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SYMMACS

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

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

SYMMACS:

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

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

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ACRONYMS

AE	Adverse events
AIDS	Acquired Immune Deficiency Syndrome
AMO	Assistant medical officer
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
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 Programme
NGO	Non-Governmental Organization
NRHS	Nyanza Reproductive Health Society
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 Programme 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

In response to clear-cut 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. In 2010 the World Health Organization (WHO) in consultation with a panel of experts issued guidance on Models for Optimizing the Volume and Efficiency for Male Circumcision Services to accelerate the scale-up of VMMC services. The report outlined six elements to increase efficiency:

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

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. 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 demonstrate that it is possible as part of this scale-up to improve efficiency with equivalent safety; and
(3) to determine the elements of efficiency that relate most closely with increased productivity.

The first round of data collection took place in 2011 and is the basis for this interim report. (Data collection for 2012 is ongoing; results from both rounds of data collection will appear in the final report.) The SYMMACS protocol calls for (1) an annual two-day visit to each selected VMMC site and (2) compilation of data from existing health information systems (where available). Data have been 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: Observation of 10 VMMC procedures per site, including timing of each operation;

#2: 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.

In South Africa, Tanzania, and Zimbabwe, the teams collected data from all VMMC sites known to be operational as of January 2011 and for which permission could be obtained. In Kenya, the 30 sites

represented a random sample of 235 sites in operation at the end of 2010 in Nyanza Province. In both South Africa and Zimbabwe, additional sites opened in the course of 2011, which were incorporated into the sample. SYMMACS was designed as a "natural experiment" to accommodate the rapid evolution of VMMC programs, as they add new sites and adopt elements of efficiency. The 2011 data collection took place as follows:

	Kenya	South Africa	Tanzania	Zimbabwe
# sites visited	30	15	14	14
Types of sites: **Fixed/outreach/mobile**	15/12/3	13/2/0	13/1/0	5/9/0
# providers interviewed	86	105	93	74
# VMMC procedures observed	151	122	133	140

Limitations of the study included the following. Because of the rapid expansion in VMMC sites, it was not possible to base the sampling on the universe of sites, nor was it feasible to visit all sites in each country. The data collection took place during low-volume periods in all countries except Zimbabwe, whereas the best test of efficiency measures would have been in peak periods. (The 2012 data collection will occur during high volume periods.) Data were collected from interviews with providers and observation of sites/providers, but not from clients themselves. The observations of sites and VMMC procedures were by definition subjective, although based on pre-established criteria.

The results from the 2011 data collection showed that the four countries differed in their adoption of the six elements of efficiency, as summarized in the chart below:

Regarding the quality and safety of VMMC services, SYMMACS provided positive evidence across all four countries on numerous points:

- Providers in all countries adhered to the surgical protocols for performing VMMC (with one exception: correctly tying the surgical knot).
- Tanzania and Zimbabwe achieved close to 100% HIV testing and counseling, whereas Kenya and South Africa continue to work toward this goal.
- VMMC sites in all four countries scored high on the provision of group education for HIV prevention.

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

*In this study we used rotation among multiple bays in the operating theater as the measure of "optimizing the use of facility space." (x) in this table denotes partial adoption of the element.

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

- The systems for monitoring and reporting adverse events were inadequate.
- Sites often lacked post exposure prophylaxis (PEP) and guidelines for administering it onsite.
- 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.

The analysis to determine the elements of efficiency that relate most closely with increased productivity (objective #3) is underway and will be presented in a separate document.

The results of the 2011 SYMMACS data collection point to the following programmatic recommendations:

Adoption of efficiency elements:

- Task-shifting: Work toward change in the national policy in South Africa and Zimbabwe that currently prohibits task-shifting (non-physicians to perform all aspects of the procedure).
- Task-sharing**:** Provide more systematic training of non-medical personnel to assist in all aspects of the procedure (e.g., administering local anaesthesia and completing interrupted sutures).
- Electrocautery**:** 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 AEs, especially severe AEs; and provide external monitoring of this process.
- Supervision: Establish a system of regular supervisory visits to each VMMC site, including reporting of adverse events.
- Training: in training of primary providers, emphasize (1) correct tying of surgical knot and (2) maintenance of a sterile field at all times.
- Protocols and guidelines: Ensure that key guidelines (e.g., WHO protocol for performing VMMC, national STI guidelines, guidelines for administration of PEP) are available at or near the operating theatre.
- Provider burnout: Identify ways of diversifying the work of primary providers to avoid burnout from an exclusive focus on performing VMMC.

Next steps for SYMMACS include finalizing the data collection for 2012 in a minimum of 30 sites per country during high-volume periods, disseminating the findings from the 2011 data collection at a meeting of VMMC stakeholders in each country, distributing a supplement with site-specific results for each country, and developing a series of articles for publication in peer-reviewed journals. Finally, the experience of SYMMACS indicates the desirability for review and updating of the 2010 WHO document on MC MOVE in light of country experience and empirical evidence from VMMC studies such as this one.

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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

A. The HIV epidemic in Eastern and Southern Africa

In the course of the past four decades, the AIDS epidemic has ravaged countries throughout sub-Saharan Africa, resulting in an estimated 1.3 million AIDS-related deaths in 2009 alone. Currently, 22.5 million adults in Africa are living with HIV (UNAIDS, 2010). The epidemic has caused immeasurable damage to the economies and health systems of the affected countries; it has afflicted men and women during the most productive years of their lives; and it has left millions of orphans in its wake.

The dynamics of transmission in this region are well known. The vast majority of people newly infected with HIV are infected during unprotected sexual intercourse (including paid sex) and vertical transmission of HIV to newborns and breastfed babies. Having unprotected sex with multiple partners remains the greatest risk factor for HIV infection in this region (UNAIDS, 2010). Although far less prevalent, injecting drug use is a relatively recent phenomenon that features in some of the region's epidemics, including in Kenya, Mauritius, South Africa, and the United Republic of Tanzania (UNAIDS, 2010). Men who have sex with men—though numerically low—also run an elevated risk of acquiring HIV (Baral, Sifakis, Cleghorn, & Beyrer, 2007).

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

This report focuses on four of the 13 countries prioritized for Voluntary Medical Male Circumcision (VMMC) programs and selected as being among the most active in the region: Kenya (HIV prevalence: 8.4%), South Africa (17.1%), Tanzania (5.7%) and Zimbabwe (13.7%) (UNAIDS, 2010; NBS, 2009; MOHCW, 2009). 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 traditional 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.

B. 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 (Auvert et al., 2005; Bailey et al., 2007; and Gray et al., 2007) conducted in the last decade found a 57% protective effect against HIV infection for men who became circumcised (Weiss et al., 2010). All three trials were stopped prematurely because it was deemed unethical to withhold VMMC from men in the control arm waiting to be circumcised. Recent data from Uganda show an increase in protective effect over time—up to 70% (Gray et al., 2012).

Based on the randomized controlled trial (RCT) results, the World Health Organization (WHO) and the Joint United Nations Programme on HIV/AIDS (UNAIDS) rapidly convened stakeholders in March 2007 to evaluate the strength of the evidence and to consider the policy and programmatic implications. The resulting recommendations addressed the essential components for program implementation in 13 priority countries (Botswana, Kenya, Lesotho, Malawi, Mozambique, Namibia, Rwanda, South Africa, Swaziland, Tanzania, Uganda, Zambia, and Zimbabwe) in Eastern and Southern Africa with settings of high HIV prevalence and low levels of male circumcision (WHO/UNAIDS, 2007; Weiss et al., 2008).

Data from mathematical modeling indicated that provision of 80% VMMC coverage among men ages 15-49 years in 13 Eastern and Southern African countries could avert 3.4 million new HIV infections by 2015 (Njeuhmeli et al., 2011). However, to reach this goal, it would be necessary to perform 20.3 million circumcisions by 2015 to close the current coverage gap (Njeuhmeli et al., 2011). 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 that it could impact the transmission of HIV infection and the course of the HIV epidemic.

C. Efforts to improve the efficiency of VMMC

In 2009 WHO, in consultation with a panel of experts, issued guidance 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 and logical manner, while recognizing the need to consider the local context and circumstances in which services are been offered.

The six elements to increase efficiency include:

- ***Optimizing the use of facility space***

This element is multifaceted; it involves 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 is critical in accommodating efficient surgery. Traditionally, surgery was performed with one physician in one theatre/surgical bay. There was significant lost time between clients as the surgical bay would need to be prepared for the next client. Adding an additional bay improves efficiency and increases the number of circumcisions performed in a day. Smooth client flow, client scheduling and the correct 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 bundling commodities: 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 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).

Disposal is equally fast post operatively. Sterility is guaranteed, and there is no need for onsite sterilization or laundry facilities.

- ***Task-shifting (allowing non-medical doctors to perform VMMC)***

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

- ***Task-sharing (allowing non-physicians to conduct certain aspects of the procedure)***

This involves the "sharing" of surgical tasks previously assigned to physicians with non-medical doctors (i.e., lower cadre providers). Task-sharing is particularly critical where task-shifting is not authorized, but is also useful as a complement to task-shifting. An example is the suturing of the skin, which in many countries is a task traditionally reserved for physicians. With task sharing, nurses are trained to acquire this skill and perform it routinely. Other examples include performing the physical examination prior to surgery and administrating local anesthesia. Task sharing results in the refocusing the medical doctor's time on the most critical steps of the procedure and reducing the amount of time spent per procedure, thus effectively increasing the number of VMMC procedures performed in a given period of time.

- ***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.

D. Country response: VMMC program in the four Countries

The response to the HIV epidemic in terms of scaling-up VMMC has been unique in each country but shares several common elements.

Leadership. 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 countries, the national coordinating body HIV control[1] worked with the Ministry of Health, establishing policies (such as the cadre of clinical personnel authorized to perform VMMC) and norms for service delivery. 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 Technical Working Group (TWG) provided guidance to countries on this scale-up through workshops, meetings, and in-country consultations.

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. The Decision Maker's Program Planning Tool (DMPPT) initiative (under the USAID-funded Health Policy Initiative) worked with 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 of the country (often corresponding to ethnic group) were essential in charting a strategy. 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. Kenya and Tanzania focused their programs on those provinces with the highest HIV prevalence and lowest male circumcision prevalence. South Africa and Zimbabwe have evolved to a more nationwide approach.

In Kenya, Nyanza Province—with high HIV prevalence and low circumcision prevalence—became the priority province for the national program (although services were also developed in Western, Rift Valley, and Nairobi Provinces). The country program was able to build on the experience at UNIM, located in Kisumu, Nyanza, and established to provide VMMC in connection with the Kenya RCT. It began the rapid scale-up of services in 2008. Moreover, it provided the first demonstration of the feasibility of conducting accelerated campaigns through its RRI (Rapid Results Initiative). Implementing agencies include AIDS, Population and Health Integrated Assistance (APHIA II) Nyanza, Catholic Medical Mission Board, UCSF, Impact Research and Development Organization, Male Circumcision Consortium (FHI, UIC, EngenderHealth, NRHS) and Marie Stopes Kenya.

[1] **Kenya**: National AIDS and STI Control Programme (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).

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 at Orange Farm expanded from a research site to a full service male reproductive health 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.

Tanzania faced a different set of challenges. Eight priority regions were identified where HIV prevalence is at or above the national average and male circumcision is well below the national average. These are Iringa, Mbeya, Rukwa, Tabora, Shinyanga, Kagera, Mwanza and one district of Mara region. The regions were divided by the Government of Tanzania (GOT) and Tanzania PEPFAR team with different United States Government (USG)-funded agencies taking responsibility 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—in the design and implementation of its VMMC service. 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.

***Service Delivery Models*.** In all four countries the initial sites were fixed clinical facilities that developed a specialized VMMC service provided on a continuous basis by clinicians trained for this role. However, the model quickly expanded to include two different modes of service delivery (which go by slightly different names in different countries): 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 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.

An important component of VMMC service delivery has been group education on the risks and benefits of the procedure, as well as HTC. Some VMMC programs initially experienced difficulties in testing all clients prior to the procedure. However, most adopted provider-initiated testing and counseling (PITC), involving routine offer of HIV testing to all male circumcision clients before the procedure, with the result that most clinics now test close to 100% of clients prior to the procedure in Tanzania and Zimbabwe (and increasing but slightly lower percentages in Kenya and South Africa). 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; he then signs an informed consent.

***Demand Creation*.** All programs had some form of demand creation, which varied in approach by country. Most used community mobilizers, deployed to increase awareness of the benefits of VMMC and actively attract clients to the services, including individual discussion and door to door activities. Similarly, some countries used mobile vans that circulated with music and/or loud speaker through communities to draw attention to this service. Local radio often complemented these other efforts, which could alert the local population to campaigns, dates, and sites where services would be provided, eligibility, and related information. Pamphlets and posters have been widely used, both to create awareness and to provide information to clients and others (wives and girlfriends, parents of adolescents, and others) about the procedure. Much of this communication has been community based (in contrast to a national media campaign) to more effectively reach audiences in a given catchment area. Advocacy with local leadership, chiefs and headmen to increase buy-in has been an essential component of demand creation in Zimbabwe. In South Africa and in Zimbabwe where services are being expanded to almost all provinces, the greater use of national communication channels is currently under way.

E. 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 13 priority countries in Eastern and Southern Africa. Given the fledging nature of these programs, it was important to develop a process 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 the VMMC facilities and lessons learned that could be shared across these countries and others less advanced in VMMC.

The PEPFAR 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 MC TWG recommended pairing Dr. Jane Bertrand (a social scientist with extensive experience in program evaluation in sub-Saharan Africa) with Dr. Dino Rech (a South African physician involved in developing the model of high volume VMMC service delivery for the clinic at Orange Farm, South Africa) as Principal Investigator (PI) and co-PI on this project.

The MC TWG convened a Technical Advisory Group (TAG), consisting of the three researchers involved in the VMMC clinical trials, as well as MC 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, Bertrand and Rech 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 MC 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.

OBJECTIVES

SYMMACS has 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 demonstrate that it is possible as part of this scale-up to improve efficiency with equivalent safety; and
3. to identify the elements of efficiency that relate most closely with increased productivity.

METHODOLGY

A. Implementing organization and members of the data collection team

The SYMMACS team in each country included an implementing partner, two local co-investigators, and the data collection team (the names are listed in the acknowledgement section above). The co-investigators were selected through a process of consultation with PEPFAR staff in-country, the implementing organization in each country, and the co-PI. Most were working in a position of authority within the local national AIDS coordinating body or were respected researchers in HIV prevention. The co-investigators assisted the SYMMACS effort in slightly different ways in each country; two common roles were to assist in submitting the protocol to the local IRB prior to data collection and to trouble-shoot in the event of any political difficulties (of which there were few).

The data collection team in each country consisted of:

- A country-coordinator (a social scientist in all cases except Kenya, where a physician held this role)
- One to two physicians, themselves trained in VMMC, to collect data on the clinical aspects of VMMC service delivery
- Two social scientists (in Kenya)
- One data manager

B. Training of the data collection teams

Initial training for SYMMACS data collection took place in Harare, Zimbabwe, from November 28–December 2, 2010. For all countries except South Africa, the country coordinator and at least one clinician trained in VMMC participated. The group not only reviewed the instruments but reworked them significantly 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 informed consent: why it was important, what forms/signatures would be needed, when it would be administered, and related questions.

Because some members of the data collection teams were not present at the Harare training, SYMMACS arranged for the co-PI (Dr. Dino Rech) and for Webster Mavhu (country coordinator for Zimbabwe) to attend a 5-day in-country training/refresher training in South Africa in February 2011 and in Kenya in May 2011. Thus, by late May 2011 all data collection teams had received training from the PI and/or co-PI of the project.

C. 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 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:

South Africa:

- The SYMMACS country team initially selected 10 sites known to be in operation at the start of 2011, then added 5 sites (2 satellite [outreach] and 3 fixed), based on known site openings.
- Subsequently, the team learned that many more government sites were operating than initially thought. 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 they initially selected several 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.
- The basis of selection was the universe of sites known to exist at the start of 2011 or scheduled to open, plus a convenience sample of additional sites.
- The sites were located in the following provinces: Gauteng (n=8), Mpumalanga (n=3), KwaZulu-Natal (n=2), and Free State (n=1).

Tanzania:

- The SYMMACS country team identified 13 fixed and 1 oureach site that were known to exist at the start of 2011, and it visited these 14 sites.
- Had data collection occurred during different months, the sample might have included more outreach sites. However, the team limited data collection to the original 14 sites.
- The sites were located in the following provinces: Iringa (n=6), Kagera (n=2), Mbeya (2), Shinyanga (n=2), Rukwa (n=1), and Tabora (n=1).

Zimbabwe:

- The SYMMACS country team originally identified seven VMMC sites (those known to exist at the start of 2011); they added eight new sites as they became operational.
- They had hoped to include one or more military sites but collecting data from these locations did not prove to be feasible.
- The basis of selection was the universe of sites known to exist at the start of 2011 or scheduled to open, plus a convenience sample of additional sites.
- The sites were located in the following provinces: Mashonaland Central (n=4), Manicaland (n=2), Mashonaland East (n=2), Masonaland West (n=2), Masvingo (n=2), Harare n=1), and Bulawayo (n=1).

The sampling in Kenya differed from the other three countries. As of late 2010, the VMMC program in Kenya was fully operational, with 235 fixed and outreach sites in the province of Nyanza. (Note: the Kenya VMMC program initially focused its greatest resources on Nyanza, because of the high levels of HIV and low level of male circumcision in this province. Although the program has now scaled out to four other provinces, its main focus was, and still remains, Nyanza Province. For this reason SYMMACS limited data collection to this set of VMMC sites.)

Given the large number of sites in Kenya and budgetary limitations, the local SYMMACS team in consultation with the national VMMC Task Force agreed to take a random sample of 30 VMMC sites in Nyanza Province (only). The approach to sampling was as follows. Based on data on number of procedures performed by site from January – November 2010, the country coordinator contracted VMMC implementing partners in Nyanza (NRHS, IMPACT/IRDO, FACES, CMMB and APHIAplus) and requested them to provide a list of the number of MC procedures performed at each of their sites from January–December 2010 and to classify each facility as a fixed site ("A"), outreach site ("B"), or mobile site ("C"). The initial intention was to randomly select these sites proportional to the number of VMMCs performed in 2010. However, it was important to include sites which were less operational in 2010 but expected to become more operational in 2011 (e.g., the sites for APHIAplus, which was a new program in 2010). Thus, of the 30 sites, the sample included 10 fixed ("A") sites, 17 outreach sites ("B"), and three mobile sites ("C"). Of these 30, 4 were APHIAplus sites (all outreach). The allocation of the 30 sites to the three types of site was approximately proportional to the number of procedures performed within each type in 2010. However, during actual data field collection, some of these selected sites were found to be non-operational for different reasons. In this case the closest similar type of facility was then selected for data collection.

D. Data collection instruments

SYMMACS data collection in calendar year 2011 involved four instruments (shown in Appendix A), 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 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 instruments 1-a and 1-b. The social scientist on the team 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 and gender, training in VMMC, working hours, lifetime number of VMMC completed). The data for instrument 3 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 adverse events 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.

E. Logistics of contacting selected VMMC sites

In each country the SYMMACS team obtained support from the Ministry of Health for this research, including an official letter that facilitated their entrée into the VMMC sites. Copies of this letter were sent to local authorities[2] to inform them that the data collection team would be present in that area. The SYMMACS team in each country then developed a provisional time table for visits to each site, based on several factors: the availability of data collection personnel, required authorization from local officials, the readiness of the site to receive the team, availability of clients, and (in the case of Tanzania) the logical routing for overland travel from one site to the next. The country coordinator sent a letter or other communication to the VMMC officers-in-charge (site managers) to determine the suitability of the proposed date, and attached a copy of the letter signed by the MOH. He/she then followed up with a phone call or email to finalize the date of the visit.

F. 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. 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 if the site manager indicated the strong likelihood of seeing no additional clients the following day.

The team generally arrived at the VMMC site on the pre-appointed date before the service providers started to arrive. The country coordinator made contact with the officer-in-charge and introduced the team and then asked the officer-in-charge to convene all clinical staff involved in VMMC on the day of the visit. Thus, the SYMMACS data collection team had the opportunity to meet all service providers at the VMMC facility at the start of the first day. The country coordinator explained to those convened the reason for the visit. The team took advantage of this meeting to explain that participation was voluntary and to review the informed consent document. The country coordinator then obtained consent from all providers during the meeting, before contacting them individually at the site over the course of the day for interview or observation.

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 collecting the data was as follows:

- The clinician interviewed the officer-in-charge and observed the facility (Instrument 1-a)

[2] These authorities included the Provincial Medical Directors, City Health Medical Directors, Regional Administrative Secretary, Regional Medical Authority, Regional AIDS Control Coordinator, and others depending on the country. A copy of the letter was also presented to the MC TWG.

- 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, since the team collected data during periods of accelerated activity, which meant that the providers were not always available for the interviews on the day of the visit, the country coordinator interviewed providers (Instrument 2) after the actual visit of the SYMMACS team to the site.

In some countries, much of the data required for Instrument 3 is also available from a central health information system in the capital city – in some cases in the headquarters of the local SYMMACS implementing agency, in others at another location. Thus, the team often arrived with data from the central system for that site, and proceeded to verify the statistics available onsite with those from the central system. In the case of South Africa, data for Instrument 3 were collected onsite.

Thus, the data in this interim report cover the following time periods:

- A two-day site visit in 2011 (for Instruments 1-a, 1-b, and 2)
- Data covering a period from January 2010 to December 2011 (Instrument 3)

G. Data entry and processing

We originally intended to collect data for Instruments 1-a, 1-b and 2 using personal digital assistants (or PDAs, a type of palmtop computer). Due to certain difficulties in programming them and subsequently downloading the data to the computer, only the SYMMACS team in Zimbabwe collected Instrument 2 data using PDAs. In all other cases, the local teams used paper forms and then entered the data into the PDA for subsequent processing and analysis. The country team had three PDAs, model HP iPAQ 210. The data were downloaded from the PDAs onto a computer using Entryware in preparation for analysis.

Data for Instrument 3 were entered onto an Excel spreadsheet, which was subsequently converted to an ACCESS database, from which tables and graphs included in this report were generated.

Although the use of paper forms originally appeared to be a duplication of effort, these forms proved invaluable for the purposes of checking back to verify certain data points or to review comments in the margin, which would not have been possible with the PDAs.

H. 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. This work greatly facilitated the task of data analysis once the data became available.

The country coordinator and data manager from each country participated in a data analysis workshop held in Cape Town, South Africa, from December 12–16, 2011. The team used SPSS version 19.0 to process the quantitative data and to produce results for the first 28 tables in this report (i.e., all data

from Instruments 1-a, 1-b and 2). Analysis of the data from Instrument 3 was completed at Tulane. The data from each of the four participating countries was aggregated to allow for a cross-national analysis. In short, the data collection from calendar year 2011 yielded the results presented in this interim report.

In addition, Instrument 2 (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 have been incorporated into the results section of this report to provide additional insight into the quantitative findings.

I. Human subjects (IRB) approval

The Tulane University Institutional Review Board (IRB) approved the original application for SYMMACS in May 2010 and a continuation application on July 26, 2011.

The local IRBs issued their approvals of this project as follows:

- Kenya: The Kenya Medical Research Institute gave initial approval on January 17, 2011, and approved a continuation application on January 24, 2012.
- South Africa: The local IRB in South Africa, the University of the Witwatersrand's Human Research Ethics Committee reviewed and approved the SYMMACS protocol on March 25, 2011. This approval is valid for the next 5 years.
- Tanzania: The Tanzanian National Institute for Medical Research gave approval received on February 22, 2011.
- Zimbabwe: The Medical Research Council of Zimbabwe gave initial approval on September 3, 2010, and approved a continuation application on August 26, 2011.

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.

A. Sampling

We initially intended to take either a random sample of VMMC sites (in Kenya) or the universe of all known sites at the start of 2011 in the other three countries. However, the final selection of sites deviated slightly from this plan. As the number of VMMC sites increased dramatically over the course of the year 2011 in South Africa and Zimbabwe (and previously "unknown sites" emerged in South Africa), SYMMACS decided to include as many of those sites as possible. In doing so, we collected more data than would have otherwise been possible, but this resulted in a sample that was no longer the "universe" of all known sites, and must be considered in rigorous terms a convenience sample. The Tanzania team kept with the 14 sites known to be in operation at the start of 2011, but in doing so excluded any fixed or outreach sites that emerged in 2011. It is a limitation of the study that two countries dealt with the expanding number of sites by adding new sites as they became operational (which was the original intent of SYMMACS—to capture all possible sites) in two countries but limited data collection to the set of sites known as of January 2011 in the third.

B. Timing of the data collection

In retrospect, the guidelines for data collection should have specified collecting data during "peak" (campaign, accelerated) periods, to evaluate the use of the efficiency elements under high volume conditions. As shown in the findings in this interim report, there are dramatic seasonal fluctuations that occur for VMMC services in all countries. Some countries (e.g., Tanzania) are attempting to counter this with promotional campaigns during period of low demand, but to date the fluctuations remain. One country (Zimbabwe) collected its data during periods of accelerated VMMC activity, but the other three collected it during low-volume periods. (In the 2012 SYMMACS data collection, we plan to target the high volume periods, which differ by country.) 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.

The timing of the data collection was also affected by unavoidable delays related to approvals. For example, South Africa had additional delays related to obtaining approval from the local IRB (involving the wording of the consent form) and in obtaining their letter of support from the MOH.

C. Lack of data from VMMC clients

SYMMACS did not interview VMMC clients to get their opinions about the services offered by the site and their own experience with undergoing the VMMC procedure. This decision stemmed from two factors: (1) the additional time and financial resources exceeded what was budgeted for SYMMACS, and

(2) interviewing clients would have made the data collection more complex and possibly more disruptive to the delivery of services at the VMMC sites.

D. Limitations in the available data on adverse events (AEs).

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. (Note: SYMMACS did not intend to obtain this information from clients but rather to compile it from existing data at the site level.) However, we encountered multiple problems with the AE data. First, in the absence of a standard tool for AE classification across VMMC programs in these four countries (as well as within a given country), 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. 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 co-PI (one of the leaders in this field on the issue of AEs) recommended, and the SYMMACS team concurred, that there be no analysis of the data for AEs, given the inconsistencies and poor quality of this information. Thus, we have not presented data on AEs in this report.

E. Subjectivity of the observations for the QA instruments

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 on the criteria for making such assessments; however, they still remained subjective. Indeed, the findings from Zimbabwe suggest that having a surgical specialist in this role may have "raised the bar" for his assessment of certain physical characteristics of the site.

F. Biases of self-report

We acknowledge the potential biases inherent in self-report, which formed the basis of our interviews with the officers-in-charge and with the service providers. Especially if they believed the SYMMACS interviewers were associated with their headquarters office, they may have modified their responses.

G. Bias based on the profile of SYMMACS' clinicians

In South Africa, Tanzania, and Zimbabwe, the clinician(s) on the SYMMACS data collection team had trained some of the providers that were observed as part of this study. This could have introduced several types of bias: favorable reporting of their performance by the clinicians; courtesy bias on the part of providers (for example, in response to the question "how adequate was the training you received to perform VMMC?"); or nervousness on the part of providers during the observation of actual surgical procedures.

H. Failure to distinguish between providers at public and private sites

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

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

Quality Assessment of VMMC Sites

Characteristics of the VMMC Sites and Service Providers[3]

The findings in Table 1-8 below were obtained from interviews with the officer-in-charge (also known as the site manager) at each site and from observations made by the clinician(s) on the SYMMACS data collection teams, using Instrument 1-a (which appear in Appendix A). The unit of analysis is the site (n=73 over the four countries).

In Tables 1-8, we present the data in the form of percentages, despite the fact that the number of sites per country ranges from 14-30. Technically, it would be more accurate to present these findings as proportions. However, to remain consistent with the presentation of data in other sections, we have opted for percentages. Readers should interpret these percentages to mean "all, some, most, a few, or none" rather than as precise figures.

A. Cadre of personnel and roles

The results in Table 1 on the cadre of personnel performing or assisting in VMMC procedures on the days of the visit reflect the variation in policy across countries regarding the cadre of health personnel authorized to perform VMMC. In Kenya and Tanzania, nurses and clinical officers perform VMMC as the primary provider, whereas in South Africa medical doctors usually perform this role and in Zimbabwe medical doctors always perform this role. In this study, Tanzania had a mean of 3 primary providers per site, whereas the other countries had a mean of 2 primary providers per site (see Table 1). The number of nurses working as secondary providers was higher (average=4 per site) at sites where physicians performed the surgeries.[4]

The mean number of clinical personnel working at the VMMC sites on the days of the SYMMACS data collection ranged from 3.4 in Kenya to 7.5 in South Africa, with 6 on average in the other two countries. In addition, 1-2 non-medical assistants worked at each site as runners, hygienists, or cleaners.

[3] The data in Section I were collected using Instrument 1-a of the SYMMACS data collection instruments.
[4] In Kenya and South Africa, the VMMC providers included both public sector and NGO staff. In Tanzania all providers were from the public sector; and in Zimbabwe, all were NGO personnel.

Table 1. Cadre of personnel performing or assisting in VMMC procedures on days of visit, by country[5]

	Number of personnel per site by cadre			
	Kenya (n=30 sites) Mean (range)	South Africa (n=15 sites) Mean (range)	Tanzania (n=14 sites) Mean (range)	Zimbabwe (n=14 sites) Mean (range)
Cadre of primary provider (person removing the foreskin):				
Medical doctor (MD)	0.0	1.4 (0-3)	0.1 (0-1)	1.8 (1-3)
Assistant medical officer (AMO)	-	-	0.3 (0-1)	-
Clinical officer	1.0 (0-3)	-	0.4 (0-1)	-
Nurse	1.0 (0-3)	0.03 (0-1)	2.5 (1-4)	0.0
Cadre of secondary provider (person assisting with clinical aspects of VMMC):				
Medical doctor	0.0	0.0	0.0	0.0
Assistant medical officer (AMO)	-	-	0.1 (0-1)	-
Clinical officer	1.0 (0-2)	-	0.3 (0-2)	-
Nurse	1.0 (0-2)	4.7 (0-10)	2.4 (1-4)	4.1 (2-7)
Total clinical VMMC providers on days of visit	3.4 (0-8)	7.5 (2-13)	6.0 (3-9)	5.9 (3-9)
Total non-medical assistants that clean and organize surgical area (hygienist, runner, cleaner, etc.)	1.2 (0-3)	2.1 (1-6)	1.0 (0-2)	2.0 (1-4)

B. Number of Surgical Beds per site and per team

Table 2 shows the number of beds used per site in the four countries. In South Africa and Zimbabwe there is a clear preference for at least 4 beds per site. These countries use a common model of service delivery based on the WHO "considerations of optimizing volume and efficiency," which recognizes multiple beds as an efficiency measure. These programs offer services in high-density areas and/or (in some cases) provide transportation to bring clients into the point of service delivery. Such specialized, high-volume sites have large numbers of clients and require multiple beds for greater efficiency and speed of service delivery.

In Tanzania, these data were collected at all sites during low-volume periods and showed an average of only 1.7 beds. However, reports by program managers indicate the use of at least 4 beds during campaign periods.

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

By contrast, in Kenya, 67% of the sites use 1 surgical bed. As mentioned previously, Kenya has a service delivery model structured on a large number of sites dispersed widely over a large geographical area to offer services throughout the province of Nyanza. This model lends itself to smaller sites that attract fewer clients per site and thus have less need for multiple beds per site to meet demand. (Had data collection occurred during the RRI, there might well have been greater use of multiple beds.)

Table 2. Surgical beds per site, by country

Proportion of facilities with this number of surgical beds (bays):	Kenya (n=30 sites)	South Africa (n=15 sites)	Tanzania (n=14 sites)	Zimbabwe (n=14 sites)
1	66.7	6.7	37.5	0.0
2	16.7	6.7	57.1	0.0
3	10.0	6.7	7.1	42.9
4	3.3	33.3	0.0	35.7
5	0.0	13.3	0.0	14.3
6	0.0	6.7	0.0	7.1
7	0.0	13.3	0.0	0.0
8	0.0	13.3	0.0	0.0
Mean number of beds per site	**1.4 beds**	**4.8 beds**	**1.7 beds**	**3.9 beds**

C. Physical characteristics of the site

Table 3 reports the findings from the QA instruments on characteristics of the site that contribute to safety and client comfort in the provision of VMMC services. Three key considerations included the lighting and ventilation of surgical areas as well as the general appearance of the site.

The majority of sites in South Africa and Kenya scored a "2" (satisfactory—the highest score) on all three criteria. In Tanzania and Zimbabwe, at least one-third of the sites scored less than "satisfactory" on these three criteria. Although reasons varied by country, some sites scored low on ventilation due to high temperatures, lack of air conditioning, or rooms with no windows. In terms of lighting, some sites depended on natural lighting that dimmed in the late afternoon (e.g., the one site in Zimbabwe where the providers operated into the evening hours during the campaign period). In general, however, with the exception of this one Zimbabwe site, the lighting and ventilation were adequate for safe service delivery.[6] Although data collection guidelines outlined parameters for assessing each item, the specialist surgeon may have had particularly high standards reflected by the score of "unsatisfactory" at this site.

[6] Zimbabwe was also the only country in which a specialist surgeon performed the QA assessment.

Table 3. Characteristics of VMMC sites, by country

Item observed:	Kenya (n=30 sites)			South Africa (n=15 sites)			Tanzania (n=14 sites)			Zimbabwe (n=14 sites)		
	0 %	1 %	2 %	0 %	1 %	2 %	0 %	1 %	2 %	0 %	1 %	2 %
Light in surgical area	0.0	16.7	83.3	0.0	6.7	93.3	7.1	35.7	57.1	7.1	50.0	42.9
Ventilation in surgical area	0.0	6.7	93.3	6.7	6.7	86.7	7.7	23.1	69.2	0.0	57.1	42.9
General appearance of VMMC facility	0.0	6.7	93.3	0.0	13.3	86.7	7.7	30.8	61.5	0.0	57.1	42.9

* Zero= unsatisfactory 1=partially satisfactory 2= satisfactory

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

Correct and complete recording of VMMC client data—whether in manual or computerized form—is essential to the functioning of a VMMC facility and to ensuring quality services to clients. The QA instrument assessed whether the sites routinely collected, processed, and submitted clinic statistics. Three of the four countries scored extremely well (85% or more of sites received a "2"), as shown in Table 4.

South Africa was the exception with some notable gaps both in information systems and AE monitoring. Specifically, the lack of standardised reporting tools led to incomplete capturing of indicators. In addition, technology challenges (difficulties with e-mail and Internet connectivity) hampered or delayed the submission/transmission of statistics. Of great concern are the notable gaps in AE reporting systems in South Africa: 27% of VMMC sites scored unsatisfactory and 13% partially satisfactory. Shortcomings included not having systems in place and a failure to disaggregate follow-up visits by client. The latter oversight created a risk of recording visits as additional clients when the same client may have been returning multiple times.

Although the other three countries—Kenya, Tanzania and Zimbabwe—scored well on having a monitoring system in place for adverse events (with 93-100% of sites being "satisfactory"), the quality of the AE data proved problematic, as discussed later (in connection with Table 6).

In all countries at least 85% of sites had MC client consent forms on file, an essential aspect to the provision of quality VMMC services. This included Kenya and Zimbabwe at 100%; South Africa, 93%; and Tanzania, 86%.

Table 4. Adequacy of information system at VMMC sites, by country

Item observed:	Kenya (n=30 sites)			South Africa (n=15 sites)			Tanzania (n=14 sites)			Zimbabwe (n=14 sites)		
	0 %	1 %	2 %	0 %	1 %	2 %	0 %	1 %	2 %	0 %	1 %	2 %
Existence of a functioning information system (manual or computerized)	3.3	0.0	96.7	0.0	40.0	60.0	14.3	0.0	85.7	0.0	0.0	100.0
VMMC client consent forms on file	0.0	0.0	100	6.7	0.0	93.3	14.3	0.0	85.7	0.0	0.0	100.0
Monitoring system in place for adverse events	6.7	0.0	93.3	26.7	13.3	60.0	7.1	0.0	92.9	0.0	0.0	100.0

* Zero= unsatisfactory 1=partially satisfactory 2= satisfactory

E. Education, counseling and referrals

The SYMMACS QA assessment monitored the components of the minimum package of VMMC services recommended by WHO: client education, counseling, and referral when needed. As shown in Table 5, all four countries achieved a "2" (the highest score) on provision of individual counseling, as well as for group education in most sites. In Zimbabwe, sites reportedly gave individual rather than group counseling if the number of clients did not warrant a group session.

With regard to referral slips and system, referral involves a paperwork notification (referral slip). It is a system that allows a site to transfer a client or patient to a better equipped medical facility in the event that the original facility cannot treat or attend to the person's medical needs. In the event of a severe complication requiring transfer, not having the correct paperwork and systems in place delays and prolongs referral and possibly compromises patient care. In the case of SYMMACS, referrals might involve ARV initiation or treatment for TB, STIs, diabetes, or high blood pressure. South Africa, Tanzania and Zimbabwe had referral slips and a system in place at most sites (87% or more). In contrast, Kenya scored poorly (57% of sites scoring unsatisfactory) with respect to referral slips and systems for clients. Providers reported that in the absence of referral slips, they would use whatever paper was available for such referrals but the practice was not systematic. However, these findings merit further exploration.

Table 5. Education, counseling and referral at VMMC sites, by country

Item observed:	Kenya			South Africa			Tanzania			Zimbabwe		
	0 %	1 %	2 %	0 %	1 %	2 %	0 %	1 %	2 %	0 %	1 %	2 %
Group education on risks & benefits of VMMC	0.0	0.0	100.0	6.7	0.0	93.3	0.0	7.1	92.9	7.1	7.1	85.8
Individual HTC & questions time on VMMC	0.0	0.0	100.0	0.0	0.0	100.0	0.0	0.0	100.0	0.0	0.0	100.0
Referral slips for clients	56.7	6.7	36.7	13.3	0.0	86.7	7.1	0.0	92.9	0.0	0.0	100.0

* Zero= unsatisfactory 1=partially satisfactory 2= satisfactory

F. Supervision of sites and monitoring of AEs

The QA instrument assessed whether the VMMC facility had a supervisory system in place to monitor activities and standards of service provision. It also examined external monitoring of adverse events (AEs). Such systems are critical in maintaining service delivery quality and ensuring adherence to the minimum package of services.

All four countries scored very poorly in this area, as shown in Table 6. South Africa was the only country where at least half of the sites scored "satisfactory" on supervisory visits in the past six months. It is important to note that the question asked about supervision in the past six months. In South Africa, Tanzania, and Zimbabwe, many of the sites visited had been in operation for less than six months and therefore were still awaiting their first supervisory visit. However, the generally low scores in this table signal the need for further attention to this issue.

Similarly, external AE monitoring was extremely low, with 60-93% of sites across the four countries scoring unsatisfactory in this regard. Table 4 (presented above) indicates that the AE monitoring systems were actually in place, but there was little external monitoring of the AE data.

Further exploration indicated that the recording of AEs was irregular or entirely lacking. The forms at different sites were not always standard, and they did not match the categories of the SYMMACS assessment (which was based on the WHO guidelines for assessing AEs as severe, moderate or mild, occurring during or after the surgery, and involving infection or bleeding). Some sites reported no mild AEs, while other sites reported surprisingly high numbers of mild AEs, suggesting that moderate and severe AEs may have been downgraded to mild. One South African site listed "0" AEs during the past 12 months. At another site the data collection team observed the problem not only from records but in actual practice: a client returned to consult on an AE; although he received treatment, the site made no record of his visit. In addition, providers do not always use the instruments, or the information captured on the client card is not linked to the monthly report for that site.

Although SYMMACS collected the available AE data from each site as part of Instrument #3, the quality of the data was highly variable and thus we opted to omit this information from this report. It is noteworthy that of all the data collected with the four SYMMACS instruments over four countries, "classification of AEs" was the only variable omitted for this reason.

Table 6. Supervisory mechanisms at VMMC sites, by country

Item observed:	Kenya (n=30 sites)			South Africa (n=15 sites)			Tanzania (n=14 sites)			Zimbabwe (n=14 sites)		
	0 %	1 %	2 %	0 %	1 %	2 %	0 %	1 %	2 %	0 %	1 %	2 %
Report of supervisory visits in past 6 months	36.7	33.3	30.0	26.7	13.3	60.0	64.3	14.3	21.4	85.7	0.0	14.3
External monitoring of adverse events in the past 6 months	66.7	16.7	16.7	60.0	0.0	40.0	92.9	7.1	0.0	85.7	7.1	7.1

* Zero= unsatisfactory 1=partially satisfactory 2= satisfactory

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

Table 7 indicates the availability onsite of standardized operating guidelines (i.e., WHO guidelines or a comparable adapted local equivalent, national STI guidelines) as well as the supplies and equipment needed to safely operate a VMMC site. In the four countries, less than 50% of the sites had the WHO protocols for performing VMMC or local equivalent available on site. (Presumably, protocols were available in country and accessible from training partners and leading NGO headquarters.) Scores were slightly higher for national STI protocols (ranging from 47% to 86% of sites scoring "satisfactory").

As shown in Table 7, sites in all countries scored well on the availability of supplies and materials: sterilized instruments, anesthesia, antibiotics, pain medication, antiseptics, dressing materials, and sharps containers.

Of particular note, almost all sites (between 97-100% per country) rated "satisfactory" in the availability and provision of HTC. This finding is exceptional, given the difficulties in the past in reaching and testing sexually active men for HIV.

However, sites scored poorly on two items related to the availability of two categories of supplies and equipment: basic CPR equipment, medication, and PEP protocols. Having basic CPR equipment onsite is a WHO requirement. However, sites may not adhere to this requirement, given the extremely rare nature of emergency events related to VMMC surgery. In some cases, providers reported this equipment to be available in nearby patient support centers or laboratories, although it was not possible to verify this information. The lack of PEP and PEP protocols onsite is one of the most worrisome findings in this study, given the risk of needle stick injuries in a large-scale program involving a surgical procedure. These items are reportedly available in other locations nearby, but the SYMMACS team was unable to confirm this.

Table 7. Availability of protocols, supplies and equipment in VMMC sites, by country

Item observed:	Kenya (n=30 sites)			South Africa (n=15 sites)			Tanzania (n=14 sites)			Zimbabwe (n=14 sites)		
	0 %	1 %	2 %	0 %	1 %	2 %	0 %	1 %	2 %	0 %	1 %	2 %
WHO guidelines for VMMC performing	30.0	0.0	70.0	60.0	0.0	40.0	21.4	28.6	50.0	64.3	14.3	21.4
National STI protocols	53.3	0.0	46.7	26.7	0.0	73.3	14.3	0.0	85.7	35.7	7.1	57.1
Equipment & supplies												
Sterilized VMMC instruments	0.0	0.0	100	13.3	0.0	86.7	7.1	0.0	92.9	7.1	0.0	92.9
Correctly stored & unexpired local anesthesia	0.0	3.3	96.7	0.0	0.0	100	7.1	0.0	92.9	0.0	0.0	100
Antibiotics for VMMC/AEs in stock	20.7	0.0	79.3	13.3	6.7	80.0	7.1	14.3	78.6	7.1	7.1	85.7
Pain medication in stock	3.3	3.3	93.3	0.0	0.0	100.0	7.1	0.0	92.9	0.0	0.0	100.0
Antiseptics in stock	0.0	0.0	100.0	0.0	0.0	100.0	7.1	0.0	92.9	0.0	14.3	85.7
Dressing materials (bandages & gauze)	0.0	0.0	100.0	0.0	0.0	100.0	7.1	0.0	92.9	0.0	0.0	100
Sharps container in surgical area	6.7	0.0	93.3	0.0	0.0	100.0	7.1	0.0	92.9	0.0	0.0	100.0
CPR equipment												
CPR Bag Mask	60.0	6.7	33.3	26.7	6.7	66.7	42.9	14.3	42.9	21.4	35.7	42.9
Oxygen supply	93.3	0.0	6.7	26.7	0.0	73.3	92.9	0.0	7.1	28.6	7.1	64.3
IV lines & fluids	40.0	30.0	30.0	26.7	0.0	73.3	28.6	14.3	57.1	14.3	21.4	64.3
Antihistamine	63.3	26.7	10.3	13.3	0.0	86.7	71.4	0.0	28.6	21.4	21.4	57.1
Prophylaxis												
Post-exposure infection prophylaxis	40.0	13.3	46.7	40.0	0.0	60.0	28.6	14.3	57.1	28.6	14.3	57.1
Guidelines for post-exposure prophylaxis	40.0	3.3	56.7	13.3	0.0	86.7	78.6	0.0	21.4	35.7	14.3	50.0
Other												
Male condoms availability	20.0	10.0	70.0	13.3	0.0	86.7	21.4	0.0	78.6	21.4	7.1	71.4
HTC provision	0.0	3.3	96.7	0.0	0.0	100.0	0.0	0.0	100.0	0.0	0.0	100.0
HTC audio/visual privacy	0.0	0.0	100.0	6.7	0.0	93.3	0.0	0.0	100.0	0.0	21.4	78.6

* Zero= unsatisfactory 1=partially satisfactory 2= satisfactory

H. Impressions of client load

Each officer-in-charge responded to the following question about the client load at the site: In terms of number of clients, were there "too many, too few, or a good balance?" Responses varied considerably between countries and sites (Table 8). The modal response in South Africa and Zimbabwe was "a good balance between number of clients and providers' ability to provide VMMC." Kenya had the highest percentage of sites reporting "too few clients" (40%), which may reflect a long-standing program that has saturated the area and/or a decentralized service model that results in a larger number of sites performing a smaller number of VMMCs per site. Also the mobilization in the Kenya program rests with organizations other than the implementing partners that may have little control over demand-creation activities. Zimbabwe had the highest percentage of sites reporting "too many clients" (29%), which is consistent with it being the only country in which data collection took place during a high-volume period.

A number of the officers-in-charge answered this questions with "it depends," qualifying their answers with reference to the time of year and season (winter months being very busy and summer months being very quiet), as well as school and university holidays. Tanzania had the highest percentage of "it depends," probably reflecting the fact that its programs largely focused on seasonal (holiday) campaigns. In South Africa, the peak periods correspond to (1) holiday periods because boys are allowed to come at that time, and (2) to the winter period, because of the perception that there is less pain and less risk of complications during and after the procedure in cooler weather.

In short, the responses regarding client load varied by country and reflected differences by season/holiday period. Officers-in-charge were more likely to mention too few than too many clients.

Table 8. Impression of officer-in-charge regarding the client load, given the operating capacity at his/her VMMC site, by country

Officer-in-charge's impression of client load:	Total %			
	Kenya (n=30 sites)	South Africa (n=15 sites)	Tanzania (n=14 sites)	Zimbabwe (n=14 sites)
Too few clients	40.0	0.0	7.1	21.4
Too many clients	0.0	20.0	21.4	28.6
A good balance between number of clients and VMMC provider's ability to provide VMMC	40.0	53.3	28.6	35.7
It depends	20.0	26.7	42.9	14.3

Observation of Male Circumcision Procedures Performed[7]

Tables 9-12 report the findings from observations of VMMC procedures performed (Instrument 1-b). At every VMMC site, the clinician(s) on the data collection team observed and assessed up to 10 VMMC procedures. The data in this set of tables should include a total of 730 procedures observed (73 sites x 10 procedures per site). The actual number (n=543) is lower, given that a number of sites performed less than 10 procedures during the days of the visit. Of the number expected, the teams in each country were able to observe the following numbers:

- Kenya: 154 of 300 = 51%
- South Africa: 116 of 150 = 77%
- Tanzania: 133 of 140 = 95%
- Zimbabwe: 140 of 140 = 100%

In this section of the results, the unit of analysis is the number of VMMC procedures observed.

A. Pre-operative and safety control procedures

Table 9 indicates the extent to which providers followed the recommended preoperative procedures. On the assessment of the basic clinical pre-operative exam, Kenya and Zimbabwe scored well ("satisfactory" on 80% or more of procedures). By contrast, Tanzania had a high percentage (70%) of partial satisfactory scores, and South Africa had the highest percentage of cases (34%) with an unsatisfactory score. Most of these partial or unsatisfactory scores related to providers failing to take or taking an incomplete pre-operative medical history. In the case of Tanzania, the SYMMACS team reported that the pre-operative assessment was often done off-site before the day of the actual surgery.

Regarding infection control during the procedures, all countries scored very high on four aspects (satisfactory in over 90% of cases observed): sterile instruments and consumables used, sterile gloves used, safe/secure storage of medical waste, and correct/hygienic instrument processing.

Criteria on which two or three of the countries scored high, but the other(s) were below 85% for fully satisfactory included maintenance of an adequate sterile surgical field (Zimbabwe—81%, Tanzania—58%) and disinfection of surgical beds and areas between clients (Zimbabwe—84%, Tanzania—67%). Problems identified in maintaining a sterile field involved (1) handling non-sterile objects such as the medication bottles with sterile operating gloves and (2) (in Tanzania) the size of the drape (O towel) was too small. For disinfection of surgical beds, some sites were scored as partially satisfactory for using alcohol instead of a recommended solution or for using a disposable mackintosh (lightweight, waterproof fabric).

The one criterion on which countries scored poorly across the board was the use of protective eyewear. This was the lowest scoring QA criterion in the entire report for all four countries and indicated either a lack of availability of protective eyewear at sites or (in most cases) a resistance to using available eyewear.

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

B. Assessment of surgical procedures

The SYMMACS team assessed the surgical procedures used to perform VMMC on 13 dimensions (steps) listed in Table 10. The results were very positive, with almost all four countries scoring "satisfactory" (the highest score) on 12 of the 13 dimensions for at least 85% of the procedures observed. The main exception involved surgical knot tying (13th item), which was scored as satisfactory in a lower percentage of the cases observed, ranging from 57% in Kenya to 84% in Zimbabwe. These lower scores in surgical knot tying reflected two issues. First, providers did not follow guidelines in the surgical technique used to lay the knot (e.g. failure to make the figure eight correctly which could result in loosening of the suture). Second, providers adapted the recommended knot-tying techniques in an attempt to improve efficiency and speed. Specifically, the WHO recommends mattress sutures at the 12, 3, 6 and 9 o'clock positions when completing a suture plan. However, providers were observed to routinely substitute these mattress sutures with interrupted sutures which are quicker to insert. It is important to note that this shortcoming in tying the surgical knot does not impact the surgical outcome of the VMMC procedure, but nonetheless warrants attention in future training and supervision.

Overall, the high percentage of satisfactory scores in Table 10 reflects well on quality and safety in the VMMC programs of these four countries.

Table 9. Assessment of pre-operative and safety control procedures for VMMC, by country

Item observed:	Kenya (n=154 procedures)			South Africa (n=116 procedures)			Tanzania (n=133 procedures)			Zimbabwe (n=140 procedures)		
	0 %	1 %	2 %	0 %	1 %	2 %	0 %	1 %	2 %	0 %	1 %	2 %
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	9.9	79.5	33.6	14.3	51.2	8.3	70.7	21.1	0.0	2.9	97.1
Surgical procedures infection & safety control:												
Sterile instruments &consumables used	0.0	0.0	100	0.8	0.8	98.3	0.0	0.8	99.2	0.0	0.0	100
Sterile gloves used	0.0	0.0	100	3.3	1.7	95.0	0.0	0.0	100.0	0.0	0.7	99.3
Hand washing/ disinfection between clients	5.3	4.0	90.7	8.3	1.7	90.0	5.3	1.5	93.2	0.7	12.1	87.1
Maintenance of an adequate sterile surgical field while operating	0.0	0.0	100	5.9	7.6	86.4	0.8	42.1	57.1	0.7	18.6	80.7
Use of protective eyewear	94.0	0.7	5.3	80.7	8.4	10.9	54.9	19.5	25.6	99.3	0.0	0.7
Safe secure storage & disposal of medical waste by provider	0.7	0.7	98.7	2.5	5.0	92.4	0.0	0.0	100.0	0.7	0.7	98.6
Correct & hygienic instrument processing	0.7	1.3	98.0	2.5	0.0	97.5	0.0	7.5	92.5	0.0	2.9	97.1
Disinfection of surgical beds & areas between clients	1.3	0.0	98.7	3.3	4.2	92.5	3.0	30.1	66.9	0.0	15.7	84.3

Table 10. Assessment of surgical procedures for VMMC, by country

Item observed:	Kenya (n=154 procedures)			South Africa (n=116 procedures)			Tanzania (n=133 procedures)			Zimbabwe (n=140 procedures)		
	0 %	1 %	2 %	0 %	1 %	2 %	0 %	1 %	2 %	0 %	1 %	2 %
Clean surgical area with a recommended scrub solution	0.0	0.0	100.0	0.0	0.0	100.0	0.0	1.5	98.5	0.0	31.4	68.6
Correctly identify the skin to be excised	0.0	0.0	100.0	0.0	1.7	98.3	0.8	6.0	93.2	0.0	8.6	91.4
Demonstrate the "safety first approach" to ensure no part of penis besides the foreskin is in danger of being injured	0.0	0.0	100.0	0.0	2.5	97.5	0.8	0.0	99.2	0.0	4.3	95.7
Demonstrate safe administration of local anesthesia	0.0	0.0	100.0	3.6	0.0	96.4	2.3	0.0	97.7	0.0	1.4	98.6
Demonstrate cautious & gentle approach to removing the foreskin	0.0	0.0	100.0	0.0	3.4	96.6	0.0	0.0	100.0	0.0	5.7	94.3
Adequately controls bleeding with electrocautery and/or ligating sutures	0.0	0.0	100.0	0.0	0.0	100.0	0.0	3.8	96.2	0.0	7.9	92.1
Use correct technique to tie surgical knots	9.3	34.0	56.7	21.2	4.2	74.6	5.3	21.8	72.9	0.0	16.4	83.6
Correctly align the frenulum and places secure mattress suture	0.0	0.0	100.0	0.0	0.0	100.0	0.0	0.0	100.0	0.7	9.3	90.0
Correctly align the other quadrant sutures	0.0	0.0	100.0	1.7	1.7	96.6	0.0	0.0	100.0	0.0	7.9	92.1
Avoid placing deep sutures around the frenulum	0.0	0.0	100.0	0.0	0.8	99.2	0.0	0.0	100.0	0.0	6.4	93.6
Place interrupted sutures evenly to avoid leaving gapping margins	0.0	0.0	100.0	5.2	5.2	89.6	1.5	0.0	98.5	0.0	10.7	89.3
Ensure no significant bleeding present	0.0	0.0	100.0	0.0	0.8	99.2	0.0	0.0	100.0	0.0	15.0	85.0
Place a secure dressing that is not excessively tight	0.0	1.3	98.7	0.0	0.0	100.0	0.0	1.5	98.5	0.0	11.4	88.6

C. Assessment of post-operative procedures for VMMC

The World Health Organization (WHO) has established a protocol for post-operative procedures in VMMC. SYMMACS assessed the extent to which providers followed these post-operative protocols in the procedures observed at each site.

As shown in Table 11, there were notable gaps in adherence to the WHO guidelines. In only 22% of cases in Zimbabwe and 42% in South Africa did the providers observe clients for an allergic reaction or any other postoperative abnormality, with the other two countries scoring slightly higher. The percentage of cases with satisfactory review of vital signs varied dramatically by country: 68% in South Africa, 49% in Tanzania, 44% in Kenya and zero in Zimbabwe.

Providers gave satisfactory instructions— written and verbal— on how to wash and care for the wound and how to deal with pain and minor bleeding in 60-80% of the cases over the four countries, with most of the other cases assessed as partially satisfactory.

Most sites in all four countries provided follow-up appointments and encouraged clients to return for follow-ups in the case of complications arising: ranging from 64% of cases in Kenya to 88% or above in the other countries. Providers gave clients an emergency number to call in the majority of cases: 67% in South Africa, 92% in Tanzania, 96% in Kenya, and 99% in Zimbabwe.

The percentage of cases in which providers satisfactorily gave post-operative counseling instructions and reinforcement to messages (e.g., regarding abstinence, being faithful and consistent condom use) varied greatly by country: from a low of 10% in South Africa to a high of 99% in Zimbabwe. Staff did remind clients about sexual abstinence during the six week post-operative period in the majority of cases, except in Tanzania (assessed as satisfactory in only 31% of cases). On these last four points relating to information given to clients (see Table 11), Zimbabwe scored consistently high.

The findings in Table 11 are noteworthy in two respects. First, countries tended to score lower on this series of post-operative steps— many including counseling and information for clients— than they did on the actual performance of the surgery (Table 10). Also, adherence to the WHO protocol on these points varied markedly from one country to another. And within a country, scores were high for some elements and low for others: for example, Zimbabwe scored 98-100% on four of the seven items, but zero on one. These findings have clear implications for future training in VMMC.

Table 11. Assessment of post-operative procedures for VMMC, by country

Item observed:	Kenya (n=154 procedures)			South Africa (n=116 procedures)			Tanzania (n=133 procedures)			Zimbabwe (n=140 procedures)		
	0 %	1 %	2 %	0 %	1 %	2 %	0 %	1 %	2 %	0 %	1 %	2 %
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	3.3	56.3	54.2	4.2	41.5	10.5	24.8	64.7	2.1	75.7	22.1
Staff review vital signs	45.7	9.9	44.4	32.2	0.0	67.8	12.8	38.3	48.9	98.6	1.4	0.0
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	27.3	64.0	7.6	12.6	79.8	7.5	28.6	63.9	0.7	30.7	68.6
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	2.6	63.6	10.1	1.7	88.2	4.5	3.8	91.7	0.0	1.4	98.6
Staff provide emergency contact details to clients	4.0	0.0	96.0	32.8	0.0	67.2	14.2	3.8	91.7	0.7	0.7	98.6
Patients receive post-operative counseling instructions and reinforcement of previous VMMC/HIV messaging	37.1	5.3	57.6	85.6	4.2	10.2	16.5	20.3	63.2	0.0	1.4	98.6
Staff give specific reminders of the 6 week post-operative abstinence period	42.3	0.7	57.0	47.1	0.0	52.9	62.4	6.0	31.6	0.0	0.0	100

D. Operating time: total and by steps

Table 12 indicates the time used by providers for each step in the VMMC procedure by country. Both the mean and the median (the latter in parenthesis) values have been included because of the known effects of outlier values on the mean. In addition to listing nine individual steps in the process, the table also summarizes (1) time of the primary provider with the client to remove foreskin, achieve hemostasis, and begin sutures, (2) total operating time from client entrance to cleaning, and (3) total time in the operating theater, entrance to exit.

In this assessment, the time of the primary provider with the client yielded an average (median) of six to eight minutes in South Africa and Zimbabwe in contrast to an average of approximately 14 minutes in Kenya and Tanzania. However, this did not determine the total operating time (scrubbing the skin to cleaning the wound). The elapsed time from scrubbing the patient in preparation for the operation to cleaning the wound took approximately 23-24 minutes in Kenya, South Africa, and Tanzania, in contrast to 30 minutes in Zimbabwe.

The times for each of the nine individual steps do not add to the total time in the operating theater because of possible delays or pauses between steps. This is most evident in the data from Zimbabwe, in which the time of the primary provider with the client was relatively low (an average of eight minutes), yet the client's total time in the operating theater was the highest of the four countries. According to the data collection team, clients, in fact, did have to wait for the medical doctors to begin the VMMC procedures.

Table 12. Time (in minutes: seconds) used by providers for each step in the VMMC procedure, by country

	Average (median) duration in minutes: seconds			
Step of the VMMC procedure:	**Kenya (n=154 procedures)**	**South Africa (n=120 procedures)**	**Tanzania (n=133 procedures)**	**Zimbabwe (n=140 procedures)**
1. **Patient enters operating area**	07:02	04:03	02:24	02:00
2. **Provider scrubs & prepares patient skin**	01:14	00:51	01:32	01:10
3. **Provider administers local anesthesia**	01:07	00:49	00:57	01:26
4. **Provider removes foreskin**	01:06	00:04	01:30	00:49
5. **Provider:** **a. Performs hemostasis using electrocautery**	*(n=0)*	*(n=120)*	*(n=0)*	*(n=80)*
(n procedures)		02:07		01:44
OR **b. Performs hemostasis using ligating sutures**				
(n procedures)	(n=151) 04:05	*(n=0)*	*(n=126)* 05:18	*(n=60)* 03:08
6. **Primary provider inserts skin sutures***	(n=151) 08:15	(n=120) 03:23	(n=129) 06:55	(n=140) 04:40
7. **Secondary provider assists with insertion of skin sutures***	(n=1) 11:58	(n=72) 04:59	(n=23) 05:15	(n=60) 04:17
Primary provider time with client (Foreskin removal, hemostasis, primary provider sutures)	13:34	06:19	14:06	07:58
8. **Provider applies dressing & cleans the client**	01:15	01:41	02:50	02:00
Total operating time (scrubbing to cleaning)	22:45	23:44	24:12	30:00
9. Client dresses and exits operating theater	00:22	02:25	00:46	01:05
* Number of sutures: by primary provider, secondary provider and in total				
Average (median) number of sutures inserted by primary provider	**(n=151) 13.2**	**(n=120) 5.3**	**(n=129) 11.0**	**(n=140) 7.6**
Average (median) number of sutures inserted by secondary provider	(n=4) 7.3	(n=71) 6.6	(n=22) 9.8	(n=60) 6.5
Average (median) number of total sutures	13.4	9.2	12.6	10.4

Demand Creation for VMMC

At all sites, the SYMMACS data collection team asked the officer-in-charge about different demand creation activities that were in place to promote VMMC and encourage clients to come for the operation. We emphasize that the information reported in this section was based on the response of the officer-in-charge, and not on interviews with individuals responsible for demand generation or behavior change communication, nor from program records on material produced or activities conducted. Moreover, in some cases, the VMMC demand generation activities were carried about by a different

organization than those performing the VMMC procedures. Given the dearth of data on demand creation in relation to VMMC, we felt it was important to include these questions in SYMMACS.

The interviewers asked each officer in-charge whether the site benefitted from demand generation activities via a number of different communication channels. In effect, it assessed whether the officer-in-charge was aware of any demand creations activities for VMMC in their area. The question has obvious limitations: (1) the officer-in-charge may have faulty recall of such communication, (2) as a non-specialist in communication programs, 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); (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.[8]

As shown in Table 13, the responses of the officers-in-charge indicated that two categories of communication dominated: small media, which includes pamphlets and posters (cited by 93%-100% of the officers-in-charge over the 4 countries) and interpersonal communication (53%- 100%). Two other categories were mentioned by one-third to two-thirds of the officers-in-charge in each country: electronic media and radio. Least widely used was television, ranging from 13%-29% across countries.

Almost all VMMC sites (93%-100%) reported benefitting from at least one channel of demand generation. The mean number of channels reported to promote VMMC differed markedly by country: 8 in South Africa, 10 in Tanzania, 12 in Kenya, and 16 in Zimbabwe. As noted above, these means should be considered approximate, not precise.

Table 13. Summary overview of percentage of VMMC sites benefiting from different types of demand creation activities (based on tables 10 and 11), by country

Channel:	Percentage %			
Any form of:	**Kenya (n=30 sites)**	**South Africa (n=15 sites)**	**Tanzania (n= 14 sites)**	**Zimbabwe (n=14 sites)**
Radio	43.3	46.7	64.3	50.0
Television	13.3	13.3	15.4	28.6
Small media	93.3	100.0	100.0	100.0
Interpersonal communication	90.0	53.3	100.0	100.0
Electronic communication	50.0	53.3	38.5	64.3
Other types of communication	36.7	13.3	23.1	78.6
Total:				
% benefiting from at least one media channel	93.3	100	100.0	100.0
Mean number of media channels utilized	12.4 channels	7.7 channels	9.9 channels	16.4 channels

[8] In Tables 13-15, we present the data in the form of percentages, despite the fact that the number of sites per country ranges from 14-30. Technically, it would be more accurate to present these findings as proportions. However, to remain consistent with the presentation of data in other sections, we have opted for percentages. Readers should interpret these percentages to mean "all, most, some, a few, or none" rather than as precise figures.

Table 14 indicates the specific channels reported in each country under the broad categories listed above. The high percentages for small media reflect the widespread use of pamphlets (especially for the clients), posters in VMMC programs and other public places, and, in Zimbabwe, newspaper ads and billboards. In those cases where the officers-in-charge cited radio, they mentioned two types of programming: radio spots and radio coverage by local reporters. Those mentioning TV cited TV coverage by local reporters.

In terms of interpersonal communication (Table 15), the exact type and location differed by country, although talks in the community or at schools and circulating motor vehicle were among the most frequently mentioned. Use of satisfied clients to promote VMMC ranged from a low of 7% in South Africa to 93% in Zimbabwe, suggesting perhaps a different interpretation of the question across countries.

These data indicate that all four countries have begun to experiment with electronic media in the form of cell phone messages, Internet website for prospective clients, and VMMC hotline.

Table 15 also shows the mention of other media, including dramas or plays, songs, or celebrity testimonials, primarily in Zimbabwe.

Table 14. Percentage of VMMC sites that benefit from demand creation via mass and small media channels, based on reports from officer-in-charge, by country

Channel:	Percentage %			
Mass Media	**Kenya (n=30 sites)**	**South Africa (n=15 sites)**	**Tanzania (n=14 sites)**	**Zimbabwe (n=14 sites)**
Radio:				
Radio spot	33.3	13.3	57.1	50.0
Radio coverage by local reporters	30.0	20.0	57.1	35.7
Radio call-in talk show	23.3	20.0	14.3	21.4
Other radio	3.3	0.0	0.0	0.0
Television:				
TV spot	6.7	0.0	0.0	28.6
TV coverage by local reporters	10.0	6.7	15.4	28.6
TV call-in talk show	3.3	0.0	0.0	7.1
Other TV	0.0	6.7	0.0	0.0
Small media:				
Newspaper Ad	6.7	33.3	7.7	71.4
Billboard	36.7	53.3	15.4	71.4
Poster: In clinic	80.0	80.0	84.6	71.4
Other public posters	80.0	73.3	53.8	78.6
Pamphlet: VMMC client	90.0	66.7	100.0	57.1
Spouse/ partner	63.3	26.7	61.5	21.4
General population	80.0	13.3	61.5	42.9
Video: Client	3.3	26.7	0.0	7.1
General population	0.0	26.7	0.0	0.0

Table 15. Percentage of VMMC sites that benefit from demand creation via interpersonal channels, electronic media, and other channels, based on reports from officer-in-charge, by country

Channel:	Percentage %			
Interpersonal communication:	**Kenya (n=30 sites)**	**South Africa (n=15 sites)**	**Tanzania (n=14 sites)**	**Zimbabwe (n=14 sites)**
Visits/ Talks /Mobilization:				
Circulating motor vehicle	53.3	33.3	76.9	92.9
Group meetings in the community	80.0	33.3	38.5	85.7
Schools	86.7	40.0	61.5	85.7
Factories, industries, mines, plantations	30.0	13.3	7.7	64.3
Military installations	10.0	0.0	23.1	28.6
Churches, mosques	56.7	13.3	53.8	78.6
Beer halls	46.7	6.7	30.8	78.6
Taxi, bus and motorbike stands	63.3	33.3	23.1	50.0
Prisons	13.3	6.7	23.1	35.7
Meetings with opinion leaders/ influentials in community	63.3	13.3	38.5	71.4
Peer education activities:				
Satisfied clients	60.0	6.7	69.2	92.9
Electronic media:				
Cell phone messages	6.7	26.7	38.5	42.9
Internet website for prospective clients	10.0	33.3	0.0	0.0
Telephone hotline	50.0	26.7	7.7	50.0
Other media:				
Songs	10.0	0.0	15.4	51.7
Dramas or plays	33.3	0.0	15.4	78.6
Celebrity testimonial	10.0	6.7	0.0	50.0
Other	3.3	6.7	7.7	0.0

Experience and Attitudes of VMMC Providers

SYMMACS included a provider survey, conducted among all personnel providing clinical VMMC services on the days of data collection.

A. Demographic profile of VMMC personnel

Table 16 summarizes the demographic profile of VMMC providers, by cadre, gender and country. The number of providers interviewed ranged from 74 to 102 per country for a total of 354 providers. In Kenya and Zimbabwe, males outnumbered females by at least two to one. By contrast, in South Africa and Tanzania, females outnumbered males.

The differences by cadre provide additional insights into the profile of VMMC staff. In the two countries with medical doctors, they were overwhelmingly male (18 of 21 in South Africa, 18 of 19 in Zimbabwe). The few female doctors were approximately 30 years of age, compared to an average age of 40 years for the male doctors.

Regarding nurses, there were more male than female nurses in two of the four countries (Kenya and Zimbabwe), whereas the reverse was true— more female than male nurses— in South Africa and Tanzania. In each country and for each gender, the average age of the nurses ranged from 37 to 42 years, except in Kenya where the mean age was 34 for male nurses and 32 for female nurses.

A clinical officer is a health professional that has received a level of training similar to a physician's assistant in the United States. Kenya had by far the highest number of clinical officers: 36 (including 32 male and 4 female). Tanzania followed with 10 (9 males, 1 female). South Africa and Zimbabwe do not have this cadre or use them in VMMC. The clinical officers in Kenya tended to be younger (mean age: 29-30) than those in Tanzania (mean age: 37-39).

Tanzania was the only country reporting assistant medical officers (AMOs): eight in total, evenly divided by gender. The four men averaged 53 years in age, compared to the four women with a mean age of 36 years.

Table 16. Profile of VMMC providers: demographic characteristics, by country

Gender and age breakdown of providers:	Kenya n= 85		South Africa n=102		Tanzania n=93		Zimbabwe n= 74	
	Males	Females	Males	Females	Males	Females	Males	Females
All Providers								
Number	64	17	46	56	30	63	50	24
Mean Age	32.2	30.9	37.8	39.0	42.2	39.6	39.3	39.3
Medical Doctors								
Number	0	0	18	3	0	0	18	1
Mean Age	-	-	40.0	30.0	-	-	39.8	31.0
Nurses								
Number	32	13	28	53	17	58	32	23
Mean Age	34.2	31.6	36.5	39.5	41.5	39.9	39.0	39.7
Clinical officers								
Number	32	4	n/a	n/a	9	1	n/a	n/a
Mean Age	30.2	28.8	n/a	n/a	39.1	37.0	n/a	n/a
Assistant Medical Officers								
Number	n/a	n/a	n/a	n/a	4	4	n/a	n/a
Mean Age	n/a	n/a	n/a	n/a	52.5	35.5	n/a	n/a

B. Cadre of personnel and role within program

Table 17 indicates the cadre of the clinical personnel working in the VMMC sites on the days of SYMMACS data collection. In South Africa and Zimbabwe, 20%-26% of providers were medical doctors; the remainder providers were nurses. By contrast, in Kenya and Tanzania there were no medical doctors. In Kenya, 53% of providers were nurses and 47% of providers were clinical officers. In Tanzania, most providers were nurses (81%), with the remaining staff divided between clinical officers (11%) and AMOs (9%).

However, the cadre of personnel does not necessarily denote the role that each has in the operating theater. Table 17 shows the role of the providers in the operating theater and it indicates the differences in national policies regarding the cadre of personnel allowed to perform VMMC. In Zimbabwe, medical doctors were the primary providers, nurses were the secondary providers, and no one played both roles; in short, there was no task shifting. South Africa tended more toward the medical-doctor-only model, although 13% of providers performed both roles. By contrast, in Kenya, virtually all providers (99%) both performed and assisted in performing VMMC. Nurses and clinical officers traded off the role of primary provider in the course of their work. Kenya exemplifies the model of task shifting, whereby non-medical doctors are primary providers. Tanzania presented a slightly different model of task-shifting, with almost half of the providers (47%—all non-medical doctors) reporting performing VMMC as the primary provider.

In addition to performing or assisting in VMMC, service providers reported a number of other tasks for which they were responsible (Table 17). Although there were some variations by country, the majority of providers in at least three countries each performed the following tasks:

- Management of staff rosters
- Compilation of service statistics
- Dedicated training
- Counseling
- Other medical activities and services

Table 17. Profile of VMMC providers: cadre and role within the program, by country

	Kenya n= 85	South Africa n=102	Tanzania n=93	Zimbabwe n= 74
Breakdown of provider by cadre:				
Medical Doctor	0.0	20.0	0.0	25.7
Nurse	52.9	80.0	80.6	74.3
AMO	0.0	0.0	8.6	0.0
Clinical officer	47.1	0.0	10.8	0.0
Role in surgical theater, % providers that:				
Perform circumcision as the primary provider (removes foreskin)	0.0	15.2	47.3	25.7
Assist the surgical provider (secondary provider)	1.2	71.4	11.8	74.3
Both perform and assist with VMMC operations depending on need	98.8	13.3	40.9	0.0
Performance of additional tasks: % that perform the following tasks in addition to clinical aspects of VMMC:				
• **Administration/ Management**	67.1	54.3	39.8	41.9
• **Management of staff rosters**	51.8	42.9	62.4	60.8
• **Compilation of service statistics (# of operations, client data)**	83.5	43.8	67.7	87.8
• **Specialized committees at clinic (such as infection prevention or quality assurance)**	51.8	38.1	59.1	28.4
• **Preparation of bundled kits**	44.7	14.3	69.9	0.0
• **Waste disposal**	43.5	57.1	67.7	45.9
• **Dedicated training opportunities**	64.7	52.4	54.8	45.9
• **Counseling**	72.9	41.9	67.7	79.7
• **Other medical activities/ services**	57.6	11.4	92.5	89.2
• **Other duties**	58.8	11.4	81.7	9.5

C. Time commitment to VMMC

The majority of VMMC providers in Kenya (65%) and South Africa (80%) reported that VMMC was a full-time job. By contrast, in Zimbabwe only 34% of providers performed VMMC full-time (Table 18). On average, providers reported performing VMMC a mean of 3.5 to 4.7 days per week, based on the experience of the past three months. Their workday (based on the past week) ranged from 5.1 to 7.7 hours per day.

Table 18. Time commitment to VMMC, by country

	Kenya n= 85	South Africa n=102	Tanzania n=93	Zimbabwe n= 74
Provider time dedicated to VMMC work:				
In the past 3 months % providers that performed VMMC: **--Full-time (at least 90% of working hours)** **--Part-time**	 64.7 35.3	 80.0 20.0	 1.1 98.9	 33.8 66.2
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	3.4	4.4
Mean number of hours per day assisting or performing VMMC in past week – all personnel full-time and part time:	5.1	6.8	7.7	6.2
Mean number of hours per week assisting or performing VMMC[9]	24.1	33.7	26.6	28.7

D. Training and experience with VMMC

In terms of training to perform or assist in performing VMMC, the majority of providers reported they had "no formal training" in performing VMMC (i.e., in medical or nursing school), although one-third of the providers in Kenya had been trained in VMMC as part of their pre-service clinical curriculum. However, 100% of providers in all four countries had received additional training or continuing education to perform VMMC. The mean number of days of this additional training varied by country: 21 days Kenya, 4 in South Africa, 14 in Tanzania, and 7 in Zimbabwe. One possible explanation for the notably higher number of days in Kenya is the training consists of 3 days of theory, followed by actual practice, with the requirement that each participant perform a minimum of 20 VMMCs. If demand is low, this extends the period required to achieve those 20 VMMCs. Again, we stress that these data are based on self-report of providers, not on program records.

To assess the amount of experience providers had had with VMMC, the survey asked about number of months the providers had been performing (or assisting) in VMMC, as well as the total numbers of VMMCs performed to date. For the lifetime number of VMMCs, we expected to derive an estimate that would differentiate those with limited experience (e.g., having done 100 VMMCs) from those with vast experience (e.g., 5000 procedures over their lifetime). Not surprisingly, Kenya – the country with the oldest program – had the highest average number of VMMCs performed (see table 19). However, the relationship wasn't linear, as shown by Tanzania, in the following statistics:

- Kenya: 30 months, 3175 procedures
- South Africa: 19 months, 1492 procedures

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

- Tanzania: 13 months, 2091 procedures
- Zimbabwe: 11 months, 804 procedures

Table 19. Training and experience in performing VMMCs, by country

Training and continuing education: % of providers that received:	Kenya n= 85	South Africa n=105	Tanzania n=93	Zimbabwe n= 74
VMMC training in medical or nursing school	36.5	20.0	7.5	4.1
Additional training/continuing education (e.g., certificate training) in VMMC for HIV prevention	100.0	100.0	97.8	100.0
Among those who had additional training	**n=85**	**n=105**	**n=91**	**n=74**
% of providers that received 6 days or less of additional training	9.5	81.9	1.1	47.3
% of providers that received 7 days or more of additional training	90.5	14.3	98.9	52.7
Mean number of days of additional training	21.2 days	4.4 days	13.9 days	6.8 days
Experience performing VMMC:				
Mean number of months of experience performing VMMC for HIV prevention	30.3 mo.	19.2 mo.	13.3 mo.	10.8 mo.
Mean number of VMMC procedures performed or assisted (career total)	3175	1492	2091	804

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

To assess what constituted a "busy day" versus a "slow day," the interviewers asked providers to indicate the average number of VMMCs performed on a busy day, an average day, and a slow day. The responses differed by country.

Responses for "busy" ranged from 21 procedures per day (Kenya and Tanzania) to 35 (Zimbabwe). Similarly, providers characterized a "slow day" as having between 3 procedures (Kenya) and 8 procedures (Zimbabwe). The number of procedures in an "average day" ranged from 9 in Kenya to 17 in Zimbabwe (Table 20). The higher averages for Zimbabwe likely reflect the fact that data were collected during a high volume period ("campaign") in Zimbabwe, but not in any of the other three countries.

Table 20. Providers' assessment of the number of clients on a busy, regular, and slow day, by country

	Kenya n=85	South Africa n=102	Tanzania n=93	Zimbabwe n=74
On a busy day:				
Mean number of VMMCs performed or assisted:	20.8	28.2	20.5	35.4
An average day:				
Mean number of VMMCs performed or assisted:	8.7	13.0	11.6	17.3
A slow day:				
Mean number of VMMCs performed or assisted:	2.7	6.2	5.1	7.5

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

The survey provided the opportunity to learn from the providers how the services at their sites operated and also to assess their opinions about the six elements of efficiency in VMMC services. Tables 21-27 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 non-medical doctors to perform VMMC)
4. Task-sharing (allowing non-medical doctors 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. Using multiple beds increases efficiency by allowing providers to move among clients, especially during high volume periods. In South Africa, Tanzania and Zimbabwe, over 93% of providers reported rotating between surgical beds (rather than having the primary provider operate on a single patient from start to finish, one at a time) (Table 21). By contrast, only two-thirds of Kenyan providers reported rotating between surgical beds. These data may reflect the service delivery model in Kenya: a high number of sites covering a large geographical area, but with lower demand per site. Moreover, SYMMACS data collection was conducted during a relatively slow period in the fall of 2011 (outside the periods of Rapid Results Initiative (RRI) activity). In addition, Kenyan providers were more likely than others (47% versus 20% or less in the other three countries) to prefer attending to one patient at a time. Where multiple beds were used, the number averaged 4 beds in each country, except in South Africa which had a mean of 5 beds.

Table 21. Surgical bed rotation, by country

Among all providers	**Kenya (n=85)**	**South Africa (n=105)**	**Tanzania (n=93)**	**Zimbabwe (n=74)**
% reporting using surgical bed rotation for VMMC within operating team:				
• **Yes**	63.5	93.3	97.8	100.0
• **No**	36.5	6.7	2.2	0.0
Among providers using bed rotation	**Kenya (n=54)**	**South Africa (n=98)**	**Tanzania (n=91)**	**Zimbabwe (n=74)**
Average (mean) # of beds used for surgical rotations	4 beds	5.1 beds	4.1 beds	3.9 beds
% reporting to prefer:				
• **Attending to one patient at a time**	46.3	20.4	5.5	0.0
• **Rotating between multiple surgical beds**	38.9	77.6	93.4	100.0
• **No preference**	14.8	2.0	1.1	0.0

Bundling of supplies and tools. Bundling supplies and instruments is considered an efficiency element because it allows the provider to have all necessary items sterilized and readily available at the start of each new operation. Variations exist: purchasing pre-bundled packages versus having clinic staff bundle them; reusing the instruments (after sterilizing them) versus purchasing disposable instruments. Having staff bundle the kits and reuse instruments tends to reduce costs, but may also reduce efficiency, especially in high-volume sites or peak time periods.

As shown in Table 22, virtually all sites across the four countries used pre-bundled packages of supplies and instruments in the past 3 months. However, in Kenya and Tanzania, clinic staff prepared the bundles themselves and re-used the instrument after sterilizing them. In contrast, in South Africa and Zimbabwe, the programs almost always purchased pre-bundled kits and used disposable instruments. Almost all (over 90%) providers across the countries believed that pre-bundling reduces infection and that pre-bundling kits decreases the time required to perform VMMC.

However, provider opinions differed markedly on issues related to bundling. Providers in Tanzania (30%) were more likely than those in the other three countries (14% or less) to believe that using pre-bundled instruments and supplies was an unnecessary expense.[10] The percent of providers favorable to assembling a surgical tray themselves rather than using a pre-bundled kit was far higher in Tanzania (94%) than in the other three countries (5%-17%). Providers in Tanzania (100%) and Kenya (92%) supported the idea of reusing the instruments, compared to 55% of providers in Zimbabwe and only 16% in South Africa (Table 22).

The question of bundling proved more complex than originally expected, given different combinations: purchased kits versus pre-bundling by staff, and disposable versus reusable instruments. Table 22 differentiates on actual use on both counts for all countries. However, the summary graphs (Figure 5)

[10] In retrospect, this question was ambiguous; it should have specified "purchasing" pre-bundled kits.

define efficiency based on use of disposable instruments, which reflects the guidance provided in the original MC MOVE document.

Table 22. VMMC kits and bundling, by country

	Kenya (n=85)	South Africa (n=105)	Tanzania (n=93)	Zimbabwe (n=14)
% providers that report using pre-bundled instruments & supplies in past 3 mo.				
Yes	100.0	99.0	100.0	100.0
No	0.0	1.0	0.0	0.0
For providers reporting to have used pre-bundled instruments and supplies for VMMC operations performed in last 3 months:	**Kenya (n=85)**	**South Africa (n=102)**	**Tanzania (n=93)**	**Zimbabwe (n=74)**
% report pre- bundled instruments were:				
Purchased as a prepackaged kit/ prepared by kit supplier	0.0	98.1	1.1	100.0
Prepared by clinic staff	100.0	1.0	98.9	0.0
Don't know	0.0	1.0	0.0	0.0
% report that instruments used in kit were:				
Entirely disposable and discarded after procedure	0.0	79.8	0.0	100.0
Recycled/ Sterilized and reused	100.0	10.6	100	0.0
Don't know	0.0	9.6	0.0	0.0
Among all providers:	**Kenya (n=85)**	**South Africa (n=105)**	**Tanzania (n=93**	**Zimbabwe (n=74)**
% report to believe bundling supplies/ surgical instruments reduces chances of VMMC infection				
Yes	91.8	91.4	98.9	100.0
No	5.9	2.9	1.1	0.0
Don't know	2.4	5.7	0.0	0.0
% of providers who strongly agree or agree with the following statements on kits and bundling, asked of all providers[11]:	**Kenya (n=85)**	**South Africa (n=105)**	**Tanzania (n=93)**	**Zimbabwe (n=74)**
Using pre-bundled kits of instruments and supplies decreases the time needed to perform male circumcision.	98.8	93.3	100.0	98.6
Using pre-bundled kits of instruments and supplies is an unnecessary expense in VMMC clinics.	1.2	10.5	30.2	13.5
I prefer assembling a surgical tray myself rather than using a pre-bundled VMMC kit.	7.1	17.2	93.5	5.4
If a clinic does use pre-bundled kits, the instruments should be reusable.	91.7	16.2	100.0	55.4

[11]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.

Task-shifting (allowing well-trained clinical personnel who are not medical doctors [such as nurses and clinical officers] to perform VMMC). At present, the national VMMC policy of South Africa and Zimbabwe does not endorse this type of task-shifting. However, providers in all four countries tended to support the concept of task-shifting. Whereas a quarter of providers in South Africa agreed that medical doctors are the only healthcare cadre who should be trained to perform adult VMMC, less than 10% of providers held this view in each of the other three countries. In response to the statement "I believe the primary provider responsible for the operation should be with the patient from the administration of anesthesia to the final dressing," providers in Kenya (75%) and Tanzania (91%) generally agreed, in contrast to relatively few that agreed from South Africa (25%) and Zimbabwe (3%). See Table 23.

Table 23. Attitudes toward task-shifting (having non-medical doctors 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 (n=85)	South Africa (n=105)	Tanzania (n=93)	Zimbabwe (n=74)
Medical doctors are the only healthcare cadre who should be trained to perform adult VMMC.	3.6	24.8	9.7	6.8
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	24.8	91.4	2.7

Task-sharing (allowing non-medical doctors to conduct certain aspects of the procedure). In programs that do not endorse task-shifting, many do allow task sharing: that is, non-medical doctors assist in performing certain aspects of the VMMC procedure, but not the most critical. Table 24 shows current practice related to task-sharing in each country, as well as attitudes and beliefs toward task-sharing.

Over three-quarters of providers in all four countries have administered local anesthesia. Over half in all countries have completed suturing of skin after the primary provider has removed the prepuce and achieved hemostasis. In all countries—except Kenya—between 84% and 96% of providers agreed with a secondary provider administering local anesthesia and completing the skin suturing (after the primary provider has removed the prepuce and achieved hemostasis). Non-medical doctors were slightly more likely than medical doctors to approve. By contrast, only half of the providers in Kenya approved this role for a secondary provider. The pattern was similar for four other types of task sharing. That is, 70%-100% of providers in South Africa, Tanzania, and Zimbabwe approved of having the secondary provider assist on these tasks; however, the percentage was slightly lower in Kenya. Based on discussions with the Kenyan providers, the resistance among some to the involvement of a second provider relates to their belief that the primary provider should stay with the patient from the start of the procedure to its completion.

Table 24. 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):	**Kenya (n=85)**		**South Africa (n=105)**		**Tanzania (n=93)**		**Zimbabwe (n=74)**	
Administered local anesthesia	79.2		98.0		96.8		77.0	
Completed suturing of skin after primary provider removed the prepuce and achieved hemostasis	55.3		95.2		100.0		68.9	
Task-sharing attitudes and beliefs								
% who strongly approve or approve of the following task-sharing practices, asked of all providers:	**MD (n=0)**	**Non MD (n=85)**	**MD (n=21)**	**Non MD (n=84)**	**MD (n=0)**	**Non MD (n=93)**	**MD (n=19)**	**Non MD (n=55)**
The secondary provider administering local anesthesia.	n/a	54.2	90.5	90.5	n/a	95.7	84.2	94.5
The secondary provider completing the skin suturing after the primary provider has removed the prepuce and achieved hemostasis.	n/a	50.6	90.5	96.4	n/a	95.7	84.3	94.6
% who strongly agree or agree with the following statements on task-sharing, asked of all providers:	**MD (n=0)**	**Non MD (n=85)**	**MD (n=21)**	**Non MD (n=84)**	**MD (n=0)**	**Non MD (n=93)**	**MD (n=19)**	**Non MD (n=55)**
It is acceptable for an assistant or secondary provider (not the primary VMMC provider) to prepare and scrub the patient.	n/a	81.2	100.0	97.7	n/a	97.9	100.0	100.0
It is acceptable for an assistant or secondary provider (not the primary provider) to administer the local anesthesia.	n/a	68.2	90.5	96.5	n/a	97.9	84.2	94.5
It is acceptable for an assistant or secondary provider (not the primary VMMC provider) to dress the operating wound.	n/a	91.7	100.0	98.8	n/a	100.0	100.0	100.0
It is acceptable for an assistant or secondary provider (not the primary provider) to complete the interrupted skin sutures.	n/a	65.9	90.5	92.8	n/a	99.0	78.9	94.6

Surgical method (e.g., forceps guided). One of the six efficiency elements is use of the forceps guided method for performing VMMC, in preference to dorsal slit or sleeve resection methods. Although forceps guided is generally considered to be the fastest and most appropriate technique in high-volume settings, there are situations in which dorsal slit or sleeve resection are considered the method of choice for medical reasons (e.g., Phimosis, where the provider cannot visualize the glans and possible

adhesions). In early 2010, when SYMMACS was being designed, not all countries had embraced forceps guided as the preferred method for their program (based on use of one of the alternative surgical methods in the past).

As the data in Table 25 show, over 80% of providers reported that forceps guided was the first surgical method they used. In addition, providers from three of the countries reported that at least 96% of the operations performed in the past months had been the forceps guided method. The exception was Tanzania, where the number of VMMCs performed with forceps guided was slightly lower (79%). In Kenya and Zimbabwe, 95% of providers preferred forceps guided, but this was slightly lower for South Africa (86%) and Tanzania (79%). Similarly, providers from the other three countries were more likely (94%-100%) to believe that forceps guided is the fastest method, compared to providers in Tanzania (84%). The likely explanation is that providers at two sites in Tanzania were trained at Rakai, Uganda, where they were trained on dorsal slit.

The large majority of providers, ranging from 81%-97% across countries were aware that the national VMMC program recommended the use of forceps guided; the one exception was South Africa, where only 41% knew this. Among those that knew the national program recommended forceps guided, over 93% agreed with this choice (Table 25).

Use of electrocautery/diathermy instead of ligating sutures. The last element of efficiency in VMMC is the use of electrocautery or diathermy to stop the bleeding more quickly after the procedure is performed.

Table 26 shows wide divergence in practice related to electrocautery/diathermy: 99% of providers in South Africa have used it, compared to 0% in Tanzania (where it is not available in the VMMC program). Use among providers in Zimbabwe (72%) and Kenya (33%) fell between these extremes.

Among providers reporting to have used electrocautery, all in Zimbabwe (100%) and the majority in South Africa (86%) had used monopolar. By contrast, in Kenya 54% had used monopolar, 32% bipolar, and 11% both. Among users of electrocautery, 85% in South Africa “always” use it, 62% in Zimbabwe “most of the time” use it, and 71% in Kenya “rarely.”

Table 25. Use of the forceps guided surgical methods, by country

Practices	Kenya (n=85)	South Africa (n=105)	Tanzania (n=93)	Zimbabwe (n=74)
% of providers reporting forceps guided as their first VMMC surgical method used	89.4	92.4	80.6	97.3
% of VMMCs in the last month performed using forceps guided (estimated by provider)	98.1	96.2	78.9	98.7
Preferences				
For providers indicating use of more than one surgical method in the last month:	**Kenya (n=85)**	**South Africa (n=105)**	**Tanzania (n=93)**	**Zimbabwe (n=74)**
% reporting a preference for forceps guided	95.3	81.5	78.5	94.6
Beliefs and attitudes				
	Kenya (n=85)	**South Africa (n=105)**	**Tanzania (n=93)**	**Zimbabwe (n=74)**
% of providers that believe that forceps guided is the fastest surgical method	96.5	94.4	83.9	100.0
% of providers reporting that their national program recommends/ uses the forceps guided method	88.2	41.4	82.8	100.0
Of providers who report forceps guided as the surgical method recommended/ used by their national program, % who agree with this choice	93.3	97.8	98.7	100.0

The survey included a series of questions on beliefs and attitudes toward electrocautery, directed to providers that had ever used electrocautery. In all three countries (excluding Tanzania where it was not available), providers viewed monopolar electrocautery as safe, but less than half considered bipolar electrocautery as safe when performing VMMC. The vast majority believed that electrocautery decreases operating time significantly, they felt competent in the use of electrocautery, and they believe clinical officers and nurses – if adequately trained – can safely use electrocautery. Over half of providers' experienced in performing electrocautery in Kenya (57%) questioned if it was appropriate in their setting because electricity is unreliable. Three in ten providers in Kenya and South Africa believed that electrocautery could compromise the surgical sterility of the VMMC procedure.

Table 26. Electrocautery/diathermy: practices, beliefs, and attitudes, by country

Practices	Kenya (n=85)	South Africa (n=105)	Tanzania (n=93)	Zimbabwe (n=74)
% providers who have ever used electrocautery/ diathermy for hemostasis in performing/ assisting in VMMC:				
% Yes	32.9	99.0	0.0	71.6
% No	67.1	1.0	100.0	28.4
For providers reporting use of electrocautery/ diathermy:	**Kenya (n=28)**	**South Africa (n=104)**	**Tanzania (n=0)**	**Zimbabwe (n=53)**
% using different types of electrocautery:				
Monopolar	53.6	85.6	n/a	100.0
Bipolar	32.1	2.9		0.0
Both	10.7	5.8		0.0
Not sure of type	3.6	5.8		0.0
% using electrocautery/ diathermy for hemostasis for VMMC (In past 3 months):				
Always	0.0	84.6	n/a	18.9
Most of the time	14.3	10.6		62.3
Sometimes	14.3	3.8		13.2
Rarely	71.4	1.0		5.7
Beliefs and attitudes	**Kenya (n=28)**	**South Africa (n=104)**	**Tanzania (n=0)**	**Zimbabwe (n=53)**
% who report to strongly agree or agree with the following statements on electrocautery/ diathermy:				
Monopolar electrocautery/ diathermy is safe to use for hemostasis when performing adult male VMMC	92.8	93.2	n/a	100.0
Bipolar electrocautery/ diathermy is safe to use for hemostasis when performing adult male VMMC	46.4	28.9	n/a	7.6
Electrocautery decreases operating time significantly	92.9	89.5	n/a	98.1
Electrocautery is not appropriate in my setting because the electricity is unreliable	57.1	14.4	n/a	1.9
I feel competent in using electrocautery/diathermy when performing or assisting with VMMC	100.0	94.2	n/a	90.6
Clinical officers or nurses – if adequately trained – can safely use electrocautery/diathermy	100.0	89.5	n/a	98.1
Electrocautery/diathermy compromises the surgical sterility of the VMMC procedure	32.2	27.9	n/a	3.8

Summary overview: actual practice and providers' preferences in relation to the six elements of efficiency. After covering each of the six elements individually, the interviewer asked the provider to recap his/her experience with each of the six elements: "if given the choice, would you apply the following elements of efficiency at your VMMC site?" One of the responses was "already in place at my site" (presented in the table as "already do"). Where the efficiency element was not in use, the providers answered "yes, no, or don't know" to the question "would you apply it at your VMMC site?" Table 27 presents the responses for "already in place" and (if not) "yes, would like to apply it at my site." The responses for "no" and "don't know" are not presented in Table 27 but can be calculated by subtracting the percent for "already in place" and "yes, would like to apply it at my site" from 100%. For example, on the first element related to multiple surgical bays, the percent "no" and "don't know" for Kenya would be 40.7% (calculated as 100% - 37.6% - 27.1%).

The data in Table 27 reflect the same trends shown by the data presented earlier, which can be summarized as follows:

- **Rotation of surgical beds**: The use of multiple surgical beds is universal in Zimbabwe, common in South Africa and Tanzania, but used at only a third of sites in Kenya.
- **Bundling of supplies and materials**: Providers in Zimbabwe and South Africa are most likely to use supplies purchased as a kit. By contrast, providers in Kenya and Tanzania use supplies bundled by clinic staff.
- **Task-shifting**: using well-trained clinical personnel who are not medical doctors (such as nurses and clinical officers) as primary providers is near universal in Kenya, widely practiced in Tanzania, still unauthorized in South Africa, and non-existent in Zimbabwe (though welcome by 87% of providers).
- **Task-sharing**: Using non-medical doctors to assist in other aspects of the VMMC procedure occurs in the large majority of cases, except in Kenya, where the primary provider (a non-medical doctor) may prefer to complete all aspects of the procedures himself, including administration of local anesthesia and completing the sutures.
- **Forceps guided method**: Providers across the sites in all four countries use this surgical technique for the majority of cases. At least a third of providers in all countries except Zimbabwe also report using dorsal slit.
- **Electrocautery/diathermy**: The large majority of providers in South Africa and Zimbabwe already use electrocautery/diathermy, and the others in these two countries want to receive training in it. Use is much lower in Kenya (14%), though 41% of providers express interest in using it (possibly because of a lack of electricity). By contrast, few providers in Tanzania use it or would use if they could in their VMMC program.

Table 27. Implementation of efficiency measures in VMMC: actual practice and stated preferences, by country

If given the choice, providers reported that they would apply the following efficiency measures at their VMMC clinic:	Kenya (n=85)		South Africa (n=105)		Tanzania (n=93)		Zimbabwe (n=74)	
	Already do (%)	Yes (%)	Already do (%)	Yes (%)	Already do (%)	Yes (%)	Already do (%)	Yes (%)
#1. Multiple surgical beds per provider								
Multiple beds per provider	37.6	27.1	82.9	14.3	73.1	25.8	100.0	0.0
#2. Bundled surgical supplies								
Bundled surgical supplies (purchased as a kit)	0.0	40.0	88.6	9.5	24.7	32.3	100.0	0.0
Bundling of surgical instruments and supplies by clinic staff	97.6	0.0	7.6	19.0	73.1	20.4	0.0	9.5
#3. Task-shifting								
Task shifting: allowing adequately trained nurses and/or clinical officers to perform the entire VMMC procedure	98.8	1.2	13.3	57.1	73.1	24.7	0.0	86.5
#4. Task-sharing								
Task sharing: allowing secondary providers to administer local anesthesia	38.8	21.2	85.7	13.3	73.1	23.7	68.9	27.0
Task sharing: allowing secondary providers to complete interrupted sutures	41.2	17.6	81.9	16.2	73.1	23.7	59.5	32.4
#5. Use of forceps guided surgical methods								
Use of forceps guided surgical method	100.0	0.0	91.4	8.6	74.2	24.7	98.6	1.4
Use of dorsal slit surgical method	41.2	29.4	38.1	25.7	33.3	57.0	0.0	12.2
Use of the sleeve surgical method	10.6	25.9	15.2	35.2	3.2	3.2	0.0	6.8
#6. Use of electrocautery/diathermy								
Electrocautery/diathermy	14.1	41.2	88.6	11.4	5.4	15.1	78.4	16.2

In addition to the six elements of efficiency, the provider survey also covered other aspects of VMMC service delivery, including attitudes, opinions or actual practice related to:

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

G. Anesthesia: Practices and preferences

Most VMMC programs use plain Lidocaine (either 1 or 2%) or a Lidocaine /Bupivicaine (also known as Marcaine) mixture for anesthesia during the procedure. The Lidocaine /Bupivicaine mixture provides longer duration of anesthesia and is preferable in the sense that clients have greater comfort; however Bupivicaine is expensive and the mixture therefore is more costly than just using Lidocaine.

Providers reported on the type of anesthesia that they administer in their programs. Again we see variations by country (Table 28). Kenya was split almost evenly between Lidocaine 2% and any mixture including Bupivicaine (Marcaine). South African providers generally used any mix including Bupivicaine (Marcaine). Most Tanzanian providers reported use of Lidocaine 2% only. In Zimbabwe all providers cited any mixture including Bupivicaine (Marcaine). Again, strong parallels were evident between the programs in South Africa and Zimbabwe.

Because providers use what is available in the program (they do not "select" it), the interviewers also asked providers what anesthesia they would prefer, if given the choice. In Kenya and South Africa, the provider preferences closely matched what they were actually using: in Kenya, either Lidocaine 2% or any mixture including Bupivicaine (Marcaine); in South Africa and Zimbabwe, any mixture including Bupivicaine (Marcaine). In Tanzania, over half did not state a preference, reporting "don't know" or others perform this task.

Regarding the technique used to administer anesthesia, most providers reported using a combination of dorsal nerve and ring block. The one exception was South Africa, where providers used ring block.

Table 28. Anesthesia: practices and preferences, by country

	Kenya (n=85)	South Africa (n=105)	Tanzania (n=93)	Zimbabwe (n=74)
% reporting their most frequently administered local anesthesia as:				
Lidocaine 1%	0.0	1.0	0.0	0.0
Lidocaine 2%	51.8	7.6	83.9	0.0
Any mixture including Bupivicaine (Marcaine)	47.1	89.5	16.1	100.0
Other	1.2	0.0	0.0	0.0
Don't know (others perform this task)	0.0	1.9	0.0	0.0
% reporting their preferred local anesthesia as:				
Lidocaine 1%	0.0	0.0	0.0	0.0
Lidocaine 2%	49.0	0.0	29.2	0.0
Any mixture including Bupivicaine (Marcaine)	51.0	89.5	16.1	95.9
Other	0.0	0.0	0.0	0.0
Don't know (others perform this task)	0.0	10.5	54.8	4.1
% reporting their most frequently used technique to administer anesthesia as:				
Dorsal nerve block	1.2	2.9	1.1	0.0
Ring block	0.0	81.9	4.3	0.0
Combination of dorsal nerve and ring block	98.8	15.2	94.6	100.0
Other	0.0	0.0	0.0	0.0

H. Wait time between VMMC procedures

The provider survey explored reasons for "downtime" between VMMC procedures (Table 29). In three of the countries (Kenya, South Africa and Tanzania), close to half of providers reported that "in our facility the primary provider often waits between operations as operating areas are cleaned and prepared." By contrast, only a quarter of providers in Zimbabwe gave this response. (As a reminder, the Zimbabwe data collection occurred primarily during a high volume period.)

Low demand was also a factor, as shown in Table 29. South African providers were least likely to cite this factor (39%), whereas Kenyan providers were most likely to cite it (62%).

The large majority of providers agreed that "using multiple beds per primary provider helps to minimize the waiting time for providers between operations." Although 82% or more concurred, Kenyan providers were least likely to concur; this finding is consistent with the Kenyan model of a team working on one patient from start to finish.

Table 29. Wait time: providers' opinions, by country

% of providers who report to strongly agree or agree to the following statements on wait time:	Kenya (n=85)	South Africa (n=105)	Tanzania (n=93)	Zimbabwe (n=74)
In our facility the primary provider often waits between operations as operating areas are cleaned and prepared.	42.4	53.4	48.4	24.3
In our facility the primary provider often waits between operations because there aren't many patients.	62.4	39.1	52.7	48.6
Using multiple beds per primary provider helps minimize the waiting time for providers between operations.	82.4	90.5	97.9	100.0

I. Job satisfaction and burnout

One concern related to the VMMC scale-up is the potential for "burnout" (provider fatigue, disinterest, or frustration), especially in countries where national policy dictates that a medical doctor must perform VMMC (e.g., South Africa and Zimbabwe). The provider survey included questions both on job satisfaction and burnout. Regarding the latter, the survey first asked about burnout among "other colleagues," then about the respondent him/herself.

Interviewers asked the providers if they had noticed any provider fatigue/burnout among colleagues when they perform VMMC full-time as a primary work activity. As indicated in Table 30, less than 15% of providers in any country – and zero percent in Tanzania – reported burnout to occur frequently among their colleagues. However, in terms of burnout occurring "occasionally," four in five providers in Kenya and one quarter in both South Africa and Zimbabwe selected this answer. Conversely, the percent reporting "no, not at all" to the question on burnout among colleagues varied markedly: from 74% in Tanzania to 5% in Kenya. Given that the responses from Kenya and Tanzania have tended to be similar on a number of other variables, the disparity on the burnout question is notable and leads one to the conjecture that the length of program duration may influence the tendency toward burnout. Alternatively, the excitement and camaraderie associated with high-volume service provision may counteract provider burnout.

As shown in Table 30, over 80% of total providers in every country agreed or strongly agreed that "performing (or assisting in performing) male circumcision is a personally fulfilling job." A breakdown of the results by cadre yields additional results of interest. The percentages are highest in the two countries where non-medical doctors are allowed to perform VMMC: Kenya (87%) and Tanzania (100%). Additionally, in South Africa and Zimbabwe, where only medical doctors (MDs) are permitted to perform VMMC, MDs were less likely than their non-MD colleagues to report that performing or assisting with VMMC was a personally fulfilling job: South Africa (76% vs. 85%) and Zimbabwe (74% vs. 84%)[12].

[12] As shown in Table 18, medical doctors performed VMMC on a part-time basis in Zimbabwe.

In terms of the percent that agreed or strongly agreed with the statement "I personally have begun to experience work fatigue or burnout from performing (or assisting in performing) male circumcision repeatedly," not surprisingly Kenya providers had the highest percent: 71%. However, providers in Tanzania were second most likely to report having begun to experience work fatigue or burnout: 54%. Whereas the Tanzanian providers didn't see this in their colleagues, at least half reported it for themselves. Providers in South Africa and Zimbabwe were generally less likely to report having begun to experience burnout. In the case of South Africa, these data reflect a program that was still relatively new and operating during a low-volume period. However, the percentage of MDs who reported beginning to experience burnout is notably higher than non-MD providers: South Africa (48% vs. 33%), and Zimbabwe (37% vs. 24%).

Table 30. Job satisfaction and burnout, by country

% of providers who report to strongly agree or agree with the following statements on job satisfaction :	Kenya (n=85)		South Africa (n=105)		Tanzania (n=93)		Zimbabwe (n=74)	
Providers' impressions of burnout:								
% 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		14.3		0.0		9.5	
yes, occasionally	80.0		26.7		8.6		24.3	
yes, but very rarely	7.1		15.2		16.1		32.4	
no, not at all	4.7		41.0		74.2		29.7	
don't know	0.0		2.9		1.1		4.1	
	MD (n=0)	**Non MD (n=85)**	**MD (n= 21)**	**Non MD (n=84)**	**MD (n=0)**	**Non MD (n=93)**	**MD (n=19)**	**Non MD (n=55)**
Performing (or assisting in performing) male circumcision is a personally fulfilling job.	n/a	87.1	76.2	84.5	n/a	100.0	73.7	83.6
% that personally have begun to experience work fatigue or burnout from performing (or assisting in performing) male circumcision repeatedly	n/a	70.6	47.6	33.3	n/a	53.8	36.8	23.6

Evolution in the VMMC Programs over Time

The findings reported in the previous sections were based on instruments that are frequently used in facility assessments (though, to our knowledge, they have not been used frequently in VMMC programs): quality assessment of the facilities, observation of clinical procedures, and interviewers 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 two year period: January 2010 to December 2011. Some of these data form part of the routine health information systems in each country and are available 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 at each site to help reconstruct the history of practices at the site in terms of the six efficiency elements. They recorded this information in an Excel spreadsheet that showed the status of each efficiency element by month over the two year period (see Instrument 3 in Appendix A).[13] Perhaps such analysis – based on recall of the officer-in-charge – might be of questionable value. However, in many cases, the response was clear-cut: the VMMC program at the site had ALWAYS used the efficiency element (e.g., use of forceps guided in a given countries) or it had never used it (e.g., task-shifting in Zimbabwe or electrocautery/diathermy in Tanzania). If there was a change at a given site, this was often sufficiently noteworthy that the officer-in-charge could remember when the change took place. More often, the "change" related to the addition of new sites that had different policies or practices than the old 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 it has generated are very instructive as to differences across the programs of the four countries.

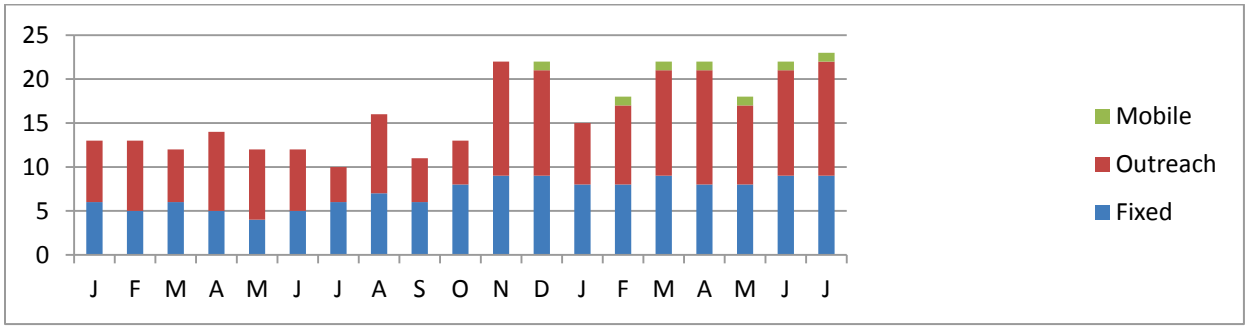
A. Number of sites reporting to be operational by month

Figure 1 provides data from January 2010 through December 2011 (or the final month for which data were available to the SYMMACS data collection team). This set of four graphs is based on the number of VMMC sites sampled by SYMMACS, which may differ from the total number of VMMC sites in that country. They illustrate growth in the number of sites offering VMMC 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 270 sites that were operational at the end of 2010 (the point at which the sampling frame was determined). By contrast, graphs for the other three countries reflect gradual increases in number of sites over time, starting in mid to late 2010 and continuing to grow into 2011. For example the national program in South Africa only began in November 2010. Kenya was the only country to include all three types of sites: fixed, outreach, and mobile. South Africa and Zimbabwe included both fixed and outreach, but the former outnumbered the latter. In Tanzania all the sites included in SYMMACS were fixed sites.

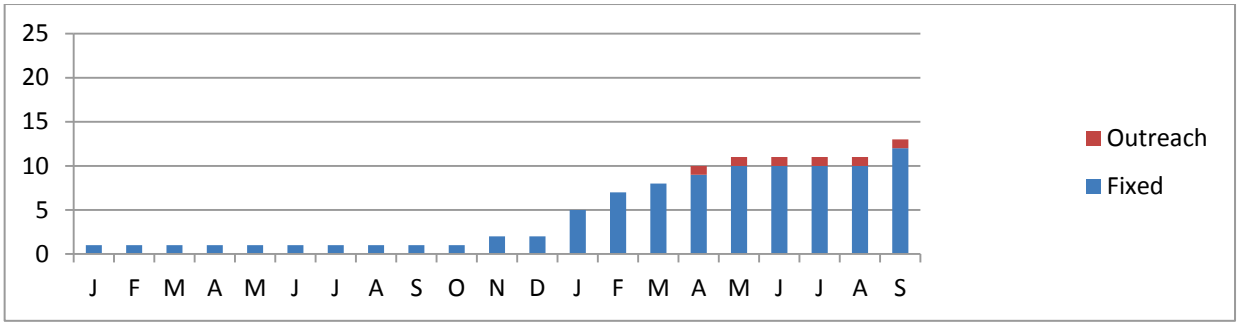
[13] In some countries, data collection ended prior to December 2011 and thus the country teams were not able to present the full 24 months of data. However, the 2012 data collection will include the months not completed in this report.

Figure 1. Number of VMMC sites reporting to be operational by month, January 2010 – December 2011

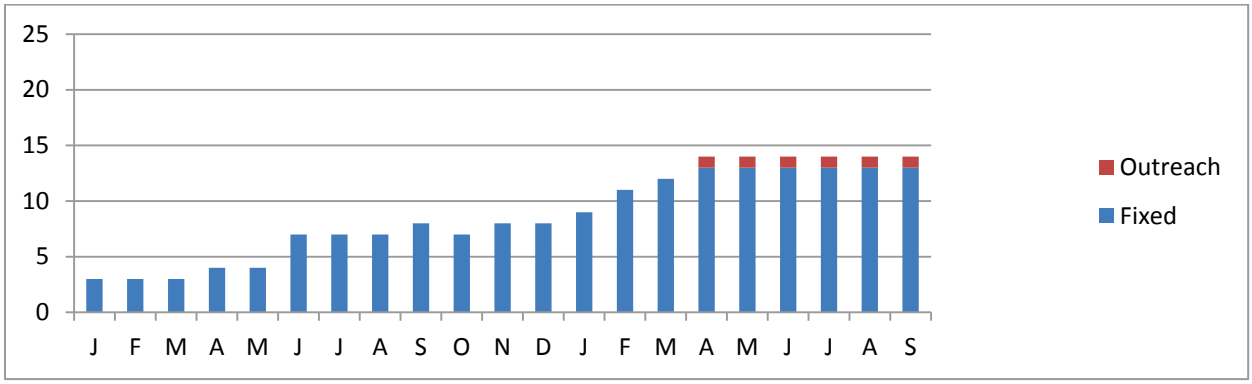
Kenya (random sample of 30 sites):



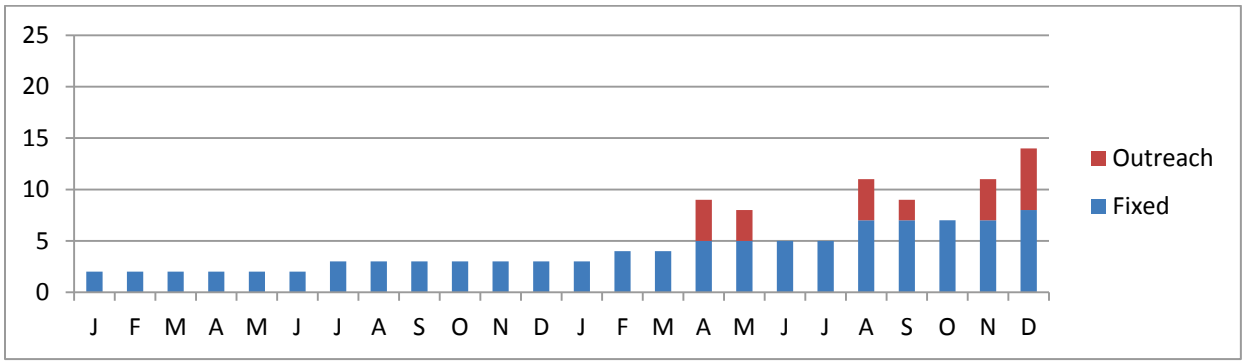
South Africa:



Tanzania:



Zimbabwe:

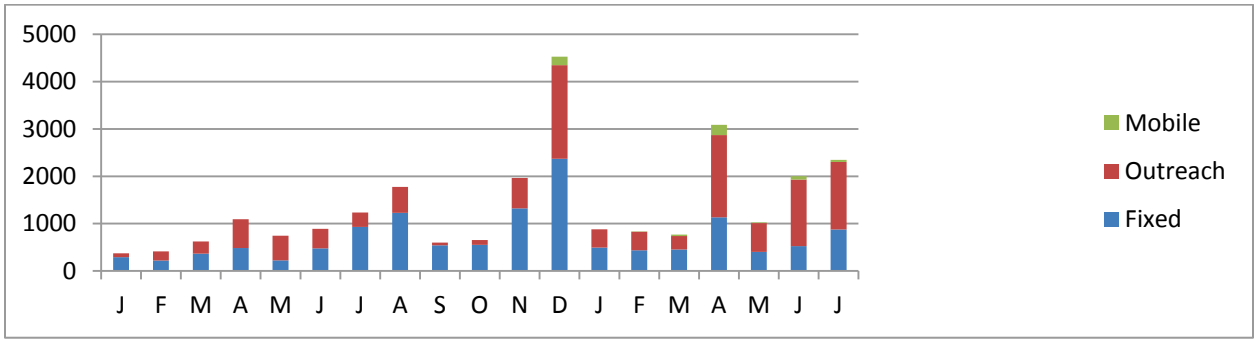


B. Number of VMMC procedures performed by month and facility type

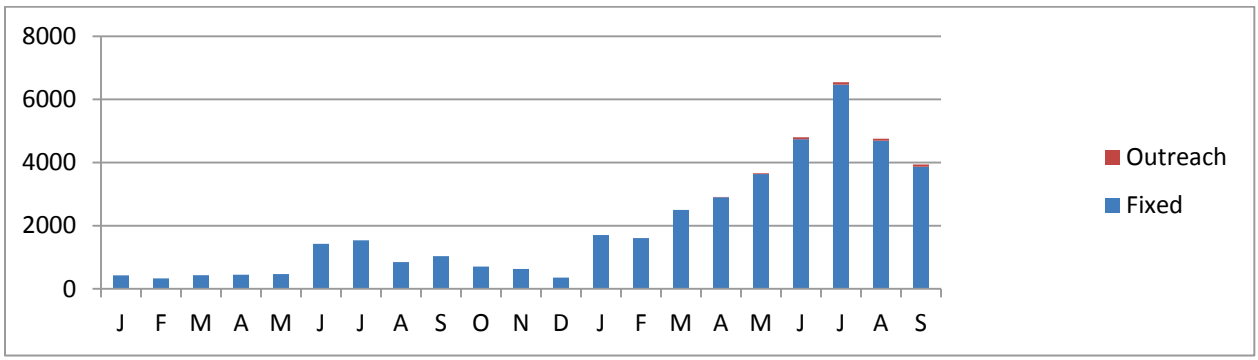
Figure 2 demonstrates the dramatic monthly fluctuation in the number of VMMCs conducted over the course of the calendar year. In all countries, the numbers performed in 2011 were higher than 2010. Peak periods differed by country. For example, the peaks occurred in June and July in South Africa and Tanzania (carrying over to August in Tanzania in 2011). In Zimbabwe, there were three peak periods: April/May, August/September, and December. In Kenya, the peak periods were July/August and November/December. These dramatic fluctuations represent an important programmatic challenge – matching supply and demand - which we address in the Discussion section.

Figure 2. Number of VMMC procedures performed by month and facility type, January 2010 – December 2011

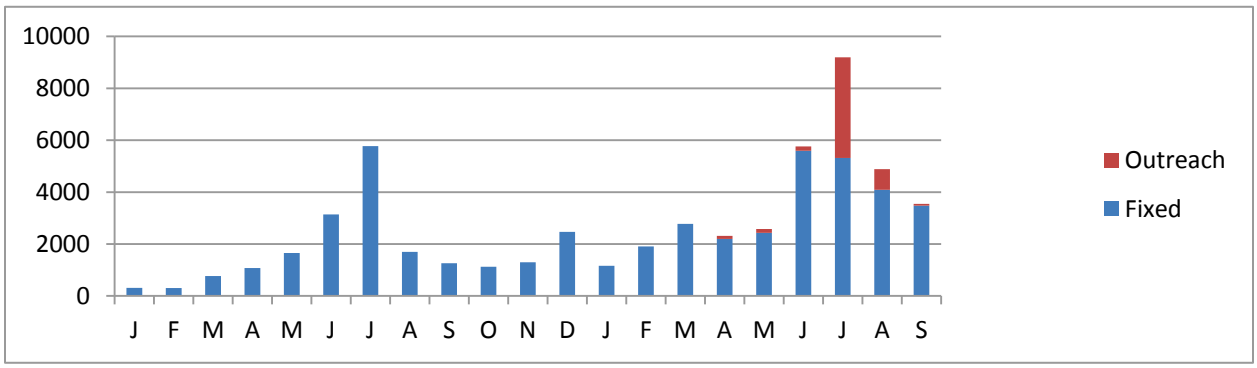
Kenya:



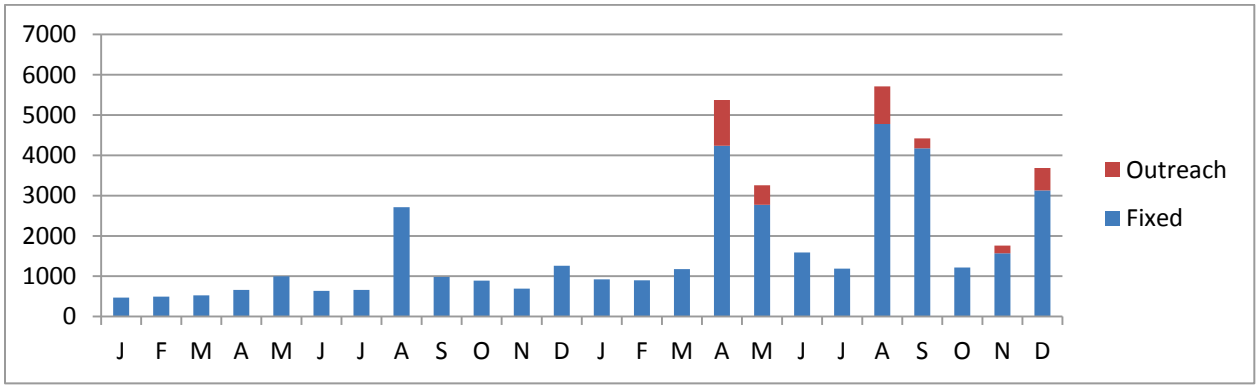
South Africa:



Tanzania:



Zimbabwe:

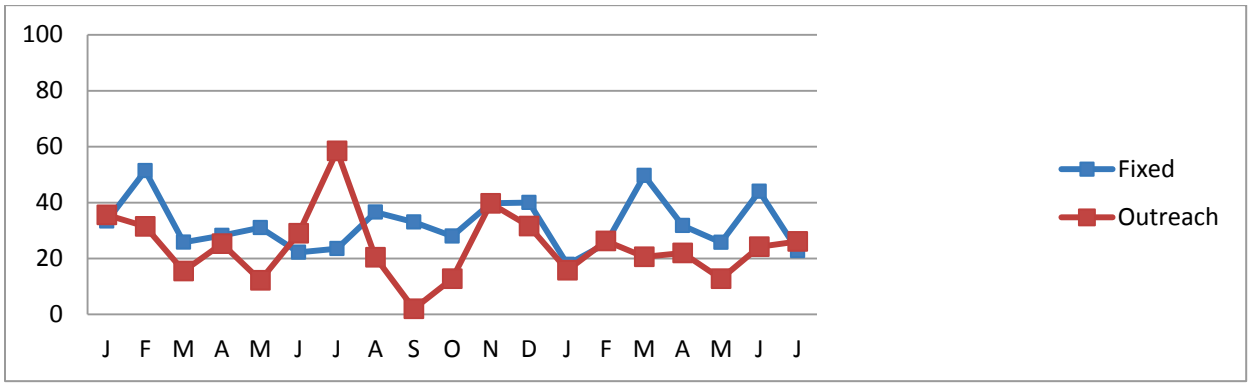


C. Percent of clients returning for follow up visits by month and facility type

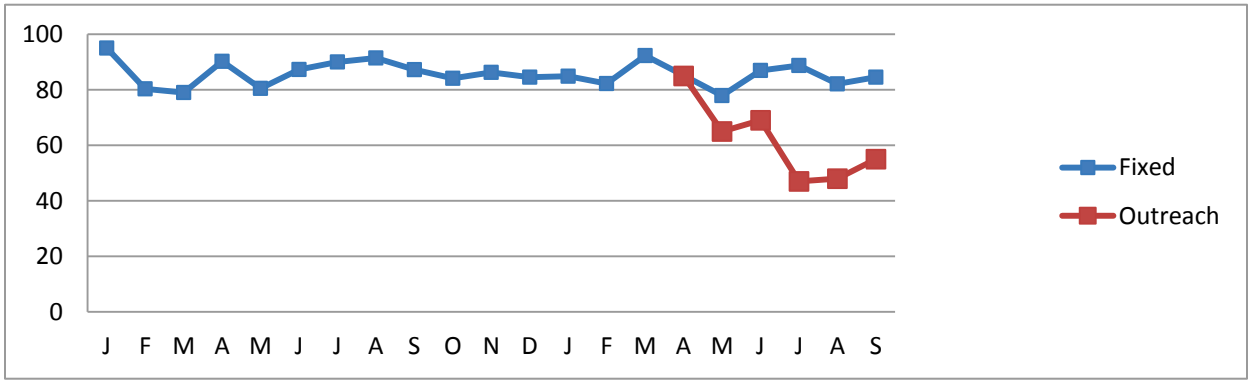
Figure 3 indicates the percentage of clients in each of the four countries that returned for a follow up visit. (Note: the number of follow-up visits and the recommended number of days post-op differed by country; thus, we analyzed the percent of clients returning for any follow-up visit.) These data were based on service statistics available at the sites or in databases at headquarter organizations, not on data collected via 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 60% or lower reporting for follow up visits, at least as reported by their record keeping system. (Data for South Africa were collected in a different format that was not comparable; thus, we excluded them from this graph.) 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.

Figure 3. Percent of clients returning for follow-up

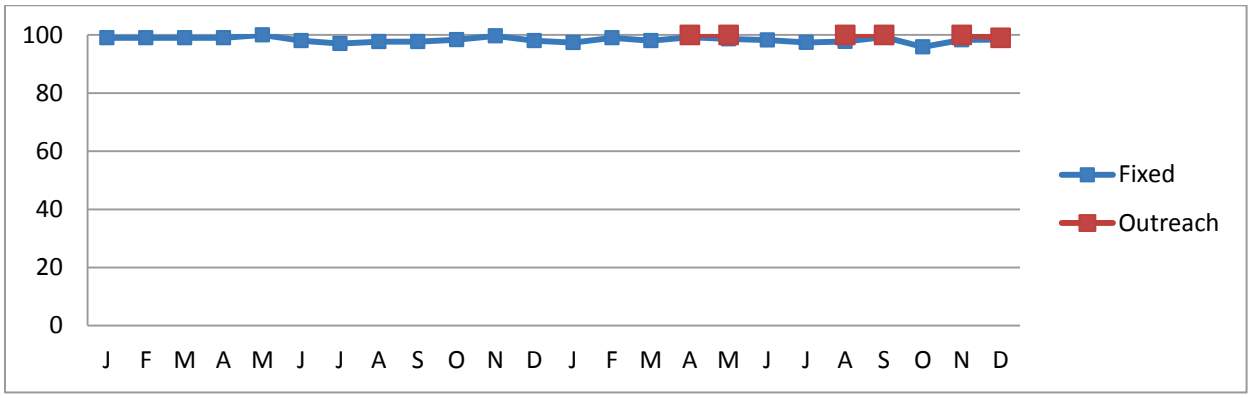
Kenya:



Tanzania:



Zimbabwe:



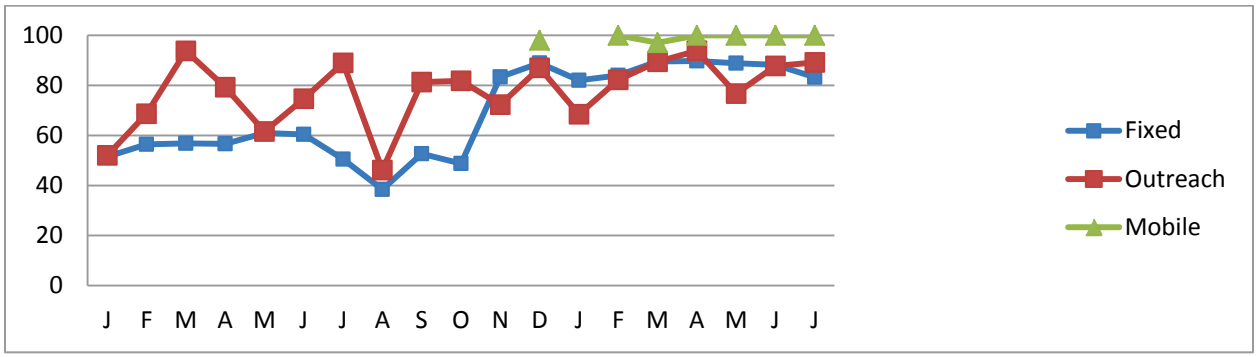
D. Percent of VMMC clients receiving an HIV test as part of the VMMC service

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 a 100% since the start of its program. Similarly, Tanzania achieved a very high level (close to a 100% in most months except November/December 2010, during which they reportedly experienced shortages in the HIV 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. However, in 2011 all three types of facilities – fixed, outreach and mobile – tested between 80-100% of clients for HIV, reflecting a clear improvement in HIV testing rates over time.

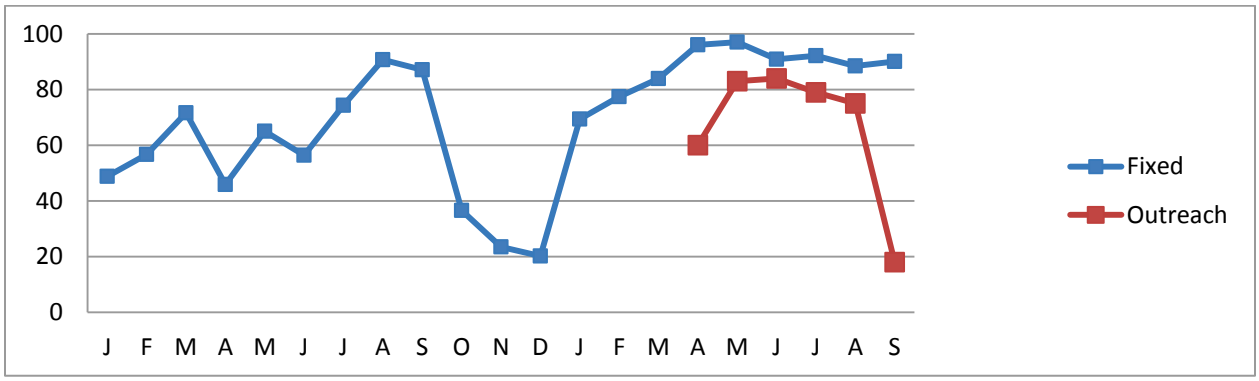
South Africa presented extreme fluctuations in the percentage of clients who received an HIV test. The low level of testing during November and December 2010 reflects the addition of new facilities which may not have had the HIV testing procedures in place. However, performance greatly improved in 2011 in fixed facilities, increasing from 50% to close to 90% by the last data point in 2011. By contrast, the record of outreach facilities that became operational in 2011 showed slightly lower levels of testing; the steep drop in September 2011 corresponded to a single outreach site.

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

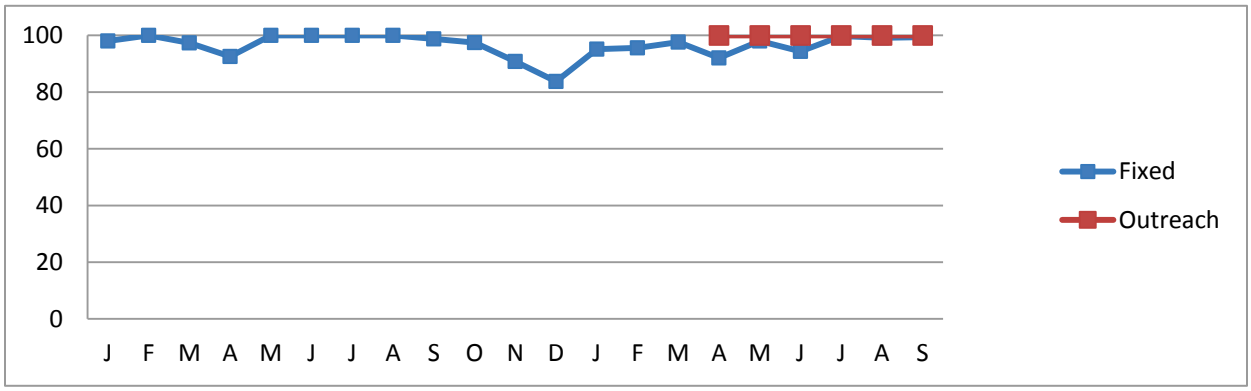
Kenya:



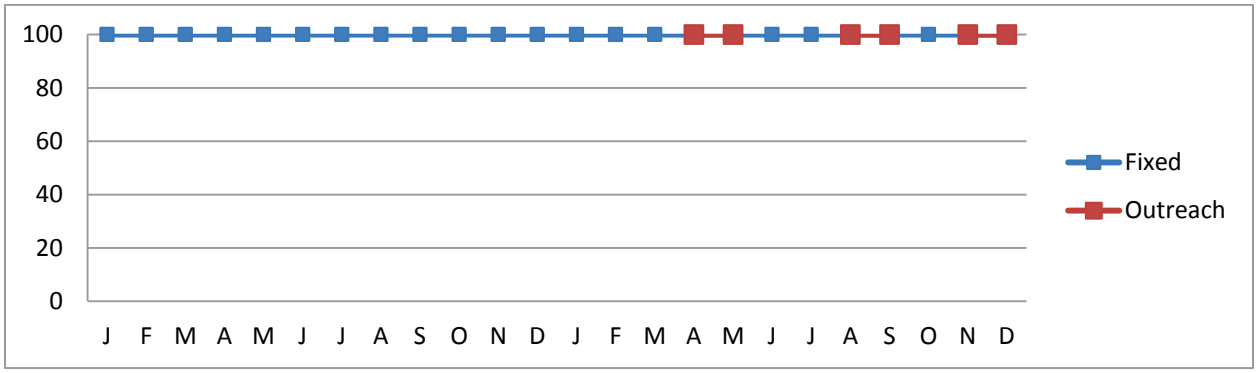
South Africa:



Tanzania:



Zimbabwe:



E. Adoption of the six efficiency elements

Whereas 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 a 21-24 month period from January 2010 to December 2011 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 in Appendix B (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. For a complete set of these graphs, see Appendix B.

Figure 5 captures the differences by country and by year on each of the six elements. The X axes 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 bar in each set indicates the number that had accepted it by the final month of data collection in 2011. (For some countries the final month with complete data occurred earlier than December 2011).

The graphs in Figure 5 visually summarize the results presented in earlier sections of this report. In terms of the providers rotating between multiple beds, this practice 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. (As a reminder, the Kenya data were collected in a low demand period, not during the RRI).

The second efficiency element relates to prepackaged consumables and disposable instruments. The graph shows that the countries divided into two camps on this element. 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. As noted earlier, some SYMMACS team members disagreed with requiring use of disposable instruments as the criterion for efficiency on bundling.

The third set of bars in Figure 5 illustrates task-shifting. On this dimension, Tanzania and Kenya have widely endorsed this practice (Tanzania, 100% Kenya, at over 90% of the sites). 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 reflects the South African policy whereby all VMMC procedures are supposed to be performed by a medical doctor. Similarly, Zimbabwe showed zero sites with task shifting, commensurate with their national policy that disallows this practice.

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 only about half in 2011, presumably because of different practices at the new sites added.

Sites using predominantly forceps guided technique are shown in the fifth set of bars in Figure 5. The data indicate that this surgical method was universally practiced (except in cases of contra indications)

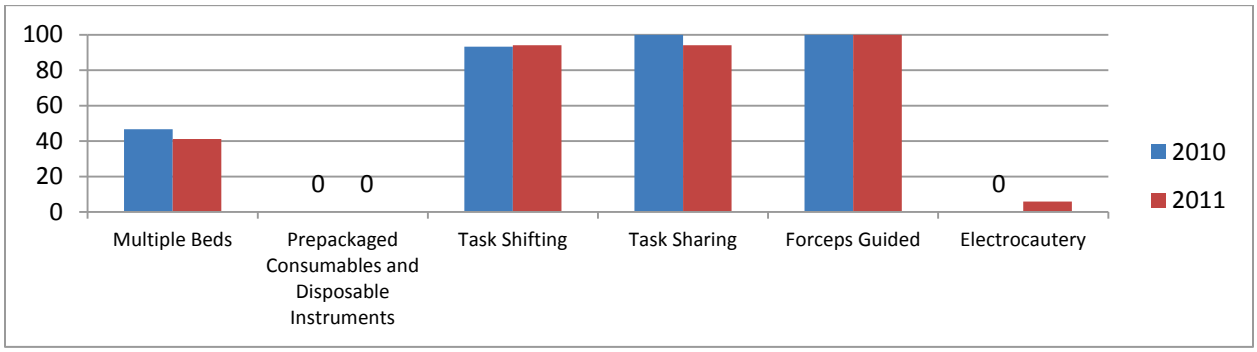
in Kenya, South Africa, and Zimbabwe. Much lower percentage of sites in Tanzania reported that about 70% of their procedures were conducted by forceps guided, reflecting the training of providers at two sites in a different method. However we do see an increase in the proportion of sites in Tanzania embracing forceps guided between 2010 and 2011.

The final element is electrocautery (sixth and last set of bars in Figure 5), which presents marked variation 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. By contrast, Kenya experimented with it but used it consistently in few sites, and in the Tanzania program electrocautery is not available at present in the VMMC program.

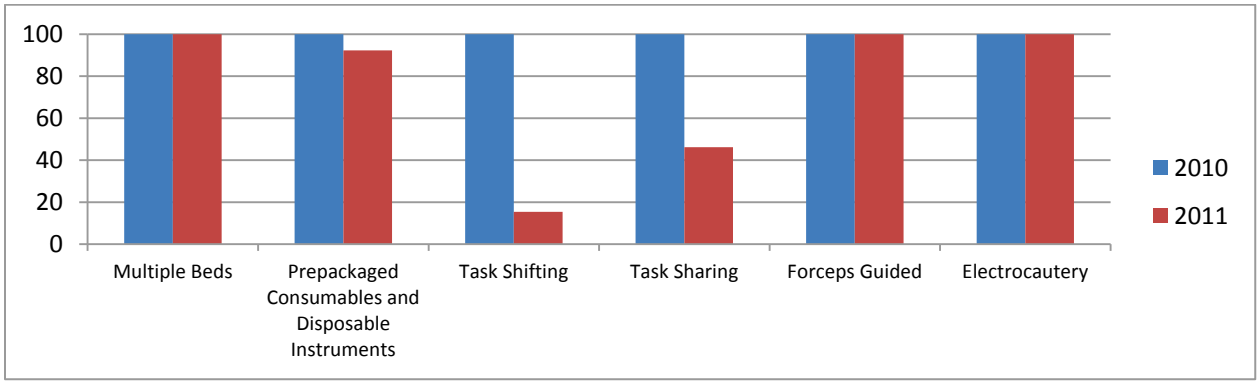
The graphs in figure 5 allow one to compare the adoption of these elements by country and over time. In two cases they do reflect some progress toward more efficiency: more sites in Tanzania accepting forceps guided and more sites in Zimbabwe using electrocautery. Particularly striking are the differences between countries that entirely adopted an element and those that do not adopt it at all. 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.

Figure 5. Proportion of sites adopting each efficiency element by the end of each year

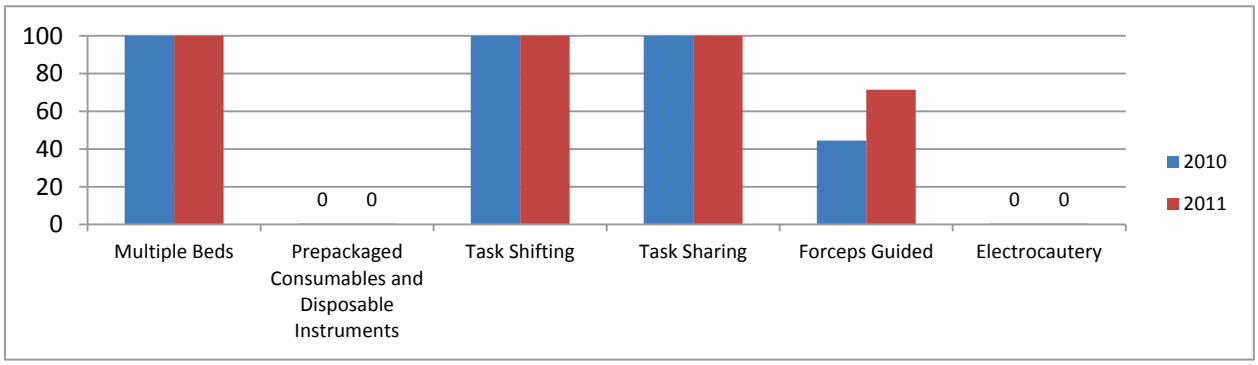
Kenya:



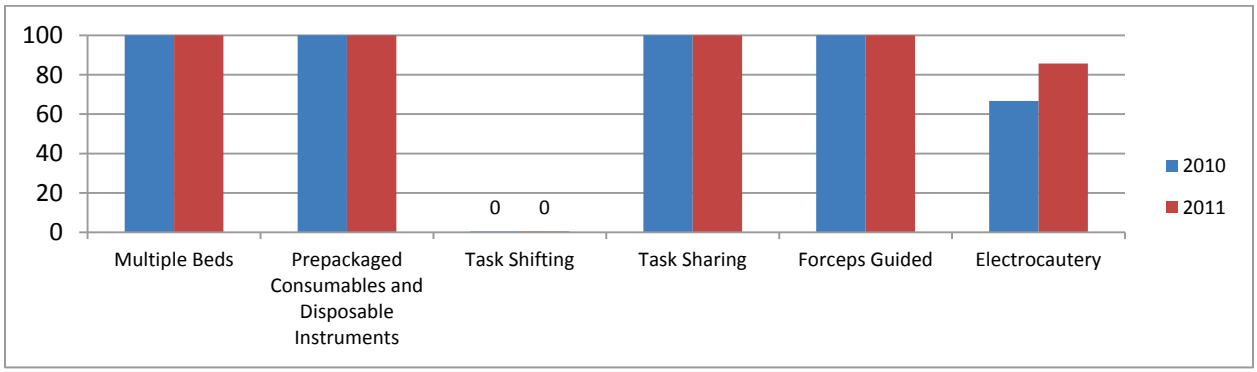
South Africa:



Tanzania:



Zimbabwe:



DISCUSSION

Given the urgency of curbing HIV transmission in Eastern and Southern Africa, numerous countries have undertaken a massive scale-up of VMMC services, either at the national level or in priority regions where HIV prevalence is high and adult male circumcision prevalence is low. A common objective in these programs is to improve the efficiency and service volume while assuring a safe service of high quality (as outlined in the 2010 WHO document). Indeed, the modeling to date regarding the impact of the scale-up of VMMC programs assumes more efficient programs, including such elements as task-shifting, the use of fixed/outreach/mobile sites, and other innovative approaches to service delivery (Njeuhmeli et al., 2011).

To date, there has been good data on the number of VMMCs performed (WHO, UNAIDS, 2011), but a dearth of systematically collected information on the operational aspects of VMMC programs. The literature on acceptability studies and demand for VMMC has grown substantially in recent years (e.g., Herman-Roloff et al., 2011). Case studies exist from pilot programs such as Orange Farm in South Africa (Lissouba et al., 2010), Kenya (Mwandi 2011), and Iringa Region in Tanzania (Mahler et al., 2011). In its Toolkit for Male Circumcision Services Quality Assessment, WHO recommended conducting quality assessments of programs, "including observations, interviews, focus group discussions, inventory, and documentation"[14] (WHO, 2009). Yet few studies have systematically documented the actual experience of service delivery in the context of the VMMC scale-up.

The current report addresses the first two of the three objectives of SYMMACS, described below. The authors will address the third objective – to identify the elements of efficiency that relate most closely with increased productivity– in a separate analysis.

A. Objective #1: To track the extent of adoption of efficiency elements in VMMC programs.

SYMMACS tracks both the extent of actual implementation of the six efficiency elements, as well as providers' attitudes toward these practices in some cases. Figure 5 provides a summary of the status of adoption of each of the six elements in each of the four countries by the end of the year (or the last month of data collection in that year) for 2010 and 2011. Highlights of these findings include:

- ***Rotation of surgical beds:***

In two of the four countries – South Africa and Zimbabwe – this practice is well-established and apparently well-accepted by providers. In Tanzania, SYMMACS collected the data during a low-volume period and recorded an average of only two beds per team in use. However, as published elsewhere, Tanzania has demonstrated its use of multiple beds very effectively during a campaign period in Iringa Region in 2011, in which a four-bed/one surgeon facility could circumcise up to 60 clients and an eight-bed/two surgeon facility could achieve 120 circumcisions per day over a six-week period (Mahler et al., 2011). By contrast, providers in Kenya – with a very different model of scale-up (decentralized with larger numbers of sites serving fewer clients per site) – both practiced and preferred a model whereby a

[14] SYMMACS included all these methods of data collection except focus groups.

provider or team of providers stayed with a single patient from start to end of the procedure. However, providers' responses might well have been different during a high-volume period, such as the RRI.

- ***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) and to use 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; it also eliminates the need for managing sterilization and laundry services.

By contrast, in Kenya and Tanzania, practice and preference tended toward use of kits bundled by VMMC staff and reuse of instruments through sterilization, because of the cost-savings. Because SYMMACS looked primarily at fixed sites that have autoclaves, this is true for Tanzania, but if the 2012 data were to include more outreach sites, then this is likely to change. 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 (Rech et al., 2009).

- ***Task shifting:***

Task-shifting (and task-sharing, addressed below) represent important ways to address human resource constraints in the context of the VMMC scale-up[15] (Curran et al., 2011).

Again the four countries were divided in their approach. South Africa and Zimbabwe have national policies that require medical doctors to perform VMMC, although nurses are allowed to do certain tasks (see below). In South Africa, there was evidence that in peak periods, nurses at two sites conducted some VMMCs under a doctor's supervision, and among providers in both countries, there was strong encouragement for a change in policy that would allow nurses (including registered/professional and enrolled nurses) to be trained for performing all aspects of the procedure. By contrast, in Kenya and Tanzania, non-medical doctors (including nurses, clinical officers, and assistant medical officers) already perform the vast majority of VMMC procedures. Moreover, they strongly believe non-medical doctors – once trained – can adequately perform in this capacity.

With these encouraging research results and the ever growing body of evidence demonstrating equivalence in efficiency and safety of nurse providers when compared to doctors (Ford et al., 2012), advocates in both South Africa and Zimbabwe are becoming more vocal in promoting policy changes to

[15] 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.

allow for task shifting 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, this change would increase the pool of clinical healthcare workers that could be recruited and trained for the purposes of meeting the ambitious targets set for the VMMC scale-up in these two countries and others in the region. As programs expand and have a growing need for VMMC providers (including replacing some that leave this line of work), the pool of medical doctors will not be adequate to meet this need. Third, medical doctors may be more prone to burnout than nurses, given that they have received highly skilled training on many complex medical conditions, yet are asked to perform a single, relatively simple procedure for hours a day. By contrast, the nurses in the Tanzania program felt a great boost in their professional status to be performing VMMC, and expressed a high level of job satisfaction with this work. Further compounding this problem is the length of time that these programs must run to reach their targets (e.g., at least five years). It is probably not coincidental that the providers from the program that had run the longest (Kenya) were most likely (71%) to have experienced some degree of burnout.

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 – as public health programs ask nurses to take on more and more responsibilities. 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 procedure would increase program capacity and flexibility.

- ***Task sharing:***

In the two countries that only authorize medical doctors to perform VMMC, task sharing – having non-medical doctors perform certain aspects of the VMMC procedures such as scrubbing the skin, administering the anesthesia, completing the suturing and other tasks – is widely practiced. In Kenya and Tanzania, the non-medical doctors already do all aspects of the VMMC procedure. Curiously, this does not result in total approval of the secondary provider conducting parts of the VMMC procedure; these attitudes appear to relate to the interest in having a single provider or team conduct the full procedure from start to finish. Kenyan providers demonstrated a strong sense of duty that as primary provider, they should take responsibility for the VMMC operation from start to finish; thus, they were not enthusiastic about having a secondary provider perform part of the procedure.

- ***Surgical method:***

The WHO guidelines (2010) recognized forceps guided as a surgical method appropriate to the scale-up of VMMC programs, because it is faster to complete than other methods (e.g., dorsal slit or sleeve) and appropriate/safe except in rare cases (e.g., Phimosis or any condition where the glans cannot be properly visualized prior to removal of the foreskin). As cited in Curran et al. (2011), the forceps guided procedure is, on average, two minutes, 45 seconds, faster than the dorsal slit procedure, and seven minutes, 40 seconds, faster than sleeve resection. When SYMMACS was first designed in 2010, it was unclear if all countries would adopt this as the method of choice in their national VMMC programs. However, by the time data collection began – at least in the four SYMMACS countries – all programs had adopted the forceps guided method where appropriate. In South Africa and Tanzania, one in five providers expressed a preference for another method (dorsal slit) but recognized the advantages of forceps guided where time was a factor. Also, providers voiced an interest in receiving training in other

methods, presumably to handle the cases that could not be done with forceps guided. In short, forceps guided appears to be a well-establish element of the VMMC scale-up, at least in these four countries. In fact, it was the only one 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. In Kenya, it was introduced more recently and is now used occasionally but not consistently. And in Tanzania, it was not available in the national VMMC program, although providers expressed an interest in receiving training to use it. In both Kenya and Tanzania, the reluctance to use electrocautery/diathermy stemmed from concern over lack of electricity and safety concerns. The authors of a 2011 article on the scale-up of VMMC in Kenya cited diathermy as a key element (Mwandi et al., 2011); however SYMMACS findings suggest only a partial acceptance of diathermy in the VMMC program in Nyanza.

From an efficiency perspective, electrocautery clearly reduced the amount of time required to complete the VMMC procedure, based on the timing data shown in Table 15. The average time to achieve hemostasis is 2 minutes and 7 seconds in South Africa, compared to 5 minutes and 30 seconds in Tanzania, where electrocautery is not available in the program. The difference of 3 minutes, 23 seconds per procedure would translate into a 2 hour, 15 minute time saving in a high volume setting where 40 procedures are performed a day.

In sum, SYMMACS provides an on-the-ground assessment for the ideas promoted in the 2010 WHO document "Considerations for Implementing Models for Optimizing the Volume and Efficiency of Male Circumcision Services" for maximizing VMMC services in these four countries. It demonstrates that "one model does not fit all," and it illustrates how countries have adopted some or most of the six efficiency elements, but to date none of the four countries has adopted all six.

B. Objective #2: To demonstrate that it is possible to improve efficiency with equivalent safety in VMMC programs.

SYMMACS includes an abbreviated version of the WHO quality assessment for VMMC programs (WHO, 2009) in its Instruments 1-a and 1-b, which measure both quality and safety in actual VMMC programs.

In an ideal world, one would hope that every facility would receive the top score (2=satisfactory) on every item in the tool, based on a sound assessment with high inter-rater reliability. Rather, SYMMACS revealed a number of 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. Because SYMMACS is a natural experiment, not a clinical trial or controlled field experiment, we cannot compare "safety" under SYMMACS with safety in a different setting. Rather, we have attempted to assess the program on multiple aspects of quality and safety, in an effort to identify aspects that are functioning well and areas for improvement.

As discussed in the limitations section, inter-rater reliability is a key concern in this type of quality assessment, especially since the clinicians collecting the data did not attend the same training on this task. Moreover, the professional profile of the person collecting the data may influence the ratings. In the case of Zimbabwe, the surgical specialist conducting the assessment appeared to have high standards in assessing certain aspects of the VMMC sites.

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

- ***Adherence to surgical protocol in performing the VMMC procedure***

Of all the sections on the QA instrument, the factors presented in Table 10 best reflect the quality of the surgical procedures used in the field in these VMMC programs. It was exceptional that in all four countries, programs scored well on 12 of the 13 criteria; surgical knot-tying was the exception and merits more detailed attention in both training and supervision.

- ***Provision of HIV testing and counseling, with high percentages tested for HIV prior to surgery***

Given past HIV testing of VMMC clients prior to the procedure, the results from SYMMACS on the provision of HTC across all four countries are impressive. Moreover, they 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. The potential benefits to this group far exceed the simple removal of the foreskin.

- ***Provision of group education around HIV and VMMC***

The VMMC sites in this study consistently provided group education and individual sexual behavior and risk counseling to the men seeking VMMC services, although SYMMACS did not asses 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 use of condoms, and the message of "partial protection," among others, is an essential part of sound programming.

SYMMACS also revealed several areas in need of improvement in the participating countries:

- ***Inadequate monitoring and reporting of adverse events at VMMC sties:***

Adverse event reporting is a key indicator of program safety. It requires (1) having a system in place with clear designations of what constitutes an adverse effect, (2) having providers trained in the system that accurately use it in recording adverse events as they occur, (3) regularly reporting adverse events through the proper channels, and (4) externally monitoring this process at the national level of each program. 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 system in place, SYMMACS revealed system-wide shortcomings in the routine standardized recording and reporting of AEs.

- ***Lack of post exposure prophylaxis (PEP) onsite and guidelines to administer PEP correctly:***

In the event of a needle stick injury or eye blood splatter, providers need immediate access to PEP, which will significantly decrease their risk of acquiring HIV. Moreover, it is 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.

- ***Inadequacies in maintaining sterile conditions during the VMMC procedure***

Although most VMMC sites received a satisfactory rating on the set of factors reported in Table 9, a number did not. This finding deserves immediate attention from program managers in the country programs in question.

- ***Inconsistencies in providing post-operative messaging for clients:***

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., regarding abstinence, being faithful and consistent condom use) varied greatly by country: from a low of 10% in South Africa to a high of 99% in Zimbabwe. Staff did inform clients about the six week post-operative period in the majority of cases, except in Tanzania (assessed as satisfactory in only 31% of cases). On these last four points relating to information given to clients (see Table 11), Zimbabwe scored consistently high. Such messages include when to return, how to care for the wound, and what to do in case of complications. In addition, it is another opportunity to reinforce the need for abstinence for six weeks, the "partial protection" message, and related prevention messaging subjects.

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 the necessary points. In some cases (e.g., Tanzania) some of this may be due to the fact that the clients are not yet sexually active and so providers are making a conscious decision not to discuss the abstinence period with very young clients.

In addition, we 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:

- ***WHO-recommended post-operative review of vital signs*:**

The results related to post-operative procedures (Table 11) showed mixed results. As a case in point, in 99% of the VMMC procedures observed in Zimbabwe, the provider received an "unsatisfactory" for post-operative review of vital signs (temperature, blood pressure). Yet Zimbabwe has an excellent safety record for performing VMMC surgeries (Population Services International, 2012). Several VMMC practitioners have questioned the relevance of this criterion as part of a QA assessment. If a client's vital signs are normal prior to the operation, if he undergoes a 30 minute operation and is then observed for another 10 minutes, if he continues to feel well and demonstrate no signs of distress, is it necessary to repeat the measurement of vital signs? Similarly, experienced practitioners have 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.

- ***Absence of the WHO service delivery protocols onsite:***

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

C. The Challenge of Matching VMMC Supply and Demand

In the early days of VMMC programming, much of the attention was understandably focused on the supply side of VMMC: how to scale up safe, quality services to large numbers of clients. However, over time, there has been a growing awareness of the importance of calibrating supply and demand. Without a steady stream of clients, initiatives to increase the speed and efficiency of the surgical procedure will not result in a higher number of VMMCs being performed. Three major challenges face program managers:

The "product": VMMC offers a social marketing challenge *par excellence*: how to convince large numbers of men to undergo a prophylactic surgical procedure. As one speaker recounted at a meeting on Demand Creation held in Durban, South Africa in September 2010, "this operation is a hard sell. It requires getting men, who don't like to go to clinics even when they are sick, to go to a clinic for a procedure that is painful, will cause them to lose time from work, have their arm twisted to get an HIV test that they don't want, and then abstain for 6 weeks" (Gesuale, 2010).

Reaching men older than 25 years of age: Although not a focus of SYMMACS, no report on VMMC in Eastern and Southern Africa would be complete without recognition of this issue. The mathematical models – showing the numbers of men that will need to be circumcised to reach national targets necessary to reduce the transmission of HIV – include reaching men over 25, yet this has proven difficult to achieve in Kenya, South Africa, and Tanzania (Williams et al., 2006; Njeuhmeli et al., 2011).

Fluctuations in demand: As shown by the graphs in this report, VMMC programs in every country experienced dramatic fluctuations in client load, which results from multiple factors that may differ by country (e.g., a natural seasonal uptake influenced by cultural beliefs and the convenience of holiday periods.) This situation presents program managers with the challenge of accommodating huge seasonal surges, where volume of procedures can double or triple, and then scaling back activity during lull periods where providers may find themselves idle. Unfortunately, the naturally-occurring surges are limited to just a few months of the year. At other points, programs try to stimulate demand by conducting a series of promotional activities or by bringing outreach activities to previously underserved communities.

Although SYMMACS was designed to measure the supply environment, it also touched on the issue of demand. For example, in terms of client load, none of the officers-in-charge in Kenya and only one in five officers-in-charge in South Africa and Tanzania reported that there were "too many clients" – although many opined that "it depends" (e.g., during peak seasons or campaigns). Whereas high volume VMMC services should be able to accommodate 40-50 clients a day, providers in these three countries characterized a "busy" day in their programs as having 20-28 clients. In response to open-ended questions, providers in all countries cited the need for more demand creation activities to bring clients into the facilities.

Despite the growing realization that demand creation is an essential element in the VMMC scale-up, there is a dearth of published data on the use of communication campaigns and activities to encourage use of VMMC services (and no evaluations to date on the impact of multi-media communication campaigns to stimulate VMMC uptake). SYMMACS provides some of the first systematically collected data on communication channels used in support of VMMC. Not surprisingly, small media (pamphlets and posters) and interpersonal communication in multiple forms were by far the most prevalent, with radio following considerably further behind. Advocacy with local leaders is an essential tool to increase buy-in for VMMC demand creation. We present these data with the caveat that no 'standard package' of demand creation elements would be universally applicable to all VMMC settings; rather, demand creation strategies must be tailored to specific settings (Bertrand et al., 2011). For example, television represents a powerful medium in South Africa and forms part of the recently launched campaign entitled "The Time is Now." Yet it would have little place in rural Tanzania, where electricity is sporadic and televisions scarce.

D. Summary and programmatic implications

SYMMACS has provided a wealth of data on the implementation of VMMC services in four countries: Kenya, South Africa, Tanzania, and Zimbabwe. From the 2011 data collection, we have learned the following:

Regarding elements of efficiency, the four countries differed in their adoption of the six elements of efficiency, as summarized in the chart below:

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

*In this study we used rotation among multiple bays in the operating theater as the measure of "optimizing the use of facility space." (x) in this table denotes partial adoption of the element.

With regard to quality and safety of VMMC services, SYMMACS provided positive evidence across all four countries on numerous points:

- Providers in all countries adhered to the surgical protocols for performing VMMC (with one exception: the correct tying of the surgical knot).
- Tanzania and Zimbabwe achieved close to 100% HIV testing and counseling, whereas Kenya and South Africa continue to work toward this goal.
- VMMC sites in all four countries scored high on the provision of group education for HIV prevention.

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

- The systems for monitoring and reporting adverse events were inadequate.
- Sites often lacked post exposure prophylaxis and guidelines for administering PEP in the operation theatre.
- 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.

The results of the 2011 SYMMACS data collection point to the following programmatic recommendations:

Adoption of efficiency elements:

- Task-shifting: Work toward change in the national policy in South Africa and Zimbabwe that currently prohibits task-shifting (non-physicians to perform all aspects of the procedure).
- Task-sharing**:** Provide more systematic training of non-medical personnel to assist in all aspects of the procedure (e.g., administering local anaesthesia and completing interrupted sutures).
- Electrocautery**:** 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:

- 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 registering AEs; and provide external monitoring of this process.
- Supervision: Establish a system of regular supervisory visits to each VMMC site, including monitoring and reporting of adverse events.
- Training: in training of primary providers, emphasize (1) correct tying of surgical knot and (2) maintenance of a sterile field at all times.

- Protocols and guidelines: Ensure that key guidelines (e.g., WHO protocol for performing VMMC, national STI guidelines, guidelines for administration of PEP) are available at or near the operating theatre.
- Provider burnout: Identify ways of diversifying the work of primary providers to avoid burnout from an exclusive focus on performing VMMC.

Next steps for SYMMACS include finalizing the data collection for 2012 in a minimum of 30 sites per country during high volume periods, disseminating the findings from the 2011 data collection at a meeting of VMMC stakeholders in each country, and developing a series of articles for publication in peer-reviewed journals.

Data collection from 2012 will allow for further assessment of capacity in these four countries to deliver VMMC services and continued progress toward the adoption of the six elements of efficiency. The final report for SYMMACS will include data from both 2011 and 2012. It will provide insights into the dynamics of service delivery that will support the continuous improvement of VMMC service delivery in these four countries and provide lessons learned to other countries in the region of Eastern and Southern Africa.

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APPENDIX A: INSTRUMENTS

SYMMACS INSTRUMENT #1-a

CHARACTERISTICS OF THE MALE CIRCUMCISION FACILITY

Name of site: _____

Code for site: _____ Date: ____DD __MM __YY

Name/code of clinical observer: _____

Name or 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 MC		
Physician		
Assistant Medical Officer (AMO)		
Clinical officer		
Nurse		
Number by cadre of secondary provider(s) assisting with MC:		
Physician		
Clinical officer		
AMO (where applicable)		
Nurse		
Number of non-medical assistants that clean and organize surgical area (hygienist, runner, cleaner, etc.)		
Total number of MC procedures performed		

The remainder of instrument #1 is based on (1) interviewing the chief medical administrator at the MC 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 MC 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				
#	**Items to be observed and scored:**	**0 = none**	**1= partial**	**2= total**	**Comments**
AVAILABILITY OF ESSENTIAL ITEMS ON SITE					
	WHO guidelines for performing MC or National guideline of Standard Operating Procedures (SOP) for MC				
	Sterilized instruments available for use during MC				
	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				
	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)				
#	**Items to be observed and scored:**	**0 = none**	**1= partial**	**2= total**	**Comments**
	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 MC surgery including behavior change counseling.				
	Staff provides private individual counseling and question time on MC and offers HCT.				
	Site has referral slips for clients requiring other services (including those with contraindications for MC)				
	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 MC 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 MC 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 MC 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	
Cell phone messages re: MC	
Internet website for prospective clients	
Song that promotes male circumcision	
Dramas or plays about MC (such as street theater)	
Testimonials by a celebrity or public figure that has had MC	
Telephone hotline	
Other: ***SPECIFY:***	

That was my last question. Thank you for participating in this interview.

SYMMACS: INSTRUMENT #1-b

OBSERVATION OF MALE CIRCUMCISION 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 MC procedure observed.

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

Code for site: _____

Date: __DD __MM __YY

Name/code of clinical observer: _____

Name of the surgical provider(s) performing the MC:

_____

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 MC (*check all that apply)* ___ physician ___clinical officer ___AMO ___nurse ___other

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

#	**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				
#	**Items to be observed and scored**	**0 =**	**1=**	**2=**	

		none	partial	total	Comments
	Sterile gloves used for surgery				
	Hand washing/disinfection between clients				
	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: surgeon and/or assisting clinical personnel:					
	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 aligns the other quadrant sutures				
	Avoids placing deep sutures around the frenulum (as the urethra located in the vicinity)				
#	**Items to be observed and scored**	**0 = none**	**1= partial**	**2= total**	**Comments**
	Places interrupted sutures evenly to avoid leaving gapping margins				
	Ensures 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 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.				
	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 haemostatis 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:

_____

_____

_____

_____

SYMMACS Instrument #2.

Questionnaire for Male Circumcision 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: __ MM __ DD __ YY

Code of interviewer:_____

Name or code of respondent:_____

Code of MC 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

__assistant medical officer (AMO)

other (specify) _____

(If a physician) what is your area of specialization?_____

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

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: responses to #3 should only be recorded for providers reporting to have received MC 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 MC 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 MCs 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 MC?

   ___ days in the past week

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

   ____ 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 addition to providing MC, MC follow up and emergency care for MC, 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 haemostasis in performing or assisting in performing male circumcision?

___ yes ___ no (SKIP TO #13)

(If yes) What type of electrocautery/diathermy have you used:

___Monopolar ___Bipolar ___ Both ___I am not sure of the type

(If yes) In the past three months, have you used electrocautery/Diathermy for haemostasis 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).***

	Strongly Disagree		**Neutral/DK**		**Strongly Agree**
	1	2	3	4	5
Monopolar electrocautery/ diathermy is safe to use for haemostasis when performing adult male MC					
Bipolar electrocautery/ diathermy is safe to use for					

haemostasis when performing adult male MC					
Electrocautery decreases operating time significantly					
Electrocautery is not appropriate in my setting because the electricity is unreliable					
I feel competent in using electrocautery/diathermy when performing or assisting with MC					
Clinical officers or nurses – if adequately trained – can safely use electrocautery/diathermy					
Electrocautery/diathermy compromises the surgical sterility of the MC procedure					

SURGICAL METHOD USED TO PERFORM MC

When you first began performing or assisting in performing adult male circumcision, what surgical method did you use (*check one):*

__ Forceps guided __ Dorsal Slit ___Sleeve ___ Other/Device (specify:_____)

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?

_____

Which surgical method do you believe is the fastest? (check one only)

___Forceps guided __ dorsal slit __sleeve __all the same __don't know

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

Method: ___ Forceps guided ___ dorsal slit __sleeve

Reason: _____

Do you agree with this choice of method? __ yes __no __not sure

OTHER ASPECTS OF OPERATING ENVIRONMENT

In the last 12 months have you worked in a surgical environment for male circumcision where you rotated or participated in a team which 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, are neutral/don't know, agree, or strongly agree with each statement:

	Strongly Disagree		**Neutral/DK**		**Strongly Agree**
Statements	1	2	3	4	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					

	Strongly Disagree		**Neutral/DK**		**Strongly Agree**
Statements	1	2	3	4	5
Medical doctors are the only healthcare cadre who should be trained to perform adult MC					
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 MC 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 MC 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):

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

a. Were the instruments and supplies "pre-bundled" (i.e., prepackaged together) for use in the operation?

___yes ___no (If no, skip to #18)

IF YES:

b. Were they purchased in the bundle (prepackaged kit prepared by a kit supplier) or did clinic staff prepare the bundles themselves?

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

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

___ entirely disposable ___Instruments recycled ___ don't know

d. In your opinion, does bundling supplies/surgical instruments reduce the chances of infection during MC?

___yes ___no ___DK, not sure

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

	Strongly Disagree 1	2	Neutral/DK 3	4	Strongly Agree 5
Using pre-bundled kits of instruments and supplies decreases the time needed to perform male circumcision.					
Using pre-bundled kits of instruments and supplies is an unnecessary expense in MC clinics.					
I prefer assembling a surgical tray myself rather than using a pre-bundled MC kit.					
If a clinic does use pre-bundled kits, the instruments should be reusable.					

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):

___DK (others did this task)

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

Mix_____

Why_____

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 MCs in an operating environment where a secondary provider (nurse, clinical officer) administered local anesthesia as an alternative to a doctor prior to performing the MC?

___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 MC in an operating environment where an assistant or secondary provider (nurse, clinical officer) completed the suturing of skin after the primary MC provider has removed the prepuce and achieved haemostasis?

___yes ___no __don't know/don't remember

Do you (would you) either 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 MC 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?

___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."

	Strongly Disagree				Strongly Agree
Statements	1	2	3	4	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.					

If given the choice, would you apply the following efficiency measures at your MC clinic?

	Already do	**Yes**	**No**	**Not sure**
Multiple beds per provider				
Electrocautery/diathermy				
Task sharing: secondary providers allowed to administer local anesthesia				
Task sharing: secondary providers allowed to complete interrupted sutures				
Task shifting: allowing adequately trained nurses and or clinical officers to perform the entire MC procedure				
Use of forceps guided surgical method				
Use of dorsal slit surgical method				
Use of the sleeve surgical method				
Bundling of surgical instruments and supplies by clinic staff				
Bundled surgical supplies (purchased as a kit)				

(Note: this ends the portion of instrument #2 to be completed on the PDA.)

Instruction to the interviewer: continue with the open-ended questions using the paper forms.

INSTRUMENT 2 CONTINUED- Open-ended questions

Date of interview: __ MM __ DD __ YY

Code of interviewer:_____

Name or code of respondent:_____

Code of MC 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 MC 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 MC 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 PARTICIPATING FACILITY

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 medical officers ____Others

2010	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 EVENTS												
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												

APPENDIX B: GRAPHS TRACKING ADOPTION OF THE SIX EFFICIENCY ELEMENTS FOR VMMC

As mentioned in the final section of the results ("Evolution in the VMMC Programs over Time"), SYMMACS experimented with a novel approach to tracking the adoption of the efficiency elements over time. Programs routinely collect and report clinic or other program statistics on a monthly basis, as we did in Figure 2 on number of VMMC procedures performed per month. We adapted this type of monthly reporting to apply to the adoption of each of the six efficiency elements in the four countries over a two year period: January 2010 to December 2011.[16] Such data are not collected routinely by VMMC sites.

Specifically, the SYMMACS interviewers asked the officer-in-charge at each site to help reconstruct the history of practices at the site in terms of the six efficiency elements. They recorded this information in an Excel spreadsheet that showed the status of each efficiency element by month over the two year period (see Instrument 3 in Appendix A). One might argue that such an analysis – based on recall of the officer-in-charge – might be of questionable value. However, in a many cases, the response was clear-cut: the VMMC program at the site had ALWAYS used the efficiency element (e.g., multiple beds in several countries) or it had never used it (e.g., task-shifting in Zimbabwe or electrocautery/diathermy in Tanzania). If there was a change at a given site, this was often sufficiently noteworthy that the officer-in-charge could remember when the change took place. More often, the "change" related to the addition of new sites that had different policies or practices than the old 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 it has generated are very instructive as to differences across the program of the four countries.

Because of the experimental nature of this retrospective approach to data collection and the "unusual" form of the graphs that result from it, we opted to present these graphs in this appendix rather than in the main section of the report.

For each efficiency element, we present the relevant graphs for all four countries on a single page. This allows for comparison across the countries. The x axis represents the months between January 2010 and December 2011 (or the last month for which complete data were available for that country; if the site visit took place in August 2011, that was the final month for this set of graphs). In all graphs, the unit of analysis is the site (ranging from 14-30 sites per country). In interpreting these graphs, the reader must keep in mind that the "proportions" shown in each bar relate to the number of VMMC sites that were operational in that month. Figure 1 in the report shows this number. For example, in South Africa only one site (Orange Farm) was operational for the first 10 months of 2010; in Zimbabwe, the number was less than five throughout 2010. This perspective is important in interpreting the graphs in this appendix.

[16] In some countries, data collection ended prior to December 2011 and thus the country teams were not able to present the full 24 months of data. However, the 2012 data collection will pick up on the months not completed in this report.

For example, Figure B-1 (in this appendix) shows the change over time in proportion of sites using multiple surgical bays. The 100% for every month in three of the four countries means that all sites in those countries were consistently using this element of efficiency; however, in the case of South Africa, there were only 1-2 sites in 2010. By contrast, the proportion was lower and fluctuated over the two year period in Kenya, but corresponded to a larger number of sites – because the VMMC program in Nyanza province was fully functional when SYMMACS started.

The graphs in Figure B-2 should be fairly self-explanatory: the mean number of beds available per site and per operating team, January 2010 – December 2011. Again, we underscore the caveat that this mean is based on a very different number of sites per country.

Figure B-3 – the change over time in proportion of sites using bundled kits with pre-packaged consumables and disposable instruments - presents a curious trend that repeats itself in later graphs. A country that is "going along at 100%" appears to take a deep plunge. The reason for this is that one or more of the new sites that become operational in that month have not adopted the efficiency element in question. In the case of South Africa, the second site that became operational in November 2010 did practice bundling, so South Africa maintained its 100% on that element. However, in January 2011 the number of sites jumped to five, and only three of the five bundled; as such, the proportion dropped to 0.60. Additional sites became operational in 2011 and bundling became widely used across all sites, so that by the last month for which data were available in South Africa (September 2011), close to 9 in 10 sites bundled their supplies and instruments. By contrast, the proportion remained at zero for both Kenya and Tanzania, because the criterion involved both pre-bundling of supplies and equipment and use of disposable instruments (the latter of which is not practiced – at least in non-campaign periods – in these two countries).

Figure B-4 illustrates the type of graphs we hoped to achieve in using this approach to data collection and presentation: that is, a gradual in change over time in a practice, as shown for Tanzania on the variable "bundled supplies with reusable instruments." However, few of the graphs in this set showed this kind of gradual increase, since countries were more likely to have an "all or none" approach to a given element. Indeed, Figures B-5 and B-6 further illustrate the all-or-none phenomenon on task-shifting: Proportion of MC procedures performed by medical doctors versus nurses (or clinical officers). It does reflect the "exceptions to the rule" when in South Africa nurses reportedly performed VMMC procedures in periods of high volume (June/July and November/December 2010).

In Figure B-7 on task-sharing, we observe 100% adoption of this practice, except in South Africa during 2011. In this graph, task sharing is defined as "any site in which a primary provider shares three or more of the following tasks with a secondary provider: surgical preparation, administration of anesthesia, suturing for haemostasis, suturing of skin, haemostasis, bandaging, history taking or other.

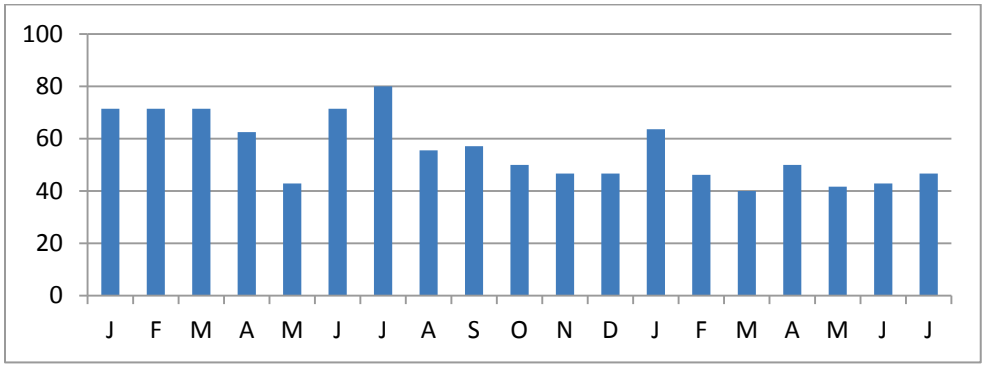
Figure B-8 shows the use of the forceps guided method at all sites in South Africa and Zimbabwe, and roughly 9 in 10 sites in Kenya. By contrast, the proportion of sites where at least 90% of VMMCs were performed using this surgical method increased from one-third to over two-thirds over the study period in Tanzania.

Figure B-10 reflects similar findings to those in the tables in the report on electrocautery. Electrocautery/diathermy is used in all sites in South Africa, a growing number of sites in Zimbabwe, very few sites in Kenya, and at no sites among those sampled in Tanzania. Figure B-11 provides further insight into this process, including a number of sites in Kenya (and all sites in Tanzania) where it was not available. For example, this graph differentiates use “sometimes” versus “never” in Zimbabwe.

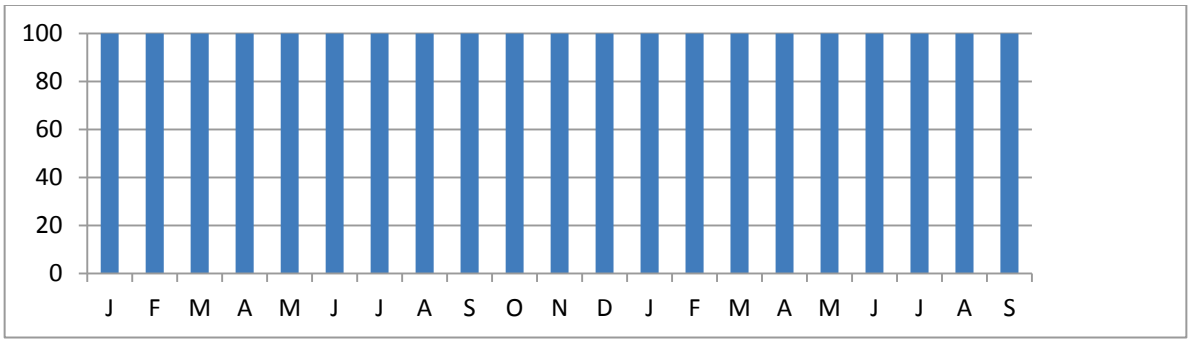
The data collection and processing to assemble this set of graphs was labor-intensive. (The Tulane team converted the statistics collected in the field with an Excel spreadsheet to an ACCESS data file used to produce these graphs.) It will be useful to get feedback from program managers, fellow researchers, and donors as to whether this novel approach to data collection represents “valued-added” to our understanding of the dynamic scale-up of VMMC programs, or whether data from the tables provided in the body of the report adequately describes the evolution in the adoption of the six efficiency elements.

Figure B-1 (Surgical bays). Change over time in proportion of sites using multiple surgical bays, January 2010 – December 2011

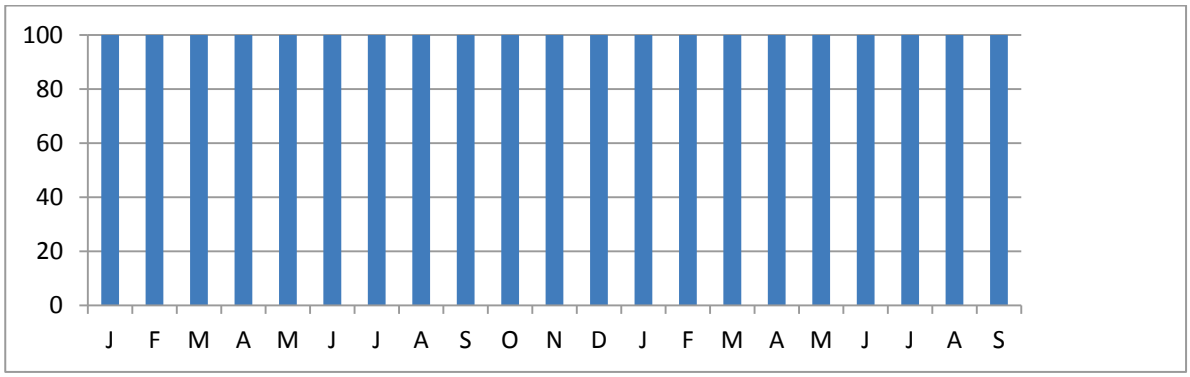
Kenya:



South Africa:



Tanzania:



Zimbabwe:

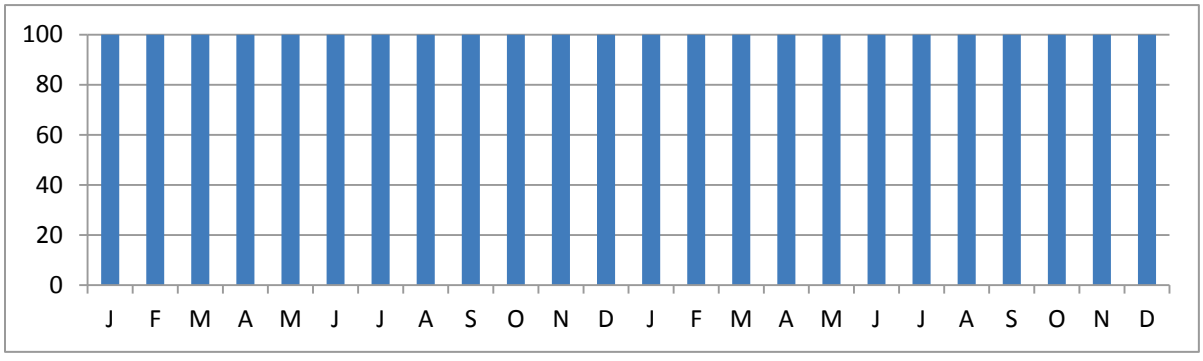
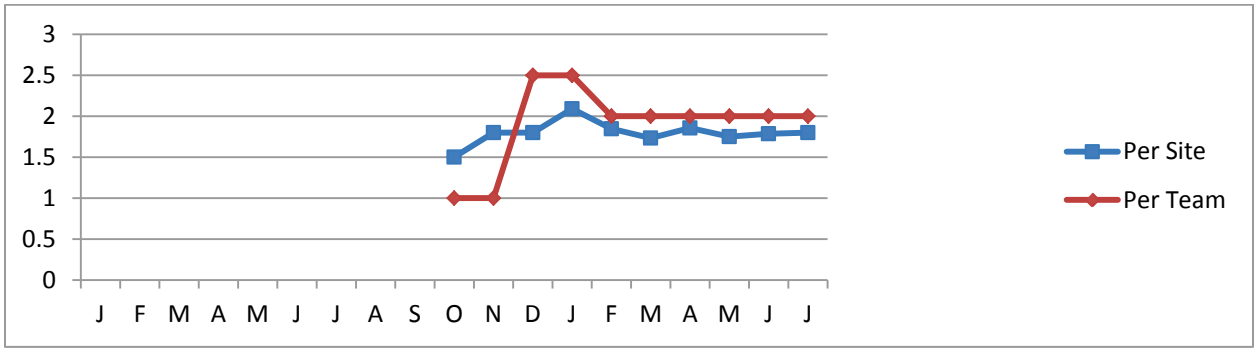
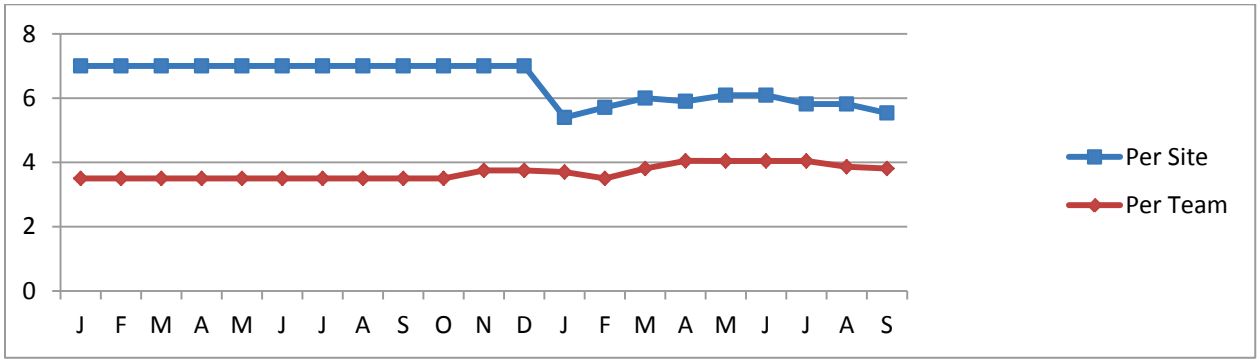


Figure B-2 (Surgical bays). Mean number of beds available per site and per operating team, January 2010 – December 2011

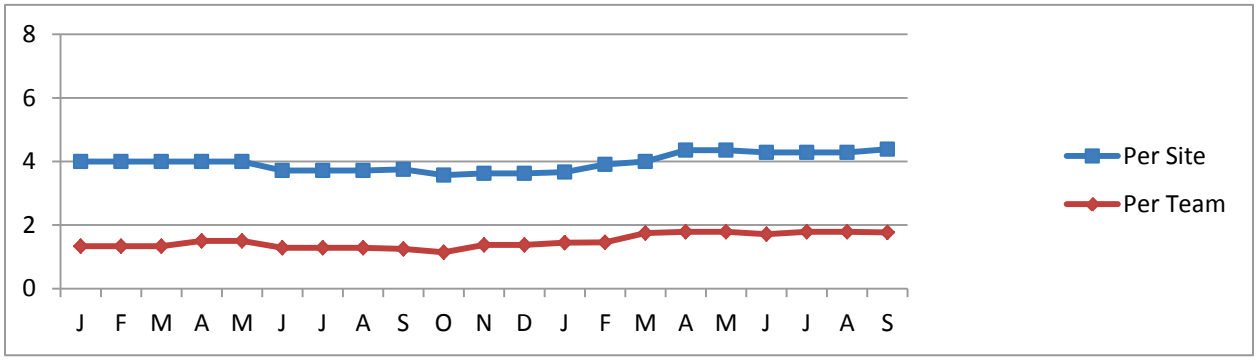
Kenya:



South Africa:



Tanzania:



Zimbabwe:

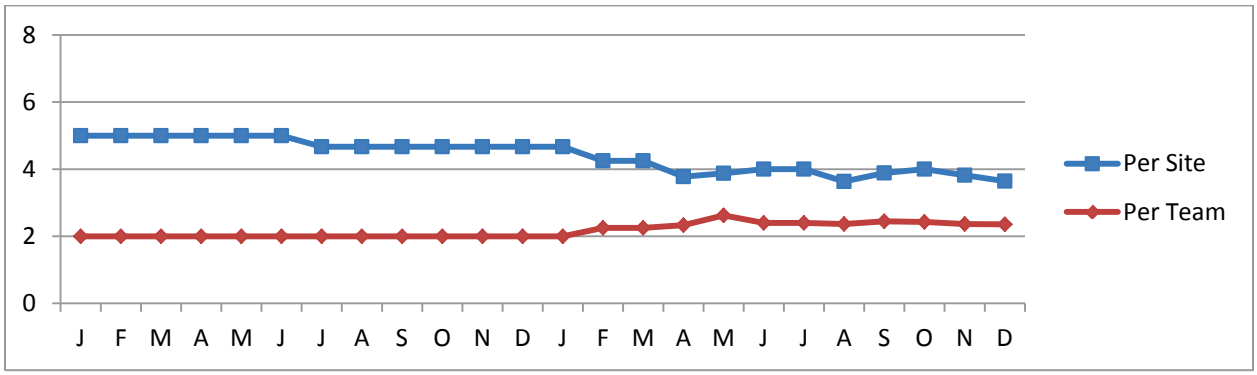
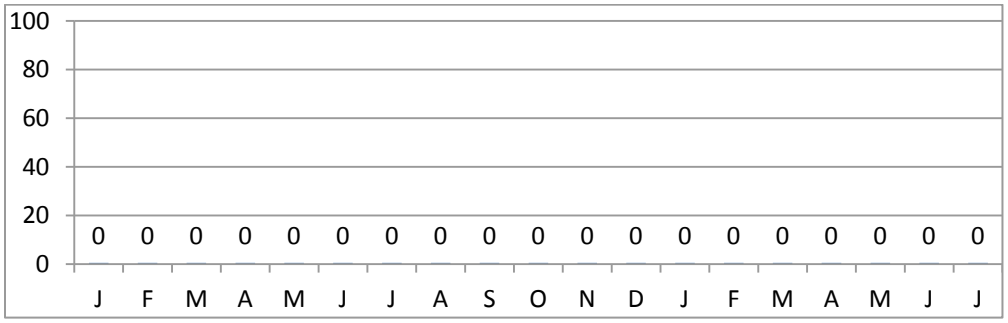


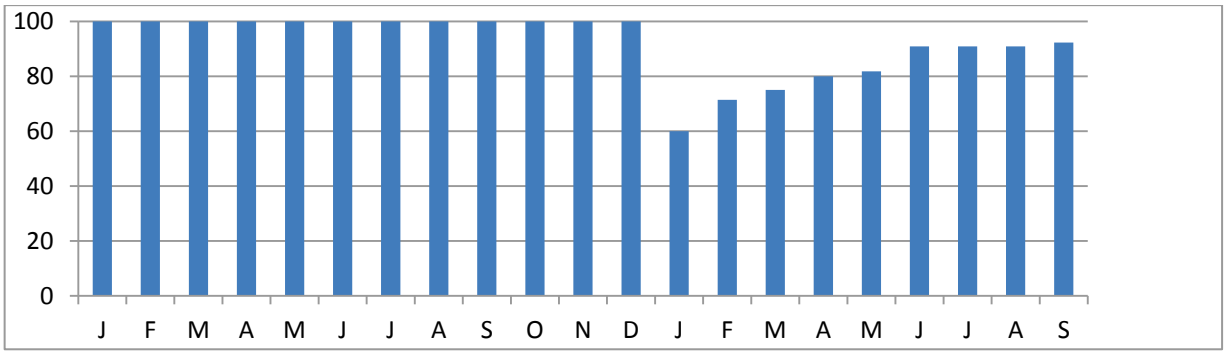
Figure B-3 (Pre-bundled supplies). Change over time in proportion of sites using bundled kits with pre-packaged consumables and disposable instruments, January 2010 – December 2011

(Defined as any site in which at least 80% of operations were performed using bundled kits with pre-packaged consumables and disposable instruments)

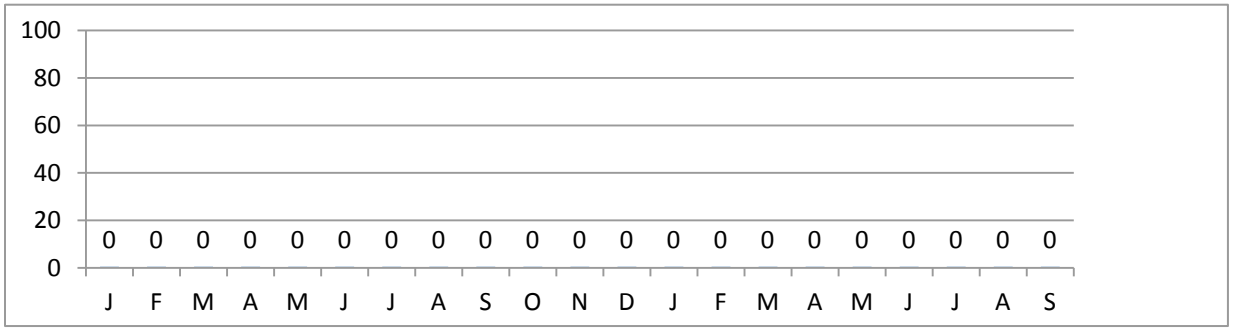
Kenya:



South Africa:



Tanzania:



Zimbabwe:

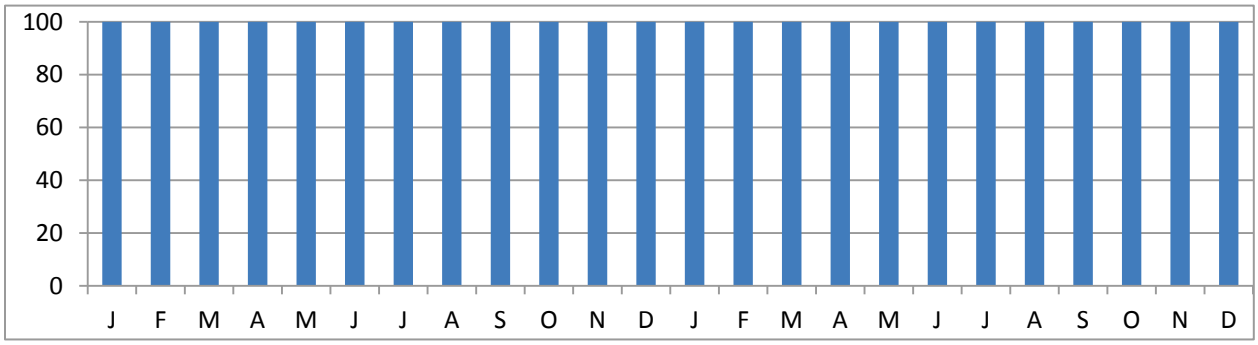
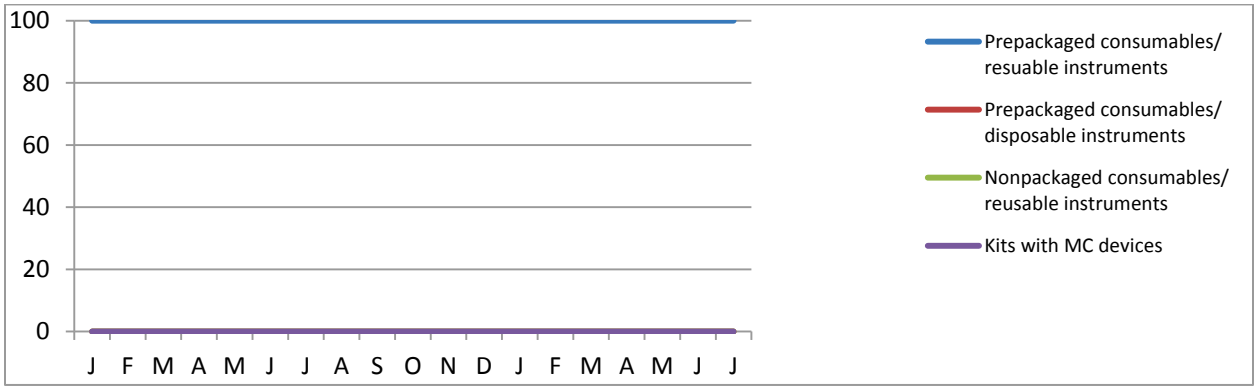
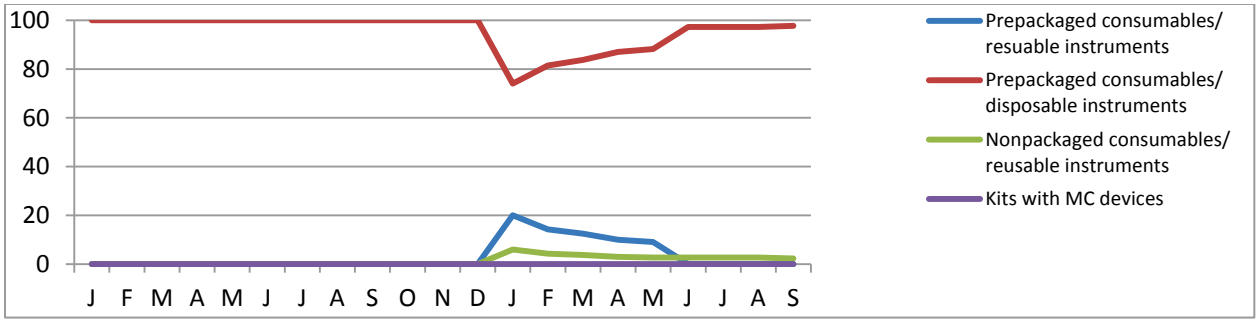


Figure B-4 (Pre-bundled supplies). Proportion of procedures conducted using bundled supplies, January 2010 – December 2011

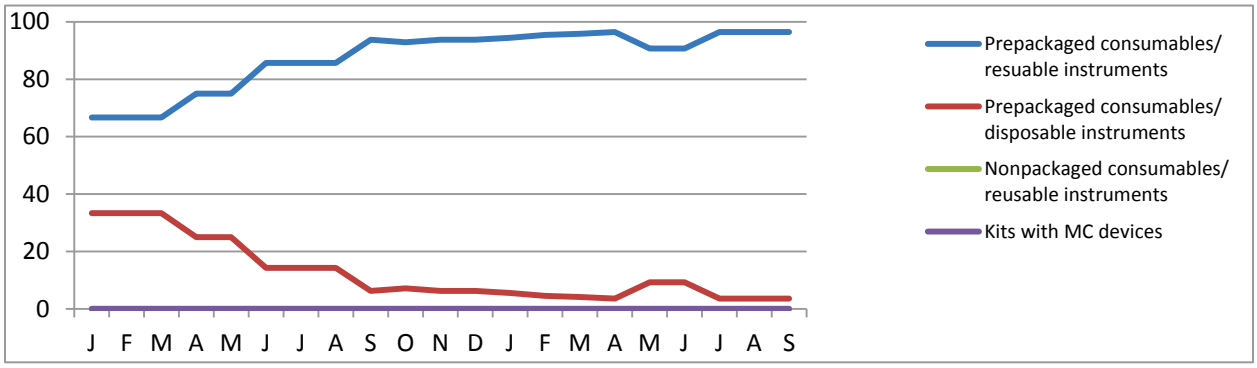
Kenya:



South Africa:



Tanzania:



Zimbabwe:

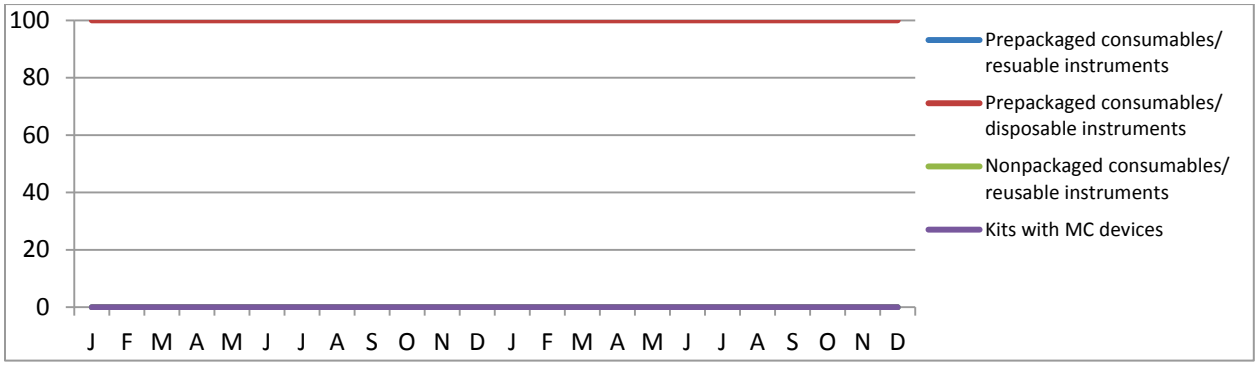
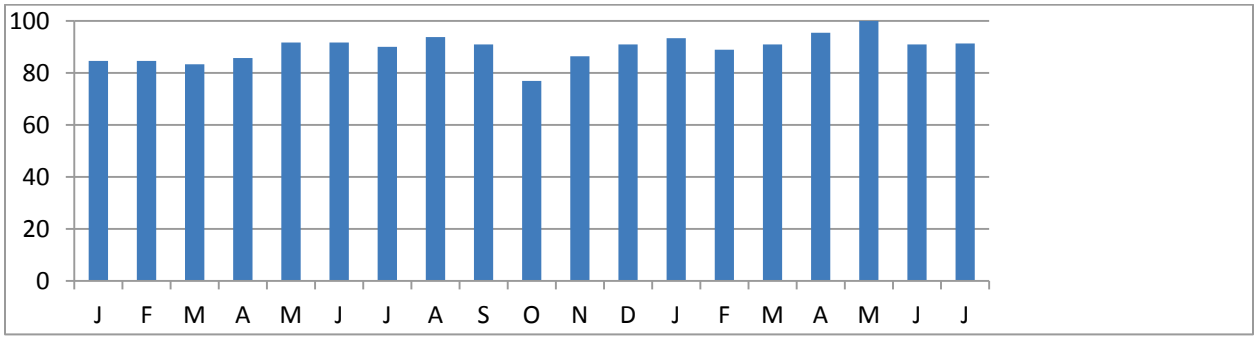


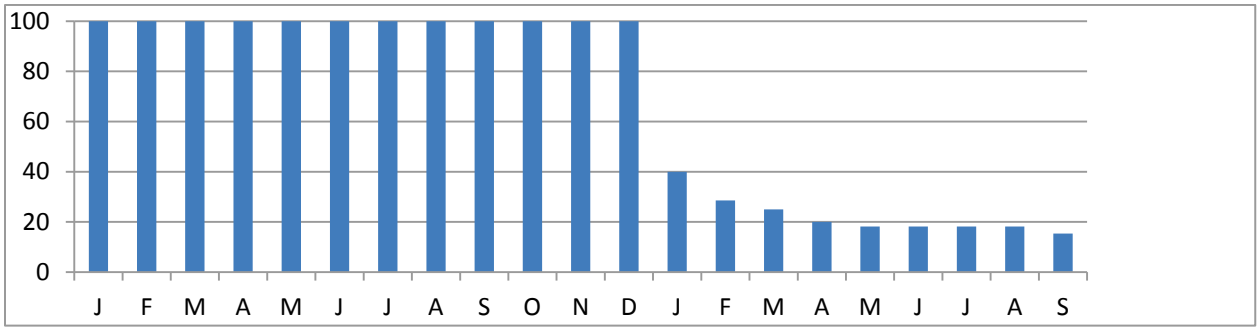
Figure B-5 (Task-shifting). Change over time in proportion of sites using task-shifting, January 2010 – December 2011

(Defined at any site in which at least 5% of operations were conducted by non-doctors/ alternative cadres of healthcare providers)

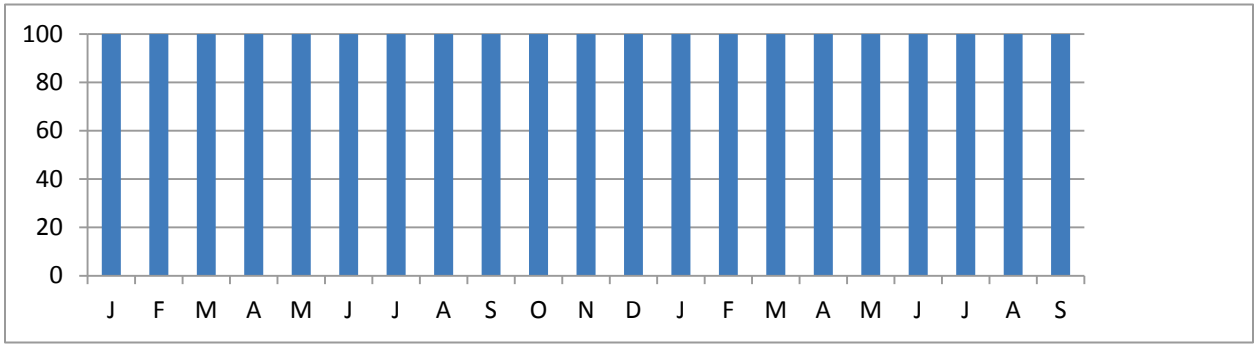
Kenya:



South Africa:



Tanzania:



Zimbabwe:

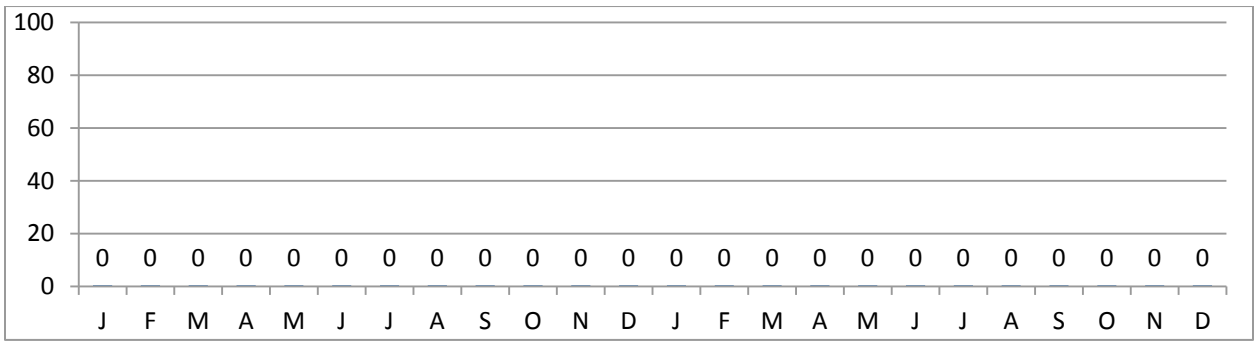
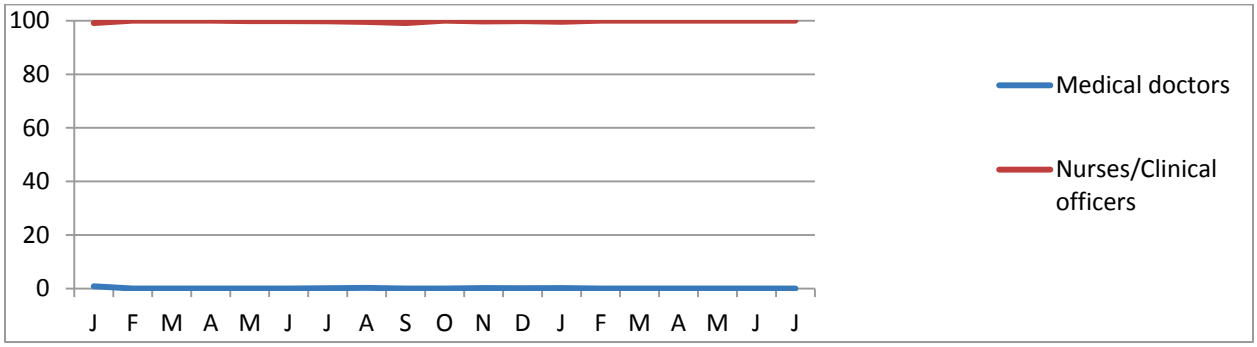
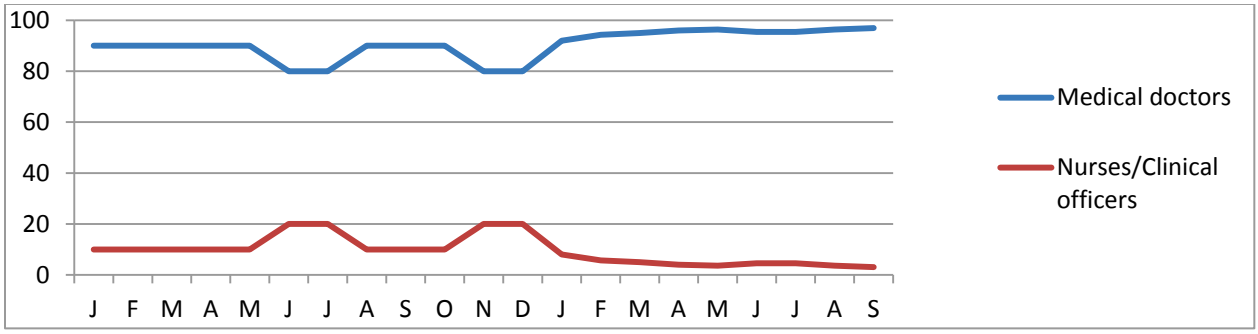


Figure B-6 (Task-shifting). Proportion of MC procedures performed by medical doctors versus nurses (or clinical officers): all MC sites, January 2010 – December 2011

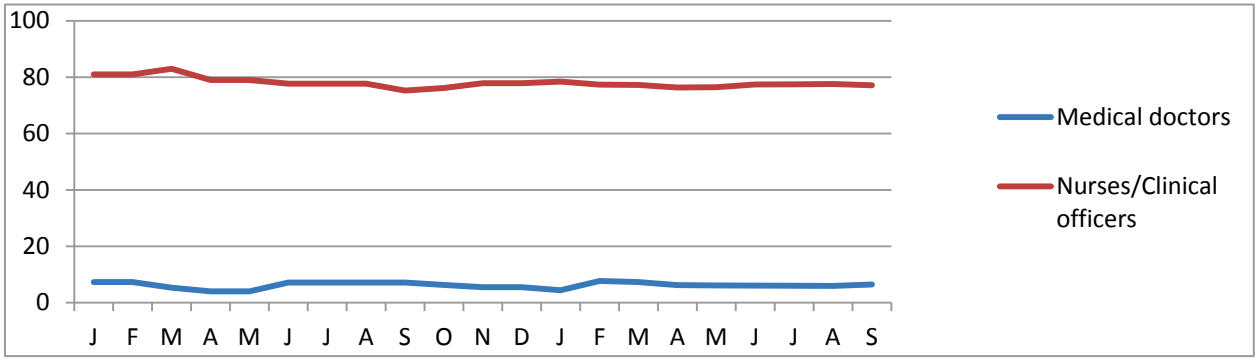
Kenya:



South Africa:



Tanzania:



Zimbabwe:

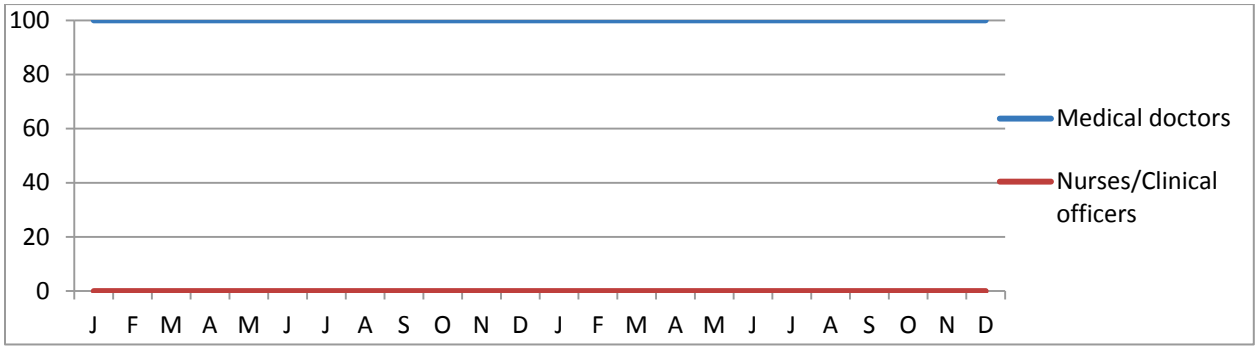
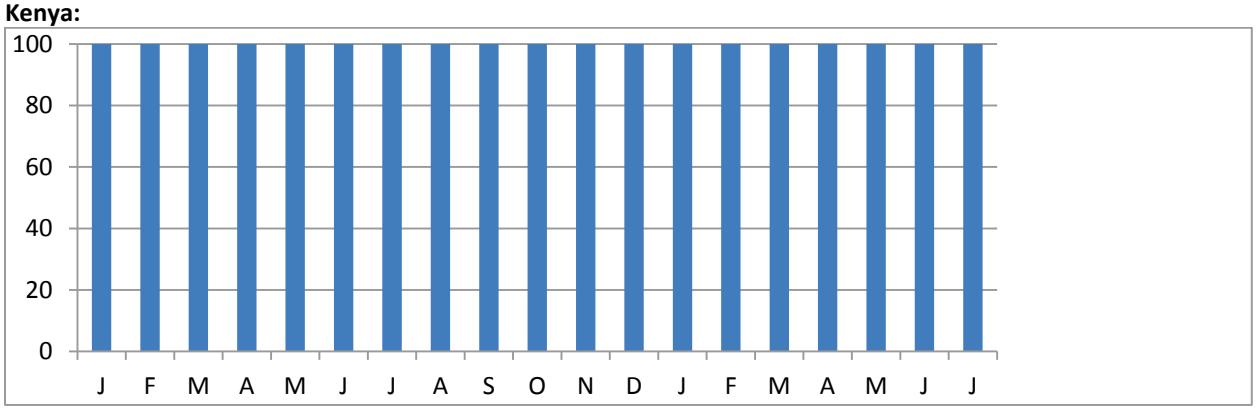
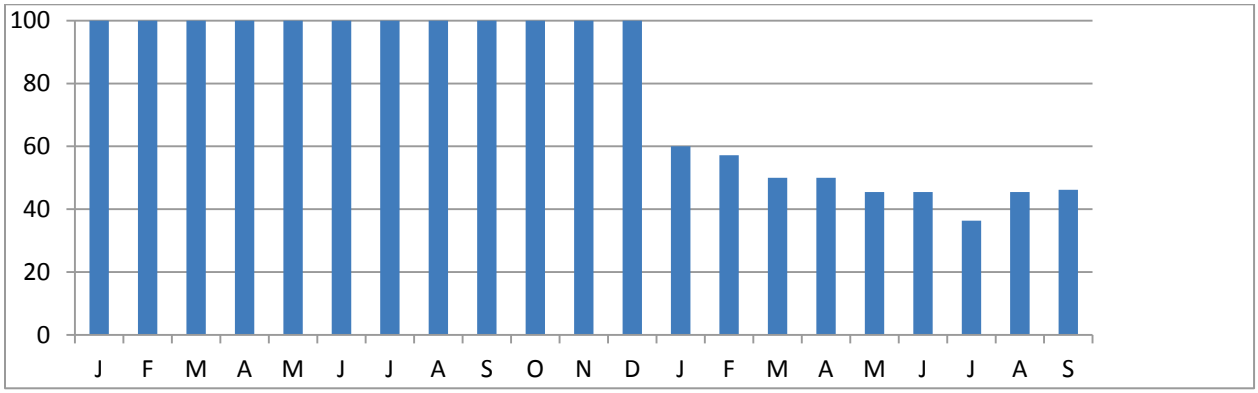


Figure B-7 (Task-sharing). Change over time in proportion of sites using task sharing, January 2010 – December 2011
(Defined as any site in which a primary provider shares three or more of the following tasks with a secondary provider: surgical preparation, administration of anesthesia, suturing for haemostasis, suturing of skin, haemostasis, bandaging, history taking or other)

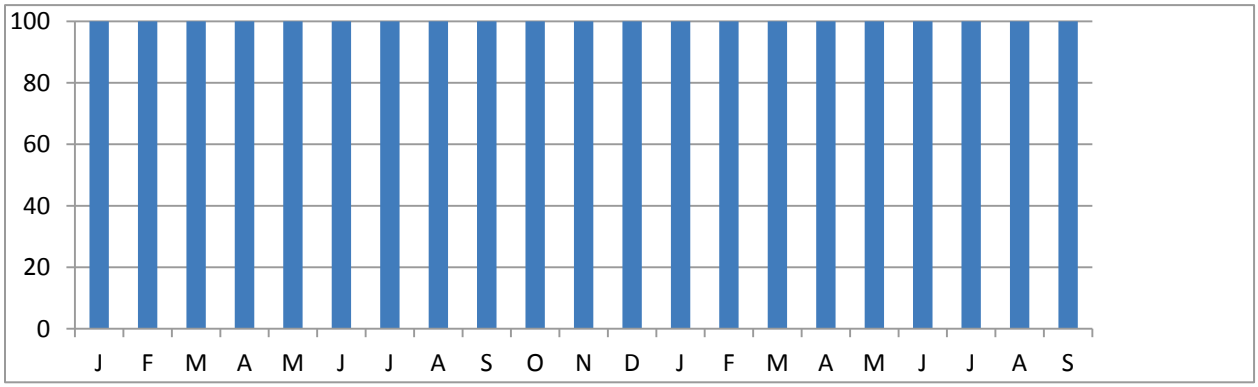
Kenya:



South Africa:



Tanzania:



Zimbabwe:

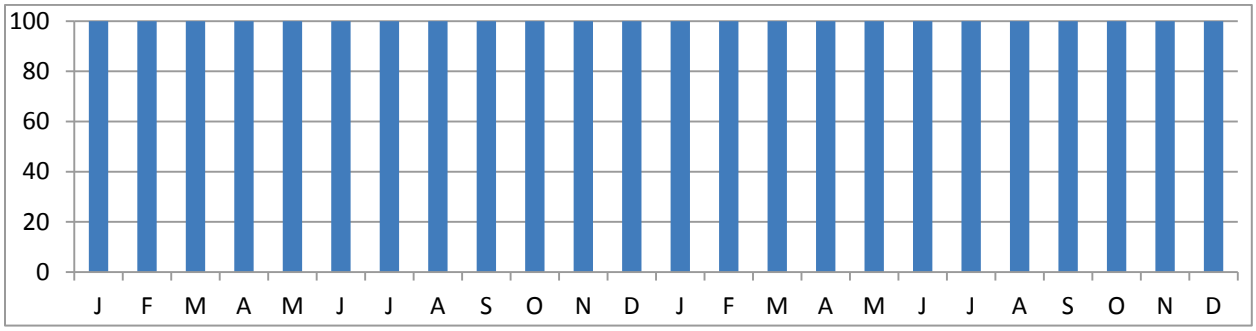
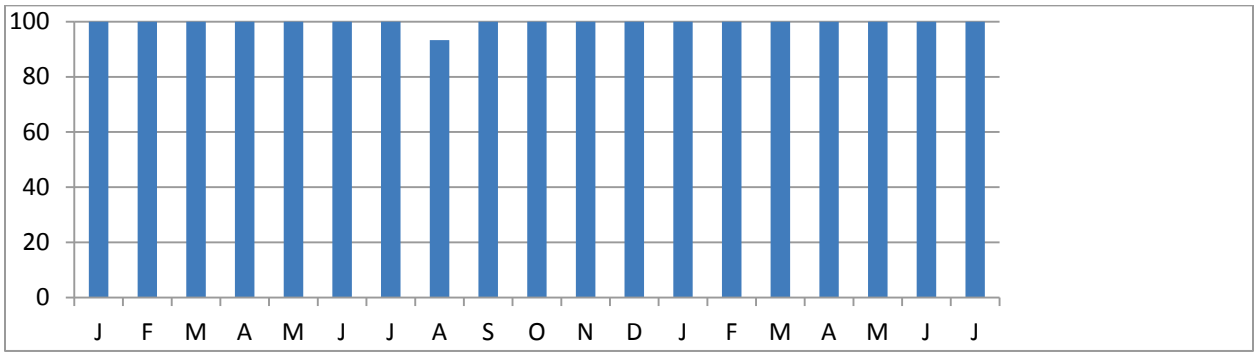
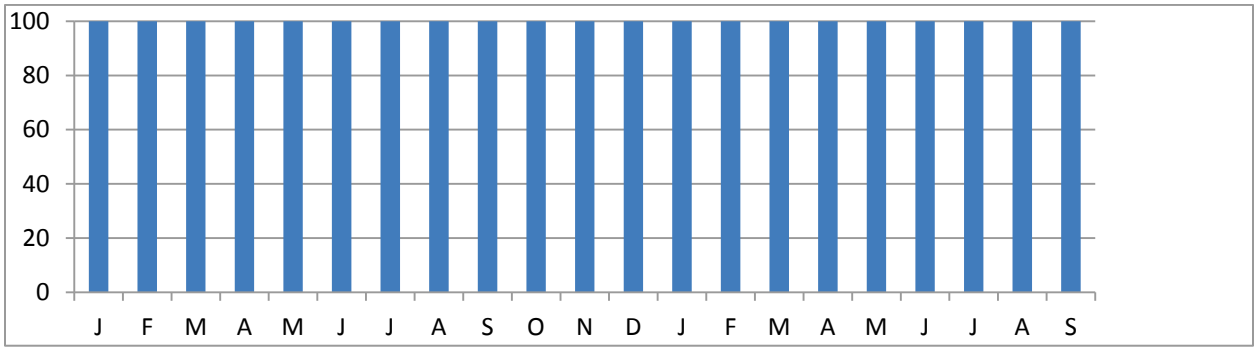


Figure B-8 (Surgical method). Change over time in proportion of sites using forceps guided method, January 2010 – December 2011
(Defined as any site in which at least 90% of procedures are performed using the forceps guided method)

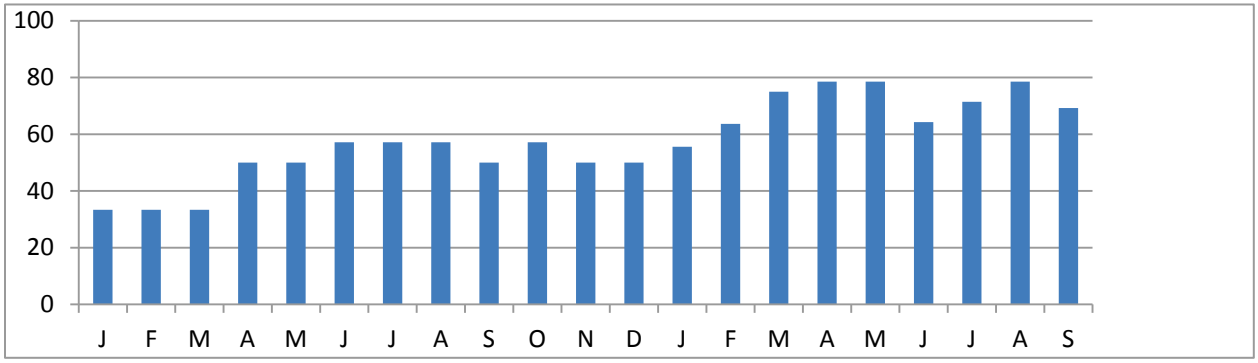
Kenya:



South Africa:



Tanzania:



Zimbabwe:

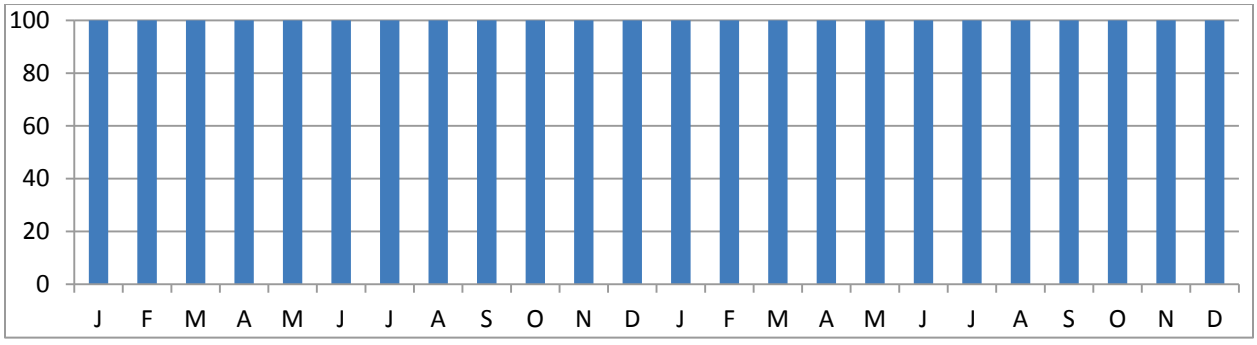
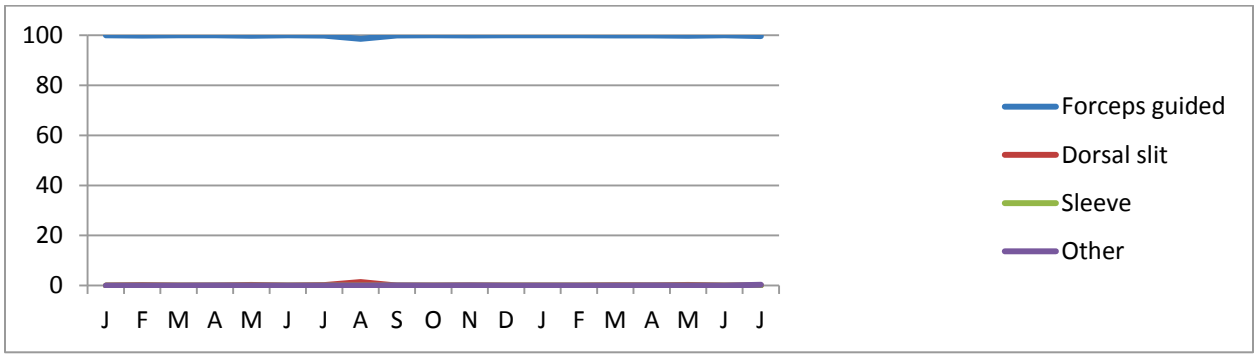
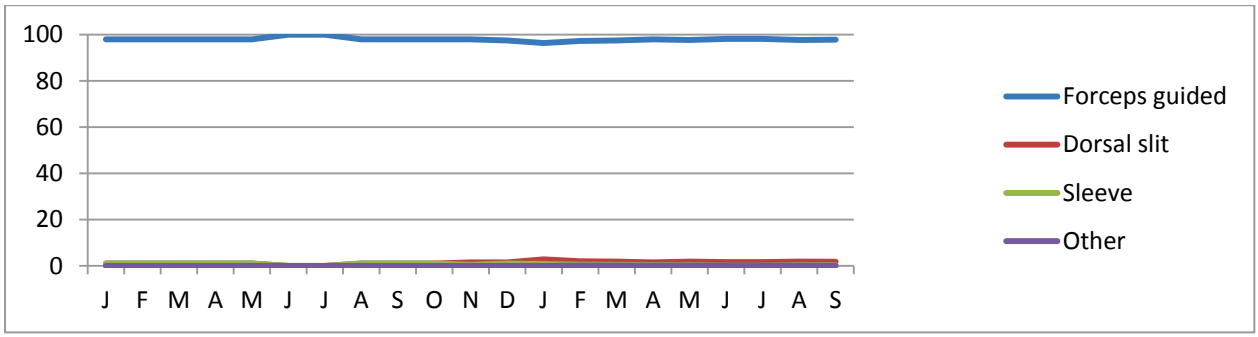


Figure B-9 (Surgical method). Change over time in proportion of MC procedures performed by surgical technique: total for all sites, January 2010 – December 2011

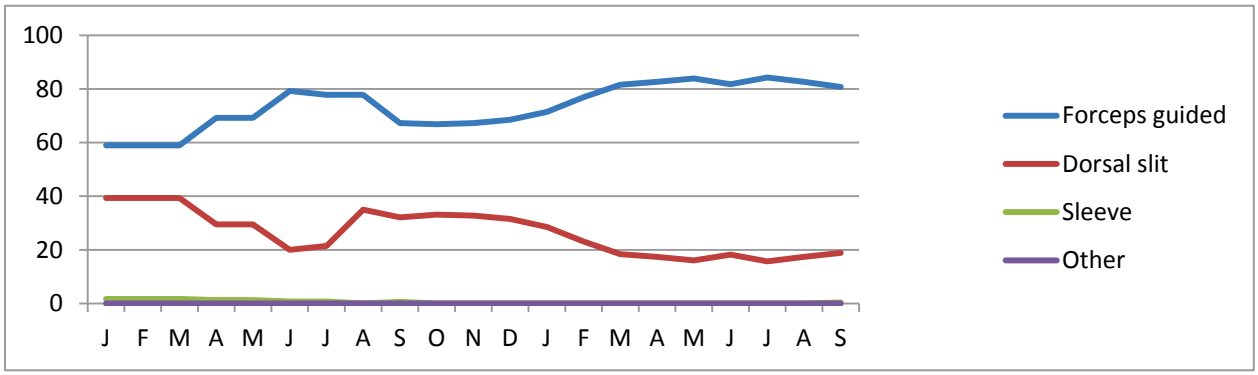
Kenya:



South Africa:



Tanzania:



Zimbabwe:

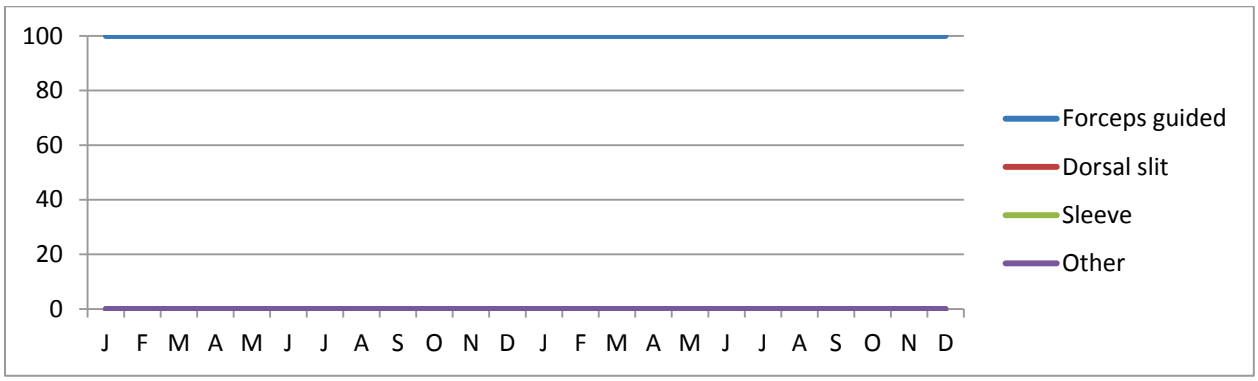
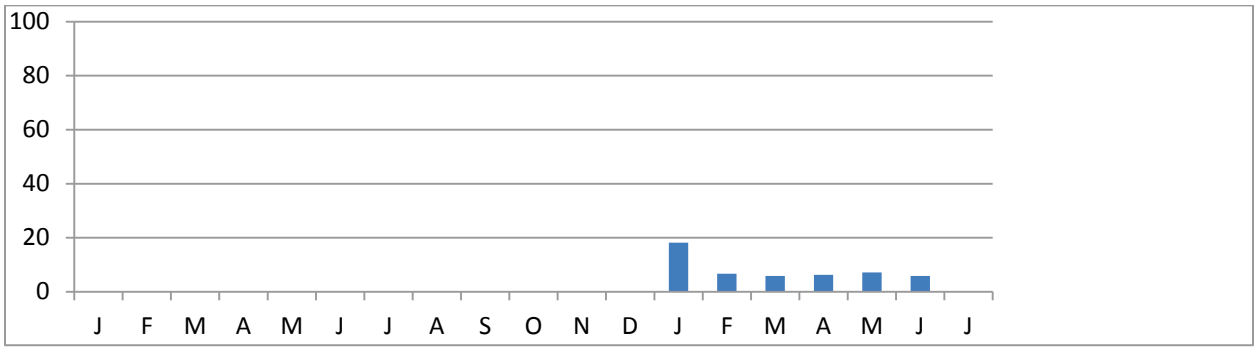
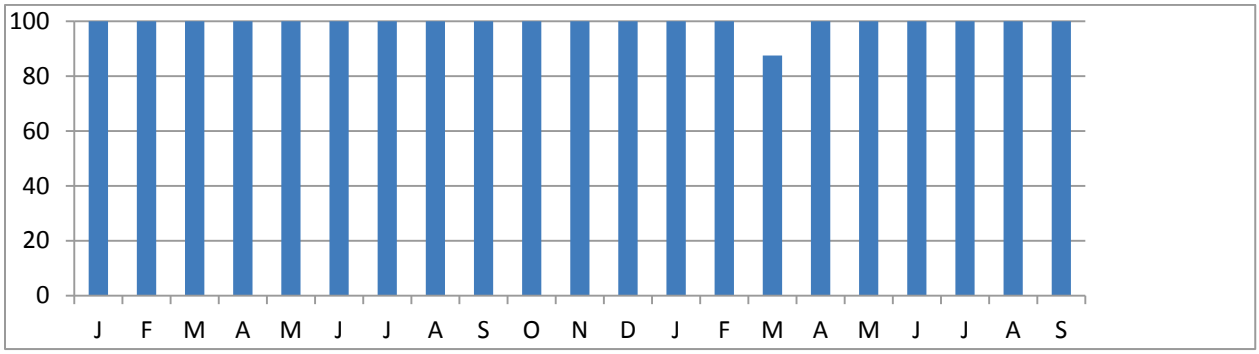


Figure B-10 (Electrocautery). Change over time in proportion of sites using electrocautery/diathermy, January 2010 – December 2011
(Defined as sites reporting to have used electrocautery/diathermy "always" or "sometimes")

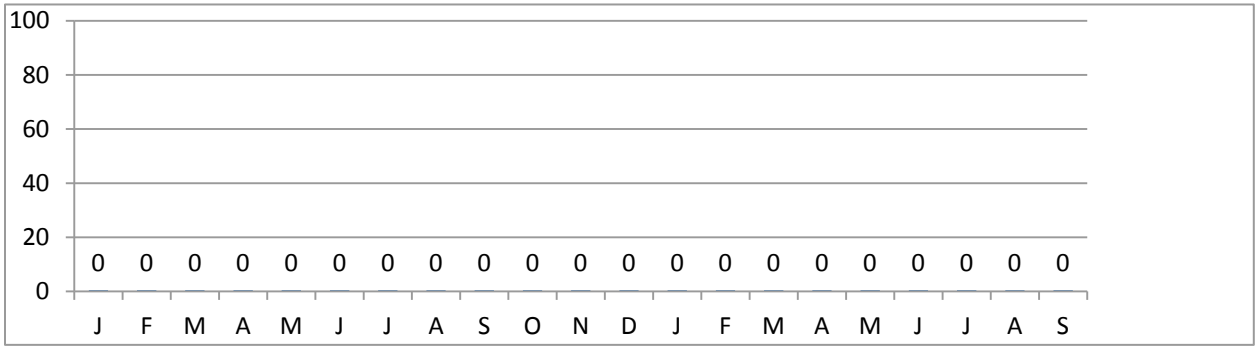
Kenya:



South Africa:



Tanzania:



Zimbabwe:

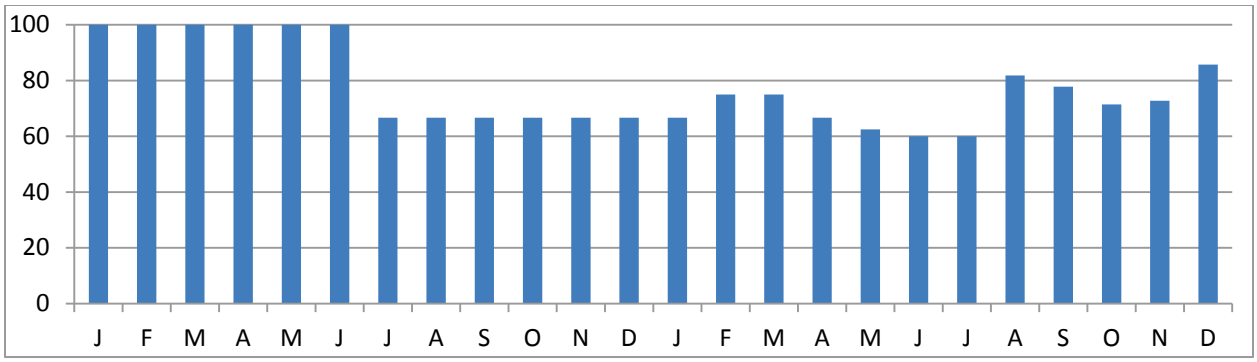
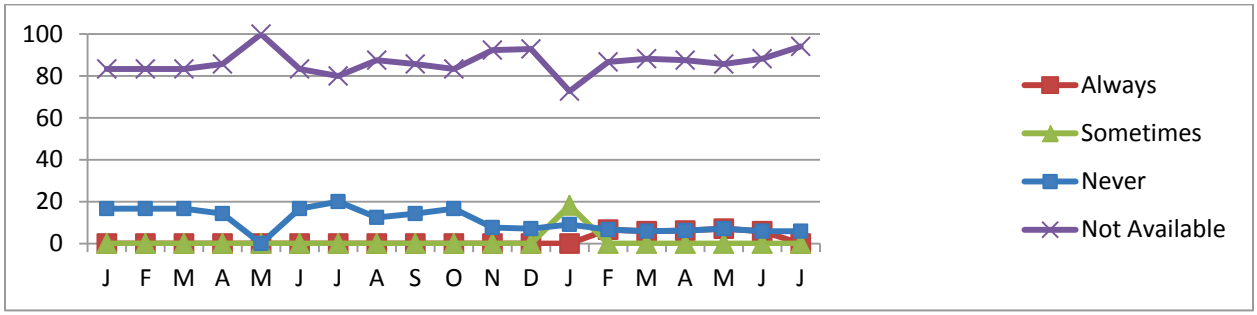
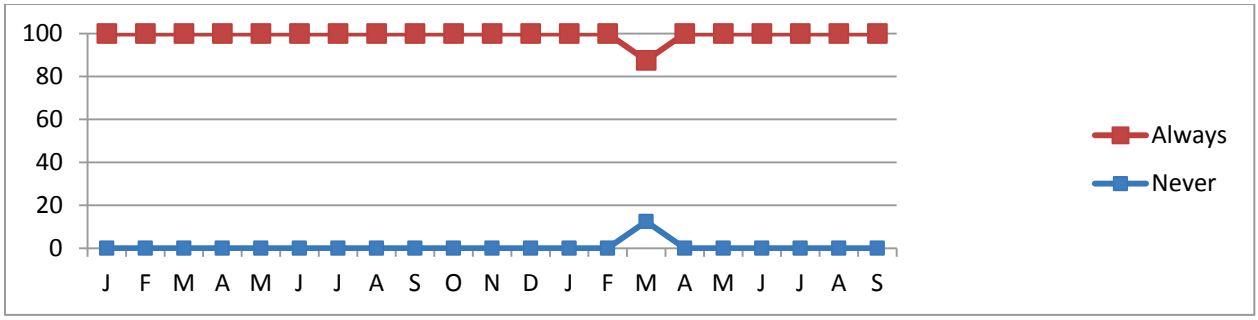


Figure B-11 (Electrocautery). Change over time in proportion of sites using electrocautery/ diathermy, January 2010 – December 2011

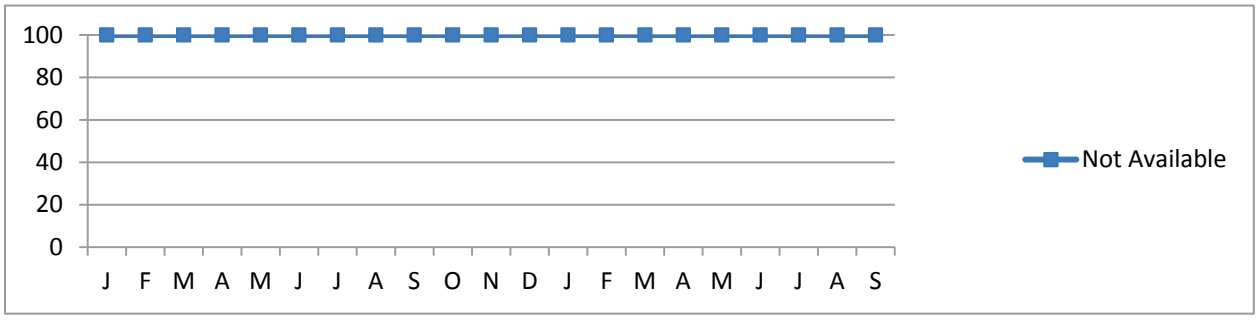
Kenya:



South Africa:



Tanzania:



Zimbabwe: