Age-specific HIV incidence patterns among population cohorts in sub-Saharan Africa

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ALPHA NETWORK
Analysing Longitudinal Population-based HIV/AIDS data on Africa

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Introduction

As the HIV epidemic in sub-Saharan Africa matures, evidence about how HIV incidence patterns by age have changed may help focus HIV prevention.

Methods

We used a Bayesian model to jointly reconstruct age-specific HIV incidence and mortality from population-based sero-survey and HIV survival data collected among rural population HIV cohorts in Tanzania (Kisesa, 1994-2017), Uganda (Masaka, 1989-2017, and Rakai, 1994-2016), Malawi (Karonga, 2002-2012), Zimbabwe (Manicaland, 1998-2012) and South Africa (uMkhanyakude, 2000-2017). HIV incidence hazard was flexibly modelled using penalised B-splines with knots every 5 years over age and time. The model was fit separately to each site with sexes sharing variance. Modelled incidence and prevalence results are applied to study populations to estimate average age of infection and percentage of new infections at given ages.

Results

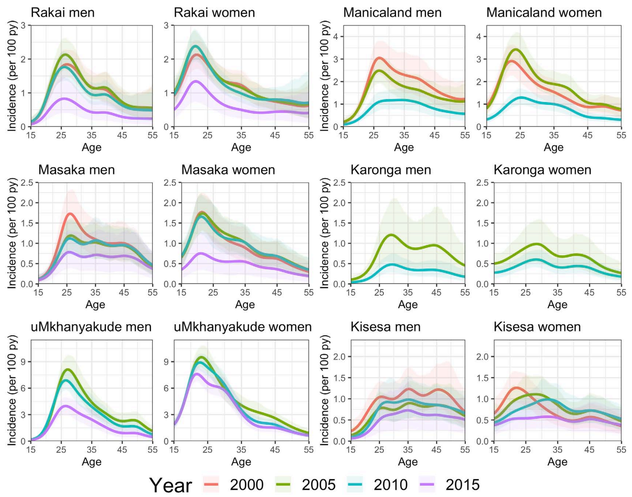


Fig. 1 Age-specific incidence modeled estimates in 6 ALPHA Network sites, for 2000, 2005, 2010 and 2015

Age-specific HIV incidence decreased across ages; around half of new infections for women and a quarter for men were among ages 15-24.

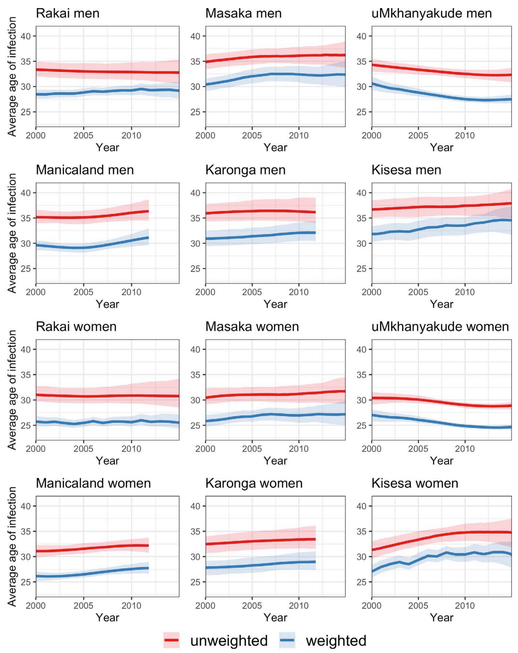


Fig. 2 Average age of infection in 6 ALPHA network study sites by sex over time. Unweighted represents the average of age-specific incidence, weighted represents the average of age-specific incidence applied to the susceptible population

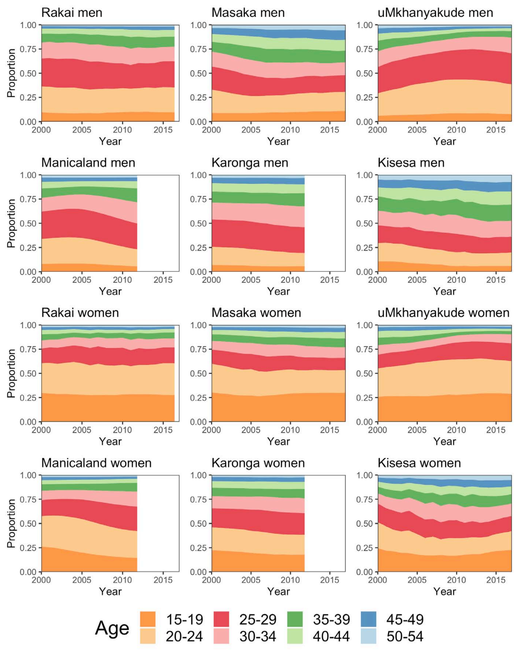


Fig. 3 Proportion of new infections by 5-year age groups in 6 ALPHA Network study sites from 2000-2017

In the most recent year, the percentage of women's new infections among 15-24 year olds (Fig 3) was: 60% (95% credible interval = 52-69%) in Rakai, 53% (37-66%) in Masaka, 63% (59-67%) in uMkhanyakude, 42% (35-49%) in Manicaland, 38% (28-46%) in Karonga, and 41% (27-55%) in Kisesa.

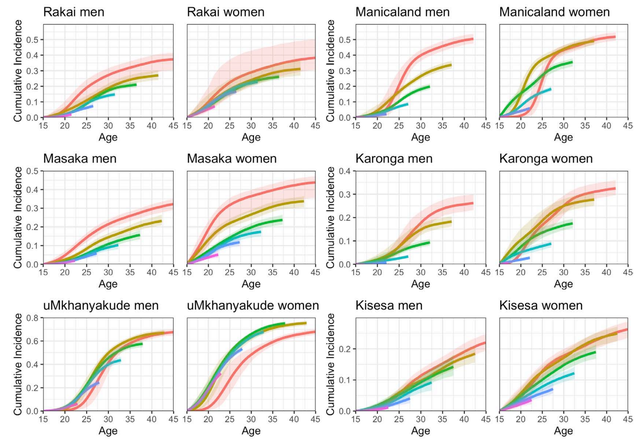


Fig. 4 Cumulative incidence by birth cohort in 6 ALPHA network study sites by sex

Conclusions

- Age-specific incidence patterns vary by study site – most recent age distribution appears different in Karonga, Kisesa, Masaka & Manicaland than in uMkhanyakude & Rakai
- While average age at infection has increased slightly in most sites since 2000, there were minimal changes
- More recent birth cohorts show evidence of decreased lifetime risk of HIV
- In all study sites in the most recent estimate, about half (38-63%) of women's new infections were among adolescent girls and young women (aged 15-24), and about a quarter (19-39%) of men's new infections were in ages 15-24

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