Estimation of counterfactual HIV incidence in young women

HPTN 082

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Overview

• HPTN 082 is a clinical trial aimed at increasing PrEP adherence among young women in sub-Saharan Africa. Enrollment is targeting high risk women informed by VOICE risk score. **Almost all participants receive PrEP so there is no control.**

• **Modeling Goal:** Provide counterfactual incidence in HPTN 082 in the absence of PrEP to be used in effectiveness evaluations.

• **Key conclusion:** **Participant risk factors alone are not predictive** of incidence and must be combined with site specific data on HIV and ART prevalence.
**Input**

- HIV/ART in male pop.
- HIV Risk Score

**Infection Model**

*(Be)havior Model (Tr)ansmission Model*

**Be**
- Sexual Activity
- Partner HIV status

**Tr**
- Infection Probability (No PrEP)

**Output**

**Key Parameters:**
- ART/HIV prevalence of male partner
- Must be site/study specific

**Model Calibrated To:**
- HIV incidence by risk score (VOICE)
- Sexual activity by risk score (HPTN082)
VOICE HIV Risk Score

- Composite of six risk factors (see right):
- Scores range from 0-10.
- Derived from seroconversions in VOICE trial
- HPTN 082 participants screened for score ≥ 5
- Judging by risk scores, we might expect higher untreated HIV incidence in HPTN 082 cohort
VOICE vs HPTN 082

- Both tested PrEP in women in Southern Africa
- Years of study: 2009-2016 vs 2016-Present
- In local male population,
  - HIV Prevalence (%): 12-18 vs 8-13
  - ART Coverage (%): 18-26 vs 57-65
  - Viral Suppression (%): ???? vs 46-60
- Participant Age Range: 21-29 vs 16-25
- Annual HIV incidence: 5.3-6.7 vs ????
- Sources: UNAIDS, Phia, SA HIV National Behavioral Survey, Uganda HIV Progress Report
Calibration to HIV infection OR by risk factor in VOICE

Association between risk factors and risk behaviors in HPTN 082

Behavioral Associations from HPTN082 ACASI or literature sources (95% CI)
Range Predicted by Model (95% CI)

Odds Ratio of HIV infection in VOICE (95% CI)
Range Predicted by Model (95% CI)
Main results

- Calibrated Model provided a good match to VOICE data (Model/Data)
- We project a 3.7% (3.1-4.3) HIV incidence in HPTN 082 without PrEP
- Both adjusting risk scores or study sites influence results significantly
Summary

- Counterfactual incidence in HPTN 082 in the absence of PrEP: 3.7% (95% CI 3.2-4.3)
  - Without accounting for changes in HIV/ART prevalence since 2012: 11.6% (10.2-13.2)
  - Without accounting for the high risk screening in HPTN 082: 2.0% (1.7-2.2)
- **Participant risk factors alone are not predictive** of incidence and must be combined with site specific data on HIV and ART prevalence
- Limitations:
  - Assumed that relationship between risk factors and risk behaviors is consistent between populations (of young women in Southern Africa).
  - Other risk-associated factors may change over time
    - Changes in condom usage over time
    - Changes in sexual behavior of HIV+ men due to increased testing
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