Contact Investigation of Incident HIV in a Population Cohort: Implications for Case Finding and PrEP

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BACKGROUND

- Eastern and Southern Africa experienced a 53% decline in HIV incidence from 2013-2023, but there were still 400,000 new HIV infections in 2023.
- It is unclear whether these incident cases are scattered or concentrated throughout the population.

METHODS

- **Parent Study:** Rakai Community Cohort Study (RCCS), includes persons aged 15-49 living in 34 communities in Rakai, Uganda (Figure 1).

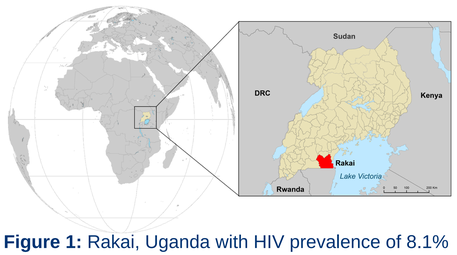


Figure 1: Rakai, Uganda with HIV prevalence of 8.1%

- **Incident HIV Cases:** From 2020-2024, identified through 1) longitudinal HIV testing in RCCS; 2) cross-sectional recency testing (Sedia LAg avidity); 3) prospective serology.
- **Study Design:** HIV incident cases 1:1 matched to HIV-negative controls from RCCS on community, age, gender, and religion.
- **Contact Tracing:** Traced named partners and a sample of female sex workers (FSWs) at named venues. HIV viral loads and genomics assessed. Survey on pre-exposure prophylaxis (PrEP) and assisted partner notification (APN).
- **Statistical Analysis:** Conditional logistic regression to account for matched design.

40% of men with an incident HIV infection report ≥1 female sex worker partner.

The reach of pre-exposure prophylaxis and assisted partner notification remains <20% in partners of incident cases.

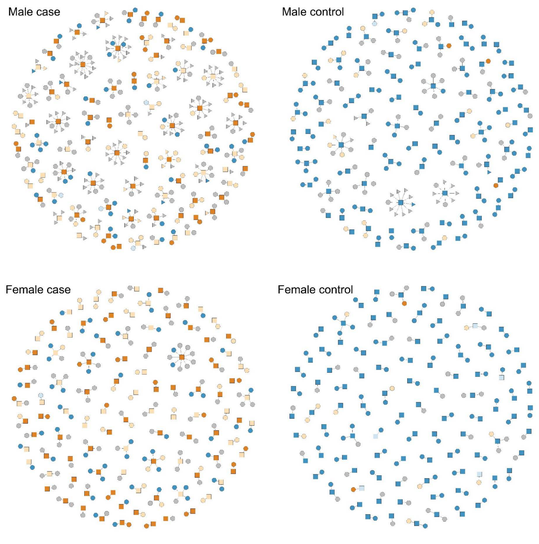


Figure 3: Sexual partner networks of persons with incident HIV infection and age, gender, sex, community, and religion matched controls without HIV including HIV viral suppression status and self-reported PrEP use.

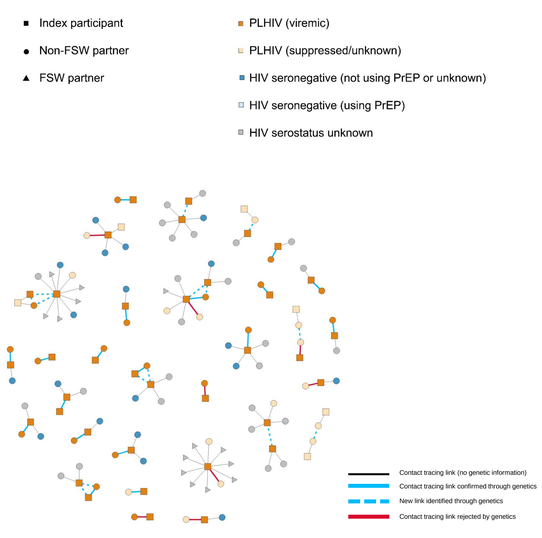


Figure 4: Evaluating named partner links through HIV genetic linkages.

Table 1: Coverage of PrEP and APN

Group	Ever PrEP use (HIV-)	Current PrEP use (HIV-)	Contact through APN	Testing through APN
Female partners of male cases	13.2%	7.5%	18.5%	15.3%
Venue-based FSWs	31.7%	6.9%	16.0%	13.3%
Male partners of female cases	5.6%	1.9%	5.0%	2.0%

Table 2: Conditional Odds Ratio: Cases vs Controls

Risk factor	Cases N (%)	Controls N (%)	Matched Odds Ratio	95% CI
≥1 partner with HIV	99 (52.3%)	30 (16.3%)	9.63	4.65-19.3
≥1 partner with HIV viremia	33 (17.7%)	5 (2.7%)	8.00	2.83-22.62
≥1 FSW partner (males only)	35 (40.2%)	5 (5.8%)	16.00	3.83-66.7

RESULTS

- 186 (99 F, 87 M) incident cases enrolled and matched to 186 controls.
- 421/663 non-FSW and 20/149 FSW partners enrolled (Figure 2).

Figure 2: Proportion of Partners Untraceable by Sex and Study Arm

- 228 FSW enrolled from 27 named venues.
- Male cases (Median: 3; IQR: 2,5) reported more partners than male controls (2; 1,3), female cases (2; 1,2), and female controls (1; 1,1) (Figure 3).
- Low PrEP, APN coverage in partners (Table 1).
- FSW partners and partners with HIV viremia associated with incident HIV in index (Table 2).
- 17/19 viremic partners, 1/7 suppressed partners genetically linked to index (Figure 4).

CONCLUSIONS

- Contact tracing is insufficient to reach many partners of male incident HIV cases.
- Low intervention reach in high-risk populations is an opportunity for targeted prevention.

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