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SYMMACS

The Systematic Monitoring of The Male Circumcision Scale-up in Eastern and Southern Africa

Final Report of Results from Kenya, South Africa, Tanzania and Zimbabwe

SYMMACS:

SYSTEMATIC MONITORING OF THE MALE CIRCUMCISION SCALE-UP IN EASTERN AND SOUTHERN AFRICA

FINAL REPORT OF RESULTS FROM KENYA, SOUTH AFRICA, TANZANIA AND ZIMBABWE

August 2013

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The USAID | Project SEARCH, Task Order No.2, is funded by the U.S. Agency for International Development under Contract No. GHH-I-00-07-00032-00, beginning September 30, 2008, and supported by the President's Emergency Plan for AIDS Relief. The Research to Prevention (R2P) Project is led by the Johns Hopkins Center for Global Health and managed by the Johns Hopkins Bloomberg School of Public Health Center for Communication Programs (CCP).

ACKNOWLEDGEMENTS

The organizers of the SYMMACS activity would like to acknowledge the work of multiple collaborators in the development and implementation of the SYMMACS project. Drs. Emmanuel Njeuhmeli, Delivette Castor (USAID) and Jason Reed (State Department – Office of the Global AIDS Coordinator -OGAC) served as co-investigators to this research.

We wish to thank PEPFAR through the United States Agency for International Development (USAID) for its support of the SYMMACS project under contract GHH-I-00-07-00032-00 Order No: 02.

Many persons contributed to SYMMACS. We gratefully acknowledge the contributions and guidance of the following institutions and persons in each country:

	Kenya	**South Africa**	**Tanzania**	**Zimbabwe**
Implementing Agency	FHI360/Kenya	CHAPS	MCHIP Jhpiego/Tanzania	PSI/Zimbabwe, with ZAPP-UZ as subcontractor
Co-investigator	Dr. Nicholas Muraguri, Dr. Peter Cherutich, Dr. Kawango Agot, Dr. Walter Obiero, Dr. Jackson Kioko	Dr. Dirk Taljaard, Dr. James McIntyre	Dr. Bennet Fimbo, Dr. Eleuter Samky	Dr. Karin Hatzold, Christopher Samkange
Country Coordinator	Dr. Mores Loolpapit, Mathews Onyango	Sasha Frade	Michael D. Machaku	Webster Mavhu
Clinician (data collection)	Omondi Dickens, Nicolas Pule	Mulashi Biola, Daniel Shabangu, Sindiswe Zwane, Sindiswe Maseko	Dr. Sifuni Koshuma, Milton Kabiligi	Dr. Tendai Mutwirah Dr. Eric Nyazika Dr. Kelvin Nemayire
Social Scientist for data collection	Rosemary Owigar, Dr. Violet Naanyu	n/a	n/a	n/a
Data Manager	Omondi Dickens	Alexandra Spyrelis	Flora Hezwa, Dr. Obadia Venance Nyongole	Dudzai Mureyi
USAID Mission	Anne Murphy	Wendy Benzerga, Rebecca Fertziger	Duncan Onditi, Seth Greenberg, Eric Mlanga	William Jansen
Technical assistance and/or sampling	Dr. Kate McIntyre, Zebedee Mwandi	Carlos Toledo, Lisa Mulwenga	Koku Kasaura	n/a
Manuscript review	n/a	n/a	Hally Mahler	Dr Karin Hatzold

In addition, we would like to recognize the contributions of several other groups to the design and implementation of SYMMACS:

Technical Advisory Group to the R2P Project for operations research related to male circumcision (convened in January 2010): Bertran Auvert, Stella Babalola, Robert Bailey, Kelly Curran, Kim Eva Dickson, Timothy Farley, Ron Gray, Jason Reed, Caroline Ryan, Jane Bertrand, and Dino Rech; also present from USAID: Benny Kottiri, David Stanton, Alison Cheng, Timothy Mah, Emmanuel Njeuhmeli.

Technical support and managerial guidance on the development of SYMMACS from USAID/Washington: Benny Kottiri, Alison Cheng, Emmanuel Njeuhmeli, Delivette Castor, Sarah Sandison, Timothy Mah; and **PEPFAR/OGAC:** Jason Reed (at time of the study).

Technical and administrative support from the Center for Communication Programs (CCP), Johns Hopkins Bloomberg School of Public Health: Susan Krenn, William Glass, and Mark Beisser; and from R2P staff (CCP): Deanna Kerrigan, Caitlin Kennedy, Brandon Howard, Emily Hurley, Andrea Vazzano, Heena Brahmbhatt, 'Kuor Kumoji, Erica Layer, Jessica Spielman, and Margie Wild.

Technical and administrative support from staff at the Tulane School of Public Health and Tropical Medicine: Alan Czaplicki, Bobbie Garner-Coffie, Francs Mather, Christopher Swalm.

Research support for SYMMACS: Nicholas Thomas

Recommended citation: Bertrand JT, Rech D, Aduda D, Frade S, Loolpapit M, Machaku MD, Mavhu W, Onyango M, Perry L, and Farrell M. Systematic monitoring of the voluntary medical male circumcision scale-up in Eastern and Southern Africa (SYMMACS): Final report of results from Kenya, South Africa, Tanzania and Zimbabwe. August 2013. Baltimore: USAID | Project Search: Research to Prevention.

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ACRONYMS

AE	Adverse Events
AIDS	Acquired Immune Deficiency Syndrome
APHIAplus	AIDS Population and Health Integrated Assistance Plus
ARV	Antiretrovirals
CDC	Centers for Disease Control and Prevention
CHAPS	Centre for HIV/AIDS Prevention Studies
CMMB	Catholic Medical Mission Board
CPR	Cardiopulmonary Resuscitation
DMPPT	Decision Maker's Program Planning Tool
DOD	Department of Defense
FACES	Family AIDS Care and Education Services
FHI	Family Health International
GOT	Government of Tanzania
HIV	Human Immunodeficiency Virus
HREC	Human Research Ethics Committee
HTC	HIV Testing and Counseling
IRB	Institutional Review Board
IV	Intravenous
IMPACT/IRDO	Impact Research and Development Organization
KEMRI	Kenya Medical Research Institute
MC	Male Circumcision
MD	Medical Doctor
MOH	Ministry of Health
NASCOP	National AIDS and STI Control Program

NGO	Non-Governmental Organization
NRHS	Nyanza Reproductive Health Society
OGAC	Office of the Global AIDS Coordinator
PDA	Personal Digital Assistant
PEP	Post-Exposure Prophylaxis
PEPFAR	President's Emergency Plan for AIDS Relief
PI	Principal Investigator
PITC	Provider-Initiated Testing and Counseling
QA	Quality Assessment
R2P	Research to Prevention
RCT	Randomized Control Trial
RRI	Rapid Results Initiative
STI	Sexually Transmitted Infection
SYMMACS	Systematic Monitoring of the Voluntary Medical Male Circumcision Scale-up
TAG	Technical Advisory Group
TB	Tuberculosis
TWG	Technical Working Group
UNAIDS	Joint United Nations Program on HIV/AIDS
UNIM	Universities of Nairobi, Illinois, and Manitoba
USAID	United States Agency for International Development
USG	United States Government
VMMC	Voluntary Medical Male Circumcision
WHO	World Health Organization

EXECUTIVE SUMMARY

Introduction

In response to clear evidence that voluntary medical male circumcision (VMMC) can reduce the risk of HIV transmission in heterosexual men by approximately 60%, numerous countries in Eastern and Southern Africa have initiated the scale-up of VMMC services for adolescent and adult males. To meet the demand, the international community has sought ways to increase the efficiency of VMMC service delivery while ensuring quality of service. This study, the Systematic Monitoring of the Voluntary Medical Male Circumcision Scale-up (SYMMACS) was designed to assess the VMMC scale-up in four countries: Kenya, South Africa, Tanzania, and Zimbabwe.

In 2010, a WHO panel of experts issued a document entitled *Models for Optimizing the Volume and Efficiency for Male Circumcision Services* (MC MOVE). This document outlined "considerations" or ways in which efficiency within VMMC programs could be improved, depending upon applicability in the local context, while ensuring safety. For the purposes of this study, practitioners working closely with the scale-up of VMMC in their localities identified six elements specifically related to surgical efficiency in high volume settings:

- Optimizing the use of facility space
- Pre-bundling of supplies and instruments
- Task-shifting (allowing well-trained clinicians who are not medical doctors, labeled herein as "other clinical providers," to perform VMMC)
- Task-sharing (allowing other clinical providers to conduct certain aspects of the procedure)
- Use of electrocautery/diathermy instead of ligaturing sutures
- Use of the forceps guided surgical method

The primary objectives of SYMMACS are:

(1) to track the implementation of VMMC services and the extent of adoption of efficiency elements as programs rapidly expand the number of sites and client loads;
(2) to monitor quality and safety in the evolving VMMC programs in each country and
(3) to determine the elements of efficiency that relate most closely with increased productivity.

This report presents findings from two rounds of data collection in 2011 and 2012. The SYMMACS protocol called for (1) an annual two-day visit to each selected VMMC site and (2) compilation of monthly data (12 months historical, plus approximately 18 months during the study period) on program statistics and elements of efficiency in use at each site. Data were collected using four instruments:

#1-a: A quality-assessment (QA) of the VMMC site, which is a shortened version of the WHO assessment tool for this purpose;
#1-b: Direct observation of 10 VMMC procedures per site, including timing of each operation;
#2: Face-to-face interviews with the primary and secondary VMMC service providers;

#3: Compilation of monthly data on number of operations, rate of adverse effects, presence/absence of efficiency elements at the site, and related data.

Methods

This multi-country study consisted of two rounds of cross-sectional data collection (2011 and 2012) and two stages of sampling. The first stage involved the selection of VMMC facilities: 73 sites in 2011 and 122 sites in 2012 across the four countries. The second stage entailed selection of all VMMC clinical providers and up to 10 VMMC procedures for observation per site. The chart below summarizes the numbers of sites visited, providers interviewed and VMMC procedures observed per country and per year. The sampling was designed to accommodate new sites that became operational in 2012.

Sites visited, providers interviewed and VMMC procedures observed, by country and year

		Kenya	South Africa	Tanzania	Zimbabwe
# sites visited	2011	30	15	14	14
	2012	29	40	29	24
Types of sites: Fixed/outreach/mobile	2011	15/12/3	13/2/0	13/1/0	5/9/0
	2012	15/12/2	26/14/0	24/5/0	6/18/0
# provider interviews	2011	85	105	93	74
	2012	82	209	206	94
# VMMC procedures observed	2011	151	120	133	140
	2012	218	361	251	204

Results

Adoption of efficiency elements

The four countries differed in adoption of the six elements of surgical efficiency, as summarized below:

Adoption of the six elements of surgical efficiency, by country and year

	Kenya	South Africa	Tanzania	Zimbabwe
	2011/2012	**2011/2012**	**2011/2012**	**2011/2012**
Multiple bays in operating theatre*		X/X	X/X	X/X
Purchase of pre-bundled kits with disposable instruments		X/X		X/X
Task-shifting	X/X		X/X	
Task-sharing	X/X	X/X	X/X	X/X
Surgical method: forceps guided	X/X	X/X	X/X	X/X
Electrocautery to stop bleeding		X/X		(x)**/X

*In this study clinical staff rotation among multiple bays in the operating theater was defined as the measure of "optimizing the use of facility space." **Indicates partial adoption of efficiency element.

In VMMC service delivery, SYMMACS looked for the comprehensive, WHO-prescribed minimum package of services that accompany the surgical procedure, including a group education session that covers HIV prevention, counseling and testing, informed consent, and post-operative instructions. Regarding the surgical procedure, key elements that the study aimed to document included pre-operative procedures (e.g., a brief physical screening to detect contraindications to surgery), safety and infection control, correct surgical technique, and post-op procedures (such as taking vital signs before discharge).

Safety and quality of VMMC services

SYMMACS showed that safe, high quality VMMC can be implemented and sustained at scale, although substantial variability was observed over time. In some settings, facility preparedness and VMMC service quality improved as the number of VMMC facilities increased (most notably in Zimbabwe). Yet the expansion of services caused a decrease in quality where the number of new sites increased most rapidly (particularly in South Africa). All four countries received the highest scores on quality of surgical procedures, although the average score dropped slightly in 2012. Scores tended to be lower on infection control, pre-operative examinations, and post-operative patient monitoring and counseling, depending on country. Regarding other elements in the comprehensive minimum package, SYMMACS provided positive evidence across the countries on several points:

- VMMC sites in all four countries universally provided group education for HIV prevention.
- Kenya, Tanzania and Zimbabwe achieved close to 100% HIV testing and counseling by 2012, whereas South Africa showed lower percentages, reportedly because clients were tested offsite and referred by these facilities for VMMC.
- The percentage of sites with a functioning information system increased between 2011 and 2012.

Areas in need of improvement (in two or more countries) were as follows:

- Systems for registering adverse events were inadequate.
- Sites often lacked post-exposure prophylaxis (PEP) and guidelines for administering it onsite.
- Providers scored inadequately in tying surgical knots.
- Occasional lapses were observed in maintaining a sterile operating field.
- Providers tended not to follow the WHO guidance on a post-operative review of vital signs and use of protective eye gear.
- WHO service delivery guidelines were not readily available at many VMMC sites.

Efficiency elements in operating theater

SYMMACS yielded data on the median time required to complete the nine steps in the VMMC procedure in each country and year. The total elapsed operating time (TEOT) for VMMC procedures averaged 23-25 minutes across the four countries and two years, excluding outliers. SYMMACS also yielded data on the median time spent by the primary provider with the client (PPTC), which is particularly important in countries such as South Africa and Zimbabwe that do not authorize other

clinical providers to perform VMMC. The findings clearly demonstrated that task-sharing on suturing and use of electrocautery reduced TEOT and PPTC in South Africa and Zimbabwe.

Discussion

Strengths

The study included the in-depth examination and documentation of the actual implementation of VMMC service delivery over a two-year period in multiple countries, yielding an assessment of trends across countries as well as country-specific areas for improvement. These findings provided a base of evidence on which to make mid-course corrections on specific aspects of services delivery in national VMMC programs, commanding the attention of program managers, policy makers and donors.

Limitations

Because of the rapid expansion in VMMC sites, it was not possible to obtain a list of the universe of operational VMMC sites at the start of each round of data collection in all countries expect Kenya. Thus random sampling was not possible and the sample cannot be considered representative of the program in these three countries. Also, it was not logistically and financially feasible to visit all sites in each country. Whereas the ideal period to test efficiency and safety measures would have been when the number of VMMCs performed was highest, it was not always possible to collect data during such high-volume periods. Data collection took place during low-volume periods (relative to the local fluctuation) in all countries except Zimbabwe in 2011, and all countries except South Africa in 2012.

Programmatic recommendations

The programmatic recommendations that emerge from SYMMACS relate both to the adoption of surgical efficiency elements (described in the MC MOVE document) and items from the WHO quality assessment (WHO, 2010), as follows:

Adoption of efficiency elements:

- Task-shifting: Work toward change in the national policy in South Africa and Zimbabwe that currently prohibits task-shifting.
- Task-sharing**:** Provide more systematic training of other clinical providers to assist in various aspects of the procedure (e.g., administering local anaesthesia and completing interrupted sutures).
- Electrocautery/diathermy**:** Consider expanding the use of electrocautery in Kenya and Tanzania, if appropriate given local conditions.
- Pre-bundling of kits**:** Encourage the more widespread use of purchased pre-bundled kits with disposable instruments in Kenya and Tanzania.

Program management:

- Effective monitoring and reporting of adverse events: Train personnel in the use of consistent definitions to classify adverse events (e.g., WHO classification); improve staff performance in

consistently screening for, recording, and reporting adverse events, especially severe adverse events; and provide external monitoring of this process.

- Supervision: Establish a system of regular supervisory visits to each VMMC site, including supervision of adverse events registration.
- Training: In training of primary providers, place particular emphasis on techniques or steps that caused difficulty to some providers in some countries, such as:
    - Correctly identifying the skin to be excised
    - Safe administration of local anesthesia
    - Using the correct technique to tie the surgical knot
    - Correctly aligning the frenulum and placing the secure mattress suture.
- Protocols and guidelines: Ensure that key guidelines (e.g., WHO protocol for performing VMMC, national sexually transmitted infection (STI) guidelines, guidelines for administration of PEP) are available at or near the operating theatre.

SYMMACS is the first study to provide data on the implementation of VMMC programs and adoption of elements of surgical efficiency. The findings have already contributed to policy change on task-shifting in Zimbabwe, a review of the monitoring system for adverse events in South Africa, a shift towards increased use of commercially bundled VMMC kits in Tanzania, and policy dialogue on improving VMMC service delivery in Kenya.

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SYMMACS is implemented as part of the Research to Prevention Project (R2P). The project received IRB approval from Tulane University in May 2010, with a renewal of approval in July 2011, as well as approvals from local IRBs in each country.

INTRODUCTION

The HIV epidemic in Eastern and Southern Africa

In the course of the past four decades, the HIV epidemic has ravaged countries throughout sub-Saharan Africa, resulting in an estimated 1.2 million AIDS-related deaths in 2011 alone. Currently, 23.5 million adults in Africa are living with HIV (UNAIDS, 2012).

Within sub-Saharan Africa, Eastern and Southern Africa have borne the greatest burden of the HIV epidemic. At least 13 countries in this region have an HIV prevalence exceeding 5% among adults 15-49 years. Although in 22 countries in sub-Saharan Africa, HIV incidence peaked in the mid-1990s and has declined since 2009, HIV remains a major threat to the region.

Evidence of the effectiveness of voluntary medical male circumcision (VMMC) in reducing HIV transmission

Observational data and ecological studies have suggested for decades that male circumcision provides a level of protection from HIV infection for men (Weiss et al., 2000). Three randomized controlled trials (RCTs) conducted in South Africa, Kenya and Uganda showed up to 60% protective effect against HIV infection for men who received medical circumcision (Auvert et al., 2005; Bailey et al., 2007; and Gray et al., 2007). Recent data from Uganda show an increase in protective effect to 73% over an extended time period after the trial observation time (Gray et al., 2012). Similarly, results from South Africa support mathematical modeling analyses of the population level impact of VMMC as HIV prevalence decreased from 12.5% to 9.3% among males aged 15 to 49 years, and from 6.2% to 4.2% among participants aged 15 to 29 (Auvert et al., 2012).

Based on the RCT results, the World Health Organization (WHO) and the Joint United Nations Program on HIV/AIDS (UNAIDS) recommended the implementation of voluntary medical male circumcision in 14 regions with high HIV prevalence and low male circumcision prevalence including: Botswana, Ethiopia (Gambella), Kenya (Nyanza), Lesotho, Malawi, Mozambique, Namibia, Rwanda, South Africa, Swaziland, Tanzania, Uganda, Zambia, and Zimbabwe (WHO/UNAIDS, 2007; Weiss et al., 2008).

Data from mathematical modeling indicated that scaling up to 80% VMMC coverage among men ages 15-49 years by 2015 in 13[1] Eastern and Southern African countries and sustaining this 80% coverage over 10 years would avert 3.36 million HIV infections by the year 2025 (Njeuhmeli et al., 2011). Achieving this scenario would be mean performing 20.3 million circumcisions by 2015. Thus, governments, non-governmental organizations (NGOs), and technical agencies with strong support from international donors are working to scale-up VMMC service delivery to a level where it could impact the transmission of HIV infection and the course of the HIV epidemic.

This report focuses on four of the 14 countries prioritized for Voluntary Medical Male Circumcision (VMMC) programs and selected as being among the most active in the region: Kenya (HIV prevalence:

[1] This study did not include the Gambella National Regional State in Ethiopia, which has been prioritized by PEPFAR and is generally included as the 14th VMMC priority country/ region.

7.1%), South Africa (17.3%), Tanzania (5.7%) and Zimbabwe (15.0%).[2] The HIV epidemic is unique in each country, yet there are many common characteristics. For example, in Kenya and Tanzania, the HIV epidemic is concentrated in certain geographic areas that have low rates of circumcision. By contrast, the prevalence of HIV shows some variation by province or region in South Africa and Zimbabwe, but is high throughout these countries.

Efforts to improve the efficiency of VMMC

In 2009, the WHO, in consultation with a panel of experts, issued recommendations regarding elements designed to optimize efficiency in the surgical procedure and operating theater (known as *Models for Optimizing the Volume and Efficiency for Male Circumcision Services*, or MC MOVE) to accelerate the scale-up of VMMC services (WHO, 2010). This document outlined various considerations and options for organizing and implementing VMMC services in an efficient, safe, high quality, and logical manner, while recognizing the need to consider the local context and circumstances in which services are been offered. For the purposes of SYMMACS, practitioners working closely with the scale-up selected six elements from the programmatic considerations presented in the WHO document that were specifically related to surgical efficiency in their high volume settings: optimizing the use of facility space, bundling of supplies and disposable instruments, task-shifting, task-sharing, use of electrocautery, and use of the forceps guided surgical method.

Optimizing the use of facility space

This element is multifaceted, involving a logical approach to the arrangement and allocation of space in a VMMC facility. From a surgical perspective, the number of surgical bays available and the ratio of surgical bays to providers are critical in accommodating efficient surgery with high client loads. Traditionally, surgery was performed with one physician in one theatre/surgical bay, resulting in significant time lost between clients waiting for the surgical bay to be prepared. Adding an additional bay can improve efficiency by reducing or eliminating this provider wait time. Smooth client flow, client scheduling and an appropriate ratio of counseling services to surgery are also important factors. In this study, we measured one specific aspect: rotation between multiple surgical bays.

Bundling of supplies and disposable instruments

The WHO document highlights a number of advantages to pre-bundling commodities offsite: improved logistics in the supply chain, enhanced quality, and greater efficiency in the operating theater. From a surgical perspective, using a completely bundled set of consumables and disposable surgical instruments makes the surgical process faster and turnover time between clients shorter. A provider simply opens a bundled VMMC kit and has everything ready to use (as compared to having to assemble a tray for every client prior to surgery). Sterility is guaranteed, and there is no need for onsite sterilization or laundry facilities. Disposal is equally fast postoperatively.

[2] These HIV prevalence data are based on the following. **Kenya**: The AIDS Survey report, 2007, reported 7.1% among adults 15-64 years old. The Kenya DHS (2008/2009) yielded 6.3% for the country as a whole, but 14% in Nyanza Province. **South Africa**: UNAIDS website http://www.unaids.org/en/regionscountries/countries/southafrica; **Tanzania**: THMIS 2007-2008 Tanzania HIV/AIDS Malaria Indicator survey; and **Zimbabwe**: 2010/2011 DHS.

Task-shifting (allowing other clinical providers to perform VMMC)

In the context of VMMC, task shifting refers to allowing well-trained clinicians who are not medical doctors (such as nurses or clinical officers), labeled herein as "other clinical providers," to complete all steps of the VMMC procedure. In health care settings with limited human resources, this approach has considerable benefits. First, it allows the medical doctor time to focus on more urgent and/or complex medical cases. Second, it reduces costs of providing VMMC as more economical human resources can be used in place of physicians.

Task-sharing (allowing other clinical providers to conduct certain aspects of the procedure)

The "sharing" of surgical tasks previously assigned to physicians with other clinical providers is referred to as task-sharing. This practice is particularly critical where task-shifting is not authorized, but it is also valuable as a complement to task-shifting. An example of a shared task is the suturing of the skin, which in many countries is a task traditionally reserved for physicians. With task-sharing, nurses and clinical officers can be trained in this skill and perform it routinely. Other examples include performing the physical examination prior to surgery and administrating local anesthesia. Task-sharing enables medical doctors to focus their time on the most critical steps of the procedure, which reduces the amount of time they spend per procedure, effectively increasing the number of VMMCs they are able to perform in a given time period.

Use of electrocautery instead of ligating sutures

Electrocautery involves using electrical current to coagulate the ends of blood vessels to stop bleeding. Electrocautery is considerably faster than the alternative of using sutures to tie bleeding vessels. However, it does require special equipment, training of personnel in its correct use, and a reliable source of electricity.

Surgical method (e.g., forceps guided)

Although the WHO document acknowledges that three surgical methods (forceps guided, dorsal slit, and sleeve resection) are all approved techniques, forceps guided is the fastest. As such, it is now the most widely used surgical technique in VMMC programs. It is technically simple to perform and easy to teach. In a very limited number of cases, there are medical reasons to use another method, but forceps guided is appropriate in the vast majority of cases.

Background of VMMC programming in the four countries

Each of the four countries in this study has had a unique response to the HIV epidemic in terms of scaling up VMMC, yet there some common elements of the response across countries.

Leadership and partnerships

When presented with the RCT evidence of the effectiveness of VMMC in reducing HIV transmission, the governments of all four countries began consultative processes regarding the appropriate national

response. In all four, the national coordinating body for HIV control[3] worked with the Ministry of Health to establish policies (such as the cadre of clinical personnel authorized to perform VMMC) and service delivery practices. All countries adopted a partnership approach to VMMC service delivery, where governments worked in close collaboration with local and international NGOs. All four countries benefited from President's Emergency Plan for AIDS Relief (PEPFAR) funding through United States Agency for International Development (USAID), Centers for Disease Control and Prevention (CDC), and/or Department of Defense (DOD) for the design and implementation of the VMMC scale-up. Some countries also received funding from other donors (e.g., the Bill and Melinda Gates Foundation in South Africa and Zimbabwe). The WHO and the PEPFAR VMMC Technical Working Group (TWG) provided technical assistance and guidance to countries on this scale-up through workshops, meetings, and in-country consultations. These external groups worked with implementing agencies at the national level, as well as key stakeholders (e.g., in Kenya, the Luo Council of Elders).

In addition, international agencies contributed expertise in developing training curricula and manuals, as well as communication materials. Observational visits to sites that had provided VMMC in the context of the RCTs (e.g., UNIM in Kenya and Orange Farm in South Africa) assisted the country teams in further envisioning how best to scale-up their activities. USAID in collaboration with UNAIDS developed The Decision Maker's Program Planning Tool (DMPPT) (USAID-funded Health Policy Initiative) to allow countries to estimate the numbers of VMMCs needed to impact the HIV epidemic in each country, and from this data governments established national targets (number of men aged 15-49 that would need to be circumcised for the country to reach a certain reduction in HIV incidence).

Scope of the program

Data on HIV prevalence by regions or provinces of the country (often corresponding to ethnic groups) informed national strategies. Based on modeling using the DMPPT, all countries established the percent of males aged 15-49 years that would need to be circumcised by 2015 to have the maximum impact on the reduction of HIV (Njeuhmeli et al., 2011). In many regions of Tanzania and Kenya, male circumcision was already high and they opted to focus their programs on those provinces with the highest HIV prevalence and lowest male circumcision prevalence. This heterogeneity was not as pronounced in South Africa and Zimbabwe, where a more nationwide approach was employed.

In Kenya, Nyanza Province—the province with both the highest HIV prevalence and lowest circumcision prevalence—became the priority province for the national program (although services were also made available in Western, Rift Valley, and Nairobi Provinces). The country program was able to build on the experience at the Universities of Nairobi, Illinois, and Manitoba, located in Kisumu, Nyanza, and was established to provide VMMC in connection with the Kenya RCT. It began the rapid scale-up of services in October 2008. Moreover, it provided the first demonstration of the feasibility of conducting accelerated campaigns through its RRI (Rapid Results Initiative). Implementing agencies have included

[3] **Kenya**: National AIDS and STI Control Program (NASCOP) and the Ministry of Health (MOH); **South Africa**: National Department of Health (NDOH) and South African National AIDS Council (SANAC); **Tanzania**: Ministry of Health (MOH) and Social Welfare and National AIDS Control Program (NACP) through the establishment of the TZ MC TWG; **Zimbabwe**: Ministry of Health & Child Welfare (MOHCW) & National AIDS Council (NAC).

AIDS, Population and Health Integrated Assistance (APHIA II) Nyanza (and later Aphiaplus Western), Catholic Medical Mission Board, University of California San Francisco, Impact Research and Development Organization [IMPACT/IRDO], Male Circumcision Consortium (Family Health International [FHI], University of Illinois at Chicago, EngenderHealth, Nyanza Reproductive Health Society [NRHS]) and in the earlier stages, Marie Stopes Kenya.

In South Africa, the national program also built on the experiences of the VMMC site established for the purposes of the RCT. The Bophelo Pele clinic in Orange Farm expanded from a research site to a full service and specialized VMMC clinic; it was incorporated as a local NGO under the name of the Centre for HIV/AIDS Prevention Studies (CHAPS). Although the South African government experienced some delays in the launch of the program, by early 2011, together with its strong base of NGO partners, it began a rapid expansion of sites. By 2012 government participation had increased, and a national awareness campaign had begun, increasing further the number of sites providing VMMC for HIV prevention. As of the end of 2012, South Africa had performed just under 800,000 VMMC procedures.

Tanzania faced a different set of challenges. Eight priority regions were identified where HIV prevalence was at or above the national average and male circumcision was well below the national average. These were Iringa, Mbeya, Rukwa, Tabora, Shinyanga, Kagera, Mwanza and one district of the Mara region. The Government of Tanzania (GOT) and the Tanzanian PEPFAR team divided up the regions, with different United States Government (USG)-funded agencies responsible for scale-up in different regions. The key partners are Jhpiego, Intrahealth, ICAP, PharmAccess, Walter Reed, Mbeya Referral Hospital, Bugando Hospital and the health authorities in each of the regions mentioned above.

In Zimbabwe, the government worked with a single implementing partner—PSI (Population Services International)—in the design and implementation of its VMMC program. Service delivery began in fixed clinics in the urban areas of Harare, Bulawayo, and Mutare in May 2009, but began expansion into other areas using fixed and outreach services over the course of 2010-2011. By end of 2012, there were approximately 59 VMMC sites across the country's 10 provinces.

Service delivery models

In all four countries the initial sites were fixed clinical facilities specializing in VMMC. Fixed sites are "permanent structures often located near or within existing health care facilities that offer VMMC on a continuous basis" (PEPFAR, 2013). However, the model quickly expanded to include two different modes of service delivery: outreach sites (whereby clinical teams are deployed to existing clinics on specific days to provide VMMC services) and mobile services (where teams are deployed to non-clinical sites such as schools, churches, community centers, or similar locations, where they set up a temporary operating theater for a short period to accommodate a large number of clients). In all countries, local health facilities in the public and private sector occasionally perform medical circumcision on adults for medical and personal reasons other than HIV prevention. Such facilities are only counted among VMMC sites if they became part of the governmental or NGO programs designed to provide VMMC for HIV prevention, which requires specialized training of clinical personnel, adherence to medical protocols, adequate instruments and supplies, appropriate infrastructure, HIV testing and counseling (HTC), and related factors.

The WHO has also outlined the program quality required for scale-up of VMMC services in the *WHO VMMC Quality Assurance Guide*, which focuses on the quality of services, both in terms of the actual operative procedure and the provision of the minimum package of services associated with a VMMC procedure (WHO, 2008). This minimum package includes the provision of HIV and VMMC education, HIV testing and counseling, provision of condoms, medical screening prior to surgery (including screening for STIs), safe surgical procedure, post-operative instructions and recovery, follow-up and emergency services, as well as safe and appropriate supplies and medications throughout the steps above in a clean and suitable environment.

Group education on the risks and benefits of the procedure, as well as HTC, have been particularly important components of the VMMC service delivery package. Some VMMC programs initially experienced difficulties in testing all clients for HIV prior to the procedure. However, most have now adopted provider-initiated testing and counseling (PITC) with an "opt-out" approach, which involves routine HIV testing for all VMMC clients before the procedure unless specifically declined. Today, most clinics test close to 100% of clients prior to the procedure in Tanzania and Zimbabwe (with increasing but significantly lower percentages in Kenya and South Africa). WHO also recommends that all VMMC services include an individual counseling session in which the client discusses personal sexual risk behavior, a risk reduction plan and the partial protection of male circumcision, and any remaining questions, culminating in the signing of an informed consent. If the client is a minor, the parent/guardian signs an informed consent after the assent of the client.

Background to the development of SYMMACS

To date, millions of dollars from both local governments and international agencies have been invested in the VMMC scale-up, with varying degrees of intensity in 14 priority countries in Eastern and Southern Africa. Given the fledging nature of these programs, it was important to develop a process of evaluation that would track and document the scale-up of VMMC, especially the extent of adoption of the six elements of efficiency. Such applied research would provide valuable insights into issues occurring at VMMC facilities and lessons learned that could be shared across these countries and others less advanced in VMMC.

The PEPFAR Voluntary Medical Male Circumcision Technical Working Group (MC TWG) selected the USAID-funded Research-to-Prevention (R2P) Project to provide technical leadership in developing such a tool. The VMMC TWG convened a Technical Advisory Group (TAG), consisting of the three researchers involved in the VMMC clinical trials, as well as VMMC TWG members, VMMC practitioners, and R2P researchers in January 2010 to explore useful approaches to an applied research project on the VMMC scale-up. The TAG recommended against any type of design that would require randomization or "holding certain sites static" in the name of advancing the VMMC scale-up. Shortly thereafter, the research team developed the preliminary methodology for what would become SYMMACS. Two countries—Kenya and Zimbabwe—indicated interest in participating in this initiative. Researchers and practitioners from these two countries assisted in further developing the SYMMACS methodology at a meeting held in Arusha, Tanzania, in June 2010, attended by members of the VMMC TWG, WHO representatives, and others. Shortly thereafter, South Africa and Tanzania signed on as partners in this

endeavor. Participants from all four countries—Kenya, South Africa, Tanzania, and Zimbabwe—attended a training workshop in December 2010 in Harare, Zimbabwe, during which the group reworked and eventually finalized the instruments. The first data analysis workshop was held in December 2011 in Cape Town, South Africa. In July 2012 USAID convened the SYMMACS TAG; the Principal Investigator (PI) and co-PI presented the 2011 data to this group and obtained their recommendations for further data analysis and dissemination. The PI and co-PI also presented findings from SYMMACS at the IAS conference in Washington DC in July 2012. The second data analysis workshop took place in Naivasha, Kenya, in October 2012.

Objectives

There is a substantial body of data on the number of VMMCs performed (WHO/UNAIDS, 2011), but a dearth of systematically collected information on the operational aspects of VMMC programs. SYMMACS represents one of the first multi-country attempts to conduct such an assessment with these three main objectives:

1. to track the implementation of VMMC services and the extent of adoption of efficiency elements as programs rapidly expand the number of sites and client loads;
2. to monitor quality and safety in the evolving VMMC programs in each country; and
3. to identify the elements of efficiency that relate most closely with increased productivity.

METHODOLOGY

SYMMACS was a two-stage study with two cross-sectional rounds of data collection (2011 and 2012) in four countries. The first stage of sampling consisted of selecting VMMC sites (fixed, outreach, or mobile) at government, NGO, faith-based and other private facilities (except military sites) at which VMMC procedures were performed as part of comprehensive HIV prevention services; in total, 73 sites were sampled in 2011 and 122 sites in 2012. In the second stage of sampling, both clinical providers were interviewed (357 in 2011, 591 in 2012) and VMMC procedures were directly observed (594 in 2011, 1034 in 2012).

Implementing organization and members of the data collection team

The SYMMACS team in each country included a local implementing partner, two local co-investigators (four in Kenya), and the data collection team, as listed below. Theses country co-investigators were selected through a process of consultation with PEPFAR in-country staff, the Ministry of Health (MOH), the implementing organization in each country, and the co-PI of the overall SYMMACS study. Most were working in a position of leadership within the local national AIDS coordinating body or were respected researchers in HIV prevention. The roles of individual country co-investigators varied across countries, but included: assisting in submission of the protocol to the local IRB, providing technical support throughout the project from protocol development to dissemination of results, and to navigating any political difficulties (of which there were few). The data collection team in each country consisted of a country-coordinator[4], one to three clinicians (themselves trained in VMMC, to collect data on the clinical aspects of VMMC service delivery), and one data manager.

Training of the data collection teams

Initial training for SYMMACS data collection took place in Zimbabwe in November 2010. Other installations of the training were also conducted in South Africa and Kenya and by late May 2011, all data collection teams had received training from the PI and/or co-PI of the project. Training groups not only reviewed the instruments, but also revised problematic sections identified during the workshop to incorporate additional variables and simplify the presentation format. The training included (1) a review of each instrument and the purpose behind each question, (2) general principles of interviewing techniques, (3) specific instructions related to the observation and timing of VMMC procedures, (4) discussion of the flow of activities over the two-day visit at each site, and (5) repeated practice in administering each instrument. Also, the participants pre-tested the four instruments in two different VMMC sites in Zimbabwe. The training also included a substantial component on ethics and informed consent.

Selection of VMMC sites to be included in the monitoring

As of early 2011 when preparation for the data collection began, three of the four countries—South Africa, Tanzania, and Zimbabwe—were just beginning the scale-up of VMMC; as such, they had very few

[4] A social scientist in all cases except Kenya, where a physician held this role in 2011 and two supporting social scientists were added to the team

VMMC sites operational prior to January 2011. Thus, the sampling for SYMMACS consisted of (1) identifying all VMMC sites that were operational as of January 2011 and (2) adding new sites as they came into existence. This process differed slightly by country. A detailed account of the site sampling strategy by country can be found in Appendix A on page 92.

Data collection instruments

SYMMACS data collection in calendar year 2011 involved four instruments (shown in Appendix B), as follows:

- #1-a: A quality assessment (QA) of the VMMC site, which is a shortened version of the WHO assessment tool for this purpose (WHO, 2009);
- #1-b: Observation of 10 VMMC procedures per site, including timing of each operation;
- #2: Interview with the primary and secondary VMMC service providers;
- #3: Compilation of monthly data on number of operations, rate of adverse events (AEs), presence/absence of efficiency elements at the site, and related data.

The SYMMACS clinician or other member of the data collection team conducted the quality assessment, scoring each site and each provider performing VMMC as "0" (unsatisfactory), "1" (partially satisfactory), and "2" (satisfactory) on a series of criteria outlined in the QA and Observation Instruments (1-a and 1-b). The social scientist on the team - who in all cases except Kenya in 2011 was the research coordinator - generally conducted the provider interviews (Instrument 2), which covered attitudes, beliefs and practices related to the six efficiency elements as well as other information (e.g., age, gender, VMMC training, working hours, lifetime number of VMMC completed). Data for monthly records operations, AEs, and use of efficiency elements for the previous 12 months were drawn from central records at headquarters (if available) and verified onsite with the site manager; if not available at headquarters, they were collected onsite. The data on AEs were taken from the previously compiled service statistics available at the site; the team did not return to individual client records to retrieve this information. Two additional questions were included in 2012 and seven were removed (Appendix B).

Description of visits to each VMMC site selected for data collection

As specified in the protocol, the data collection team spent two days at each selected site to collect the data.[5] Officers-in-charge were asked prior to the visit to convene all clinical staff involved in VMMC on the first specified day of data collection to meet the country coordinator SYMMACS team. The country coordinator explained the reason for the visit and the data collection team explained that participation was voluntary and reviewed the informed consent document. The country coordinator or another SYMMACS team member then obtained consent from providers during the meeting who would later participate in the provider interviews or observations.

[5] In a few exceptional cases, the team spent only one day per site, especially if it was an outreach or mobile site where the required number of VMMC procedures (n=10) could be observed in just one day, and/or the site manager indicated the strong likelihood of seeing no additional clients the following day.

The team interviewed all service providers involved in the clinical aspects of VMMC service delivery working on either of the two days. In addition, they observed up to 10 VMMC procedures per site. The division of labor for the data collection team was as follows:

- The clinician interviewed the officer-in-charge and observed the facility (Instrument 1-a)
- The clinician assessed the operating theater; he/she observed and timed the steps in the 10 VMMC procedures per site (Instrument 1-b)
- The social scientist interviewed the service providers (Instrument 2)
- The social scientist and the clinician interviewed the officer-in-charge and compiled data on aspects of service delivery (Instrument 3)

In Zimbabwe, where data collection occurred during periods of high volumes of VMMC service delivery in 2011, the providers were interviewed on after the actual visit of the SYMMACS team to the site. This was not necessary in 2012 given low volume at many sites.

The team often arrived with site records previously obtained from a central system and proceeded to verify them with the statistics available. In the case of South Africa, primary data for the service delivery survey (Instrument 3) were collected onsite. The final month of data collection in 2012 differed by country. Therefore, the graphs in this report (based on instrument 3) end in different months: May (South Africa), June (Kenya), July (Tanzania), and September (Zimbabwe).

Data entry and processing

Data collection for the quality assessment, observation, and provider interview was originally intended to be completed with personal digital assistants (PDAs, HP iPAQ 210). Due to certain difficulties in programming and downloading the data to the computer, only the SYMMACS team in Zimbabwe collected provider interview data using PDAs. In all other cases, the local teams used paper forms and then manually entered the data into the PDAs for processing and analysis. The PDAs were programed with various controls to minimize data entry errors (e.g., set skip patterns, prompts for missing answers and limited ranges for numerical data). The paper forms were used to spot check the final data sets as well as to reference specific data inquiries. The data were downloaded from the PDAs onto a computer using Entryware in preparation for analysis. Data for the service delivery questionnaire were entered onto an Excel spreadsheet. This was subsequently converted to an ACCESS database, from which graphs included in this report were generated.

Data analysis

Prior to data processing and analysis, a standard set of the tables and graphs for presenting the results from the four instruments was developed. All SYMMACS country teams reviewed these tables prior to finalization.

The country coordinator and data manager from each country participated in two data analysis workshops. The team used SPSS version 19.0 to process the quantitative data and to produce results for the first 34 tables in this report. Analysis of the data from Instrument 3 was completed at Tulane. In addition, the provider questionnaire included a series of eight open-ended questions that the

interviewer posed to the service provider right before completing the interview. These qualitative data will be used in a separate publication on provider perspectives of VMMC scale-up in the four countries.

Human subjects (IRB) approval

The Tulane University Institutional Review Board (IRB), the Kenya Medical Research Institute, the University of the Witwatersrand's Human Research Ethics Committee (HREC) in South Africa, the Tanzanian National Institute for Medical Research, and the Medical Research Council of Zimbabwe provided ethical approval for all phases of the SYMMACS study prior to the onset of data collection.

RESULTS

The results from SYMMACS by country are presented in the following five sections:

- Quality assessment of VMMC sites
- Observation of male circumcision procedures performed
- Demand creation for VMMC
- Experience and attitudes of VMMC providers
- Evolution in the VMMC programs over time

All accompanying tables and figures can be found at the end of this document (see List of Tables and List of Figures beginning on page 50.

Quality assessment of VMMC sites

Characteristics of the VMMC sites and service providers[6]

The findings in Table 1-13 at the end of this document were obtained from interviews with the officer-in-charge at each site and from observations made by the clinician(s) on the SYMMACS data collection teams. The unit of analysis is the site (n=73 over the four countries in 2011, n=122 in 2012).

In Tables 1-13, data is presented in the form of percentages. Readers should interpret these percentages to mean "all, some, most, a few, or none" rather than as precise figures.

A. Volume of site and number of procedures

In 2012, we introduced a question to the officers in charge as to whether, based on seasonal patterns of demand for VMMC at their site, they considered the day of the visit to be in the high, average, or low volume period. As shown in Table 1, the perception of this classification is based on the capacity of the site and differed by country. One should also use caution when comparing countries on average number of operations per day, as these figures do not take into account site capacity. Kenya had the highest percentage reporting "high volume" yet it had the lowest number of operations on the day of the visit (median=5). Of the remaining three countries, South Africa had the highest number of operations (23 per day), but only 30% of providers classified it as high volume. In contrast, Zimbabwe, with the second highest median number of operations (13), was most likely to classify it as a low volume period (54%).

B. Cadre of personnel and roles

Table 2 presents data on the cadre of personnel performing or assisting on VMMC procedures on the day of the visit by country. The average number of clinical VMMC providers on the day of the visit dropped in all four countries from 2011 to 2012, which may reflect the greater use of outreach sites or newer sites with fewer personnel. Other explanations may include pressures on resource allocation and efforts to streamline staffing with experience over time. The biggest drops occurred in Tanzania (from 6.0 to 3.9 clinical personnel) and Zimbabwe (from 5.9 to 4.0 clinical personnel).

[6]The data in this section were collected using Instrument 1-a of the SYMMACS data collection instruments (see Appendix B)

C. Number of Surgical Beds per site and per team

As shown in Table 3, the average number of surgical beds also dropped slightly between 2011 and 2012 for all countries except Tanzania. This may again reflect the addition of new sites with different characteristics. However, the same general trend was observed in both years when comparing percentages across countries: South Africa (4.8 beds in 2011; 3.7 in 2012) and Zimbabwe (3.9; 2.9) had a larger numbers of beds than did Kenya (1.4; 1.2) and Tanzania (1.7; 1.9).

D. Physical characteristics of the site

In both years, the surveys included an abbreviated quality assessment of VMMC sites in each country. The data in Tables 4 to 16 present the findings from this assessment. This series of items was scored as 0=unsatisfactory, 1=partially satisfactory, or 2=satisfactory.

When examining site characteristics, results were mixed by country. In terms of light in the surgical area, Kenya and South Africa scored high in both years (from 83% to 93%, achieving a "2"= satisfactory). Zimbabwe improved from 43% to 84% satisfactory, whereas Tanzania dropped from 57% to only 31% satisfactory, possibly reflecting the larger number of new sites and outreach conditions.

Scores for ventilation in the surgical area were very high in the 2012 data. Kenya maintained a score of 93% satisfactory; South Africa dipped from 87% to 73% satisfactory; Tanzania increased from 69% to 93% satisfactory; and Zimbabwe rose from 43% to 88% satisfactory.

In terms of general appearance of the VMMC facility, Kenya was the only one of the four countries to score high in both years (93%, 100%). Tanzania increased slightly (from 62% to 72%) as did Zimbabwe (from 43% to 92%). South Africa dropped from 87% to 55% satisfactory.

E. Information system and record keeping on adverse events (AEs)

Table 5 shows the adequacy of information systems at VMMC sites. By 2012, the vast majority of sites in all four countries had a functioning information system (either manual or computerized) ranging from 96% to 100% satisfactory.

Similarly, the sites in all countries had VMMC client consent forms on file (97% to 100%). Zimbabwe, Tanzania, and Kenya had satisfactory monitoring systems in place for adverse events as of 2012. However, ratings for monitoring systems for adverse events in South Africa dropped sharply (from 60% satisfactory in 2011 to 23% satisfactory in 2012).

F. Education, counseling and referrals

Overall, the sites in the four countries scored very high on education, counseling, and referral at the VMMC sites (Table 6). In 2012, 100% of the sites in Kenya, Tanzania, and Zimbabwe reported the existence of group education on the risks and benefits of VMMC; South Africa reported this activity in only 80% of sites. Similarly, in three of the four countries, the sites scored very high (between 97% and 100%) in 2012 on individual HIV testing and counseling and time for clients to ask questions about VMMC; the exception was South Africa at 68%. One area that remains problematic for three of the four

countries was the existence of referral slips for clients needing other HIV-related services. Whereas Zimbabwe scored 100% in both years, the percent satisfactory in 2012 was 59% for Kenya and Tanzania, and 43% for South Africa. It appears that programs may have had difficulty maintaining referral systems as they increased in size.

G. Supervision of sites and monitoring of AEs

Table 7 reports data on supervisory mechanisms at VMMC sites as measured by reports of supervisory visits in the past six months. Supervision appeared to be less than ideal across all countries. Two countries improved slightly from 2011 to 2012, but still reported only half of sites as satisfactory (Kenya, increasing from 30% to 55% and Zimbabwe, from 14% to 54%). By contrast, Tanzania made little improvement between 2011 (21%) and 2012 (24%), and South Africa actually dropped from 60% (2011) to 18% (2012). It should be noted that new some facilities had only been in operation for six months or less when data collection occurred. Nonetheless, this does not explain the low percentages found.

H. Availability of protocols, supplies and equipment in VMMC sites

As shown on Table 8, the existence of appropriate documentation at the VMMC sites continues to be problematic. In terms of the availability of WHO guidelines for performing VMMC, four in five sites in Kenya and Tanzania satisfactorily had the guidelines available in 2012, compared to less than half in South Africa (43%) and Zimbabwe (46%). Similarly, Zimbabwe was the only country where the availability of national STI protocols was rated satisfactory in most sites (92%). By contrast, the percent that received a satisfactory rating in the other countries was only 55% (Kenya), 30% (South Africa), and 38% (Tanzania). In both Tanzania and South Africa the percent of sites with the STI protocols dropped markedly between 2011 and 2012.

I. Availability of operating supplies and equipment

Table 9 reports the availability of operating supplies and equipment in VMMC sites. With scores already high by 2011, the percentages with satisfactory ratings ranged from 95% to 100% in all countries by 2012. Similarly, the vast majority of sites in all countries (ranging from 90% to 100%) reported correctly stored and unexpired local anesthesia as of 2012. In terms of availability of antibiotics in stock to treat VMMC-related adverse events, two countries were already fairly high and further increased (Tanzania: 79% to 90% and Zimbabwe 86% to 96%). By contrast, the other two countries actually dropped on this indicator: Kenya from 79% to 59% and South Africa from 80% to 60%. Three of the four countries reported 100% of sites to have pain medication in stock; the one exception was South Africa that reported a decrease from a 100% to 75%. Similarly, three of the countries had 100% antiseptics in stock as of 2012, with South Africa reporting 88% sites with antiseptics in stock. The pattern was similar for dressing materials (bandages and gauze). Kenya, Tanzania, and Zimbabwe all scored 100% satisfactory on this indicator in 2012; South Africa dropped from 100% to 80%. All four countries reported total compliance with availability of a sharps container in the surgical area, with scores for satisfactory ranging from 95% to 100%.

J. Availability of CPR equipment

Table 10 reports the availability of CPR equipment in the VMMC sites. Data from this set of four factors reflect serious inadequacies in this area. For example, in terms of the availability of a CPR bag mask, the

four countries ranged from 48% to 67% satisfactory as of 2012. In terms of an oxygen supply, three of the four countries reported less than half their sites to be satisfactory in 2012 (Kenya, 7%; South Africa 48%; and Tanzania 17%); Zimbabwe reported 63% satisfactory. The availability of IV lines and fluids was slightly better, ranging from 45% in Kenya to approximately three-quarters satisfactory in South Africa (78%), Tanzania (76%), and Zimbabwe (79%). The availability of antihistamine also varied, ranging from 41% in Kenya to 71% in Zimbabwe, as of 2012.

K. Availability of prophylactic supplies

Table 11 displays data on the availability of prophylactic supplies in VMMC sites. In regard to post-exposure infection prophylaxis (PEP), the percent scoring satisfactory ranged from a low of 8% in South Africa and 10% in Tanzania, to 17% in Kenya, and 51% in Zimbabwe. The availability of guidelines for PEP fell far short of 100%: Kenya (68%); South Africa (33%); Tanzania (62%); Zimbabwe (71%). Both these parameters are essential requirements for ensuring provider and client safety. Given its importance, it is noteworthy that many sites scored a "1," often indicating availability within the larger health facility but not within the VMMC area.

L. Availability of condoms and HIV testing and counseling

Table 12 provides data on condom availability and HIV testing and counseling. As of 2012, 100% of the sites in Zimbabwe and approximately three-quarters of the sites in Kenya, South Africa, and Tanzania had male condoms available on the day of the visit in 2012. Although not in South Africa, the other three countries reported 97-100% of sites providing HIV testing and counseling as of 2012. By contrast, only two-thirds of these sites in South Africa (68%) did so in 2012. Similarly, Kenya, Tanzania, and Zimbabwe scored high (93% to 97%) on audio and visual privacy during HIV testing and counseling, compared to South Africa at 60%.

M. Impression of client load

Table 13 presents data on the impression of the officer in charge regarding the client flow given the capacity of the facility. At least half of the respondents in 2012 (ranging from 50% to 69%) reported a good balance between the number of clients and the VMMC providers' ability to provide the service. The percentage of officers in charge across the four countries reporting too few clients ranged from 13% (South Africa) to 42% in Zimbabwe. The percentage reporting "too many clients" ranged from 0% in Kenya to 30% in South Africa. For reasons that are unclear, the percentage reporting "it depends" decreased in every country between 2011 and 2012, making comparisons between those two years for any given country more difficult.

Observation of VMMC procedures performed[7]

The second of the four SYMMACS data collection instruments involved the observation of up to 10 procedures per site in every site visited. Because of low volume at certain sites, the number fell short of the maximum expected. However, in all countries the number of procedures observed increased significantly between 2011 and 2012, and in South Africa it actually tripled. These larger numbers

[7]The data in this Section were collected using Instrument 1-b of the SYMMACS data collection instruments.

provided a more solid base for assessing a series of factors related to appropriate surgical technique and operating conditions as well as counseling from the surgical provider to the client.

A. Pre-operative and safety control procedures

Table 14 reports the assessment of preoperative and safety control procedures for VMMC. The first variable involves clinical personnel conducting a basic preoperative assessment, including a targeted history and physical exam to exclude surgical contraindications, primarily bleeding disorders, allergies, immunocompromised states, and STIs. Whereas Kenya scored 71% and Zimbabwe scored 100% in this variable as of 2012, the scores were much lower for South Africa (12%) and Tanzania (26%). All sites in all countries scored very high on sterile instruments and consumables used (99% to 100% satisfactory). Similarly, scores were high for sterile gloves being used, ranging from 86% to 100%. On hand washing or disinfection between clients, Zimbabwe, Kenya and Tanzania scored well (100% to 91%) as of 2012, in contrast to South Africa at 60%. In terms of maintaining an adequate sterile surgical field while operating, Zimbabwe and Kenya scored high, 100% and 95% respectively, while South Africa and Tanzania scored slightly lower at 79% and 80%. Although use of protective eyewear is a criterion of the WHO guidelines for performing VMMC, sites in South Africa, Kenya and Zimbabwe reported only 3% to 6% usage, while Tanzania's was remarkably better at 55%.

In terms of the safe secure storage and disposal of medical waste, the providers in Kenya, Tanzania, and Zimbabwe scored 100%; by contrast, 73% scored satisfactory on this factor in South Africa. Scores on correct and hygienic instrument processing ranged from 88% satisfactory in Tanzania to 100% satisfactory in Zimbabwe. Regarding disinfection of surgical beds between clients, two countries scored very high: Kenya, 98% and Zimbabwe, 97%. Scores were lower in South Africa, 61%, and Tanzania, 65%.

B. Assessment of surgical procedures

Table 15 assesses the surgical procedures conducted based on observation of the providers' performance on up to 10 clients per site. In 2011, these scores were uniformly high across the four countries on 12 of 13 factors, the exception being the correct tying of surgical knots. In 2012, the scores showed slightly more variation, depending on the factor. Regarding cleaning of the surgical area with the recommended scrub solution, Kenya, Tanzania, and Zimbabwe scored 100% in 2012, with South Africa scoring 90%. In terms of correctly identifying the skin to be excised, Kenya and Zimbabwe scored between 96% and 100% satisfactory, compared to the scores for South Africa (72%) and Tanzania (84%). Providers across all sites in all countries scored high on demonstrating the "safety first approach" to ensure that no part of the penis, besides the foreskin, is removed or injured (ranging from 97% to 100%). In three of the four countries, the providers scored between 90% and 100% in demonstrating safe administration of local anesthesia; South Africa scored lower at 71% for this factor. The vast majority of providers (ranging from 95% to 100% in all countries) demonstrated a cautious and gentle approach to removing the foreskin.

Between 93% and 100% of providers in 2012 adequately controlled the bleeding with electrocautery and/or ligating sutures. With regard to the correct technique for tying the surgical knots, Zimbabwe improved (scoring 100% satisfactory up from 84% in 2011). However, this remains an issue in other countries, with low scores reported in Kenya (67%), South Africa (62%), and Tanzania (48%). In general,

providers scored satisfactorily (ranging from 88% to 100% across countries) on correctly aligning the frenulum and placing secure mattress sutures. Moreover, 2012 scores were high (ranging from 91% to 100%) on correctly aligning the other quadrant sutures, avoiding placing deep sutures around the frenulum, placing interrupted sutures evenly to avoid leaving gaping margins insuring no significant bleeding was present, and placing a secure dressing that was not excessively tight. The variables on which less than 90% of providers scored satisfactorily include correctly identifying the skin to be excised (72-100%), demonstrating safe administration of local anesthesia (71-100%), using correct technique to tie the surgical knot (62-100%), and correctly aligning the frenulum and placing the secure mattress suture (88-100%).

C. Assessment of post-operative procedures for VMMC

SYMMACS assessed the extent to which providers followed the WHO's post-operative protocols in the procedures observed at each site, summarized in Table 16.

As shown in Table 16, providers did not uniformly observe post-operative clients for allergic reactions or any other abnormality before allowing them to leave the operating table or recovery room. Whereas Zimbabwe scored 100% on this, the other countries' scores were lower: Kenya (56%), South Africa (8%), and Tanzania (74%). Results varied by country and were well below the ideal for the staff review of vital signs: Kenya (34%), South Africa (59%), Tanzania (43%), and Zimbabwe (10%). Some scores also varied on staff providing clients with clear instructions (both verbal and written) on how to wash and care for the wound and how to deal with pain and minor bleeding. Whereas Zimbabwe scored 100% as of 2012, scores were lower for Kenya (64%), South Africa (45%), and Tanzania (69%). In terms of staff insisting/encouraging clients to return for a follow-up visit within 48 hours of the VMMC or in the case of a complication, the providers in Tanzania (90%) and Zimbabwe (100%) scored high in 2012, compared to Kenya (60%) and South Africa (64%). Responses varied markedly by country in terms of staff providing emergency contact details to clients. Whereas 92% of providers in Kenya and 100% in Zimbabwe did so in 2012, the percentages were considerably lower for South Africa (36%) and Tanzania (69%). Providers are expected to give post-operative counseling and instructions, as well as to reinforce previous VMMC and HIV prevention messaging. One hundred percent of providers did so in Zimbabwe as of 2012, compared to far lower percentages in the other countries: Kenya (41%), South Africa (5%), and Tanzania (23%). The same pattern occurred for staff giving specific reminders of the six-week post-operative abstinence period. The percent doing so was 100% for Zimbabwe compared to Kenya (31%), South Africa (29%), and Tanzania (17%).

D. Operating time: total and by steps

Table 17 shows the median time for each of nine steps of the VMMC procedure, from the time the client enters the operating room to the time he exits. In South Africa and Zimbabwe, where task-shifting is not allowed, task-sharing occurs such that two to three members of the operating team perform different steps of the process. In contrast, in Kenya, one provider tends to take full responsibility of a client from start to finish. And in Tanzania, the procedure may vary depending on the volume of clients. Because providers in some countries use electrocautery to stop the bleeding, while providers in other countries use ligating sutures, data are shown separately for the fourth step depending on which technique was used. The first three steps are: the client enters the operating room, the provider scrubs and prepares

the client's skin, and the provider administers the local anesthesia. There was considerable variation among countries, but surprising consistency within a given country between 2011 and 2012 on the amount of time each of these steps took.

Regarding the timing of hemostasis, the use of electrocautery took approximately 2 to 2.5 minutes while use of ligating sutures took about 4 to 6 minutes.

If the primary provider is a physician, it is important to capture the amount of time required for this high-cost resource to complete these steps in countries that do not allow task-shifting (South Africa and Zimbabwe). From the data in Table 15, it is clear that the primary provider time with the client (for the three steps of removing the foreskin, achieving hemostasis, and inserting the mattress sutures) was far lower in South Africa (6:46 in 2012) and in Zimbabwe (6:48) than in Kenya (12:53) and Tanzania (14:47) as of 2012. We will return to this topic in the discussion.

It is also important to consider the total operating time (from scrubbing to cleaning, steps 2 through 8 in Table 15) across the four countries. Of note, they are far more similar than the data on primary provider time with the client. As of 2012, the total operating time across the four countries, ranged from Kenya (23:10), South Africa (26:03), Tanzania (23:12), and Zimbabwe (23:20). In terms of surgical outputs, one should consider not only the total operating time, but also the number of beds utilized.

The final information provided in Table 12 relates to the total number of sutures used for VMMC clients, which ranged from 10 in Zimbabwe to 12 in Kenya.

Demand creation for VMMC

Although the purpose of SYMMACS was to track the service delivery of VMMC, the research teams took advantage of the opportunity to collect data on types of demand creation activities as well. Specifically, at all sites, the SYMMACS data collection team asked the officer-in-charge if he was aware of any demand creation activities that were in place to promote VMMC. The question has obvious limitations: (1) the officer-in-charge may have faulty recall of such communication; (2) he or she may not have distinguished clearly between different types (e.g., a radio spot on VMMC versus radio coverage of VMMC by a local reporter); and (3) he may have imagined that certain activities were taking place without having clear knowledge of them (e.g., the exact locations where community meetings on VMMC were held). Thus, the findings below should be interpreted with caution.

Table 18 shows an overview of the percentage of sites that benefited from different types of media, categorized into the following channels: mass media, small media, interpersonal communication, electronic media, and other media. By 2012, 100% of all sites in all countries benefited from at least one media channel.

In the category of mass media, demand creation through radio increased in all four countries from 2011 to 2012. By 2012, the percentage of sites benefiting from radio ranged from 45% in Kenya to 75% in Tanzania. Demand creation through television ranged from 13% to 29% in 2011, and 0% (Tanzania) to 75% (Zimbabwe) in 2012.

For small media, pamphlets or posters were most commonly mentioned. As of 2012, over half of the clinics in all four countries, including 100% in two of the four, used posters. Over three-quarters of the clinics across all four countries reported the use of pamphlets targeting potential VMMC clients. Except in Zimbabwe, less than half of VMMC sites reportedly benefited from either newspaper ads or billboards, whereas in Zimbabwe, 79% of sites reported newspaper ads and 96% mentioned billboards by 2012. Videos for the client were reported in 0% (Tanzania) to 17% (Zimbabwe) as of 2012; similar levels were reported for videos for the general population, with the exception of Zimbabwe, where 71% of sites reported benefiting from videos for the general population.

The percentage of sites that reported group meetings in schools, churches/mosques and the general community was consistently high. The data also show certain variations by type of interpersonal communication: for example, talks in beer halls were more common in Kenya and Zimbabwe than in South Africa and Tanzania. At least half of the sites in Kenya, Tanzania, and Zimbabwe reported use of meetings with opinion leaders and influential community members for the purpose of promoting VMMC as of 2012. A second type of interpersonal communication that increased in almost all countries between 2011 and 2012 was the use of satisfied clients to promote VMMC.

Text messages and telephone hotlines are two promising channels of electronic media that are under experimentation but not fully implemented in all sites. Use of text messages ranged from 8% to 15% of sites in all countries except Tanzania, where 59% of sites reported benefiting thanks to an innovative national program. Telephone hotlines benefited over 50% of sites in Kenya but lower percentages, ranging from 17% to 28%, in the other three countries in 2012.

As country programs mature, it is not surprising to see the increase of other specialized types of communications. For example, in Zimbabwe the percentage of clinics that benefited from songs about VMMC increased from 52% in 2011 to 92% in 2012. Similarly, three-quarters of sites in Zimbabwe reported dramas or plays, as well as celebrity testimonials. By contrast, the other three countries made relatively little use of these other media with the exception of drama/plays in Tanzania (38%).

Experience and attitudes of VMMC providers

SYMMACS included a provider interview that was conducted among all personnel providing clinical VMMC services on either of the two days of data collection. The purpose of the interview was to obtain information on the age and gender of providers, their training history and experience, their current work status, and their current workload. In addition, the interview questionnaire included measures of knowledge, attitude, opinions, beliefs, and perceptions related to the different elements of efficiencies that constitute the VMMC scale-up. At the end of the interview, providers were asked eight open-ended questions that allowed the providers to offer additional information about experience and attitude topics in a less structured format.

A. Demographic profile of VMMC personnel

Given the marked increase in the number of sites in three of the four countries, it is not surprising that the number of providers interviewed as part of SYMMACS also increased from 2011 to 2013. In fact, this

figure doubled in South Africa (from 102 to 209) and in Tanzania (from 93 to 206). Zimbabwe also saw an increase in providers (from 74 to 94). Only in Kenya did the figure decrease (from 85 to 82).

B. Cadre of personnel and role within program

Table 20a shows the profile of the VMMC providers in terms of their cadre and role within the clinic. Within each county, the distribution of providers that were classified as medical doctors, nurses, or clinical officers was strikingly similar in both years of data collection. Another notable finding is the difference in percent of total providers who were physicians between South Africa and Zimbabwe (17% and 27% respectively) and Kenya and Tanzania (0% and 2% respectively). These figures reflect the policies of South Africa and Zimbabwe that require the primary provider of VMMC to be a medical doctor. In Kenya and Tanzania, nurses, assistant medical officers, and clinical officers are authorized to perform VMMC. Furthermore, the similarity between the percentage of medical doctors and the percentage of providers in the clinic that perform VMMC in South Africa and Zimbabwe suggest that medical doctors are performing most of the circumcisions, as required by the national policies. By contrast, in Kenya and Tanzania, a large majority of all providers (>90%) reported performing and/or assisting with VMMC operation, depending on the need.

Common tasks performed by clinical providers other than VMCC differed slightly from country to country, as shown in Table 20a. In Kenya, for example, the most commonly mentioned task was compiling service statistics, followed by administration/management and counseling. In South Africa, the most commonly mentioned task was administration/management, followed by waste disposal and compilation of service statistics. In Tanzania, providers most frequently mentioned preparation of bundled kits, followed by dedicated training opportunities, and other medical activities or services. In Zimbabwe, providers most frequently mentioned other medical activities/services, followed by collection of service statistics, and counseling.

Finally, Table 20b includes data collected among nurses in 2012 regarding the years of formal training they have received. The mean ranged from 2.7 in South Africa, to 3.0 in Kenya and Zimbabwe, to 3.6 in Tanzania.

C. Time commitment to VMMC

Table 21 reports the time commitment of providers to VMMC. The table depicts considerable change between 2011 and 2012 in the percent of service providers working full time on VMMC (defined as at least 90% of working hours). For example, while the percent working full time dropped in Kenya (from 65% to 45%) and Zimbabwe (from 34% to 14%), it increased markedly in Tanzania (from 1% to 50%), and it remained virtually unchanged in South Africa (80% to 79%). In both 2011 and 2012, the mean number of days per week that providers performed or assisted in performing on VMMC during the previous three months ranged from 3.4 to 4.7. By country, this figure changed little between the two years in Kenya (4.4, 4.7) and South Africa (4.7, 4.5), yet increased in Tanzania (3.4, 4.2) and decreased in Zimbabwe (4.4, 3.5).

In all countries the average number of hours per day that providers spent assisting or performing VMMC during the previous week increased (in Kenya from 5.1 to 7.7 and in South Africa from 6.8 to 7.4) or

stayed roughly the same (7.7 to 8.0 in Tanzania and 6.2 to 6.3 in Zimbabwe). By multiplying the average number of days per week by hours per day, we estimated the number of hours per week that providers spend assisting in or performing VMMC. This figure increased in Kenya (from 24.1 to 38.8) and in Tanzania (26.6 to 33.3), remained relatively stable in South Africa (from 33.7 to 34.6), and dropped in Zimbabwe (28.7 to 22.2).

D. Training and experience with VMMC

Table 22 presents data on training and experience in performing VMMC. The mean number of months of experience performing VMMC for HIV prevention was greatest in Kenya, reflecting the earlier establishment of national VMMC programs relative to the other countries. Kenyan providers reported 30.3 months of experience in 2011 and 31.3 months as of 2012. Between the two years of data collection, average months of provider experience increased in Tanzania (13.3 to 17.1 months) and Zimbabwe (10.8 to 13.9 months). By contrast, months of experience decreased in South Africa (from 19.2 months to 12.7 months). With the exception of Kenya, these averages must be interpreted with the concurrent increase in overall service providers in mind. Often these new providers have less months of experience, as particularly reflected in the overall decrease of average experience in the case of South Africa. Similarly, the mean number of total VMMCs performed or assisted in a provider's career also reflects the longer history of VMMC program in Kenya. It should be noted that the number of career VMMCs performed was intended to be a self-reported estimate, and does not represent exact quantities for each provider. In Kenya, the average number given dropped slightly between 2011 and 2012 (from 3,175 to 2,712). Similarly in South Africa, the figure dropped from 1,492 to 1,345. In contrast, the other two countries saw a slight increase in average number of career VMMCs per provider: Tanzania (2,091 to 2,238) and Zimbabwe (805 to 972).

Relatively few of the providers surveyed had received VMMC training in medical or nursing school. In 2012, one in five providers from Kenya reported this type of training compared to less than 5% of providers from any of the other three countries. By contrast, in all countries except South Africa, 100% of providers received additional training or continuing education in VMMC for HIV prevention as of 2012. In South Africa, the percentage was lower (77%). Apparently, with the rapid expansion of VMMC services, some providers are scheduled but have yet to receive formal training in VMMC. Among those that had additional training, the number of days of additional training reported in each year was consistent within each country, yet markedly different across countries. The shortest durations of additional training for VMMC were reported in South Africa (4.4 days in 2011, 5.7 days in 2012) and Zimbabwe (6.8 days, 7.0 days). Tanzania (13.9 days, 11.5 days) and to an even greater extent, Kenya (21.2 days, 20.4 days) reported substantially more training days than the other two countries.

E. Providers' perceptions of busy, average, and slow days

Table 23 reports providers' estimations of the number of clients on a busy, regular, and slow day in their VMMC site. From 2011 to 2012, the average provider's perception of a "busy day" remained constant in Kenya: 21 VMMC operations. In the other three countries that experienced an increase in the number of sites, the number of clients on a "busy day" varied from 2011 and 2012: in South Africa (from 28 to 20), in Tanzania (from 21 to 24), and in Zimbabwe (from 35 to 30). In addition to the influx of sites, some the

variation in this data between the two years might also reflect the fact that the seasonal patterns of client load changed in many locations between the two periods of data collection.

Looking at the data for a "slow day," we see the lowest estimate in Kenya (just under three clients per day), yet a range of five to eight clients on a "slow day" in the other three countries.

F. Six elements of efficiency in VMMC: Practices and Preferences

The provider survey also included items specifically related to the six elements of efficiency in VMMC services. Tables 24-29 present provider practices and attitudes or preferences related to the six elements:

1. Rotation among multiple bays in the operating theater
2. Bundling of supplies and tools
3. Task-shifting (allowing other clinical providers perform VMMC)
4. Task-sharing (allowing other clinical providers to conduct certain aspects of the procedure)
5. Surgical method (e.g., forceps guided)
6. Use of electrocautery instead of ligating sutures

Rotation among multiple bays in the operating theater. Table 24 presents findings on surgical bed rotation, a practice whereby the primary provider rotates between two or more surgical beds to increase the efficiency and surgical outputs of the operating team. One hundred percent of providers in Zimbabwe reported practicing rotation between multiple surgical beds. The practice was also widespread in South Africa and Tanzania in 2011 (93% and 98% respectively), though it decreased in both countries in 2012 (79% and 87% respectively). This may be due to the increase of new facilities and additional providers. The practice of rotation among multiple beds was less common in Kenya and decreased slightly between the two years (from 64% to 60%). Among those providers that did report use of multiple surgical beds, the mean number of beds ranged from three to five across the different sites in different countries. Whereas the national policy of a given country might call for rotation among surgical beds, the data indicate differences in provider preference regarding this practice. For example, the percentage of providers that reported to prefer rotation among multiple surgical beds as opposed to attending to one client at a time (or no preference) was far lower in Kenya (39% in 2011 dropping to 22% in 2012) compared to the other three countries. In South Africa, at least three-quarters of providers in both years preferred to rotate between multiple surgical beds, and in Zimbabwe this practice was the preference of 100% of the providers. Curiously in Tanzania, the percent of providers reporting to prefer the rotation among multiple surgical beds dropped from 93% in 2011 to 64% in 2012.

Bundling of supplies and tools. Table 25 reports practices and preferences regarding bundling of VMMC kits. The interviewer asked providers whether they had used pre-bundled instruments and supplies in the past three months. Virtually all providers in all countries reported this practice. However, the countries differed on how this pre-bundling was achieved. The data in the third row on Table 27 shows that virtually all providers (98-100%) purchased pre-bundled kits prepared by a kit supplier in South Africa and Zimbabwe, while all providers in Kenya (100% in both years) and the vast majority in Tanzania (99% in 2011 and 90% in 2012) reported using kits pre-bundled by clinic staff. A related finding was that

the large majority of providers in South Africa (80% in 2011, 90% in 2012) and in Zimbabwe (100% both years) reported using disposable instruments. This is related to the use of purchased kits, as these kits contain disposable instruments. By contrast, 100% of providers in Kenya (in both years) and the vast majority in Tanzania (100% in 2011, 90% in 2012) reported recycling and sterilizing instruments for reuse. Despite these differences in practices, the large majority of providers in all countries in both years (ranging from 74% to 100%) believed that bundling supplies and surgical instruments reduces the risk of VMMC infections. Moreover, the vast majority of providers in all countries on both years (93% to 100%) believed that using pre-bundled kits and instruments decreases the time needed to perform VMMC. The exception was Tanzania, where only 73% believed this as of 2012, a drop from 100% in the previous year. One sometimes hears the argument that using pre bundled instruments and supplies is an unnecessary cost for VMMC clinics. However, this view was shared by relatively few of the providers in this study: ranging from 2% to 14% across countries and across years, with the except for Tanzania in 2011 (30%). In all countries except Tanzania, relatively few providers agreed to the statement "I prefer assembling a surgical kit myself rather than using pre-bundled VMMC kits." In stark contrast, the large majority of providers in Tanzania (94% in 2011, 89% in 2012) did agree with this statement. Another survey item asked providers if they felt that instruments should be reusable in the case of clinics that use pre-bundled kits. Providers in Kenya generally supported this idea (92% in 2011 and 88% in 2012) as did those in Tanzania in 2011 (100%). In 2012 however, this percentage dropped substantially in Tanzania to only 10%, possibly because of the introduction of purchased kits. Even in Zimbabwe where the use of bundled kits with disposable instruments is the norm, between 36% and 55% of providers in both years felt that the instruments should be reusable. Only in South Africa, where the practice of using purchased kits is universal, was there a much lower proportion of providers who felt that bundled instruments should be reusable (approximately one in five for both years).

Task-shifting. Table 26 reports provider attitudes towards task-shifting, i.e. allowing personnel other than medical doctors to be trained in and to perform all steps of a VMMC surgery. Although this practice is not permitted in South Africa and Zimbabwe, there appears to be considerable support for a policy shift to allow task-shifting in these countries. South Africa began with the highest percentage of providers who upheld the belief that only medical doctors should be authorized to perform VMMC in 2011 (25%), but this dropped substantially in 2012 (15%). By contrast, in Zimbabwe, the other country that does not allow task-shifting, less than 8% in either 2011 or 2012 endorsed the policy of requiring VMMC to be performed by medical doctors. Not surprisingly, relatively few of the providers in Kenya (4% in both years) and Tanzania (10% in 2011 falling to 2% in 2012) endorsed the idea that only a medical doctor should be authorized to perform VMMC. Providers also replied to the question "I believe the primary provider responsible for the operation should be with the client from the administration of the anesthesia to the final dressing." There was strong support for this philosophy in both Kenya (75% in 2011, 72% in 2012) and in Tanzania (91% in 2011, falling to 76% in 2012). However, the percent of providers endorsing this practice was much lower in South Africa (25% in 2011, dropping to 12% in 2012) and in Zimbabwe (3% in 2011, 2% in 2012).

Task-sharing. Table 27 reports on the practice of task-sharing, i.e. allowing clinical personnel other than medical doctors to complete specific tasks in the VMMC procedure. In 2012, task-sharing in both

administering anesthesia and assisting in suturing the foreskin was virtually universal as reported by providers in South Africa, Tanzania, and Zimbabwe. In Kenya however, the practice of assisting in anesthesia dropped from 2011 to 2012 (from 79% to 59%) Task-sharing in suturing also remained lower in Kenya compared to the other three countries (55% in 2011 and 61% in 2012).

The bottom section of Table 27 presents data on provider approval of task-sharing practices, comparing medical doctors and non-medical providers in each country and across years. The relatively consistent findings over time in each country highlight different local philosophies towards conducting VMMC procedures. In responding to the question "Is it acceptable for an assistant or secondary provider (not the primary provider) to administer local anesthesia?" providers in Kenya were less likely to support this practice (68% in 2011, 53% in 2012) than providers in the other three countries (ranging from 95% to 100% among all providers as of 2012). Further, 78% of providers in Kenya believed it was acceptable for the secondary provider to prepare and scrub the client, in contrast to virtually all providers (from 97% to 100%) in the other three countries. Regarding the question "Is it appropriate for an assistant or secondary provider to dress the operating wound?" the large majority of providers in all countries, including Kenya, supported this practice (ranging from 85% to 100% over the two years). Finally, in response to the question "Is it acceptable for an assistant or secondary provider (not the primary provider) to complete the interrupted skin sutures?" the patterns mentioned above again emerge. Providers in Kenya in both years were less supportive of this practice (66% in both years) than providers in the other three countries (which ranged from 93% to 100% as of 2012).

Surgical method (e.g., forceps guided). When SYMMACS was first designed, the surgical method for VMMC differed slightly across countries. However, by the time of the 2011 data collection, most countries had selected the forceps guided method. The data in Table 28 reflect this, with providers in Kenya, South Africa, and Zimbabwe reporting that the forceps guided method was used to complete 96-99% of VMMCs performed in the last month. The one exception was Tanzania, where the percentage was lower, increasing from 79% in 2011 to 84% in 2012.

Though the national policies mandate the use of the forceps guided method, it was of interest to determine whether providers actually preferred this method. When asked their preferred surgical method for VMMC, the majority of providers in all countries did cite the forceps guided method: 73% in Kenya, 85% South Africa, 96% in Tanzania, and 91% in Zimbabwe. Moreover, the data in Table 28 reveal that not all providers are aware that the national program recommends the use of forceps guided method, except in Zimbabwe (100%). By contrast, the percent reporting that the national program recommends forceps guided was 71% in Kenya, 67% in South Africa, and 88% in Tanzania.

Use of electrocautery/diathermy instead of ligating sutures. Table 29 presents data on the use of electrocautery/diathermy, showing a stark contrast between South Africa and Zimbabwe on one hand and Kenya and Tanzania on the other. In South Africa, 98% to 99% of providers have ever used electrocautery for homeostasis in performing VMMC. In Zimbabwe, the figure climbed from 72% in 2011 to 92% in 2012. In comparison, only a third of providers in Kenya reported ever using electrocautery as of 2011 (33%), and this figure dropped to 19% in 2012. In Tanzania, the use of electrocautery at the time

of SYMMACS data collection in 2011 and 2012 was virtually nonexistent. (For this reason, the rest of the questions on electrocautery were not asked to providers in Tanzania).

Among the few providers in Kenya that reported using electrocautery/diathermy, most reported "rarely" having used it in both 2011 and 2012. In South Africa however, where the percentage of ever use was very high, the vast majority reported using it "always" or "most of the time." Zimbabwe, which was in the midst of scaling up the use of this practice over the course of data collection, reported an increase in percentage of providers having ever used electrocautery; the percent using it "always" or "most of the time" was over 85%.

Table 29 presents responses to two knowledge questions about monopolar electrocautery and bipolar electrocautery in 2011. However, responses to these questions seemed heavily dependent on the type of training these providers received and not essential to the objectives of SYMMACS. Thus, these questions were dropped from the 2012 survey. In 2012, providers were instead asked if they believed that "electrocautery/diathermy is safe to use for homeostasis when performing adult male VMMC." In Kenya, where it is not widely used, 87% of providers did believe it to be safe, compared to 97% in South Africa and 98% in Zimbabwe, where its use is widespread. Providers in all countries recognized that electrocautery reduces operating time significantly (with the percent agreeing ranging from 94% to 98% in 2012).

In response to the statement "electrocautery is not appropriate in my setting because electricity is unreliable," providers in Kenya were more likely than in the other countries to respond affirmatively, although this decreased from 56% in 2011 to 38% in 2012. This figure was below 15% in South Africa and below 2% in Zimbabwe for both years.

Finally, providers were asked to agree or disagree with the statement "I feel competent in using electrocautery/diathermy when performing or assisting in performing VMMC." Among those few in Kenya that had used the technique, a relatively high percentage felt competent in it (100% in 2011 and 81% in 2012). In the countries where it is used routinely, the proportions that reported feeling competent in using it were consistently high (between 91% and 98% in South Africa and Zimbabwe).

There was also widespread agreement to the statement "clinical officers and nurses -if adequately trained- can safely use electrocautery/diathermy." Percentages ranged from 94% to 100% in all countries across the two years. Finally, with regard to the statement "electrocautery/diathermy compromises the sterility of the VMMC procedure," a small but important percentage of providers both in Kenya and South Africa held this belief, ranging from 19% to 38% in the two years.

Beyond the six elements of efficiency, the provider survey also assessed attitudes, opinions and/or actual practice related to:

- Types of anesthesia used
- Wait time for clients
- Job satisfaction and burnout

G. Anesthesia: Practices and preferences

Table 30 shows practices and preferences related to anesthesia as reported in the provider survey. In three countries there was some change from 2011 and 2012 among providers that used Lidocaine 2% and those that used any mixture including Bupivacaine (Marcaine). In Kenya, providers were fairly evenly divided between these two in 2011, but showed a marked preference for Lidocaine 2% in 2012 (83%). In South Africa, 90% of providers in both years opted for any mixture including Bupivacaine (Marcaine). In Tanzania, providers in 2011 showed a preference for Lidociane 2% (84%), but were spread between the two different types of anesthesia in 2012. In sharp contrast, 100% of providers in Zimbabwe reported using any mixture including Bupivacaine (Marcaine) in both 2011 and 2012. In terms of the most frequently used technique to administer anesthesia, in three of the four countries –Kenya, Tanzania, and Zimbabwe – the vast majority of providers reported using a combination of dorsal nerve and ring block (95%-100%). In South Africa however, over four of five providers reported using only ring block in both 2011 and 2012.

H. Wait time between VMMC procedures

Providers were asked to agree or disagree on statements describing possible reasons for wait time between operations. In 2011, between a quarter and a half of all providers affirmed, “In our facilities, the primary provider often waits between operations as operating areas are cleaned and prepared.” As of 2012, the percent of providers giving this response skyrocketed in Tanzania (to 92%) while it dropped dramatically in Zimbabwe (to 2%). In at least three of the countries in 2012, providers reported that the primary provider often waits between operations because there are not many clients: Kenya (57%), Tanzania (75%), and Zimbabwe (66%). In all countries and in both years, at least four out of five of the providers agreed that using multiple beds per primary provider helps minimize the waiting time for providers between operations (Table 31).

I. Job satisfaction and burnout

Table 32 summarizes provider responses to questions on the related concepts of job satisfaction and burnout. To introduce the topic, providers were asked if they have noticed any fatigue/burnout among colleagues who perform VMMC as their full-time, primary work activity. Possible responses were on the following scale: “frequently,” “occasionally,” “rarely,” “not at all”, or “don’t know”. The responses within a given country were surprisingly similar between 2011 and 2012; however there were notable differences in comparing across countries. Kenya reported by far the highest level of perceived burnout, either frequently or occasionally, among colleagues (88% to 89% over the two years). South Africa reported the second highest level of perceived burnout among colleagues: 41% frequently or occasionally in 2011 and 49% in 2012. Zimbabwe followed with 34% and 33% of providers reporting colleagues’ burnout respectively in 2011 and 2012. In Tanzania by contrast, no providers reported perceived burnout frequently among colleagues, only 9% reported it occasionally in 2011 and 0% in 2012. Interviewers also asked providers (both medical doctors and other clinical providers) if they agreed or strongly agreed with the following statement: “Performing or assisting in performing male circumcision is a personally fulfilling job.” Overall, a large majority of providers of both categories reported that this type of work made for a personally fulfilling job, ranging from 56% to 100% in the four

countries. Moreover, in almost every category and every country the percent of providers who considered their job personally satisfying increased between 2011 and 2012.

Nonetheless, many providers reported to have personally experienced fatigue or burnout from performing or assisting in performing VMMC. In both 2011 and 2012, Kenya showed the highest level of reported personal burnout (71% and 66% respectively for the two years). As of 2012, approximately a third of both doctors and other clinical providers in South Africa said to have experienced burnout. By contrast, in both Tanzania and Zimbabwe, the data suggest a drop in levels of personal burnout from 2011 to 2012.

Evolution in the VMMC programs over time

The findings reported in the previous sections were based on instruments frequently used in facility assessments (though, to our knowledge, they have not been used frequently in VMMC programs). These included quality assessment of the facilities, observation of clinical procedures, and interviews with providers and key informants (in this case, the officers-in-charge).

In this final section of findings, we attempt to capture the evolution of the VMMC programs in each of these four countries over a 2.5-year period: January 2010 to mid-2012.[8] Some of these data were obtained from the routine health information systems collected in each country independent of SYMMACS (e.g., monthly data on the number of VMMC procedures performed, the percent of clients that came for a follow-up visit, and the percent of clients that were tested for HIV).

To capture the evolution in the adoption of efficiency elements in VMMC programs over time, SYMMACS experimented with a new type of data collection. Specifically, the SYMMACS interviewers asked the officer-in-charge to help reconstruct the history of the implementation of the six efficiency elements at their site. This information was recorded in an Excel spreadsheet that to show the status of each efficiency element by month over the 2.5- year period (see Instrument 3 in Appendix B). Because the data were based on the recall of the officer-in-charge, there may be limitations or biases in its accuracy. However, in many cases, the status of an element was unchanged of the 2.5- year period, or its change was a noteworthy and recallable event in the facility. In the analysis, the overall "change" at the country level was often heavily influenced by the addition of new sites that had different policies or practices than the older ones. In short, although we acknowledge that data collection on the evolution of programs in terms of the six elements of efficiency was experimental in nature, the results shed light on the differences in programs across the four countries.

A. Number of sites reporting to be operational by month

Figure 1 provides data from January 2010 through the final month for which data were available to the SYMMACS data collection team in each country: May 2012 for South Africa, June 2012 for Kenya, July 2012 for Tanzania, and September 2012 for Zimbabwe. This first set of four graphs is based on the number of VMMC sites sampled by SYMMACS. The sampling roughly reflects the growth in the number

[8] The last month for which complete data were available on all sites in each country, which varied depending on the last month of data collection.

of sites offering VMMC in each country, though it should not be interpreted as a perfect measure of the site growth trend in each country. At the start of this program only Kenya had a fully functioning VMMC project in the Nyanza region. In fact, SYMMACS sampled only 30 of over 235 sites that were operational at the end of 2010 (the point at which the sampling frame was determined for 2011). By contrast, graphs for the other three countries reflect a parallel increase in the number of sites over time in each county, starting in mid-to-late 2010 and continuing to grow through 2012. For example, the national program in South Africa only began in November 2010.

In terms of the types of VMMC sites, Kenya was the only country to include all three types: fixed, outreach, and mobile. In Tanzania, the vast majority of sites were fixed. South Africa included both types, with more fixed (n=26) than outreach (n=14). And in Zimbabwe, outreach sites (n=18) outnumbered fixed sites (n=6) by the end of 2012.

B. Number of VMMC procedures performed by month and facility type

Figure 2 demonstrates that in all countries, the number of VMMCs performed in 2011 and 2012 were higher than in 2010. Moreover, there were dramatic monthly fluctuations in the number of VMMCs conducted over the course of the calendar year.

Peak operation periods differed by country. For example, in Kenya, the peak periods coincided with school holidays, when an increased number of school-aged boys undergo circumcision. Further, the Kenyan MOH does not allow circumcision of school children when schools are in session. Tanzania has peak periods in June/July. South Africa also peaks in June/July, as well as in October and April due to school holidays. Zimbabwe shows dramatic peaks in April/May, August/September, and December. These dramatic fluctuations represent an important programmatic challenge – matching supply and demand - which we address in the Discussion section.

C. Percent of clients returning for follow-up visits by month and facility type

Figure 3 depicts the percentage of clients in each of the four countries that returned for a follow-up visit. (Note: the recommended number of follow-up visits and the time from post-op to the follow-up visit differed by country; thus, we analyzed the percent of clients returning for any follow-up visit.) These data were based on service statistics available at the sites or in databases at headquarter organizations, not on data collected directly through SYMMACS. Zimbabwe had by far the highest percentage, equaling nearly 100% every month. Tanzania also had a very high percent of clients returning for a follow-up visit, fluctuating between 80% and close to 100%. Kenya, by contrast, presented a far different picture, with local records reporting a follow-up rate of 60% or lower. South Africa had the greatest monthly variation; some months reached percentages of 80% or higher for follow-up, and others dipped to below 20%. The reason for the drastic fluctuations is unknown. Program personnel indicated that clients may visit different health facilities other than the site where they had their operation, especially if there is a closer or more accessible option for their follow-up visit. Fixed facilities had slightly higher levels of follow-up than the outreach facilities but both were far below the 100% goal that the program planners expected to return.

D. Percent of VMMC clients receiving an HIV test as part of the VMMC service

Figure 4 demonstrates considerable variation among the four countries in the percentage of clients receiving an HIV test. Zimbabwe had the highest level with nearly 100% since the start of its program. Tanzania also maintained a very high level (nearly 100%) except during November/December 2011 and February- June 2012 when they reported shortages in testing kits. Kenya and South Africa presented more complex situations. In Kenya, the percent of clients tested for HIV fluctuated markedly by month, dipping as low as 40% at some points in 2010. Outreach facilities did slightly better than fixed facilities during this period in Kenya, and mobile sites achieved the highest levels. In 2012 however, most sites fell in the 60-80% range on this variable. These percentages may reflect the fact that some clients receive HIV testing offsite, present their HIV test results at the time of VMMC, and are not retested at the VMMC facility.

South Africa presented extreme fluctuations in the percentage of clients who received an HIV test in 2010. The low level of testing during November and December 2010 reflects the addition of new facilities that may not have had the HIV testing procedures in place. However, performance greatly improved in 2011 and 2012 in fixed facilities, increasing from 50% to close to 100% by the last data point in 2012. By contrast, the record of outreach facilities that became operational in 2011 showed slightly lower levels of testing, but by mid-2012 they too reported testing 100% of VMMC clients for HIV.

E. Adoption of the six efficiency elements

Whereas the four previous figures present data that are available from other sources (routine programs statistics and records), the data in Figure 5 are unique to SYMMACS. As mentioned earlier, for each of the six efficiency elements, we collected data over an approximate 2.5 year period – from January 2010 to mid-2012 – for all four countries. The intention was to demonstrate the gradual adoption of different efficiency elements by countries over time. In fact, a few of these graphs did show very interesting trends, such as Figure 9 (change over time in the proportion of VMMC procedures performed using the forceps guided technique in Tanzania). However, the large majority of graphs instead showed an "all or nothing" situation, in which a country either entirely accepted or entirely avoided a given practice. The complete set of these graphs begins on page 95.

Figure 5 captures the differences by country and by year on each of the six elements. The x-axis on this set of graphs show the six elements of efficiency. The first bar in each set shows the proportion of sites that had adopted that efficiency element as of December 2010, the second as of December 2011, and the third as of the last month with complete data in 2012.

The graphs in Figure 5 visually summarize the results presented in earlier sections of this report. For example, the first illustrates how the practice of providers rotating between multiple beds was well established in South Africa, Tanzania, and Zimbabwe from the start of their respective programs. By contrast, it was evident in less than half of the sites in Kenya, where this practice was said to vary by client flow; (i.e., providers may add one or more beds if the client flow warrants it). As noted in the MC MOVE document, the elements of efficiency were intended to be adapted to local context, and this example from Kenya is reflective of one such case.

The second efficiency element relates to prepackaged consumables and disposable instruments. The graph shows that the countries divided into two groups on this element over the 30-month period reflected in these graphs. South Africa and Zimbabwe used purchased kits and disposable instruments, in contrast to Kenya and Tanzania where clinic staff bundled their own kits and sterilized and reused the instruments.

The third set of bars in Figure 5 illustrates task-shifting. On this dimension, Tanzania and Kenya have widely endorsed this practice (at 100% of sites in 2011 and 2012). The graph for South Africa requires careful interpretation because the bar for 2010 reflects only two sites (where task-shifting did occur at peak periods). However, the drop to less than one in five VMMC sites in 2011 and 2012 reflects the South African policy restricting VMMC operations to medical doctors only. Similarly, Zimbabwe showed no sites with task-shifting, commensurate with their national policy that disallowed this practice as of 2012.

In terms of task-sharing (the fourth set of bars in Figure 5), Kenya, Tanzania, and Zimbabwe all showed close to 100% of sites adopting task-sharing. South Africa (the two sites) showed very high levels in 2010 but far lower levels (under 40%) in 2011 and 2012, presumably because of different practices at the new sites added in these years. Almost all of the sites in Kenya, Tanzania and Zimbabwe had adopted task-sharing (fourth set of bars in Figure 5) during the study period.

Sites predominantly using the forceps guided technique are shown in the fifth set of bars in Figure 5. “Predominantly” was defined as 90% or more of VMMC procedures performed using this method. The data indicate that this surgical method was universally practiced (except in cases of contraindications) in Kenya, South Africa, and Zimbabwe. A slightly lower percentage of sites in Tanzania reported use of the forceps guided method, reflecting the two sites where practicing providers had received their training in a different method. However, we do see an increase in the proportion of sites in Tanzania embracing forceps guided method between 2010 and 2012.

The sixth and last sets of bars in Figure 5 present data on electrocautery, which varied greatly by country. South Africa used this method in the vast majority of its sites from the start of the program and at new sites as the program evolved. Similarly, Zimbabwe had a very high proportion of sites using electrocautery. Kenya experimented with the technique; only a few sites reported using it consistently. In Tanzania, electrocautery is not presently available in the VMMC program.

The graphs in Figure 5 allow one to compare the adoption of these elements by country and over time. In two cases, they do reflect some progress toward more efficiency; an increase in the number of sites in Tanzania accepting forceps guided and an increase in the number of sites in Zimbabwe using electrocautery. The differences between countries that entirely adopted an element and those that did not adopt it at all are particularly striking. The results of SYMMACS will be useful in promoting dialogue at the national level on possible revisions in the policies and practices of the four countries on these six elements of efficiency.

DISCUSSION

This discussion covers strengths and limitation of the research, interpretation of key results for the three objectives of SYMMACS, and topics for future research. An overview of the key findings appears in the executive summary on page 7.

Strengths

The SYMMACS study included the in-depth examination and documentation of the actual implementation of VMMC service delivery over a two-year period in multiple countries, yielding an assessment of common trends across countries as well as country-specific strengths and weaknesses.

To the authors' knowledge, this is the first study to systematically examine quality in VMMC programs. The observation of procedures provides additional evidence on the timing of VMMC procedures in four countries. This study also presents a comprehensive assessment of current practices, preferences and opinions of VMMC service providers. Additionally, SYMMACS provides some of the first systematically collected data on communication channels used in support of VMMC.

The study also took place at a time (2011-2012) when programs were fast-evolving. The findings provided an evidence-base on which to make mid-course corrections on specific aspects of services delivery in national VMMC programs, commanding the attention of program managers, policy makers and donors. The dedication and continuity of the in-country research teams, as well as the continued enthusiasm and involvement of local stakeholders including each country's MOH and co-investigators, were invaluable assets to the study.

Limitations

Given the challenges of coordinating the design of the study and data collection procedures over four countries, we readily acknowledge limitations in this work, as follows.

The sampling strategy varied by country, as described above. Because of the rapid expansion in VMMC sites, it was not possible to obtain a list of the universe of operational VMMC sites at the start of each round of data collection in all countries except Kenya. Thus, random sampling was not possible in South Africa, Tanzania or Zimbabwe, and the samples in these countries cannot be considered representative of their national programs.

Whereas the ideal period to test efficiency and safety measures would have been when the number of VMMCs performed was highest, it was not always possible to collect data during such periods. Data collection took place during low-volume periods (relative to the local fluctuation) in all countries except Zimbabwe in 2011, and all countries except South Africa in 2012. In both Kenya and Tanzania, the teams felt that the results on some variables (e.g., use of multiple surgical beds, impression of client load, and experience with burnout) might have been quite different if the data had been collected during high-volume periods. Also, a higher workload on the days of the visit might have affected conditions in the VMMC sites or providers' performance of the VMMC procedures.

Instruments 1-a and 1-b included a number of variables on which the clinicians on the SYMMACS data collection team had to assess aspects of the VMMC facility, surgical procedures, compliance with WHO requirements, adequacy of systems, and related variables. *The SYMMACS Data Collection Guide* (Research to Prevention [R2P] Project, 2011) provided guidance for data collectors on the criteria for making such assessments; however, they still remained subjective. Indeed, the 2011 findings from Zimbabwe suggest that having a surgical specialist in the data collection role may have "raised the bar" for his assessment of certain physical characteristics of the site.

Although the data are available through SYMMACS, the analysis in this report does not differentiate between private sector and public sector facilities. This variable could be incorporated in additional, in-depth analyses.

Interpretation of results for Objective #1: Adoption of six surgical efficiency elements

The first objective of SYMMACS was to track both the extent of actual implementation of the six efficiency elements, as well as providers' attitudes toward these practices in some cases. Highlights of these findings include:

Rotation of surgical beds

In two of the four countries – South Africa and Zimbabwe – the practice of rotation of surgical beds is well established and apparently well accepted by providers. In Tanzania, SYMMACS recorded fewer than two beds per team over the two years. However, as published elsewhere, Tanzania has demonstrated its use of multiple beds very effectively during a six-week campaign period in Iringa Region in 2011, in which a four-bed/one-surgeon facility could circumcise up to 60 clients per day and an eight-bed/two-surgeon facility could achieve 120 circumcisions per day (Mahler et al., 2011). In Kenya, where scale-up is decentralized with larger numbers of sites serving fewer clients per site, providers practiced and preferred a model whereby a provider or team of providers stayed with a single client from start to end of the procedure. However, providers' responses might well have been different, had the client load been higher.

Pre-bundling of supplies and use of disposable instruments

The vast majority of sites in all countries embraced the idea of pre-bundling supplies and instruments for use in the VMMC operating theater as a means of reducing time and ensuring readily available sterilized instruments. However, two distinct approaches to bundling emerged from the SYMMACS data. In South Africa and Zimbabwe, it is both practice and preference to use kits that are purchased (not assembled by staff) that include disposable instruments rather than reusable instruments to be sterilized by the staff. Those with experience using purchased kits consider them operationally and logistically simpler than having staff pre-bundle the kits; and the purchased kits also eliminate the need for managing sterilization and laundry services. Indeed, the scores on the QA tool for sterility of instruments were high in these countries, indicating the logistical benefits of purchased kits.

By contrast, in Kenya and Tanzania, practice and preference tended toward use of kits bundled by VMMC staff and reuse of instruments through sterilization, due to the cost-savings associated with this approach. About 30,000 disposable kits were used in Tanzania in 2011, but only in outreach situations.

As noted by Kuznik et al. (2012), in resource-limited settings seeking to expand access to medical male circumcision for HIV prevention, substantial cost reductions may be achieved by adopting reusable circumcision kits. Advocates of reusable instruments also argue that this approach is more environmentally friendly (USAID/PEPFAR, 2009).

Task-shifting

As with previous elements, the four countries were divided in their approach to task-shifting. South Africa and Zimbabwe have national policies that require medical doctors to perform VMMC; although nurses are allowed to do certain tasks (see below). Nurses conducted a limited number of VMMCs under a doctor's supervision during peak periods in South Africa, and providers in both countries demonstrated strong support for a change in policy that would allow other clinical providers to be trained in performing all aspects of the procedure. In Kenya and Tanzania, providers other than medical doctors (including nurses, clinical officers, and assistant medical officers) already perform the vast majority of VMMC procedures. Moreover, they strongly believe that these other personnel – once trained – can adequately perform in this capacity.

Task-shifting (and task-sharing, addressed below) represent important ways to address human resource constraints in the context of the VMMC scale-up[9] (Curran et al., 2011). There is an increasing body of evidence demonstrating equivalence in efficiency and safety of nurse providers when compared to doctors (Ford et al., 2012). Zimbabwe is currently piloting a major policy change that would allow trained nurses to assume the role of primary provider, and advocates in South Africa are becoming more vocal in promoting similar policy changes. Support for task-shifting is growing for several reasons. First, nurses and clinical officers have an excellent record for safety, as shown in other programs (e.g., Kenya and Tanzania). Second, as expanding programs require a greater numbers of VMMC providers, the current pool of medical doctors cannot meet this demand. Task-shifting would increase the number of trained clinical healthcare workers needed to reach the ambitious targets set for VMMC scale-up in these and other countries. Third, medical doctors may be more prone to burnout than nurses, as the relatively simple VMMC procedure may be viewed as tedious given their high skill level and extensive training. Compounding this problem is the length of time that these programs must run to reach their targets (e.g., at least five years). According to our data, providers from the longest-running program (Kenya) were most likely (approximately 70%) to have experienced some degree of burnout. In contrast, nurses in the Tanzania program felt that performing VMMC increased their professional status, and expressed a high level of job satisfaction with this work.

A counter argument often raised is that training nurses to perform VMMC will place additional burdens on a cadre of personnel that is already overextended due to many public health programs asking nurses to take on mounting responsibility. However, in the case of South Africa and Zimbabwe, there is a current pool of nurses already involved in VMMC service delivery. Allowing them to provide the entire

[9] Others include surgical efficiencies, non-surgical efficiencies, temporary redeployment of public sector staff during VMMC campaign periods, expansion of the health workforce through recruitment of unemployed, recently retired, newly graduating, or on-leave health care workers, and the use of volunteer medical staff from other countries as approaches that address human resource constraints.

procedure would increase program capacity and flexibility without further straining the existing healthcare infrastructure.

Task-sharing

Task -haring is widely practiced in the two countries that authorize only medical doctors to perform VMMC (South Africa and Zimbabwe). In Kenya and Tanzania, other clinical doctors already perform all aspects of the VMMC procedure. Providers in these latter two countries did not fully approve of the task-shifting model, a stance that appeared to be rooted in the philosophy that it is better to have a single provider or team conduct the full procedure from start to finish. Kenyan providers demonstrated a strong sense of duty that a primary provider should take responsibility for the VMMC operation in full.

Surgical method

The WHO guidelines (2010) recognized forceps guided as a surgical method appropriate for the scale-up of VMMC programs, due to the fact that it is faster to complete than other methods and appropriate/safe except in rare cases. As cited in Curran et al. (2011), the forceps guided procedure is, on average, over two and a half minutes faster than the dorsal slit procedure, and over seven and a half minutes faster than sleeve resection. By the time data collection began, all programs in the four SYMMACS countries had adopted the forceps guided method where appropriate. A small minority of providers (27% in Kenya and 15% or less in the other countries) expressed a preference for other methods, but recognized the advantages of forceps guided where time was a factor. Notably, providers voiced an interest in receiving training in other methods, presumably to handle the cases that could not be done with forceps guided. Nevertheless, forceps guided appeared to be the only of the six elements of efficiency that was entirely accepted with few or no exceptions across the four countries.

Use of electrocautery/diathermy

In both South Africa and Zimbabwe, electrocautery/diathermy is an established, accepted aspect of the VMMC scale-up. A recent article on the scale-up of VMMC in Kenya cited diathermy as a key element in this country's effort (Mwandi et al., 2011). However, SYMMACS findings suggest only a partial acceptance of diathermy in the VMMC program in Nyanza. Across Kenya, electrocautery/diathermy is used occasionally but not consistently. In Tanzania, this technique was not available in the national VMMC program, although providers expressed an interest in receiving training to use it. In both Kenya and Tanzania, reluctance to use electrocautery/diathermy appeared to stem from concerns over lack of electricity and safety concerns.

Interpretation of results for Objective #2: Quality and safety

The second objective of SYMMACS was to monitor quality and safety in the evolving VMMC programs in each country.

The program quality required for scale-up of VMMC services is outlined in the *WHO VMMC Quality Assurance Guide*, which focuses on the quality of services, both in terms of the actual operative procedure and the provision of the minimum package of services that should accompany a VMMC procedure (WHO, 2008). To monitor quality and safety, SYMMACS used an abbreviated version of the WHO quality assessment instrument for VMMC programs (WHO, 2009) in Instruments 1-a and 1-b.

SYMMACS identified a number of areas in which programs were operating at the WHO standard. It also revealed field-level problems that are common in service delivery programs across the health sector, such as shortcomings in regular supervision, inadequate record keeping of program statistics, and related challenges.

The results from the quality assessment (Instrument 1-a) and the observation of procedures (Instrument 1-b) identified the following areas of strength, areas in need of improvement, and areas showing improvement over the course of the study in existing VMMC programs across the four countries:

Areas of strength in the participating countries

It was exceptional that in 2011, programs in all four countries scored well on 12 of the 13 quality criteria for surgical technique. The exception was surgical knot-tying, which merits more detailed attention in both training and supervision. In 2012, the programs scored well on 9 of the 13 indicators, demonstrating a slightly lower—but still acceptable—level of adherence. The items requiring quality improvement in some countries include correctly identifying the skin to be excised, demonstrating safe administration of local anesthesia, using correct tying of the surgical knot, and correctly aligning the frenulum and placing the secure mattress suture.

It is also impressive that programs in all four SYMMACS countries demonstrated high percentages of clients tested for HIV prior to surgery. These results highlight the significant achievement that VMMC programs have realized in bringing HIV testing in particular and HIV prevention services in general to a segment of the population – young men – that historically has eluded the reach of public health programming. Potential benefits to this group therefore far exceed the simple removal of the foreskin.

Further, the VMMC sites in this study consistently provided group education and individual counseling on sexual risk behavior to men seeking VMMC services, although SYMMACS did not assess the content or quality of these sessions. The opportunity to reach this group – many on the verge of sexual debut – with information on the means to prevent HIV, the need for consistent condom use, and the message of "partial protection" is an essential part of sound programming.

Areas in need of improvement in the participating countries

First, adverse event reporting is a key indicator of program safety, and it is particularly essential that VMMC programs monitor, record, and report on severe adverse events. Whereas almost all the VMMC sites across the four countries had the identification and reporting system in place, SYMMACS revealed system-wide shortcomings in the routine standardized recording and reporting of adverse events.

Secondly, in the event of a needle stick injury or eye blood splatter, providers need immediate access to post-exposure prophylaxis (PEP), which will significantly decrease their risk of acquiring HIV. However, satisfactory scores in PEP ranged from only 8% (South Africa) to 51% (Zimbabwe). It is also essential for VMMC sites to have guidelines available for administering PEP correctly, should an accident occur. Bringing all sites to 100% compliance on this safety criterion is feasible in a short time period, thus minimizing provider and program risk.

Next, although most VMMC sites received a satisfactory rating on the set of factors related to maintaining sterile conditions, a number did not, particularly in Tanzania and South Africa. This finding deserves the immediate attention of program managers.

Although pre-operative education and counseling was offered comprehensively, the percentage of cases in which providers satisfactorily gave post-operative counseling instructions and reinforcement to messages (e.g., abstinence, being faithful, and consistent condom use) varied greatly by country: from a low of 5% in South Africa to a high of 100% in Zimbabwe. Staff did inform clients about the six-week post-operative abstinence period in the majority of cases in 2011, but this decreased in 2012 in all countries except Zimbabwe. Such messaging would seem to be a natural means of completing the provider/client interaction, but many providers in the system are not consistently covering all necessary points. In some cases (e.g., Tanzania) this may be due to the fact that the clients are not yet sexually active. Providers may be making a conscious decision not to discuss the abstinence period with very young clients.

We also cite two areas in which VMMC sites (in one or more countries) scored poorly, but which call into question the validity of the factors included in the assessment. The first is the mixed results related to post-operative procedures. Zimbabwe, for example has an excellent safety record for performing VMMC surgeries (Population Services International, 2012). However, in 2011, 99% of the VMMC procedures observed in Zimbabwe were rated as "unsatisfactory" for post-operative review of vital signs (temperature, blood pressure); in 2012, 68% were recorded as unsatisfactory on this criterion. Several VMMC practitioners have questioned the relevance of this criterion as part of the SYMMACS QA assessment. They argue that if a client's vital signs are normal prior to the operation, he/she is observed for 10 minutes after the 30-minute operation, and he/she continues to feel well and demonstrates no signs of distress, it is not necessary to repeat the measurement of vital signs. Second, experienced practitioners have similarly questioned the length of the post-operative recovery time (30 minutes) or the need for a second dressing review prior to the client leaving the recovery area.

Finally, AE rates among clients are important measures of the safety of VMMC services. However, in both 2011 and 2012 we encountered multiple problems with the AE data. In all four countries, we found that data on AEs, which were supposed to be collected routinely at the facility level by program staff (independent of SYMMACS), were either not available or not sufficiently specific. First, in the absence of a standard tool for AE classification across VMMC programs in all countries except Kenya[10], there were inconsistencies in the manner in which individual sites reported the severity of AEs (e.g., "moderate" was sometimes recorded as "mild"). Second, some sites had not systematically collected AE data. The teams witnessed instances when clients would come for a follow-up visit with an AE and receive treatment, but no one recorded the visit or the AE complaint. A third situation was the start date for the collection of AE data. For example, in Zimbabwe, classification of severity of AEs (Instrument 3) only began in August 2010 and data for preceding months were unavailable. In view of this situation, the SYMMACS co-PI (an expert in the area of AE) recommended that there be no analysis of the data for

[10]Kenya had a standard NASCOP-approved tool for assessing AEs, but still experienced problems because clients either did not return for follow-up or went to a different facility.

AEs given the inconsistencies and poor quality of this information. The SYMMACS team concurred. Thus, we have not presented data on AEs in this report. Improvements in AE reporting are desperately needed.

Areas showing improvement between 2011 and 2012

The VMMC sites across the four countries tended to score "unsatisfactory" on the availability of WHO protocols for performing VMMC in 2011, despite the widespread distribution of these protocols from partner organizations or training courses and the insistence of program managers to have these documents onsite. Experienced practitioners have voiced concern that the existing documents are too bulky and hard to navigate. It was recommended that developing a more user-friendly tool could contribute to increased compliance on this factor.

The results with regard to a functional information system showed marked improvement, which may reflect that reporting the number of VMMCs is a major priority of donor organizations. However, this improvement in terms has not extended to the reporting of adverse events.

Interpretation of results for Objective #3: Efficiency in operating theater

SYMACS yielded timing data on the individual steps of VMMC procedures, as well as summary measures on the primary provider time spent with the client and total elapsed operating time. There was clear evidence that electrocautery and task-sharing on suturing reduced the amount of time required to complete the VMMC procedure, based on the timing data shown in Table 17. For example the time savings from use of electrocautery over ligating sutures was approximately 2:30 minutes per procedure, which would translate into one hour and 40 minutes in a high volume setting where 40 procedures were performed a day. Similarly, in countries that did not allow task-shifting, having a secondary provider assist in skin sutures reduced the time of the primary provider with the client.

Areas for future research

The findings from SYMMACS point to several areas of future VMMC research. SYMMACS did not collect any data on client perspectives or surgical outcomes. This study judged quality in terms of safety standards at the sites and technical competence of providers. Future research may consider trying to understand how this relates to clients' perspectives on quality. It would also be useful to link quality measures to client outcomes in terms of adverse events in future studies.

SYMMACS gives a comprehensive view of the supply of VMMC services. There is an equally large gap in the literature on demand creation and matching of supply and demand. Future research is needed to identify demand creation strategies especially to reach men over the age of 25. Additionally, SYMMACS shows dramatic seasonal fluctuations in client load. Additional research is needed to characterize this phenomenon and to identify programmatic approaches to matching seasonal variations in supply and demand.

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LIST OF TABLES

LIST OF FIGURES

Table 1. Volume of site and number of procedures on days of site visit, by country

	Kenya(sites)		South Africa (sites)		Tanzania (sites)		Zimbabwe (sites)	
	2011 **n=30**	2012 **n=29**	2011 **n=15**	2012 **n=40**	2011 **n=14**	2012 **n=29**	2011 **n=14**	2012 **n=24**
% of site managers reporting the day of site visit to be part of a[11]:								
High volume period	--	58.6	--	30.0	--	20.7	--	16.7
Average volume period	--	24.1	--	27.5	--	48.3	--	29.2
Low volume period	--	17.2	--	42.5	--	31.0	--	54.1
Number of VMMCs performed on days of site visit								
Mean		6.4		26.0		10.8		10.5
Median		5.0		22.5		8.5		12.6

[11] Question not asked of site managers in 2011

Table 2. Cadre of personnel performing or assisting in VMMC procedures on days of visit, by country[12]

	Number of personnel per site by cadre							
	Kenya mean (range)		South Africa mean (range)		Tanzania mean (range)		Zimbabwe mean (range)	
	2011 **n=30**	2012 **n=29**	2011 **n=15**	2012 **n=40**	2011 **n=14**	2012 **n=29**	2011 **n=14**	2012 **n=24**
Cadre of primary provider (person removing the foreskin):								
Medical doctor (MD)	0.0	0.0	1.4 (0-3)	1.4 (1-4)	0.1 (0-1)	.0 (01)	1.8 (1-3)	1.1 (1-2)
Assistant medical officer (AMO)	-	-	-	-	0.3 (0-1)	.2 (0-1)	-	-
Clinical officer	1.0 (0-3)	0.9 (0-3)	-	0.0 (0-1)[13]	0.4 (0-1)	.3 (0-2)	-	-
Nurse	1.0 (0-3)	0.9 (0-3)	0.03 (0-1)	-	2.5 (1-4)	1.6 (0-4)	0.0	0.0
Cadre of secondary provider (person assisting with clinical aspects of VMMC):								
Medical doctor	0.0	0.0	0.0	0.0	0.0	0.0 (0-0)	0.0	0.0
Assistant medical officer (AMO)	-	-	-	-	0.1 (0-1)	.0 (0-1)	-	-
Clinical officer	1.0 (0-2)	0.2 (0-2)	-	0.0 (0-0)	0.3 (0-2)	.1 (0-1)	-	-
Nurse	1.0 (0-2)	0.4 (0-2)	4.7 (0-10)	5.8 (1-14)	2.4 (1-4)	1.6 (0-4)	4.1 (2-7)	2.9 (1-5)
Total clinical VMMC providers on days of visit	3.4 (0-8)	2.4 (1-5)	7.5 (2-13)	7.1 (2-15)	6.0 (3-9)	3.9 (1-9)	5.9 (3-9)	4.0 (2-6)
Total other clinical assistants that clean and organize surgical area (hygienist, runner, cleaner, etc.)	1.2 (0-3)	1.0 (0-2)	2.1 (1-6)	2.2 (0-6)	1.0 (0-2)	0.7 (0-2)	2.0 (1-4)	1.3 (1-2)

[12] The dash indicates that this cadre of personnel does not work in VMMC programs in this country.

[13] Clinical Officer is a new cadre of health care provider in South Africa; thus just one site had one clinical officer providing VMMC on the day of site visit.

Table 3. Surgical beds per site, by country

Proportion of facilities with this number of surgical beds (bays):	Kenya (sites)		South Africa (sites)		Tanzania (sites)		Zimbabwe (sites)	
	2011 n=30 sites	2012 n=29 sites	2011 n=15 sites	2012 n=40 sites	2011 n=14 sites	2012 n=29 sites	2011 n=14 sites	2012 n=24 sites
1	66.7	79.3	6.7	12.5	37.5	27.6	0.0	0.0
2	16.7	20.7	6.7	12.5	57.1	58.6	0.0	41.7
3	10.0	0.0	6.7	20.0	7.1	6.9	42.9	33.3
4 or more	3.3	0.0	79.9	52.5	0.0	6.9	57.1	25
Mean number of beds per site	**1.4 beds**	**1.2 beds**	**4.8 beds**	**3.7 beds**	**1.7 beds**	**1.9 beds**	**3.9 beds**	**2.9 beds**

Table 4. Characteristics of VMMC sites, by country

Item observed:	Kenya 2011: n=30 sites 2012: n=29 sites						South Africa 2011: n=15 sites 2012: n=40 sites					
	0 (%)		1 (%)		2 (%)		0 (%)		1 (%)		2 (%)	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
Light in surgical area	0.0	0.0	16.7	10.3	83.3	89.7	0.0	0.0	6.7	7.5	93.3	92.5
Ventilation in surgical area	0.0	0.0	6.7	6.9	93.3	93.1	6.7	2.5	6.7	25.0	86.7	72.5
General appearance of VMMC facility	0.0	0.0	6.7	0.0	93.3	100	0.0	0.0	13.3	45.0	86.7	55.0

Item observed:	Tanzania 2011: n=14 sites 2012: n=29 sites						Zimbabwe 2011: n=14 sites 2012: n=24 sites					
	0 %		1 %		2 %		0 %		1 %		2 %	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
Light in surgical area	7.1	0.0	35.7	69.0	57.1	31.0	7.1	4.2	50.0	12.5	42.9	83.8
Ventilation in surgical area	7.7	0.0	23.1	6.9	69.2	93.1	0.0	4.2	57.1	8.3	42.9	87.5
General appearance of VMMC facility	7.7	0.0	30.8	27.6	61.5	72.4	0.0	0.0	57.1	8.3	42.9	91.7

* Zero= unsatisfactory 1=partially satisfactory 2= satisfactory

Table 5. Adequacy of information system at VMMC sites, by country

Item observed:	Kenya 2011: n=30 sites 2012: n=29 sites						South Africa 2011: n=15 sites 2012: n=40 sites					
	0 %		1 %		2 %		0 %		1 %		2 %	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
Existence of a functioning information system (manual or computerized)	3.3	0.0	0.0	0.0	96.7	100	0.0	0.0	40.0	2.5	60.0	97.5
VMMC client consent forms on file	0.0	3.4	0.0	0.0	100	96.6	6.7	2.5	0.0	0.0	93.3	97.5
Monitoring system in place for adverse events	6.7	0.0	0.0	0.0	93.3	100	26.7	50.0	13.3	27.5	60.0	22.5

Item observed:	Tanzania 2011: n=14 sites 2012: n=29 sites						Zimbabwe 2011: n=14 sites 2012: n=24 sites					
	0 %		1 %		2 %		0 %		1 %		2 %	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
Existence of a functioning information system (manual or computerized)	14.3	0.0	0.0	0.0	85.7	100	0.0	0.0	0.0	4.2	100	95.8
VMMC client consent forms on file	14.3	0.0	0.0	0.0.	85.7	100	0.0	0.0	0.0	0.0	100	100
Monitoring system in place for adverse events	7.1	3.4	0.0	0.0	92.9	96.6	0.0	0.0	0.0	4.2	100	95.8

* Zero= unsatisfactory 1=partially satisfactory 2= satisfactory

Table 6. Education, counseling and referral at VMMC sites, by country

Item observed:	Kenya 2011: n=30 sites 2012: n=29 sites						South Africa 2011: n=15 sites 2012: n=40 sites					
	0 %		1 %		2 %		0 %		1 %		2 %	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
Group education on risks & benefits of VMMC	0.0	0.0	0.0	0.0	100	100	6.7	12.5	0.0	7.5	93.3	80.0
Individual HTC& questions time on VMMC	0.0	0.0	0.0	3.4	100	96.6	0.0	10.0	0.0	22.5	100	67.5
Referral slips for clients	56.7	37.9	6.7	3.4	36.7	58.6	13.3	47.5	0.0	10.0	86.7	42.5

Item observed:	Tanzania 2011: n=14 sites 2012: n=29 sites						Zimbabwe 2011: n=14 sites 2012: n=24 sites					
	0 %		1 %		2 %		0 %		1 %		2 %	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
Group education on risks & benefits of VMMC	0.0	0.0	7.1	0.0	92.9	100	7.1	0.0	7.1	0.0	85.8	100
Individual HTC& questions time on VMMC	0.0	0.0	0.0	0.0	100	100	0.0	0.0	0.0	0.0	100	100
Referral slips for clients	7.1	6.9	0.0	34.5	92.9	58.6	0.0	0.0	0.0	0.0	100	100

* Zero= unsatisfactory 1=partially satisfactory 2= satisfactory

Table 7. Supervisory mechanisms at VMMC sites, by country[+]

Item observed:	Kenya 2011: n=30 sites 2012: n=29 sites						South Africa 2011: n=15 sites 2012: n=40 sites					
	0 %		1 %		2 %		0 %		1 %		2 %	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
Report of supervisory visits in past 6 months	36.7	24.1	33.3	20.7	30.0	55.2	26.7	72.5*	13.3	10.0	60.0	17.5
External monitoring of adverse events in the past 6 months	66.7	64.3	16.7	10.7	16.7	25.0	60.0	92.5	0.0	5.0	40.0	2.5

Item observed:	Tanzania 2011: n=14 sites 2012: n=29 sites						Zimbabwe 2011: n=14 sites 2012: n=24 sites					
	0 %		1 %		2 %		0 %		1 %		2 %	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
Report of supervisory visits in past 6 months	64.3	48.3	14.3	27.6	21.4	24.1	85.7	45.8	0.0	0.0	14.3	54.2
External monitoring of adverse events in the past 6 months	92.9	44.8	7.1	10.3	0.0	44.8	85.7	45.8	7.1	0.0	7.1	54.2

[+]This table does not reflect the fact that some sites had been in operation less than 6 months; nor does it report supervisory visits that occurred after data collection.

* Zero= unsatisfactory 1=partially satisfactory 2= satisfactory

Table 8. Availability of protocols, in VMMC sites, by country

Item observed:	Kenya 2011: n=30 sites 2012: n=29 sites						South Africa 2011: n=15 sites 2012: n=40 sites					
	0 %		1 %		2 %		0 %		1 %		2 %	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
WHO guidelines for VMMC performing	30.0	20.7	0.0	0.0	70.0	79.3	60.0	45.0	0.0	12.5	40.0	42.5
National STI protocols	53.3	44.8	0.0	0.0	46.7	55.2	26.7	62.5	0.0	7.5	73.3	30.0

Item observed:	Tanzania 2011: n=14 sites 2012: n=29 sites						Zimbabwe 2011: n=14 sites 2012: n=24 sites					
	0 %		1 %		2 %		0 %		1 %		2 %	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
WHO guidelines for VMMC performing	21.4	10.3	28.6	3.4	50.0	86.2	64.3	37.5	14.3	16.7	21.4	45.8
National STI protocols	14.3	58.6	0.0	3.4	85.7	37.9	35.7	0.0	7.1	8.3	57.1	91.7

* Zero= unsatisfactory 1=partially satisfactory 2= satisfactory

Table 9. Availability of operating supplies and equipment in VMMC sites, by country

Item observed:	Kenya 2011: n=30 sites 2012: n=29 sites						South Africa 2011: n=15 sites 2012: n=40 sites					
	0 %		1 %		2 %		0 %		1 %		2 %	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
Sterilized VMMC instruments	0.0	0.0	0.0	0.0	100	100	13.3	2.5	0.0	2.5	86.7	95.0
Correctly stored & unexpired local anesthesia	0.0	0.0	3.3	3.4	96.7	96.6	0.0	0.0	0.0	10.0	100	90.0
Antibiotics for VMMC/AEs in stock	20.7	31.0	0.0	10.3	79.3	58.6	13.3	5.0	6.7	35.0	80.0	60.0
Pain medication in stock	3.3	0.0	3.3	0.0	93.3	100	0.0	2.5	0.0	22.5	100	75.0
Antiseptics in stock	0.0	0.0	0.0	0.0	100	100	0.0	0.0	0.0	12.5	100	87.5
Dressing materials (bandages & gauze)	0.0	0.0	0.0	0.0	100	100	0.0	5.1	0.0	15.4	100	79.5
Sharps container in surgical area	6.7	0.0	0.0	0.0	93.3	100	0.0	2.5	0.0	2.5	100	95.0

Item observed:	Tanzania 2011: n=14 sites 2012: n=29 sites						Zimbabwe 2011: n=14 sites 2012: n=24 sites					
	0 %		1 %		2 %		0 %		1 %		2 %	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
Sterilized VMMC instruments	7.1	0.0	0.0	0.0	92.9	100	7.1	0.0	0.0	0.0	92.9	100
Correctly stored & unexpired local anesthesia	7.1	0.0	0.0	0.0	92.9	100	0.0	0.0	0.0	0.0	100	100
Antibiotics for VMMC/AEs in stock	7.1	10.3	14.3	0.0	78.6	89.7	7.1	4.2	7.1	0.0	85.7	95.8
Pain medication in stock	7.1	0.0	0.0	0.0	92.9	100	0.0	0.0	0.0	0.0	100	100
Antiseptics in stock	7.1	0.0	0.0	0.0	92.9	100	0.0	0.0	14.3	0.0	85.7	100
Dressing materials (bandages & gauze)	7.1	0.0	0.0	0.0	92.9	100	0.0	0.0	0.0	0.0	100	100
Sharps container in surgical area	7.1	0.0	0.0	0.0	92.9	100	0.0	0.0	0.0	0.0	100	100

* Zero= unsatisfactory 1=partially satisfactory 2= satisfactory

Table 10. Availability of CPR equipment in VMMC sites, by country

Item observed:	Kenya 2011: n=30 sites 2012: n=29 sites						South Africa 2011: n=15 sites 2012: n=40 sites					
	0 %		1 %		2 %		0 %		1 %		2 %	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
CPR Bag Mask	60.0	34.5	6.7	10.3	33.3	55.2	26.7	50.0	6.7	2.5	66.7	47.5
Oxygen supply	93.3	82.8	0.0	10.3	6.7	6.9	26.7	45.0	0.0	7.5	73.3	47.5
IV lines & fluids	40.0	27.6	30.0	27.6	30.0	44.8	26.7	22.5	0.0	0.0	73.3	77.5
Antihistamine	63.3	34.5	26.7	24.1	10.3	41.4	13.3	17.5	0.0	27.5	86.7	55.0

Item observed:	Tanzania 2011: n=14 sites 2012: n=29 sites						Zimbabwe 2011: n=14 sites 2012: n=24 sites					
	0 %		1 %		2 %		0 %		1 %		2 %	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
CPR Bag Mask	42.9	41.4	14.3	3.4	42.9	55.2	21.4	20.8	35.7	12.5	42.9	66.7
Oxygen supply	92.9	82.8	0.0	0.0	7.1	17.2	28.6	20.8	7.1	16.7	64.3	62.5
IV lines & fluids	28.6	13.8	14.3	10.3	57.1	75.9	14.3	0.0	21.4	20.8	64.3	79.2
Antihistamine	71.4	17.2	0.0	17.2	28.6	65.5	21.4	8.3	21.4	20.8	57.1	70.8

* Zero= unsatisfactory 1=partially satisfactory 2= satisfactory

Table 11. Availability of prophylactic supplies in VMMC sites, by country

Item observed:	Kenya 2011: n=30 sites 2012: n=29 sites						South Africa 2011: n=15 sites 2012: n=40 sites					
	0 %		1 %		2 %		0 %		1 %		2 %	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
Post-exposure infection prophylaxis	40.0	31.0	13.3	51.7	46.7	17.2	40.0	40.0	0.0	52.5	60.0	7.5
Guidelines for post-exposure prophylaxis	40.0	25.0	3.3	7.1	56.7	67.9	13.3	67.5	0.0	0.0	86.7	32.5

Item observed:	Tanzania 2011: n=14 sites 2012: n=29 sites						Zimbabwe 2011: n=14 sites 2012: n=24 sites					
	0 %		1 %		2 %		0 %		1 %		2 %	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
Post-exposure infection prophylaxis	28.6	10.3	14.3	79.3	57.1	10.3	28.6	8.3	14.3	41.7	57.1	50.7
Guidelines for post-exposure prophylaxis	78.6	34.5	0.0	3.4	21.4	62.1	35.7	16.7	14.3	12.5	50.0	70.8

* Zero= unsatisfactory 1=partially satisfactory 2= satisfactory

Table 12. Provision of HTC and distribution of male condoms in VMMC sites, by country

Item observed:	Kenya 2011: n=30 sites 2012: n=29 sites						South Africa 2011: n=15 sites 2012: n=40 sites					
	0 %		1 %		2 %		0 %		1 %		2 %	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
Male condoms availability	20.0	21.4	10.0	3.6	70.0	75.0	13.3	27.5	0.0	2.5	86.7	70.0
HTC provision	0.0	0.0	3.3	3.4	96.7	96.6	0.0	20.0	0.0	12.5	100	67.5
HTC audio/visual privacy	0.0	0.0	0.0	6.9	100	93.1	6.7	22.5	0.0	17.5	93.3	60.0

Item observed:	Tanzania 2011: n=14 sites 2012: n=29 sites						Zimbabwe 2011: n=14 sites 2012: n=24 sites					
	0 %		1 %		2 %		0 %		1 %		2 %	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
Male condoms availability	21.4	6.9	0.0	20.7	78.6	72.4	21.4	0.0	7.1	0.0	71.4	100
HTC provision	0.0	0.0	0.0	0.0	100	100	0.0	0.0	0.0	0.0	100	100
HTC audio/visual privacy	0.0	0.0	0.0	3.4	100	96.6	0.0	0.0	21.4	4.2	78.6	95.8

* Zero= unsatisfactory 1=partially satisfactory 2= satisfactory

Table 13. Impression of officer-in-charge regarding the client load, given the operating capacity at his/her VMMC site, by country

Percentage of officers-in-charge who report the following impressions of client load:	Total %							
	Kenya 2011: n=30 sites 2012: n=29 sites		South Africa 2011: n=15 sites 2012: n=40 sites		Tanzania 2011: n=14 sites 2012: n=29 sites		Zimbabwe 2011: n=14 sites 2012: n=24 sites	
	2011	2012	2011	2012	2011	2012	2011	2012
Too few clients	40.0	20.7	0.0	12.5	7.1	20.7	21.4	41.7
Too many clients	0.0	0.0	20.0	30.0	21.4	10.3	28.6	4.2
A good balance between number of clients and VMMC provider's ability to provide VMMC	40.0	69.0	53.3	57.5	28.6	58.6	35.7	50.0
It depends	20.0	10.3	26.7	0.0	42.9	10.3	14.3	4.2

Table 14. Assessment of pre-operative and safety control procedures for VMMC, by country

Item observed:	Kenya 2011: n=154 procedures 2012: n=218 procedures						South Africa 2011: n=116 procedures 2012: n=361 procedures					
	0 %		1 %		2 %		0 %		1 %		2 %	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
Pre-operative assessment:												
Clinical personnel conduct a basic preoperative assessment including a targeted history and physical exam to exclude surgical contraindications, primarily bleeding disorders, allergies, and immunocompromised states and STIs	10.6	13.8	9.9	15.2	79.5	71.0	33.6	53.8	14.3	34.0	51.2	12.3
Surgical procedures infection & safety control:												
Sterile instruments &consumables used	0.0	0.5	0.0	0.9	100	98.6	0.8	0.6	0.8	0.3	98.3	99.2
Sterile gloves used	0.0	0.0	0.0	0.5	100	99.5	3.3	5.4	1.7	8.2	95.0	86.4
Hand washing/ disinfection between clients	5.3	6.5	4.0	2.8	90.7	90.8	8.3	25.8	1.7	14.7	90.0	59.5
Maintenance of an adequate sterile surgical field while operating	0.0	0.9	0.0	3.7	100	95.4	5.9	4.3	7.6	16.8	86.4	78.9
Use of protective eyewear	94.0	93.6	0.7	0.0	5.3	6.4	80.7	86.0	8.4	8.7	10.9	5.3
Safe secure storage & disposal of medical waste by provider	0.7	0.0	0.7	0.0	98.7	100	2.5	4.5	5.0	22.9	92.4	72.6
Correct & hygienic instrument processing	0.7	0.5	1.3	3.2	98.0	96.3	2.5	0.6	0.0	1.7	97.5	97.7
Disinfection of surgical beds & areas between clients	1.3	2.3	0.0	0.0	98.7	97.7	3.3	8.7	4.2	30.4	92.5	60.8

Table 14 (con't). Assessment of pre-operative and safety control procedures for VMMC, by country

Item observed:	Tanzania 2011: n=133 procedures 2012: n=251 procedures						Zimbabwe 2011: n=140 procedures 2012: n=204 procedures					
	0 %		1 %		2 %		0 %		1 %		2 %	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
Pre-operative assessment:												
Clinical personnel conduct a basic preoperative assessment including a targeted history and physical exam to exclude surgical contraindications, primarily bleeding disorders, allergies, and immunocompromised states and STIs	8.3	4.0	70.7	69.7	21.1	26.3	0.0	0.0	2.9	0.0	97.1	100
Surgical procedures infection & safety control:												
Sterile instruments &consumables used	0.0	0.0	0.8	0.8	99.2	99.2	0.0	0.0	0.0	0.0	100	100
Sterile gloves used	0.0	0.0	0.0	0.4	100	99.6	0.0	0.0	0.7	0.0	99.3	100
Hand washing/ disinfection between clients	5.3	0.0	1.5	2.8	93.2	97.2	0.7	0.0	12.1	0.0	87.1	100
Maintenance of an adequate sterile surgical field while operating	0.8	0.4	42.1	19.9	57.1	79.7	0.7	0.0	18.6	0.0	80.7	100
Use of protective eyewear	54.9	32.7	19.5	12.0	25.6	55.4	99.3	97.5	0.0	0.0	0.7	2.5
Safe secure storage & disposal of medical waste by provider	0.0	0.4	0.0	0.0	100	99.6	0.7	0.0	0.7	0.5	98.6	99.5
Correct & hygienic instrument processing	0.0	0.4	7.5	12.0	92.5	87.6	0.0	0.0	2.9	0.0	97.1	100
Disinfection of surgical beds & areas between clients	3.0	4.8	30.1	30.7	66.9	64.5	0.0	0.0	15.7	3.4	84.3	96.6

Table 15. Assessment of surgical procedures for VMMC, by country

Item observed:	Kenya 2011: n=154 procedures 2012: n=218 procedures						South Africa 2011: n=116 procedures 2012: n=361 procedures					
	0 %		1 %		2 %		0 %		1 %		2 %	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
Clean surgical area with a recommended scrub solution	0.0	0.5	0.0	0.0	100	99.5	0.0	0.6	0.0	9.5	100	89.9
Correctly identify the skin to be excised	0.0	0.0	0.0	4.1	100	95.9	0.0	15.8	1.7	12.7	98.3	71.5
Demonstrate the “safety first approach” to ensure no part of penis besides the foreskin is in danger of being injured	0.0	0.0	0.0	0.0	100	100	0.0	0.0	2.5	2.8	97.5	97.2
Demonstrate safe administration of local anesthesia	0.0	0.0	0.0	0.0	10.1	89.9	3.6	1.4	0.0	27.9	96.4	70.8
Demonstrate cautious & gentle approach to removing the foreskin	0.0	0.0	0.0	0.9	100	99.1	0.0	1.1	3.4	3.6	96.6	95.3
Adequately controls bleeding with electrocautery and/or ligating sutures	0.0	0.0	0.0	0.0	100	100	0.0	0.8	0.0	3.1	100	96.1
Use correct technique to tie surgical knots	9.3	1.8	34.0	31.2	56.7	67.0	21.2	9.5	4.2	28.2	74.6	62.3
Correctly align the frenulum and places secure mattress suture	0.0	0.0	0.0	1.4	100	98.6	0.0	1.4	0.0	10.3	100	88.3
Correctly align the other quadrant sutures	0.0	0.0	0.0	0.5	100	99.5	1.7	0.0	1.7	2.8	96.6	97.2
Avoid placing deep sutures around the frenulum	0.0	0.0	0.0	0.0	100	100	0.0	0.3	0.8	2.8	99.2	96.9
Place interrupted sutures evenly to avoid leaving gapping margins	0.0	0.0	0.0	9.2	100	90.8	5.2	1.1	5.2	1.9	89.6	96.9
Ensure no significant bleeding present	0.0	0.0	0.0	0.0	100	100	0.0	1.1	0.8	2.3	99.2	96.6
Place a secure dressing that is not excessively tight	0.0	0.0	1.3	0.0	98.7	100	0.0	2.0	0.0	0.8	100	97.2

Table 15 (cont). Assessment of surgical procedures for VMMC, by country

Item observed:	Tanzania 2011: n=133 procedures 2012: n=251 procedures						Zimbabwe 2011: n=140 procedures 2012: n=204 procedures					
	0 %		1 %		2 %		0 %		1 %		2 %	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
Clean surgical area with a recommended scrub solution	0.0	0.0	1.5	0.4	98.5	99.6	0.0	0.0	31.4	0.0	68.6	100
Correctly identify the skin to be excised	0.8	0.8	6.0	14.7	93.2	84.5	0.0	0.0	8.6	0.0	91.4	100
Demonstrate the “safety first approach” to ensure no part of penis besides the foreskin is in danger of being injured	0.8	0.0	0.0	1.6	99.2	98.4	0.0	0.0	4.3	0.0	95.7	100
Demonstrate safe administration of local anesthesia	2.3	1.2	0.0	8.8	97.7	90.0	0.0	0.0	1.4	0.0	98.6	100
Demonstrate cautious & gentle approach to removing the foreskin	0.0	0.8	0.0	3.2	100	96.0	0.0	0.0	5.7	0.0	94.3	100
Adequately controls bleeding with electrocautery and/or ligating sutures	0.0	0.0	3.8	6.8	96.2	93.2	0.0	0.0	7.9	0.5	92.1	99.5
Use correct technique to tie surgical knots	5.3	4.0	21.8	48.2	72.9	47.8	0.0	0.0	16.4	0.0	83.6	100
Correctly align the frenulum and places secure mattress suture	0.0	0.0	0.0	0.4	100	99.6	0.7	0.0	9.3	0.0	90.0	100
Correctly align the other quadrant sutures	0.0	0.0	0.0	0.4	100	99.6	0.0	0.0	7.9	0.0	92.1	100
Avoid placing deep sutures around the frenulum	0.0	0.0	0.0	0.0	100	100	0.0	0.0	6.4	5.4	93.6	94.6
Place interrupted sutures evenly to avoid leaving gapping margins	1.5	0.0	0.0	1.6	98.5	98.4	0.0	0.0	10.7	0.5	89.3	99.5
Ensure no significant bleeding present	0.0	0.0	0.0	0.8	100	99.2	0.0	0.0	15.0	0.5	85.0	99.5
Place a secure dressing that is not excessively tight	0.0	0.0	1.5	0.4	98.5	99.6	0.0	0.0	11.4	0.0	88.6	100

Table 16. Assessment of post-operative procedures for VMMC, by country

Item observed:	Kenya 2011: n=154 procedures 2012: n=218 procedures						South Africa 2011: n=116 procedures 2012: n=361 procedures					
	0 %		1 %		2 %		0 %		1 %		2 %	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
Staff observe post-op clients for an allergic reaction or any other abnormality before allowing them to leave the operating table or recovery room	40.4	44.0	3.3	0.0	56.3	56.0	54.2	84.7	4.2	7.8	41.5	7.5
Staff review vital signs	45.7	64.7	9.9	1.4	44.4	33.9	32.2	39.4	0.0	1.4	67.8	59.2
Staff provide patients with clear instructions, verbal and written on how to wash and care for the wound and how to deal with pain and minor bleeding	8.7	21.6	27.3	14.7	64.0	63.8	7.6	17.0	12.6	37.6	79.8	45.4
Staff insist/encourage clients to return for a follow-up visit within 48 hours of the VMMC or in the case of a complication	33.8	39.0	2.6	1.4	63.6	59.6	10.1	34.4	1.7	2.0	88.2	63.7
Staff provide emergency contact details to clients	4.0	8.3	0.0	0.0	96.0	91.7	32.8	64.5	0.0	0.0	67.2	35.5
Patients receive post-operative counseling instructions and reinforcement of previous VMMC/HIV messaging	37.1	55.5	5.3	3.2	57.6	41.3	85.6	95.3	4.2	0.3	10.2	4.5
Staff give specific reminders of the 6 week post-operative abstinence period	42.3	68.8	0.7	0.0	57.0	31.2	47.1	70.7	0.0	0.8	52.9	28.5

Table 16 (cont). Assessment of post-operative procedures for VMMC, by country

Item observed:	Tanzania 2011: n=133 procedures 2012: n=251 procedures						Zimbabwe 2011: n=140 procedures 2012: n=204 procedures					
	0 %		1 %		2 %		0 %		1 %		2 %	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
Staff observe post-op clients for an allergic reaction or any other abnormality before allowing them to leave the operating table or recovery room	10.5	4.8	24.8	21.2	64.7	74.0	2.1	0.0	75.7	0.5	22.1	99.5
Staff review vital signs	12.8	25.1	38.3	32.3	48.9	42.6	98.6	68.1	1.4	22.1	0.0	9.8
Staff provide patients with clear instructions, verbal and written on how to wash and care for the wound and how to deal with pain and minor bleeding	7.5	4.8	28.6	26.7	63.9	68.5	0.7	0.0	30.7	0.0	68.6	100
Staff insist/encourage clients to return for a follow-up visit within 48 hours of the VMMC or in the case of a complication	4.5	3.2	3.8	6.8	91.7	90.0	0.0	0.0	1.4	0.0	98.6	100
Staff provide emergency contact details to clients	14.2	14.7	3.8	16.7	91.7	68.5	0.7	0.0	0.7	0.0	98.6	100
Patients receive post-operative counseling instructions and reinforcement of previous VMMC/HIV messaging	16.5	34.6	20.3	40.8	63.2	22.8	0.0	0.0	1.4	0.0	98.6	100
Staff give specific reminders of the 6 week post-operative abstinence period	62.4	75.7	6.0	7.2	31.6	17.1	0.0	0.0	0.0	0.0	100	100

Table 17a. Time (in minutes: seconds) used by providers for each step in the VMMC procedure, by country

Step of the VMMC procedure:	Average (median) duration in minutes: seconds							
	Kenya		South Africa		Tanzania		Zimbabwe	
	2011 (n=154)	2012 (n=218)	2011 (n=120)	2012 (n=361)	2011 (n=133)	2012 (n=251)	2011 (n=140)	2012 (n=204)
1. Patient enters operating area	07:02	06:12	04:03	03:35	02:24	02:24	02:00	02:20
2. Provider scrubs & prepares patient skin	01:14	01:02	00:51	00:40	01:32	01:38	01:10	01:08
3. Provider administers local anesthesia	01:07	01:00	00:49	00:57	00:57	00:57	01:26	01:10
4. Provider removes foreskin	01:06	01:12	00:04	00:45	01:30	01:18	00:49	00:03
5. Provider:								
a. Performs hemostasis using electrocautery *(n procedures)*	- *(n=0)*	- *(n=0)*	02:07 *(n=120)*	02:33 *(n=357)*	- *(n=0)*	- *(n=0)*	01:44 *(n=80)*	02:00 *(n=136)*
OR:								
b. Performs hemostasis using ligating sutures *(n procedures)*	04:05 *(n=151)*	03:56 *(n=218)*	- *(n=0)*	03:51 *(n=3)*	05:18 *(n=126)*	05:44 *(n=251)*	03:08 *(n=60)*	04:16 *(n=68)*
6. Primary provider inserts skin sutures*	08:15 *(n=151)*	07:26 *(n=218)*	03:23 *(n=120)*	02:52 *(n=354)*	06:55 *(n=129)*	07:11 *(n=251)*	04:40 *(n=140)*	03:28 *(n=204)*
7. Secondary provider assists with insertion of skin sutures*	11:58 *(n=1)*	-- *(n=0)*	04:59 *(n=72)*	04:31 *(n=272)*	05:15 *(n=23)*	2:59 *(n=8)*	04:17 *(n=60)*	04:56 *(n=130)*
Primary provider time with client (Foreskin removal, hemostasis, primary provider sutures)	**13:34**	**12:53**	**06:19**	**06:45**	**14:06**	**14:47**	**07:58**	**06:48**
8. Provider applies dressing & cleans the client	01:15	01:16	01:41	01:44	02:50	02:31	02:00	02:11
Total operating time (scrubbing to cleaning)	**22:45**	**23:10**	**23:44**	**26:03**	**24:12**	**23:12**	**30:00**	**23:20**
9. Client dresses and exits operating theater	00:22	00:21	02:25	02:19	00:46	00:34	01:05	00:45
Total time patient in operating theater (entrance to exit)	**30:05**	**29.56**	**30:37**	**32:52**	**27:56**	**26:22**	**37:00**	**28:36**

Table 17b: Number of sutures: by primary provider, secondary provider and in total

	Kenya		South Africa		Tanzania		Zimbabwe	
	2011	2012	2011	2012	2011	2012	2011	2012
Average (mean) number of sutures inserted by primary provider	13.2 *(n=151)*	11.9 *(n=216)*	5.3 *(n=120)*	4.9 *(n=354)*	11.0 *(n=129)*	11.1 *(n=251)*	7.6 *(n=140)*	6.5 *(n=181)*
Average (mean) number of sutures inserted by secondary provider	7.3 *(n=4)*	N/A *(n=0)*	6.6 *(n=71)*	8.3 *(n=272)*	9.8 *(n=22)*	6.7 *(n=7)*	6.5 *(n=60)*	7.2 *(n=129)*
Average (mean) number of total sutures	13.4	11.9	9.2	11.0	12.6	11.3	10.4	10.3

Table 18. Percentage of VMMC sites benefiting from different types of demand creation activities, by country

Channel	Percentage %							
	Kenya		South Africa		Tanzania		Zimbabwe	
	2011 (n=30)	2012 (n=29)	2011 (n=15)	2012 (n=40)	2011 (n=14)	2012 (n=29)	2011 (n=14)	2012 (n=24)
1. MASS MEDIA								
Radio:								
Radio spot	33.3	37.9	13.3	15.0	57.1	72.4	50.0	75.0
Radio coverage by local reporters	30.0	37.9	20.0	20.0	57.1	58.6	35.7	70.8
Radio call-in talk show	23.3	37.9	20.0	22.5	14.3	17.2	21.4	25.0
Other radio	3.3	3.4	0.0	2.5	0.0	0.0	0.0	4.2
Any form of radio	43.3	44.8	46.7	50.0	64.3	72.4	50.0	75.0
Television:								
TV spot	6.7	3.4	0.0	7.5	0.0	0.0	28.6	75.0
TV coverage by local reporters	10.0	3.4	6.7	2.5	15.4	0.0	28.6	75.0
TV call-in talk show	3.3	3.4	0.0	2.5	0.0	0.0	7.1	37.5
Other TV	0.0	0.0	6.7	17.5	0.0	0.0	0.0	4.2
Any form of television	13.3	10.3	13.3	27.5	15.4	0.0	28.6	75.0
2. SMALL MEDIA								
Newspaper Ad	6.7	13.8	33.3	20.0	7.7	3.4	71.4	79.2

Billboard	36.7	24.1	53.3	40.0	15.4	44.8	71.4	95.8
Poster: In clinic	80.0	75.9	80.0	52.5	84.6	100	71.4	100
Other public posters	80.0	79.3	73.3	32.5	53.8	100	78.6	100
Pamphlet: VMMC client	90.0	79.3	66.7	77.5	100	100	57.1	95.8
Spouse/ partner	63.3	65.5	26.7	17.5	61.5	82.8	21.4	91.7
General population	80.0	72.4	13.3	17.5	61.5	100	42.9	87.5
Video: Client	3.3	6.9	26.7	10.0	0.0	0.0	7.1	16.7
General population	0.0	6.9	26.7	2.5	0.0	0.0	0.0	70.8
Any form of small media	93.3	93.1	100	95.0	100	100	100	100
3. INTERPERSONAL COMMUNICATION								
Visits/ Talks /Mobilization:								
Circulating motor vehicle	53.3	82.8	33.3	40.0	76.9	75.9	92.9	100
Group meetings in the community	80.0	96.6	33.3	60.0	38.5	75.9	85.7	100
Schools	86.7	87.9	40.0	75.0	61.5	75.9	85.7	95.8
Factories, industries, mines, plantations	30.0	41.4	13.3	20.0	7.7	10.3	64.3	75.0
Military installations	10.0	13.8	0.0	5.0	23.1	0.0	28.6	66.7
Churches, mosques	56.7	58.6	13.3	47.5	53.8	58.6	78.6	91.7
Beer halls	46.7	51.7	6.7	22.5	30.8	24.1	78.6	41.7
Taxi, bus and motorbike stands	63.3	75.9	33.3	55.0	23.1	72.4	50.0	70.8
Prisons	13.3	17.2	6.7	25.0	23.1	24.1	35.7	50.0
Meetings with opinion leaders/ influentials in community	63.3	55.2	13.3	32.5	38.5	55.2	71.4	79.2
Peer education activities:								
Satisfied clients	60.0	79.3	6.7	90.0	69.2	96.6	92.9	87.5
Any form of interpersonal communication	90.0	100	53.3	100	100	100	100	100
4. ELECTRONIC MEDIA								
Cell phone messages	6.7	10.3	26.7	15.0	38.5	58.6	42.9	8.3
Internet website for prospective	10.0	0.0	33.3	20.0	0.0	0.0	0.0	0.0

clients								
Telephone hotline	50.0	58.6	26.7	27.5	7.7	17.2	50.0	20.8
Any form of electronic communication	50.0	62.1	53.3	42.5	38.5	65.5	64.3	25.0
5. OTHER MEDIA								
Songs	10.0	0.0	0.0	2.5	15.4	0.0	51.7	91.7
Dramas or plays	33.3	20.7	0.0	5.0	15.4	37.9	78.6	79.2
Celebrity testimonial	10.0	13.8	6.7	5.0	0.0	3.4	50.0	70.8
Other	3.3	3.4	6.7	0.0	7.7	3.4	0.0	0.0
Any of theses other types of communication	36.7	27.6	13.3	12.5	23.1	37.9	78.6	95.8
TOTAL								
% benefiting from at least one media channel	93.3	100	100	100	100	100	100	100
Mean number of media channels utilized	12.4 channels	13.2 channels	7.7 channels	9.1 channels	9.9 channels	13.7 channels	16.4 channels	22.3 channels

Table 19. Age and gender of primary and secondary VMMC providers, by country

	Kenya		South Africa		Tanzania		Zimbabwe		Total	
	2011 (n=85)	2012 (n=82)	2011 (n=105)	2012 (n=209)	2011 (n=93)	2012 (n=206)	2011 (n=74)	2012 (n=94)	2011 (n=357)	2012 (n=591)
Gender:										
Male	80.0	69.5	45.7	41.6	32.3	39.8	67.6	67.0	54.9	48.9
Female	20.0	30.5	54.3	58.4	67.6	60.2	32.4	33.0	45.1	51.1
Age (years):										
18-34	76.5	75	38.2	40.1	26.9	28.6	32.4	48.9	42.9	42.5
35-44	16.0	19.5	34.3	31.2	35.5	36.9	39.2	26.6	31.4	30.8
45+	7.4	4.9	27.5	28.7	37.6	34.5	28.4	24.5	25.7	26.7

Table 20a. Profile of VMMC providers: cadre and role within the program, by country

Breakdown of provider by cadre:	Kenya		South Africa		Tanzania		Zimbabwe	
	2011 (n=85)	2012 (n=82)	2011 (n=102)	2012 (n=209)	2011 (n=93)	2012 (n=206)	2011 (n=74)	2012 (n=94)
Medical Doctor	0.0	0	20.0	16.7	0.0	1.9	25.7	26.6
Nurse*	52.9	53.7	80.0	83.3	80.6	78.6	74.3	73.4
AMO	--	--	--	--	8.6	5.3	--	--
Clinical officer	47.1	45.1	--	0.0	10.8	14.1	--	--
Other[14]	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0
Role in surgical theater, % providers that:								
Perform circumcision as the primary provider (removes foreskin)	0.0	1.2	15.2	11.0	47.3	0.5	25.7	26.6
Assist the surgical provider (secondary provider)	1.2	7.3	71.4	78.5	11.8	0.5	74.3	73.4
Both perform and assist with VMMC operations depending on need	98.8	91.5	13.3	10.5	40.9	99.0	0.0	0.0
Performance of additional tasks: % that perform the following tasks in addition to clinical aspects of VMMC:								
• Administration/ Management	67.1	56.1	54.3	56.0	39.8	49.0	41.9	55.3
• Management of staff rosters	51.8	46.3	42.9	41.1	62.4	50.5	60.8	66.0
• Compilation of service statistics (# of operations, client data)	83.5	80.5	43.8	49.8	67.7	56.3	87.8	81.9
• Specialized committees at clinic (such as infection prevention or quality assurance)	51.8	41.5	38.1	33.5	59.1	56.8	28.4	12.8
• Preparation of bundled kits	44.7	20.7	14.3	4.3	69.9	85.9	0.0	0.0
• Waste disposal	43.5	32.9	57.1	52.2	67.7	64.1	45.9	44.7
• Dedicated training opportunities	64.7	40.2	52.4	27.3	54.8	81.6	45.9	29.8
• Counseling	72.9	58.5	41.9	29.2	67.7	60.2	79.7	80.9
• Other medical activities/ services	57.6	40.2	11.4	4.3	92.5	93.7	89.2	84.0
• Other duties	58.8	56.1	11.4	14.4	81.7	53.9	9.5	5.3

[14] Kenya had one provider who reported to have their Pharmacy diploma (3 years training).

Table 20b. Years of formal training received by nurses interviewed in 2012

Years training:	Kenya **2012:** (n=44)	South Africa **2012:** (n=174)	Tanzania **2012:** (n=162)	Zimbabwe **2012**: (n=69)
1	0.0	16.1	3.7	0.0
2	15.9	39.7	4.3	0.0
3	65.9	0.6	21.6	100
4	18.2	43.7	70.4	0.0
Median	3	2	4	3
Mean	3.0	2.7	3.6	3.0

Table 21. Time commitment to VMMC, by country

Provider time dedicated to VMMC work:	Kenya		South Africa		Tanzania		Zimbabwe	
	2011 (n=85)	2012 (n=82)	2011 (n=102)	2012 (n=209)	2011 (n=93)	2012 (n=206)	2011 (n=74)	2012 (n=94)
In the past 3 months % providers that performed VMMC:								
--Full-time (at least 90% of working hours)	64.7	45.1	80.0	78.5	1.1	50.0	33.8	13.8
--Part-time	35.3	54.9	20.0	21.5	98.9	50.0	66.2	86.2
Mean number of days per week that provider has performed or assisted in VMMC in past 3 months – all personnel full-time and part time:	4.4	4.7	4.7	4.5	3.4	4.2	4.4	3.5
Mean number of hours per day assisting or performing VMMC in past week – all personnel full-time and part time:	5.1	7.7	6.8	7.4	7.7	8.0	6.2	6.3
Mean number of hours per week assisting or performing VMMC[15]	24.1	38.8	33.7	34.6	26.6	33.3	28.7	22.2

[15] This variable is created, based on mean number of days per week and mean number of hours per day.

Table 22. Training and experience in performing VMMCs, by country

	Kenya		South Africa		Tanzania		Zimbabwe	
	2011 (n=85)	2012 (n=82)	2011 (n=105)	2012 (n=209)	2011 (n=93)	2012 (n=206)	2011 (n=74)	2012 (n=94)
Experience performing VMMC:								
Mean number of months of experience performing VMMC for HIV prevention	30.3 mo.	31.3 mo.	19.2 mo.	12.7 mo.	13.3mo.	17.1 mo.	10.8 mo.	13.9 mo.
Mean number of VMMC procedures performed or assisted (career total)	3175	2712	1492	1345	2091	2238	804	972
Training and continuing education:								
% of providers that received:								
VMMC training in medical or nursing school	36.5	20.7	20.0	4.3	7.5	1.0	4.1	4.3
Additional training/continuing education (e.g., certificate training) in VMMC for HIV prevention	100	100	100	76.6	97.8	100	100	100
Among those who had additional training:	(n=85)	(n=82)	(n=105)	(n=160)	(n=91)	(n=206)	(n=74)	(n=94)
% of providers that received 6 days or less of additional training	9.5	9.8	81.9	84.7	1.1	0.0	47.3	4.3
% of providers that received 7 days or more of additional training	90.5	90.2	14.3	15.3	98.9	100	52.7	95.7
Mean number of days of additional training	21.2 days	20.4 days	4.4 days	5.7 days	13.9 days	11.5 days	6.8 days	7.0 days

Table 23. Providers' assessment of the number of clients on a busy, regular, and slow day, by country

	Kenya		South Africa		Tanzania		Zimbabwe	
	2011 (n=85)	2012 (n=82)	2011 (n=105)	2012 (n=208)	2011 (n=93)	2012 (n=206)	2011 (n=74)	2012 (n=94)
On a busy day: Mean number of VMMCs performed or assisted:	20.8	21.1	28.2	20.4	20.5	24.46	35.4	30.1
An average day: Mean number of VMMCs performed or assisted:	8.7	8.4	13.0	11.0	11.6	14.17	17.3	14.7
A slow day: Mean number of VMMCs performed or assisted:	2.7	2.7	6.2	5.4	5.1	5.62	7.5	6.2

Table 24. Surgical bed rotation, by country

Among all providers	Kenya		South Africa		Tanzania		Zimbabwe	
	2011 (n=85)	2012 (n=82)	2011 (n=105)	2012 (n=209)	2011 (n=93)	2012 (n=206)	201 (n=74)	2012 (n=94)
% reporting using surgical bed rotation for VMMC within operating team:								
• Yes	63.5	59.8	93.3	78.9	97.8	87.4	100	100
• No	36.5	40.2	6.7	21.1	2.2	12.6	0.0	0.0
Among providers using bed rotation	(n=54)	(n=49)	(n=98)	(n=165)	(n=91)	(n=180)	(n=74)	(n=94)
Average (mean) # of beds used for surgical rotations	4.0 beds	3.3 beds	5.1 beds	4.8 beds	4.1 beds	3.4 beds	3.9 beds	3.0 beds
% reporting to prefer:								
• Attending to one patient at a time	46.3	36.7	20.4	20.0	5.5	35.0	0.0	0.0
• Rotating between multiple surgical beds	38.9	22.4	77.6	78.8	93.4	64.4	100	100
• No preference	14.8	40.8	2.0	1.2	1.1	0.6	0.0	0.0

Table 25. VMMC kits and bundling, by country

	Kenya		South Africa		Tanzania		Zimbabwe	
	2011 (n=85)	2012 (n=82)	2011 (n=105)	2012 (n=209)	2011 (n=93)	2012 (n=206)	2011 (n=74)	2012 (n=94)
% providers that report using pre-bundled instruments & supplies in past 3 mo.								
Yes	100	100	99.0	100	100	100	100	100
No	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0
For providers reporting to have used pre-bundled instruments and supplies for VMMC operations performed in last 3 months:	(n=85)	(n=82)	(n=102)	(n=209)	(n=93)	(n=206)	(n=74)	(n=94)
% report pre- bundled instruments were:								
Purchased as a prepackaged kit/ prepared by kit supplier	0.0	0.0	98.1	97.6	1.1	10.2	100	100
Prepared by clinic staff	100	100	1.0	1.4	98.9	89.8	0.0	0.0
Don't know	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0
% report that instruments used in kit were:								
Entirely disposable and discarded after procedure	0.0	0.0	79.8	89.5	0.0	10.2	100	100
Recycled/ Sterilized and reused	100	100	10.6	8.1	100	89.8	0.0	0.0
Don't know	0.0	0.0	9.6	2.4	0.0	0.0	0.0	0.0
Among all providers:	(n=85)	(n=82)	(n=105)	(n=209)	(n=93)	(n=206)	(n=74)	(n=94)
% report to believe bundling supplies/ surgical instruments reduces chances of VMMC infection								
Yes	91.8	85.4	91.4	91.9	98.9	73.8	100	95.7
No	5.9	7.3	2.9	6.7	1.1	12.6	0.0	3.2
Don’t know	2.4	7.3	5.7	1.4	0.0	13.6	0.0	1.1

Table 25 (con't). VMMC kits and bundling, by country

% of providers that strongly agree or agree with the following statements on kits and bundling, asked of all providers[16]:								
Using pre-bundled kits of instruments and supplies decreases the time needed to perform male circumcision.	98.8	97.6	93.3	96.7	100	72.8	98.6	100
Using pre-bundled kits of instruments and supplies is an unnecessary expense in VMMC clinics.	1.2	3.6	10.5	10.0	30.2	12.7	13.5	8.5
I prefer assembling a surgical tray myself rather than using a pre-bundled VMMC kit.	7.1	11.0	17.2	9.5	93.5	88.8	5.4	2.1
If a clinic does use pre-bundled kits, the instruments should be reusable.	91.7	87.9	16.2	21.0	100	10.2	55.4	36.2

Table 26. Attitudes toward task-shifting (having other clinical providers complete all steps of VMMC surgery), by country

% of providers that strongly agree or agree to the following statements on task-shifting, asked of all providers:	Kenya		South Africa		Tanzania		Zimbabwe	
	2011 (n=85)	2012 (n=82)	2011 (n=105)	2012 (n=209)	2011 (n=93)	2012 (n=206)	2011 (n=74)	2012 (n=94)
Medical doctors are the only healthcare cadre who should be trained to perform adult VMMC.	3.6	3.6	24.8	15.3	9.7	2.4	6.8	7.4
I believe the primary provider responsible for the operation should be with the patient from the administration of anesthesia to the final dressing.	75.3	72.0	24.8	11.5	91.4	75.7	2.7	1.1

[16]For most of the attitudinal questions in this survey, the interviewer read a statement asking the provider to rate his/her agreement with that statement as: "strongly agree, agree, neutral/don't know, disagree, or strongly disagree." On questions regarding the provider's approval of a particular practice, "approve/ disapprove" replaced agree/disagree in the aforementioned scale.

Table 27. Task-sharing (having other clinical providers complete specific steps of VMMC procedure, where the primary provider is a medical doctor), by country

Task-sharing practice				
% of providers reporting to have performed or assisted in performing VMMC in an operating environment where secondary provider (nurse or clinical officer):	**Kenya**		**South Africa**	
	2011 (n=85)	2012 (n=82)	2011 (n=105)	2012 (n=209)
Administered local anesthesia	79.2	58.5	98.0	96.2
Completed suturing of skin after primary provider removed the prepuce and achieved hemostasis	55.3	61	95.2	96.7

Task-sharing attitudes and beliefs								
% who strongly agree or agree with the following statements on task-sharing, asked of all providers:	**MD** (n=0)	**OCP*** (n=85)	**MD** (n=0)	**OCP** (n=82)	**MD** (n=21)	**OCP** (n=84)	**MD** (n=35)	**OCP** (n=174)
It is acceptable for an assistant or secondary provider (not the primary VMMC provider) to prepare and scrub the patient.	n/a	81.2	n/a	78.1	100	97.7	100	97.7
It is acceptable for an assistant or secondary provider (not the primary provider) to administer the local anesthesia.	n/a	68.2	n/a	52.5	90.5	96.5	94.3	95.4
It is acceptable for an assistant or secondary provider (not the primary VMMC provider) to dress the operating wound.	n/a	91.7	n/a	85.4	100	98.8	100	98.3
It is acceptable for an assistant or secondary provider (not the primary provider) to complete the interrupted skin sutures.	n/a	65.9	n/a	65.8	90.5	92.8	94.3	96.5

*Other clinical provider (any clinical provider involved in VMMC procedures who is not a medical doctor)

Table 27 (con't). Task-sharing (having non-doctor/ alternative cadre healthcare providers complete specific steps of VMMC procedure, where the primary provider is a medical doctor), by country

Task-sharing practice								
% of providers reporting to have performed or assisted in performing VMMC in an operating environment where secondary provider (nurse or clinical officer):	**Tanzania**				**Zimbabwe**			
	2011 (n=93)		2012 (n=206)		2011 (n=93)		2012 (n=206)	
Administered local anesthesia	96.8		99.5		96.8		99.5	
Completed suturing of skin after primary provider removed the prepuce and achieved hemostasis	100		100		100		100	
Task-sharing attitudes and beliefs								
% who strongly agree or agree with the following statements on task-sharing, asked of all providers:	**MD** (n=0)	**OCP*** (n=93)	**MD** (n=4)	**OCP** (n=202)	**MD** (n=19)	**OCP** (n=55)	**MD** (n=25)	**OCP** (n=69)
It is acceptable for an assistant or secondary provider (not the primary VMMC provider) to prepare and scrub the patient.	n/a	97.9	100	97.5	100	100	100	100
It is acceptable for an assistant or secondary provider (not the primary provider) to administer the local anesthesia.	n/a	97.9	100	97.5	84.2	94.5	96.0	95.7
It is acceptable for an assistant or secondary provider (not the primary VMMC provider) to dress the operating wound.	n/a	100	100	100	100	100	100	100
It is acceptable for an assistant or secondary provider (not the primary provider) to complete the interrupted skin sutures.	n/a	99.0	100	99.6	78.9	94.6	100	97.1

*Other clinical provider (any clinical provider involved in VMMC procedures who is not a medical doctor)

Table 28. Use of the forceps guided surgical methods, by country

Practices	Kenya		South Africa		Tanzania		Zimbabwe	
	2011 (n=85)	2012 (n=82)	2011 (n=105)	2012 (n=209)	2011 (n=93)	2012 (n=206)	2011 (n=74)	2012 (n=94)
% of VMMCs in the last month performed using forceps guided (estimated by provider)	98.1	99.2	96.2	97.6	78.9	84.0	98.7	97.2
Preferences								
For providers indicating use of more than one surgical method in the last month:	(n=33)	(n=26)	(n=54)	(n=73)	(n=67)	(n=206)	(n=32)	(n=42)
% reporting a preference for forceps guided	95.3	73.1	81.5	84.9	78.5	95.6	94.6	90.5
Beliefs and attitudes	(n=85)	(n=82)	(n=105)	(n=209)	(n=93)	(n=206)	(n=74)	(n=94)
% of providers reporting that their national program recommends/ uses the forceps guided method	88.2	70.7	41.4	67.5	82.8	88.3	100.0	100.0

Table 29. Electrocautery/diathermy: practices, beliefs, and attitudes, by country

Practices	Kenya		South Africa		Tanzania		Zimbabwe	
	2011 (n=85)	2012 (n=82)	2011 (n=105)	2012 (n=209)	2011 (n=93)	2012 (n=206)	2011 (n=74)	2012 (n=94)
% providers who have ever used electrocautery/ diathermy for hemostasis in performing/ assisting in VMMC:								
% Yes	32.9	19.5	99.0	98.1	0.0	0.0	71.6	91.5
% No	67.1	80.5	1.0	1.9	100	100	28.4	8.5
For providers reporting use of electrocautery/ diathermy:	(n=28)	(n=16)	(n=104)	(n=205)	(n=0)	(n=0)	(n=53)	(n=86)
% using electrocautery/ diathermy for hemostasis for VMMC (In past 3 months):								
Always	0.0	6.3	84.6	91.7	--	--	18.9	31.4
Most of the time	14.3	0.0	10.6	6.8	--	--	62.3	54.7
Sometimes	14.3	0.0	3.8	1.5	--	--	13.2	10.5
Rarely	71.4	93.8	1.0	0.0	--	--	5.7	3.5
Beliefs and attitudes								
% who report to strongly agree or agree with the following statements on electrocautery/ diathermy:	(n=28)	(n=16)	(n=104)	(n=205)	(n=0)	(n=0)	(n=53)	(n=86)
Monopolar electrocautery/ diathermy is safe to use for hemostasis when performing adult male VMMC	92.8	--	93.2	--	--	--	100	--
Bipolar electrocautery/ diathermy is safe to use for hemostasis when performing adult male VMMC	46.4	--	28.9	--	--	--	7.6	--
Electrocautery/ diathermy is safe to use for hemostasis when performing adult male VMMC[17]	--	87.5	--	97.0	--	--	--	97.7
Electrocautery decreases operating time significantly	92.9	93.8	89.5	98.0	--	--	98.1	97.7
Electrocautery is not appropriate in my setting because the electricity is unreliable	57.1	37.6	14.4	13.6	--	--	1.9	0.0
I feel competent in using electrocautery/diathermy when performing or assisting with VMMC	100	81.3	94.2	98.6	--	--	90.6	94.1
Clinical officers or nurses – if adequately trained – can safely use electrocautery/diathermy	100	93.8	89.5	95.6	--	--	98.1	96.5
Electrocautery/diathermy compromises the surgical sterility of the VMMC procedure	32.2	18.8	27.9	38.0	--	--	3.8	0.0

[17] In 2012, providers were only asked about safety of electrocautery in general.

Table 30. Anesthesia: practices and preferences, by country

	Kenya		South Africa		Tanzania		Zimbabwe	
	2011 (n=85)	2012 (n=82)	2011 (n=105)	2012 (n=209)	2011 (n=93)	2012 (n=206)	2011 (n=74)	2012 (n=94)
% reporting their most frequently administered local anesthesia as:								
Lidocaine 1%	0.0	3.7	1.0	0.5	0.0	0.0	0.0	0.0
Lidocaine 2%	51.8	82.9	7.6	5.3	83.9	57.3	0.0	0.0
Any mixture including Bupivicaine (Marcaine)	47.1	12.2	89.5	92.8	16.1	42.7	100	100
Other	1.2	0.0	0.0	0.5	0.0	0.0	0.0	0.0
Don't know (others perform this task)	0.0	1.2	1.9	1.0	0.0	0.0	0.0	0.0
% reporting their most frequently used technique to administer anesthesia as:								
Dorsal nerve block	1.2	0.0	2.9	2.9	1.1	0.0	0.0	0.0
Ring block	0.0	2.5	81.9	89.7	4.3	0.0	0.0	0.0
Combination of dorsal nerve and ring block	98.8	97.5	15.2	5.9	94.6	100	100	100
Other	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0

Table 31. Wait time: providers' opinions, by country

% of providers who report to strongly agree or agree to the following statements on wait time:	Kenya		South Africa		Tanzania		Zimbabwe	
	2011 (n=85)	2012 (n=82)	2011 (n=105)	2012 (n=209)	2011 (n=93)	2012 (n=206)	2011 (n=74)	2012 (n=94)
In our facility the primary provider often waits between operations as operating areas are cleaned and prepared.	42.4	30.5	53.4	32.6	48.4	92.3	24.3	2.2
In our facility the primary provider often waits between operations because there aren't many patients.	62.4	57.3	39.1	24.9	52.7	75.3	48.6	65.9
Using multiple beds per primary provider helps minimize the waiting time for providers between operations.	82.4	81.7	90.5	81.3	97.9	97.5	100	100

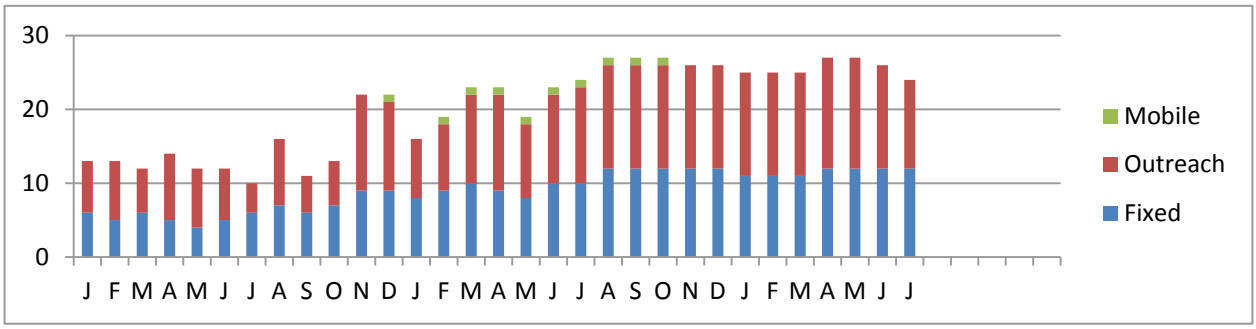
Table 32. Job satisfaction and burnout, by country

% of providers who report to strongly agree or agree with the following statements on job satisfaction :	Kenya				South Africa				Tanzania				Zimbabwe			
	2011 (n=85)		2012 (n=82)		2011 (n=105)		2012 (n=209)		2011 (n=93)		2012 (n=206)		2011 (n=74)		2012 (n=94)	
% reporting to have noticed any provider fatigue/burnout among colleagues when they perform VMMC full-time as a primary work activity																
yes, frequently	8.2		11.0		14.3		8.6		0.0		0.0		9.5		7.4	
yes, occasionally	80.0		78.0		26.7		40.7		8.6		0.0		24.3		28.7	
yes, but very rarely	7.1		6.1		15.2		6.7		16.1		16.5		32.4		17.0	
no, not at all	4.7		4.9		41.0		41.6		74.2		82.5		29.7		46.8	
don't know	0.0		-		2.9		2.4		1.1		1.0		4.1		0.0	
	MD n=0	**OCP*** n=85	**MD** n=0	**OCP** n=82	**MD** n=21	**OCP** n=84	**MD** n=35	**OCP** n=174	**MD** n=0	**OCP** n=93	**MD** n=4	**OCP** n=202	**MD** n=19	**OCP** n=55	**MD** n=25	**OCP** n=69
Performing (or assisting in performing) male circumcision is a personally fulfilling job.	n/a	87.1	n/a	82.9	76.2	84.5	68.6	82.2	n/a	100	100	98.5	73.7	83.6	56.0	85.5
% that personally have begun to experience work fatigue or burnout from performing (or assisting in performing) male circumcision repeatedly	n/a	70.6	n/a	65.9	47.6	33.3	37.1	31.6	n/a	53.8	25.0	14.4	36.8	23.6	16.0	17.4

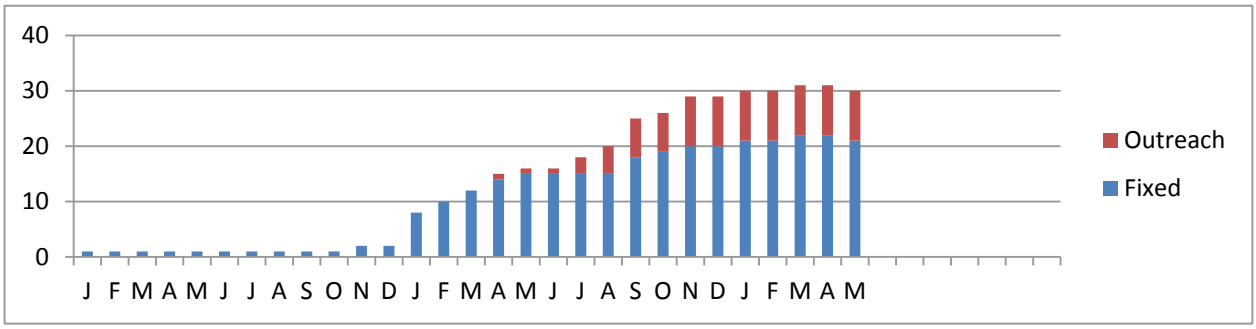
*Other clinical provider (any clinical provider involved in VMMC procedures who is not a medical doctor)

Figure 1. Number of VMMC sites reporting to be operational by month, January 2010 - mid 2012

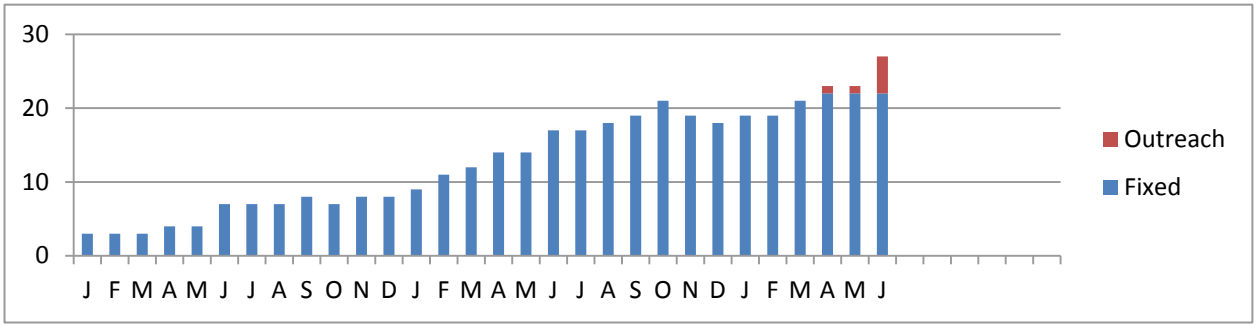
Kenya:



South Africa:



Tanzania:



Zimbabwe:

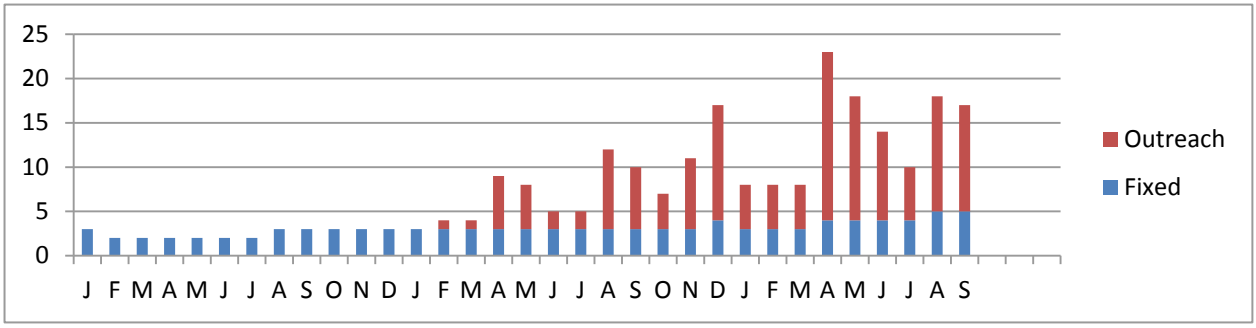
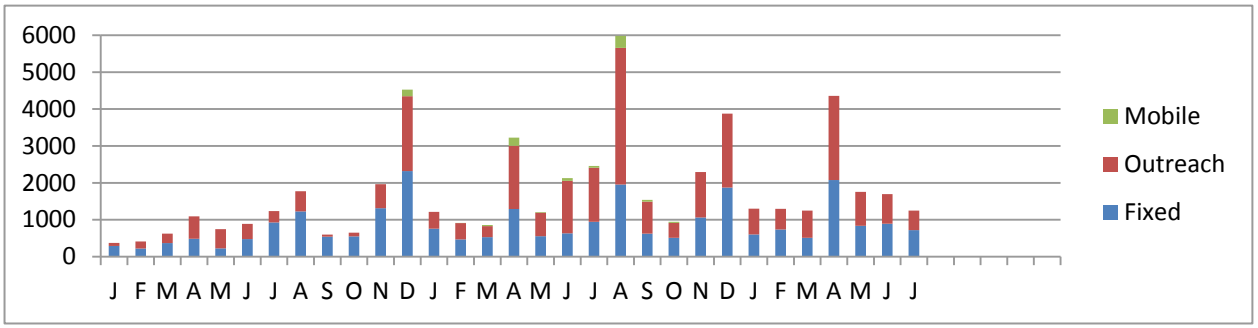
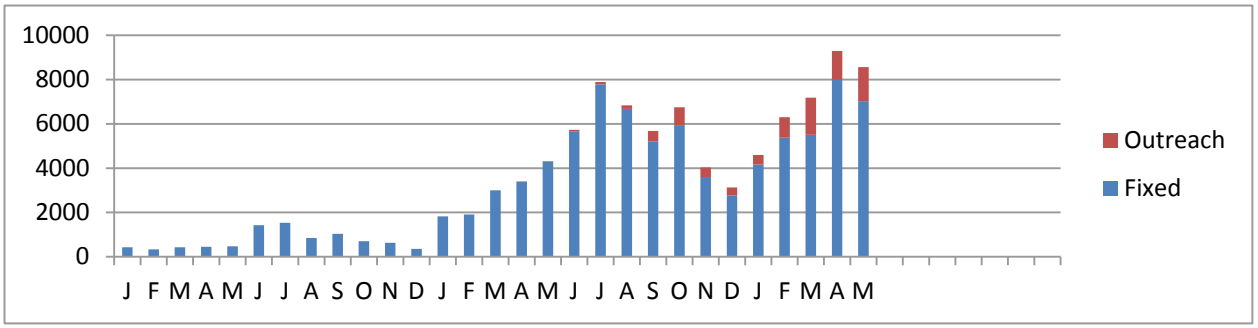


Figure 2. Number of VMMC procedures performed by month and facility type, January 2010 - December 2012

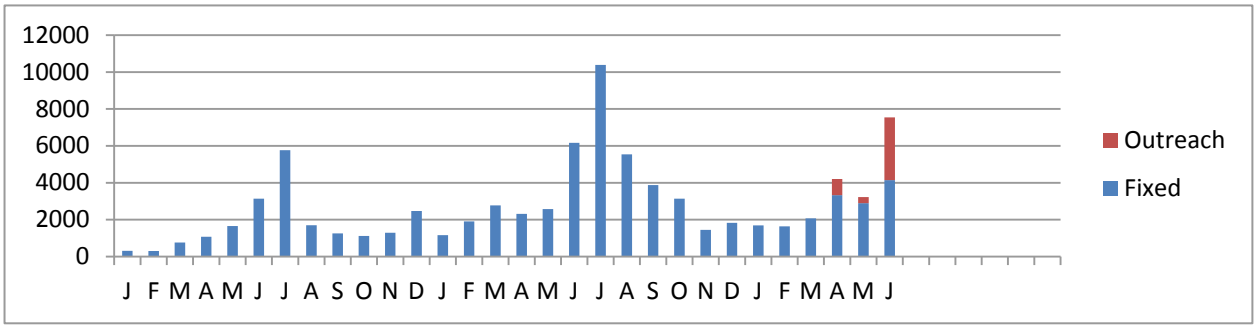
Kenya:



South Africa:



Tanzania:



Zimbabwe:

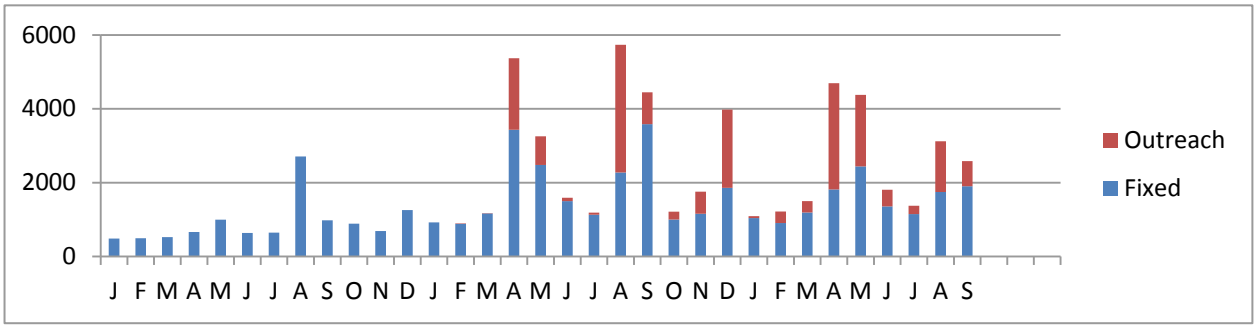
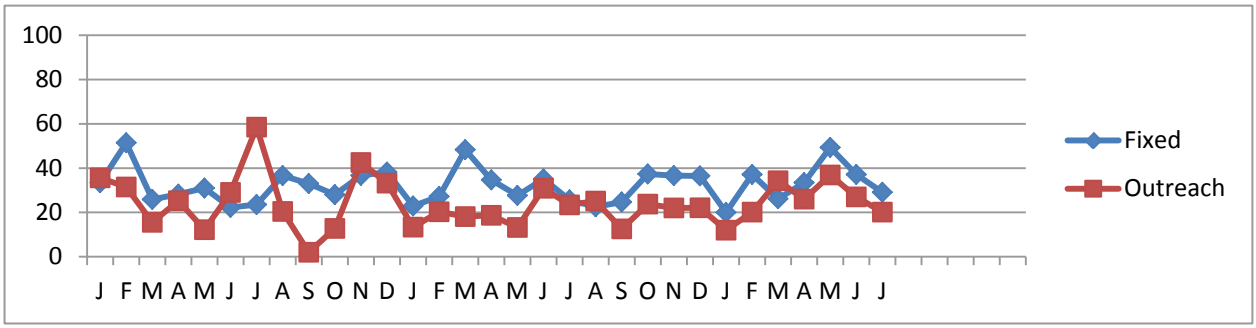
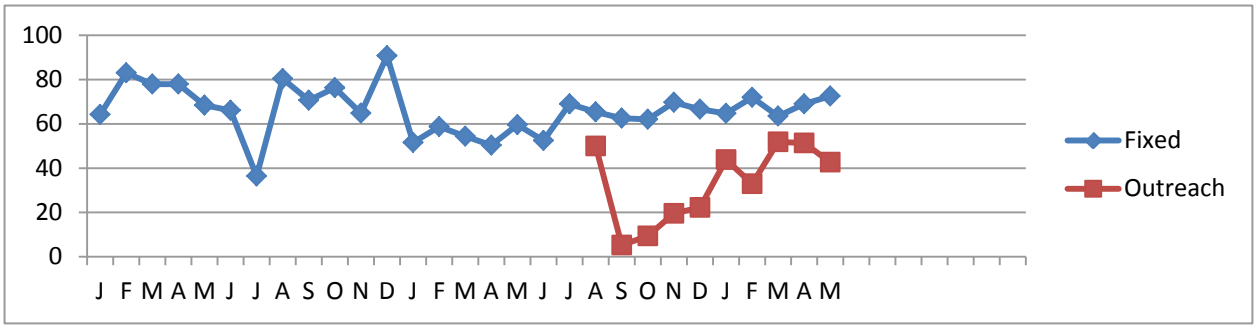


Figure 3. Percent of clients returning for follow-up

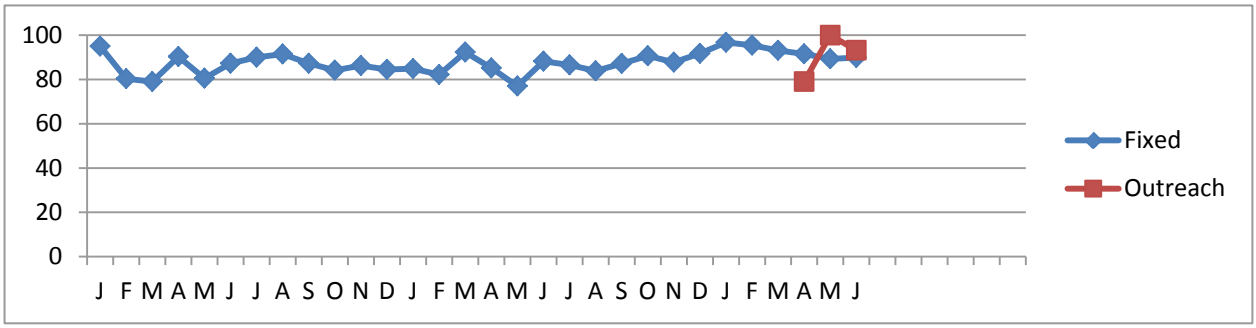
Kenya:



South Africa:



Tanzania:



Zimbabwe:

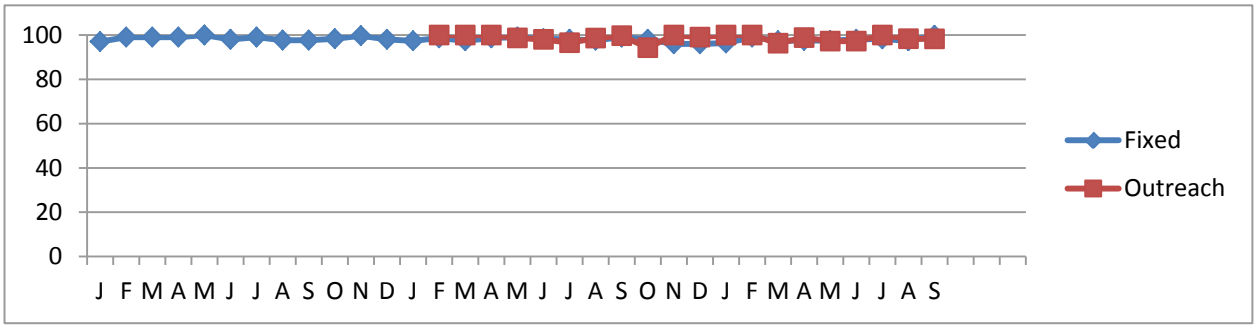
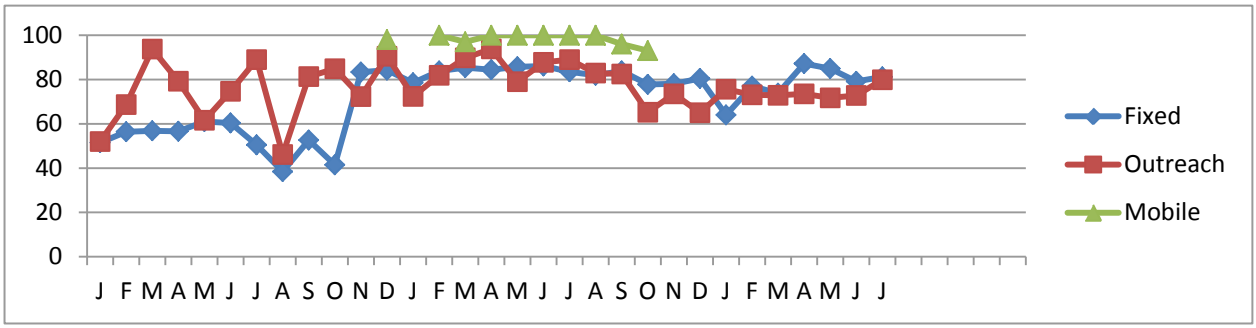
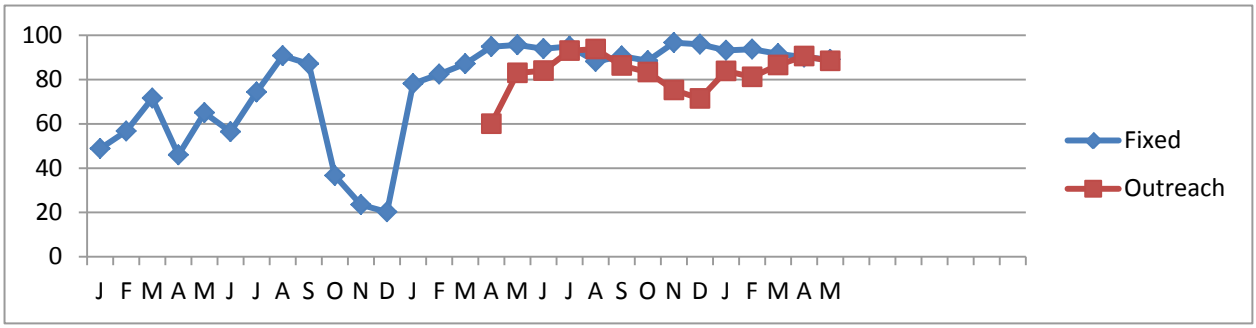


Figure 4. Percent of VMMC clients receiving an HIV test as part of VMMC services

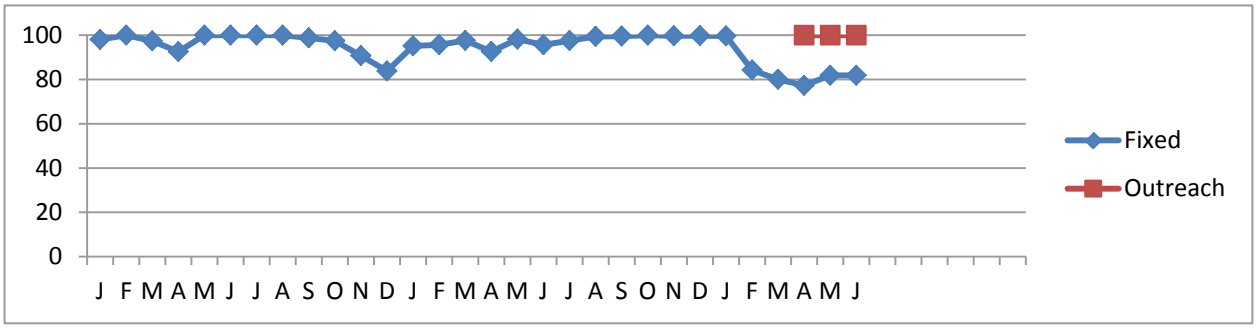
Kenya:



South Africa:



Tanzania:



Zimbabwe:

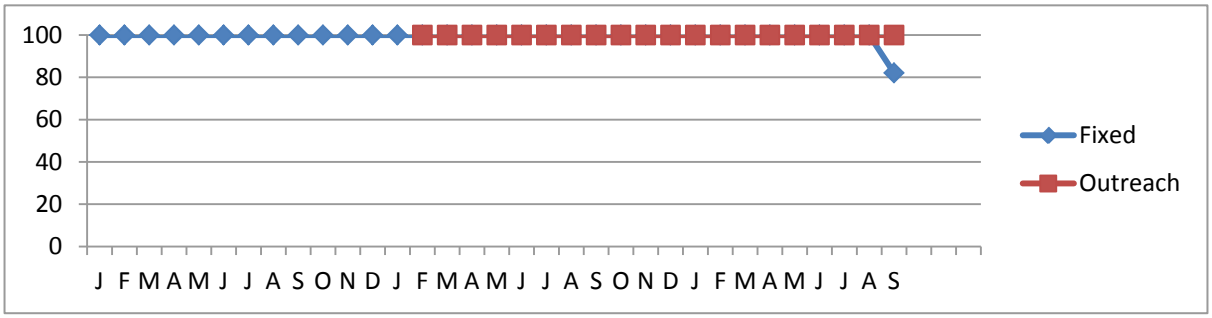
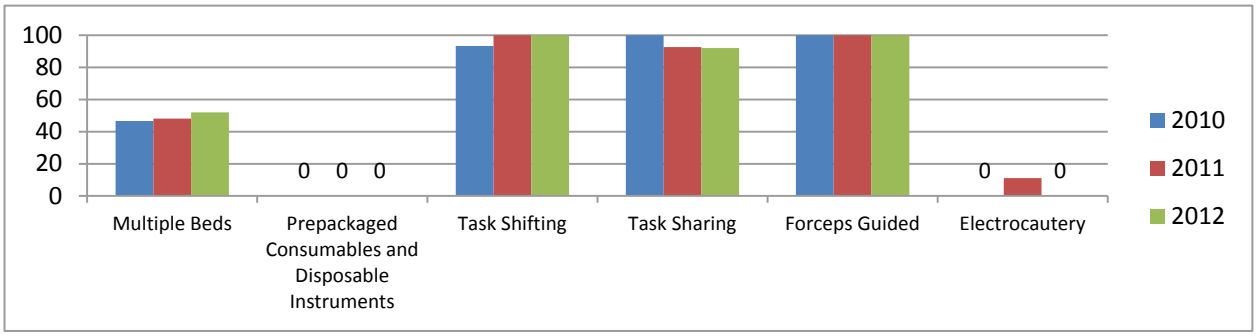
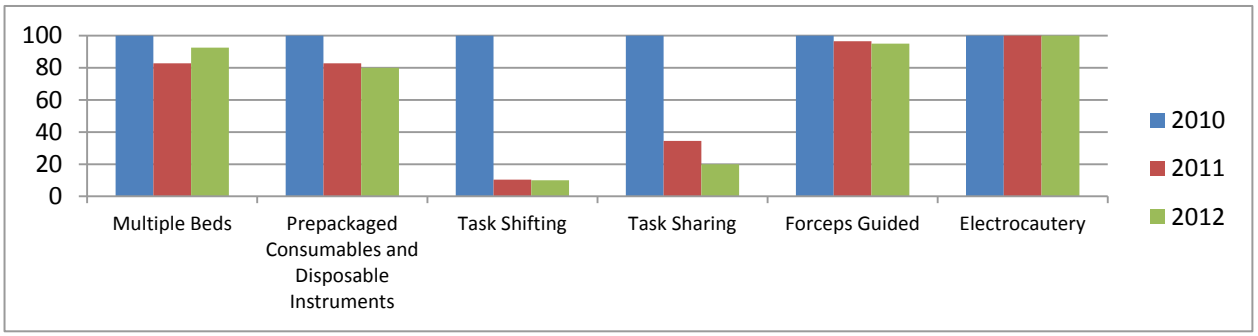


Figure 5. Percentage of sites adopting each efficiency element by year and by country

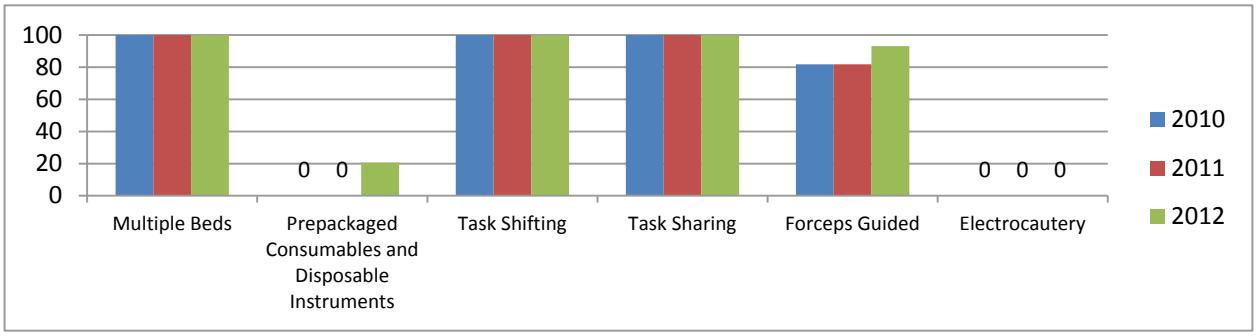
Kenya:



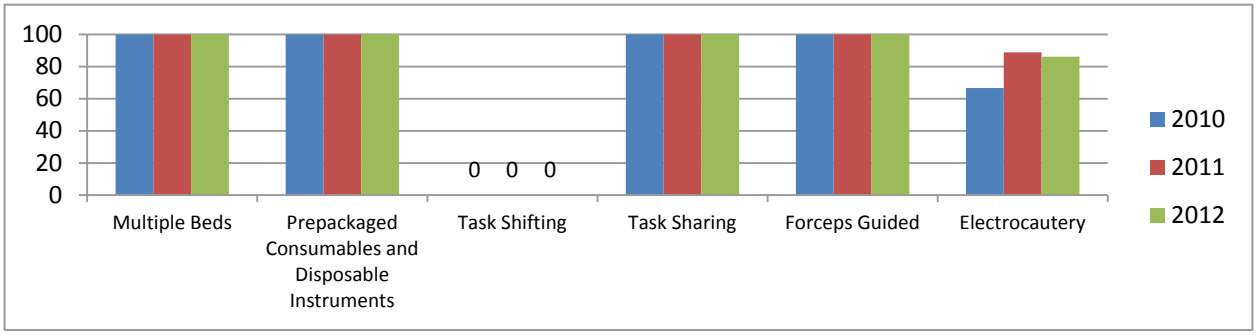
South Africa:



Tanzania:



Zimbabwe:



APPENDIX A:
DETAILED SAMPLING STRATEGY, BY COUNTRY

South Africa

In 2011, the SYMMACS country team initially selected 10 sites known to be in operation, then added 5 sites (2 satellite [outreach] and 3 fixed) that become operational by the time of data collection. The program was in the early stages of scale-up and the service delivery landscape was rapidly changing. Thus, the team continued to learn that many more government sites were operating than initially known. The government did not have clear records of all sites offering VMMC (since it constitutes a routine operation for facilities that are not necessarily participating in the PEPFAR scale-up). Although the team initially selected several government sites in Kwazulu-Natal, it would have been necessary to obtain provincial IRB approval to collect data there; given the tight timeline, this was not feasible. However, several NGO partner sites in the province were included in this 2011 sample.

By 2012, over 80 VMMC sites were operational. SYMMACS returned to the same 15 sites, but purposively selected and visited an additional 25 sites. Criteria for this purposeful selection included: (1) choosing sites that did at least 100 VMMC per month or at least 10 per day on days of operation, (2) including as many of South Africa's nine provinces as possible; the final sample included six of the nine provinces, and (3) including as many of the VMMC partners as possible (they reached 9 out of 14).

Tanzania

In 2011, the SYMMACS team visited a total of 14 sites, which represented the universe of VMMC sites operational at the start of that year (excluding military sites).

In 2012, the team revisited the same 14 sites, but added all fixed sites that had become operational since the first round of data collection excluding military sites (n=10) and five outreach sites. During the period of data collection only one partner organization was implementing outreach services, and the SYMMACS team selected all outreach sites that were serving at least 100 VMMC clients per day (five of 22 total outreach sites; the others performed less than 100 VMMCs per day). This brought the total to 29 VMMC sites in Tanzania in 2012.

Zimbabwe

In 2011, the SYMMACS team identified the universe of VMMC sites known to exist at the start of that year (n=7); they added seven new sites as they became operational on a convenience basis, for a total of 14. They had hoped to include one or more military sites but collecting data from these locations did not prove feasible.

In 2012, the team planned to visit the original 14 sites; however, only six were still offering VMMC at the time of data collection, and these six represented the universe of fixed VMMC sites in that year. The team then selected new sites (all outreach) as follows. The research team obtained a list (by province) of all 18 outreach teams in the country. They then scheduled the data collection visits so as to visit each

outreach team once and to cover all of the country's 10 provinces. This resulted in a total of 24 sites in 2012.

Kenya

Based on considerations of feasibility and resources, it was decided to take a stratified random sample of 30 sites in Nyanza Province, Kenya, which would be representative of the number of VMMCs performed for each service delivery model (fixed, outreach, mobile). The research team obtained a list from VMMC partner organizations of the number of VMMCs performed from Jan 1 – Dec 31, 2010, at each of the sites they supported. This exercise yielded a list of 235 sites in Nyanza province that carried out VMMC in 2010.

Before randomly selecting the 30 sites, it was necessary to develop the final sample frame. From the original 235 sites, 76 sites were omitted for the following reasons:

- 12 were sites operated by an organization that would no longer carry out VMMC under the PEPFAR program in 2011;
- 29 were "too small" (conducted less than 100 VMMCs in the entire year of 2010);
- 26 were mobile sites that were temporary (i.e., the teams would not visit there a second time but instead move to another location);
- 9 were reported to be closed or inactive.

This resulted in a final sample frame of 159 sites that met the criterion of performing at least 100 VMMCs in 2010; all four partner organizations conducting VMMC in Nyanza were represented. The 159 sites were stratified by type of model (fixed, outreach). Within each stratum, the required number of sites was randomly selected: 15 fixed and 12 outreach. The remaining 3 sites for mobile were to be identified once the dates and locations for 2011 operating schedule were known.

In 2012, the intent was to revisit the same 30 sites. However, one of the implementing partners had drastically reduced the number of its sites, including five of the originally sampled sites. The team determined which sites from the original sampling frame were still operational, and they randomly selected four replacement sites from this list. The 5th site was to be a mobile site, identified by a partner organization. However, the Nyanza program had shifted from mobile service provision to primarily fixed and outreach service. Thus data collection was not possible at the mobile site. The total number of sites visited was 29, one short of the 30 originally planned.

APPENDIX B:
SYMMACS 2012 DATA COLLECTIONS INSTRUMENTS

INSTRUMENT #1-a:

Characteristics of the voluntary medical male circumcision (VMMC) Facility

Name of site: _____

Code for site: _____ Date: ____DD ___MM ___YY

Name/code of clinical observer: _____

Code of site manager providing data: _____

Instruction: the clinician obtains the data for the following chart from the site manager or other person responsible for the site on the day of the visit:

	Day 1	**Day 2**
Number of beds in use on day of visit		
Number by cadre of primary provider(s) performing VMMC:		
Physician		
Assistant Medical Officer (AMO)		
Clinical officer		
Nurse		
Number by cadre of secondary provider(s) assisting with VMMC:		
Physician		
Clinical officer		
AMO (where applicable)		
Nurse		
Number of other clinical assistants that clean and organize surgical area (hygienist, runner, cleaner, etc.)		
Total number of VMMC procedures performed		

Based on seasonal patterns of demand for VMMC at your site, would you consider today to be part of a[18]:

____ high volume period ____ average volume period ____ low volume period ____ don't know

The remainder of instrument #1 is based on (1) interviewing the chief medical administrator at the VMMC facility, and (2) confirming through visual inspection the presence of data, supplies, and equipment on site.

Items to be observed and scored:	**0 = none**	**1= partial**	**2= total**	**Comments:**
CHARACTERISTICS OF THE FACILITY:				
Adequate lighting in surgical area				
Adequate ventilation in surgical area				
General appearance of VMMC facility (including surgical area) – clean, hygienic				
AVAILABILITY OF DATA (manual or computerized files):				
Existence of a functioning information system that collects: date of operation, client's name, age, procedure performed, anesthesia given, surgeon's name, comments				
Consent forms on file for every client circumcised on the day of visit				
Monitoring system in place for adverse events (on the day or at follow-up) that records: patient's name, ID #, nature and severity of adverse event, and treatment of AE				
AVAILABILITY OF ESSENTIAL ITEMS ON SITE:				
WHO guidelines for performing VMMC or National guideline of Standard Operating Procedures (SOP) for VMMC				
Sterilized instruments available for use during VMMC				
Local anesthesia (correctly stored, not expired)				
Antibiotics in stock to treat infection related AEs				
Pain medication in stock				
Antiseptic solution in stock				
Dressing materials (bandages and gauze) in stock				

[18] This question was added to the survey in 2012.

Items to be observed and scored:	0 = none	1= partial	2= total	Comments:
Basic life support equipment (CPR) is on hand in case of an emergency: -- Bag and mask for CPR				
--Oxygen supply				
--IV lines and resuscitation fluids				
--Antihistamine, cortisone and adrenalin to treat anaphylaxis				
HIV post exposure prophylaxis in stock				
Guidelines available on site for post exposure prophylaxis in stock				
Sharps container available in surgical area				
National protocols for syndromic management and treatment of STIs available				
Male condoms available for distribution to clients				
Facility offers HIV counseling and testing (HCT)				
Facility area that provides visual and auditory privacy for HCT and disclosure of results				
PREOPERATIVE PROCEDURES:				
Staff provides group education on risks and benefits of VMMC surgery including behavior change counseling				
Staff provides private individual counseling and question time on VMMC and offers HCT				
Site has referral slips for clients requiring other services (including those with contraindications for VMMC)				
SUPERVISORY MECHANISM IN PLACE:				
Site manager reports receiving a supervisory visit in past 6 months				
Site manager reports that an external source has monitored the Adverse Events rate of the program within the past 6 months				

Comments (optional):

(READ ALOUD): I'd like to discuss a few issues related to demand creation and client load.

1. At this site do you have (***READ THE RESPONSES***):

   ___too many clients for the operating capacity

   ___too few clients (you could do more MCs per day if you had more clients)

   ___a good balance between number of clients and your ability to provide MC

   INSTRUCTION TO INTERVIEWER: DON'T READ "IT DEPENDS," BUT IF THE SITE MANAGERS GIVES THIS ANSWER, THEN TICK "IT DEPENDS" AND ASK HIM/HER TO EXPLAIN:

   ___ it depends (***EXPLAIN***):

   _____

2. My final question relates to demand creation activities to encourage male circumcision in this catchment area (that is, the population served by this site). These may be activities organized at the national level (such as radio or TV) or activities organized by your own site (such as mobilization). To the best of your knowledge, which of the following communication channels have been used to promote VMMC in your catchment area within the past 3 months? ***TICK ALL THAT APPLY; DO NOT INCLUDE ACTIVITIES THAT ARE PLANNED BUT HAVE NOT YET STARTED.***

Type of channel	**Has taken place in past 3 months (TICK ALL THAT APPLY)**
Radio	
--Radio spot	
--Radio coverage by local reporters (such as a news report about your site)	
--Radio call-in talk show	
--Other (radio)	
Television	
--TV spot	
--TV coverage by local news reporters about the VMMC service	
--TV call-in talk show	
--Other publicity (TV)	
Print and audiovisual media	

--Newspaper ad	
--Billboard	
--Posters (in clinics)	
--Posters (in other public places)	
--Pamphlet (or printed flyer):	
--For VMMC client	
--For spouse or partner of client	
--For general population (different from client or spouse pamphlet)	
--Video for prospective clients (to show in waiting room)	
--Video for general population	
Community-level events:	
--Van, truck or other mobile vehicle that circulates in the community to promote MC	
Visits/talks/mobilization in the following venues:	
--Group meetings in the community	
--Schools	
--Factories, industries, mines, plantations	
--Military installations	
--Churches, mosques	
--Beer halls	
--Taxi stands, bus stops, motor bike stands	
--Prisons	
--Meetings with opinion leaders, influentials in the community	
Peer education activities: ***(different from mobilization activities above)***	
--Satisfied clients	
Electronic Media	
Cell phone messages re VMMC	
Internet website for prospective clients	
Song that promotes male circumcision	
Other Media	
Dramas or plays about VMMC (such as street theater)	
Testimonials by a celebrity or public figure that has had MC	
Telephone hotline	
Other ***SPECIFY:***	

INSTRUMENT #1-b:

Observation of VMMC procedures performed

Instructions: the clinician observes one male circumcision from start to finish. He times the steps in each operation; at the close of the operation and before starting the next observation, he completes this form on the VMMC procedure observed.

Name of site: _____ City/town and country: _____

Code for site: _____

Date: __DD __MM __YY

Name/code of clinical observer: _____

Code for the provider observed: _____

Cadre of primary surgical provider **performing** the MC:_ physician __clinical officer _nurse

Cadre of secondary surgical provider used to assist in performing/completing the VMMC (*check all that apply)*
___ physician ___clinical officer ___AMO ___nurse ___other

Cadre of any additional providers assisting primary and/ or secondary provider during the VMMC: ___ clinical officer ___nurse ___other

Number of VMMC procedures that the primary provider has performed today (including this one)[19] _____

Items to be observed and scored	**0 = none**	**1= partial**	**2= total**	**Comments**
PREOPERATIVE ASSESSMENT:				
Clinical personnel conduct a basic preoperative assessment including a targeted history and physical exam to exclude surgical contraindications, primarily bleeding disorders, allergies, and immunocompromised states and STIs				
SURGICAL PROCEDURES: INFECTION CONTROL, SAFETY:				
Sterile instruments and consumables used for surgery				
Sterile gloves used for surgery				
Hand washing/disinfection between clients				

[19] This question was added to the survey in 2012.

Maintenance of an adequate sterile surgical field when operating				
Use of protective eyewear by all providers during procedure				
Safe, secure storage and disposal of medical waste by provider/site				
Correct and hygienic instrument processing				
Disinfection of surgical beds and areas between patients/clients				
SURGICAL TECHNIQUE:				
Clean surgical area with a recommended surgical scrub solution (chlorhexidine based or Povidine iodine)				
Correctly identify the skin to be excised				
Demonstrate "safety first approach' - ensuring no part of the penis other than the foreskin is in danger of being injured				
Demonstrate the safe administration of local anesthesia				
Demonstrate cautious and gentle approach to removing the foreskin				
Adequately controls bleeding with electrocautery and/or ligating sutures				
Uses correct technique in tying surgical knots				
Correctly aligns the frenulum and places secure mattress suture				
Correctly align the other quadrant sutures				
Avoids placing deep sutures around the frenulum (as the urethra located in the vicinity)				
Place interrupted sutures evenly to avoid leaving gapping margins				
Ensure no significant bleeding present				
Places a secure dressing that is not excessively tight				
POST-OP PROCEDURES AND CARE:				
Staff observe post-op clients for an allergic reaction or any other abnormality before allowing them leave the operating table or recovery room				
Staff review vital signs				
Staff provides patients with clear instructions, verbal and written on how to wash and care for the wound, and how to deal with pain and minor bleeding				

Staff insist/encourage clients to return for at least one follow-up visit or in the case of a complication				
Staff provide emergency contact details to clients				
Patients receive post-operative counseling instructions and reinforcement of previous MC/HIV messaging				
Staff give specific reminders of the 6 week post-operative abstinence period				

TIMING FOR THE PROCEDURE:

Step in the procedure	**Start time** **(minute, second)**	**End time** **(minute, second)**
1) Patient enters operating area		
2) Provider scrubs/prepares patient skin (note: applying anesthesia may come first)		
3) Provider administers local anesthesia		
4) Provider removes foreskin *(Start time: 1st incision cut; end time: complete removal of the foreskin)*		
5) Provider performs hemostasis using:		
A. electrocautery **OR**		
B. ligating sutures		
6) Primary provider inserts skin sutures (number of sutures inserted by primary provider = ____)		
7) Secondary provider assists with insertion of skin sutures(Number of sutures inserted by secondary provider =____)(*LEAVE BLANK IF NO SECONDARY PROVIDER)*		
8) Provider applies dressing and cleans the client		
9) Patient leaves operating bed		

Remarks:

INSTRUMENT #2:

Questionnaire for VMMC providers

Instructions: the country coordinator administers this questionnaire to physicians, clinical officers, AMOs (where applicable) and nurses involved in providing male circumcision (one form per provider)

Date of interview: ___ DD ___ MM ___ YY

Code of interviewer:_____

Code of respondent:_____

Code of VMMC site: _____

READ ALOUD: Good morning. We are interested in learning more from the doctors and nurses involved in performing adult male circumcision. We will ask you various questions about your experience with performing male circumcision and your opinions on certain aspects of your work. In this survey, I will refer to the primary provider as the surgical staff member that removes the foreskin (whether or not this person is a medical doctor); I will refer to the secondary provider as any other member of the clinical staff (including clinical officers, nurses, assistant medical officers) that assist with other steps in the male circumcision procedure.

Age of respondent: _____ (in years)

Sex of respondent (based on observation): 1._____ male 2. ____female

What is your highest medical/clinical degree?

__ physician/MO
__ clinical officer
__ nurse (1 year training)[20]
__ nurse (2 years training)
__ nurse (3 years training)
__ nurse (4 years training)
__assistant medical officer (AMO)
__other (specify) _____

EXPERIENCE WITH PROVIDING MALE CIRCUMCISION:

I would like to begin by asking you about the training you have received on male circumcision.

1. Did you receive training on performing or assisting in performing the MC procedure in medical/nursing school?

___ yes
___ no
___ don't know, don't remember

[20] These categories were added in 2012 in order to further define the cadre "nurse".

If yes, in what year? _ _ _ _ YYYY

2. Please describe any (additional) training you have received in performing male circumcision for HIV prevention. Please specify the organization that provided the training and approximately when this training was conducted.

Year	# days	Organization giving training	Credentials received (certificate? Other?)

3. ***Instructions to interviewer: rresponses to #3 should only be recorded for providers reporting to have received VMMC training in #1 and/ or #2. If #1 is no and #2 is blank, skip to #4***

How adequate do you feel your training has been in preparing you to perform or assist in performing male circumcision (READ THE RESPONSES):

__ very adequate __somewhat adequate ___not very adequate __not at all adequate

(IF LESS THAN "VERY ADEQUATE," ASK) Please explain: _____

What is your role in the surgical theater (***check only one***):

___Perform circumcision (primary provider that removes the foreskin)
___Assist the surgical provider when he/she performs MC (secondary provider)
___ Both perform and assist with VMMC operations (both roles depending on the need)
Instruction to interviewer: for the nurses or clinical officers that are not involved in performing the actual surgery, please word questions 4-10 in terms of "assisting with providing male circumcision."

4. In what month and year did you begin performing or assisting with adult male circumcisions for HIV prevention?
   _____ MM _____ YYYY

5. In total, approximately how many adult male circumcisions have you performed or assisted in performing during your professional career?

   ___ (number) male circumcisions

   (PROBE: It's not necessary to give the exact number, just your best guess.)

6. In the past 3 months have you performed or assisted in performing VMMCs as a full time or part time activity? By "fulltime," I mean at least 90% of your working hours.
   ___ full-time ____ part-time

7. In the past 3 months, on average how many days a week have you performed or assisted in performing VMMC?

   ___ days in the past week

8. In the past week, how many hours per day on average) have you performed or assisted in performing VMMC?

   ____ hours per day

9. I'd like to ask you about the number of male circumcisions you perform or assist in performing on a busy day, an average day and a slow day:

   # on a busy day: _____ __don't know
   # on an average day: _____ __don't know
   # on a slow day: ____ __don't know

10. In the past month, in addition to providing VMMC, VMMC follow-up and emergency care for VMMC, do you perform any of the following duties
    (TICK ALL THAT APPLY):

    __ administration/management
    __ management of staff rosters
    __compilation of service statistics (# of operations, client data)
    __specialized committees at clinic (such as infection prevention or quality assurance)
    __ preparation of bundled kits
    __waste disposal
    __dedicated training opportunities
    __ counseling
    __ other medical activities/ services
    __ other (Specify): _____

ELECTROCAUTERY:

11. Have you ever used electrocautery/Diathermy for hemostasis in performing or assisting in performing male circumcision?

    ___ yes ___ no (SKIP TO #13)

    (If yes) In the past three months, have you used electrocautery/Diathermy for hemostasis for male circumcision (READ THE RESPONSES):

    ___ always ___ most of the time ____ sometimes ___ rarely

12. I am going to read you some statements about electrocautery/diathermy. Please tell me if you strongly disagree, disagree, agree, or strongly agree with each one. To assist you in choosing your answer, please refer to the codes on the card ***(Interviewer hands card to provider).***

Statements:	Strongly disagree 1	Disagree 2	Neutral/ don't know 3	Agree 4	Strongly agree 5
Electrocautery/ diathermy is safe to use for hemostasis when performing adult male VMMC					
Electrocautery/ diathermy decreases operating time significantly					
Electrocautery/ diathermy is not appropriate in my setting because the electricity is unreliable					
I feel competent in using electrocautery/diathermy when performing or assisting with VMMC					
Clinical officers or nurses – if adequately trained – can safely use electrocautery/diathermy					
Electrocautery/diathermy compromises the surgical sterility of the VMMC procedure					

SURGICAL METHOD USED TO PERFORM VMMC

Regarding the adult male circumcisions you have performed or assisted in performing in the past month, what surgical method or methods did you use? I'll read the methods; please indicate the proportion of procedures that were performed using each method. (PROBE: for example of 100 operations completed, how many were done using each surgical method? If all were done using a single method, record 100% for that method.)

___% forceps guided
___% dorsal slit
__% sleeve
___% other (specify): _____

(IF MORE THAN ONE METHOD USED) which method do you prefer:

__forceps guided
__ dorsal slit
__sleeve
__other/Device (specify):_____
__no preference (SKIP to 14-c)
Why do you prefer this method?

_____

Has a method been recommended or chosen by your national program? If so which method and why?

Method: ___ Forceps guided ___ dorsal slit ___sleeve ___ don't know

OTHER ASPECTS OF OPERATING ENVIRONMENT

In the last 12 months have you worked in a surgical environment for male circumcision where you used/rotated, or participated in a team which used/rotated, operating between multiple surgical beds?

___ yes __ no (SKIP TO #16)

How many surgical /beds did your team rotate between? ___

(IF DIFFERENT NUMBERS AT DIFFERENT TIMES, GIVE THE AVERAGE)

Do you prefer an approach of attending to "one patient at a time" or a team approach of rotating between multiple surgical beds?

___ one at a time ___multiple surgical beds ___no preference

Explain your preference:_____

I am going to read you some statements about the different arrangements for performing male circumcision. Please tell me if you strongly disagree, disagree, re neutral/don't know, agree, or strongly agree with each statement:

Statements:	**Strongly disagree 1**	**Disagree 2**	**Neutral/ don't know 3**	**Agree 4**	**Strongly agree 5**
In our facility the primary provider often waits between operations as operating areas are cleaned and prepared.					
In our facility the primary provider often waits between operations because there aren't many patients					
Using multiple beds per primary provider helps minimize the waiting time for providers between operations					

Statements:	**Strongly disagree 1**	**Disagree 2**	**Neutral/ don't know 3**	**Agree 4**	**Strongly agree 5**
Medical doctors are the only healthcare cadre who should be trained to perform adult VMMC					
I believe the primary provider responsible for the operation should be with the patient from the administration of anesthesia to the final dressing					
It is acceptable for an assistant or secondary provider (not the primary VMMC provider) to prepare and scrub the patient					
It is acceptable for an assistant or secondary provider (not the primary provider) to administer the local anesthesia					
It is acceptable for an assistant or secondary provider (not the primary VMMC provider) to dress the operating wound					
It is acceptable for an assistant or secondary provider (not the primary provider) to complete the interrupted skin sutures					

KITS and BUNDLING (Bundling refers to packaging together of items needed for surgery. Kits may include just consumable items used for the procedure or they may also include instruments):

Let's discuss the male circumcisions you have performed or assisted in performing in the past 3 months.

a. Were the instruments and supplies prepackaged together before the procedure? (whether it came like this in a kit from a supplier or was bundled by the clinic staff before the procedure)

___yes ___no (If no, skip to #18)

IF YES:

b. Were they purchased as a kit from a supplier or did the clinic staff prepare the bundles before the procedure?

___purchased ___bundles prepared by clinic/program staff ___ don't know

c. Were the instruments used in the kit disposable and discarded after the procedure or did the clinic sterilize and reuse any of the instruments?

___ entirely disposable ___Instruments sterilized and reused ___ don't know

14. Do you strongly agree, agree, disagree or strongly disagree that:

Statements:	Strongly disagree 1	Disagree 2	Neutral/ don't know 3	Agree 4	Strongly agree 5
Using pre-bundled (purchased) kits of instruments and supplies decreases the time needed to perform male circumcision					
Using pre-bundled (purchased) kits of instruments and supplies is an unnecessary expense in VMMC clinics					
I prefer assembling a surgical tray myself rather than using a pre-bundled (purchased) VMMC kit					
If a clinic does use pre-bundled (purchased) kits, the instruments should be reusable					
Using pre-bundled (purchased) kits of instruments and supplies reduces the chances of infection during VMMC					

ANESTHESIA

In the operations you performed or assisting in performing in the past three months, which local anesthesia did you most frequently administer? (NOTE TO INTERVIEWER: DON'T READ THE RESPONSES; LET THE PROVIDER GIVE YOU AN ANSWER):

___Lidocaine 1 %
___Lidocaine 2 %
___Any mixture including Bupivicaine (Marcaine)
___Other (specify): _____
___Don't know (others did this task)

What is your preferred local anesthetic and/or mixture of local anesthetic for VMMC surgery and why?

Mix:

_____Lidocaine (____ ml) and Marcaine (_____ml)
_____Don't know
Why:

____It is fast acting
____It is long-lasting
____It is both fast-acting and long-lasting
____This is what I was taught to do
____Better pain control during surgery
____Better pain control in immediate period after surgery
____Don't know
____Other (specify):_____

Which technique do you use to administer the local anesthesia?

___Dorsal nerve block
___Ring Block
___Combination of dorsal nerve block and ring block
___Other (Specify):_____

TASK-SHARING:

Have you ever performed or assisted in performing VMMCs in an operating environment where a secondary provider (nurse, clinical officer) administered local anesthesia as an alternative to a doctor prior to performing the VMMC?

___yes ___no __don't know/don't remember

Do you (would you) strongly approve, approve, disapprove or strongly disapprove of this practice?

__strongly approve __approve __disapprove _strongly disapprove ___neutral/DK

Have you ever performed or assisted in performing VMMC in an operating environment where an assistant or secondary provider (nurse, clinical officer) completed the suturing of skin after the primary VMMC provider has removed the prepuce and achieved hemostasis?

___yes ___no __don't know/don't remember

Do you (would you) approve or disapprove of a secondary provider completing the suturing?

__strongly approve __approve __disapprove _strongly disapprove ___neutral/DK

PROVIDER BURNOUT AND JOB SATISFACTION:

In your experience, have you noticed any provider fatigue/burnout among colleagues when they perform VMMC full-time as a primary work activity?

___yes, frequently
___yes, occasionally
___ yes, but very rarely
___no, not at all (SKIP to #28)
___don't know (SKIP to #28)

After how many months or years does this burnout start to appear or does it depend?

___months *(if stated in years, convert to months; put "0" for less than 1 month)*
___it depends (if so, explain): _____

I'd like to ask you several questions about your job satisfaction. Please respond to the following questions with "strongly disagree, disagree, agree, or strongly agree:

Note to Interviewer: if the respondent is a secondary provider of male circumcision, ask the question in terms of "assisting with male circumcision."

Statements:	**Strongly disagree 1**	**Disagree 2**	**Neutral/ don't know 3**	**Agree 4**	**Strongly agree 5**
Performing (or assisting in performing) male circumcision is a personally fulfilling job					
I personally have begun to experience work fatigue or burnout from performing (or assisting in performing) male circumcision repeatedly					

OPEN-ENDED QUESTIONS:

Date of interview: __ MM __ DD __ YY

Code of interviewer:_____

Name or code of respondent:_____

Code of VMMC site: _____

READ ALOUD: Before we finish the interview, I'd like to give you the opportunity to discuss any aspect of performing or assisting in performing male circumcision that you believe is important. We are particularly interested in learning more about your thoughts on the scale-up of male circumcision services to reach more men in a shorter period of time.

(ALLOW THE PROVIDER TO ANSWER THIS QUESTION IN AS MUCH DEPTH AS DESIRED. IF THE PROVIDER HAS NO INITIAL RESPONSE TO THIS QUESTION, ONE OR MORE PROBES MAY BE USED TO SOLICIT A RESPONSE.

How do you feel about the scale-up of male circumcision services in your country?

What additional information (if any) would you like to have received regarding the need for the scale-up?

What additional training, if any, would you liked to have received to safely perform VMMC for this scale-up?

What has been the effect of this scale-up on your own work?

In your opinion, is the level of supervision of the VMMC activities satisfactory in your site?

What are the biggest programmatic challenges your program encounters?

What recommendations would you have for the persons responsible for the scale-up?

Is there anything else you'd like to add?

THANK YOU FOR PARTICIPATING IN THIS SURVEY

INSTRUMENT #3:

Efficiency elements, number of procedures, adverse events and follow-up at each site

Name of site manager: _____

Date of Interview: ___ (DD) ___ (MM) ___(YY)

Name of Interviewer: _____

Code of Facility: _____

Type: ____ Fixed ____ Outreach ____ Mobile

Month/year when adult male circumcisions services began: __MM __YY

Number of service providers that have been involved in MC service delivery in the past week:

In total: ____ Physicians/MOs ____Clinical officers ____Nurses ___Assistant medical officers ____Others

Per shift (on average): ____ Physician/MOs ____Clinical officers ____Nurses ___Assistant MOs ____Others

	J	F	M	A	M	J	J	A	S	O	N	D	
EFFICIENCY ELEMENTS													
Proportion of operations conducted by:													
Physicians-%													
CI officer-%													
Nurse-%													
Assistant medical officer- %													
Other-%													
Surgical technique used:													
Forceps guided-%													
Dorsal slit-%													
Sleeve-%													
Other-%													
Which if any tasks does the primary provider share with secondary providers:													
(Code as Yes=1, No=2)													
Surgical preparation													
Administer anesthesia													
Suturing for haemostasis													
Suturing of skin													
Haemostasis													
Bandaging													
History taking													
Other													
Provider uses electrocautery (diathermy):													
(tick "1" for answer that applies)													
Always													
Sometimes													

Never												
Not Available												
Number of surgical beds in use:												
In total												
Per team												
Preparation of MC Instruments and consumables/ reusable instruments- % distribution per month												
Prepackaged consumables/ reusable instruments												
Prepackaged consumables/ disposable instruments												
Nonpackaged consumables/ reusable instruments												
Kits with MC devices												
NUMBER OF PROCEDURES												
Number of operations performed per month:												

ADVERSE EFFECTS												
Nature of adverse event:												
Intra-operative:												
Number of bleeding-related												
Other												
Post-operative:												
Number of bleeding-related AE												
Number of infection-related AE												
Number of other AE												
TOTAL (Intra- and post- operative):												
Severity of Adverse Events Reported:												
Severe:												
Intra-operative												
Post-operative												
TOTAL severe AE												
Moderate:												
Intra-operative												
Post-operative												
TOTAL moderate AE												
Mild:												
Intra-operative												
Post-operative												
TOTAL mild AE												
TOTAL AE reported per month:												
FOLLOW-UP												
Number of follow-up visits conducted												
Percentage of MC clients returning for follow-up												
HIV TESTING												
Percentage of MC clients who received an HIV test												