Impact of Combination HIV Interventions on HIV incidence in South-central Uganda: Perspectives from the Rakai cohort

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Combination HIV Intervention in sub-Saharan Africa

- Combination of biomedical, behavioral and structural interventions against HIV

- Modeling studies suggested that high coverage of Antiretroviral therapy (ART) and male circumcision (VMMC) could substantially reduce HIV incidence at population-level

- No empirical evidence of effectiveness of CHI on HIV incidence
Evaluation of the “Real-world” Impact of CHI through the Rakai Cohort

• To assess the “real-world” impact of CHI on HIV incidence, we analyzed long-term population trends in HIV incidence and their associations with:

1. Trends in ART and VMMC scale-up
2. Changes in population-level viral load suppression
3. Trends in sexual behaviors
Methods

- Rakai Community Cohort Study (RCCS)
  Open, longitudinal population-based cohort of individuals aged 15-49 years.

- Data: Demographic, behavioral, service utilization, HIV-testing, viral load

- CH1 services: ART, VMMC, HTS, Behavioral change messaging, structural interventions (e.g. School enrolment)

- Assessed trends in:
  - self-reported ART and VMMC coverage
  - population-level HIV viral load suppression (<1000 copies/ml)
  - sexual risk behaviors
  - HIV incidence
Results: ART Scale-up

• Self-reported ART increased from 12% to 69% between 2006 and 2016.

• Increases partly a consequence of changing criteria for ART initiation

• By 2016, 61% of HIV-positive men and 72% of HIV-positive women self-reported ART.

Grabowski et al. NEJM. 2017
Viral load Suppression Trends

- HIV viral load results obtained for 96% of HIV-positive participants in 2009 and for 99% in 2016.

- By 2016, 75% of all HIV-positive persons were virally suppressed compared with 42% in 2009 (p<0.001) (Achieved 90-90-90).

- Suppression among self-reported ART users was 94% and did not differ by gender.

Grabowski et al. NEJM. 2017
Male Circumcision Coverage

- Male circumcision coverage significantly increased from 15% in 1999 to 59% in 2016 among all men ($p<0.001$)

- Among non-Muslim men, coverage increased from 3.5% to 53% over the same time period.

Grabowski et al. NEJM. 2017
Trends in Sexual debut

- % not initiating sex increased significantly among adolescents.
- No changes in proportions reporting multiple partners or in condom use with casual partners.

Grabowski et al. NEJM. 2017
HIV Prevalence and Incidence Trends

- HIV incidence remained stable prior to and early during CHI scale-up.

- Incidence declined from 1.16/100 py to 0.66/100 py in 2016 (p<0.001).

- Relative to pre-CHI period, 42% decline in incidence by 2016 (aIRR=0.58; 95%CI: 0.45-0.76).
HIV Prevalence and Incidence by Gender

- HIV incidence **declined 54% in men** (adjIRR=0.46; 95%CI: 0.29-0.73) and **32% in women** (adjIRR=0.68, 95%CI: 0.50-0.94).
HIV Prevalence and Incidence by Male circumcision status

- HIV incidence was 39% lower among circumcised compared to uncircumcised men (adjIRR=0.61; 95%CI: 0.48-0.79).

- However, incidence declined significantly in both circumcised men (aIRR=0.43; 95%CI: 0.19-0.99) and uncircumcised men (aIRR: 0.51, 95%CI: 0.29-0.88).

Grabowski et al. NEJM. 2017
HIV Incidence Trends (1999-2018)

RCCS Male HIV incidence trends, 1999-2018

Female HIV incidence trends, 1999-2018

UTT implemented

Unpublished
Did CHI Reduce HIV incidence in Rakai’s Hyperendemic Fishing Communities on Lake Victoria?
Impact of CHI on HIV incidence in HIV hyperendemic Fishing Community on L. Victoria.

• Study setting:
  – HIV Prevalence ~40%
  – High levels of mobility and risky sexual behaviors including transactional sex
  – Starting late 2011, major ramp up of CHI including UTT and VMMC
Increasing Coverage with ART and VMMC in Lake Victoria Fishing Communities with UTT and VMMC scale-up

Kagaayi, Chang et al., Lancet HIV 2019
HIV Prevalence and Incidence Trends in Fishing Communities

- 48% overall reduction in HIV incidence with UTT and VMMC scale-up over a period of 5 years (IRR=0.52, 95%CI: 0.34-0.79).
- No differences by gender

Kagaayi, Chang et al., Lancet HIV 2019
Summary

• In this prospective population-level study, HIV incidence significantly declined by 42% in the general communities and 48% in fishing villages as ART and VMMC were scaled and sexual activity in adolescents declined

• Results are very encouraging

• However, even at “90-90-90” and circumcision at 60% coverage, incidence remains well above elimination levels (0.1/100 pys).