

Added Benefits of Pre-exposure Prophylaxis Use on HIV Incidence with Minimal Changes in Efficiency in the Context of High Treatment Engagement among Men Who Have Sex with Men

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BACKGROUND

- No singular approach can eliminate HIV transmission
- Strategies that combine pre-exposure prophylaxis (PrEP) and antiretroviral treatment (ART) hold promise
- There is ongoing debate over the need for substantial increases in PrEP use when ART both reduces HIV morbidity and mortality and prevents HIV transmission
- No studies to date have quantified the potential added impact of PrEP in the context of high levels of treatment among multiple domestic micro-epidemics

METHODS

- We used an agent-based network model, the TITAN model, to simulate HIV transmission through a dynamic sexual network of 17,440 Black/African American and White men who have sex with men (MSM) in Atlanta, Georgia (2015–2024)
- Race-specific estimates from the published literature of two studies conducted among Black/African American and White MSM in Atlanta were used to parameterize the model
- Model scenarios varied levels of PrEP use (0–90%) in potential futures where treatment engagement reached UNAIDS ‘90-90-90’ and eventual ‘95-95-95’ goals, compared to current Atlanta treatment levels (‘65-63-82’ and ‘82-58-88’ among Black/African American and White MSM, respectively)
- The magnitude of reductions in HIV incidence rates and changes in PrEP efficiency (person-years of PrEP use per HIV infection averted) were calculated for each model scenario

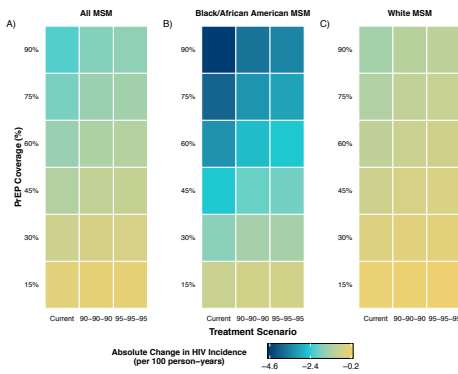
RESEARCH QUESTION



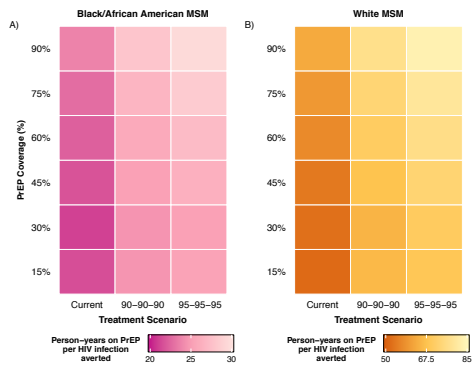
What are the added benefits of PrEP use in the context of high treatment engagement among various domestic micro-epidemics?

RESULTS

Marginal Changes in HIV Incidence Rates*



Marginal Changes in PrEP Efficiency*



* Changes were calculated within each set of treatment scenarios relative to a scenario where no agents use PrEP

- Even at achievement and maintenance of ‘90-90-90’ goals, 75% PrEP coverage reduced incidence rates by an additional 67.9% and 74.2% to 1.53 and 0.355 per 100 person-years for Black/African American and White MSM, respectively (left).
- Our measure of PrEP efficiency (person-years of PrEP use per HIV infection averted) showed very little variation across coverage levels, particularly among Black/African American MSM (right).
- Increasing 15% PrEP coverage to 75% under ‘90-90-90’ goals only increased person-years of PrEP use per HIV infection averted by 8.1% and 10.5% to 26.7 and 73.3 among Black/African American MSM and White MSM, respectively (right).

CONCLUSIONS

- Even in the context of high treatment engagement, substantial expansion of PrEP use will be an efficient and necessary component in lowering HIV incidence rates, particularly for Black/African American MSM in the US.
- There is likely no strict upper bound on PrEP efficiency for Black/African American MSM, even under high treatment levels. These findings are relevant to other US subpopulations in which background prevalence may be high enough to sustain a high incidence rate.

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