

# Determinants of HIV Testing Uptake among Undergraduate Students Aged 17-26 Years at the University of Nairobi, Kenya

Paulina Kalimbo<sup>1</sup>, Emmanuel Magesa<sup>2</sup>, Rose Opiyo<sup>3</sup> & Susan Nyawade<sup>3</sup>

<sup>1</sup> Welwitchia Health Training Centre, Kombat Campus, Namibia

<sup>2</sup> Welwitchia Health Training Centre, Windhoek Campus, Namibia

<sup>3</sup> University of Nairobi, School of Public Health, Nairobi, Kenya

Correspondence: Emmanuel Magesa, PO Box 98604, 183 Industrial Street; Lafrenz, Windhoek, Namibia. Tel: +264-81-368-9057. E-mail: emagesa2002@yahoo.com

Received: July 10, 2022 Accepted: August 25, 2022 Online Published: August 30, 2022

doi:10.5539/gjhs.v14n9p41

URL: <https://doi.org/10.5539/gjhs.v14n9p41>

## Abstract

**Background:** The human immunodeficiency virus infection among young people remains a public health concern around the global. To reduce HIV incidences among the young people. To reduce the HIV incidences among the group of young people, the identification of the determinants that influence the uptake of HIV testing especially students are mandatory. Hence help to prevent and control the epidemic.

**Objective:** The aim of this study was to identify the determinants that associated with the uptake of HIV testing among undergraduate students at the college of Health Sciences.

**Methods:** Analytical cross-sectional study was conducted at the University of Nairobi among undergraduate students aged 17- 26 years. Stratified proportionate sampling technique was used to select participants for each school within a college. Data was collected using a closed ended questionnaire and STATA version 11.2 developed by Stata Corp was used to analyse data in which multivariable logistic regression analysis were performed. Confidence interval and level of significance were set at 5% and 20% respectively.

**Results:** Determinants associated with the HIV testing uptake among the young students were as follows; privacy of the location of Testing center (AOR:8.1; 95%CI:2.7-24.6; p<0.01), peer influence (AOR:1.6; 95%CI:1.0-2.4; p=0.05), duration in the academic programme (AOR:0.77; 95%CI:0.25-2.28; p=0.03), and whether the participants were sexually active or not (AOR:2.1; 95%CI:1.3-3.2; p<0.01).

**Conclusion:** The uptake of HIV testing was increased by, privacy of Testing location, sexually active and peer influence.

**Keywords:** Determinant, counselling, uptake, testing

## 1. Introduction

The epidemic of the human immunodeficiency virus infection and acquired immune deficiency syndrome (HIV/AIDS) remains a global health and socio-economic burden which has brought innumerable public health predicaments. Furthermore, the epidemic is not only a humanitarian disaster but a developmental disaster which is threatening to derail the gains in health and development globally (Sidibé, 2013). According to The Joint United Nations Programme on HIV/AIDS Report, globally there are approximately 36.9 million people worldwide who are currently living with HIV/AIDS, and this includes 3.9 million young people aged 15-24 years (UNAIDS, 2017). However, 25% (9.4 million) of these individuals do not know their HIV status (UNAIDS, 2017). In addition, in 2017 the World Health Organization (WHO) African Region was reported as the most affected region, with an estimated number of 25.7 million individuals living with HIV. Globally, Sub-Saharan Africa (SSA) is the most affected region with the highest overall HIV prevalence being among adult populations (15-49 years). The prevalence of HIV infection in SSA varies between countries and Swaziland has the highest at around 27.2%, followed by Botswana with 21.9%, Lesotho with 25.0%, South Africa with 18.90% and Namibia with an estimated prevalence of 13.8% (UNAIDS, 2016). Other SSA countries known to have high rates of HIV/AIDS infection include Zimbabwe (13.5%), Zambia (12.4%), Mozambique (12.3%), Malawi (9.2%), Uganda (6.5%) and Equatorial Guinea (6.2%). With a population of about 49.7 million (2016), Kenya is one of the countries in SSA

that have been affected by a generalized HIV/AIDS epidemic with an estimated national HIV prevalence of 4.9% (females 5.2% and males 4.5%). There were an estimated 1.5 million individuals of all ages living with HIV in 2017 which included 12% of young people aged 15-24 years of age (females 2.6% and males 1.3%) as reported by Kenya HIV Estimates report (National AIDS and STI Control Programme [NASCOP], 2018). About 33% of all new HIV infections in Kenya in 2017 occurred among adolescents and young people aged 15-24 years (NASCOP, 2018). This report is supported by the studies conducted by Abiodun et al., (2014); Chimoyi et al., (2015); Hadish et al., (2017), suggested that older individuals are more likely to use HIV Counselling and Testing (HCT) services as opposed to the younger ones. It might be that older people perceive themselves to be at high risk of acquiring HIV virus and will therefore readily access HCT service. However, with advancing age, individuals may also become more educated hence increasing the awareness and economic stability to go for HIV testing (Hadish et al., 2017). This is a challenge for the Kenyan youth population as they are at high risk of contracting HIV infection and hence the need to scale up HCT uptake initiatives. HIV counselling and testing (HCT) is an important entry point to HIV prevention, treatment, care, and support services, and early treatment initiation greatly reduces AIDS-related symptoms and the rates of transmission (World Health Organization [WHO], 2015). According to the Guideline for HIV Testing Services in Kenya (NASCOP, 2015), the youth are at significant risk of acquiring HIV infections. The guideline requires the youth to take annual HIV re-tests and encourages the establishment of Youth Friendly Services (YFS) with integrated HIV Testing services. Scaling up the uptake initiatives calls for a deeper understanding of predictors of HCT uptake among the youth, including the university students. Available research indicate that only about half of university students utilize HCT services (Mwangi et al., 2014), further revealing the need of HCT services among university students in Kenya. This can only be possible if there is comprehensive background information on predictive factors of HCT uptake among this population group. To support the identification of the predictors, the conceptual framework based on the Health Belief Model (HBM) was used. Core constructs of the HBM included perceived susceptibility and severity such as fear of positive HIV results, perceived benefits, and barriers such as long waiting for HIV test and cues of action and self-efficacy such as social network support and influence.

Many studies have found sex to be associated with the uptake of HCT as alluded to by Asaolu et al., (2016); Khawcharoenporn, Chunloy, and Apisarnthanarak, (2016); Woldeyohannes et al., (2017), who reported that male youth had lower odds of HCT uptake as compared to females. This concurred with findings from a study by Chimoyi et al., (2015) to the effect that females were more likely to be tested for HIV as compared to males. This may be attributed to the fact that females have a window opportunity for HCT uptake during Antenatal Care (ANC) and hence this increases their odds ratio for HCT uptake. In addition, Charles et al., (2009) found that being female was significantly associated with accepting HCT results as compared to being male. This may be due to the fact that females are more worried about their health than males as they are keen to know more about matters affecting their health which include HCT (Abiodun et al., 2014).

However, those who reside in the urban settings have a higher chance to access health facilities for HIV care compared to those who reside in the rural setting. This can be attributed to the opportunities available to individuals in the urban areas; most of them have access to information through the media (Gebremedhin et al., 2017; Hadish et al., 2017; Muhinda et al., 2017; Lubogo et al., 2015). The disparity may also be due to limited accessibility of higher educational establishments, up-to-date health services, reduced coverage of mass media and hence poor and reduced exposure to health-related information in rural areas (Fikadie et al., 2014).

## 2. Materials and Methods

To identify the determinants of HIV testing uptake, analytical cross-sectional study design was used. Total population of 4732 undergraduate students aged 17-26 years was sampled, using Raosoft® sample size calculator software and obtained sample size of 390 undergraduate students. Stratified proportional sampling technique was used to get proportional of participants from each school within a college. The participants from each school were randomly selected using randomizer software then the pretested closed ended questionnaire was administered

### 2.1 Ethical Considerations

Approval to carry out this study was obtained from University of Nairobi, faculty of health sciences and other relevant facilities. All participants were consented.

### 2.2 Data Analysis

STATA software version 11.2 was used to analyze data in which Multivariate logistic regression analysis was carried out to assess the net effect of each independent variable on dependent variable multivariable binary logistic regression was carried out. This was done by including all variables with p value less than 0.20 (20%) from the

univariable analysis in the multivariable logistic regression model. Statistical significance was set at the p-value less than 0.05 ( $P < 0.05$ ). In addition, odds ratios and 95% CI estimate were used to examine the associations.

### 3. Results

#### 3.1 Students' Characteristics

Participants who involved in the study were 386. As shown in Table 1, the study sample consisted of 51.1% females and 48.9% males within the age range of 17-26 years with the mean age of 21.6 (SD= 2.0) years. Most of the participants (95.3%) were single, and three quarters of participants were Christians (75.1%). The study also found that 57.5% of the participants lived in the urban setup before joining the university.

Table 1. Socio-demographic characteristics of study participants (N=386)

Characteristics	Mean (SD)	Frequency n (%)
<b>Age (years)</b>	21.57 (2.0)	
<b>Sex</b>		
Male	189 (48.9)	
Female	197 (51.1)	
<b>Marital status</b>		
Never married	368 (95.3)	
Married	10 (2.6)	
Others	8 (2.1)	
<b>Religion</b>		
Non-Christian	80 (20.7)	
Christian	290 (75.1)	
Not religious	16 (4.2)	
<b>Residence of origin</b>		
Urban	222 (57.5)	
Rural	164 (42.5)	
<b>Field of study</b>		
Nursing	35 (9.1)	
Dental	23 (6.0)	
Pharmacy	55 (14.3)	
Medicine and Surgery	221 (57.3)	
Biochemistry	29 (7.5)	
Medical lab	23 (6.0)	
<b>Year of study</b>		
1 <sup>st</sup>	74 (19.2)	
2 <sup>nd</sup>	112 (29.0)	
3 <sup>rd</sup>	96 (24.9)	
4 <sup>th</sup>	52 (13.5)	
5 <sup>th</sup>	32 (8.3)	
6 <sup>th</sup>	20 (5.2)	

SD (standard deviation)

### 3.2 Logistic Regression Analyses

Based on the univariable logistic regression analyses, socio-demographic factors that were significantly associated with HIV uptake at  $p \leq 0.20$ , (Dohoo et al., 2012) were *age* ( $OR: 1.09$ ;  $95\%CI: 0.99-1.21$ ;  $p=0.08$ ), and *year of study* ( $OR: 1.02$ ;  $95\%CI: 0.37-2.80$ ;  $p=0.013$ ), as shown in Table 2.

Table 2. Univariable logistic regression analysis of socio-demographic factors affecting HIV testing uptake among undergraduate students (N=386)

Characteristics	Crude	95% CI	LRT
	Odds Ratio	Lower - Upper	p-value
<b>Age (years)</b>	1.09	0.99 - 1.21	<b>0.08*</b>
<b>Sex</b>			
Male	ref		
Female	1.01	0.67 - 1.50	0.97
<b>Marital status</b>			
Never married	ref		
Married	1.77	0.49 - 6.36	0.59
Others	0.71	0.17 - 2.99	
<b>Religion</b>			
Non-Christian	ref		
Christian	1.34	0.81 - 2.22	0.36
Not religious	1.93	0.65 - 5.70	
<b>Residence of origin</b>			
Urban	0.83	0.55 - 1.24	0.37
Rural	ref		
<b>Field of study</b>			
Nursing	ref		
Dental	0.86	0.29 - 2.50	
Pharmacy	0.96	0.41 - 2.26	
Medicine	1.27	0.62 - 2.61	0.82
Biochemistry	1.24	0.46 - 3.35	
Medical lab	0.86	0.29 - 2.50	
<b>Year of study</b>			
1st	ref		
2nd	0.35	0.19 - 0.64	
3 <sup>rd</sup>	0.55	0.29 - 1.02	
4 <sup>th</sup>	0.58	0.29 - 1.20	<b>0.013*</b>
5 <sup>th</sup>	0.77	0.34 - 1.78	
6 <sup>th</sup>	1.02	0.37 - 2.80	

Note. \*Significant variable at  $p < 0.20$ ; Likelihood Ratio Test (LRT).

Among the psychosocial factors (Table 8) the ones that were significantly associated with HCT in univariable logistic regression at  $p \leq 0.20$ , (Dohoo et al., 2012) were *sexually active* ( $OR: 2.04$ ;  $95\%CI: 1.36-3.07$ ;  $p < 0.01$ ), and *peer influence to go for HIV testing* ( $OR: 1.53$ ;  $95\%CI: 1.01-2.31$ ;  $p = 0.043$ ).

Table 3. Multivariable logistic regression analysis of the determinants of HIV testing uptake among undergraduate students (N=386)

Characteristics	Adjusted Odds Ratio	95% CI Lower - Upper	p-value
<b>Private location of VCT</b>			
Influenced	8.09	2.66 - 24.57	0.0000
Not influenced	ref		
<b>Sexually active</b>			
Yes	2.05	1.32 - 3.18	0.001
No	ref		
<b>Year of study</b>			
1st	ref		
2nd	0.27	0.14 - 0.52	0.030
3rd	0.42	0.22 - 0.83	
4th	0.43	0.19 - 0.89	
5th	0.53	0.22 - 1.31	
6th	0.77	0.25 - 2.28	
<b>Peer influence to go for HIV testing</b>			
Yes	1.57	1.01 - 2.43	0.045
No	ref		

Note. Significant variables at p value of 0.05.

#### 4. Discussion

In this study, factors that were independently associated with the uptake of HIV testing among undergraduate students at the College of Health Science at the University of Nairobi were privacy of the location of VCTs, peer influence, the duration in the academic programme, and whether the participants were sexually active or not. Participants were more likely to go for HIV testing if the VCT location was privately located. These findings on the privacy of the VCT location could be attributed to fear of stigmatization by peers (Sanga et al., 2015). In this study, however, there was no statistically significant association between stigmatization and HIV testing uptake. It is therefore possible that students in this study preferred private VCT location compared to the public facilities within the university where they also conduct their clinical practices. These findings are supported by systematic review study work in Sub-Saharan Africa by Musheke et al., (2013) which explained that perceived poor location of HIV testing site is associated with low HCT uptake as it brings negative connotations such as being labelled HIV positive, sexually active or being infected by other STIs.

Being sexually active was also significantly associated with HIV testing uptake in this study. These findings suggest that individuals who are sexually active perceived themselves to be at a higher risk of contracting HIV infection, hence they are more likely to go for HIV testing. Participants who were sexually active were 2.05 times more likely to have undergone HIV testing in the last 12 months prior to the study compared to those who were not. Similar findings were reported from Sub-Saharan Africa and Ethiopia (Asaolu et al., 2016; Tsegay et al., 2013).

The HIV testing uptake among participants also increased with the year of study. Participants from the final year (6<sup>th</sup> year) were more likely to go for HIV testing visits than those at the beginning of the academic programme. Although these findings might be attributed to the increase in source and access to HIV related information, there was no statistically significant association between HIV-related awareness and HIV testing uptake, despite the reported high level of awareness about HIV/AIDS modes of transmission, preventions, and treatment. The increase in HIV testing uptake with the students' duration in the medical education programme could therefore be attributed to independence, freedom, as well as sexual maturity accompanied by possibility of more relations with opposite sex that may lead to heightened sexual activities which tend to increase with the length of stay on campus, subsequently increasing perceived risk to HIV infection. Similar findings were reported from Ethiopia. It was

suggested that as students stay longer on campus, the HIV exposure risk perception increases and thus senior students are likely to have increased access to VCT related information compared to first year students (Fikadie et al., 2014).

Although only slightly more than half of participants (57.3%) indicated that they would not seek approval from anyone when going for HCT services, peer influence was associated with HIV testing uptake in this study. It is possible that peer pressure or family influence may help one to gather courage and strength to go for VCT. Individuals with supportive families and friends have been known to have a higher HIV testing uptake compared to those who lack support from families and friends (Fikadie et al., 2014). Peers have also been known to be the primary sources of information on HIV infection and HIV testing (Fikadie et al., 2014; Lubogo et al., 2015). Hence, individuals whose family members and friends have previously visited VCT sites are more likely to go for HIV testing.

There was no statistically significant association between HIV testing uptake and participants' demographic and socio-economic factors of age, sex, religion, residence, socio-economic status, and marital status. These findings are consistent with previous studies conducted in Tanzania, Ethiopia, and Thailand among university students (Charles et al., 2009; Fikadie et al., 2014; Khawcharoenporn et al., 2016; Tsegay et al., 2013). Furthermore, specific disciplines were not associated with HCT uptake, and probably because participants had the same medical educational background. Similar observations have been made in Tanzania (Charles et al., 2009).

Among the health service delivery factors, only privacy of the VCT location was significantly associated with HCT uptake. Perceived confidentiality and privacy at the VCT site and HCT uptake were not significantly associated. However, 87.7% of the participants were influenced by confidentiality and privacy at VCT site, this indicates that lack of confidentiality and privacy at VCT site could be an obstacle to HCT uptake. Similar findings were reported from Ethiopia (Tsegay et al., 2013). The influence of quality of HIV testing services offered at the VCT site was also not associated with the uptake of HCT. Most of participants (85.5%) indicated that they were influenced by the perceived quality of health services offered at the VCTs. This may stipulate that poor quality of health services offered at VCTs could cause a reduction on the number of participants' turn up for HCT. Similar results were observed in a related systematic review study conducted in Sub-Saharan Africa (Musheke et al., 2013). Furthermore, majority of participants (83.2%) self-reported that short waiting time at VCT determined their desire to go for HCT, however the influence did not make a difference in the uptake of HCT. This may suggest that perceived long waiting time at the VCTs could result in low uptake of HCT. These findings are in sync with findings from Tanzania and Zimbabwe (Meremo et al., 2016; Sambisa, 2008). Knowing that ART was available at the VCT site was also not associated with HCT uptake in this study. However, majority of participants (76.7%) appeared to have been influenced by the knowledge of the availability of ART. This may indicate that lack of ART availability at the VCT site, may result in the reduction of HCT uptake. Similar results were noted in Ethiopia (Tsegay et al., 2013).

#### 4.1 Limitation

Firstly, the study findings were based on HIV testing and exclude counselling. The findings from this study may only be generalized to undergraduate student populations of college of health sciences who might be knowledgeable about HIV/AIDS.

#### 5. Conclusion

Almost all students at the College of Health Sciences, University of Nairobi were aware of where to go for HIV testing services, however, only less than half of them went for testing. The determinants that were independently associated with HIV testing uptake were: privacy of the location of VCT centers, being sexually active, peer influence and the duration in the academic programme. Privacy of the VCT location was significant determinant for HIV testing.

#### Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

#### References

- Abiodun, O., Sotunsa, J., Ani, F., & Jaiyesimi, E. (2014). Knowledge of HIV/AIDS and predictors of uptake of HIV counseling and testing among undergraduate students of a privately owned university in Nigeria. *BMC Research Notes*, 7(1), 1-8. <https://doi.org/10.1186/1756-0500-7-639>
- Asaolu, I. O., Gunn, J. K., Center, K. E., Koss, M. P., Iwelunmor, J. I., & Ehiri, J. E. (2016). Predictors of HIV testing among youth in sub-Saharan Africa: A cross-sectional study. *PLoS ONE*, 11(10), 1-12.

<https://doi.org/10.1371/journal.pone.0164052>

- Charles, M. P., Kweka, E. J., Mahande, A. M., Barongo, L. R., Shekalaghe, S., Nkya, H. M., ... Mahande, M. J. (2009). Evaluation of uptake and attitude to voluntary counseling and testing among health care professional students in Kilimanjaro region, Tanzania. *BMC Public Health*, *9*, 1-9. <https://doi.org/10.1186/1471-2458-9-128>
- Chimoyi, L., Tshuma, N., Muloongo, K., Setswe, G., Sarfo, B., & Nyasulu, P. S. (2015). HIV-related knowledge, perceptions, attitudes, and utilisation of HIV counselling and testing: A venue-based intercept commuter population survey in the inner city of Johannesburg, South Africa. *Global Health Action*, *8*(1), 1-9. <https://doi.org/10.3402/gha.v8.26950>
- Fikadie, G., Bedimo, M., & Alamrew, Z. (2014). Prevalence of Voluntary Counseling and Testing Utilization and Its Associated Factors among Bahirdar University Students. *Advances in Preventive Medicine*, *2014*, 1-9. <https://doi.org/10.1155/2014/906107>
- Gebremedhin, S. A., Youjie, W., & Tesfamariam, E. H. (2017). Predictors of HIV/AIDS Knowledge and Attitude among Young Women of Nigeria and Democratic Republic of Congo: Cross-Sectional Study. *Journal of AIDS & Clinical Research*, *08*(03). <https://doi.org/10.4172/2155-6113.1000677>
- Hadish, M. T., Mao, J., Gong, G., Hadish, B. T., Tesfamariam, E. H., Tesfay, A. W., ... Hadgu, T. R. (2017). Predictors of Health-Seeking Behavior: HIV Test Experiences among Youth Aged 15-24 Years in Cameroon and Gabon. *Journal of Transmitted Diseases and Immunity*, *01*(02), 1-12. <https://doi.org/10.21767/2573-0320.100010>
- Khawcharoenporn, T., Chunloy, K., & Apisarnthanarak, A. (2016). Uptake of HIV testing and counseling, risk perception and linkage to HIV care among Thai university students. *BMC Public Health*, *16*, 556. <https://doi.org/http://dx.doi.org/10.1186/s12889-016-3274->
- Lubogo, D., Ddamulira, J. B., Tweheyo, R., & Wamani, H. (2015). Factors associated with access to HIV care services in eastern Uganda: the Kumi home based HIV counseling and testing program experience. *BMC Family Practice*, *16*(1), 1-9. <https://doi.org/10.1186/s12875-015-0379-6>
- Meremo, A., Mboya, B., Ngilangwa, D. P., Dulle, R., Tarimo, E., Urassa, D., & Ilako, F. (2016). Barriers to accessibility and utilization of HIV testing and counseling services in Tanzania: Experience from Angaza Zaidi programme. *Pan African Medical Journal*, *23*, 1-12. <https://doi.org/10.11604/pamj.2016.23.189.5683>
- Muhinda, J. C., & Pazvakawambwa, L. (2017). HIV Testing among Women in Namibia: Patterns and Determinants. *Biomed J Sci & Tech Res*, *1*(3), 2017. <https://doi.org/10.26717/BJSTR.2017.01.000248>
- Musheke, M., Ntalasha, H., Gari, S., Mckenzie, O., Bond, V., Martin-Hilber, A., & Merten, S. (2013). A systematic review of qualitative findings on factors enabling and deterring uptake of HIV testing in Sub-Saharan Africa. *BMC Public Health*, *13*(1), 220. <https://doi.org/10.1186/1471-2458-13-220>
- Mwangi, R. W., Ngure, P., Thiga, M., & Ngure, J. (2014). Factors Influencing the Utilization of Voluntary Counselling and Testing Services among University Students in Kenya. *Global Journal of Health Science*, *6*(4), 84-93. <https://doi.org/10.5539/gjhs.v6n4p84>
- National AIDS Control Council (NACC) and National AIDS & STIs Control Programme (NASCOP). Kenya HIV Estimates 2018. Nairobi, Kenya.
- Sambisa, W. (2008). DHS WORKING PAPERS AIDS Stigma and Uptake of HIV Testing in Zimbabwe. (49).
- Sanga, Z., Kapanda, G., Msuya, S., & Mwangi, R. (2015). Factors influencing the uptake of Voluntary HIV Counseling and Testing among secondary school students in Arusha City, Tanzania: A cross sectional study Health behavior, health promotion and society. *BMC Public Health*, *15*(1), 1-9. <https://doi.org/10.1186/s12889-015-1771-9>
- Sidibé, M. (2013). *Global Report. Global report:UNAIDS report on the global AIDS epidemic 2013*. <https://doi.org/10.1017/CBO9781107415324.004>
- Tsegay, G., Edris, M., & Meseret, S. (2013). Assessment of voluntary counseling and testing service utilization and associated factors among Debre Markos University Students, North West Ethiopia: A cross-sectional survey in 2011. *BMC Public Health*, *13*(1). <https://doi.org/10.1186/1471-2458-13-243>
- UNAIDS. (2017). Data 2017. *Programme on HIV/AIDS*, 1-248. <https://doi.org/978-92-9173-945-5>
- UNAIDS (Joint United Nations Programme on HIV/AIDS). (2016). On the to end AIDS.

Woldeyohannes, D., Asmamaw, Y., Sisay, S., Haileselassie, W., Birmeta, K., & Tekeste, Z. (2017). Risky HIV sexual behavior and utilization of voluntary counseling and HIV testing and associated factors among undergraduate students in Addis Ababa, Ethiopia. *BMC Public Health*, *17*(1), 1-10. <https://doi.org/10.1186/s12889-017-4060-y>

World Health Organization [WHO]. (2015). *Global Health Sector Response to HIV, 2000-2015: Focus on innovations in Africa: Progress report*.

### Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).