992

Modeled Effectiveness of CAB-LA Prioritization Strategies Based on Data From HPTN 083

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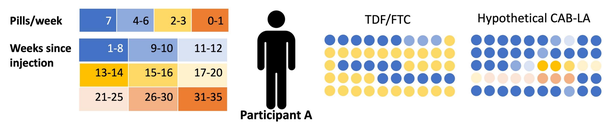
BACKGROUND

- Long-acting injectable cabotegravir (**CAB-LA**) as HIV Pre-exposure Prophylaxis (**PrEP**) demonstrated superiority over daily oral tenofovir disoproxil fumarate–emtricitabine (**TDF/FTC**) in the HPTN 083 trial [1]
- **Data from the HPTN 083 TDF/FTC adherence cohort allow us to estimate individual participants' risk of acquiring HIV when using CAB-LA or TDF/FTC and to project the population-level impact of different CAB-LA prioritization strategies on HIV incidence**

METHODS

- The HPTN 083 adherence cohort (n=390) were offered active TDF/FTC and placebo CAB-LA with dried blood spots collected as a biomarker for TDF/FTC adherence evaluation
  - Participants with SexPro scores and 3+ placebo injection visits were included in this analysis (n=281)
- **SexPro score evaluates risk of HIV acquisition** based on sexual and drug-use behavior, race, and ethnicity; range 1-20 and score = 1 indicates the highest probability of future HIV acquisition [2]
- Projected time-varying CAB-LA efficacy was modeled based on the time since the last placebo injection [3]
- Stochastic agent-based model to simulate HIV incidence in this cohort
- For each cohort participant, we estimated the probability of HIV acquisition when using each PrEP option based on:
  - Individual daily probability of HIV acquisition based on SexPro score components [2]
  - Individual adherence to TDF/FTC and to CAB-LA placebo injections



- We calibrated the model to match 1.24/100 PYs incidence observed in the TDF/FTC arm of HPTN 083 when all people were assigned TDF/FTC, then modeled HIV incidence for eight scenarios (Table 1)

Table 1: Descriptions of modeled scenarios

Scenario	Definition
Counterfactual placebo	No participants on PrEP
All on TDF/FTC	All participants on TDF/FTC, *calibrated*
All on CAB-LA	All participants on CAB-LA
SexPro score scenarios	CAB-LA prioritized by SexPro score ≤5,10,15
CAB-LA for SexPro ≤ 16	Participants with SexPro score ≤16 received CAB-LA, remaining participants received TDF/FTC
CAB-LA for suboptimal TDF/FTC adherence	Participants with 0-3 pills/week received CAB-LA, participants with 4+ pills/week received TDF/FTC
CAB-LA for poor TDF/FTC adherence	Participants with 0-1 pills/week received CAB-LA, participants with 2+ pills/week received TDF/FTC

Prioritizing CAB-LA based on SexPro score or TDF/FTC adherence could reduce HIV incidence comparably to providing CAB-LA to all participants

Figure 1: HIV incidence (per 100 PYs) with all participants not on PrEP, on TDF/FTC, or on CAB-LA

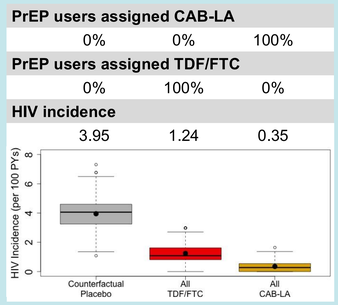


Figure 2: HIV incidence (per 100 PYs) with CAB-LA prioritized by SexPro score and remaining participants on TDF/FTC

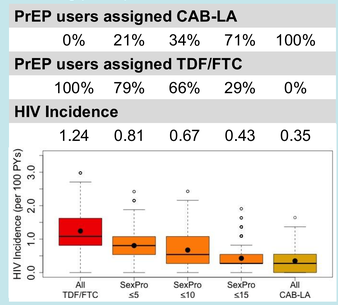
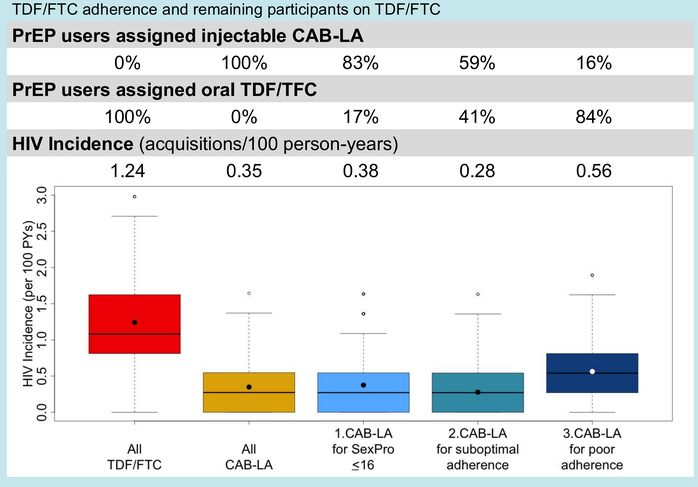


Figure 3: HIV incidence (per 100 PYs) with CAB-LA prioritized by SexPro score or TDF/FTC adherence and remaining participants on TDF/FTC



RESULTS

- We estimated **93% mean CAB-LA effectiveness** and **72% mean TDF/FTC effectiveness** in the TDF/FTC adherence cohort
- If CAB-LA was prioritized by SexPro score, incidence decreased as the prioritized SexPro threshold rose and more people were assigned to CAB-LA (Figure 2)
- If CAB-LA was prioritized to:
  - 83% of participants with SexPro score <16, effectiveness was predicted to be 90%
  - 59% with suboptimal TDF/FTC adherence, effectiveness was predicted to be 93%
  - 16% with poor TDF/FTC adherence, effectiveness was predicted to be 86% (Figure 3)

CONCLUSIONS

- Sex Pro score is not routinely used in clinical practice, but these data show it may be useful clinically while being easy to collect for US and Latin American MSM
- Adherence to TDF/FTC may be challenging to measure in clinical settings, but patient self-report of taking few to no PrEP pills taken may reflect the "poor adherence" category here
- Prioritizing CAB-LA based on SexPro score or TDF/FTC adherence could achieve a reduction in HIV incidence *comparable to providing CAB-LA to all participants*
- **Ideally CAB-LA would be provided based on user preference, but while cost and supply limit its use, this analysis may inform optimal prioritization strategies in settings and programs with resource constraints**
- If CAB-LA availability is severely limited, prioritizing CAB-LA to those with poor TDF/FTC adherence still substantially lowered HIV incidence compared to providing only TDF/FTC

PLAIN LANGUAGE SUMMARY

What we did: Made a computer model of participants in HPTN 083 and their chance of acquiring HIV during the trial based on their sexual behavior and PrEP adherence

What we found: When we prioritized CAB-LA to ~60% of people based on their PrEP pill adherence or ~80% of people based on their SexPro score and everyone else received PrEP pills, *new HIV acquisitions were as low as when everyone received CAB-LA*

Why it matters: Cost and program access may limit CAB-LA use, so our analysis may help prioritize CAB-LA within programs

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