THE CIRCUMCISION IMPACT STUDY IN KISUMU, KENYA 2008-2013

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UIC UNIVERSITY OF ILLINOIS AT CHICAGO

MCC MALE CIRCUMCISION CONSORTIUM

NRHS Nyanza Reproductive Health Society

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FREQUENTLY ASKED QUESTIONS

When exactly were the data collected?

2008 survey: November 2008 to April 2009
2011 survey: February 2011 to July 2011
2013 survey: February 2013 to July 2013

What does VMMC stand for?

VMMC stands for Voluntary Medical Male Circumcision and in this report refers to Kenya's program to provide safe, accessible and sustainable male circumcision services for HIV prevention.

Why were the surveys done in Kisumu?

Due to a high burden of HIV and low circumcision rates, Nyanza province was an early focus of the VMMC program. Kisumu City, as the largest population center in Nyanza province, provided a relatively stable and accessible population to assess population level impact and monitor for changes over time.

Are these surveys representative of the population, and what does that mean?

The three CIRCIS surveys are representative of the low to middle income population of Kisumu municipality (Kisumu City and immediately surrounding area). This means that the samples were chosen in a way that ensured that every resident of Kisumu had a known chance of being included in the sample. This allows us to estimate characteristics of the whole population from our relatively small sample.

What is a p-value?

At several points in this report we have indicated a p-value. P-values can be rather confusing even to those that have spent a good amount of time calculating and talking about them. Very briefly, a p-value is a measure of the uncertainty in a given result. Put another way, a p-value helps us answer the question of how certain we are that a difference we see may have occurred by chance (or by accident). The smaller the p-value the greater our certainty can be that what we see is real: a p-value of 0.05 is pretty small, a p-value of 0.0001 is really small, and a p-value of 1.0 is as big as they come.

INTRODUCTION

Based on the scientific evidence, male circumcision (MC) could have a significant impact on the HIV epidemic in populations with high HIV prevalence and low prevalence of circumcision in men. The results of three clinical trials (RCTs) in Kenya, South Africa, and Uganda have shown that male circumcision significantly reduces the risk of acquisition of heterosexually (female to male) transmitted HIV-1 among men. These findings validate convincing observational evidence regarding the immune functions of the foreskin and follow-up studies have shown the protection to be stable over time. In view of these results, efforts are currently underway for the large-scale provision of voluntary medical male circumcision (VMMC) throughout Kenya and in other countries in East and southern Africa.

The promotion and provision of VMMC for HIV prevention may alter peoples' perceptions of risk of HIV infection. If men and women perceive introduction of MC in their community as reducing their risk of infection, they may change their behaviors to compensate for the perceived lower risk. To address this, the purposes of this study series are to:

1. Assess current circumcision-related knowledge and beliefs about HIV risk and how this knowledge and these beliefs are associated with sexual risk behaviors
2. Assess any change in knowledge and beliefs about MC and HIV risk over time
3. Assess changes in MC prevalence following MC-service introduction in the general population

This report presents findings from the first (baseline survey), second (3-year post service introduction), and third (5-year post service introduction) rounds of the Circumcision Impact Study (CIRCIS). The purpose of the report is to inform key stakeholders of study findings as we move forward with formal manuscript preparation. The hope of the authors is that this report will allow more informed discussion and decisions regarding the impact of VMMC programs in the community.

CIRCIS would like to thank and recognize the following study partners:

- The Kenyan National Bureau of Statistics
- District Commissioner – Kisumu District
- The Ministry of Health
- District Laboratory Technician – Kisumu District
- The Chiefs, Assistant Chiefs, and Elders working throughout our study area
- The Communities comprising and surrounding our study area

Finally, I would like to offer my personal thanks to all our study participants, the communities in which we worked, and the $CIRCIS_1$, $CIRCIS_2$, and $CIRCIS_3$ study teams. Without the assistance and professionalism of all study partners, this important study would not have been possible.

Sincerely,

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STUDY METHODS

CIRCIS is a series of three random household surveys designed to be representative of the population of Kisumu municipality. Surveys were completed approximately every two years beginning in late 2008.

Households were selected through a multi-stage process to ensure random selection:

1. 40 study clusters were randomly chosen from all Kisumu enumeration areas. The population of each enumeration area was taken into account.
2. The total number of households in each study cluster was estimated using maps and information provided by KNBS. Field teams visited each to reengage local leadership and delineate cluster boundaries.
3. Households within each study cluster were randomly selected using a systematic methodology that gave every house an equal chance of selection.

All selected households were offered study participation, and all men and women aged 15-49 years sleeping in the house the night before the first visit by the field team were eligible for study participation.

Participation in the CIRCIS study included up to 4 separate activities. All study activities were voluntary and participants could decline any or all activities at any time during participation. CIRCIS study activities were:

1. Detailed face-to-face interview focused on participant knowledge, attitudes, and beliefs regarding HIV and male circumcision
2. In-home VCT (rapid HIV testing with results provided)
3. Visual confirmation of circumcision status (MALES ONLY)
4. Collection of a dried blood spot (DBS) sample for additional HIV laboratory-based testing

CIRCIS STUDY CLUSTERS

With the assistance and approval of the KNBS, 40 enumeration areas were randomly selected to serve as CIRCIS study clusters.

Location	Sub-Location	Cluster Name
CENTRAL KISUMU	KORANDO "B"	U. KAROMBO "C"
CENTRAL KOLWA	KASULE	KANYAIKA
EAST KAJULU	GOT NYABONDO	KOLOUCH
EAST KAJULU	OKOK	KAMOLO "B"
EAST KISUMU	KANYAKUAR	GEBO
EAST KISUMU	KANYAKUAR	UPPER OBUNGA
EAST KISUMU	KOGONY	PUNDO "A"
EAST KOLWA	BUOYE	KANYUMBA EAST
EAST KOLWA	MAYENYA	KADIJU
KONDELE	MANYATTA 'A'	MANYATTA
KONDELE	MANYATTA 'A'	MANYATTA “A”
KONDELE	MANYATTA 'A'	MANYATTA “A”
KONDELE	MANYATTA 'A'	MANYATTA “A”
KONDELE	MANYATTA 'A'	MANYATTA “A”
KONDELE	MANYATTA 'A'	MANYATTA “A”
KONDELE	MIGOSI	MIGOSI ESTATE
KONDELE	MIGOSI	MIGOSI
KONDELE	NYAWITA	NYAWITA
NORTH KISUMU	BAR “B”	NDEDE
NORTH KISUMU	NYAHERA	KODAWO II
S.W. KISUMU	OJOLLA	KAHONGO "A"
S.W. KISUMU	OSIRI	KANYAUMA
TOWNSHIP	KALOLENI	KALOLENI
TOWNSHIP	KALOLENI	NUBIAN
TOWNSHIP	NORTHERN	ARGWINGS EST.
WEST KAJULU	KONYA	KADHOLA "B"
WEST KAJULU	WATHOREGO	KUTUNGA
WEST KOLWA	MANYATTA 'B'	ESTATE
WEST KOLWA	MANYATTA 'B'	ESTATE
WEST KOLWA	MANYATTA 'B'	KUOYO VILL.
WEST KOLWA	NYALENDA 'A'	LIBETO
WEST KOLWA	NYALENDA 'A'	WADHARE
WEST KOLWA	NYALENDA 'A'	WADHARE
WEST KOLWA	NYALENDA 'A'	KANYAKWAR
WEST KOLWA	NYALENDA 'B'	DUNGA
WEST KOLWA	NYALENDA 'B'	KILO
WEST KOLWA	NYALENDA 'B'	PANDPIERI
WEST KOLWA	NYALENDA 'B'	PANDPIERI
MIWANI	CENTRAL MIWANI	L. KOLENG 'B'
MIWANI	MIWANI WEST	KIBOS NUBIAN

NOTE: CIRCIS STUDY CLUSTER SELECTED BY RANDOM SAMPLING PROPORTIONAL TO THE 2008 ESTIMATED POPULATION FROM ALL ENUMERATION AREAS WITHIN THE MUNICIPALITY OF KISUMU.

THE STUDY SAMPLE

A description of those who participated

The total number of participants per study round:

CIRCIS$_1$ (2008): 1,762

CIRCIS$_2$ (2011): 2,912

CIRCIS$_3$ (2013): 2,840

The number and age of female participants by study round:

2008
Interviewed = 1,087
Median Age = 24
IQR[1] = 20-31

2011
Interviewed = 1,540
Median Age = 24
IQR[1] = 20-31

2013
Interviewed = 1,530
Median Age = 26*
IQR[1] = 21-33

* Female participants were significantly older in 2013 than in 2011 and 2008 (Wilcoxon signed-rank test, $p < 0.001$)

[1] IQR = Interquartile range: the values between which the most commonly reported 50% of the data can be found

The number and age of male participants by study round:

2008
Interviewed = 675
Median Age = 24
IQR = 20- 31

2011
Interviewed = 1,372
Median Age = 26*
IQR = 21- 33

2013
Interviewed = 1,310
Median Age = 28*
IQR = 22- 34

* Male participants were significantly older in both the 2011 and 2013 samples than in previous survey rounds (Wilcoxon signed-rank test, $p \leq 0.01$).

Based on lessons learned in 2008, we introduced multiple changes in field procedures to ensure faster and more complete identification of selected participants as well as improvements in participant tracing. Our ability to physically locate selected individuals, which was required in order to offer them study participation, was limited to only 73% of those eligible in 2008. This was increased to over 95% in subsequent survey rounds. Refusal to participate was 6% in 2008, 9% in 2011, and approximately 8% in 2013.

The increase in age in men from 2008 to 2011 is partially a result of the improvements in locating men and increasing participation rates. The increased age noted in both the male and female samples between 2011 and 2013 may reflect continued improvement in locating harder to reach participants, who tend to be older, or actual changes in the age structure of Kisumu residents, although this seems unlikely.

Marriage status of women by study round:

	2008	2011	2013
Never married	**25%**	**27%**	**32%**†**
Previously married	**12%**	**11%**	**12%**
Currently married	**63%**	**62%**	**56%**

**† Controlling for differences in the ages of those selected, significantly more women reported never being married in 2013 than in 2008 or 2011 ($p < .001$)

Marriage status of men by study round:

	2008	2011	2013
Never married	**51%**	**40%**	**43%**
Previously married	**3%**	**3%**	**4%**
Currently married	**46%**	**57%***	**53%**

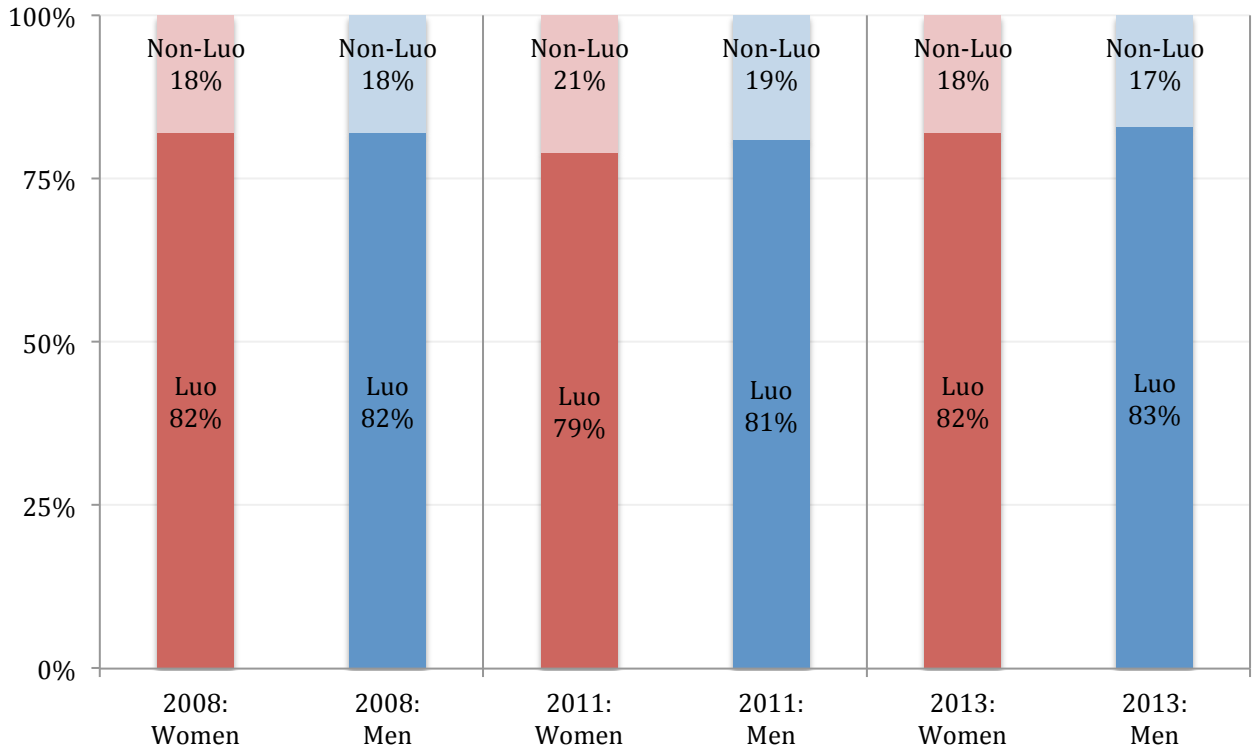
* Controlling for differences in the ages of those selected, significantly more men reported being currently married in 2011 than in 2008 ($p = 0.005$)

Here we have controlled for the differences in the ages of those selected to limit the influence of age on the marriage status of participants.

Women in 2013 were noted to be more likely to have never been married compared to previous surveys. One possible explanation would be a recent (after 2008) increase in the age of women at their first marriage. Such an increase in age at first marriage would be seen as a larger portion of our targeted age group (15-49 years) never having been married. It may also be related to a higher proportion of young women staying in school (see Educational Attainment below).

The increase noted in currently married men in 2011 likely relates to our difficulty in reaching men outside their residence in 2008. No difference in the marriage status of the 2011 and 2013 samples was observed.

The ethnic group of participants by study round:



The ethnic groups represented in our survey samples have been consistent across survey rounds with approximately 80% being Luo, 12% Luhya, 2% Kisii, and a mixture of other ethnic groups each representing less than 1% of the total.

Educational attainment of men by study round:

	2008	2011	2013
Primary school or less	44%	40%*	39%**
Secondary school	43%	47%*	45%**
Post-secondary School	13%	13%	16%**

* Controlling for differences in the age of those selected, in 2011 fewer men than in 2008 had primary or less education and more men reported receiving some secondary level education (p = 0.03).

** Controlling for differences in the age of those selected, in 2013 fewer men than in 2008 had primary or less education with boarder-line significant increase in men reporting secondary and post-secondary educational attainment (p= 0.09).

Educational attainment of women by study round:

	2008	2011	2013
Primary school or less	62%	56%*	51%**†
Secondary school	30%	32%*	36%**†
Post-secondary School	8%	12%*	13%**

* Controlling for differences in the age of those selected, in 2011 fewer women than in 2008 had primary or less education and more women reported receiving some secondary level education or beyond (p < 0.03).

** Controlling for differences in the age of those selected, in 2013 fewer women than in 2008 had primary or less education with significant increase in those reporting secondary or post-secondary educational attainment (p< 0.001).

† Controlling for differences in the age of those selected, in 2013 fewer women than in 2011 had primary or less education with more women reporting at least some secondary level schooling (p = 0.008).

Since 2008 we observed consistent increases in the educational level of the study samples - most markedly in women. As will be shown in the following section, there is little evidence that this educational attainment has yet to translate to significant increases in employment.

Employment status of men by study round:

	2008	2011	2013
Unemployed	30%	23%*	23%**
Student	17%	16%	18%**†
Regularly employed	12%	19%*	16%†
Casually employed	41%	42%	44%**

* Controlling for differences in the ages of those selected, in 2011 fewer men were unemployed and more were regularly employed than in 2008 ($p \leq 0.05$).
** Controlling for differences in the ages of those selected, in 2013 fewer men were unemployed and more were students or casually employed than in 2008 ($p \leq 0.05$).
† Controlling for differences in the ages of those selected, in 2013 fewer men were regularly employed and more were students than in 2011 ($p \leq 0.05$).

Employment status of women by study round:

	2008	2011	2013
Unemployed	50%	47%*	42%**†
Student	10%	14%*	16%**†
Regularly employed	7%	5%	7%
Casually employed	33%	34%	35%

* Controlling for differences in the ages of those selected, in 2011 fewer women were unemployed and more were students than in 2008 ($p \leq 0.05$).
** Controlling for differences in the ages of those selected, in 2013 fewer women were unemployed and more were students than in 2008 ($p \leq 0.05$).
† Controlling for differences in the ages of those selected, in 2013 fewer women were unemployed and more were students than in 2011 ($p \leq 0.05$).

Since 2008 we observe decreases in the percentage of individuals considering themselves unemployed. Some corresponding increase in employment is noted for men. In women, however, the shift from unemployment has been limited to an increasing number of women considering themselves students.

CIRCUMCISION PREVALENCE

The estimated percentage of men in Kisumu who are circumcised:

2008 = 32% (95% CI: 26-38)

2011 = 49% (95% CI: 44-53)

2013 = 60% (95% CI: 56-63)

The estimated percentage of traditionally non-circumcising Luo men in Kisumu who are circumcised:

2008 = 18% (95% CI: 14-22)

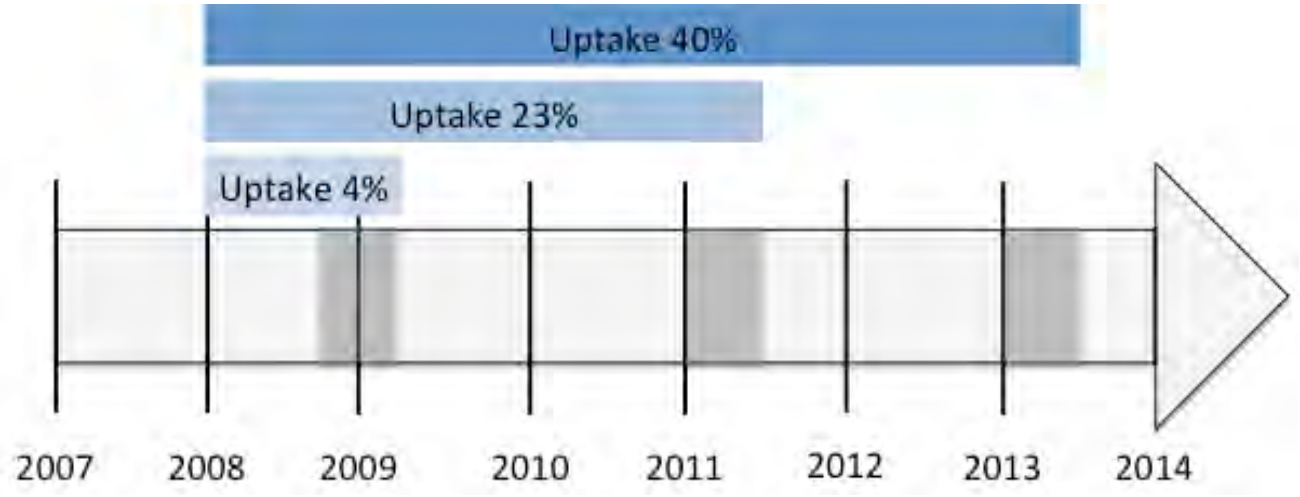
2011 = 38% (95% CI: 34-41)

2013 = 53% (95% CI: 50-55)

The prevalence of male circumcision in Kisumu has increased consistently since the initial scale-up of the VMMC program in 2008. Between 2008 and 2011, the initial 3 years of VMMC activities, we observed a 53% increase in the percentage of circumcised men. The following 2 years, 2011 to 2013, saw a smaller but still significant 22% increase in the circumcised population. The changes observed are almost exclusively seen in gains in circumcision rates among the traditionally non-circumcising Luo population.

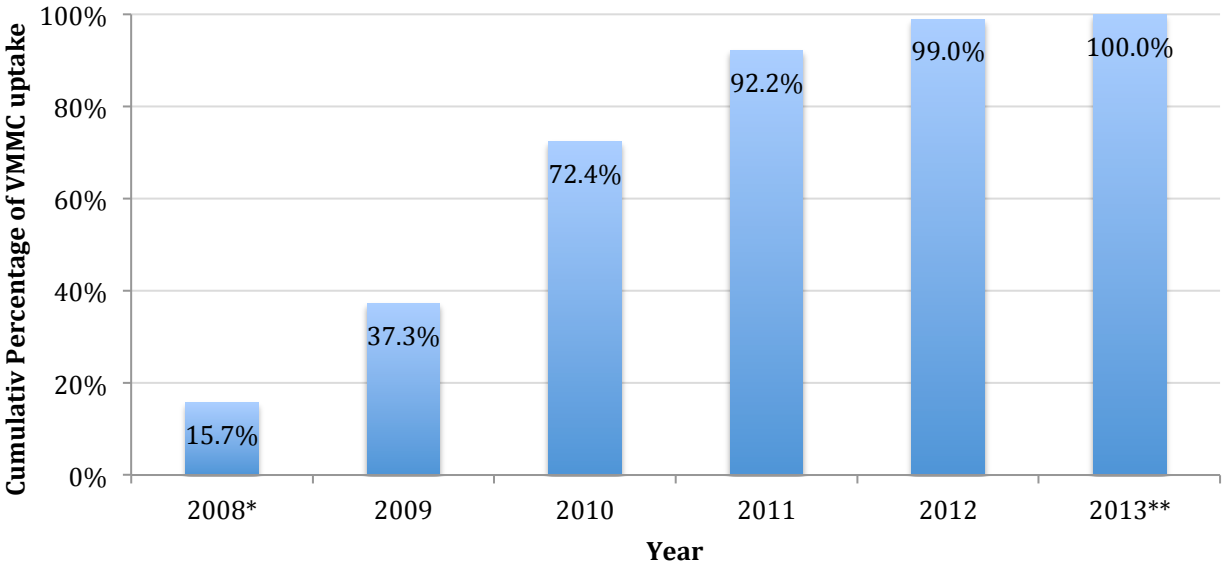
CIRCUMCISION UPTAKE

The percentage of men who were uncircumcised at the beginning of VMMC scale-up in 2008 that became medically circumcised during the time period considered by each survey.



Note: Shaded grey areas denote the time period of data collection for each survey. Uptake is defined as the percentage of men who report being uncircumcised in 2008 who became circumcised, in a medical setting, between 2008 and the date interviewed.

The percentage of total VMMC program uptake (2008 to 2013) by year

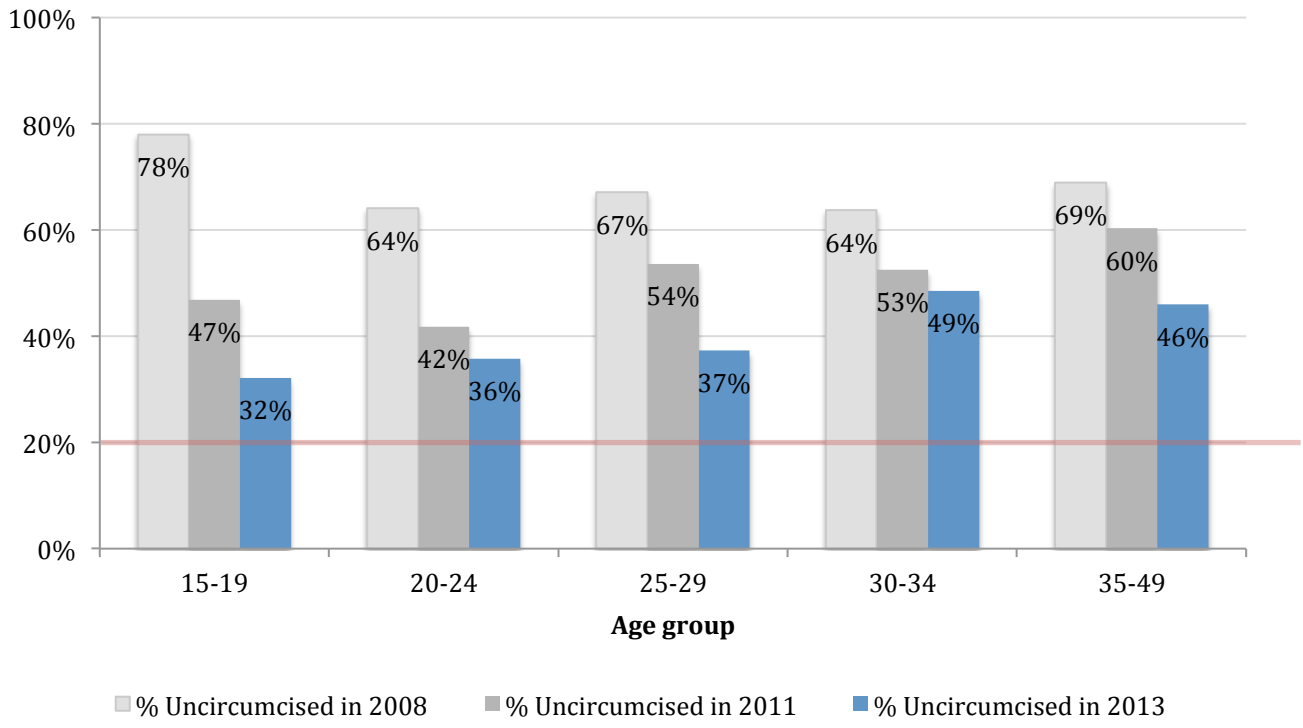


* VMMC service available throughout 2008, but official scale-up and promotion began in October of 2008
**2013 data are incomplete, available only to date of interview (data collection done February 2013 to July 2013)

On the previous page we observe that VMMC program uptake has been significant and appears fairly stable in both the 2011 and 2013 surveys. This strong uptake of VMMC services is well reflected by the significant increase in circumcision prevalence noted on page 15. When we examine uptake by year, however, we observe a gradual decrease from a peak in 2010 and a dramatic reduction in in 2012.

If reductions in VMMC uptake continue, the VMMC program goal of circumcising at least 80% of the population may be at risk with future significant increases in circumcision prevalence unlikely.

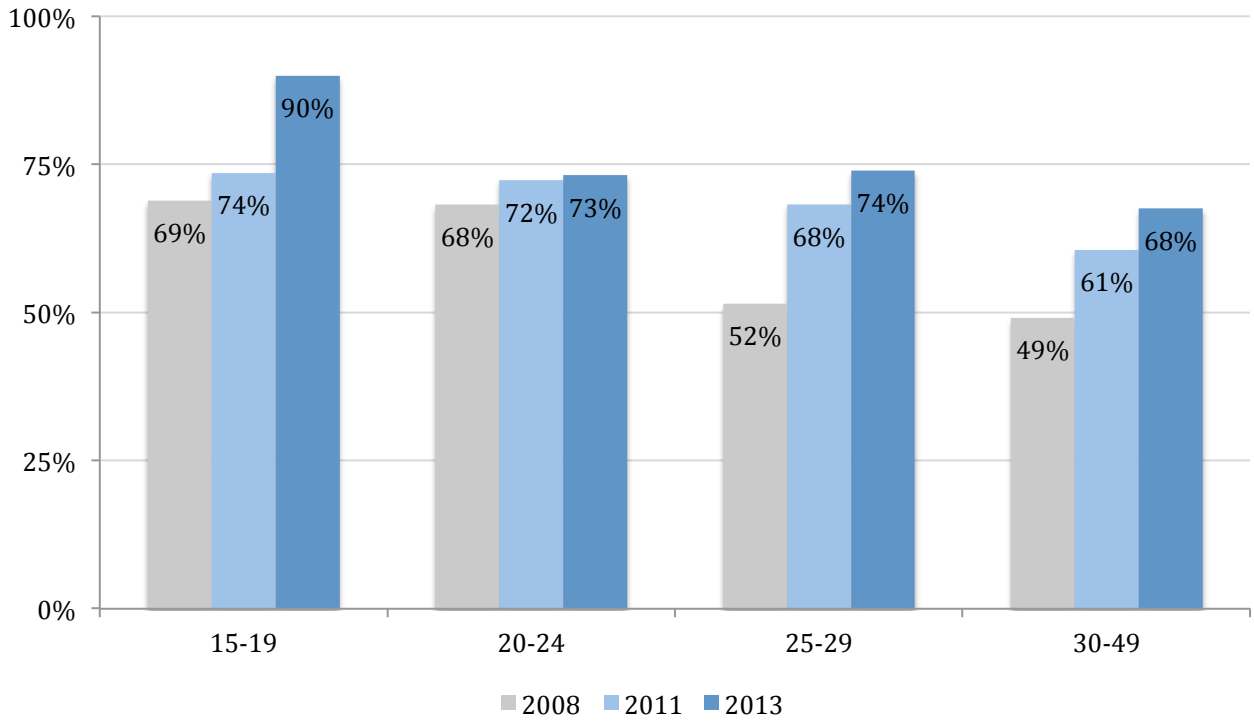
Percent of men <u>uncircumcised</u> by age group and study year



Above we see an alternative look at VMMC uptake through the changing proportion of men who are uncircumcised by age and across survey year. The red line represents the goal of circumcising 80% of the population (less than 20% uncircumcised).

PREFERENCE TO BE CIRCUMCISED

Preference to be circumcised among uncircumcised men by age group and study year:



All uncircumcised men were asked: "Would you prefer to be circumcised or uncircumcised?" The percentage of men indicating that they would prefer to be circumcised by study round is presented above.

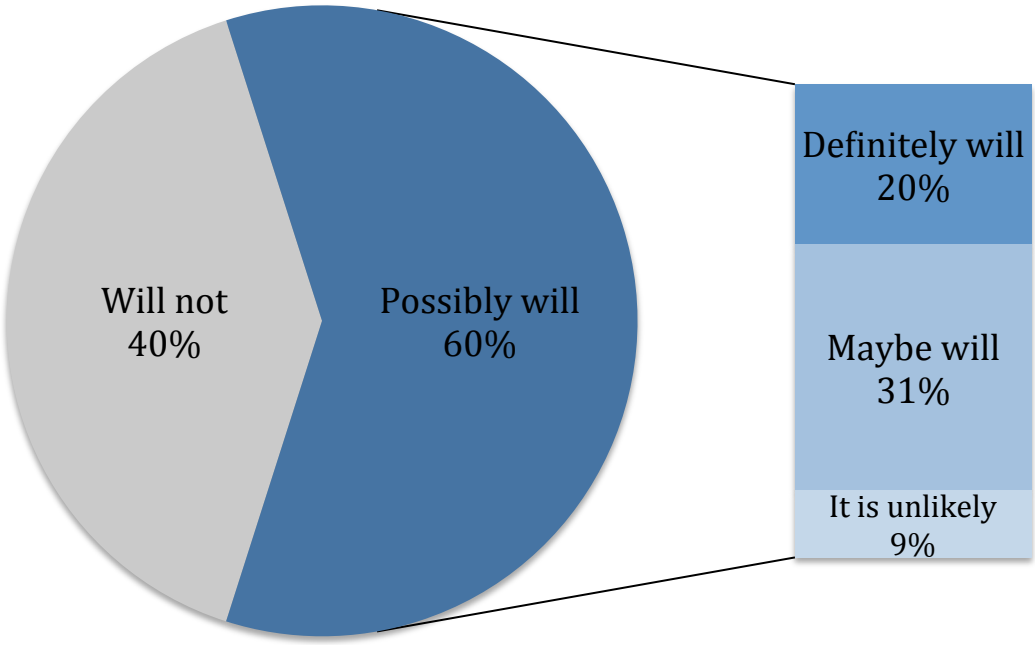
Because the prevalence of circumcision has been increasing in this population, it might be expected that the proportion of uncircumcised men preferring to be circumcised would decrease over time. Said another way, as uncircumcised men who would prefer to be circumcised actually become circumcised, the proportion preferring to be uncircumcised should rise.

No decrease in the preference to be circumcised was observed indicating that preference has actually increased across all age groups since the VMMC program began in 2008.

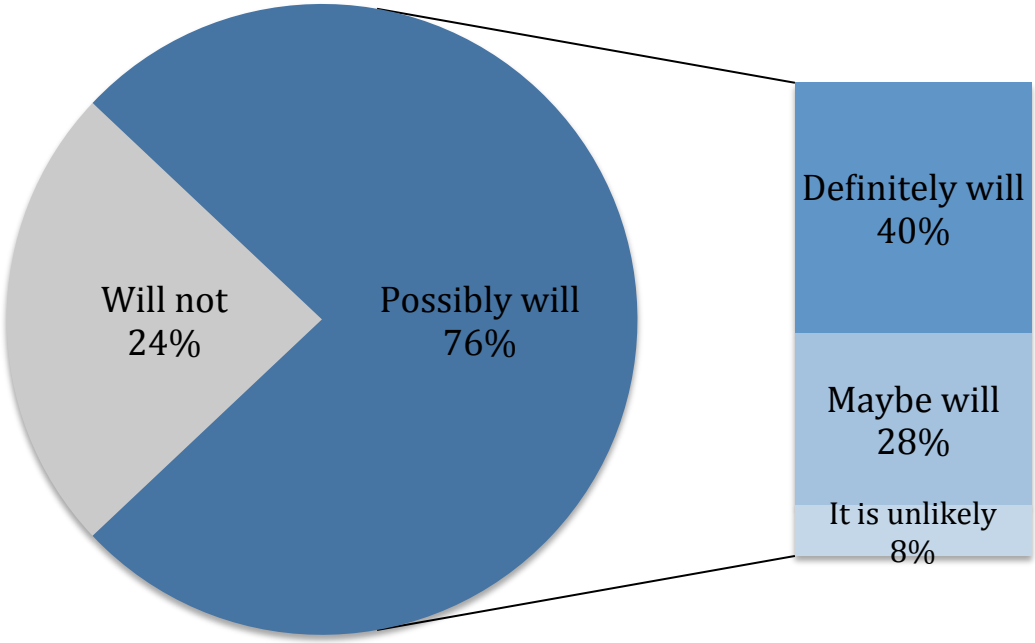
CIRCUMCISION IN THE FUTURE

Likelihood of uncircumcised men becoming circumcised in the future:

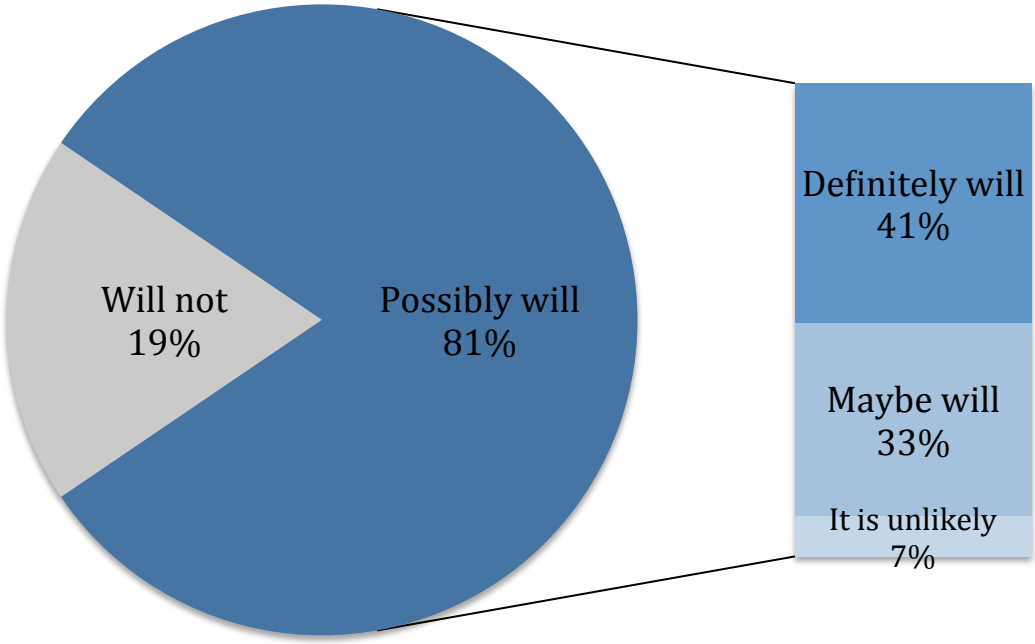
2008



2011



2013



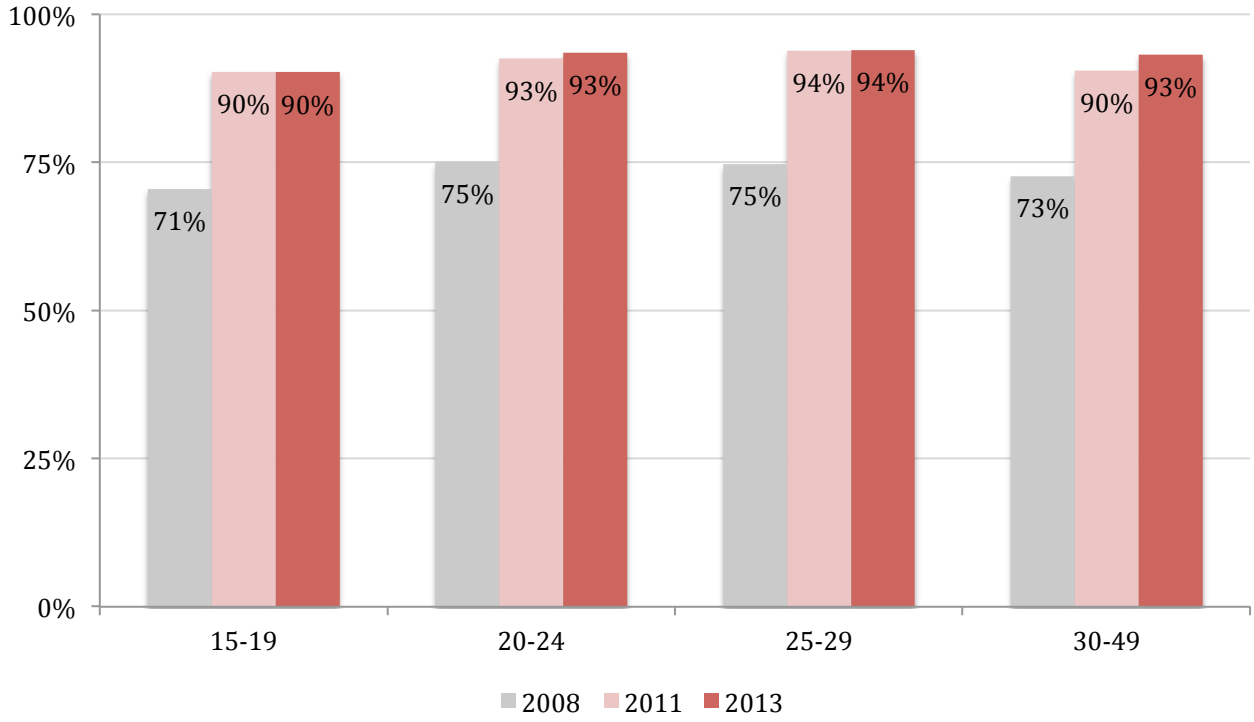
We asked all uncircumcised men about their likelihood of becoming circumcised in the future by asking: "Are you going to be circumcised in the future?" Possible answers included: yes – definitely, maybe, it is unlikely, and definitely not. The relative proportion of each by survey year is presented in the preceding three charts.

Overall we observe a decreasing proportion of men who are definitively not considering the procedure along with significant gains in the percentage of uncircumcised men considering future circumcision definite.

These findings add further depth to the increasing preference to be circumcised noted on page 18 and indicate that there are still many men who desire VMMC services but have not yet accessed them.

PREFERENCE FOR CIRCUMCISED SEXUAL PARTNERS

Preference for circumcised partners among Luo women by age group and study round:



The dramatic increase in women's preference for circumcised partners noted from 2008 to 2011 was sustained in 2013 with over 90% of Luo women in all age groups reporting a preference of circumcised sexual partners.

BARRIERS TO BECOMING CIRCUMCISED

Primary reason given for not yet becoming circumcised among uncircumcised men who would prefer to be circumcised:

	$CIRCIS_1$	$CIRCIS_2$	$CIRCIS_3$
Fear of pain	20%	23%	28%
Circumcision is not part of my culture	7%	7%	2%
Circumcision takes too long	23%	38%	30%
No specific reason	30%	10%	18%
Circumcision is too expensive	2%	4%	1%
No transportation	2%	3%	1%
Risk of the procedure	2%	3%	3%
Family/partner opposed	2%	1%	1%
Friends opposed	1%	0%	0%
Other reason	11%	12%	15%

Primary reason given for not becoming circumcised among uncircumcised men who would prefer to remain uncircumcised:

	$CIRCIS_1$	$CIRCIS_2$	$CIRCIS_3$
Fear of pain	15%	21%	21%
Circumcision is not part of my culture	26%	33%	11%
Circumcision takes too long	12%	13%	16%
No specific reason	18%	13%	23%
Circumcision is too expensive	1%	1%	0%
No transportation	1%	1%	0%
Risk of the procedure	4%	3%	3%
Family/partner opposed	3%	1%	0%
Friends opposed	0%	1%	0%
Other reason	20%	13%	26%

Note: Statistical significance testing of the changes in reported primary barriers by study round was not performed.

On the previous page we have presented the main barriers to becoming circumcised in two groups of uncircumcised men: 1) men who would prefer to be circumcised and 2) those that prefer to remain uncircumcised. In 2011 it was observed that circumcision being incompatible with one's culture was the most commonly cited reason for remaining uncircumcised in men who plan to remain uncircumcised (33%). By 2013 this was no longer the case with culture having decreased to being the primary reported barrier in just 11% of these men. This shift may reflect increasing cultural acceptance of circumcision and suggests movement in later adopters towards increased personal acceptance of the procedure.

> Overall, the primary barriers to circumcision uptake have remained consistent across surveys with the fear of pain and concerns about the time required being the most frequently reported. This consistency suggests that these identified barriers are entrenched and have not been effectively addressed. **Yet, since two out of five men who are still uncircumcised express a desire to undergo the procedure, there is ample opportunity to increase uptake of VMMC. Educational messages that assure pain control and clarify the time required for the procedure and for convalescence will likely have the biggest impact on additional VMMC uptake.**

In light of the slowing of VMMC service uptake we have noted, finding methods to overcome commonly perceived barriers to becoming circumcised should be given increased attention. The circumcision devices (i.e., PrePex and Shang Ring) currently in the final stages of operational field study may offer one avenue to address these barriers

identified if their use is perceived to be less painful and faster healing than traditional techniques.

BELIEFS ABOUT THE CIRCUMCISION PROCEDURE

The percent of uncircumcised men and women who believe that medical male circumcision is available to most men who want it:

	2008	2011	2013
Uncircumcised men	72%	93%*	97%**
Women	68%	90%*	90%

* More men and women in 2011 believed that circumcision was readily available than in 2008.
** More men in 2013 believed that circumcision was readily available than in 2011.

With 97% of men and 90% of women believing that medial circumcision is available to those who want it, a lack of access to the procedure does not appear to be a significant issue in Kisumu.

Sources of information identified as having provided information about male circumcision to uncircumcised men:

	Uncircumcised Men		
	2008	2011	2013
A person who is circumcised	65%	88%	44%*
A sexual partner	19%	40%	26%*
Radio	92%	98%	89%*
Newspaper / Magazine	72%	78%	55%*
Television	70%	76%	57%*
Billboards / Posters	64%	92%	62%*
Community meetings	57%	78%	51%*
Mobile campaigns	70%	95%	74%*
Teacher or someone at school	54%	58%	35%*

	Uncircumcised Men		
Staff at a VCT clinic	69%	65%	36%*
Staff at a health facility	70%	68%	44%*

* All sources of information were reported less frequently in 2013 than in 2011

Sources of information identified as having provided information about male circumcision to women:

	Women		
	2008	2011	2013
A person who is circumcised	46%	62%	48%*
A sexual partner	37%	45%	32%*
Radio	86%	89%	87%
Newspaper / Magazine	51%	33%	37%
Television	58%	47%	53%
Billboards / Posters	45%	62%	60%
Community meetings	51%	50%	48%
Mobile campaigns	57%	80%	76%
Teacher or someone at school	37%	37%	38%
Staff at a VCT clinic	38%	42%	34%*
Staff at a health facility	56%	80%	72%*

In 2013 we observed significant declines in men's reported exposure to all sources of information regarding male circumcision.

These findings suggest decreased mobilization efforts targeting this community and may offer some explanation for the lower VMMC uptake in 2012 and 2013 noted on page 16.

Women reported less dramatic decrease in exposure to circumcision related information, with the reports of men and women becoming more similar in 2013 than seen previously. This may indicate that circumcision messaging has shifted from targeted messages directed specifically at men to more general population-level messaging.

CIRCUMCISION AND PERCEPTIONS OF HIV RISK

Percent of responses - "In your opinion, how likely are circumcised men to get infected with HIV compared to uncircumcised men?"

	Men			Women		
	2008	2011	2013	2008	2011	2013
Circumcised men are less likely to get infected with HIV	**70%**	**80%***	**90%****	**65%**	**84%***	**90%****
The likelihood is about the same	18%	10%	6%	11%	5%	4%
Circumcised men are more likely to get infected with HIV	4%	2%	2%	8%	3%	3%
Unsure	8%	8%	1%	16%	8%	4%

* More men and women believed circumcised men less likely to get infected with HIV in 2011 than in 2008
** More men and women believed circumcised men less likely to get infection with HIV in 2013 than in 2011

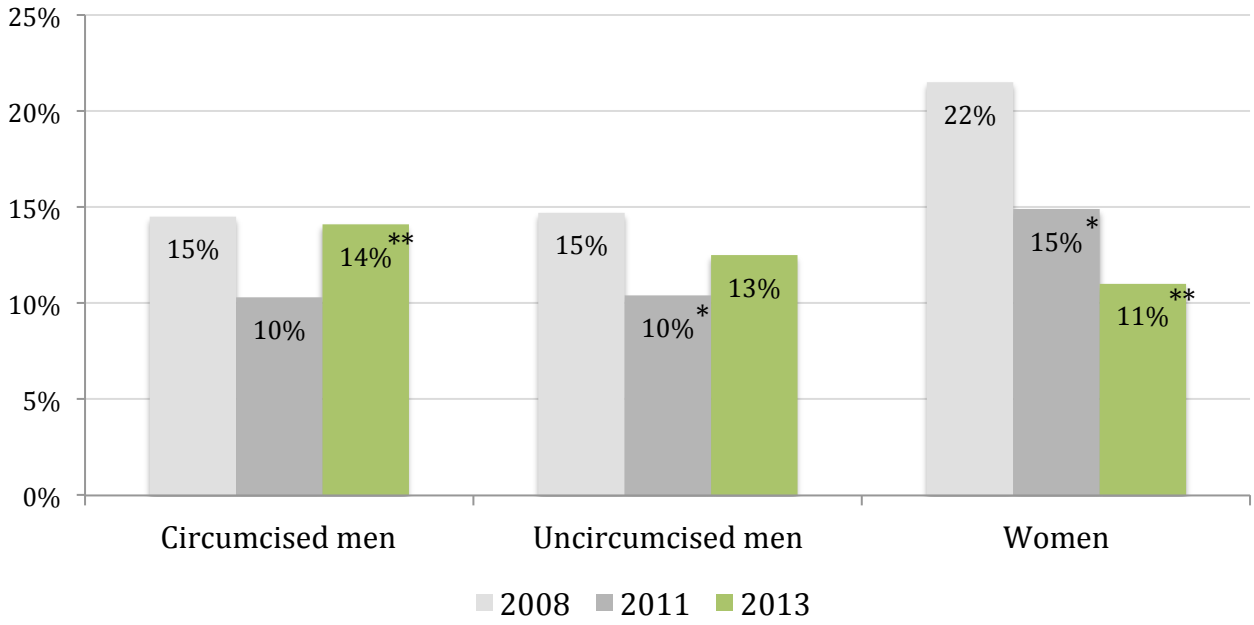
In 2013, 90% of Kisumu's population believed that circumcised men are less likely to get infected with HIV, continuing increases seen since 2008. While the protective effect of male circumcision for men from heterosexual HIV transmission has been proven beyond reasonable doubt, it is feared that actually holding this belief could result in individuals increasing their HIV risk behaviors due to considering themselves at lower risk of HIV. Such an increase in risky behavior is called risk compensation, and is an important concern for VMMC programs.

To assess possible risk compensation in Kisumu with exposure to the VMMC initiative, we asked a series of questions regarding individual's beliefs about MC and HIV risk along with changes in their behavior they believe may result from the increasing availability of male circumcision in the community.

The following pages, page 27 and page 28, present findings from four of these questions: 1) Now that male circumcision is available I am less worried about HIV infection, 2) Now that circumcision is available I am more likely to have more than one sexual partner, 2) Now that male circumcision is available condom use is less necessary, and 4) Now that male circumcision is available I am less likely to use a condom.

None of the beliefs regarding MC and HIV risk examined increased between 2008 and 2013. This is not consistent with widespread risk compensation.

Now the MC is available, I am less worried about HIV infection (percent agreement):



* Change from 2008 to 2011 significant (p<0.05)
** Change from 2011 to 2013 significant (p<0.05)

Now that MC is available, I am more likely to have more than one sexual partner (percent agreement):

* Change from 2008 to 2011 significant (p<0.05)
** Change from 2011 to 2013 significant (p<0.05)

Now that MC is available, condom use during sex is less necessary (percent agreement):

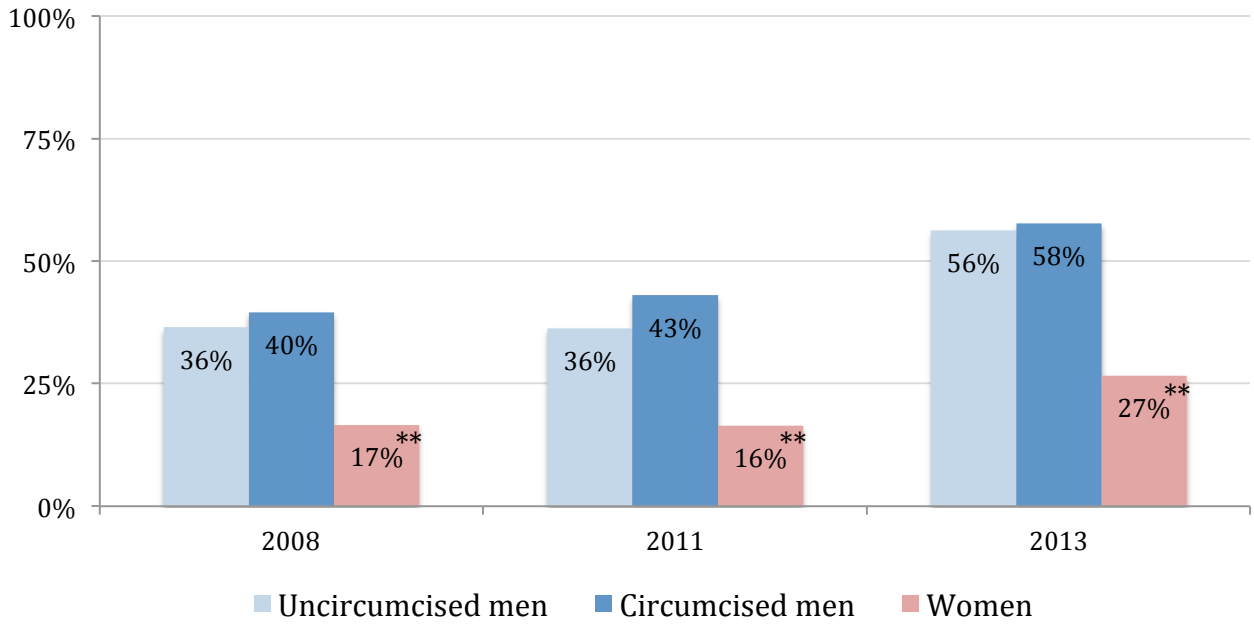
* Change from 2008 to 2011 significant (p<0.05)
** Change from 2011 to 2013 significant (p<0.05)

Now that MC is available, I am more likely to have sex without a condom (percent agreement):

* Change from 2008 to 2011 significant (p<0.05)
** Change from 2011 to 2013 significant (p<0.05)

HIV RISK BEHAVIORS

Percentage of the sexually active population that reported using a condom at last sex with a non-spousal partner:

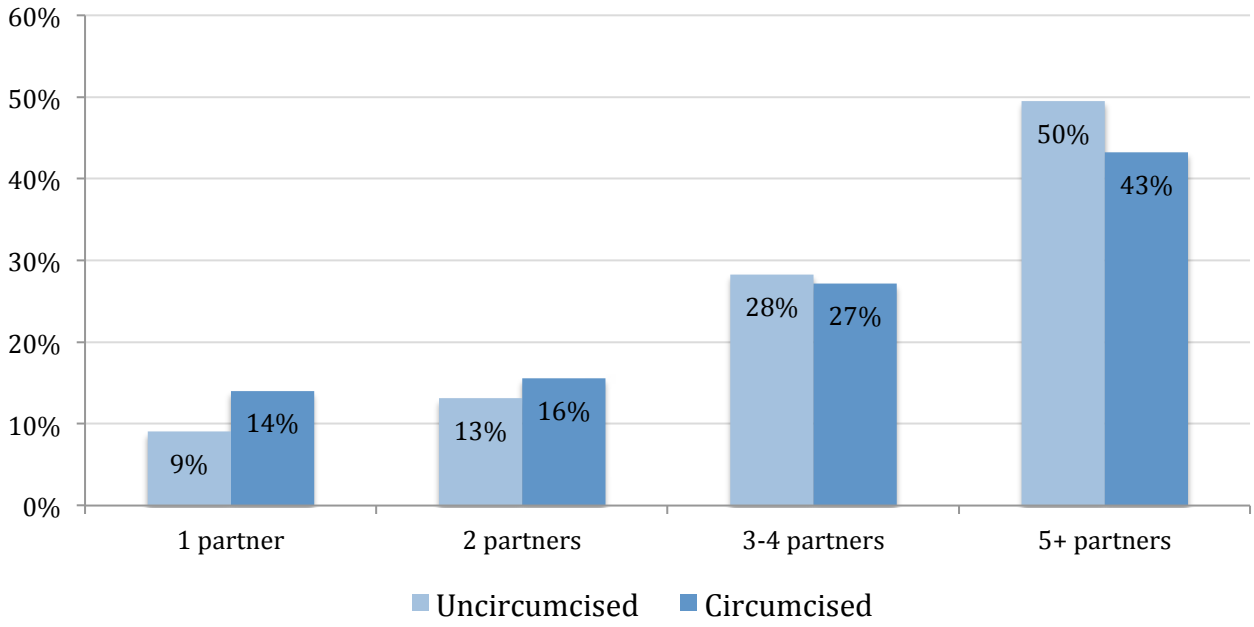


** Significantly more men than women reported using a condom with their most recent non-spousal partner.

Here we observe no decrease in condom use at last sex with a non-spousal partner between 2008 and 2013. Additionally, there is no association between circumcision status and condom use. Women were significantly less likely to report condom use at last sex with a non-spousal partner than men.

> Decreased condom use has been suggested as one of the more likely unwanted behavior changes resulting from circumcision for HIV prevention. **Our results indicate that there has been no decrease in condom use over the initial 5-years of VMMC program activity.**

Lifetime number of sexual partners reported by men in 2013:

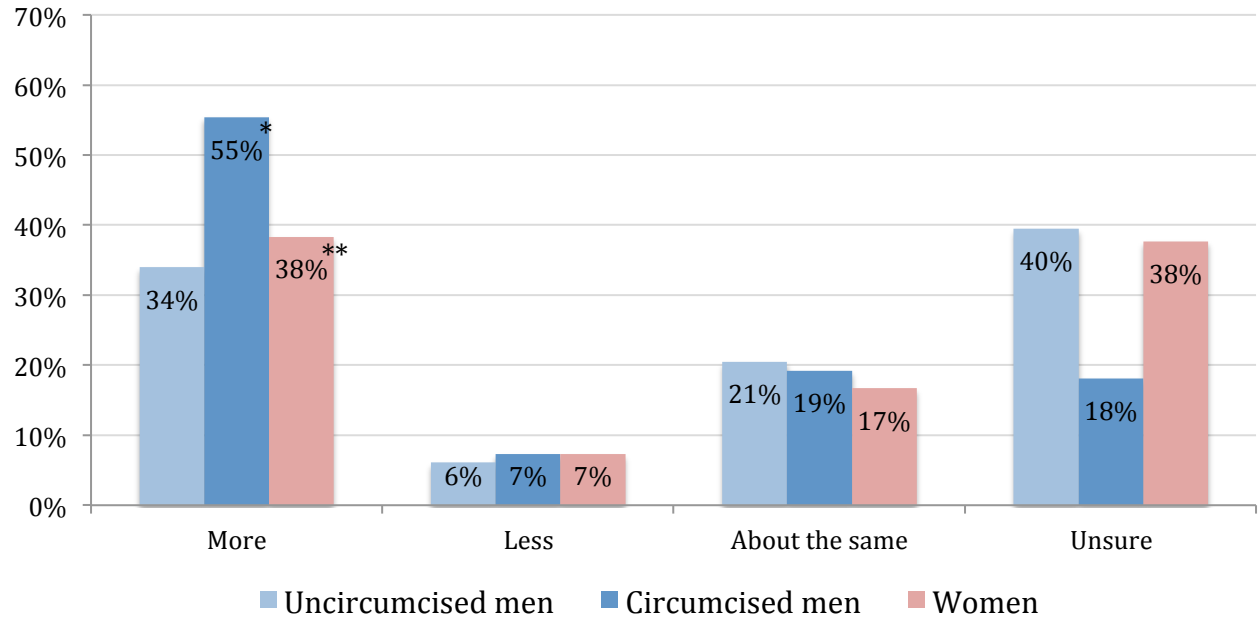


Above we see no difference in the lifetime number of partners in circumcised versus uncircumcised men in 2013 — following 5 years of VMMC exposure. Increasing of sexual partners following circumcision has also been a common fear in VMMC programs.

Our findings reveal no difference in the lifetime number of sexual partners by circumcision status after 5-years of VMMC program activity.

CIRCUMCISION AND SEXUAL PLEASURE

Sexual pleasure for circumcised compared to uncircumcised men as reported in 2013:



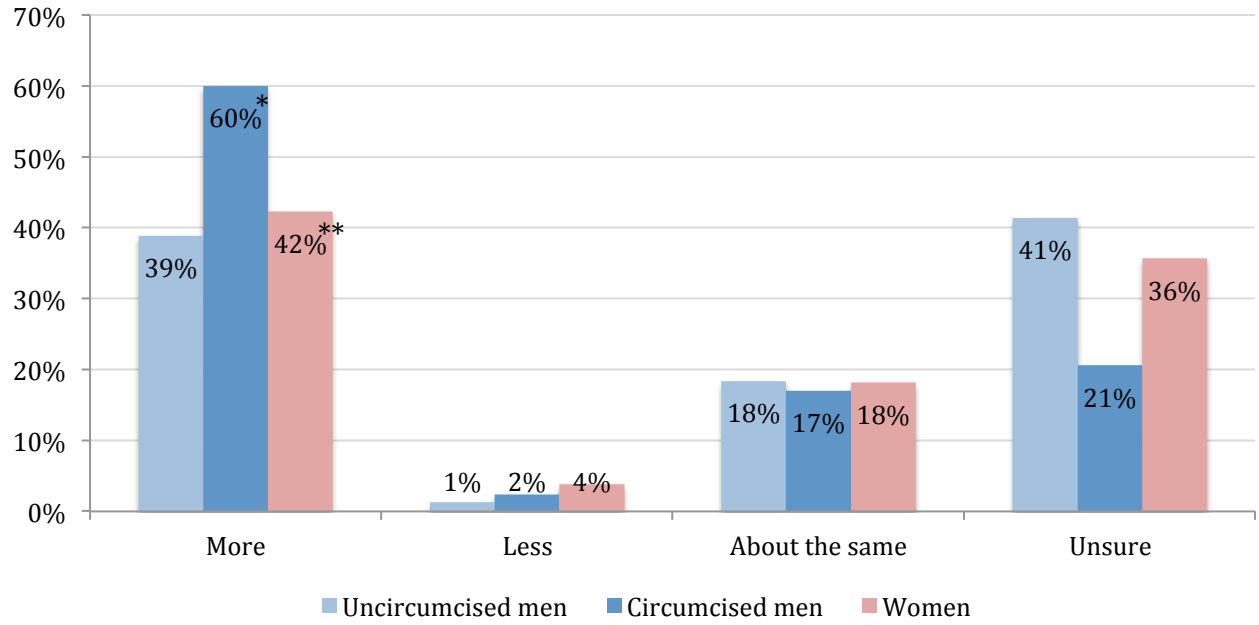
*** Circumcised men more likely than uncircumcised men to believe circumcised men experience more sexual pleasure.**
**** Women were less likely than men to believe circumcised men experience more sexual pleasure than uncircumcised men.**

Sexual pleasure is a difficult idea to clearly define and very difficult to measure. Here we have taken a simple approach and asked men and women what they believe to be the impact of being circumcised on the sexual pleasure experienced by men.

We see that the most commonly held belief is that circumcised men experience more sexual pleasure when compared to uncircumcised men.

More circumcised men than uncircumcised men or women believed circumcised men have greater pleasure; however, this belief was common in all groups.

Sexual pleasure for the partners of circumcised men compared to the partners of uncircumcised men as reported in 2013:



*** Circumcised men more likely to believe the partners of circumcised men experience more sexual pleasure than the partners of uncircumcised men.**
**** Women were less likely than men to believe the partners of circumcised men experience more sexual pleasure than the partners of uncircumcised men.**

Here we see the perception of the sexual experience of female sexual partners of circumcised men compared to the partners of uncircumcised men.

Similar to beliefs for men, the partners of circumcised men are most commonly believed to have more pleasure than the partners of uncircumcised men.

For both men and women we observe a sizable group that are unsure of the relationship that being circumcised has to the sexual experience. This is understandable, especially in uncircumcised men and women who may have not had a circumcised partner.

CONCLUSIONS

Since initial scale-up in 2008, the VMMC program in Kenya has proven the most successful male circumcision focused HIV prevention program in the world. As a national initiative, it has circumcised hundreds of thousands of men, exposed millions to VMMC promotional and mobilization messages, and refocused a nation's attention on HIV prevention.

This report has presented the findings from three surveys spanning the first 5 years of VMMC program activities to determine what impact the VMMC program has had on one of the principle targeted populations — residents of Kisumu. We can draw the following preliminary conclusions:

1. **The number of circumcised men increased in Kisumu City from just over 30% of all men circumcised in 2008 to 60% by 2013. This represents over 27,500 newly circumcised men.**
2. **Uptake of VMMC services peaked in 2010 with the lowest number of men circumcised in 2012. This decrease in the uptake of services coincides with evidence of less exposure to VMMC messaging and promotion in the community.**
3. **The demand for circumcision services remains significant.**
4. **There appears to be a continuing unmet need for VMMC services in Kisumu that may be best addressed by educating Kisumu men and women to allay their fears about the pain involved and the amount of time required to access and recover from the procedure.**
5. **There is no evidence of higher HIV risk behaviors as a result of exposure to the VMMC program (i.e., no risk compensation).**
6. **The reported sexual pleasure and sexual performance experienced by men and women have not been impacted by the VMMC program.**

Our 2013 survey represents the final round of the circumcision impact study. Moving forward, we hope that the continuing impacts of Kenya's VMMC program will be explored using the wealth of VMMC specific monitoring and evaluation data as well as through Kenya's regular public health related national surveys.