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Voluntary Medical Male Circumcision in Nyanza Province, Kenya

At the end of 2010, Dr. Nicholas Muraguri, head of Kenya's National AIDS and Sexually Transmitted Infections Control Programme (NASCO) had been working hard to promote male circumcision in Kenya since he took his post in 2008. Initially spending 20% of his time on the issue, Muraguri oversaw the creation of the Voluntary Male Medical Circumcision (VMMC) Strategic Plan, whose goal was to circumcise 80% of consenting uncircumcised Kenyan men aged 15–49 by 2013. Officials believed performing these 860,000 circumcisions could avert an estimated 900,000 infections over 20 years.¹ Nyanza province, which had the highest HIV prevalence rates and lowest male circumcision rates in the country, was a primary target for the program, expected to perform 426,500 circumcisions by the end of 2013.

In December 2009 a Rapid Results Initiative (RRI) in Nyanza, an intensive campaign to speed up progress, resulted in implementers completing 36,077 circumcisions in 30 working days. With a repeat RRI the following year, an additional 55,376 surgeries were performed. With 230,000 procedures completed in Nyanza by the end of 2010, Muraguri wondered how to sustain demand and to expand services nationally as 2013 quickly approached.

Overview of the Republic of Kenya

The Republic of Kenya is located in Eastern Africa and borders Ethiopia to the north, Sudan to the northwest, Uganda to the west, Tanzania to the south, and Somalia to the east. The country's southeastern border lies on the Indian Ocean, and the southwestern side borders Lake Victoria.³ Kenya is divided into eight provinces: the Coast, North Eastern, Eastern, Central, Nairobi, Rift Valley, Western, and Nyanza (see **Exhibit 1** for map). The majority of Kenya's roadways are unpaved and in rural areas.³

Of over 70 ethnic groups in Kenya, the Kikuyu (22%), the Luhya (14%), the Luo (13%), the Kalenjin (12%), and Kamba (11%) were the largest,^{3,4} with the smallest group, El Molo, numbering only about 500 people. The majority of Kenyans were Christian; others were Muslim, and some held indigenous beliefs.³

Julie Rosenberg, Claire Cole, Maria May, and Rebecca Weintraub prepared this case for the purposes of classroom discussion rather than to illustrate either effective or ineffective health care delivery practice.

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English was the official language, used by the government and in official documents, while Kiswahili was the national language spoken throughout most of the country.⁵ There were 69 languages spoken in total.³

In 2009, 78% of Kenyans lived in rural areas,⁵ of whom the majority worked in small-scale subsistence agriculture. Approximately 47% of all Kenyans lived below the national poverty line,⁶ and vulnerable groups such as orphans, widows, pastoralists, and the displaced comprised 40% of the population.⁷ About 40% of the population was unemployed in 2008,³ but one 2008–2009 survey showed 86% of men had held employment in the past 12 months.⁵

Basic Socioeconomic and Demographic Indicators*

INDICATOR		YEAR
UN Human Development Index ranking	147 (out of 168)	2009
Population (millions)	38.6	2009
Urban population (%)	21.6	2008
Drinking water coverage (%)	59	2008
Poverty rate (% living under USD 1.25 per day)	19.7	2005
Gini index	48	2005
GDP per capita in PPP (constant 2005 international dollars)	1,432	2008
GDP per capita (constant 2000 USD)	453	2008
Literacy (adult/youth; %)	(87/92)	2008

History

Kenya gained independence from Great Britain in December 1963 under the leadership of Jomo Kenyatta, who served as Kenya's first president until his death in 1978. Vice President Daniel arap Moi, succeeded Kenyatta and remained Kenya's president until 2002, when he was constitutionally banned from running for office again. Mwai Kibaki became Kenya's third president in what was widely considered a free and democratic election. In December 2007 Kibaki was re-elected for a second term, defeating Raila Odinga in a highly controversial election. Though Kenya was historically one of the more politically stable countries in the region, amid allegations of vote rigging and corruption, riots broke out across the country following Kibaki's re-election, resulting in 1,300 deaths and over 600,000 internally displaced persons.⁸

The election violence and related political and ethnic tensions largely came to an end in February 2008, when UN Secretary Kofi Annan mediated a power-sharing agreement between the parties that gave way to a coalition government. Kibaki would serve as Kenya's president and Odinga as prime minister—a newly created position that was not yet clearly defined. Cabinet positions were split evenly between the parties. Several ministries were split to accommodate greater power sharing, increasing the total from 32 to 44.⁹

Nyanza Province

Located along the banks of Lake Victoria, the largest lake in Africa, Nyanza Province was home to more than 5 million people, including 1.2 million males aged 15–49.^{10, 11} The Luo comprised the majority of Nyanza's population and primarily lived in 16 of Nyanza's 34 diverse districts.¹² Some districts were landlocked, while others bordered Lake Victoria and included many islands. Nyanza's rural terrain was

* This data was compiled from the following sources: United Nations (UN), UNICEF, World Bank, and United Nations Educational, Scientific, and Cultural Organization (UNESCO).

often described as rough. There was significant migration to, from, and within Nyanza, as many men left the province or went to Kisumu, Nyanza's capital, to find work.

Health in Kenya

Among all Kenyans, the leading causes of death were malaria (21%), pneumonia (12%), tuberculosis (10%), AIDS (9%), anemia (5%) and cancer (5%) according to 2006 vital registration records.¹³

Health System and Epidemiologic Indicators[†]

INDICATOR		YEAR
Average life expectancy at birth (total/female/male [years])	54.2/54.7/53.8	2008
Maternal mortality ratio (per 100,000 live births)	530	2008
Under-five mortality rate (per 1,000 live births)	128	2008
Infant mortality rate (per 1,000 live births)	81	2008
Vaccination rates (% of DTP3 coverage)	75	2009
Undernourished (%)	31	2007
Adult (15–49 years) HIV prevalence (%)	6.3	2008
HIV antiretroviral therapy coverage (%)	48	2009
Tuberculosis prevalence (per 100,000)	180	2008
DOTS coverage (%)	100	2007
Malaria cases (per 1,000)	310	2006
Expenditure on health as a % GDP expenditure	4.5	2008
Government expenditure on health as a % of total government expenditure	7.1	2008
Annual government expenditure on health per capita (international dollar/USD)	27/15	2008
Total annual health expenditure per capita (international dollar/USD)	71/40	2008
Physician density (per 10,000)	1.4	2002
Nursing and midwifery density (per 10,000)	11.8	2002
Number of hospital beds (per 10,000)	11	2009

Health Care System

In 2006, 41% of health facilities were public, 43% were private for-profit, and 14% were nonprofit. The Kenyan public health system had six tiers that worked to help fulfill its vision to provide “quality health care that is acceptable, affordable, and accessible to all.” At the uppermost level were the national referral and teaching hospitals, followed by regional or provincial general hospitals and district general hospitals, all of which provided tertiary care. Health centers, dispensaries, and community health workers who

[†] This data table was compiled using data and definitions from the following sources: WHO, UNICEF, UN.

worked to respond to local health needs, primarily without compensation, comprised the lower three tiers and provided primary health care (see **Exhibit 2** for number of facilities).^{14, 15}

Consultation at dispensaries and health centers was free after a minimum registration fee of USD 0.2 and USD 0.3, respectively, starting in 2004. Treatment for specific conditions posing a public health threat, including HIV (starting in 2006),¹⁶ tuberculosis, and malaria, was also free, as was care for children younger than five years. Though health care utilization increased by 70% when the policy took effect, the increase in attendance was not sustained. Patients did not understand the recommended charges, and charges differed between and within districts, depending on adherence to the policy.¹⁷

The government recognized that “the public health infrastructure often falls short of having the means to fulfill its mandate without external assistance.”¹ In Nyanza province, for example, the majority of public hospitals were understaffed and underequipped to provide even basic medical care. In Rachuonyo district, the doctor-to-patient ratio was 1:150,000.¹⁸ The average distance to a health facility was five kilometers, and travel for many patients was by foot. Most Kenyans accessed the private sector; 47% of poor people reported using private facilities.

Under Kenya’s coalition government, the Ministry of Health was divided into the Ministry of Public Health and Sanitation and the Ministry of Medical Services in 2008.¹⁹ The Ministry of Medical Services oversees health service delivery in the national, provincial, and district hospitals, and the Ministry of Public Health and Sanitation oversees primary health care services and public health programs.²⁰ A different political party heads each ministry.⁹

All health facilities are responsible for reporting into the Health Management Information System, which was strengthened in 2008 with aid from the US President’s Emergency Fund for HIV and AIDS Relief (PEPFAR; see **Exhibit 3** for PEPFAR background).²¹

Out-of-pocket health expenditures accounted for 77.2% of private health spending and 44.7% of total health spending in 2008.²² The National Hospital Insurance Fund, the primary insurance used in Kenya, available to informal workers and those over 65, covered inpatient services, and 88% of insured people had this insurance.²³ While there were plans to convert the National Hospital Insurance Fund into a social health insurance system in 2004, these plans were never realized.²³ The Kenyan government reported that donors funded 31% of health projects in 2008. External funding, having increased over the past decade, accounted for 20.3% of total health spending, much less than in surrounding countries.^{24, 25} The 2008–2012 strategic plans for the Ministry of Public Health and Sanitation and the Ministry of Medical Services called for more public-private partnerships.²⁶

Male Circumcision in Kenya

Long before medical benefits were known, most ethnic groups in Kenya practiced male circumcision as a rite of passage from boyhood into manhood.²⁷ Muslims also practiced circumcision. Members of circumcising groups stigmatized those who were uncircumcised. “If you have a foreskin, you’re not a real man,” one informant explained. “Even if you have gray hair, you’re considered a boy.” This type of “cultural chauvinism,” as he called it, was used for political expediency. Most of Kenya’s powerful political leaders came from circumcising ethnic groups, and circumcision status had been raised as an issue during elections.¹

The majority of adult males in Kenya were circumcised, with a national rate of 84% in 2009 (see **Exhibit 4** for circumcision rates by province).¹¹ Non-circumcising groups included the Turkana, who live primarily in northern Kenya, and groups originating from areas near the Ugandan border, such as the Luo and Teso. Nyanza Province had the lowest circumcision numbers in the country, with a reported prevalence of 46.7%

in 2007; some districts of Nyanza primarily occupied by Luo had a circumcision prevalence of as low as 17%.^{28, 29}

Traditional circumcision providers were not professionally trained health care providers, and their circumcisions ranged in the extent of foreskin removal. Often done on adolescents in public group ceremonies, one knife could be used to perform several circumcisions.²⁹ Anesthesia was not commonly used, as the pain of the circumcision was central to the rite of passage into manhood. Traditional circumcision accounted for 10% of all circumcisions, and though limited, studies of traditional circumcision suggested a higher rate of adverse events and complications than those done by trained health professionals.^{27, 29}

Even prior to the introduction of VMMC as a public health intervention to prevent HIV infection, many Kenyans, including those from traditionally non-circumcising groups, sought male circumcision from the health system, separating the physical cutting from the ceremonial portion of the ritual. Sterilization practices varied across informal and formal clinical circumcision settings, ranging from heating the knife in fire to using pressure cookers if there was not an autoclave available.²⁹ Men scheduled their circumcisions, considered a minimally invasive surgical procedure, at the health facility and paid out of pocket for the procedure. Circumcision in a medical facility cost between USD 6 and USD 12, an amount that was prohibitive for many.

Men from traditionally non-circumcising communities opted for circumcision for a variety of reasons. Some, especially after the VMMC campaign began, sought circumcision for the protective effects against HIV transmission. A small minority³⁰ sought circumcision to improve the prospect of engaging with more sexual partners. One client explained, “I got circumcised because it gave me a very easy time with ladies from other tribes. Several tribes prohibit their women from sleeping with uncircumcised men.”^{29, 31}

HIV/AIDS in Kenya

The first official case of HIV/AIDS was reported in Kenya in 1984. As of 2007, Kenyan women were more likely to be infected with HIV (8.4%) than men (5.4%). Women aged 15–24 were four times more likely to be infected (5.6%) than men in the same age group (1.4%; see **Exhibit 5** for HIV prevalence by age).³² In 2009 new reports showed that almost 7% of Kenyans aged 15–64 (1.4 million Kenyans) were HIV positive and that transmission was occurring most frequently through vaginal sex between casual heterosexual partners (accounting for 41% of cases), in discordant couples in steady partnerships (accounting for 12% of cases), formal and informal sex work (accounting for 8% of cases), and injecting drug users (accounting for 5–7% of cases; see **Exhibit 6** for incident HIV infections by mode of transmission). About 45% of married, HIV-positive individuals had a partner who was not infected.³³ In 2003 HIV prevalence was about 25% in Luo women and 18% in Luo men.³⁴ The epidemic was mixed and geographically heterogeneous, with characteristics of both a “generalized” epidemic and a “concentrated” epidemic among most-at-risk populations.³⁵ There were regional discrepancies, with prevalence ranging from less than 1% in Northeastern province to almost 15% in Nyanza.

National Response

The Kenyan government’s initial response to HIV/AIDS, starting in 1986, aimed to prevent HIV through educational campaigns.³⁶ By 1990, when over 100,000 Kenyans had died from the disease, Kenya had created the National AIDS and STI Control Program (NAS COP) in the Ministry of Health, but progress in responding to HIV was widely perceived as slow.³⁶ In 1999, amid mounting criticism, President Moi announced plans to create a National AIDS Control Council (NACC)³⁶ within the office of the president to coordinate HIV activities across all ministries, civil society, and faith-based, private, and donor organizations in Kenya.³⁷ NACC announced Kenya’s first five-year National AIDS Strategic Plan in 2000.³⁸

In 2004 Kenya received USD 92.5 million from PEPFAR for service delivery and technical support.³⁹ Funding was channeled through the US Centers for Disease Control and Prevention (CDC), the US Agency for International Development (USAID), the Walter Reed Medical Research Unit, and the Peace Corps.⁴⁰ In partnership with the Government of Kenya, PEPFAR selected 78 primary funding recipients.⁴¹ PEPFAR funds assisted in expanding prevention of mother-to-child transmission (PMTCT; reaching 73% of HIV-positive pregnant women by 2009) and voluntary counseling and testing (VCT) services.³⁶

In 2005 the government published the second National AIDS Strategic Plan (2005–2010)³⁸ and declared a “total war on AIDS.” With a budget of USD 2.39 billion (24% to prevention, 29% to care and treatment, 30% to mitigation of socio-economic impact, and 17% to support services), the plan prioritized targeted interventions for vulnerable populations, including discordant couples, commercial sex workers, orphans, migrant workers, armed services, youth, and people living with HIV/AIDS and called for greater grassroots-level involvement.³⁸ NACC made a deliberate effort to decentralize and increase local participation and decision making.

In 2004 public hospitals and clinics began to offer antiretroviral drugs free of charge. The percent of Kenyans with a diagnosis of HIV infection who were eligible for treatment and were receiving antiretrovirals increased from 5% in 2000 to 42% in 2007. By June 2006, at the Government of Kenya’s request, PEPFAR had allocated an additional USD 60 million to HIV prevention.⁴² A small part of that funding, starting in 2007, went toward male circumcision. In 2008, the United Kingdom’s Department of International Development and the World Bank began supporting the government’s plan to increase delivery of HIV prevention and care services by community-based organizations at the local level.⁴³

With new 2009 reports confirming heterosexual sex as the most common means of HIV transmission in Kenya, NACC and NASCOP quickly created the National AIDS Strategic Plan 2009–2013, focusing on Kenya’s most-at-risk populations. Its goals included reducing the number of new HIV infections by 50% and AIDS-related deaths by 25%. With 60.7% of government health spending going to HIV/AIDS-related costs,⁴⁴ the plan focused on results-based management, ensuring that all of its investments led to desired results (see **Exhibit 7** for donor contributions to the plan). All national activities were expected to be cost-effective—costing less than USD 4,000 per infection averted—to save more lives.⁴⁵

Of the USD 3.56 billion budgeted for the 2009–2013 plan execution, USD 2 billion came from PEPFAR.⁴⁶ About 19.5% was allocated to prevention, 57.9% to care and treatment, 8.4% to orphans and vulnerable children, 13.8% to AIDS program management (including surveillance, monitoring, and evaluation), 0.2% to human resources, and 0.1% “to create an enabling environment.”⁴⁵

Voluntary Medical Male Circumcision for HIV Prevention

A 1986 paper suggesting that male circumcision had a protective effect against HIV/AIDS was the first of many observational studies suggesting a similar hypothesis. In 2000 a cohort study done in Rakai, Uganda, found male circumcision was associated with reduced HIV acquisition in men.⁴⁷ The first report of a randomized controlled trial looking at the association was from a study of 18–24 year old males started in 2002 in Orange Farm, South Africa. The study was stopped early, in 2004, after interim data showed a 60% reduction in risk of female-to-male transmission of HIV among the men who were circumcised.⁴⁸ At that point, those in the control group were offered circumcision.⁴⁹

Around the same time the Orange Farm trial began, in 2002, two other randomized controlled studies began. One study in Rakai, Uganda, looked at the impact of circumcision on HIV incidence among HIV-negative, uncircumcised men aged 15–49.⁵⁰ In Nyanza’s capital, Kisumu, a team of researchers from the Universities of Nairobi, Illinois, and Manitoba (UNIM) sought to determine the relative risk of HIV

incidence in 18- to 24-year-old men who underwent circumcision compared with those who did not.⁴⁸ With permission from various institutional review boards, researchers sought advice and consent for the Kisumu trial from the Luo Council of Elders and formed an advisory board of Kisumu community members who met quarterly to advise on conduct of the Nyanza trial that ultimately recruited 2,784 participants, including many Luo.

Prior to the release of UNIM trial results,⁴⁸ with the Orange Farm trial results in hand, the Government of Kenya convened the first official male circumcision stakeholder meeting in September 2006, aiming to scale up existing male circumcision services as quickly as possible (see **Exhibit 8** for a timeline of events).^{1 †}

In December 2006 an interim data analysis by the Data and Safety Monitoring Board found a 51% protective effect in Rakai, Uganda, and a 60% protective effect in Kisumu, Kenya. Both trials were stopped, and researchers began offering circumcision procedures to all participants. In February 2007 the results of both the Rakai and UNIM trials were published in *The Lancet*, and within a month, having three conclusive studies in hand, the WHO and the Joint United Nations Programme on AIDS (UNAIDS) issued guidance and endorsed male circumcision accompanied by HIV counseling and testing, sexually transmitted disease treatment, safe sex promotion, and condom provision for HIV prevention. They advised countries with heterosexually driven, generalized HIV epidemics and low male circumcision rates to “scale up with urgency.”⁵¹ As the UNIM researchers wrote, “Such consistency of clinical, observational, and biological data has not been reported for any other intervention that addresses reduction of HIV incidence in adults.”⁴⁸ While UNAIDS recommended countries target men aged 12–30, another study found targeting men older than the recommended age group might initially be the most cost-effective strategy; targeting any adult age group would eventually be cost-saving.⁵²

Following the international recommendations and accounting for emerging research, the third Kenyan National AIDS Strategic Plan 2009–2013 included male circumcision as an official part of its strategy. The plan stated, “The most cost-effective intervention, at about USD 225 per case averted, is that of voluntary, medically-assisted adult male circumcision (VMMC) for men in rural Nyanza aged 25 to 49 years.”^{53, 11} Kenya would be the first country in sub-Saharan Africa to roll out a national male circumcision program for HIV prevention.

Voluntary Medical Male Circumcision in Kenya

UNIM’s research teams urged national leadership to reach out to Luo community leaders to discuss the plan. As one partnering implementer explained, “When we were first getting started, I said ‘This is not going to be a public health project where you sit and a sick person just comes. You will need the community leaders to help you in the future after the first wave of demand is over’ ... It was very important that we hold off until we’d gotten community buy in.”

Community engagement began in April 2007.¹ National leaders shared the results of the Kisumu trial with the Luo Council of Elders. Dr. Nicholas Muraguri, director of health promotion at the time, explained:

We took a very aggressive publicity approach. We wanted the message to be clear. The Ministry of Public Health had to overcome the idea that we were selling other people’s culture and convince them [*male circumcision*] was a medical intervention, not a cultural expectation.

[†] Male circumcision was believed to be effective in aiding HIV prevention because it removed tissue most susceptible to HIV. The inner mucosal surface of the human foreskin present in uncircumcised men had a high density of HIV target cells. During intercourse, this mucosal surface was exposed to vaginal fluid that could contain HIV, providing an environment conducive to HIV transmission.

The director of medical services issued a statement in support of voluntary medical male circumcision, and the government's plan to scale up circumcision began to foment public debate. In the fall of 2007, the Ministry of Health made the National AIDS Control Council responsible for ensuring stakeholder participation in the national circumcision agenda. The Ministry of Health also created the National Male Circumcision Task Force within NASCOP (see **Exhibit 9** for National Task Force composition) as the formal programmatic and planning advisory body to ensure that male circumcision efforts aligned with the national goals for health system strengthening. The task force was also responsible for ensuring consistent messaging regarding the 60% protective effect of male circumcision, overseeing training, monitoring and evaluation, development of various program tools, and ensuring quality control.⁵⁴ Peter Cherutich, the head of HIV at NASCOP, chaired the task force.

Luo resistance to the male circumcision campaign continued. As Kenya prepared for the national election in December 2007, Ministry of Health officials decided to delay implementation of the program until after the election. They worked on creating a national voluntary medical male circumcision policy in the meantime. In April 2008, once tensions had subsided, they began meeting with stakeholders about the program again, starting with the Luo Council of Elders, youth, and women's groups. They reached out to faith-based organizations, professional caucuses, social groups, trade unions, and journalists as well,¹ focusing on the science and sharing the proposed new national policy. Muraguri became the head of NASCOP in July 2008, leaving his post as director of health promotion, and he prioritized the public campaign promoting VMMC. "It was the first thing we had that was going to be cost-effective—that was going to give us good returns in a short time," he said.

In September Prime Minister Raila Odinga, a Luo and Nyanza native, met with 500 people in Kisumu, including members of the Luo Council of Elders, government and non-governmental health officials, and researchers, during a six-hour meeting. Odinga promoted the medical benefits of the procedure to the Luo Council of Elders. "I know circumcision will raise a lot of eyebrows, but there is evidence that it reduces infection by as much as 60%. We should not just say that this is not our culture," he said to the council.⁵⁵ He promoted circumcision as an individual rather than a communal choice and aimed to calm fears, saying, "All there is to circumcision is availing your male organ for the foreskin to be removed, like 'ting' [snip] and it is all over." Three Luo government ministers and a member of parliament also endorsed male circumcision, to the dismay of Luo elders.⁵⁶ Learning of some Luos' concerns about the word "policy" being associated with male circumcision, the National Task Force changed the title of the document it had been promoting to *National Guidance on Voluntary Male Circumcision in Kenya*.

Though dissenters remained among the Council of Elders, as a body the council agreed to support the campaign. Many leaders saw this as an opportunity to increase health system utilization. Muraguri explained:

We see male circumcision as another strategy for promoting men's health in general. We know women, by nature of biological function or social functions, they have a lot of contact with the health system. But for men, the opportunities are rare. So we see male medical circumcision services as an opportunity to address that gap.⁵⁷

The national program launched officially in November 2008, four months after Muraguri took his post, with a public event in Nairobi.¹ "Speed matters," Muraguri said. "It was an emergency ... and the 'building blocks' for implementation—partnerships, coordinating structures, infrastructure assessments, and training—had been assembled."

External Support for Male Circumcision

The infrastructure costs for the VMMC campaign were estimated at USD 7.3 million, the majority of which went toward public facilities. Overall, setup costs for each delivery site were anticipated at USD 12,000. Assuming no more than a 5% adverse event rate, costs related to complications were budgeted at just over USD 33.2 million. The overall cost per circumcision client was expected to decline over the four years, from USD 143 to USD 65; consumables were USD 15 per procedure in private implementers' sites and USD 22.50 in government facilities. The total cost over five years was estimated at USD 76.5 million (see **Exhibit 10** for 2009–2013 estimated program costs). The Kenyan VMMC program was allocated 1.6% of total AIDS funding in the 2009–2013 strategic plan.⁴⁵

As the sole funder of male circumcision implementation, PEPFAR channeled funds in Kenya through USAID and the CDC. In total, PEPFAR funded 11 sub-grantees and US agencies to implement male circumcision services throughout Nyanza (see **Exhibit 11** for list and description of Nyanza's VMMC implementers by funding source). It provided direct assistance to NASCOP as well to support coordination and the development of guidelines.⁵⁸

Since its founding in 1961, USAID's mission included supporting long-term and equitable growth. Of the USD 480 million USAID put into Kenya in 2010, 75% went to health.⁵⁹ USAID worked through a large umbrella program called AIDS, Population, and Health Integrated Assistance (APHIA) II. A five-year, national project that started in June 2006, APHIA-II's priority in Nyanza was health system strengthening. Its grantee, EngenderHealth, an international reproductive health organization that had been working in Kenya since 1982, oversaw four Nyanza-based, non-governmental organizations that built the capacity of public-sector staff by training and paying them for locum services.

The CDC had been working in Kenya since 1979 in collaboration with the Kenyan Medical Research Institute, employing 1,200 employees in six health branches in state-of-the-art laboratories and facilities in 2009. The CDC "used its scientific expertise to help people ... live healthier, safer, longer lives."⁶⁰ In addition to research, the CDC worked with PEPFAR on HIV and provided technical support to the Ministries of Health, often as an outbreak responder. The CDC funded four direct grantees to conduct circumcisions: IMPACT Research and Development Organization[§] (which included UNIM); the University of California San Francisco's Family AIDS Care and Education Services (FACES) project; Nyanza Reproductive Health Society (NRHS); and the US-based Catholic Medical Mission Board (CMMB). It promoted rapid scale-up of male circumcision services and encouraged grantees to develop nontraditional strategies to achieve short-term targets. CDC implementers hired dedicated staff and paid government staff as consultants to perform circumcisions.

Beyond direct implementation support, the Bill & Melinda Gates Foundation funded a five-year USD 18.5 million grant that partners used to launch a Male Circumcision Consortium (MCC) in Kenya in 2008. The MCC aimed to support the government in developing a national strategy; expand research, training, health facility capacity, and monitoring; address misunderstandings about male circumcision; and conduct research. "It's like MCC is the champion of male circumcision," one stakeholder explained.⁶¹ The Gates Foundation selected FHI 360, a nonprofit organization with experience working in the area and with technical expertise in operational research, to lead the consortium. EngenderHealth and the University of Illinois at Chicago, working closely with the Nyanza Reproductive Health Society (NRHS), were the other consortium partners.

[§] From 2007 to 2009, IMPACT acted as the fiscal sponsor for the Nyanza Reproductive Health Society (NRHS).

Male Circumcision in Nyanza Province

In February 2008, upon resuming development of Kenya's National VMMC Strategy,⁶² the National Task Force, which included a representative from each NGO involved in VMMC, called for formation of a provincial body to coordinate the delivery efforts in Nyanza. The Provincial Male Circumcision Task Force for Nyanza met for the first time in July 2008 in Kisumu. Each implementing partner joined at least two of three subcommittees—Service Delivery, Monitoring and Evaluation, and Communications. The Provincial Task Force included the director of public health and sanitation, the provincial director of medical services, officers of the district hospitals and the local health ministries, representatives from the MCC, and all 11 PEPFAR-funded implementers. The provincial AIDS and STI coordinator and the provincial director of public health and sanitation chaired the meetings.

The MCC allocated funds to FHI 360 to coordinate stakeholders in Nyanza, and implementers elected FHI 360's Isaac Oguma as secretary of the task force, responsible for facilitating and assembling the monthly meeting agendas. "My role is to bring the partners together to work under the umbrella of the Ministry of Health. Another role of mine is to mobilize resources to support implementation of these joint activities. We come up with a budget, and then my role is to make sure that the cost is evenly distributed across the partners and that the reports are submitted ... I'm also the intermediate person when a partner has an issue; a partner will come through me, and I will link them to the Ministry of Health," Oguma explained. He met with the provincial AIDS/STI control officer daily. "We meet first thing in the morning, and then go out in the field," the officer said. "By 4 p.m., we're back again, sharing what we have learned."

Though Task Force meetings could become tense, publicly implementers began to represent their work as a joint effort, led by the Government of Kenya. As one communications officer shared, "This is a Ministry of Health-led effort, not a partner-led effort. We don't attribute leadership to any specific partner, but to the government."¹ Oguma explained further:

If this effort were [implementer]-led, it would give room for competition, but with the Ministry of Health owning it, people understand that they have to learn to work together because they don't have to attribute leadership to any specific partner but to the government ... We treat [CDC] as a donor. CDC doesn't come into this, and USAID doesn't come into this.

"At the provincial level, we are like a family," the provincial AIDS/STI control officer said.⁵⁸

Oguma believed having the Provincial Task Force was beneficial for the VMMC campaign in general because male circumcision was competing with the many other health issues the Ministry of Health oversaw. "Male circumcision is just one of a million of [the provincial health director's] responsibilities. So when I need him to preside over functions of male circumcision, other functions like reproductive health, measles, maternal and child health, child survival, also need him," he said. One Gates Foundation officer explained that the MCC played this role on the national level:

There is no doubt that the key to the successful roll-out of VMMC in Kenya as compared to other countries is the solid ownership and push by the MOH, however ... they have to have things handed to them in a neat package to make things happen. It was the role of the MCC to produce those packages so that the MOH could take the ownership and leadership roles it needed to. In fact, the model of the MCC was used in the development of an operational plan for male circumcision in Zambia, where, with 17 implementing partners and little coordination, roll-out was not really happening. Now, the scene has started to change.

Implementation Efforts

Implementing grantees used various delivery models in their assigned districts to provide the comprehensive HIV prevention package Kenya's government recommended. This package was based on WHO guidelines.

Training

The NRHS housed UNIM and trained teams consisting of a surgeon, a surgical assistant, a hygiene or infection control officer, and a counselor in implementing Kenya's *Clinical Manual for Male Circumcision under Local Anesthesia*, using an adapted version of the WHO/Jhpeigo training curriculum. The training involved two to three days of classroom instruction followed by six to eight days of practicum in which each trainee observed two circumcisions, assisted with one, performed the surgery with assistance from the trainer, then performed 20 additional circumcisions under supervision.^{1, 63, 58}

Once services were rolled out, the NRHS Quality Improvement team regularly observed delivery sites to identify providers who needed refresher training courses. In addition many sites deployed a "train-the-trainers" model to scale the volume of providers. Training cost about USD 6,500 per team.¹¹

On average, a newly trained provider could complete one circumcision in 25 to 45 minutes. With more experience, providers' speed increased and patients' likelihood of experiencing an adverse event decreased. Some VMMC surgeons could complete the procedure in 10–15 minutes, typically after performing 100 or more procedures. Providers who had completed 20 or fewer procedures were nearly twice as likely to provide circumcisions in which complications arose during or after the procedure.⁶⁴ The most common adverse events reported were pain and swelling after the procedure. Only 0.1% of known adverse events occurred during the procedure.⁶⁴ When implementers knew about adverse events, they would pay for any additional care clients needed to resolve the problem. Often the sites did not know if clients experienced adverse events due to the low follow-up rates.

Newly trained providers were also less likely to provide circumcisions in general. "People had too many doubts in their heads," Muraguri explained. "They weren't implementing or motivated." VMMC program leaders noticed that those in hospitals who were mentored by colleagues were often more confident, and they realized that helping people learn and practice in their own environment was critical. After seven months, UNIM began providing and recruiting district leadership to provide training on site.

Care Package

Services were rolled out in Nyanza starting in September 2008, prior to the national launch. When a client presented for circumcision, a counselor ensured voluntary consent (or parental consent from those under 18) and an understanding of risks and benefits, i.e., that clients were not seeking circumcision to resolve erectile dysfunction or other problems that would not be remedied. Clients then received HIV voluntary counseling and testing (VCT), and most sites offered free condoms. Rapid HIV testing gave consenting clients immediate results. Counselors surveyed clients for visual signs of other sexually transmitted infections and treated those with infections, asking them to return for the procedure once healed. Those with HIV could still opt to have the procedure, as long as CD4 levels were not too low. Counselors explained post-procedure care, emphasized that circumcision was only 60% protective—that clients should continue to use condoms, and advised clients to maintain a six-week period of abstinence following the procedure to allow the wound to heal.

After being counseled, clients moved to the minor surgery theater. Many fixed sites had formal surgical rooms, while outreach and mobile sites created theaters in available spaces. The majority of implementers

advised clients to remove their dressings at home after three days and to return on the seventh for follow-up care.

Upon leaving the facility, all male circumcision clients received an adverse event hotline number to call with any problems. They were asked to educate and motivate their communities to have the procedure and to bring their partners in for HIV prevention services.¹ While both clinical and non-clinical staff were trained in mobilization techniques, clients were considered key mobilizers. They could speak directly about the experience to friends and family, and most implementers offered a small monetary reward for each new client they referred. The monetary reward for mobilizers replaced a reward that was initially reserved for participants; some believed that compensating clients was coercive.

All VMMC health workers were also trained in client mobilization. Providers, especially those in the APHIA II sites, helped with other health care services, such as HIV or maternity care, when there were no male circumcision clients. APHIA II site staff found that there was rarely a shortfall of things to do. In fact, staff shortages and competing priorities could pose challenges. “If you have a convulsing child and a person waiting for male circumcision, then the male circumcision client must wait,” explained one implementing partner.⁵⁸

Equipment and Supplies

The Ministry of Health mandated implementers use a consumables pack (including gauze, needles, scalpel blade, and gloves) and a reusable surgical instrument set for each circumcision (see **Exhibit 12** for WHO-recommended VMMC supplies). As the director of one CDC-funded program said, “We provide surgical instruments and supplies with the view that when we leave, those instruments will stay. Even if they aren’t used for male circumcision, they will be useful to the health system here ... but we’re criticized to a degree for this, for not being efficient.” Each implementer supplied equipment packs to its sites directly. After use, instruments were decontaminated, sterilized, and repacked.²

Implementers generally followed WHO recommendations that every surgical space have an operating table, instrument trolleys, and operating lamps or fluorescent lighting, though optimal lighting was not always possible.

Delivery Models

Both USAID and CDC implementers delivered services through “fixed” (or “static”) and “outreach” sites. Fixed sites existed in health facilities that had surgical capabilities, such as regional hospitals, district hospitals, and health centers. Outreach sites were health facilities set up to temporarily deliver circumcision, such as dispensaries. CDC implementers also delivered services to clients in remote areas via mobile sites in non-clinical settings such as schools, churches, or temporary tents. Mobile and outreach sites accounted for 90% of the VMMC program’s total performance (see **Exhibit 13** for images of mobile service delivery).¹

The delivery models are somewhat iterative. As Oguma explained, “In our Task Force, we have things that are governing us,” he said. “One is respect for culture. Two is allowing innovation.” Through the task force, partners exchanged innovations and adapted their delivery models. While Kenyan policy had originally restricted surgery to medical officers, the Male Circumcision Consortium found that allowing clinical officers and nurses to perform the surgery would increase the number of facilities capable of participating in the VMMC program from 12% to 85%, and the government changed its policy in June 2009 to allow nurses to act as VMMC surgeons.^{1, 65}

USAID-Funded Delivery

Starting in November 2008, APHIA-II Nyanza worked in its assigned districts to build public hospitals' human resources' capacity to provide circumcisions. An assessment of government health facilities' capacity to offer voluntary medical male circumcision based on seven criteria determined by the Government of Kenya revealed that of 81 facilities in Nyando and Kisumu districts, none was fully prepared (see **Exhibit 14** for assessment criteria).⁶⁵ Eight of Nyanza's 59 public hospitals had the staff and space to accommodate male circumcision services and participated in the VMMC program (see **Exhibit 15** for facilities meeting criteria).¹⁸ Of Nyanza's 140 government health facilities, 50% would be renovated for circumcisions by the end of 2009, with the remainder renovated in 2010.

District hospital sites could theoretically support 10–20 procedures per day at capacity. The hospitals' catchment areas were relatively large, meaning patients often had to travel long distances for care, and few patients returned for post-procedure care. The circumcision procedure was not written into staff contracts, and many public-sector providers prioritized their contractual responsibilities over male circumcision. Public providers had a much higher rate of adverse events than those working for CDC-funded projects.⁶⁴

A shortage of public health supplies in the hospital could present supply chain challenges for the VMMC program.¹⁸ For example, when the hospital ran out of surgical gloves for urgent needs, such as a caesarian section, many staff used gloves from the VMMC program. It was also difficult to maintain stocks of the VMMC program's rapid HIV test kits in some public-sector facilities. APHIA-II implementers communicated with the district hospitals about their supplies using cell phones, and when supplies were high at one location but low at another, program officers drove available resources between sites.

With support from APHIA-II supervisors, government VMMC providers also provided circumcisions in outreach settings. Of APHIA-II's 20 VMMC sites, demand at the 11 outreach sites was generally the highest. At one site, after a few years of practice, the hospital team provided 343 circumcisions in one three-week period. Conducting regular outreach events was not possible because of the workforce shortage.

Public-sector staff working through APHIA-II performed approximately 12% of circumcisions in Nyanza. As an APHIA-II senior medical adviser reflected, "Because of the challenges they are facing, many find that the numbers they have done are not that high, but that's what they can do ... We can only do so much with the public sector in this short amount of time."

CDC-Funded Delivery

CDC-funded implementers were free to set up their own sites outside the health system.¹ The CDC-funded surgical teams were each expected to provide 12 or more circumcisions per day. CDC managers in Nairobi commonly called their grantees, Nyanza implementation program leaders, in the evenings or on weekends to discuss data on low performance or high unit costs and means for improvement. Nyanza implementers frequently worked late into the night, either performing circumcisions or holding after-hours meetings to maximize their time to perform circumcisions during the day.

CDC's implementers set up fixed sites in a range of public and private health facilities in their designated districts. CMMB, a US-based, Catholic, global health care charity, operated 11 fixed sites, primarily in rural faith-based hospitals. CMMB engaged the hospitals' community health workers to mobilize clients to seek circumcision services during regular house visits and rewarded those who referred five or more clients. CMMB also incorporated circumcision messaging into its school-based sexual health programs.

IMPACT, a Kisumu-based, non-governmental Kenyan public health research and implementation organization, ran one of its fixed sites at the Kodiaga Prison near Kisumu in partnership with the Ministry

of Public Health and Sanitation's prison staff. Trained prison wardens mobilized more than 2,800 consenting male prisoners, men awaiting trial, and family of prison staff that lived on the grounds to get circumcised. With minimal distance for clients to travel and no time lost to work, IMPACT provided large numbers of circumcisions in the prison's clinical services office.

Along with other implementers, FACES—a collaboration between the Kenya Medical Research Institute (KEMRI) and the University of California, San Francisco, begun in 2004—operated in several health facilities, employing government staff and making minor renovations as necessary. FACES used community engagement officers to promote male circumcision through *barazas* (chief meetings), community events, schools, churches, football tournaments, flyer distribution, and mobile phone text messages.⁶⁶

CDC implementers also used outreach sites. IMPACT, for example, created minor surgery theaters in the five PEPFAR-funded youth prevention, care, and treatment sites, the Tuungane Centers, it was running. Regular youth center clients sought circumcision, and circumcision providers referred clients to the youth program.

All CDC programs offered mobile services in hard-to-reach places. They trucked staff, tents, water, and generators to the sites and, at times, paid staff extra to camp at the site on account of distance or inclement weather. Mobile sites were the most expensive to set up. NRHS reached many people with its mobile sites. It went to sites throughout the district Monday through Thursday and set up at the Siriba dispensary on Maseno University grounds on Fridays. The dispensary had one waiting room and one patient exam room, serving students, staff, and their families. NRHS delivered counseling under nearby trees and used a 100-square-foot tent with one surgical table as the operating theater. Commenting on the challenges of operating in the tent, one officer said, "When it rains, the tent floods. When it's sunny, the tent is hot. If it's dry, the dust from a nearby construction site drifts through. But we work with all of this." The NRHS mobile team provided as many as 18 circumcisions per day and maintained an 80% follow-up rate. Staff attributed the high follow-up rate to the regular Friday schedule. CDC implementers performed 88% of all procedures in Nyanza.⁶⁷

Monitoring and Evaluation

Implementers reported to their respective PEPFAR grantors electronically using PEPFAR's predetermined indicators. PEPFAR primarily evaluated implementers on the number of circumcisions performed. To maximize numbers, some implementers shuttled clients out of other implementers' districts to their own sites. One CDC-funded implementer recalled, "It was very difficult to draw a clear boundary in terms of mobility of clients because people in Nyanza are very mobile. When clients are moving from one district that is assigned to a particular partner to another district, it becomes very hard to draw that boundary in terms of whether to attribute the data to the partner who has performed the circumcision or to the partner who was assigned to the district ... this was a big area for friction ... It was the fight for the foreskin, to get as many foreskins as possible." Some implementers felt they had an unfair disadvantage, depending on how many eligible men were available for circumcision in their assigned district.

Though the Provincial Task Force had no formal authority to hold implementers accountable for performance, Oguma posted implementers' data for the month at each meeting and encouraged implementers to share resources. The Provincial Task Force became a forum, and the meeting created a dialogue about districts and zoning. "Turf wars were always there," Muraguri said. "People want to protect their area and their influence. We stormed for a while ... Then we clearly defined what we were going to do and how, and everyone found their space."

APHIA-II, which relied on public-sector staff as opposed to dedicated providers, had some of the lowest numbers of all implementers. As the CDC-funded implementer explained, “People felt that [APHIA-II] didn’t have the capacity. People didn’t take note of the different approaches. By virtue of the fact that partner A has more male circumcisions than partner B, they got more attention, more acknowledgment.”

The National Task Force Subcommittee on Monitoring and Evaluation had begun meeting in March 2008, using data collection forms from UNIM’s research to develop tools and guidelines. Eventually the subcommittee coordinated with UNAIDS, WHO, and PEPFAR, which were also developing indicators, to ensure all forms and indicators were compatible across programs and countries. Because implementers had been collecting data on various forms, it was difficult to compare district volume or outcomes in the first year of the project.⁵⁸

By the end of 2009, the Ministry of Health adopted VMMC indicators for inclusion in its health and management information system. The indicators were much less detailed than the indicators UNIM collected for research; they addressed the total number of men circumcised disaggregated by age, the number of adverse events and their severity, the number of sites offering circumcision, and the number of men returning for follow-up visits. Providers had to complete a clinical intake form for each client, including the client’s past medical history, to evaluate the risks and benefits of the procedure.

In the Ministry of Health and its APHIA-II sites, data flowed from the facility level to the district level to the province level up to the national level for aggregation. CDC implementers collated their data separately. A meeting in July 2010 for providers to discuss their experiences revealed the need for greater standardization of data in 2011.

The Male Circumcision Consortium’s behavioral and operational research projects used some of the data collected in assessing how to improve upon efforts and expand services in Kenya and sub-Saharan Africa.⁶⁸ NRHS, for example, working with University of Illinois at Chicago researchers, found VCT rates were only 37% across Nyanza VMMC sites.⁶⁹ It found sessions could take up to 45 minutes and required a private space and trained counselors, which only 38% of existing sites were equipped to provide. The surgery was taking only 8–45% of total provider time. By contrast, the study found that 70% were prepared to offer provider-initiated counseling and testing (PITC), which did not require additional space or staff. The finding inspired a switch from VTC to PITC, increasing testing rates to a mean of 60%. As more implementers adopted the PITC model, testing rates jumped to 93.6% province-wide, and counseling and testing sessions dropped to less than 20 minutes.⁶⁹ The MCC also supported research on sentiment about circumcision and the implications of circumcision on risk behavior in Nyanza. Researchers found that, after VMMC, most men did not exhibit changes in their sexual behaviors or increased protective sexual behaviors, including increasing condom use and reducing the number of sexual partners. A minority reported engaging in higher-risk behaviors. Most described being able to perform more rounds of sex, easier condom use, and fewer cuts on the penis during sex.³⁰

The Rapid Results Initiative

The Government of Kenya, in partnership with the National and Provincial Task Forces, formally released the *Kenya National Strategy for Voluntary Medical Male Circumcision* in October 2009. The aim was to increase the proportion of men ages 15–49 years who were circumcised in Kenya from 84% to 94% by 2013 under the guidance of a new male circumcision officer who was hired to facilitate and speed the development of the program. A “catch-up” phase would focus on parts of the country where circumcision rates were low and HIV rates high among consenting Kenyan men aged 15–49 by 2013. These included Nyanza, Western, Rift Valley, and Nairobi provinces.¹¹

Nearly half of Kenya's four-year target of 860,000 circumcisions would depend on the performance of Nyanza.¹¹ Nyanza was tasked with providing 426,500 circumcisions: 76,500 in the first year, 100,000 in the second, and 125,000 in each of the final two years (see **Exhibit 16** for VMMC targets over four years).¹¹ The model predicted that 80% coverage could reduce HIV prevalence in Nyanza by 45%–67%, dropping the male prevalence rate from 17% to 10% and averting an estimated 900,000 infections within 20 years.^{70, 5, 11} USAID estimated that if the program reached 60% of its target population by 2014, it could avert 47,000 infections by 2025, saving USD 247 million in HIV care and treatment costs.⁷¹ Programming would use a “high-quality, high-volume” approach. The strategy codified many of the activities that already were ongoing in Nyanza.^{1, 11}

With 50,526 circumcisions performed by October 2009¹ (see **Exhibit 17** for circumcisions performed over time) and each circumcision costing an average of USD 86, two Nyanza implementers suggested a province-wide, aggressive campaign, modeled after previous Kenyan immunization and HIV testing and counseling campaigns, to reach their targets.⁷² The implementers agreed to pool their resources at a Provincial Task Force meeting to increase efficiency and reduce costs.

District coordinating committees led by district medical officers helped coordinate the efforts and submitted local plans to the Provincial Task Force. The task force compiled the district plans into a final plan with a corresponding budget used to solicit and allocate resources. Each district had a Provincial Task Force adviser to promote technical and programmatic oversight and serve as a communication link as well as a supervision team with experts on logistics, data management, and waste disposal. All teams used a checklist adapted from the WHO quality-assurance toolkit and planned to circumcise up to 12 clients per day.^{72, 73}

Implementers had been hesitant to run large media campaigns previously due to concerns they would be unable to meet the demand. The task force agreed to begin social mobilization two weeks prior to the start of the campaign. The Provincial Task Force's communications subcommittee arranged to place VMMC speakers at district radio stations throughout Nyanza to foment interest in the campaign and answer on air any questions the public might have. PSI (formerly, Population Services International), another PEPFAR grantee, was enlisted to develop and pay for radio spots played throughout Nyanza on male circumcision.

NGO personnel worked with Ministry of Health and locum staff to train and enable public hospital staff,⁷⁴ improve networking between public and private male circumcision providers, and leverage human resources from different agencies.^{72, 74} Trained providers who were on leave joined the efforts, and additional providers were trained and hired.

The implementers (110 teams) set a goal to circumcise 30,000 eligible boys and men within 30 working days between November 9 and December 20, 2009—the school holidays when many teens and men would return home. The campaign was named the Rapid Results Initiative (RRI).¹

Two- to three-day supplies of prepacked reusable surgical kits were distributed to sites a week before the campaign started, and each partner tracked supplies using management tools, allowing districts to forecast needs daily. Since only reusable surgical packs were used, basic decontamination was done on site, and the instruments were then brought to district autoclave facilities for sterilization.

Unpredicted variation in demand could lead to complex supply and waste management problems despite several vehicles helping with staff and supply distribution. Counseling and screening clients on the eve of surgery and group counseling in high-volume sites increased efficiency during the RRI in Nyanza.

Impact

Over the course of the RRI, VMMC implementers performed 36,077 circumcisions¹ at an average cost of USD 39 per circumcision (see **Exhibit 18** for circumcisions per month over time). The complication rate was under 2%, and most complications were minor and resolved completely. As one program officer explained, “The Provincial Task Force brought us together ... and you could see that in the RRI. Implementers forgot about their boundaries and came together for a common goal ... It was a lesson for me in partnership.”

Combining the public-sector and private implementers into surgical teams was challenging, however. As one implementer wrote, “The availability of government staff was unpredictable at times, which affected our ability to schedule during the initiative.”¹ Within the RRI, APHIA-II staff performed about 20% of the circumcisions, while CDC-funded implementers performed the remainder.

Of clients circumcised during the RRI, 45% were below age 15—likely due to demand by parents in urban areas for circumcision of young sons—and only 39% of all clients consented to on-site HIV counseling and testing, a rate lower than that seen during routine service delivery. Of those tested on site, 2.8% were HIV positive, and 79% (236) of those with HIV opted for circumcision. The follow-up rate was 23%.¹ Partners found it challenging to commit and marshal adequate resources because there was not funding allocated to the RRI, and they had to sustain demand beyond the initiative.

Continuing the Campaign

After extensive pretesting in Nyanza, a VMMC logo was approved in February 2010, clearing the way for publication of materials for partners. After focus groups in the province in early 2010 revealed a need for addressing the partial protection male circumcision provided and the importance of sexual abstinence during the healing period (36% of observed clients engaged in sex before their wounds were fully healed^{1, 67}), the group developed a VMMC communication toolkit and guide. The kit included materials for specific audiences including billboards, posters, video vignettes, radio spots, flip charts for health workers, and a handbook for community mobilizers. The MCC helped provide training workshops to journalists, radio presenters, reporters, and call-in show hosts about male circumcision. Over 88,217 circumcisions were completed in Nyanza by the start of 2010, with follow-up rates averaging 30%.

Implementers decided to hold another RRI in Nyanza. This time implementers used two operating tables per team to reduce preparation time between surgeries, used prepackaged supply kits, and shared tasks among different cadres of providers. In high-volume areas, some clients received counseling the day before surgery so surgeons could start working first thing in the morning. Service providers trained health care workers in the use of diathermy for hemostasis to improve efficiency and productivity. The number and size of teams at each site were adjusted with client flow. Experienced providers partnered with less-experienced providers and served as team leaders to ensure quality.

Mobilization and advocacy targeted men 15 and older, particularly those 18–49, and were important for the second RRI. Some mobilizers even went door-to-door to discuss VMMC. The campaign offered volunteers monetary and nonmonetary incentives for referring clients, and those referring clients older than 18 received double the incentive. In order to increase access for working men, implementers opened “moonlight” services—sometimes as late as 3 a.m.—at 20 locations.

The second RRI led to 55,376 circumcisions, exceeding the goal by 38%. More than 84% of all clients were 15 and older, and 80% opted for HIV testing and counseling. About 41% of clients returned for follow-up. There was a low (1.53%) rate of complications. The cost per procedure decreased by 43%, from USD 48 during regular program implementation to USD 27 during the 2010 RRI.

Matching client flow with deployment of staff remained a challenge. Social mobilization proved to be the most important determinant of the number of clients seeking circumcisions each day.

Next Steps

By August 2010, a division of Nairobi Province had begun offering VMMC. A Nairobi Task Force worked to expand services to six additional divisions of Nairobi.⁷⁵ “We borrowed lessons we’ve learned in Nyanza so as not to reinvent the wheel,” one implementing director said. “However, we also recognize that each place is unique and requires different approaches to service delivery.”⁷⁶

In Western Province, about 50 health workers were trained in mid-2010 in the provision of VMMC. While most men in Western Province were circumcised already, circumcisions were not always done by trained health professionals. Every August in years ending in even numbers, thousands of males aged 10–18 were circumcised in traditional ceremonies as a rite of passage, and up to 40% experienced complications. In August 2010, 20,000 were prepared to undergo the procedure in a traditional ceremony. Two districts reduced the price of circumcision to USD 2.50 in government health facilities and offered free services in medical camps during the circumcision period.

Muraguri and the national VMMC campaign worked to persuade parents that it was safer to have their sons circumcised by medical professionals in a sterile environment. “While we respect the cultural aspect of the procedure, we cannot guarantee the safety when done by the traditional circumcisers and what we are promoting is health facility–based circumcision,” he said.⁷⁷

With the national strategy in hand, two RRI behind them, and new provinces beginning to offer VMMC services by the end of 2010,⁵⁸ VMMC implementers had made notable progress. There were 1,385 surgeons, surgical assistants, counselors, and infection prevention officers trained; circumcision services were accessible at 268 health facilities in three provinces. More than 230,000 circumcisions, about 62% of the goal, in Nyanza Province had been completed.^{1, 78} Nyanza was well ahead of national efforts, which had performed 27% of the needed circumcisions. Was the national goal realistic, and if so, how could Muraguri help ensure the country would achieve it?

Exhibit 1 *Map of Kenya*

Source: University of Texas Libraries.

Exhibit 2 *Health Facilities, National and Nyanza Province*

	National	Nyanza
Dispensaries/health centers	5744	630
District general hospitals	432	84
Provincial hospitals	10	2
National referral hospitals	4	0

Source: Republic of Kenya, Division of Health Management Information Systems. Annual Health Sector Statistics Report; 2008.

Exhibit 3 *Overview of PEPFAR*

PEPFAR Background

In May 2003, under US President George W. Bush, the US Congress approved USD 15 billion over a five year period “to turn the tide against AIDS in the most afflicted national of Africa and the Caribbean,” as Bush explained. It was the largest commitment in history by any nation to combat a single disease. Managed by the US Global AIDS Coordinator (OGAC), PEPFAR’s original targets were to provide antiretroviral treatment for 2 million people, prevent 7 million new infections, and care for 10 million people (see summary below). It allocated 55% of funding for HIV/AIDS treatment, 15% for palliative care for individuals with HIV/AIDS, 20% for HIV/AIDS prevention (of which at least 33% was to be spent on abstinence until marriage programs), and 10% for helping orphans and vulnerable children. The money was made available in 2004 through country teams coordinated through US embassies who primarily gave the money to international (often US) NGOs, which funded local NGOs and small grants to governments. PEPFAR exceeded its target for treatment. Meeting the prevention goals was harder, especially given some of the policy requirements. In addition to promoting abstinence before marriage, implementing organizations had to agree not to perpetuate sex work and trafficking, which excluded high risk groups from receiving support. PEPFAR wanted to see measurable results, which were also hard to demonstrate with prevention. There was not regular, accurate surveillance in most countries where PEPFAR worked. For every two new people enrolled in treatment through PEPFAR, there were five new infections.

In 2008, PEPFAR was reauthorized for USD 48 billion over five years (2009 to 2013), with the goals of preventing 12 million new infections, treating 3 million people living with AIDS, and caring for 12 million people, including 5 million orphans and vulnerable children. The Reauthorization Act sought to transition PEPFAR from an emergency response to a sustainable response, including health system strengthening and partnership building. The legislation allowed the program to serve as a platform for expanded responses to a broader range of global health needs, eliminating policies that prevent work with high-risk groups and policies requiring promotion of abstinence before marriage.

Summary of PEPFAR’s Targets

TARGET	PEPFAR I	PEPFAR II
Treatment	<ul style="list-style-type: none"> ◆ 2 million on ARTs ◆ 10 million provided with care 	<ul style="list-style-type: none"> ◆ Support 4 million people on treatment ◆ Support care of 12 million people, including 5 million orphans and vulnerable children (OVCs) ◆ Ensure that partner countries with generalized epidemics reach 65% testing coverage for early infant and 80% of older children of HIV-positive mothers, with increased referrals and linkages to care and treatment
Prevention	<ul style="list-style-type: none"> ◆ Prevent 7 million new infections ◆ PMTCT led to 100,000 HIV-free children born to HIV-positive mothers 	<ul style="list-style-type: none"> ◆ Support the prevention of 12 million new HIV infections ◆ Ensure that partner countries with generalized epidemic shave 80% coverage of testing for pregnant women and 85% coverage of PMTCT ◆ 480,000 at-risk babies born HIV-free ◆ In partner countries with generalized epidemics, provide 100% of youth in PEPFAR prevention programs with comprehensive and correct knowledge of HIV/AIDS transmission and protection
Sustainability		<ul style="list-style-type: none"> ◆ Support training and retention of 140,000 new health care workers ◆ Ensure partner government leads efforts to evaluate and define needs in each country PEPFAR investment greater than \$5 million ◆ Every partner with a Partnership Framework will change policies to address the larger structural conditions, such as gender-based violence, stigma, or low male partner involvement, which contribute to the spread of the epidemic

Exhibit 4 *HIV Prevalence and Male Circumcision Rates by Province*

Province	HIV (2007)	Circumcised (2008)
Nyanza (Luo in Nyanza)	15.3% (22%)	48.2% (12%)
Nairobi	9.0%	83.2%
Western	5.1%	87.8%
Rift Valley	7.0%	88.7%
Central	3.8%	95.5%
North Eastern	1.0%	97.3%
Eastern	4.7%	96.3%
Coast	7.9%	97.0%

Source: Government of Kenya. *Kenya AIDS Indicator Survey Data Sheet*: Population Reference Bureau; 2007.

Exhibit 5 *HIV Prevalence by Age Group, 2007*

	Women		Men		Total	
	HIV- infected (%)	Total number tested	HIV- infected (%)	Total number tested	HIV- infected (%)	Total number tested
Age group (years)						
15-19	3.5	1,328	1.0	1,175	2.3	2,503
20-24	7.4	1,598	1.9	1,034	5.2	2,632
25-29	10.2	1,345	7.3	874	9.1	2,219
30-34	13.3	1,154	8.9	772	11.6	1,926
35-39	11.2	950	9.3	678	10.5	1,628
40-44	9.4	742	10.2	576	9.7	1,318
45-49	8.8	732	5.6	549	7.5	1,281
50-54	7.5	519	8.3	425	7.8	944
55-59	4.7	425	2.3	380	3.6	805
60-64	1.7	256	3.4	341	2.7	597
Totals						
15-24	5.6	2,926	1.4	2,209	3.8	5,135
15-49	8.8	7,849	5.5	5,658	7.4	13,507
50-64	5.2	1200	4.7	1146	5.0	2346
Total (15-64)	8.4	9,049	5.4	6,804	7.1	15,853

Source: Government of Kenya. *Kenya AIDS Indicator Survey Data Sheet*: Population Reference Bureau; 2007.

Exhibit 6 *Incident HIV Infections by Modes of Transmission in Five sub-Saharan Africa Countries*

Table 1 Incident HIV infections by modes of transmission in five sub-Saharan Africa countries					
	% share of modes of HIV transmission in five countries				
	Uganda (2008)	Kenya (2006)	Zambia (2008)	Swaziland (2008)	Lesotho (2008)
Injecting drug users (IDUs)	0.28	4.84	0	1.1	0
Partners of IDU	0.01	0.2	0	0.1	0
Sex workers (SW)	0.91	1.25	0.75	3	0.47
SW clients	7.83	10.48	4.04	4.7	0.59
Partners of SW clients	1.81	1.1	1.81	2.6	1.68
Men who have sex with men (MSM)	0.61	4.49	0.99	3.6	2.89
Female partners of MSM	0.1	0.64	0.05	0.5	0.5
Multiple partnerships (MP)	23.73	18.31	33.96	13.4	31.04
Partners' MP (PMP)	21.76	27.74	37.03	20.8	27.45
Mutually monogamous heterosexual sex	42.89	30.14	21.19	49.8	35.15
Medical injections	0.06	0.55	0.17	0.01	0.04
Blood transfusions	0	0.24	0.02	0.02	0

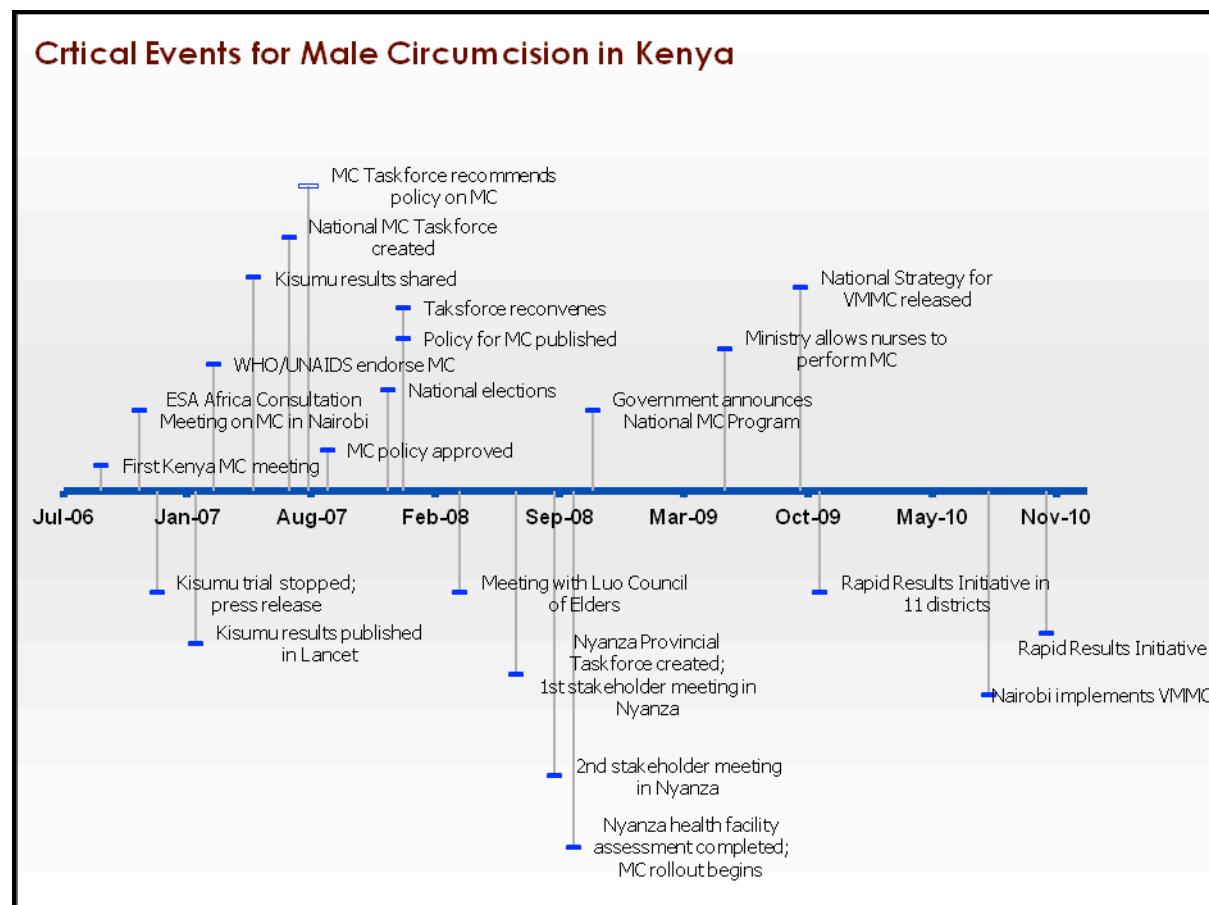
Bold text indicates sexual transmission [61,78-81].

Exhibit 7 *Kenya's Third National AIDS Strategic Plan Donor Contributions in Millions USD by Year (expected)*

	2009–10	2010–11	2011–12	2012–13
US Government (PEPFAR, USAID, CDC)	510	510	510	510
United Nations System	9	9	9	9
Global Fund to Fight AIDS, TB and Malaria	32.5	32.5	32.5	32.5
UK Department for International Development	5	5	5	
Clinton Foundation	11.7	11.7		
Japan International Cooperation Agency	4.5	4.5	4.5	4.5
Government of Kenya	2.6	2.6		
World Bank	34	34	34	34
TOTAL (millions USD)	629.3	629.3	615	590

Source: Kenya's National AIDS Strategic Plan, III.

Exhibit 8 *Timeline of Voluntary Medical Male Circumcision Program Events*



Source: Compiled by case writers.

Exhibit 9 *National Task Force Membership, 2008*

National Task Force members:

- ◆ Chairperson—The Director of Medical Services or his nominee members representing the following positions and institutions:
- ◆ Head, Department of Preventive and Promotive Health Services
- ◆ Head, Department of Curative Services
- ◆ Head, Division of Health Promotion
- ◆ Head, Division of Reproductive Health
- ◆ Head, Division of Child Health
- ◆ Director, National AIDS and STD Control Program
- ◆ Chief Executive Officer, National AIDS Control Council
- ◆ Chief Executive Officer of the National Council for Population and Development
- ◆ Representative of the University of Nairobi
- ◆ Chairpersons of professional associations including: National Nurses Association of Kenya, Clinical Officers Association, Surgical Society of Kenya, Kenya Medical Association, and Association of Public Health Officers of Kenya
- ◆ Representatives of Health Donor Working Group
- ◆ Representative of the Catholic Medical Mission Board
- ◆ Representative of the Consortium of the Universities of Nairobi, Illinois, and Manitoba (UNIM) project
- ◆ Representative of the UN agencies (WHO, UNICEF, UNAIDS, UNFPA)
- ◆ Representative of the Kenya Medical Research Institute (KEMRI)
- ◆ Representative of FHI 360

Source: National AIDS/STD Control Programme. *National Guidance for Voluntary Male Circumcision in Kenya*. Ministry of Health, Republic of Kenya; 2008.

Exhibit 10 *VMMC Estimated Program Costs, 2009–2013*

Estimated Kenya VMMC costs 2009–2013				
I. Through Mobile Teams				
Goal	Target nos. of AMCs	Annual cost year 2	Total cost years 3–4	4-year cost
Human resources	No. of teams needed	160,000	408,000	688,000
Breakdown		Cost	Cost	
1. Salary & benefits	Mobile team	3,280,000	8,364,000	14,104,000
2. Surgery	Equipment & infrastructure	480,000	120,000	1,320,000
	Consumables @ \$15/MC	2,400,000	6,120,000	10,320,000
3. Training costs	US \$6500 per team	130,000	143,000	520,000
4. Rural outreach	Vehicle @ US \$30,000	600,000	600,000	2,400,000
	Petrol & maintenance	800,000	2,040,000	3,440,000
5. Complications	Adverse events (5% default)	200,000	1,020,000	1,370,000
	Total Direct Costs (1–4)	7,890,000	18,467,000	33,474,000
II. Through Support to Public Health Facilities				
Goal	Target nos. of AMCs	Annual cost year 2	Total costs years 3–4	4-year costs
Facilities upgraded	Hospitals	40,000	102,000	172,000
	Health centers	44		
	Total Facilities	96		
Human resources	2 Teams per facility for 140 facilities	280	0	560
Breakdown		Cost	Cost	Cost
1. Incentives	\$10 per circ done	400,000	1,020,000	1,720,000
2. Surgery	Equipment & Infrastructure	3,360,000		6,720,000
	Consumables @ \$22.5/MC	900,000	2,295,000	4,972,500
3. Training costs	\$6500 per team	1,820,000		3,640,000
4. Complications	Adverse events (5% default)	50,500	127,500	215,000
	Total Direct Costs (1–4)	6,530,000	3,442,500	16,165,000
III. Other costs				
	Monitoring & evaluation (7.5%)	1,395,484	2,120,274	4,881,484
	Warehousing & distribution (7.5%)	1,395,484	2,120,274	4,881,484
	Communication campaign (10%)	1,860,645	2,827,032	6,508,645
	General administration (15%)	2,790,968	4,240,548	9,762,968
Overall goal	Target nos. of AMC	200,000	510,000	860,000
Human resources	Overall no. of teams	360	662	662
	Overall program costs	21,862,581	32,217,629	76,47,581
	Overall cost per client (national)	109	65	89
*Overall target nos. for years 3–5 are cumulated of those shown in Table 2 above.				

Source: Government of Kenya. *Kenya National AIDS Strategic Plan 2009/10–2012/13*. Nairobi: National AIDS Control Council; 2009.

Exhibit 11 *List of Nyanza's VMMC Implementers by Funding Source, 2009*

USAID via APHIA-II	CDC	Gates Foundation
EngenderHealth <i>Sub-grantees:</i> <ul style="list-style-type: none"> ◆ Academy for Educational Development (AED) ◆ Christian Health Association of Kenya (CHAK) ◆ Interdiocesan Christian Community Services ◆ PATH 	IMPACT Research & Development Organization Nyanza Reproductive Health Society (NRHS) Family AIDS Care and Education Services (FACES) Catholic Medical Mission Board	FHI 360 <i>Sub-grantees:</i> <ul style="list-style-type: none"> ◆ University of Illinois at Chicago ◆ Nyanza Reproductive Health Society (NRHS) ◆ EngenderHealth

Source: Compiled by case writers.

Exhibit 12 *WHO-Recommended Male Circumcision Equipment and Supplies*

Equipment and Supplies “Pre-packs” or “consumables” contained: <ul style="list-style-type: none"> ◆ two sizes of latex gloves ◆ plain and petroleum jelly impregnated gauze ◆ one scalpel knife handle and two blades ◆ one 10-milliliter syringe ◆ one 18- or 21-gauge needle ◆ chromic gut or vicryl 3-0 and 4-0 sutures with a three-eighths circle reverse cutting needle Surgical packages (reusable) included: <ul style="list-style-type: none"> ◆ fine-toothed dissecting forceps ◆ two straight and two curved artery forceps ◆ curved Metzenbaum’s scissors ◆ stitch scissors ◆ Mayo’s needle holder ◆ sponge-holding forceps Other supplies kept on site included: <ul style="list-style-type: none"> ◆ surgical masks ◆ aprons ◆ lidocaine anesthetic solution ◆ povidone iodine ◆ 80 cm x 80 cm “o” drapes with 5 cm holes ◆ sterile marking pens to mark the line of incision ◆ emergency medications for anaphylactic reactions ◆ sterile drapes ◆ gallipots for antiseptic solution ◆ instrument trays
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Source:

World Health Organization. *Manual for Male Circumcision Under Local Anesthesia*; 2008.

Exhibit 13 *Mobile Service Delivery Model Images*

Group counseling on male circumcision



Mobile circumcision counseling site



Circumcision being conducted in tented delivery site

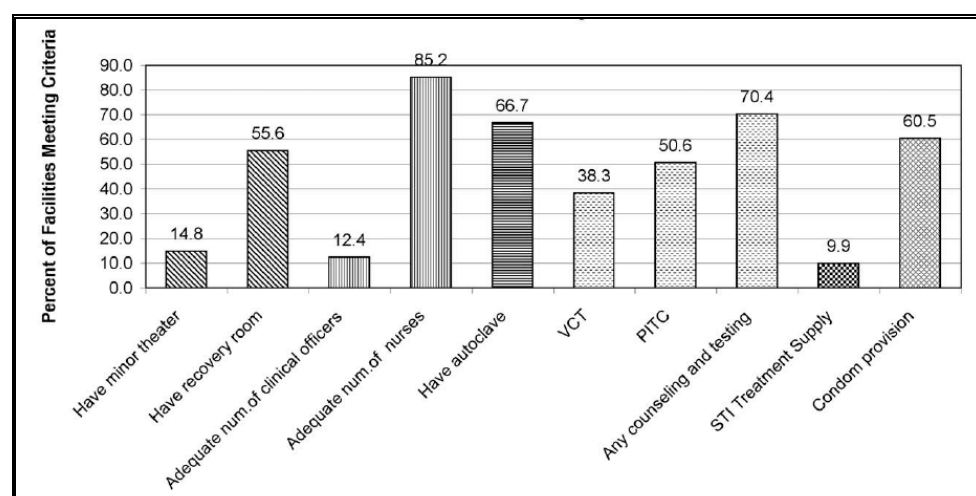


Source: Nyanza Reproductive Health Society.

Exhibit 14 *Minimum Criteria for Male Circumcision Service Provision*

1. Room available for surgery (e.g., minor theater)
2. Room available for recovery
3. Trained and available staff
4. Sterilization and infection control compliance
5. HIV voluntary counseling and testing (VCT); and risk-reduction counseling
6. STI syndromic diagnosis and treatment
7. Provision and promotion of male and female condoms

Source: Herman-Roloff A, Llewellyn E, Bailey R, Agot K. *Using Health Facility Assessment Data to Strategically Roll-Out Male Circumcision in Nyanza Province, Kenya: A Mixed Method Approach*; 2009.

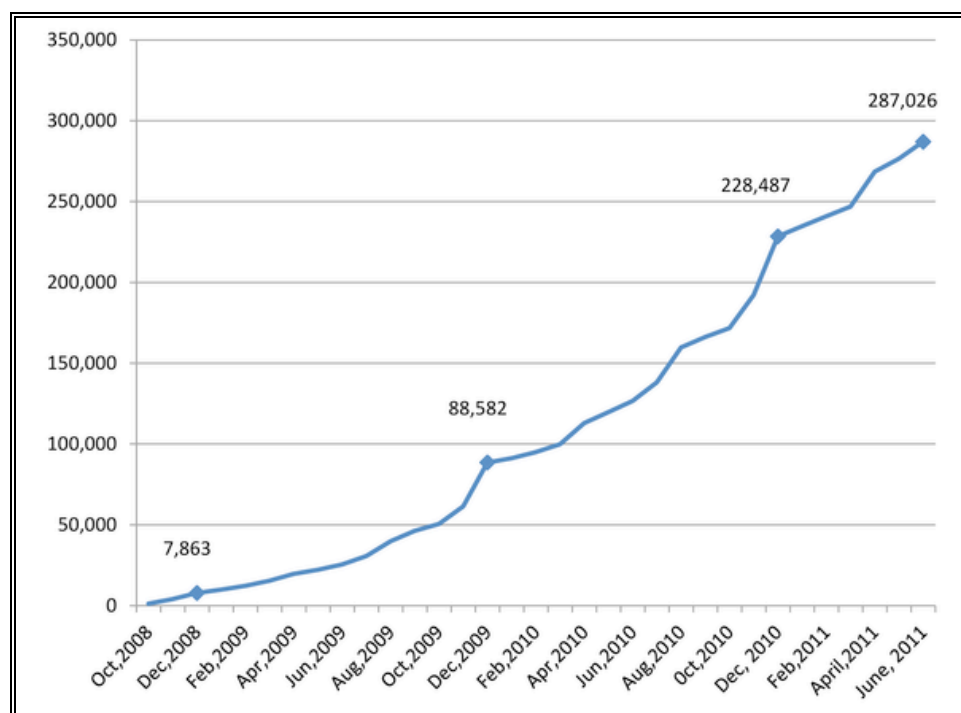
Exhibit 15 *Percent of Government Health Facilities in Kisumu and Nyando Districts with Components of the Minimum Criteria for VMMC Service Provision*

Source: Herman-Roloff A, Llewellyn E, Obiero W, Agot K, Ndinya-Achola J, Muraguri N, Bailey RC: *Implementing Voluntary Medical Male Circumcision for HIV Prevention in Nyanza Province, Kenya: Lessons Learned During The First Year*. PLoS ONE 2011, 6:e18299. <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0018299>

Exhibit 16 *National VMMC Targets by Province, 2009–2013*

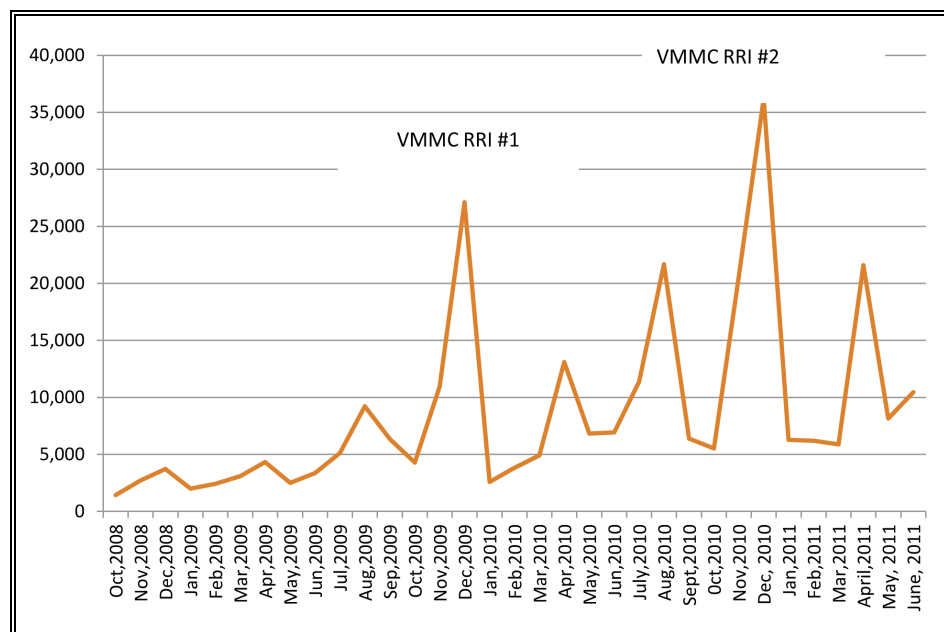
	2009–10	2010–11	2011–12	2012–13	4 Year Total
Nyanza	76,500	100,000	125,000	125,000	426,500
Rift Valley	28,500	40,000	60,000	60,000	188,500
Nairobi	19,500	30,000	40,000	40,000	129,500
Western	12,000	15,000	15,000	15,000	57,000
Others	13,500	15,000	15,000	15,000	58,500
TOTALS	150,000	200,000	255,000	255,000	860,000

Source: Government of Kenya. *Kenya National AIDS Strategic Plan 2009/10– 2012/13*. Nairobi: National AIDS Control Council; 2009.

Exhibit 17 *Cumulative Circumcisions Done in Kenya, 2008–2011*

Source: PLoS Med. 2011 Nov;8(11):e1001130. Epub 2011 Nov 29.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3226459/pdf/pmed.1001130.pdf>

Exhibit 18 *Monthly Circumcisions Done in Kenya, 2008–2011*

Source: PLoS Med. 2011 Nov;8(11):e1001130. Epub 2011 Nov 29.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3226459/pdf/pmed.1001130.pdf>

Appendix A *Male Circumcision*

Medical Circumcision of Adults

Three methods were recommended for adult and adolescent male circumcision for HIV prevention: the forceps-guided, the dorsal slit, and the sleeve resection method. Advantages and disadvantages are summarized in the table below. Though the sleeve resection method was regarded as having the most ideal result, it required the highest level of surgical skill. The dorsal slit was the most widely used procedure by trained surgeons worldwide but ran the risk of uneven foreskin removal, as there was no guide to ensure a uniform incision since the provider cut free-hand around the circumference of the penis. Finally, the forceps-guided method, the simplest method, was regarded as ideally suited to most resource-limited clinical setting. It was the most simple to teach and perform and was the method used in Kenya's VMMC campaign. All recommended adult and adolescent circumcision procedures require knowledge of penile anatomy, training in draping and skin preparation, anesthesia administration, haemostasis, and suturing. Each technique removes a uniform amount of the foreskin sufficient to expose the glans whether the penis is erect or flaccid.²

The Forceps-Guided Method

To perform a forceps-guided circumcision, surgeons sterilize the skin with iodine and drape the body so that only the penis is exposed. After administering injected anesthesia, surgeons pull back the foreskin to separate any adhesions between the foreskin and the glans. Then, surgeons pull the foreskin forward to mark the point at which the foreskin meets the glans as the line of incision. Surgeons clamp the foreskin, evenly holding the foreskin just past the glans. Surgeons use their fingertips to ensure the glans had not been caught in the forceps and is still located before the line of incision. Then, using a scalpel, surgeons cut along the exterior line of the forceps, removing the foreskin. The surgeon retracts the skin on the shaft of the penis to tie off blood vessels as necessary. Surgeons place at least six sutures, then check for any remaining bleeding and dress the wound.²

Advantages and Disadvantages of Adult Male Circumcision Methods

METHOD	ADVANTAGES	DISADVANTAGES
Dorsal Slit	<ul style="list-style-type: none"> ◆ A surgical assistant is helpful but not required ◆ Widely used by surgeons throughout the world 	<ul style="list-style-type: none"> ◆ Requires more surgical skill than forceps-guided method ◆ Small risk of asymmetric result
Forceps Guided	<ul style="list-style-type: none"> ◆ Can be learned by surgeons/surgical assistants who are relatively new to surgery ◆ Ideal for use in a clinic with limited resources ◆ Can be done without a surgical assistant 	<ul style="list-style-type: none"> ◆ Cosmetic effect may be less satisfactory ◆ Leaves 0.5–1.0 cm of mucosal skin proximal to corona

Sleeve Recession	<ul style="list-style-type: none"> ◆ Better cosmetic results than other two techniques 	<ul style="list-style-type: none"> ◆ Requires highest level of surgical skill ◆ Better suited to hospital rather than clinic setting ◆ Requires an assistant ◆ More room for surgical error
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Medical Circumcision of Infants

In 2008, the World Health Organization recommended that circumcision for male infants and children be performed using one of four methods: the dorsal slit, Plastibell, Mogen clamp, and Gomco clamp methods. Each of the four methods was considered easier to perform than adult and adolescent circumcision, as the childhood foreskin would be less vascular and proportionally much longer than the penis during infancy and childhood, leading to lower chance of complications from bleeding or accidental amputation of the glans during incision. Because the risk of erection was much lower in infants and children, non-surgical procedures such as the Plastibell were feasible, in which a clamp was left on the foreskin for three to four days causing the foreskin to fall off. The Plastibell is a disposable device that does not require surgical expertise but cost more than other methods and required a steady supply chain to ensure sufficient stock of the various clamp sizes. The dorsal slit method, similar to that used for adult and adolescent circumcision, was effective but required the highest level of surgical skill of the four methods. The Mogen clamp is a one-piece device that enabled providers with limited surgical training to make the incision by guiding their scalpel, but which obscured visibility of the glans and foreskin during the procedure, thereby increasing risk of partial amputation. The Gomco clamp is a multipiece device that comes in multiple sizes and does not require even simple suturing to complete. The pieces of each size of the Gomco clamp are unique and thus are not interchangeable with those of other Gomco clamp sizes. As a result, clinics preferring this method required adequate stocking of each size and its accompanying pieces to ensure accurate use. Both the Mogen and Gomco clamps are reusable devices, requiring staff trained in sterilization procedures as with the dorsal slit method (see below for comparison of infant and child circumcision methods, including equipment).²

Advantages and Disadvantages of Pediatric Circumcision Methods

METHOD	ADVANTAGES	DISADVANTAGES
Dorsal slit	<ul style="list-style-type: none"> ◆ Can be performed in any hospital or clinic equipped with standard surgical instruments ◆ Can be undertaken by skilled surgeons who do not regularly perform circumcision 	<ul style="list-style-type: none"> ◆ Requires more surgical skill than other methods
Plastibell	<ul style="list-style-type: none"> ◆ Simple technique ◆ Can be performed using topical anesthetic cream ◆ Good for high volume clinics 	<ul style="list-style-type: none"> ◆ Requires stock of different sizes of Plastibell ◆ Plastibell stays attached for 3 to 4 days ◆ May require second clinic visit for removal
Mogen clamp	<ul style="list-style-type: none"> ◆ One-piece instrument is simple to use ◆ Simple to teach 	<ul style="list-style-type: none"> ◆ Risk of partial amputation if device not applied carefully ◆ Risk of glans being buried by cross

		adhesions ♦ Suturing may be needed on occasion; thus surgical skills must be available
Gomco clamp	♦ Simple technique ♦ Can be performed with cream anesthesia ♦ Produces a circular, crushed welded edge, which does not need suturing	♦ Clinic needs to have a set of Gomco clamps with different bell sizes ♦ Multipart device, with risk that parts will be lost or damaged ♦ Parts not readily interchangeable between different clamp sets ♦ Suturing may be needed on occasion; thus surgical skills must be available

Appendix B*Useful Abbreviations*

APHIA	AIDS, Population, and Health Integrated Assistance
CDC	US Centers for Disease Control and Prevention
CMMB	Catholic Medical Mission Board
DOTS	directly observed therapy, short-course (internationally recommended strategy for TB control)
DTP3	third dose of diphtheria toxoid, tetanus toxoid, and pertussis vaccine (used as a proxy for a fully immunized child).
FACES	Family AIDS Care and Education Services
Gates Foundation	The Bill & Melinda Gates Foundation
GDP	gross domestic product
MCC	Male Circumcision Consortium
NACC	National AIDS Control Council
NASCO	National AIDS and STI Control Program
NRHS	Nyanza Reproductive Health Society
PEPFAR	US President's Emergency Fund for HIV and AIDS Relief
PMTCT	prevention of mother-to-child transmission
PPP	purchasing power parity
STD	sexually transmitted disease
STI	sexually transmitted infection
TB	tuberculosis
UN	United Nations
UNAIDS	The Joint United Nations Programme on AIDS
UNIM	Universities of Nairobi, Illinois, and Manitoba
USAID	United States Agency for International Development
USD	United States' dollar
VCT	voluntary counseling and testing
VMMC	voluntary medical male circumcision
WHO	World Health Organization

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