

Population-level impact of expanding PrEP coverage among men who have sex with men with long-acting injectable cabotegravir: Model comparison analysis for Atlanta, US and Montreal, Canada

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BACKGROUND

- **HPTN 083** has shown that there was a **66% lower risk of HIV infection** in participants receiving long-acting injectable cabotegravir (**CAB-LA PrEP**) compared to oral tenofovir disoproxil fumarate/emtricitabine (TDF/FTC) among cis-gender men who have sex with men (MSM) and transgender women in North and South America, South Africa and Thailand and Vietnam. It is currently **approved for use as PrEP** in the US
- We conducted a **comparative modelling analysis** of the potential impact of expanding PrEP coverage by offering CAB-LA to men who have sex with men (MSM) in Atlanta, US and Montreal, Canada

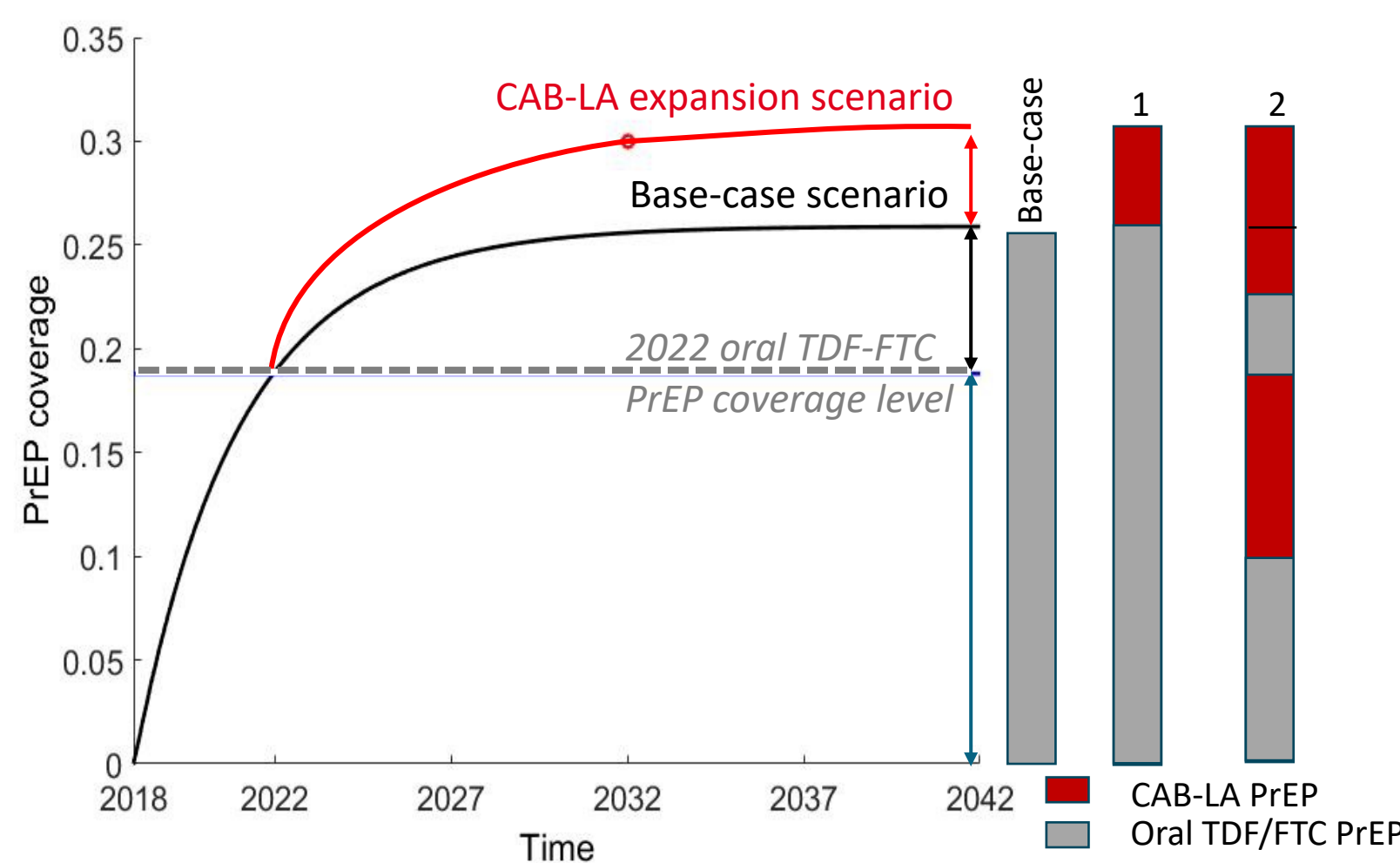


Figure 1: Example scenarios. *Base-case:* no CAB-LA expansion. *Scenario 1:* Expansion with no switching. *Scenario 2:* Expansion with 50% TDF/FTC users switching to CAB-LA.

METHODS

- **Two independent age- and risk-stratified HIV transmission models** for MSM in Atlanta and Montreal were parameterized and calibrated to local data. Model output was HIV infections
- These were used to create base-case scenarios based on **site-specific improvement in the HIV care cascade and constant oral TDF/FTC initiation/discontinuation rates** from 2022-2042 (Figures 1 & 2)
- **Expansion of overall PrEP coverage** from 30% (Atlanta) and 6% (Montreal) in 2020 to up to 50% in 2027 or 2032 was **simulated by recruiting additional CAB-LA users** based on current PrEP indication criteria (Figure 1 Scenario 1) and **switching different proportions of oral TDF/FTC users to CAB-LA** starting in 2022 (Figure 1 Scenario 2)

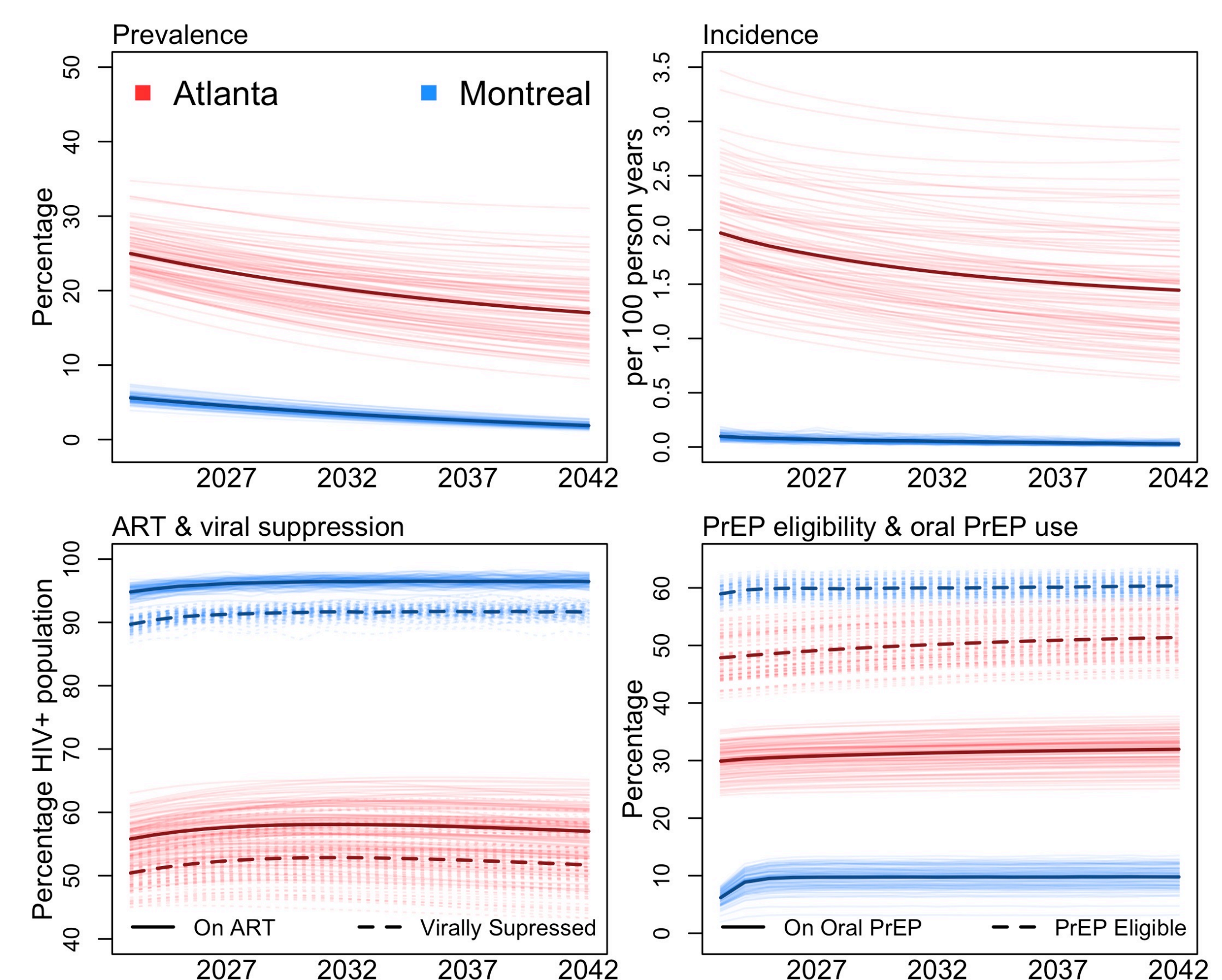


Figure 2: Base case scenarios with no CAB-LA expansion. Bold lines show means of 100 simulation replicates.

Expanding PrEP coverage by offering CAB-LA could be highly efficient and potentially cost-effective in places with high HIV incidence

IMPACT METRICS

- **Population-level effectiveness:** Cumulative fractions of new HIV infections averted over 20 years compared to base-case scenarios
- **Population-level efficiency:** Additional person-years on PrEP needed (**number needed to treat**) to prevent one HIV infection compared to base-case scenarios
- **Cost-effectiveness:** The additional cost per disability-adjusted life year (DALY) averted over 20 years compared to base-case scenarios. Cost-effectiveness estimates included PrEP & ART drug prices, HIV testing and other tests for PrEP users, and annual HIV care compared to base-case scenario PrEP uptake with lowest available price generic oral TDF/FTC PrEP, with disability-adjusted life years (DALYs) and costs discounted at 3%/year

RESULTS

- **Base-case scenarios:** median overall oral TDF/FTC PrEP coverage could reach 32% (Atlanta) and 10% (Montreal) by 2042 with no CAB-LA expansion (Figure 2)
- **Atlanta:** higher prevalence & incidence as well as high initial oral TDF/FTC PrEP use (Figure 2) and high oral TDF/FTC effectiveness (82%, range 75-87%)
 - Increasing overall PrEP coverage to 40% of the MSM population in 2027 (8-10 percentage points (pp) increase) is expected to avert 35%-39% of new HIV infections over 20 years (Figure 3A)
 - **Approximately 20 additional person years** on PrEP are needed to prevent one infection (Figure 4)
 - Averting one disability-adjusted life year with CAB-LA will cost around US \$220,000 (\$140,000-\$390,000, data not shown) with CAB-LA price \$3,700 per vial
- **Montreal:** very low prevalence & incidence and lower initial oral TDF/FTC PrEP use (Figure 2) and high oral TDF/FTC effectiveness (86%)
 - Increasing overall PrEP coverage to 30% of the MSM population in 2027 (a ~20pp increase) is necessary to achieve a comparable reduction to Atlanta in new HIV infections over 20 years (Figure 3A)
 - **More than 1,000 additional person years** on PrEP are needed to prevent one infection (Figure 4)
 - At US CAB-LA prices, averting one disability-adjusted life year will cost > US \$1.5 M
- **Reaching 50% PrEP coverage by 2027 by recruiting CAB-LA users among MSM with a PrEP indication could avert approximately 60% of new HIV infections over 20 years in both settings**
- Expanding to new users or reaching coverage targets sooner (Figure 3A) has a larger impact on infections averted than switching existing oral TDF/FTC users to CAB-LA while maintaining the same level of coverage (Figure 3B)

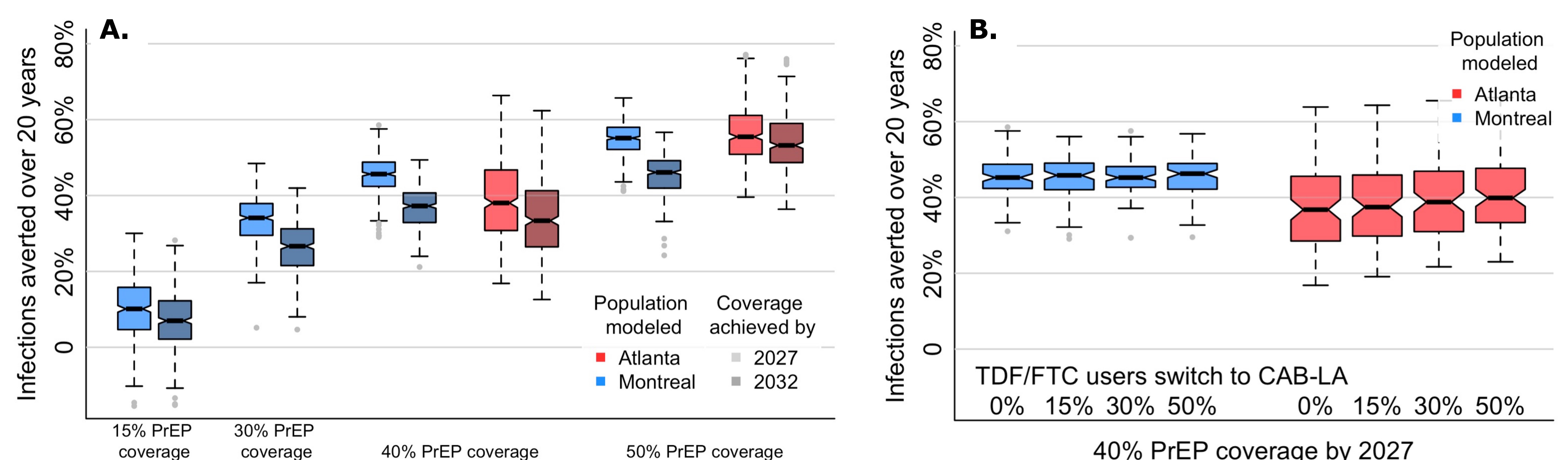


Figure 3: Cumulative fractions of new HIV infections averted over 20 years: A) by overall PrEP coverage level; B) by percent of existing oral TDF/FTC users switching to CAB-LA use. X-axis shows overall PrEP coverage. Notches in boxplot show 95% CI for the median. Dotted lines show maximum & minimum without outliers

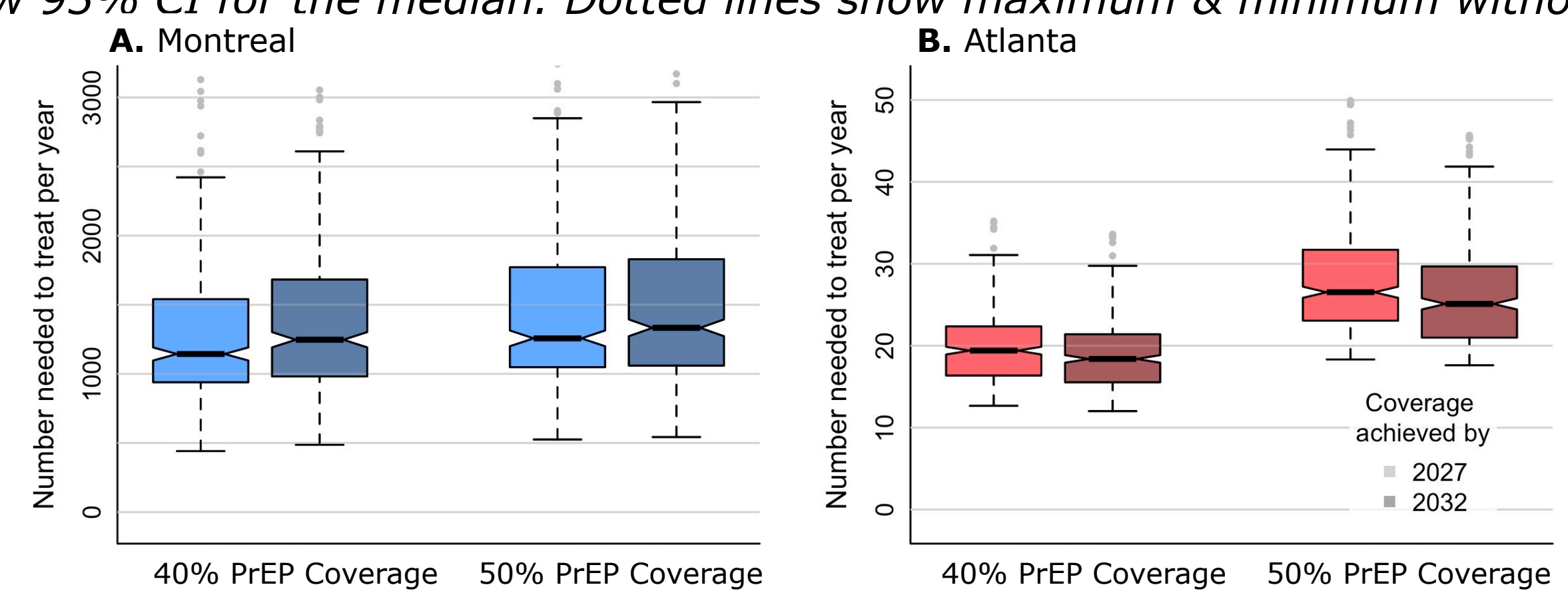


Figure 4: Number needed to treat per year. Note different y-axes

CONCLUSIONS

- **Offering CAB-LA to MSM in the US and Canada can impact HIV epidemics substantially if it helps achieve higher overall PrEP coverage**
- **Expanding overall PrEP coverage by ~10 pp by offering CAB-LA to PrEP eligible MSM may avert a significant proportion of new HIV infections over 20 years in settings with high oral TDF/FTC PrEP coverage (like Atlanta)**
- **Substantially larger increases in overall PrEP coverage (~20 pp) would be needed to achieve comparable proportion of infections averted in settings with low coverage of individuals with PrEP indications (like Montreal)**
- If PrEP coverage is expanded among PrEP eligible MSM, **switching existing users** from oral TDF/FTC to CAB-LA PrEP while maintaining the same overall coverage level is predicted to have **only a small positive effect** due to the high efficacy and adherence to oral TDF/FTC PrEP assumed in the models. This effect may be larger in populations with lower adherence to oral TDF/FTC PrEP
- **Expanding the PrEP toolbox with CAB-LA could be highly efficient and possibly cost-effective in places with high HIV incidence (like Atlanta) but it is unlikely to be cost-effective in settings with low HIV incidence (like Montreal)**