

Comparison of HIV Incidence as Determined by Different Recency Assays in Ugandan Women

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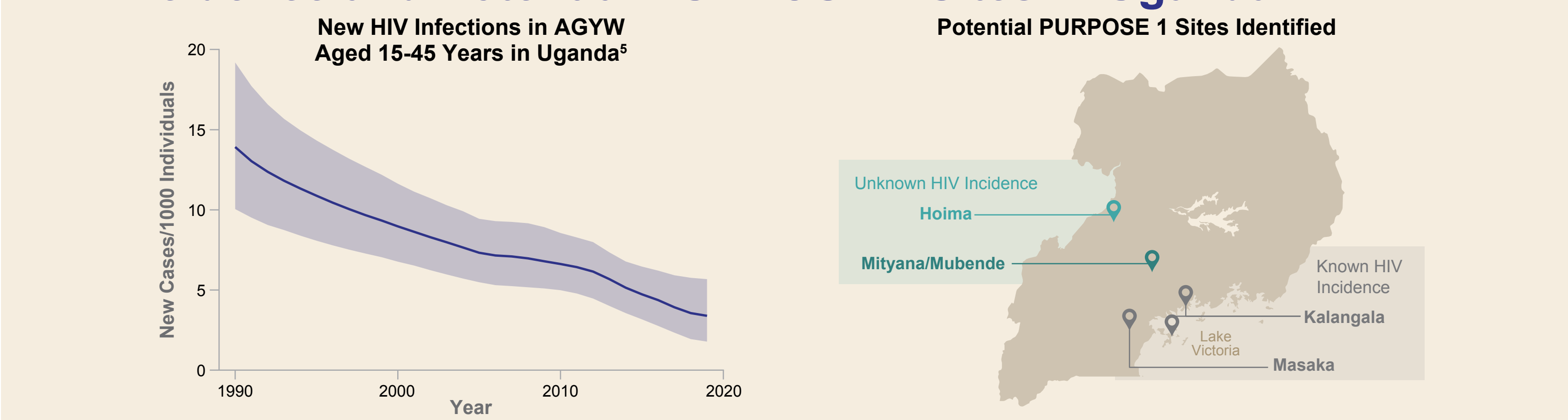
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Introduction

- Accurate estimates of background HIV incidence (bHIV) are critical to site selection and evaluation of efficacy in next-generation pre-exposure prophylaxis (PrEP) studies with counterfactual designs¹
- HIV-1 recent infection testing algorithms (RITAs) use recency assays to estimate population-level HIV incidence and are currently being employed in PrEP trials to estimate bHIV^{2,3}
 - Multiple assays have been suggested to determine recent infections for RITA development, including antibody (Ab) avidity assays and HIV 1/2 antigen (Ag)/Ab HIV infection assays⁴
- The PURPOSE 1 study (ClinicalTrials.gov NCT04994509) is using the novel counterfactual bHIV design and requires a high bHIV (> 3.5/100 person-years [PY])
 - This trial is evaluating the efficacy and safety of lenacapavir and emtricitabine/tenofovir alafenamide for PrEP in adolescent girls and young women (AGYW) in South Africa and Uganda
 - The primary endpoint will compare HIV incidence in each active study arm (lenacapavir and emtricitabine/tenofovir alafenamide) to bHIV in the screened population
- The SIENA study was conducted to determine the bHIV among AGYW in and around central and midwestern Uganda in regions with sociodemographic factors associated with higher HIV incidence (eg, marital/relationship status, education level, financial independence, and available occupations)

HIV Incidence and Potential PURPOSE 1 Sites in Uganda



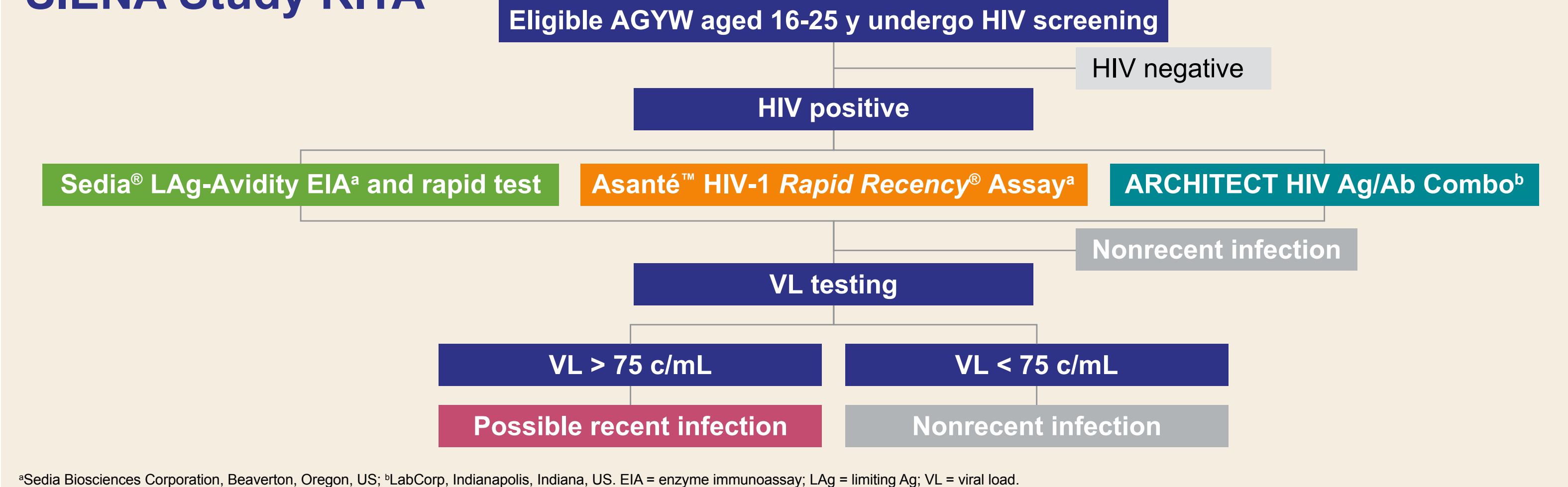
- In Uganda, HIV incidence has decreased at the national level; however, micro-epidemics still occur in key populations and high-risk communities
- 4 potential sites were identified, including 2 (Mityana/Mubende and Hoima regions) that have sociodemographic characteristics suggesting increasing HIV incidence, but with no recent data on bHIV
- Mityana/Mubende was confirmed as a PURPOSE 1 site due to a bHIV of 23.2/100 PY (95% confidence interval [CI] 13.1, 41.2)⁶

Objective

- To compare recency assay platforms by assessing their suitability, performance, and reliability for estimating bHIV in future PrEP studies

Methods

SIENA Study RITA



- Eligibility criteria: female sex, age 16-25 years, unknown HIV status, and no HIV testing in past 3 months
- A cross-section of AGYW were recruited from HIV testing sites and known areas of commercial sex activity, eg, bars, nightclubs, lodges, gold mines, factories, farmlands, islands, and fishing communities
- HIV diagnosis and confirmation via Alere Determine™ HIV-1/2 (Abbott, Abbott Park, Illinois, US), and OraQuick ADVANCE® Rapid HIV-1/2 Antibody Test (OraSure Technologies, Bethlehem, Pennsylvania, US)

Table 1. Recency Assay Characteristics⁷

	Platform	Method	Cutoff	Cutoff Time, y	MDRI, d	FRR, %	VL Cutoff, c/mL
LAG-EIA	Sedia LAg-Avidity EIA	Ab avidity, EIA	1.5 ODn	1	166.8	6.5	75
Asanté	Asanté HIV-1 Rapid Recency Assay	Ab avidity, lateral flow immunoassay, interpreted with electronic reader	2.5 LT/R	1	129.3	5.1	75
ARCHITECT	ARCHITECT HIV Ag/Ab Combo	Ag/Ab chemiluminescent immunoassay	175 S/Co	1	152.9	6.7	75

- Positive samples analyzed for recent infection using the LAg-EIA, Asanté, and ARCHITECT recency assays
- VL determined by COBAS® AmpliPrep/COBAS® TaqMan® HIV-1 Test, v2.0 (Roche Diagnostics, Indianapolis)
- bHIV and 95% CI calculated using previously determined MDRI and FRR specific for the study population, based on Gao et al⁸
- Participants diagnosed with HIV were referred to appropriate sites for treatment

Results

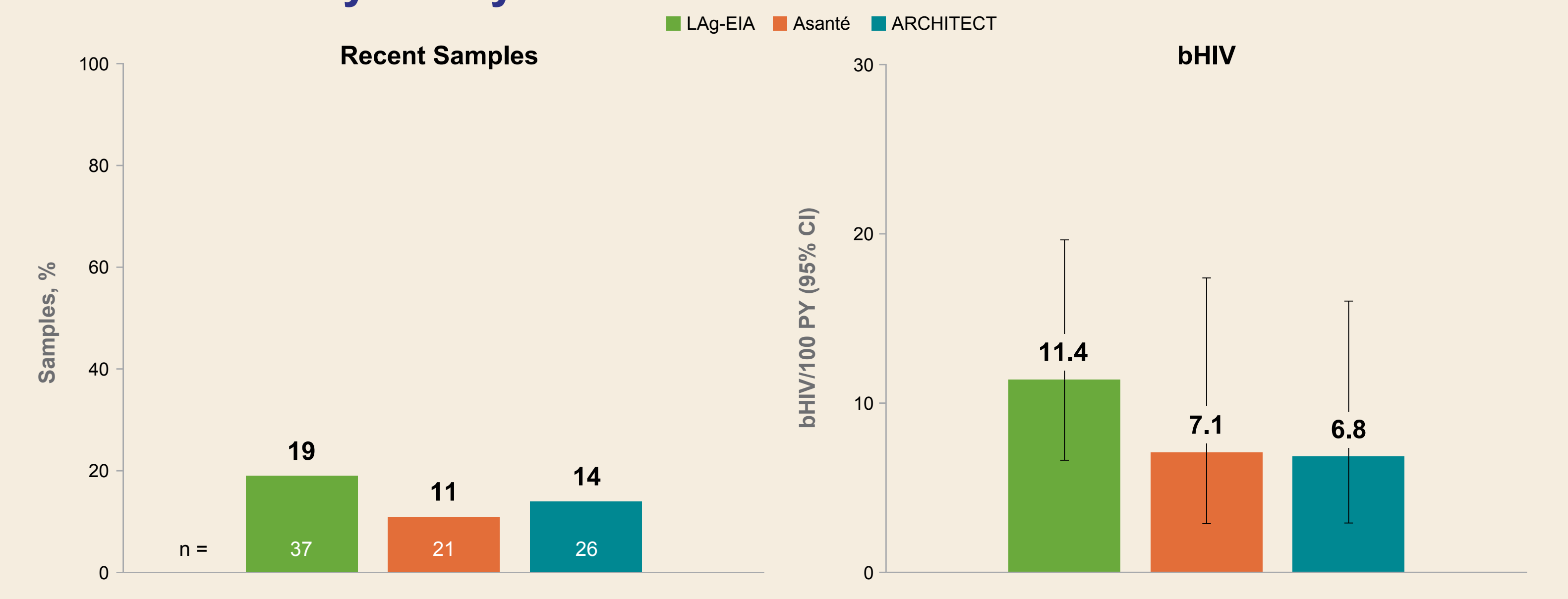
Participant Characteristics

	Total: N=742
Median age, y (range)	21 (16-26)
Secondary education or higher, n (%)	359 (48)
Living with partner/cohabiting, n (%)	109 (15)
Median time living in community, y (Q1, Q3)	1.2 (0.5, 5.5)
Median age at 1st sex encounter, y (Q1, Q3)	16 (14, 17)
Median mo since last HIV test (Q1, Q3)	8 (5, 15)
Sex partners in past 3 mo, n (%) ^a	0
	1
	≥2
Median number of vaginal sex encounters in past 3 mo (Q1, Q3)	100 (24, 100)
	Never
	Rarely
	Sometimes
	Often
New sex partner in past 3 mo, n (%)	518 (70)
Concerned about having HIV, n (%)	321 (56)
	Somehow worried
	Very worried
Partner provided financial/material support, n (%) ^b	222 (39)
	473 (91)
Primary occupation, n (%)	479 (65)
	Commercial sex worker, bar/lodge/hotel attendant
	Other
	263 (35)

^a93 participants in Mityana/Mubende group reported number of sex partners not known; Mityana/Mubende %s calculated from n = 332; total %s calculated from n = 703; ^b105 participants in Hoima and 120 in Mityana/Mubende groups reported not applicable or missing data; Hoima %s calculated from n = 266; Mityana/Mubende %s calculated from n = 251; total %s calculated from n = 517; Q, quartile.

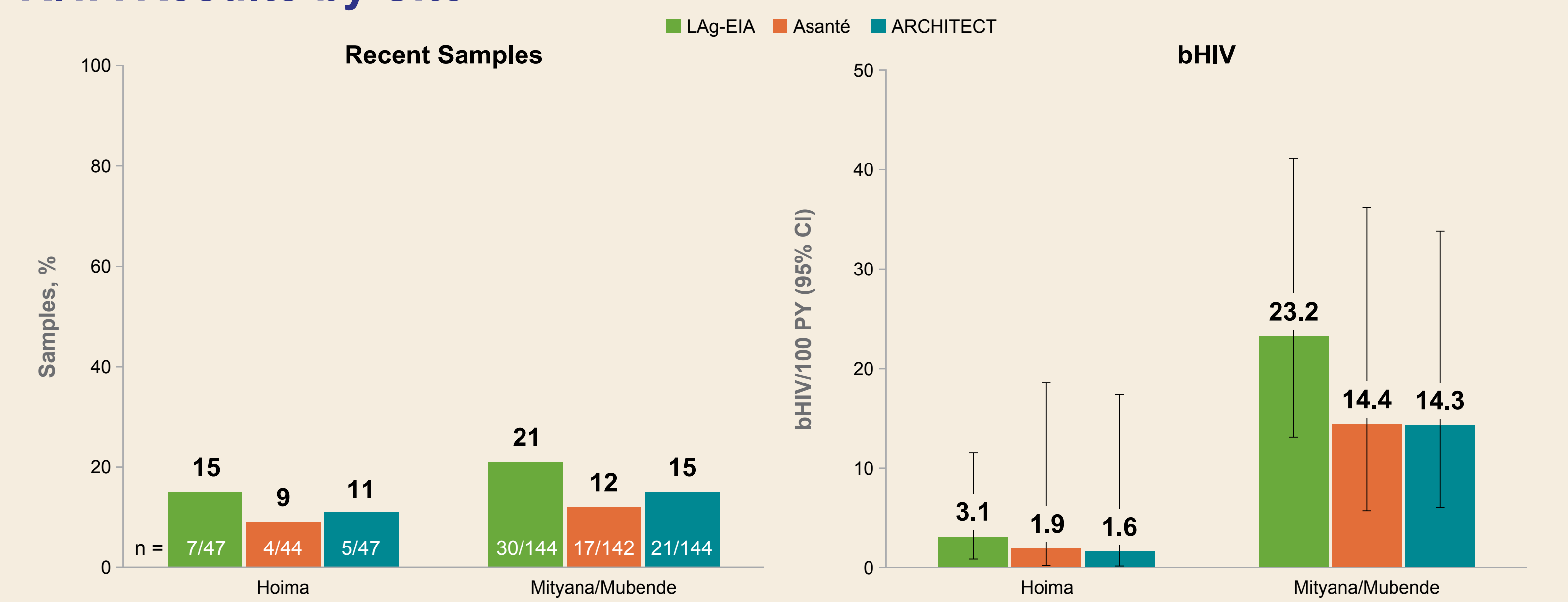
- Of 742 AGYW screened, 191 were diagnosed with HIV, of whom 44 (23%) had VL < 75 c/mL
- 53% of participants had HIV subtype A, 23% subtype D, and 18% subtype A/D

RITA Results by Assay



- The 3 assays identified 21-37 recent samples

RITA Results by Site



Correlations Between Assays

	Asanté				ARCHITECT				ARCHITECT			
	Infections ^a	Recent	Nonrecent	Total	Infections ^a	Recent	Nonrecent	Total	Infections ^a	Recent	Nonrecent	Total
LAG-EIA	Recent	20	12	32	Recent	22	13	37	Recent	13	8	21
	Nonrecent	1	153	154	Nonrecent	4	152	110	Nonrecent	9	156	165
	Total	21	165	186	Total	26	121	147	Total	22	164	186

^a5 infections called recent by LAg-EIA were considered HIV negative by Asanté and results were excluded by assay protocol; ^b4 infections called recent and 1 called nonrecent by ARCHITECT were considered HIV negative by Asanté and results were excluded by assay protocol.

- Assay results were significantly correlated
 - LAG-EIA and Asanté: $\phi = 0.7376$; LAg-EIA and ARCHITECT: $\phi = 0.6802$; Asanté and ARCHITECT: $\phi = 0.5532$

Conclusions

- In the SIENA study, the LAg-EIA, Asanté, and ARCHITECT recency assays identified high levels of recent infections, resulting in high estimates of bHIV in Uganda consistent with results seen evaluating other Ugandan HIV micro-epidemics
- These analyses support using these recency assays in the RITA to estimate bHIV in current and future PrEP studies
- The results demonstrate extremely high prevalence and incidence of HIV in AGYW in central and midwestern Uganda, highlighting the need for expanded HIV prevention options in these areas

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