individuals trained as SMAG members, and the fact that SMAG members operated with inadequate supplies and were not remunerated as the main weakness of the SMGL program. Women who had recently delivered expressed concern that SMAG members were overworked and would experience burnout unless they received additional financial support. SMAG members, in turn, believed their work to be essential and asked for more members, citing the need to expand their work to include encouraging HIV testing and male involvement in maternal health care.

"Truly, the SMAGs are working hard for us but the problem is their employers don't take care of them."

— WOMEN WITH RECENT HOME DELIVERY, KALOMO, ZAMBIA

PRESSURE FOR FACILITY DELIVERY

In order to understand the effects of SMGL on community attitudes toward facility and home delivery, we asked all focus group participants (i.e., recently-delivered women, local leaders, and community health workers) about community attitudes, perceptions and consequences surrounding place of delivery. We specifically wanted to assess whether women who delivered at home were stigmatized and the extent to which this was as a result of SMGL. To this end, focus group participants were asked about any negative consequences for women who delivered at home. Participants in both countries and women across both facility and home delivery focus groups reported that women who delivered at home faced disapproval from community members.

In Uganda, women who delivered at home reported feelings of shame and expressed concern that they had disappointed the VHTs and other women in their communities. A woman who delivered at home in Uganda observed, "You truly become a bad example to other pregnant women because they will think it's okay to deliver at home if nothing bad happened to you during your delivery." Women who delivered at health facilities in Uganda reported negatively judging women who deliver at home and described them as "foolish" and "ignorant." In Zambia, both women with facility deliveries and home deliveries reported that women

who delivered at home were perceived as "poor" and "uneducated."

However, among women who participated in the exit interviews, relatively few (11% in Uganda, 2% in Zambia) reported experiencing pressure to deliver at a facility for their most recent delivery (Table 8). In Uganda, there was significantly more perceived pressure in SMGL districts than in comparison districts, although interviewers noted that some women interpreted "pressure" as a positive push to make better health care choices.

TABLE 8: Women's exit survey: Did you feel pressured to deliver at a facility?

	UGANDA		ZAMBIA	
	INTERVENTION	COMPARISON	INTERVENTION	COMPARISON
Felt a great deal of pressure	11%	2%	2%	1%
Felt somewhat pressured	6%	5%	3%	5%
Did not feel pressured at all	83%	93%	95%	94%

After hearing anecdotal reports of monetary and non-monetary penalties for home deliveries in Zambia, we investigated this in all focus group discussions. Focus group participants in Zambia confirmed that, since the launch of SMGL, some local leaders had started imposing penalties for home deliveries. Participants across all the four SMGL focus districts in Zambia reported that penalties for home deliveries were imposed on women and sometimes on their families and on village headman. We relayed these findings to the SMGL district coordinators who confirmed that in three of the four Zambia SMGL districts (except Kalomo) these penalties were introduced after SMGL began. The box below gives a detailed description of penalties reported by community members.

In **Lundazi**, respondents reported various types of penalties for women who delivered at home: a fee of 5-10 Zambian kwacha ($1-2) which was charged by the health facility, a goat that the household and/or village headman (who has jurisdiction over a single village within the chiefdom) would have to pay to the Chief or a delay in receiving the "Under 5" card (a free, comprehensive child health card) from the facility. In **Kalomo**, local leaders reported that a "law" had been put in place to charge women 200 kwacha ($40) for home deliveries, although no women had been fined since the decision was made. A local leader from Kalomo explained, "Yes the Chief told us something, if a woman delivers from home, she has to pay about 200 kwacha, even a headman has to pay because he does not care for the subjects." Women in the focus groups confirmed these reports and also reported that facilities charged women who delivered at home between 5 -100 kwacha ($1-20) for the Under 5 card when they eventually brought their infants to facilities. In **Mansa**, respondents reported that women were fined between 10-50 kwacha ($2-10) which they paid to the headman but only if he was unsatisfied with the woman's reason for delivering at home. In **Nyimba**, women cited a 50 kwacha ($10) fine to the facility when taking their children for postnatal care and/or immunizations and an additional payment of a goat or two to the headman. Headmen in Nyimba were also fined for "allowing" home deliveries to occur in their villages.

Respondents reported monetary and livestock penalties for failing to deliver in a facility in many Zambian villages

6.4 Remaining barriers to facility delivery

Women with recent home and facility deliveries in Uganda and Zambia were asked about decision-making regarding place of delivery and about remaining barriers to facility deliveries in their communities. When asked who typically makes the decision about place of delivery, women in both countries overwhelmingly reported that they typically made the decision, followed by male partners. With regards to barriers to facility delivery, women in both countries gave similar responses, namely, rapid labor or night labor that precluded travel to a facility, expenses associated with facility deliveries, transportation difficulties, and the long distances to facilities. Interestingly, many women with recent home deliveries in Uganda attributed their current home deliveries to a short and unexpected labor, which caused them to give birth on the way to the facility. Many of these women noted that they had intended to go to the facility, although courtesy bias to give the "right answer" to researchers may have influenced women's reporting. In contrast, women with recent home deliveries in Zambia attributed their delivery location to three factors: they could not afford to purchase the provisions they felt were required for a facility delivery (i.e., a sheet, polyethylene mat, soap, and a baby shawl), lack of transportation, and fear of mistreatment by health workers.

"Women never used to deliver from the hospitals because they feared to be abused by the nurses, but people who have delivered in hospital have been telling me that it seems the situation in hospitals has changed... They always say the improvement is because of SMGL."

— WOMEN WITH HOME DELIVERY, KIBAALE, UGANDA

7

Functioning of SMGL partnership

SECTION SUMMARY

- SMGL's global leaders noted that the SMGL partnership served an essential purpose in enhancing commitment to maternal health in their government or corporate constituencies; however the lack of clear roles and lack of a shared operational and financing plan hindered the effectiveness of the global partnership and complicated planning for the future.
- Although stakeholders acknowledged that national governments were resource-constrained, most agreed that host governments needed to play a central role in the future of SMGL, including in financing and oversight.
- The domestic private sector—from large corporations to private health providers where available—has not been fully tapped in reducing maternal mortality. Uganda's experience of contracting private providers is a promising model.

7.1 Effectiveness of SMGL global partnership

In Wave 2, we assessed the SMGL partnership in an attempt to understand its structure and functioning and elicit lessons for the future of the partnership. To this end, we asked 17 global partners for their views on how they thought the SMGL partnership had performed, the extent to which they felt that the vision was shared by all members, and the key lessons learned for implementing a program like SMGL.

In terms of achievements of SMGL as a global public-private partnership, global leaders agreed that SMGL heightened visibility and urgency among participating agencies, governments, and private companies on maternal mortality and instilled greater confidence that the current situation is not intractable. Government respondents noted clear benefits of working with the private sector, such as greater efficiency, the ability to "get things done" with greater speed, the creative use of internet and communication, and the focus on sustainability of solutions. Private sector respondents noted that government partners had ready access to expert technical solutions and strong diplomatic relationships in the countries.

When asked if the global partnership had added value beyond what their individual organizations could have achieved working alone, several respondents felt that the global partnership model was essential in persuading their own constituencies, be they boards or legislative bodies, to support SMGL. The notion of pooling resources and leveraging expertise was attractive both to governments facing fiscal pressures and to corporate boards with limited past engagement in health system projects. One global partner stated: "If it's a movement, people will talk about it. If it's one individual group doing it, we can get a lot of work done, but [are] probably not going to attract the attention or the imagination of people who are going to really make a difference."

Responses highlighted two major weaknesses in the SMGL leadership structure. First, many global stakeholders felt that SMGL lacked clarity on the roles and responsibilities of the various partners and that the governance structure was not designed to hold partners accountable. This was said to have contributed to misunderstandings and communication difficulties between global partners and those in country. Second, while all global stakeholders agreed that there was general consensus on the overall goal to reduce maternal mortality, they noted that there was in fact no agreed-upon operational plan for how to achieve this. This included the precise model to be used, the implementation process, and the financing of program activities. This created confusion globally and in countries and reduced the effectiveness of the partnership.

In describing lessons they had learned about the partnership, many global partners noted that clear expectations, strong communication, and alignment not only of the larger vision but also of the programmatic approach were critical components to program success. Respondents spoke to the complexity of partnerships like SMGL and noted the importance of learning from implementers on the ground about needed course corrections. A substantial proportion of the global SMGL respondents were unhappy with the

"headquarters-heavy" governance model and advocated for a more distributed governance model going forward.

Global respondents shared their perspectives on the success of the SMGL intervention in the two countries. They observed that SMGL had shown that it is possible to improve data quality, health infrastructure, and the utilization of maternal health services with dedicated effort. Global partners were uniformly complementary of the immense work of country teams, implementing partners, and district health managers in moving quickly to implement SMGL interventions. They praised the commitment they saw among in-country partners—especially district health offices and health providers—who "disrupted their established working patterns" to help achieve SMGL goals.

We also asked national-level USG agency leads, implementing partners, and government representatives to comment on the global partnership. Many national-level stakeholders expressed little awareness about the structure and functioning of the global level of the partnership and described the extent of their involvement with SMGL global partners as largely confined to accompanying members on visits to SMGL districts. In-country partners were also concerned about the lack of direction, guidance, and vision for SMGL beyond Phase 1 from the global level.

"[SMGL is a model] of what we can do for maternal health over time and grow the pie in terms of resources and excite people"

— GLOBAL STAKEHOLDER

7.2 National ownership of SMGL

Implementers and policymakers in Zambia and Uganda were asked to assess two elements of country ownership: government enthusiasm/support for SMGL versus government leadership/control of SMGL. Respondents agreed that there was greater ownership of SMGL at the district level than the national level and views on this issue remained largely unchanged since the interim assessment, with most reiterating that governments were very supportive of SMGL but were not truly in charge of the program. Some respondents pointed out that national governments played an important role by creating an enabling environment for SMGL implementation, and showed more support for SMGL activities than for typical donor-funded projects.

In-country stakeholders attributed the lack of a leadership role by national governments to a combination of external and internal factors. Chief among these was the SMGL funding model, particularly the fact that funds were channeled directly from the USG partners to the implementing partners and not through the central MoH. This was said to have greatly constrained the level of control and ownership that national governments could exert in the program.

In terms of internal factors, respondents in Zambia highlighted the reorganization of the Ministry of Health and creation of the MCDMCH, which reassigned responsibilities, and inadequate human resources within the MoH overall. This created a leadership vacuum in coordinating SMGL activities through the central MoH. In Uganda, respondents attributed low national government control of SMGL in the country to three internal factors: lack of funding, lack of capacity, and competing demands at the MoH. Although respondents in both countries appreciated that national governments faced substantial resource-constraints and that SMGL was "only one of the national government's health programs," most insisted that national governments needed to demonstrate much greater leadership by tackling inadequate health system resources. A DHO in Uganda explained, "Their hands could have been tied by the resource envelope, but you know amidst knowing that mothers were dying, no one was coming out saying 'look, we must buy an ambulance for every district.' They fall short [on leadership]."

We also elicited respondents' suggestions for improving national ownership of SMGL. The three most frequent responses were: greater involvement of the

government in coordination of SMGL activities (48% of respondents), greater funding commitment from national governments (22%), and hiring of more central-level Ministry staff to help manage programs, such as SMGL (18%).

Regarding MoH coordination of SMGL, central-level respondents in Uganda specifically called for the creation of a steering committee or a technical working group that would be housed at and chaired by the MoH. The role of such a committee would be to coordinate all SMGL activities and IPs in the four districts, convene regular meetings with partners, draft and enforce implementation plans, and also ensure that SMGL activities are incorporated into district plans. A central MoH official in Zambia suggested the appointment of an SMGL focal person to oversee all SMGL activities in the country.

Many respondents noted that without a substantial financial commitment to SMGL, the program would not become truly nationally owned. Respondents in both countries noted that although national budgets were limited, national governments—beyond the MoH—had an obligation to find ways to raise more money and/or reallocate available funds especially since the "SMGL program had proved that it is possible to reduce maternal mortality in a short time." Respondents in Uganda expressed frustration that the MoH budget was often among the first to be cut in the event of a deficit. A DHO remarked, "It is the responsibility of the government to provide services to its citizens, mainly financing, but when you look at their budgets you find that government contribution is there but not at a level where it should be. How can you lack vaccines? How can you lack test kits? Because the donors haven't given you money, you don't have condoms?"

Finally, USG and national implementers alike observed that ministries of health were understaffed and needed to hire more health system managers centrally to help coordinate SMGL and other health programs. A central-level MoH respondent in Zambia observed, "I think the biggest thing we really need to do as the Government of Zambia is to get someone who can really work with SMGL to ensure we get support…" while a central-level IP in Uganda remarked, "It could help in the future if we have an SMGL person seconded to the Ministry, who helps with their work and has value embedded."

> "Frankly, at the national level they are just so stretched, …they have to lean on us more than I think they want to."
>
> — UNITED STATES GOVERNMENT, ZAMBIA

7.3 Role of the private sector in SMGL

As reported in Wave 1, private sector involvement in SMGL, particularly that of private health providers, was substantially greater in Uganda than in Zambia, where the private health sector is considerably smaller. There was broad consensus among implementing partners and district government officials in Uganda that the public-private partnerships in the SMGL focus districts enhanced service delivery and quality of care for women in the districts. Respondents in Zambia noted that the private sector, both private health providers and the corporate sector, had been minimally involved in the SMGL program.

In Uganda, private health providers were viewed as essential for wider coverage and respondents expressed the view that the national government needed to find a way to better manage and involve this sector in the program. SMGL implementing partners have been working to strengthen private facilities within SMGL districts and beyond. PACE, Marie Stopes Uganda (MSU), and STRIDES have accredited private facilities, which provide basic and comprehensive emergency obstetric care. MSU and STRIDES have led the provision of private service vouchers and incentives for antenatal care. PACE has plans for further work in expanding private franchise clinic networks and testing innovative methods of providing affordable maternal care such as community health insurance schemes. A USG official in Uganda remarked, "We cannot do without them.

Private facility in Kyenjojo District, Uganda

Private health providers have done the bulk of C-sections in Kabarole and taken over the burden of HC IVs in that district and contributed to the decongestion."

Respondents expressed some concerns about the lack of standardization of maternity services provided in private health facilities and the lack of systems at central MoH to monitor or enforce national standards, especially at lower-level private facilities. Respondents in Uganda suggested two ways to improve the involvement of the private health sector in the country. These were: "outsourcing" some health services to the private sector and involving private providers in SMGL planning meetings and in data collection efforts in the districts. An implementing partner observed that private providers could play a unique role in incentivizing healthy behavior by offering free sonograms to women who attend four ANC visits. One private facility in Kyenjojo is currently employing this strategy and believes it has been effective at increasing women's ANC visits.

When asked about the potential role the corporate sector could play in SMGL, respondents in Uganda overwhelmingly described "corporate social responsibility" as a largely untapped resource in terms of SMGL financing. They noted potential private-sector roles such as funding telecommunication services at facilities, subsidizing transport, investing in infrastructure development (both facility and staff housing), and funding health provider training. Zambian respondents also suggested sensitizing the business sector on the importance of maternal mortality and targeting local businesses operating in the SMGL districts. Respondents felt that Zambian corporations could contribute to the following activities: training of health providers, renovating or constructing mothers' shelters and maternity wings, enhancement of roads and telecommunication systems, and supporting outreach and educational initiatives via text-messaging and/or radio advertising.

Private service vouchers distributed by Baylor in three SMGL districts in Uganda

"I would want to see a comparable interest and support from the companies that are … really doing well in Zambia and for little effort could really have added value to the SMGL program."

— IMPLEMENTING PARTNER, ZAMBIA

8

Recommendations

Our final evaluation confirms that SMGL was successful in delivering a large portfolio of activities intended to boost demand and access and improve the quality of care in health facilities. In health facilities that received several SMGL interventions, providers had higher levels of confidence in their clinical ability and new tools to save maternal and newborn lives. In the community, SMGL created a sense of urgency around maternal mortality and an understanding that facility delivery is the key means to reduce it. This rise in ambition and a new sense of what is possible may be among the most potent legacies of SMGL.

We found that several of the demand generation activities had broad penetration into the population in both countries. We further observed that in Uganda, SMGL districts performed consistently better than similar districts without SMGL in a number of metrics of quality of care. A key question for the future of SMGL and other initiatives, which may have fewer resources to invest per district, is: which SMGL activities had the greatest impact on changing the likelihood of maternal survival? Which were the so-called "active ingredients"? The best way to answer this question would be to conduct a head-to-head comparison of different MNCH packages, but this was not the model adopted by SMGL. Instead, we conducted an exploratory analysis of "active ingredients" using the data we collected to test some relevant hypotheses.

ACTIVE INGREDIENTS OF SMGL

In order for us to consider an intervention an "active ingredient," it had to have been implemented successfully and to have a measurable impact on the recipients that should lead to a reduction in maternal mortality. We assessed separately the active ingredients that mattered most to women and to providers in SMGL districts, exploring which demand-side interventions were correlated with women's perception of service quality and which supply-side interventions were correlated with providers' perceptions of quality.

Demand-side activities:

To pinpoint the SMGL interventions most associated with facility utilization, it would have been ideal to conduct a population-based survey that included women who were and were not exposed to the SMGL interventions and to measure their utilization of health services. In the absence of such as study, we considered which SMGL demand-side interventions influenced women's perception of the quality of care. This can be seen as a measure of the influence of a given SMGL demand-building intervention on women's confidence in the health system and valuing of health care. We thus explored which of the most commonly used SMGL interventions had an independent effect on quality and satisfaction ratings *within* SMGL districts. The most commonly used interventions in the two countries were: vouchers for transportation, Mama Kits/Packs, radio programs, and visits with VHTs and SMAGs. Between 10% and 30% of women used one or more of these in both countries. Vouchers and Mama Kits are examples of subsidies and incentives, respectively.

We found two categories of activities that especially resonated with women: 1) **subsidies/incentives** and 2) **community health worker outreach**. Our analysis found that the use of these interventions was not only common but raised women's assessment of care quality and/or satisfaction in the intervention districts. For example, vouchers and visits with a village health team member were associated with higher quality ratings and some higher satisfaction ratings in Uganda's SMGL districts. Mama Packs were particularly influential in the two Zambian districts in which they were implemented, where they were associated with higher satisfaction and likelihood of recommending the facility to others. And the delivery incentives may have additional benefits beyond maternal health: in both countries, women who received Mama Kits/Packs reported a greater likelihood of bringing the child back to that facility for needed health care in future.

Supply side activities:

On the supply side, we examined which SMGL activities were most likely to predict higher quality of care ratings from providers in intervention districts. We identified three types of active ingredients: 1) **new health workers**, 2) **training and**

support to enhance clinical skills, and 3) **tools to do the job** (operating theaters, obstetric equipment, reliable medicines). Providers in intervention districts in both countries who believed they have adequate equipment and infrastructure and medicines to perform their work were twice as likely to rate the overall quality of care for delivery that they were able to provide as excellent or very good. Mentoring was also associated with higher quality of care ratings in SMGL districts in Uganda. In future SMGL countries, the details of the active ingredients may change. This is particularly the case for demand-generating interventions, which may not be necessary in areas with higher facility utilization. For example, subsidies may be less important if facility delivery and Caesarean section are free and facilities are nearby (e.g., urban areas). Similarly, community health worker outreach may not be essential where facility delivery rates are higher. The health system activities (people, knowledge, tools) are likely to be required in most if not all low-income countries with high maternal mortality. The importance of health system investments will only increase as more women deliver in facilities.

Potential active ingredients of SMGL in Uganda and Zambia

- Subsidies and incentives to offset costs of care (e.g., travel vouchers, Mama Kits/Packs)
- Community health worker (VHT/SMAG) outreach
- Health care providers: more doctors, nurses, midwives
- Knowledge and support: training and mentoring in obstetric and newborn care
- Tools to do the job: operating theaters, obstetric equipment, medicines

Importance of synergistic health system interventions

One of the striking findings in our evaluation was the clear perception by both women and providers that the quality of care in Uganda's SMGL districts was higher than that in non-SMGL districts. Women's perceptions of quality matter, as quality of care is a key consideration when women decide where to deliver. Research shows that women highly value provider communication and availability of equipment and medicines in choosing where to deliver.[10-12] We found that women in Uganda's SMGL districts rated quality of care higher than women in comparison districts in 5 of 8 quality domains, including equipment, communication, and overall quality. Providers in Uganda's SMGL districts largely agreed with the women, giving high ratings to their ability to provide excellent care for delivery, obstetric complications, and newborns.

Without an experiment that prospectively compares different packages, we cannot explain why respondents in Uganda, but not Zambia, thought that quality was higher in SMGL versus comparison districts. Our hypothesis is that, for a variety of reasons, Uganda managed to implement a key set of interventions that functioned synergistically to boost facilities' overall capacity to provide quality obstetric care. Whereas both countries did extensive training and distribution of equipment and medicines, Uganda additionally hired many new providers, expanded surgical capacity, and conducted intensive mentoring. We believe that, implemented together, these interventions create large multiplicative effects that create a **culture of competence** in which providers are confident in their skills and enabled to deploy these skills in assisting women. One example is that while satisfaction with in-service training doubled the likelihood of rating the quality of care the facility could provide for laboring women as excellent or very good,

training *and* adequate equipment and infrastructure made the same rating 3-4 times more likely.

The power of synergistic investments is apparent in Uganda. Between 2011 and June 2013, Uganda nearly doubled the number of doctors in SMGL districts from 25 to 49. Uganda also increased the number of nurses and midwives by approximately 20%, hiring 123 new staff. By comparison, Zambia hired just 19 midwives for SMGL. At the same time, Uganda embarked on extensive mentoring and supportive supervision including mentoring by obstetric specialists from Kampala, potentially increasing the quality or value of mentoring. Finally, while both countries provided training, obstetric equipment and supported supply of medicine, Uganda additionally built 11 new operating theaters that dramatically transformed what providers could do for women experiencing obstetric complications: the new theaters almost tripled surgical capacity in the districts (from 6 to 17 CEmONC-capable facilities). As these investments came together, providers not only attained new skills, but could also implement them to the benefit of pregnant women.

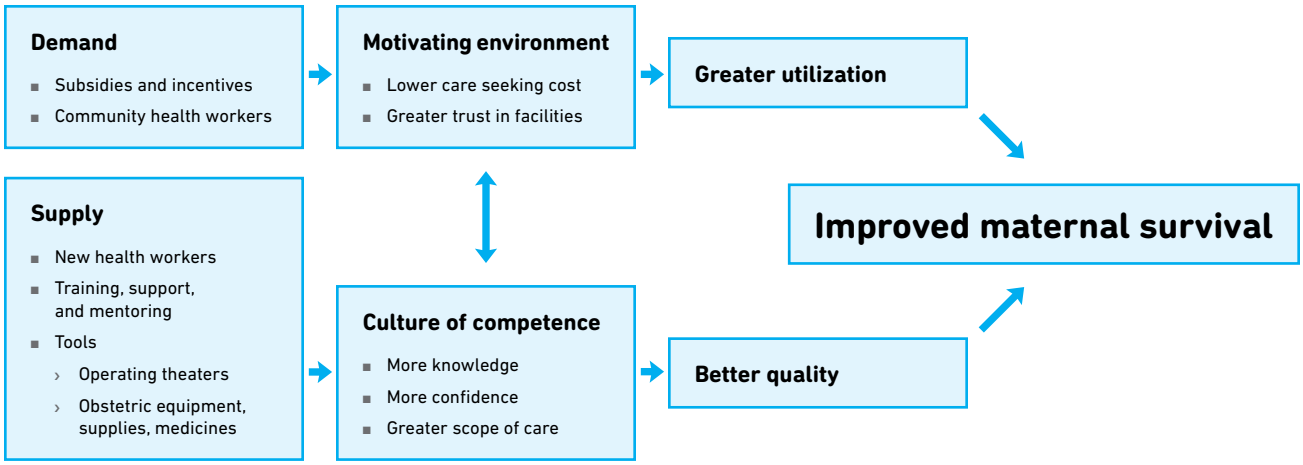
In terms of SMGL's community activities, the combination of vouchers and incentives with health worker outreach created a **motivating environment** for facility delivery. In concert with quality improvements in facilities, these promoted a surge in demand for facility delivery and higher perceptions of quality. In Uganda where the vouchers and incentives were extensively delivered and where facilities were upgraded and equipped to a greater degree and where mentoring was intensive, the impact of the synergies is seen in the consistently higher quality scores in SMGL versus comparison districts. It is also apparent in the substantially greater increases in utilization in Uganda compared to Zambia, even accounting for more adverse geography in Zambia that were identified in the SMGL internal evaluation. Figure 14 shows a potential mechanism for how the active ingredients improve care seeking, quality of care, and, in turn, maternal survival.

National ownership and sustainability

For SMGL to succeed in changing community mindsets and the health system in the long run, national governments need to be true partners in SMGL. We found that while national governments were supporters of SMGL, they were not in the lead. National government partners do not participate in the Global Leadership Council meetings and do not have formal commitments—particularly financial—to supporting and sustaining SMGL. National policymakers, district health managers, and USG agency leads agree that in future, governments should play a more central role in coordinating SMGL activities and committing funding, especially in central functions of the health system.

National governments are "natural owners" of activities such as hiring of health workers, hiring of community health workers, building/upgrading facilities, and managing the supply chain for medicines. Activities in which development partners may have a comparative advantage in supporting may include providing stop-gap equipment and supplies, supporting mentoring and supervision by sharing curricula, tools and best practices, providing in-service training, incentive kits and vouchers, and facilitating media campaigns. Clearly the respective roles and contributions of national governments and SMGL global partners will differ in different countries. However, it is essential that the role of national governments be not merely symbolic and that their participation not be curtailed by low expectations from global partners. Technical support to the central Ministry of Health in budgeting, program management, and monitoring/evaluation may assist Ministries of Health in their oversight of SMGL. In future

FIGURE 14: Intervention packages and improved maternal survival: potential mechanisms



SMGL countries, development partners should explicitly consider the trade-offs between speed and lasting change. As SMGL transitions from proof-of-concept to a phase of building and scaling achievements, the value of involving governments as owners rises. Planning a transition to greater national ownership will be a key to sustainability. Transition models used by the Global Alliance for Vaccine Initiative (GAVI) and now by PEPFAR may be useful examples.

Recommendations

1. Commit to five years—with a clear transition plan

Our evaluation demonstrates the formidable challenges facing initiatives that try to change health systems and population behaviors on a one-year timeline and budget. Some activities took nearly 12 months to implement, and some had not yet launched by the end of the program year. Visits towards the end of Phase 1 showed signs that SMGL was already waning in terms of its implementation and its effectiveness in some areas, as no plans for future activities or staffing were in place. In Phase 2, SMGL partners should make minimum commitments of five years to enable appropriate planning, engagement of local ministries, sequencing of interventions, and planning for sustainability. In addition, the role of national governments and district authorities should be clearly outlined. From the outset, this should include government investments in core areas such as infrastructure and human resources, as well as a transition plan detailing how countries will assume responsibility for the program moving forward.

2. Think in terms of health system packages not isolated interventions

Improving maternal survival requires system-level investments, most centrally in doctors and nurses/midwives, surgical infrastructure, training and support. While the need for investments in generating demand and promoting access, such as vouchers, incentive kits, and community health worker outreach will vary throughout low-income countries, health systems in the poorest countries will likely require similar system investments to those made in Uganda's SMGL districts. There we have seen that investments in surgically equipped facilities,

medicine supply chains, health workers, and clinical skill acquisition are mutually-reinforcing and essential for creating a culture of competence that enables health workers to provide more and higher-quality obstetric care. Packages of health system investments—with funding shared between development partners and host governments—are also more likely to have beneficial "spillover" effects that enhance health services for women, men, and children. An excellent example of this is the operating theaters built in Uganda that can serve both women with obstetric complications and victims of road-traffic accidents.

3. Training is not enough: consider other cost-effective models for improving care quality

We found that training—whether of community health workers, health providers, or data collectors—was the most rapidly and extensively delivered of all the interventions in both countries. In-service training, mentoring, and supportive supervision required less systems-level change than other activities, and was provided largely by existing implementing partners, using existing staff, materials, and tested methods established in the HIV and MCH development assistance platforms. For these reasons, training is among the most common donor-supported activities in global health. Our findings of a modest effect—roughly a 10% difference in knowledge—of training alone echoes other literature questioning the effects of short, in-service trainings on provider performance over the long run. Other countries have found promising approaches to improving quality of care ranging from Morocco's quality competitions to Rwanda's performance-based financing.[13,14] Sharing health facility ratings and clinical outcomes with the public is commonly used in high-income countries and an adapted approach may be relevant in lower-income settings. SMGL offers a perfect opportunity for testing some of these innovations.

4. Focus on "last mile" women

Even with expansion of obstetric facilities and transport solutions, many women in rural areas will be too far to reliably access facilities for delivery. Yet reaching these "last mile" women will be required to bring down maternal mortality numbers and to ensure the health system meets the needs of all people. SMGL should continue testing innovations to provide good care for these women, including maternity waiting homes near hospitals, and telemedicine to support lone providers in first-level facilities. Some women are dissuaded from coming to facilities for fear of disrespectful treatment. Efforts to promote dignified maternal care must go hand in hand with technical quality improvements. Finally, our evaluation revealed that demand-generation activities had an unintended consequence in some settings—the creation of stigma and the imposition of fines on women who deliver at home. Careful attention should be paid to the negative effects of the social pressure to deliver in facilities on women, some of whom are likely to be amongst the poorest and most vulnerable members of communities.

5. Clarify the SMGL governance structure—globally and in host countries

At the global level, the SMGL Leadership Council should define a governance structure with clear roles and responsibilities (e.g., funding, implementation, advocacy) and articulate and clear lines of accountability within the partnership and to the countries for all major activities relating to the partnership. This will enhance the effectiveness of the SMGL global partnership and clarify the value added beyond the actions of individual members. Within countries, national governments should take on a central role in oversight of SMGL and, over time,

increase investments in functions, particularly those related to strengthening health systems.

6. Test future intervention packages using rigorous evaluation methods

The experience in Uganda and Zambia has produced important insights, including that the PEPFAR and MCH platforms can be used to rapidly scale new programs, and that MNCH interventions can be implemented within existing delivery systems. However we know less about the minimum contents of an effective SMGL package and its implementation. As SMGL moves beyond the "big push" to a phase of sustaining and scaling gains in Uganda and Zambia and in new countries, it confronts a context of declining global health funding and low national resources. In this setting, identifying a lean and scalable package is a priority. To this end, combinations of interventions likely to be the "active ingredients" should be tested head-to-head in a variety of settings. The same can be done for alternative implementation approaches—for example, in-person or web-based continuing education. The most credible evidence of effectiveness will come from experimental and quasi-experimental evaluations that are done prospectively alongside program roll-out.

9
Appendices

APPENDIX A

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APPENDIX B

District-Level Demographic and Health Indicators

	UGANDA								ZAMBIA							
	Kabarole	Kamwenge	Kibaale	Kyenjojo	Kiryandongo	Masindi	Year	SOURCE	Kalomo	Mansa	Lundazi	Nyimba	Kabwe	Kapiri Mposhi	Year	SOURCE
DEMOGRAPHIC																
Population	409,400	324,400	646,500	369,700	635,200		2011	1,2	254,211	217,603	314,281	101,616	202,914	240,841	2010	3
Literacy rate (%)	54.4						2011	4	62.7	41.8	39.5		54.3		2007	4
Secondary education or higher (%)	25.5						2011	4	39.8	21.9	16.1		34.9		2007	4
Farmers (%)	64.1						2011	4	37.5	17.8	34.7		20.0		2007	4
Own a telephone (landline) (%)	1.0						2011	4	0.8	0.5	1.2		2.5		2007	4
Have electricity (%)	8.6						2011	4	18.7	6.1	5.5		15.7		2007	4
Improved water supply (%)	64.9						2011	4	42.0	31.1	18.5		47.7		2007	4
HEALTH																
HIV prevalence (%)	8.2						2011	5	15.2	10	15	7.7	19.6	15.3	2010	7
Maternal deaths, annual*	57	45	90	51	88		2010	6	58	50	72	23	46	55	2010	6
Newborn deaths, annual**	422	334	666	381	655		2012	6	383	328	474	153	306	363	2012	6
Deliveries, annual	18,341	14,533	28,963	16,563	28,457		2011	1	13,219	11,315	16,343	5,280	10,552	12,524	2010	1
HEALTH SYSTEM																
Medical officers	21	0	5	3	3	4	2011	1,8	9	12	5	3	20	4	2011	8
Clinical officers	51	17	32	22	13	10	2011	1	20	7	12	9	44	18	2011	8
Anaesthetic officers	3	0	1	1	†	†	2011	1	†	1	1	0	2	†	2011	8
Nurse/midwives	168	37	34	37	85	149	2011	1	14	173	119	50	389	116	2011	8
Provincial/regional/referral hospitals	4	0	1	0	0	0	2011	1	0	1	0	0	1	0	2010	9
District hospitals	2	4	5	2	1	3	2011	1	1	0	1	1	1	1	2010	9
Health centers	17	9	17	15	8	10	2011	1	29	27	23	12	26	25	2010	9
Health posts	24	14	20	15	†	7	2011	1	4	1	19	5	6	4	2010	9
Total CEmONC facilities †	6	4	5	2	1	3	2011	1,8	1	1	1	1	2	1	2011	1,8
Total BEmONC facilities	17	9	17	15	8	10	2011	1,8	29	27	23	12	26	25	2011	1,8
UTILIZATION																
Women who completed at least 4 ANC visits during pregnancy (%)	48.73						2011	4	60.8	68.0	61.5		54.6		2007	4
Women who gave birth by Caesarean section (%)	6.9						2011	4	2.8	3.4	2.5		1.6		2007	4
Households with bednets (%)	84.9						2011	4	57.5	88.5	66.4		68.3		2007	4
Women who received a vitamin A dose within 2 months of delivery (%)	36.4						2011	4	44.9	51.8	46.6		36.0		2007	4
Women who use a modern contraception method (%)	21.6						2011	4	30.2	10.9	40.0		3.1		2007	4
Health facility delivery coverage (%)	55.9						2011	4	37.6	35.5	44.8		33.0		2011	4

Sources

1 SMGL COUNTRY OPERATIONAL PLANS

2 PROJECTIONS BASED ON UGANDA BUREAU OF STATISTICS DATA

3 2010 CENSUS OF POPULATION AND HOUSING, ZAMBIA, CENTRAL STATISTICAL OFFICE

4 DEMOGRAPHIC AND HEALTH SURVEYS; DATA FROM THE DEMOGRAPHIC AND HEALTH SURVEYS ARE REPORTED AT THE REGIONAL LEVEL

5 UGANDA AIDS INDICATOR SURVEY

6 WHO GLOBAL HEALTH OBSERVATORY

7 ZAMBIA NATIONAL AIDS COUNCIL

8 INFORMATION COLLECTED FROM DISTRICT HEALTH OFFICE

9 LIST OF HEALTH FACILITIES IN ZAMBIA, 2010, MINISTRY OF HEALTH

* Maternal deaths calculated based on the WHO 2010 Global Health Observatory point estimate of 310 and 440 maternal deaths per 100,000 live births in Uganda and Zambia, respectively

** Newborn deaths calculated based on the WHO 2012 Global Health Observatory point estimate of 23 and 29 newborn deaths per 1,000 live births in Uganda and Zambia, respectively

*** Uganda crude birthrate = 44.8 according to Uganda SMGL operational plan; Zambia births estimated at 5.2% of population according to operational plan

† Data not available

APPENDIX C

SMGL logic model

INPUTS

- SMGL program plan
- Funding
- USG, MoH, and implementing partners
- Health workers
- Trainers and training curricula
- Equipment (e.g., laboratory, vehicles, scales, delivery equipment, etc.)
- Supplies (e.g., essential medicines, blood supply)
- Basic infrastructure (e.g., water, electricity)
- Guidelines (clinical, data, supply chain)
- Information and communication technology

ACTIVITIES

Demand

- Train and supervise community groups to promote facility delivery and birth preparedness (Village Health Teams [VHTs], Safe Motherhood Action Groups [SMAGs])
- Identify and engage community influencers in safe motherhood (Change Champions)
- Provide basic newborn/birth supplies to incentivize facility delivery (Mama Kits, Mama Packs)
- Run mass media campaigns on safe motherhood, engage community drama groups

Access

- Build new operating theatres with CEmONC capacity
- Expand/refurbish maternity wards, labs, pharmacies
- Renovate mothers' shelters near hospitals for high risk women
- Provide service delivery vouchers and vouchers for transport to facilities and referral to higher-level private facilities
- Buy emergency obstetric and neonatal care (EmONC) equipment
- Buy ambulances, motorcycles, motorbikes, and communication equipment for transportation and referrals
- Form district-level transport committees to improve referral
- Contract with private providers for EmONC

Quality

- Hire new doctors, nurses, and midwives in collaboration with the Ministry of Health
- Train health workers in EmONC
- Train health workers in newborn resuscitation ("Helping Babies Breathe")
- Train doctors in surgical obstetric care and anesthetic officers in anesthesia
- Provide regular supportive supervision to frontline health workers to maintain and improve skills in obstetrics, newborn care and anesthesia
- Provide training and oversight for maternal death reviews
- Provide essential medicines to health facilities

System strengthening

- Build provincial and district health team capacity with SMGL staff
- Strengthen supply chains through training on procurement and stock management
- Build capacity of facility staff to supervise community health workers
- Provide computer-based medical records (SmartCare)
- Strengthen pharmacy, lab, and blood supply
- Support roll-out of electronic district health information system
- Train health workers in data collection and health information systems

OUTPUTS

Utilization

INCREASE IN:

- facility deliveries
- four antenatal care visits
- postnatal care visits
- referrals for complications
- EmONC
- neonatal resuscitation

Quality

REDUCTION IN:

- maternal facility case fatality rate
- perinatal mortality in facilities

System strengthening

- Stronger supply chains and health information systems
- New operating theaters
- More mothers' shelters
- Improved transport and communication

OUTCOMES

- Reduction in maternal mortality
- Reduction in newborn mortality

BOTH COUNTRIES UGANDA ZAMBIA

APPENDIX D

Descriptive data of study participants

TABLE D1:

Characteristics of exit survey participants: women with recent deliveries

	UGANDA		ZAMBIA	
	Intervention (n=790)	Comparison (n=451)	Intervention (n=843)	Comparison (n=404)
Age	25	24	25	25
Married/ cohabiting with partner (%)	80	85	88	82
EDUCATION				
Never attended school (%)	11	14	9	4
Any primary education (%)	66	51	51	43
Any secondary education or higher (%)	20	32	38	52
Literate: writes easily (%)	45	37	42	31
Farmer/ homemaker/ services (%)	80	76	68	49
Religion: % Christian (%)	95	93	99	100
FACILITY TYPE WHERE SURVEYED				
CEmONC	66	63	47	43
Public	70	95	75	100

TABLE D2:

Characteristics of satisfaction survey participants: skilled providers

	UGANDA		ZAMBIA	
	Intervention (n=435)	Comparison (n=275)	Intervention (n=357)	Comparison (n=200)
CADRE				
Enrolled nurse/ midwife	64	60	64	59
Registered nurse/midwife/ clinical officer	30	35	32	39
Doctor/medical licentiate	6	5	4	3
Full time employees	95	97	89	93
Permanent employees	60	90	89	92
Female	65	66	55	71
Age (mean)	32	37	38	38
Years worked (mean)	3	6	5	5
Hired for SMGL	19	0	10	1
FACILITY WHERE PROVIDER WORKS				
CEmONC	60	62	41	47
Public	57	87	78	92

TABLE D3:
Characteristics of facility managers interviewed (intervention districts)

	UGANDA (n=41)	ZAMBIA (n=40)	TOTAL (n=80)
TYPE OF FACILITY EMPLOYED AT			
Referral CEmONC	1	2	3
Other CEmONC	13	5	18
BEmONC	27	33	60
JOB TITLE			
Hospital administrator/ medical superintendent	3	2	5
"In-charge"	35	36	71
Other	3	2	5
QUALIFICATIONS			
Doctor	5	4	9
Clinical Officer	14	6	20
Midwife	10	6	16
Nurse	8	21	29
Other	4	3	7
Years employed at facility (mean)	3.7	4.5	4.1

TABLE D4:
Characteristics of focus group participants: women with recent deliveries (intervention districts)

	FACILITY DELIVERY FGDS			HOME DELIVERY FGDS		
	UGANDA	ZAMBIA	TOTAL	UGANDA	ZAMBIA	TOTAL
Number of participants	89	103	192	83	118	201
Age (mean)	24.8	25.7	25.3	25.9	28.2	27.3
Years in current village (mean)	9.1	13.9	11.7	10.6	14.8	13.1
Married/cohabitating with partner (%)	86	94	91	83	95	90
Parity (mean)	2.9	3.1	3.0	3.5	3.8	3.7
Total home deliveries (mean)	1.0	0.7	0.8	2.6	2.6	2.6
Total facility deliveries (mean)	1.9	2.0	1.9	0.9	1.2	1.1
Occupation: Farmers (%)	79	81	80	89	75	81

TABLE D5:
Characteristics of focus group participants: community health workers (intervention districts)

	UGANDA	ZAMBIA	TOTAL
Number of participants	54	65	119
Age (mean)	39.7	43.9	42.0
Female (%)	46	56	52
Years in current village (mean)	27.7	27.6	27.6
Years as CHW (mean)	6.4	4.6	5.0
Highest grade completed (mean)	Not available	9	Not available
SMGL trained (%)	100	74	87

TABLE D6:
Characteristics of focus group participants: local leaders (intervention districts)

	UGANDA	ZAMBIA	TOTAL
Number of participants	50	55	105
Age (mean)	46.5	51.4	49.1
Female (%)	28	22	25
Years in current village (mean)	35.2	23.7	29.2
Years in position (mean)	10.5	7.3	8.7
SMGL Change Champion (%)	N/A	96	N/A
POSITION			
Local Council Member	23	0	23
Traditional leader	0	26	26
Religious leader	3	5	8
Other	2	23	11
No response	22	1	23

APPENDIX E Descriptive statistics for quality metrics in Uganda and Zambia (pooled data for intervention and comparison districts)

INDICATOR		UGANDA	ZAMBIA
QUALITY METRIC	MEASURE	MEAN % (n)	
Provider knowledge: [1]	—	52.2% (n=328)	57.2% (n=327)
Provider confidence: [2]	—	57.3% (n=313)	65.4% (n=286)
Receipt of services: (PERCENT OF WOMEN REPORTING RECEIPT)	Caesarean section	13.3% (n=1,241)	8.5% (n=1,247)
	Antibiotics/IV drip	86.0% (n=1,241)	77.6% (n=1,247)
	Health worker checked on mothers' health	61.2% (n=1,232)	90.4% (n=1,243)
	Health worker checked on newborn's health	75.6% (n=594)	95.7% (n=959)
	Newborn topics women couseled on (out of 7)	54.3% (n=1,241)	67.1% (1,247)
	Receipt of counseling on family planning	19.8% (n=1,235)	52.2% (n=1,243)
	Receipt of family planning products/services	7.6% (n=1,232)	20.6% (n=1,241)
Women's rating of quality of: (PERCENT RATING "VERY GOOD" OR "EXCELLENT" VERSUS "GOOD," "FAIR," OR "POOR")	Delivery care	45.2% (n=1,233)	65.2% (n=1,245)
	Knowledge & competence of health workers	66.8% (n=1,230)	80.8% (n=1,243)
	Respect shown by health workers	62.6% (n=1,237)	74.8% (n=1,244)
	Availability of drugs	42.1% (n=1,179)	49.5% (n=1,216)
	Availability of medical equipment	41.2% (n=1,013)	43.4% (n=1,173)
	Privacy given during delivery	56.7% (n=1,230)	63.8% (1,241)
	Communication skills of providers	47.4% (n=1,231)	62.4% (n=1,239)
	Cleanliness of facility	26.8% (n=1,228)	56.5% (n=1,243)
Providers' rating of input quality: (PERCENT RATING "STRONGLY AGREE" VERSUS "SOMEWHAT AGREE," SOMEWHAT DISAGREE," OR "STRONGLY DISAGREE")	Consistent availability of supplies and medications	39.0% (n=707)	21.9% (n=557)
	Functioning equipment and infrastructure	24.8% (n=709)	16.2% (n=557)
Providers' rating of quality of: (PERCENT RATING "EXCELLENT" VERSUS "GOOD," "FAIR," OR "POOR")	Delivery care	19.6% (n=667)	21.2% (n=518)
	Care for women with obstetric complications	15.4% (n=642)	20.8% (n=528)
	Newborn care	17.5% (n=669)	25.9% (n=533)
Women's satisfaction with care[3]	—	63.8% (n=1,238)	74.3% (n=1,244)
Likely to recommend this facility to others[4]	—	80.0% (n=1,233)	82.2% (n=1,244)

1 (Percent score on a 60-question multiple choice test)
2 (Percent of 26 obstetric skills rated "very confident" versus "not very confident"; "I cannot perform this skill" or "does not apply")
3 (Percent rating: "very satisfied" versus "somewhat satisfied," "somewhat dissatisfied," or "very dissatisfied")
4 (Percent of women rating "very likely" versus "somewhat likely," "somewhat unlikely," or "not at all likely")

APPENDIX F

Descriptive statistics for provider satisfaction metrics in Uganda and Zambia (pooled data for intervention and comparison districts)

MEASURE DEFINITION	UGANDA	ZAMBIA
	MEAN % (N)	MEAN % (N)
In general, I am satisfied with this job	46.2% (n=704)	58.7% (n=555)
I feel that my workload is manageable	23.2% (n=710)	10.8% (n=557)
There are enough staff to provide quality patient care	20.6% (n=708)	9.4% (n=555)
Doctors, nurses, and other health workers have good working relationships	63.4% (n=707)	53.1% (n=550)
District health managers support and value health workers	35.5% (n=677)	40.9% (n=545)
I find that my opinions are respected at work	52.8% (n=706)	48.2% (n=554)
I am satisfied with my pay compared to similar jobs in other organizations	12.0% (n=699)	10.3% (n=551)
There is adequate in-service (continuing) education to improve my skills	32.3% (n=705)	27.5% (n=553)
There is adequate clinical supervision in this position	51.3% (n=708)	42.6% (n=551)
There is adequate mentoring and support to assist me in this position	43.7% (n=707)	34.4% (n=553)
If it were up to me, I would continue to work for this hospital/clinic for quite some time	50.6% (n=702)	35.3% (n=553)

Provider satisfaction (Percent of providers who "strongly agree" versus "somewhat agree," "somewhat disagree," or "strongly disagree")

APPENDIX G

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