Determinants of Long-Term HIV Infections at Point of HIV Diagnosis in the Kingdom of Eswatini: Results from the HIV-1 Recent Infection Surveillance Program

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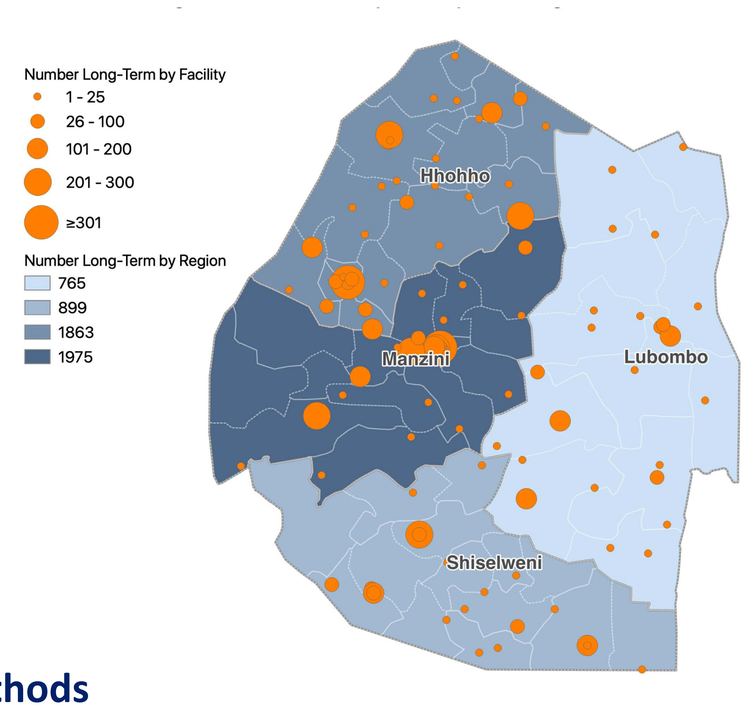
Background

Delayed HIV diagnosis continues to be a major obstacle for epidemic control. Utilizing the rapid test for recent infection (RTRI) implemented within the routine National HIV Testing Services (HTS) as part of the Eswatini HIV-1 Recent Infection Surveillance (EHRIS) program, we classified newly diagnosed people living with HIV (PLHIV) into those with RTRI recent and RTRI long term (LT) infection. We examined determinants of LT infection among EHRIS participants.

Map 1: *Number of RTRI LT Infections by Facility and Region of Residence in Eswatini, July 2019–September 2020*



Methods

- We used individual-level data collected during July 2019–Sept 2020 for individuals ≥15 years of age who were newly diagnosed with HIV in routine HTS and who did not opt-out of receiving a RTRI test.
- LT infection was defined as a RTRI LT result, which likely indicates infection of ≥12 months.
- In EHRIS, because some RTRI recent cases are repeat testers already on antiretroviral therapy, we reclassify those with RTRI recent cases with baseline viral load (VL) of < 1000 copies/µL as Recent Infection Testing Algorithm (RITA) LT cases.
- We compared the age and sex distribution of individuals with RTRI recent, RTRI LT, and RITA LT cases (Table 1).
- Because RTRI recent cases reclassified as RITA LT shared similar characteristics with RTRI recent cases vs. RTRI LT cases, we used RTRI results for our main analysis.
- Bivariate logistic regression was used to assess associations between RTRI LT infection as the outcome and hypothesized predictors, including a range of sociodemographic, geographic, and health risk factors, in unadjusted models.
- Stepwise backward multivariate logistic regression was performed to calculate adjusted odds ratios (aORs) in a final adjusted model. Variables that were significantly associated with the outcome at $p<0.05$ were retained in the model.
- Data analysis was conducted using Python 3.7.

Table 1: Select Demographic Characteristics of RTRI Recent, RTRI LT and RITA LT Infections

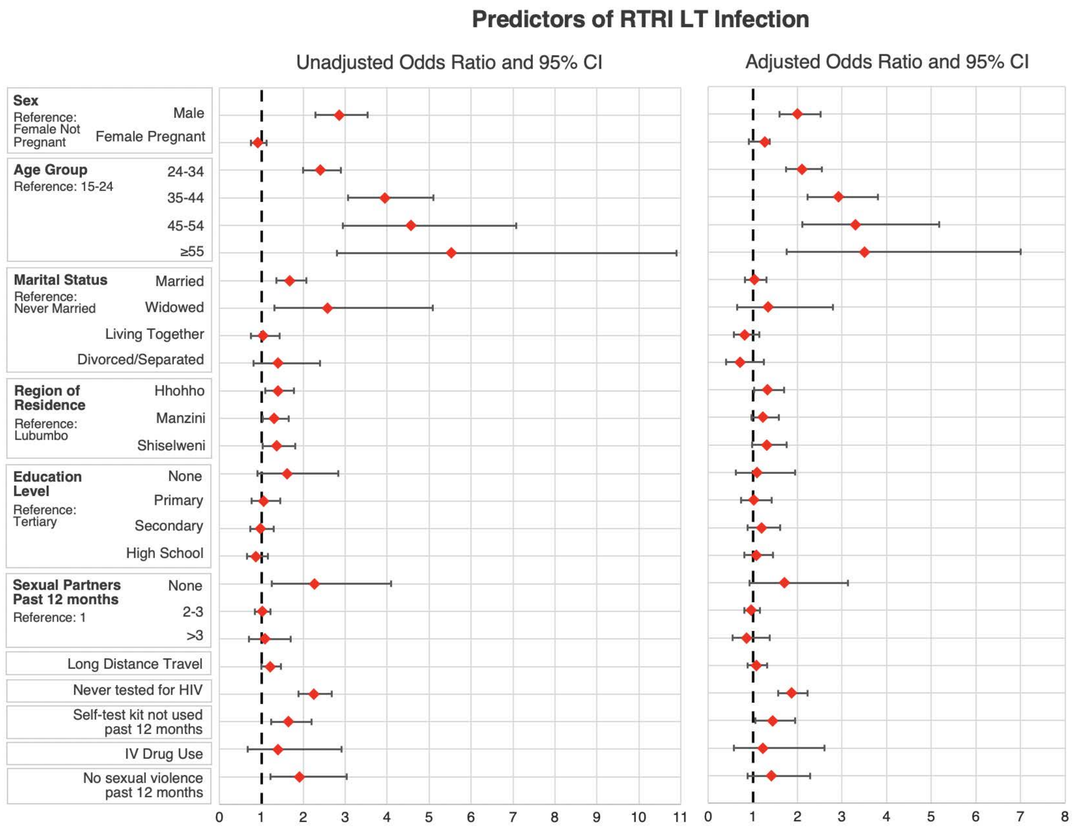
	RTRI Recent		*RTRI LT*		*RITA LT*	
Characteristic	*n/N*	*%†*	*n/N*	*%*	*n/N*	*%*
Sex Composite	**650**		**5393**		**161**	
Female Pregnant	164	25%	957	18%	47	29%
Female Not Pregnant	369	57%	2329	43%	92	57%
Male	117	18%	2107	39%	22	14%
Age Group	**669**		**5502**		**165**	
<30	481	72%	2455	45%	114	69%
≥30	188	28%	3047	55%	51	31%

† *% (n/N) calculated as column percentages*

Results

- We analyzed 6,171 newly diagnosed PLHIV from 113 testing facilities.
- 5,502 (89.2%) had RTRI LT infection and 669 (10.8%) had a RTRI recent infection.
- In adjusted multivariate analyses (Figure 1), RTRI LT infection was associated with:
  - Male sex ($aOR_{vs.non\text{-}pregnant\ female}$: 2.00; 95% CI: 1.59 – 2.51)
  - Clients who were older than 25 years of age:
    - 25-34 ($aOR_{vs.15\text{-}24}$: 2.10; 95% CI: 1.74 – 2.54)
    - 35-44 ($aOR_{vs.15\text{-}24}$: 2.92; 95% CI: 2.23 – 3.81)
    - 45-54 ($aOR_{vs.15\text{-}24}$: 3.30; 95% CI: 2.10 – 5.16)
    - ≥55 ($aOR_{vs.15\text{-}24}$: 3.5; 95% CI: 1.76 – 7.07)
  - Residence in the Hhohho region ($aOR_{vs.Lobombo}$: 1.32; 95%CI: 1.03 – 1.70)
  - Clients with no prior testing history (aOR: 1.86; 95%CI: 1.55 – 2.23)
  - Clients who reported no use of HIV self-test kit in the past 12 months (aOR: 1.44; 95%CI: 1.06 – 1.94).
- Distance traveled for HIV diagnosis, marital status, education, injection drug use, number of partners in the past 12 months and experiencing forced sex in the past 12 months were not associated with RTRI LT infection.

Figure 1: Unadjusted Odds Ratio and Adjusted Odds Ratio with 95% Confidence Interval for Determinants of RTRI LT Infection



Conclusions

Recent infection surveillance can sharpen program response to accelerate epidemic control. In the context of fewer and fewer new infections, finding and targeting programs to hardest-to-reach population to test and link early is critical. Further promotion of frequent HIV testing, including through expanded access to self-test kits, particularly among men and older individuals, is critical to reduce delayed HIV diagnosis—a major impediment to achieve epidemic control.

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