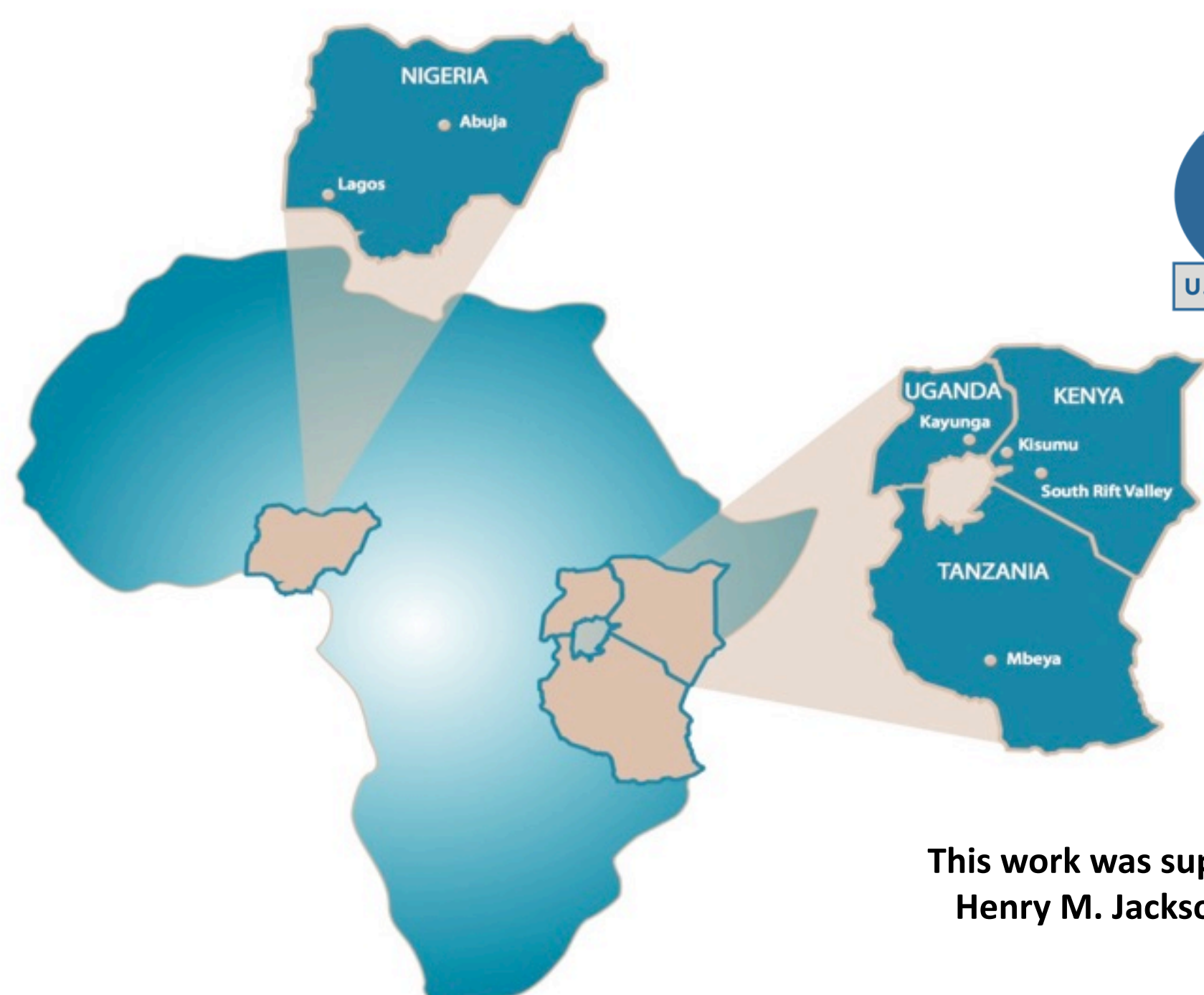


INTRODUCTION

- Every year, 5.6 million new syphilis cases are diagnosed in men and women ages 15-49 years old.^{1,2}
- HIV and syphilis infections frequently co-exist as a result of their shared mode of transmission where treatment benefits both the individual and public health.³
- Syphilis prevalence for Africa is estimated at 3.5-4.6% (excluding South Africa).^{2,4}
- World Health Organization (WHO) guidelines for people living with HIV (PLWH) in low income countries (LIC) recommend STI testing for:
 - Symptomatic individuals
 - Asymptomatic individuals with a new HIV diagnosis or high-risk sexual behaviors⁵
- Current estimates may be contributing to undiagnosed STIs; updated prevalence data is needed to identify risk factors and help guide HIV & syphilis prevention and treatment strategies.³

BACKGROUND

- AFRICOS is a prospective observational HIV-focused cohort studying HIV pathogenesis and impact of comorbidities.
- Syphilis screening started in January 2013.
- Twelve PEPFAR-supported public/private facilities enroll adult volunteers in 4 countries (Kenya, Tanzania, Uganda, Nigeria).
- Demographic, clinical and laboratory (syphilis testing and HIV-specific) information captured at enrollment and subsequent study visits.⁶



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METHODS

- Enrollment syphilis data for each participant was used for this analysis.
- Syphilis algorithm varied by country; all countries utilize the rapid plasma reagin (RPR) as the initial (non-treponemal) screening test.
- Bivariate analysis (χ^2 tests) for categorical variables were performed; factors with p-value < 0.05 were included in multivariate model.
- Logistic regression was used to estimate unadjusted and adjusted odds ratios (aORs) and 95% confidence intervals (95% CIs) for associations between various factors and confirmed syphilis infection.
- All independent variables investigated had less than 6% missing data.
- Analyses performed in SAS version 9.3 and Stata version 15.0.
- The investigators adhered to the policies for protection of human subjects as prescribed in AR-70.

RESULTS

Table 1. Factors associated with Syphilis co-infection among PLWH in the AFRICOS Cohort

	All (n = 2844) ^c	Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
Sex (Female)	1663 (58.5)	0.74 (0.48, 1.13)	0.76 (0.49, 1.18)
CD4 count (cells/mm ³) ^a	390.0 (238.0, 573.0)		
Viral load (VL) (copies/mL) ^a	50.5 (1.0, 18801.0)		
Age (Years)			
18-24	294 (10.3)	Reference	Reference
25-39	1311 (46.1)	2.64 (0.94, 7.38)	2.32 (0.82, 6.53)
40-49	781 (27.5)	2.80 (0.97, 8.02)	2.78 (0.96, 8.10)
50+	458 (16.1)	1.45 (0.44, 4.76)	1.45 (0.43, 4.85)
Education level			
None or some primary	957 (33.6)	2.97 (1.51, 5.85)	3.03 (1.53, 5.99)
Primary or some secondary	1106 (38.9)	2.49 (1.27, 4.90)	2.52 (1.27, 4.98)
Secondary and above	781 (27.5)	Reference	Reference
Cognitive Impairment ^b			
No	2295 (80.7)	Reference	Reference
Yes	163 (5.7)	0.79 (0.28, 2.15)	0.71 (0.25, 1.99)
Alcohol Consumption			
No	2295 (80.7)	Reference	Reference
Yes	549 (19.3)	2.11 (1.34, 3.33)	1.88 (1.17, 3.02)
Support Group Involvement			
No	2489 (87.5)	2.42 (0.97, 5.99)	1.89 (0.75, 4.77)
Yes	355 (12.5)	Reference	Reference
Viral Suppression			
On ART, VL <200 copies/mL	1522 (53.5)	0.49 (0.31, 0.79)	0.61 (0.37, 0.98)
On ART, VL >200 copies/mL	438 (15.4)	0.65 (0.34, 1.22)	0.77 (0.40, 1.46)
Not on ART	884 (31.1)		

^aMedian and Interquartile range (IQR); ^bInternational HIV Dementia Scale (IHDS) ^cAll results (except CD4 count and VL) are also reported as a percentage

RESULTS

- Between January 21, 2013 and March 1, 2020, 2939 PLWH were enrolled. 2844 had complete covariate and outcome data and were included in this analysis (Table 1).
- 1986 (68.9%) were taking antiretroviral therapy (ART) at enrollment.
- Median time since HIV diagnosis was 2.4 years (IQR 0.2-6.3) and median time on ART was 3.0 years (IQR 0.7-5.9).
- Screen-positive and confirmed syphilis prevalence among PLWH was 5.3% (151/2844) and 3.1% (89/2844), respectively; 46/89 (51.7%) were female.
- None of the PLWH and confirmed syphilis co-infection had documented genital ulcers (prevalence was 1.5% in PLWH overall).
- In the multivariate model, statistically significant risk factors for HIV and syphilis co-infection included lower educational level and alcohol consumption whereas ART with VL suppression was protective.

CONCLUSIONS

- We observed a 5.3% screen-positive vs 3.1% serologically confirmed syphilis prevalence, which are consistent with prior studies and demonstrate that rates remain elevated in LIC.⁷
- Our results highlight the challenges of diagnosing syphilis where almost half would have received unnecessary syphilis treatment.
- No PLWH and syphilis co-infection had documented genital ulcers on exam, indicating that current WHO guidelines may not be adequately addressing STI testing.
- This study identified lower educational level and alcohol consumption as risk factors for HIV and syphilis co-infection.

REFERENCES

1. Newman L, Rowley J, Vander Hoorn S, et al. (2015) Global Estimates of the Prevalence and Incidence of Four Curable Sexually Transmitted Infections in 2012 Based on Systematic Review and Global Reporting. *PLoS Negl Trop Dis*. 10(12): e0143304. <https://doi.org/10.1371/journal.pone.0143304>
2. World Health Organization: Global health sector strategy on sexually transmitted infections 2016-2021 towards ending STIs, 2016. <https://www.who.int/reproductivehealth/publications/rtis/ghss-stis/en/>
3. Kaida A, Dietrich J, Laher F et al. A high burden of asymptomatic genital tract infections undermines the syndromic management approach among adolescents and young adults in South Africa: implications for HIV prevention efforts. *BMC Infect Dis* 2018;18:499.
4. Kojima N, Klausner J. An update on the global epidemiology of syphilis. *Curr Epidemiol Rep* 2018 Mar; 5(1): 24-38.
5. World Health Organization. Essential prevention and care interventions for adults and adolescents living with HIV in resource-limited settings, 2008. <https://www.who.int/hiv/pub/guidelines/EP/en/>
6. Ake J, Polyak C, Crowell T, et al. Noninfectious comorbidity in the African Cohort Study. *Clin Infect Dis* 2019;69(4):639-647.
7. Djomand G, Schlefer M, Gutreuter S, et al. Prevalence and correlates of genital infections among newly diagnosed human immunodeficiency virus-infected adults entering human immunodeficiency virus care in Windhoek, Namibia. *Sex Transm Dis* 2016;43(11):698-705.

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