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Diagnosing established and acute HIV in the context of facility-based HIV testing services in rural Eswatini: a cross-sectional study

Iza Ciglenecki ,[1,2] Bernhard Kerschberger,[3] Esther Mukooza,[3] Skinner Lekelem,[3] Nombuso Ntshalintshali,[3] Mpumelelo Mavimbela,[4] Sindisiwe Dlamini,[5] Lenhle Dube,[4] Nomvuyo Mabuza,[5] Roberto de Latour,[2] Melat Haile,[2] Tom Ellman,[6] Olivia Keiser,[1] Niklaus Daniel Labhardt,[7,8] Sindy Matse,[9] Alexandra Calmy[1,10,11]

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For numbered affiliations see end of article.

Correspondence to
Dr Iza Ciglenecki; Iza.Ciglenecki@etu.unige.ch

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ABSTRACT

Introduction Acute HIV infection (AHI) is the brief period between viral acquisition and the appearance of HIV antibodies and cannot be detected by routinely used HIV rapid diagnostic tests (RDTs). Its role is likely to become increasingly important in the rapidly changing context of HIV testing in high-burden countries. We describe the characteristics of individuals attending HIV testing services (HTS) in rural Eswatini and the prevalence of newly diagnosed HIV, including AHI.

Methods Adults aged ≥18 years were enrolled at six routine HTS between June 2022 and April 2023. Participants completed detailed questionnaires. Routine HIV testing was conducted using the national serial RDT algorithm (Determine and Uni-Gold). HIV viral load (VL) analysis was performed on the Xpert platform (Xpert HIV-1 Viral Load, Cepheid) in the central laboratory. Newly diagnosed HIV was defined as a positive HIV RDT algorithm with detectable VL (established HIV), or negative or discordant HIV RDT together with VL ≥10 000 copies/mL (AHI).

Results Of 1095 participants with a median age of 27 years (IQR 22–33), 684 (61.5%) were women. Risk factors for HIV acquisition were common: >1 sexual partner (332, 30.3%), condomless sex (452, 44.5%), not knowing main partner's HIV status (437, 42.8%). Symptoms consistent with AHI (713, 65.1%) and genito-urinary (660, 60.3%) infections were common. Overall, 41 participants (3.7%, 95% CI 2.7% to 5.0%) were diagnosed with HIV; 31 (2.8%, 95% CI 1.9% to 3.9%) with established HIV and 10 (0.9%, 95% CI 0.04% to 1.7%) with AHI, representing 24.4% (95% CI 12.4% to 40.3%) of new diagnoses. All participants diagnosed with AHI reported symptoms consistent with AHI.

Conclusions Our study among a general adult population attending HTS revealed a high overall HIV prevalence with a substantial proportion of AHI, highlighting the decreasing sensitivity of routine HTS to detect all HIV infections. To address AHI, accurate and accessible diagnostic tools and AHI testing guidance are needed.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Acute HIV infection (AHI) is the brief period between viral acquisition and the appearance of HIV antibodies, characterised by a high viral load and a high risk of onward transmission. AHI cannot be detected by routinely used rapid diagnostic tests (RDTs).

⇒ Although past studies have demonstrated the significant burden of AHI in various HIV testing settings, there are currently no recommendations to guide AHI testing in countries with a high HIV burden.

WHAT THIS STUDY ADDS

⇒ Our study conducted among the general population attending facility-based HIV testing services (HTS), in the high HIV prevalence setting of rural Eswatini, showed a 0.9% prevalence of AHI. This represents a quarter of all newly diagnosed HIV infections, which would have otherwise been missed by routine RDTs.

⇒ All participants diagnosed with AHI reported non-specific influenza-like symptoms.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Our study highlights the important relative role of AHI in the current context of HIV testing in high-prevalence settings, including the decreasing sensitivity of routine HTS in detecting all HIV infections.

⇒ Models of AHI care targeting individuals presenting with symptoms at health facilities and leveraging existing molecular point-of-care diagnostics could be implemented and documented to inform scaling up.

⇒ To address AHI, accurate and accessible diagnostic tools for AHI and guidance on AHI testing are urgently needed.

INTRODUCTION

Although several countries with a high burden of HIV have reached the global HIV control targets of 95% HIV status awareness, 95% antiretroviral therapy (ART) coverage and 95% viral load (VL) suppression, HIV incidence remains high globally, with an estimated 1.3 million people acquiring HIV in 2024—over three times more than the target of 370 000 or fewer new infections in 2025.[1]

HIV testing yields have shifted significantly with growing HIV status awareness.[2] A modelling study

using data from population-based HIV surveys estimated that in southern Africa, awareness of HIV status increased from 9% in 2000 to 90% in 2020, while the median time to HIV diagnosis decreased from 7.7 to 1.5 years and the positivity rate at HIV testing fell from 15% to 5.5%.[3] With shorter time to diagnosis, more people are diagnosed soon after HIV acquisition, including during acute HIV infection (AHI). AHI is the brief period between viral acquisition and the appearance of HIV antibodies,[4] associated with high VL, seeding of viral reservoirs and a high likelihood of onward transmission.[4 5] Diagnosing AHI is challenging, as it cannot be reliably detected by routinely used rapid diagnostic tests (RDT). Fourth generation antigen/antibody RDTs have shown variable and overall poor performance,[6] and diagnosis requires access to fourth-generation immunoassays to detect p24 antigen or VL testing.[4]

Many studies in the past decades documented AHI burden and the feasibility of diagnosing AHI in high HIV burden settings. AHI yields ranged from 0.02%–1.1% among individuals attending HIV testing services (HTS) or antenatal/postnatal care[7–9] to 1%–3.8% among participants at higher risk of AHI such as individuals seeking urgent care for fever or malaria,[10 11] attending clinics for sexually transmitted infections (STIs)[12 13] or meeting AHI screening or scoring criteria.[14–16] Nevertheless, despite the well-documented burden, AHI is rarely diagnosed in routine care in resource-limited settings and current guidelines for HIV testing do not provide clear guidance on AHI diagnosis.[17]

Not addressing AHI represents a missed opportunity in the complicated context of trying to reach the relatively few individuals who are not yet aware of their HIV status. Although many people presenting with AHI are symptomatic[18] and seek care during the acute retroviral syndrome period,[19] they may receive false negative HIV test results and fail to engage in care, potentially contributing to onward transmission. In the context of undiagnosed AHI, individuals may be initiated on pre-exposure prophylaxis (PrEP), possibly contributing to resistance against ART particularly with the scale-up of long-acting injectable PrEP.[20]

Eswatini has a high HIV prevalence in the general population (24.8% among adults in 2021) and an excellent HIV control programme reaching 95-95-95 targets (93.7-97.3-96.2 in 2021) but still a high HIV incidence (0.6% overall in 2021).[21] Undiagnosed AHI may play a role. A recent study among participants presenting to an outpatient department in rural Eswatini with symptoms suggestive of AHI had reported AHI prevalence of 3.8%.[14] To better understand the role of AHI in the current routine HTS context in Eswatini, we analysed data from a larger study measuring the burden of STIs and described the characteristics of individuals attending facility-based HTS and the prevalence of newly diagnosed HIV, including AHI.

METHODS

Overview and study design

This study was part of a larger cross-sectional study evaluating the feasibility of diagnosing, treating and preventing STIs among persons attending HIV care services between July 2022 and March 2023.[22] This analysis only included participants who underwent routine HTS.

Setting and study procedures

The study took place in the predominantly rural Shiselweni region in southern Eswatini with a population of around 200 000 people. The study was conducted at four public health facilities and two community stand-alone sites supported by Médecins Sans Frontières. In addition to general outpatients' consultations, all sites provided HTS, HIV prevention, ART initiation, reproductive healthcare and syndromic STI screening and management.

Details are described elsewhere.[22 23] Adult participants (18 years or older) were included in the AHI substudy if they attended HTS or were referred to HTS if diagnosed with a syndromic STI at the outpatient department and had a negative or unknown HIV status. Consenting participants completed a detailed self-questionnaire (electronic or paper-based) on sociodemographic and behavioural characteristics associated with increased risk of HIV acquisition and current symptoms consistent with AHI and genitourinary infections (see online supplemental table S1 for complete questionnaire). Participants underwent routine HIV testing and provided urine and blood samples.

HIV status ascertainment

Routine HIV testing was performed on finger-prick blood using the Eswatini serial RDT algorithm (Determine as the first-line test followed by Uni-Gold if reactive).[24] Blood samples were sent to the central laboratory in Nhlangano Health Centre, where HIV RNA testing was performed on plasma on the Xpert platform (Xpert HIV-1 Viral Load, Cepheid).

Following national guidelines,[24] HIV status was verified before HIV testing and before ART initiation to reduce retesting among people living with HIV using the Electronic Client Management Information System (CMIS) to track individual testing history, clinical care and prevention services across healthcare facilities.

Newly diagnosed established HIV infection was defined as reactive on both Determine and Uni-Gold, using the serial RDT algorithm, and a detectable HIV VL. Participants with established HIV infection and an undetectable VL were considered to be currently enrolled in HIV/ART care, as were those identified in CMIS after HTS, and were excluded from the analysis. AHI was defined as a negative or discordant HIV test result according to the national serial RDT algorithm and an HIV VL >10 000 copies/mL, or a detectable HIV VL <10 000 copies/mL measured in two separate samples, to rule out false positive VL results and to align with the definition used in the previous study in the same setting.[14]

Participants with positive serial RDT HIV results were offered immediate ART initiation and assisted partner notification. Participants diagnosed with AHI based on detectable VL results were contacted once results were available to offer linkage to care, usually within a week. Participants who tested negative were offered HIV prevention interventions (condoms, oral PrEP or vaginal ring, PEP or referral to voluntary medical male circumcision).

Data management, analysis and statistics

Data were collected (directly or from the paper forms) into the REDCap application. The linkage-to-care information was collected from the routinely used paper-based patient forms and/or CMIS. All data were analysed with STATA V.18.0 (StataCorp).

HIV yield was defined as the proportion of participants with newly diagnosed established HIV infection or AHI among those tested. AHI prevalence was calculated as the proportion of participants with AHI among those who initially tested HIV negative or had discordant serial RDT results.

We defined PrEP AHI criteria based on WHO screening criteria for deferring PrEP initiation in case of suspected AHI. These criteria comprised symptoms consistent with AHI including

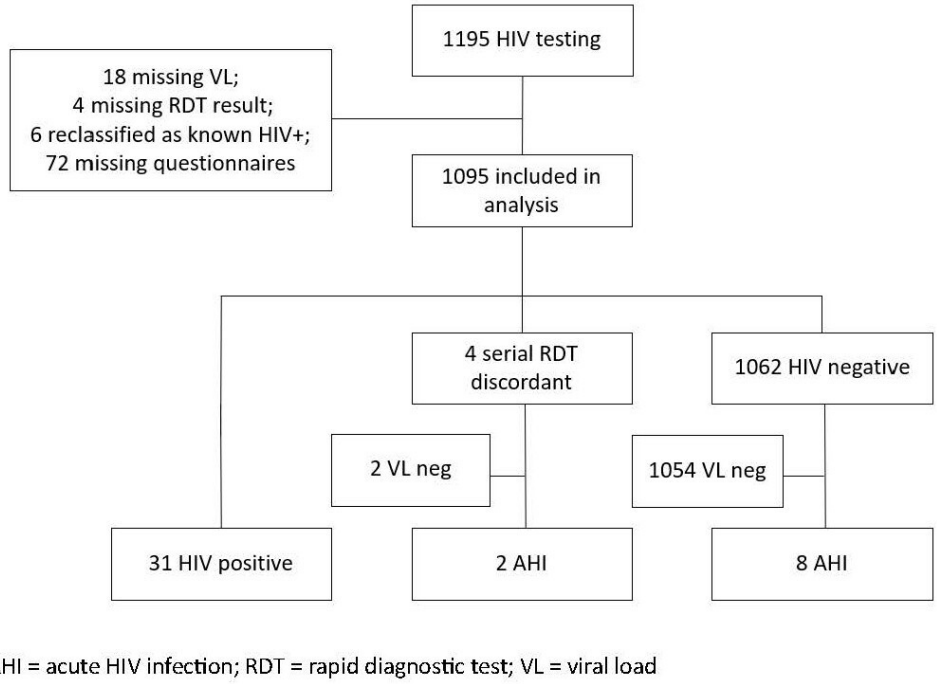

Figure 1 Flow chart of participants included in the study, by routine HIV testing result. AHI, acute HIV infection; RDT, rapid diagnostic test; VL, viral load.

reported fever, rash, sore throat, aches and pains, lymphadenopathy, mouth sores and/or headache, and potential exposure within the past 14 days.[24 25] Any genitourinary symptom was defined as genital discharge, genital sores, genital warts, pain on urination, blood in urine or pain during sexual intercourse.

Key participant characteristics were described by HIV status. Categorical variables were summarised as counts and percentages, and continuous variables as medians with IQRs. Distributions between the groups were compared with the Pearson's χ^2 test or Fisher's exact test. Comparisons of continuous variables were performed with the Wilcoxon rank-sum test.

RESULTS

Of 1195 participants with negative or unknown HIV status who were offered HTS, 22 were excluded from the analysis due to missing information for final ascertainment of HIV status (4 missing RDT and 18 missing VL result). An additional 72 (6.1%) were excluded due to missing risk factor questionnaires and six participants were reclassified as known HIV based on the case definitions (five had undetectable VL and one had a record of ART use in CMIS) (figure 1). The participants excluded from the risk factor analysis did not differ from those included by age, sex or HIV status (online supplemental table S2).

Of the 1095 participants included in the analysis, the median age was 27 years (IQR 22–33) and 673 (61.5%) were female. Details of sociodemographic, risk factor and clinical characteristics by HIV status are provided in table 1. Most participants attended facilities because they felt ill (384, 35.1%), for HTS (339, 31%) or HIV prevention (105, 9.6%). Behaviours associated with HIV acquisition were common: 332 participants (30.3%) reported more than one sexual partner, 452 (44.5%) reported condomless sex with a partner living with HIV or with unknown HIV status, and 437 (42.8%) were unaware of their main partner's HIV status. Most participants (796, 74.8%) reported an HIV test within the last six months, while 40 (3.7%) reported testing for the first time. Almost two-thirds of participants reported symptoms consistent with AHI (713, 65.1%). 660 (60.3%) reported genitourinary symptoms, and 399 (36.4%) had at least one bacterial STI confirmed.

According to the serial HIV RDT algorithm and detectable VL, 31 (2.8%, 95% CI 1.9% to 3.9%) participants had a positive result and were considered to have a newly diagnosed, established HIV infection. Two among four participants (50%) with discordant and eight among 1062 participants (0.7%) with negative routine HIV RDT results had VL detectable and were considered to have AHI, with an AHI prevalence of 0.94% (95% CI 0.04% to 1.7%) among 1066 participants with negative or discordant HIV RDT results.

In total, 41 (3.7%, 95% CI 2.7% to 5.0%) participants were diagnosed with HIV, 10 (24.4%, 95% CI 12.4% to 40.3%) of them with AHI. Participants with AHI had significantly higher VL (median VL 3.4 million (M), IQR 0.75M–10.M copies/mL) compared with those newly diagnosed with established HIV infection (median VL 64 800, IQR 14 400–231 000, $p<0.001$) (table 2).

In total, 33 (80.5%) participants with newly diagnosed HIV initiated ART, including eight participants with AHI. The overall median time to treatment initiation was one (IQR 0–7) day; zero (IQR 0–1) in participants diagnosed with established HIV and nine days (IQR 7.5–16.5, $p<0.001$) among those diagnosed with AHI (table 1).

Compared with participants who tested negative or were diagnosed with established HIV, those diagnosed with AHI were more likely to attend family planning services or present due to feeling unwell, report condomless sex with a partner living with HIV or unknown HIV status, have had more recent HIV test, report symptoms consistent with AHI, and be diagnosed with a bacterial STI (table 1). The PrEP AHI screening criteria were equally common in all three groups ($p=0.928$). Online supplemental tables S3 and S4 detail characteristics of individuals diagnosed with AHI and newly diagnosed established HIV.

Table 1 Demographic, behavioural and clinical characteristics of participants, by HIV diagnosis

(Missing: n, %)	All	Established HIV	AHI	Participants without HIV	P value
	N=1095	N=31	N=10	N=1054	
Sex					
Female	673 (61.5)	22 (71.0)	9 (90.0)	642 (60.9)	0.093
Male	422 (38.5)	9 (29.0)	1 (10.0)	412 (39.1)	
Age, (years)					
18–29	684 (62.5)	17 (54.8)	9 (90.0)	658 (62.4)	0.135
>30	411 (37.5)	14 (45.2)	1 (10.0)	396 (37.6)	
Facility					
Health facility	718 (65.6)	25 (80.7)	9 (90.0)	684 (64.9)	0.055
Stand-alone site	377 (34.4)	6 (19.4)	1 (10.0)	370 (35.1)	
Study entry					
HIV testing service	876 (80.0)	25 (80.6)	7 (70.0)	844 (80.1)	0.235
OPD referral (STI)	219 (20.0)	6 (19.4)	3 (30.0)	210 (19.9)	
Self-reported reason for visit*					
Feeling unwell	384 (35.1)	9 (29.0)	8 (80.0)	367 (34.8)	0.010
Family planning	19 (1.7)	3 (9.7)	2 (20.0)	14 (1.3)	<0.001
Maternal health services	83 (7.6)	1 (3.2)	0	82 (7.8)	0.673
TB services	6 (0.6)	0	0	6 (0.6)	1
HIV prevention services	105 (9.6)	3 (9.7)	0	102 (9.7)	0.817
HIV testing services	339 (31.0)	4 (12.9)	2 (20.0)	333 (31.6)	0.06
STI services	58 (5.3)	1 (3.2)	1 (10.0)	56 (5.3)	0.656
Partner notification services	22 (2.0)	0	0	22 (2.0)	1
Other	244 (22.3)	11 (35.5)	1 (10.0)	232 (22.0)	0.143
Pregnant (N=673) (22, 3.3)					
Yes	146 (22.4)	4 (19.1)	2 (22.2)	140 (22.5)	0.698
No	458 (70.4)	17 (81.0)	6 (66.7)	435 (70.5)	
Don't know	47 (7.2)	0	1 (11.1)	46 (7.4)	
Breastfeeding (N=673) (20, 3.0)					
Yes	76 (11.6)	1 (4.6)	0	75 (12.1)	0.756
No	577 (88.4)	21 (95.5)	9 (100.0)	547 (87.9)	
Education level (6, 0.6)					
Secondary school or less	383 (35.2)	16 (51.6)	6 (60.0)	361 (34.5)	0.037
High school or tertiary	706 (64.8)	15 (48.4)	4 (40.0)	687 (65.6)	
Occupation (7, 0.6)					
Employed	563 (51.8)	15 (48.4)	3 (30.0)	545 (52.1)	0.355
Unemployed	525 (48.3)	16 (51.6)	7 (70.0)	502 (47.9)	
Relationship status (25, 2.3)					
In relationship	999 (93.4)	28 (96.6)	10 (100.0)	961 (93.2)	0.542
Not in relationship	71 (6.6)	1 (3.5)	0	70 (6.8)	
Last sexual intercourse (6 months) (5, 0.5)					
None	44 (4.0)	2 (6.5)	0	42 (4.0)	0.44
Less than 2 weeks ago	665 (61.0)	17 (54.8)	4 (40.0)	644 (61.4)	
Three weeks or more	381 (35.0)	12 (38.7)	6 (60.0)	363 (34.6)	
More than 1 sexual partner (43, 4.1)					
Yes	332 (31.6)	7 (22.6)	3 (30.0)	322 (31.9)	0.547
No	720 (68.4)	24 (77.4)	7 (70.0)	689 (68.2)	
Condomless sex since last HTS with partner living with HIV or unknown HIV status (80, 7.3)					
Yes	452 (44.5)	13 (66.7)	6 (66.7)	433 (44.1)	0.2
No	563 (55.5)	10 (43.5)	3 (33.3)	550 (55.9)	
HIV status of main partner (75, 6.9)					
Without HIV	503 (49.3)	7 (24.1)	4 (40.0)	492 (50.2)	0.05
Living with HIV	80 (7.8)	4 (13.8)	0	76 (7.8)	
Unknown	437 (42.8)	18 (62.1)	6 (60.0)	413 (42.1)	
Time since last HIV test (16, 1.5)					
First time today	40 (3.7)	1 (3.3)	0	39 (3.8)	0.008
1 month ago	286 (26.5)	4 (13.3)	4 (40.0)	278 (26.8)	

Continued

Table 1 Continued

(Missing: n, %)	All	Established HIV	AHI	Participants without HIV	P value
2–3 months ago	309 (28.6)	2 (6.7)	2 (20.0)	305 (29.4)	
4–6 months ago	201 (18.6)	8 (26.7)	1 (10.0)	192 (18.5)	
>6 months ago	243 (22.5)	15 (50.0)	3 (30.0)	225 (21.7)	
Use of HIV PrEP (last 6 months) (5, 0.5)					
Yes	111 (10.2)	2 (6.5)	0	109 (10.4)	0.437
No	979 (89.8)	29 (93.6)	10 (100)	940 (89.6)	
Use of HIV PEP (last 6 months) (4, 0.4)					
Yes	63 (5.8)	3 (9.7)	0	60 (5.7)	0.475
No	1028 (94.2)	28 (90.3)	10 (100)	990 (94.3)	
Symptoms consistent with AHI					
Yes	713 (65.1)	21 (67.7)	10 (100)	682 (64.7)	0.063
No	382 (34.9)	10 (32.3)	0	372 (35.3)	
PrEP AHI screening criteria					
Yes	427 (39.0)	13 (41.9)	4 (40.0)	410 (38.9)	0.941
No	668 (61)	18 (58.1)	6 (60.0)	644 (61.1)	
Any genitourinary symptoms					
Yes	660 (60.3)	23 (74.2)	7 (70.0)	630 (59.8)	0.222
No	435 (39.7)	8 (25.8)	3 (30.0)	424 (40.2)	
Any STI (Syphilis, NG, CT or TV)					
Yes	399 (36.4)	17 (54.8)	7 (70.0)	375 (35.6)	0.007
No	696 (63.6)	14 (45.2)	3 (30.0)	679 (64.4)	

*Several reasons for visit could be reported.
AHI, acute HIV infection; CT, *Chlamydia trachomatis*; HTS, HIV testing service; NG, *Neisseria gonorrhoeae*; OPD, outpatient department; PEP, post-exposure prophylaxis; PrEP, pre-exposure prophylaxis; STI, sexually-transmitted infection; TB, tuberculosis; TV, *Trichomonas vaginalis*.

DISCUSSION

Our cross-sectional study of HIV prevalence among the general adult population attending facility-based HTS in rural Eswatini revealed a high HIV yield. Almost a quarter of participants newly diagnosed with HIV had AHI and would have been missed by routine HIV testing alone. Our results reflect the reality of facility-based HIV testing in a context of high HIV prevalence and high HIV status awareness: participants frequently reported risk factors for HIV acquisition, symptoms consistent with AHI and genitourinary infections, and three-quarters had undergone HIV testing within the past 6 months.

The AHI prevalence in our study (0.9%) was similar to findings from general HTS or antenatal care settings in South Africa,[7 8 26] but lower than the 3.8% reported previously in Eswatini among participants presenting with symptoms suggestive of AHI,[14] or the 3.3% among individuals seeking care for malaria in

Table 2 Summary of virological, immunological and ART initiation characteristics of participants who were newly diagnosed with HIV

Missing (n, %)	Newly diagnosed HIV	Established HIV	AHI	P value
CD4 count (N=41) (25, 61)				
<200	6 (37.5)	5 (45.5)	1 (20)	0.551†
200–349	1 (6.3)	1 (9.1)	0	
350–499	4 (25.0)	2 (18.2)	2 (40)	
>500	5 (31.3)	3 (27.3)	2 (40)	
Viral load (N=41) (0, 0)				
Median (IQR)	131 000 (24 300–407 000	64 800 (14 400–231 000)	3 375 000 (748 000–10 000 000)	<0.001‡
<10 000 copies/mL	6 (14.6)	6 (19.4)	0	0.043†
10 000–99 999 copies/mL	13 (31.7)	12 (39.7)	1 (10)	
>100 000 copies/mL	22 (53.7)	13 (41.9	9 (90)	
ART initiation (0, 0)				
Yes	33 (80.5)	25 (80.7)	8 (80)	1.000†
No*	8 (19.5)	6 (19.3)	2 (20)	
Time to ART initiation (days) (0, 0)				
Median (IQR)	1 (0–7)	0 (0–1)	9 (7.5–16.5)	<0.001‡

*Reason for not initiating ART was only noted for two participants who moved to South Africa.
†Fisher's exact test.
‡Wilcoxon rank-sum test.
AHI, acute HIV infection; ART, antiretroviral treatment.

Mozambique.[11] Notably, the high proportion of AHI among participants with newly diagnosed HIV was striking. This may be due to the decline in positivity rates at routine HIV testing. Earlier studies conducted prior to universal access to ART documented high prevalence of established HIV (28%–56%) and low proportions of AHI, ranging from 0.4%–2.1% among pregnant women in Malawi[9] and South Africa,[8 26] to 5%–9.2% among patients with fever seeking care in Mozambique[17] and Uganda.[16] By contrast, the proportions of AHI were higher in recent studies from coastal Kenya, which documented a lower prevalence of established HIV: 24% in 2014 (3.9% established HIV)[27] and 20% in the 2019 study (3.4% established HIV).[16] A higher relative proportion of AHI results in reduced sensitivity of routinely used RDTs,[23] well below the 99% sensitivity recommended for HIV RDTs by WHO.[17] A 2016 systematic review of sensitivity or third-generation HIV RDTs reported reduced RDT sensitivity in high income countries, possibly due to a higher proportion of AHI in the targeted population.[28]

Importantly, as shown previously,[29] the criteria used to identify suspected AHI among individuals initiating PrEP[24 25] had limited sensitivity. This may be due to short exposure window of preceding 2 weeks, which may not capture the full interval between exposure and seroconversion, estimated at median of 31.1 days for sensitive antibody RDTs.[30 31] On the other hand, all participants diagnosed with AHI in our study presented with symptoms suggestive of AHI. Other studies reported highest AHI yields when testing focused on patients presenting with symptoms and seeking care at health facilities.[22–24] Studies from routine care in US emergency departments similarly described an increase of AHI detection, when HIV and AHI testing was integrated alongside COVID-19 testing in symptomatic patients.[32] Focusing AHI screening on participants presenting with symptoms at facility-based HTS may improve screening efficiency.

The challenge of AHI diagnostics in resource limited settings could be leveraged by increased availability of molecular testing. However, despite the substantial expansion in the use of near point-of-care molecular platforms, such as Xpert, during COVID-19 and mpox pandemics, the cost per test remains expensive.[33]

There are several limitations to this study. We may have overestimated HIV yield, as the enrolment criteria included participants diagnosed with syndromic STI at the outpatient department, who may have been at a higher risk of HIV acquisition than the general population attending facility-based HTS. However, these participants represented a minority and had a similar prevalence of newly diagnosed HIV to other participants. We may have overestimated the newly diagnosed established HIV, despite attempts to verify participants' HIV status and linkage to care in CMIS, as records may be inaccessible, updated with delays or some participants may link to care outside the country. In addition, our definition of newly diagnosed established HIV relied on detectable VL to exclude individuals on ART, which may still have included those with detectable VL or not on ART. Similarly, our pragmatic AHI definition may have included people living with HIV with false negative HIV RDT results, including those on ART or with HIV acquired under PrEP. Conversely, our AHI definition was restricted to AHI stages prior to seroconversion, and therefore likely underestimates AHI prevalence compared with studies that use broader AHI definitions. Importantly, participants diagnosed with AHI could not be immediately linked to care due to delays in issuing VL results. On the other hand, the study was conducted in a real-life setting at diverse facility-based HTS points among the general population, who were seeking care for a variety of reasons, with AHI testing integrated within HTS without additional steps. Although based on a small number of detected infections, our findings may be applicable to facility-based HTS in other high HIV burden settings with high HIV status awareness.

CONCLUSIONS

Our study among a general adult population attending HTS in rural Eswatini revealed a high overall HIV yield, with AHI representing almost a quarter of new HIV diagnoses which would have been missed by routine HTS. The relative proportion of AHI among participants newly diagnosed with HIV may further increase as the frequency of HIV testing increases, particularly in the context of PrEP scale-up, resulting in decreased sensitivity of routinely used RDTs. HIV control efforts, including testing strategies, must adapt to the new reality of the HIV epidemic, in which most of the individuals are aware of their HIV status and test frequently. Ignoring AHI is a missed opportunity both at individual and public health level. Models of AHI care targeting symptomatic individuals at health facilities and using molecular point-of-care diagnostics should be implemented and documented to inform scaling up. More accessible diagnostic tools for AHI and guidance on AHI testing are urgently needed.

Author affiliations
[1]Institute of Global Health, University of Geneva, Geneva, Switzerland
[2]Médecins Sans Frontières, Geneva, Switzerland
[3]Médecins Sans Frontières, Mbabane, Eswatini
[4]Eswatini National AIDS Programme, Eswatini Ministry of Health, Mbabane, Eswatini
[5]National Reference Laboratory, Eswatini Ministry of Health, Mbabane, Eswatini
[6]South African Medical Unit, Médecins Sans Frontières, Cape Town, South Africa
[7]University Hospital Basel, Basel, Switzerland
[8]University of Basel, Basel, Switzerland
[9]Eswatini Ministry of Health, Mbabane, Eswatini
[10]HIV Unit, Division of Infectious Diseases, Geneva University Hospitals, Geneva, Switzerland
[11]Center for Clinical Research, Geneva University Hospitals and University of Geneva, Geneva, Switzerland

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ORCID iD

Iza Ciglenecki https://orcid.org/0000-0003-0406-5218

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