Combination HIV Prevention Strategies to Meet the 2030 "Ending the HIV Epidemic" Goals

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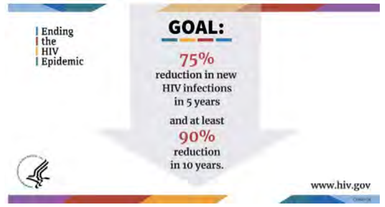
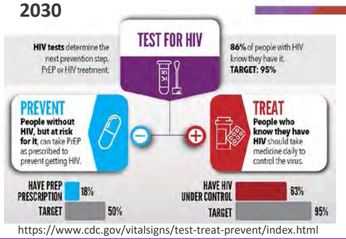
Background

The US Government's plan to reduce HIV transmission in the US

Ending the HIV Epidemic: A Plan for America **seeks to reduce new HIV infections by 90% by 2030**





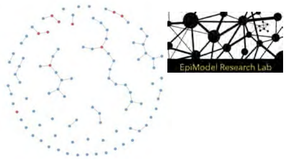
https://www.cdc.gov/vitalsigns/test-treat-prevent/index.html

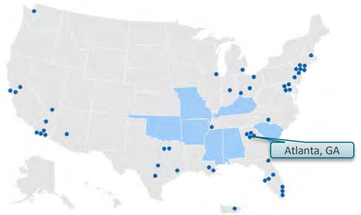
CDC recently announced ambitious targets for key measures related to HIV detection, prevention and control

Methods

In this analysis we modeled a sexual network of 10,000 men who have sex with men (MSM) with partnership formation and dissolution via temporal exponential random graph models (TERGMs) using EPIMODEL

- Three different sexual network types: main, casual, one-off – integrated into 1 model
- Men form partnerships according to model terms based on numbers of each partner type, differential frequency of condomless anal sex, and mixing on race and age, and preferences as Top-only, Bottom-only, or Versatile





The EHE plan proposes that for the first 5 years the focus will be on a rapid infusion of resources, expertise and technology into the parts of the country most impacted by HIV

For this analysis we chose to focus on one of these areas in the Southeastern US:

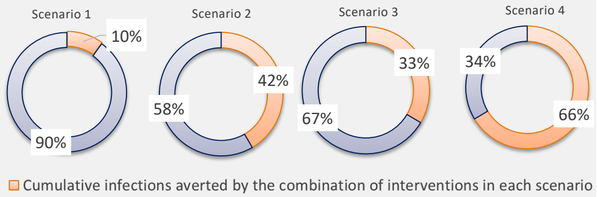
- Men who have sex with men (MSM) in the Atlanta metropolitan area
- Aged 15 to 65, stratified by Black, Hispanic, White/Other race/ethnicity because baseline rates of screening and care retention differed by race (Table)

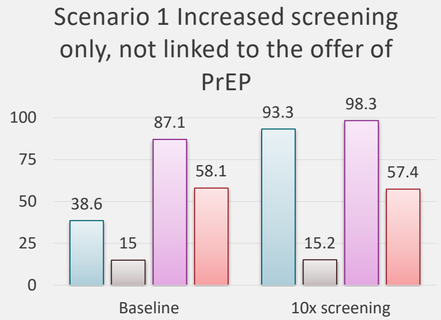
The model was calibrated to recent estimates of HIV care continuum steps and PrEP utilization in this population

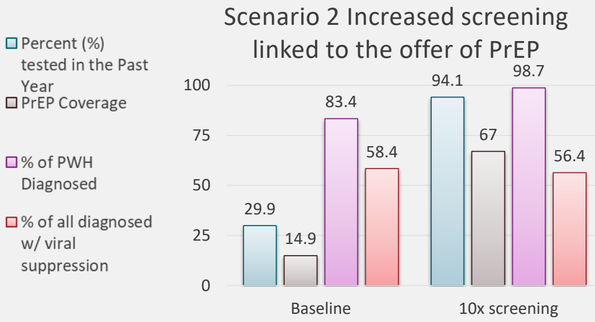
- e.g. Proportion of diagnosed virally suppressed
  - GA DPH surveillance B/H/W targets: 55%, 60%, 72%

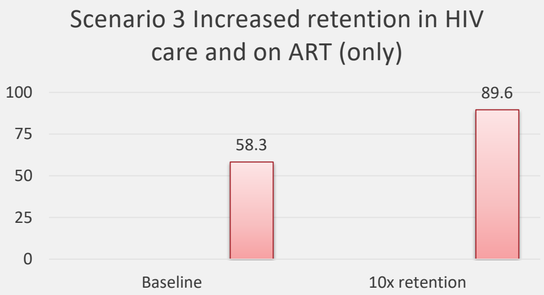
Results

In our model of MSM in Atlanta, a combination of increased HIV screening linked with the offer of PrEP, and improved retention in care was able to reduce cumulative incidence by 66% over 10 years









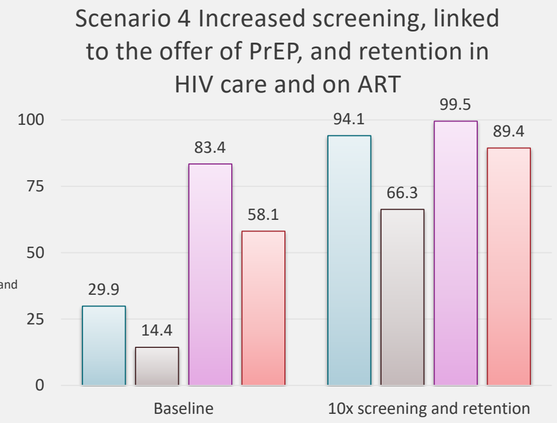


Table: Baseline rates of HIV screening and care retention, by Race, calibrated to the HIV epidemic in Atlanta, GA, 2019, and modeled 10-fold increases

	HIV Screening		HIV Care Retention	
	Mean time between HIV tests		Mean time before going off ART	
	Base	10xBase	Base	10xBase
Race				
Black MSM	5 years	26 weeks	3.1 years	31 years
Hispanic MSM	5 years	26 weeks	3.5 years	35 years
White/Other MSM	2.8 years	15 weeks	6.1 years	61 years

Discussion

Comparing the four scenarios presented:

Scenario 1: Increased the proportion diagnosed, and the overall proportion of those infected who are virally suppressed, but not PrEP coverage or viral suppression among those with diagnosed infection, and reduced incidence by ~10% over 10 years

Scenario 2: Increased both proportion diagnosed and PrEP coverage to meet EHE targets, and reduced incidence by 42% over 10 years

Scenario 3: Just improving HIV care retention increased the proportion with diagnosed infection who are virally suppressed to nearly 90% and reduced incidence by 33% over 10 years

Scenario 4: Increased HIV screening linked to the offer of PrEP and excellent care retention met the EHE targets for HIV diagnoses, and PrEP coverage. Although viral suppression increased dramatically, it did not meet the EHE target of 95%. In this scenario, cumulative incidence was reduced by 66% over 10 years

- » **Incidence rates reduced by 75% in ~7 years, and by 90% by 2050**

Limitations

The model was parameterized to the state of the HIV epidemic in Atlanta, GA, and only includes Men who have Sex with Men

- **The strategy of first targeting areas with the highest numbers of new HIV diagnoses means that EHE will also be implemented in places with many challenges and existing missed opportunities for detection, prevention, and control of HIV.**
- **Other jurisdictions may currently have better baseline rates of HIV diagnoses, PrEP coverage, and viral suppression, thus our conclusions are not generalizable to achieving EHE targets nationally.**
- **The rates of uptake of HIV detection, prevention, and care, and the mix of interventions required to achieve the EHE goals in other risk groups is likely also going to be different.**

For model identifiability we considered only improvements in retention in HIV care, not in care reengagement

- **Other strategies central to EHE efforts including identification of clusters of ongoing transmission and HIV case management to improve care reengagement will also need to be considered to reach the EHE viral suppression targets.**

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