

# The PrEP Care Continuum and HIV Racial Disparities among Men Who Have Sex with Men

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Abstract #857

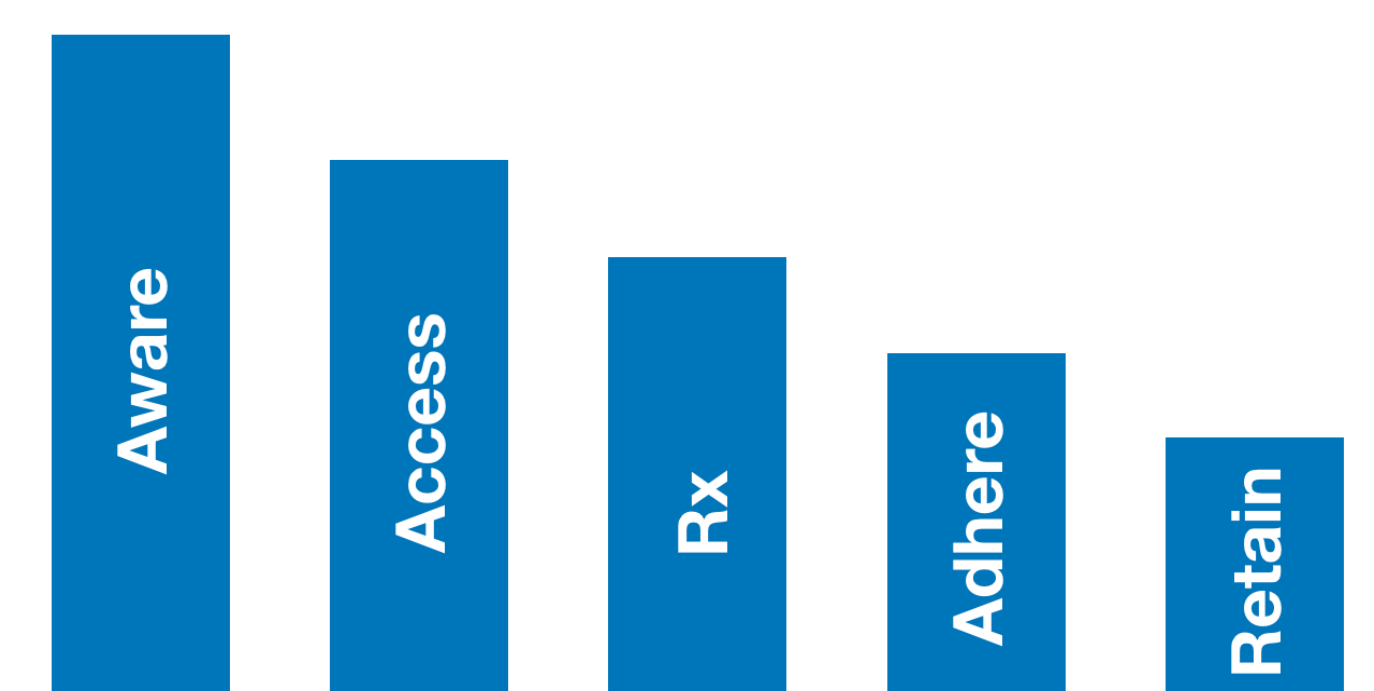
## Background

### HIV Disparities among MSM

- HIV prevalence 3–6 times higher among black MSM (BMSM) compared to white MSM (WMSM) in the United States.
  - Constellation of factors, including worse linkage and retention to HIV prevention and care services, contribute to disparities.
- NHAS goal of reducing disparities by 15% (relative scale) by 2020.

### The PrEP Care Continuum

- PrEP effective at HIV prevention, but success at reducing disparities depends on uptake, adherence, and retention rates.
  - Several studies demonstrating significant gaps in PrEP care by race/ethnicity
- PrEP continua have been proposed as an organizing framework for measuring and addressing PrEP-related gaps in care.
  - Final goals are fully adherent PrEP use and retention in PrEP care for any MSM with bio-behavioral indications.



### Study Aims

- To estimate HIV incidence reduction among BMSM given current estimates of BMSM metrics for each step of the PrEP continuum.
- To predict the additional impact of intervening on the continuum steps, individually and jointly, on HIV incidence for both BMSM and WMSM.

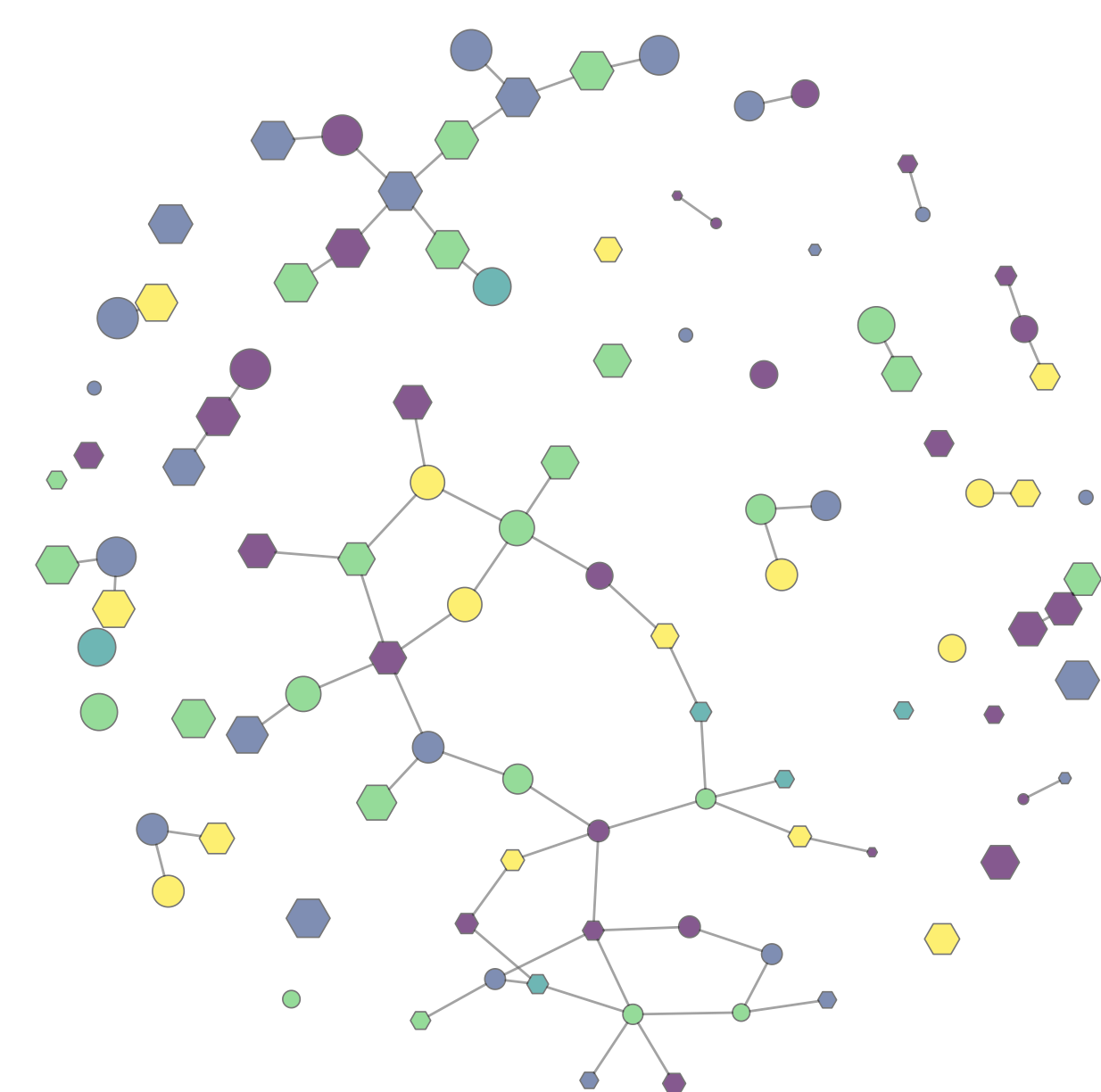
## Methods

### Network-Based Mathematical Model

- Extended our robust HIV transmission model for MSM in the United States.
- Network model for dynamics of main, casual, and one-off sexual partnerships using statistical framework of exponential random graph models (ERGMs).
- Probability of observing network,  $y$ , is modeled as an exponential function of a set of predictors,  $g$ , for edge formation that are estimated from egocentric network data.

$$P(\mathbf{Y} = \mathbf{y}) = \frac{\exp\{\theta'g(\mathbf{y})\}}{\mathcal{K}(\theta)}$$

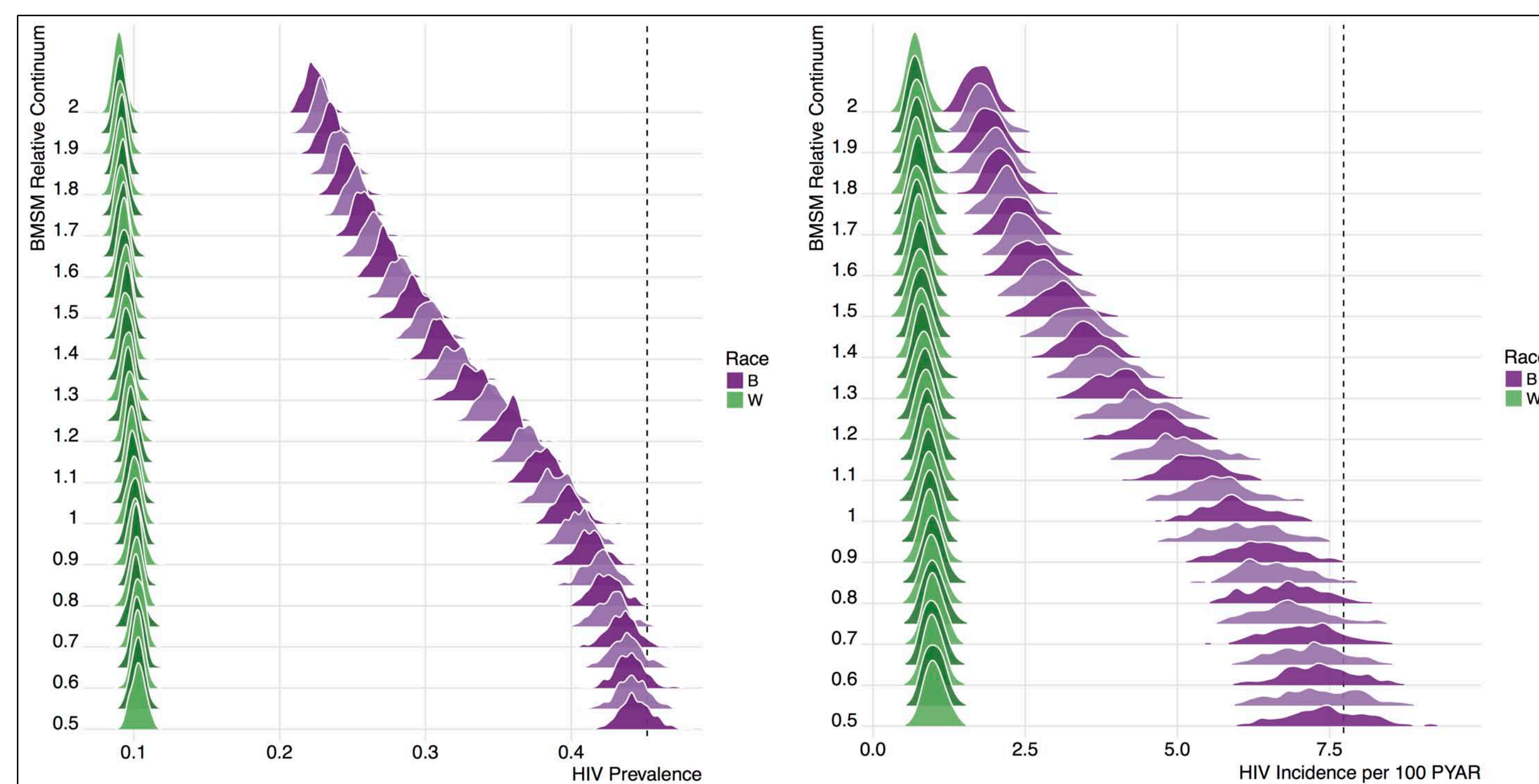
- Dynamic networks are simulated from the ERGM fit for each partnership type



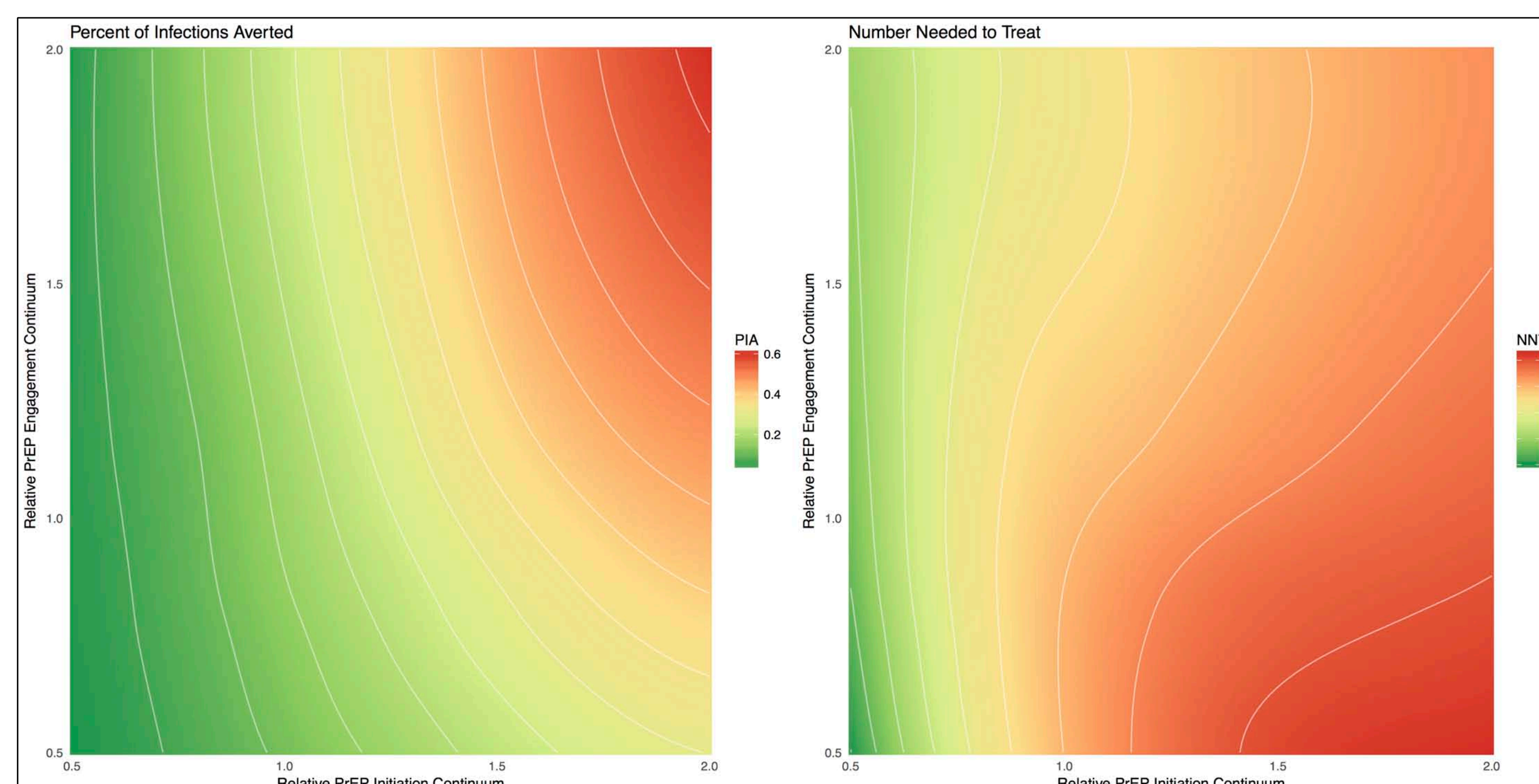
- Intrahost and interhost HIV transmission and progression simulated on top of evolving networks using the **EpiModel** modeling software ([www.epimodel.org](http://www.epimodel.org)).
- PrEP indications simulated based on CDC guidelines for behavioral risk factors or STI diagnoses in the past 6 months.
- Reference parameters for continuum steps based on combination of BMSM Cohort studies (Kelley et al.) and the PrEP Demo Project (Liu et al.).

## Results

- Implementing PrEP given current estimated levels of awareness, access, prescription, adherence, and retention would reduce HIV incidence and prevalence for BMSM.
- Targeting PrEP awareness for BMSM as a single continuum step would have the largest impact on further reduction of HIV incidence for BMSM.
- Jointly targeted all continuum steps would be required to make a substantial impact on disparities. Figure shows HIV incidence/prevalence across relative scaling of BMSM PrEP parameters (1.0 = as observed). Dashed line = Reference (No PrEP) scenario.



- Figure shows relative improvements in effectiveness (infections averted) and efficiency (number needed to treat on PrEP to prevent one new infection) by increasing PrEP initiation (awareness, access, Rx) versus engagement (adherence, retention) factors.



BMSM Incidence by BMSM PrEP Continuum Parameters	
Scenario	HIV Incidence 95% CrI
Reference (No PrEP)	7.73 (6.51, 9.07)
<b>Awareness</b>	
50% (Obs B & W)	5.88 (4.66, 7.05)
90%	4.68 (3.88, 5.57)
<b>Access</b>	
76% (Obs B)	5.88 (4.66, 7.05)
95% (Obs W)	5.54 (4.56, 6.48)
<b>Prescription</b>	
63% (Obs B)	5.88 (4.66, 7.05)
73% (Obs W)	5.83 (4.84, 6.90)
<b>Full Adherence</b>	
59.8% (Obs B)	5.88 (4.66, 7.05)
93% (Obs W)	5.59 (4.66, 6.78)
<b>Retention</b>	
1.1 years (Obs B)	5.88 (4.66, 7.05)
3.16 years (Obs W)	5.23 (4.11, 6.22)

## Discussion

### PrEP Can Reduce HIV Disparities

- Challenging to simultaneously increase population-level impact of interventions while also addressing health disparities.
- Despite current gaps in PrEP initiation and engagement of BMSM, PrEP could be a promising approach to reduce overall incidence and while also lowering disparities by race.
- Interventions to improve metrics at each step of the PrEP care continuum for BMSM could further reduce disparities.

### Preprint

- Manuscript available at bioRxiv: <https://doi.org/10.1101/249540>.