Technical Appendix

Commodity costs

Zambia

In Zambia, commodity costs were estimated based on a combination of Society for Family Health (SFH) procurement planning data as well as facility consumption data during the PrePex safety and acceptability study conducted from October 2013 to January 2014. The authors were provided with the list of commodities and quantities which SFH was planning on procuring for surgical and PrePex based VMMC for this period.

The expected cost per VMMC for all products was calculated and ranked to determine which commodities were expected to contribute the largest portion of commodity costs for each method. Consumption data for those commodities that were expected to contribute substantially to cost (listed below in Table 2 and **Table 3**) was collected from October 8th through December 31st 2013 based on facility stock cards and combined with procurement prices to calculate the average cost per VMMC conducted. This was done individually for each method as all commodities were managed separately at study sites. The average cost per VMMC for commodities that were not expected to contribute materially to cost (denoted below as 'other commodities') was calculated based on the average quantity procured per VMMC.

The average commodity cost per adverse event (AE) was calculated based on the expected commodity costs of treating either sepsis ($5.63) or hemorrhage ($16.53) as depicted below in **Table 1**:. Adverse event rates were assumed to be the same for each circumcision method, with sepsis and hemorrhage equally likely to occur, and were assumed not to exceed 1%[i], leading to an estimated cost per VMMC of $0.11.

Table 1: Estimated commodity cost per adverse event

Hemorrhage	
Gloves, surgeons, sterile disposable, pair	$0.86
10% Povidine Iodine solution (100ml Bottle)	$0.59

Gauze pad, sterile, 12ply 100x100mm (per 100)	$0.36
Lignocaine 1%, injection 20ml ampule (10 ml / patient)	$0.40
Paracetamol, tablets 500mg	$0.28
Iboprufen, Brufen 400mg	$1.23
Antibiotics - One course average	$3.70
Suture, braided synthetic 75cm, on reverse cutting needle 26mm	$7.82
Linen saver (2 units per patient) one unit price	$0.99
Bandage (compression 75x2mm - 10 patients)	$0.11
Total	**$16.34**

Sepsis	
Gloves, examination, non-sterile, disposable, pair	$0.27
Gloves, surgeons, sterile disposable, pair	$0.43
10% Povidine Iodine solution (100ml Bottle)	$0.59
Gauze pad, sterile, 12ply 100x100mm (per 100)	$0.44
Antibiotics - One course average	$3.70
Paracetamol, tablets 500mg	$0.19
Total	**$5.63**

Table 2: Zambia - Commodity cost assumptions for surgical VMMC using reusable dorsal slit commodities ($/VMMC)

	Procurement unit	Price per procurement unit	Unit cost per VMMC
MC Kits	1 Kit	$4.88	$4.43
Lignocaine	30ml bottle	$1.02	$0.22
Bupivacaine Hydrochloride (Macaine) 0.5%	20ml bottle	$2.64	$0.22
Methylated Spirit	2.5 Litre container	$3.52	$0.02
Povidone Iodine	500ml bottle	$6.94	$0.43

Examination Gloves	1box by 100 units	$6.39	$0.18
Other commodities	per MC	N/A	$4.52
AE commodities	per MC	N/A	$0.11
		Sub-total	**$10.13**
		Assumed supply chain costs, 20%	**$2.03**
		Total	**$12.15**

Table 3: Zambia - Commodity cost assumptions for PrePex ($/VMMC)

	Procurement unit	Price per procurement unit	Unit cost per VMMC
Devices in several sizes	1 Device	$12.00	$12.00
Gauze Swabs	1 package of 100	$27.69	$2.12
Anesthetic Dermal/ Emla Cream	5g Tube	$10.19	$1.89
Paper tape	1x1500 cm roll	$7.09	$0.15
Povidine - Iodine	500ml bottle	$6.94	$0.24
Examination Gloves	1 box by 100 units	$6.39	$0.59
Wound Dressing	1 box by 100 units	$3.70	$0.08
Other commodities	per MC	N/A	$1.36
AE commodities	per MC	N/A	$0.11
		Sub-total	**$18.55**
		Assumed supply chain costs, 20%	**$3.77**
		Total	**$22.32**

Zimbabwe

In Zimbabwe, commodity cost estimates were based on an adaptation of the excel-based costing model used by the Clinton Health Access Initiative (CHAI) to cost the Accelerated Strategic and Operational Plan 2014-2018 (ASCOP). For the purposes of this analysis, the commodity cost estimates used for dedicated VMMC sites in the ASCOP, which were based on historical partner consumption data in Zimbabwe, were adapted in the following ways:

1. The cost of a surgical VMMC kit was assumed to be $12.50 to represent the cost of disposable forceps-guided kits that were in use during the period of analysis. The ASCOP assumed that disposable dorsal slit kits would be procured due to WHO guidance on the use of dorsal slit for youth; however this was not yet occurring at the time of analysis and dorsal slit procedures would not be required for men 18 and over.
2. Adverse event commodities were added based on assumptions described above.
3. Supply chain costs were recalculated to include adverse event commodities.
4. Waste management costs were included in commodity costs (ASCOP included these costs under a separate category).

The resulting commodity costs per VMMC are depicted in **Table 4**.

Table 4: Zimbabwe - Commodity cost assumptions for PrePex and surgical VMMC using disposable forceps-guided commodities ($/VMMC)

	Surgical	PrePex
HIV testing commodities	$1.62	$1.62
VMMC kit/device	$12.50	$12.00
Other consumables	$5.22	$5.06
Adverse event commodities	$0.17	$0.11
Non-consumables	$0.55	$0.52
Supply Chain Management	$3.90	$3.76
Waste management	$0.55	$0.53
Total	**$24.52**	**$23.59**

VMMC service delivery volumes

Zambia

Service delivery data for Zambia are from March to October 2012. Daily VMMC volume data by site was provided and included the service delivery model used at each

site on a given day. A total of 281 sites was included in the data set though not all were active in all months. The total number of sites where VMMC was conducted in a given month ranged from 83 to 129. Minimum, median and maximum volumes are reported below in **Table 5**.

Table 5: Zambia – Minimum, median and maximum daily VMMC volumes for an active VMMC site by service delivery model

	Minimum	Median	Maximum
Fixed	1	8	80
Short Distance Outreach	1	10	75
Long Distance Outreach	1	18	107

Zimbabwe

Service delivery data for Zimbabwe is from October 2013 to September 2014. Data were provided on monthly VMMC output for a given VMMC team and site (or outreach point). Site types were mapped to service delivery models and the number of active days per month for each team at each site was estimated based on historical program reports to arrive at an average daily output for each team/site type combination in a given month. As daily output data were not available, only average VMMC volumes (as opposed to median) could be calculated. Estimated average daily volumes are reported below in **Table 6**.

Table 6: Zimbabwe – Estimated average daily VMMC volumes for an active VMMC site by service delivery model

Estimated average daily volumes	
Fixed Site	28
Urban Short Distance Outreach	9
Rural Short Distance Outreach	10
Long Distance Outreach	17

VMMC service delivery times

Zambia

Service delivery times for Zambia were estimated by SFH program management, which were then validated by comparing resulting staffing numbers with norms generally seen by SFH program staff.

Table 7: Zambia – Estimated minutes of service delivery time required each step in VMMC procedure by method

Estimated average service delivery times (minutes)	PrePex	Surgical
Counseling	20	20
Physical assessment	8	8
Procedure	15	59
Autoclaving	0	3
Medical review (day 2, day 7 and week 4)	0	7
Device removal	5	0
Total	48	96

Zimbabwe

In Zimbabwe, service delivery times were not used to calculate unit costs. Staffing assumptions on FTE per cadre by site type, as depicted in **Error! Reference source not found.**, were used to calculate total team cost , which was divided by average VMMC output to calculate the unit cost of HR.

Detailed unit cost results

Table 8: Zambia – average unit costs ($/VMMC) by service delivery model

	Fixed Site		Short distance Outreach		Long Distance Outreach	
	Mixed	Surgical	Mixed	Surgical	Mixed	Surgical
Commodities	$14.02	$12.15	$13.98	$12.15	$13.94	$12.15
Human resources	$30.15	$30.53	$31.31	$34.18	$72.25	$70.45
Demand creation	$3.94	$3.94	$3.94	$3.94	$3.94	$3.94
Training	$3.47	$3.47	$3.47	$3.47	$3.47	$3.47
Transport	$0.00	$0.00	$4.79	$4.79	$4.87	$4.87
Total cost per MC	**$51.58**	**$50.10**	**$57.50**	**$58.54**	**$98.48**	**$94.90**

Table 9: Zimbabwe – average unit costs ($/VMMC)

	Existing service delivery models				New PrePex only models		
	Fixed Site	Urban Short Distance Outreach	Rural Short Distance Outreach	Long Distance Outreach	Workplace PrePex	Mobile PrePex	Integrated PrePex
Human resources	$35.58	$70.82	$29.82	$35.01	$30.02	$31.16	$2.50
Commodities	$24.52	$24.52	$24.52	$24.52	$23.59	$23.59	$23.59
Training	$0.41	$0.64	$0.78	$0.46	$2.96	$1.60	$2.95
Transport	$2.90	$1.46	$3.73	$2.43	$2.47	$1.25	$0.00
Demand creation	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00
Total	**$69.41**	**$103.44**	**$64.85**	**$68.41**	**$65.03**	**$63.61**	**$35.05**

[i] WHO Guidelines on the use of Devices for Adult Male Circumcision for HIV Prevention, October 2013