



# The continuum of HIV care and population viral load (PVL) among a representative sample of gay, bisexual and other men who have sex with men (MSM) in Nairobi, Kenya

Adrian D Smith<sup>1</sup>, Rhoda Kabuti<sup>2</sup>, Mary Kung'u<sup>2</sup>, Erastus Irungu<sup>2</sup>, Peter Muthoga<sup>2</sup>, Amos Mugambi<sup>2</sup>, Chrispo Nyamweya<sup>2</sup>, Peter Weatherburn<sup>3</sup>, Elizabeth Fearon<sup>3</sup>, Adam Bourne<sup>4</sup>, Joshua Kimani<sup>2,5</sup> and the TRANSFORM Study group

<sup>1</sup>Nuffield Department of Population Health, University of Oxford, Oxford OX3 7LF <sup>2</sup>Partners for Health and Development, UNITID Building Kenyatta National Hospital, Nairobi <sup>3</sup>London School of Hygiene and Tropical Medicine, Department of Public Health, Environments and Society, 15-17 Tavistock Place, London, WC1H 9SH, United Kingdom <sup>4</sup>Australian Research Centre in Sex, Health & Society, La Trobe University, Melbourne, VIC 3086, Australia <sup>5</sup>Department of Medical Microbiology and Infectious Diseases, University of Manitoba, Winnipeg, Manitoba R3E 0J9, Canada

## Background

The UNAIDS 90-90-90 targets are central to Kenya's National AIDS Control Strategy. MSM are a key population in Kenya yet criminalisation and discrimination present obstacles to care engagement.

### Study aim

This study set out to assess for the first time the continuum of HIV care among a representative sample of MSM in Nairobi

## Method

Respondent-driven sampling (RDS) was employed to recruit 618 MSM between April–November 2017. Eligibility criteria were age 18+, male gender at birth or currently, Nairobi residence and consensual oral or anal intercourse with a male partner in the last 12 month.

Prevalent HIV care continuum measures included HIV testing history, timing of diagnosis, care linkage within 3 months, retention in care (12 months) and current ART use as per CDC guidelines<sup>1</sup>.

Information was self-reported on a computer-assisted survey, and verified during interview with the study clinician.

HIV status was established using rapid diagnostic tests (RDT) Determine™ HIV-1/2 Ag/Ab & First Response™ HIV-1-2-0 (per Kenya National guidelines<sup>2</sup> followed by PCR [Xpert™ HIV-1 Qual]<sup>3</sup>

Where applicable participants were linked to care and viral load was quantified using Xpert™ HIV-1 Viral Load<sup>3</sup>. Virological suppression was defined as <200 copies/ml

Total and geometric mean viral load and proportion of HIV positive participants with a viral load of >50,000 copies/ml were used as metrics of population viral load<sup>4</sup>. Where applicable, viral load was estimated as half the lower limit of detection of Xpert™ HIV-1 Viral Load (quoted as 40 copies/ml<sup>3</sup>)

Measures were adjusted for RDS sampling using the RDS-II method. Viral loads were treated as count distributions, and variance approximated from the negative binomial distribution.

<sup>1</sup>U.S. Department of Health and Human Services. (2013) The HIV/AIDS Care Continuum

<sup>2</sup>NASCO. (2015) The Kenya HIV Testing Services guidelines

<sup>3</sup>Cepheid <http://www.cepheid.com>

<sup>4</sup>CDC (2011) Guidance of Community Viral Load: A family of measures, definitions and method for calculation

## Results

### HIV status

28.7% [21.4–37.3] participants were HIV positive (186/617)

- 96.8% [90.6–98.9] positive RDTs (183/186)
- 3.2% [1.0–9.4] positive on PCR only (3/186)

### HIV care continuum (figure)

Of HIV positive participants

#### HIV diagnosed

- 71.3% [62.7–78.6] (139/186)

#### Currently receiving antiretroviral therapy

- 59.5% [50.7–67.7] (116/186)

#### Virologically suppressed

- 51.7% [43.0–60.2] VL<200 copies/ml (102/186)

In relation to UNAIDS 90-90-90 targets, these findings represent

71-83-83

### Linkage to care

Among men aware of their diagnosis

- 94.9% [88.7–97.8] reported linkage to a care provider within 3 months of diagnosis (118/129)
- 65.8% [54.3–75.8] started ART within two weeks of diagnosis (76/111)

### Retention in care

94.9% [88.1–97.9] reported attending clinical HIV services in the last year (121/127)

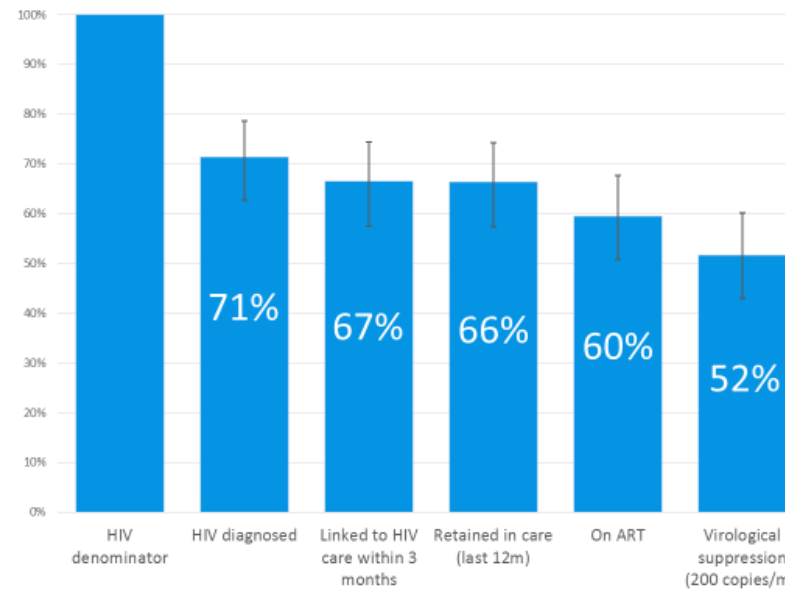
- public clinic: 37.0%
- private clinic: 21.5%
- MSM-specific service: 41.2%

### Satisfaction with care

Satisfaction with current HIV care provider was high irrespective of the type of provider: the proportion of men quite/highly satisfied with current provider ( $p=0.196$ )

- public clinic: 97.8%
- private clinic: 93.9%
- MSM-specific service: 100%

Figure: HIV diagnosis, care and treatment engagement among MSM in Nairobi, Kenya (2017)



71%

Aware of HIV status  
[63 – 79]

of whom

83%

On ART  
[75 – 90]

of whom

83%

VL <200  
[73 – 90]

Estimates RDS-II adjusted

### Population viral load

Among all MSM living with HIV

- Geometric mean VL was 826 [409–1668] copies/ml
- Proportion with viral loads >50,000 copies/ml was 21.0% [14.9–28.7]

Among all MSM

- Geometric mean VL was 5.8 [4.2 – 8.0] copies/ml
- Proportion with viral loads >50,000 copies/ml was 5.5% [3.9–7.9]

Undiagnosed HIV infection, and particularly early HIV infection, accounted for the vast majority of population viral load.

Table: Proportion of total population viral load, mean viral load and viral loads >50,000 copies/ml by method of HIV diagnosis, awareness of HIV diagnosis and current use of ART (Nairobi MSM, Kenya 2017)

	N	Mean individual viral load <sup>†</sup>	VL >50k copies/ml	Proportion of total PVL <sup>†</sup>
		Geometric mean VL (95% CI)	% (95% CI)	%

### Undiagnosed

Positive PCR only	3	5.4 x 10 <sup>5</sup> (9 x 10 <sup>4</sup> – 1.5 x 10 <sup>23</sup> )	66.7 (15.1–95.8)	43.0
Positive RDT	44	4.9 x 10 <sup>4</sup> (2.3 x 10 <sup>4</sup> – 1.1 x 10 <sup>9</sup> )	53.5 (36.4–69.7)	41.1

### Diagnosed

Not currently using ART	23	1.6 x 10 <sup>4</sup> (4.8 x 10 <sup>2</sup> – 6.1 x 10 <sup>4</sup> )	32.9 (15.3–57.1)	14.2
Currently using ART	116	6.1 x 10 <sup>2</sup> (3.7 x 10 <sup>2</sup> – 6.4 x 10 <sup>9</sup> )	2.4 (0.7–7.3)	1.8

Estimates RDS-II weighted, <sup>†</sup>Negative binomial distribution

## Conclusion

The continuum of HIV care for MSM/TG is remarkably strong despite potential obstacles to care engagement. This compares favourably to continuum estimates among MSM in other LMIC settings and to the general adult population in Kenya.

HIV diagnosis represents the weakest link in the current continuum of care for MSM in Nairobi, and undiagnosed HIV accounts for over 80% of total population viral load. Approaches to increase testing access and frequency among MSM should be prioritised.

A small but potentially highly significant proportion of MSM with early HIV infection are not diagnosed using the current Kenyan HIV rapid test algorithm which includes 4<sup>th</sup> generation capability. The cost-effectiveness of point of care PCR diagnostics should be evaluated.

RDS is an effective approach to recruit a population representative sample to estimate the prevalent care continuum and population viral load.



PHDA  
Partners for Health and Development in Africa



UNIVERSITY OF MANITOBA



WITS RHI



LONDON SCHOOL OF HYGIENE & TROPICAL MEDICINE



UNIVERSITY OF OXFORD



LA TROBE UNIVERSITY



Australian Research Centre in Sex, Health and Society