# The Influence of Racialized Economic Segregation on Unmet HIV Prevention Needs in the Real World

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# Conclusions

- This is the first study to use the Index of Concentration at the Extremes (ICE) to investigate the relationship between racialized economic segregation and the uptake of HIV-1 pre-exposure prophylaxis (PrEP) in the USA
- These results demonstrated that the greatest unmet PrEP needs occurred in the most underprivileged communities, and that disparities in unmet needs between the most and least underprivileged groups widened over time
- Individuals in socioeconomically underprivileged communities were less likely to have PrEP claims dispensed versus those in privileged communities
- There is an urgent need for targeted efforts to address the consequences of segregation, reduce disproportionate unmet needs in marginalized communities, and ensure equitable access to PrEP across diverse populations
- Future strategies should prioritize offering a variety of PrEP options, including innovative, longer-acting products, to accommodate the needs of all individuals who need or want PrEP

# Plain Language Summary

- Discrimination based on race, income, or education can affect people's ability to get HIV prevention medication
- This study looked at the effect of social segregation due to race or income on getting HIV prevention medication in the USA
- The results showed that people living in underprivileged areas had the highest unmet needs for HIV prevention compared with people living in privileged areas
- People living in underprivileged areas were also less likely to have their prescription for HIV prevention medication filled by a pharmacy compared with those living in privileged areas
- New efforts should aim to make sure that there is equal access to HIV prevention medication for all people who need or want it, especially in communities that are most affected by HIV

References: 1. AIDSVu. Deeper Look: PrEP. Available at: https://aidsvu.org/resources/deeper-look-prep/ (Accessed February 2025). 2. Mayer KH, Agwu A, Malebranche D. Adv Ther. 2020;37(5):1778–811. 3. Sullivan PS, et al. Lancet Reg Health Am. 2024;33:100738. 4. Larrabee Sonderlund A, et al. PLoS One. 2022;17(1):e0262962. 5. Krieger N, et al. Health Place. 2015;34:215–28. 6. Massey D, Booth A, Crouter AC. The Prodigal Paradigm Returns: Ecology Comes Back to Sociology. Does It Take A Village? Community Effects on Children, Adolescents, and Families. Mahwah, NJ: Lawrence Erlbaum Associates, 2001. 41–48. 7. Siegler AJ, et al. Ann Epidemiol. 2018;28(12):841–9.

### Background

- Inequities exist in access to and uptake of PrEP in historically underrepresented populations disproportionately affected by HIV-1 within the USA<sup>1-3</sup>
- Racialized economic segregation significantly affects health outcomes by exacerbating disparities in disease prevalence and access to healthcare among marginalized communities<sup>4</sup>
- The ICE, which measures the extent of socioeconomic segregation by capturing the distribution of a
  population across relative extremes of privilege and underprivilege,<sup>4–6</sup> has not yet been assessed in
  relation to its impact on HIV-1 PrEP access in the USA

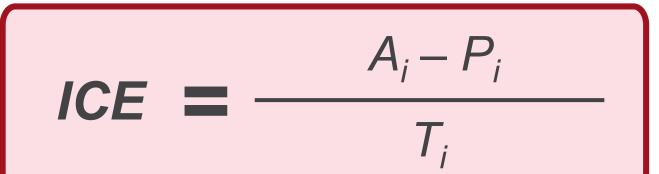
## Objective

 To investigate the association between racialized economic segregation and HIV-1 PrEP uptake in the USA

### Methods

#### Index of Concentration at the Extremes (ICE)

 The ICE quantifies segregation by measuring the concentration of individuals at opposite ends of the socioeconomic spectrum<sup>4–6</sup>:



*i* is a geographic area or unit

 $A_i$  is the number of residents categorized to the most privileged extreme  $P_i$  is the number of residents categorized to the most underprivileged extreme  $T_i$  is the total population in the area

#### Table 1. Attributes of ICE Scores

Attribute	1. ICE Race	2. ICE Income	3. ICE Education	4. ICE Race & Income
Privilege extreme (A <sub>i</sub> )	Non-Hispanic White	Annual household income ≥\$100K	Education ≥ college graduate	Non-Hispanic White with income ≥\$100K
Underprivilege extreme (P <sub>i</sub> )	Non-Hispanic Black	Annual household income <\$25K	Education < high school	Non-Hispanic Black with income <\$25K

ICE, Index of Concentration at the Extremes.

- Four ICE scores were calculated for >32,000 USA Zip Code Tabulation Areas (ZCTAs) using American Community Survey data (2022; 5-year data) (Table 1)
- ICE values range from -1 (entire population is in the most underprivileged group) to
   1 (entire population is in the most privileged group)
- ZCTAs were categorized into quintiles (Q) based on sample distributions of ICE values
- Q1 represents the most underprivileged communities and Q5 represents the most privileged communities

#### Analytic Cohort

The number of PrEP claims (2019–2023; N=4,521,267) and individuals who newly initiated PrEP (2019–2023; N=529,016) were obtained from the IQVIA Longitudinal Access and Adjudication Dataset and linked with ICE indices

#### Data Analyses

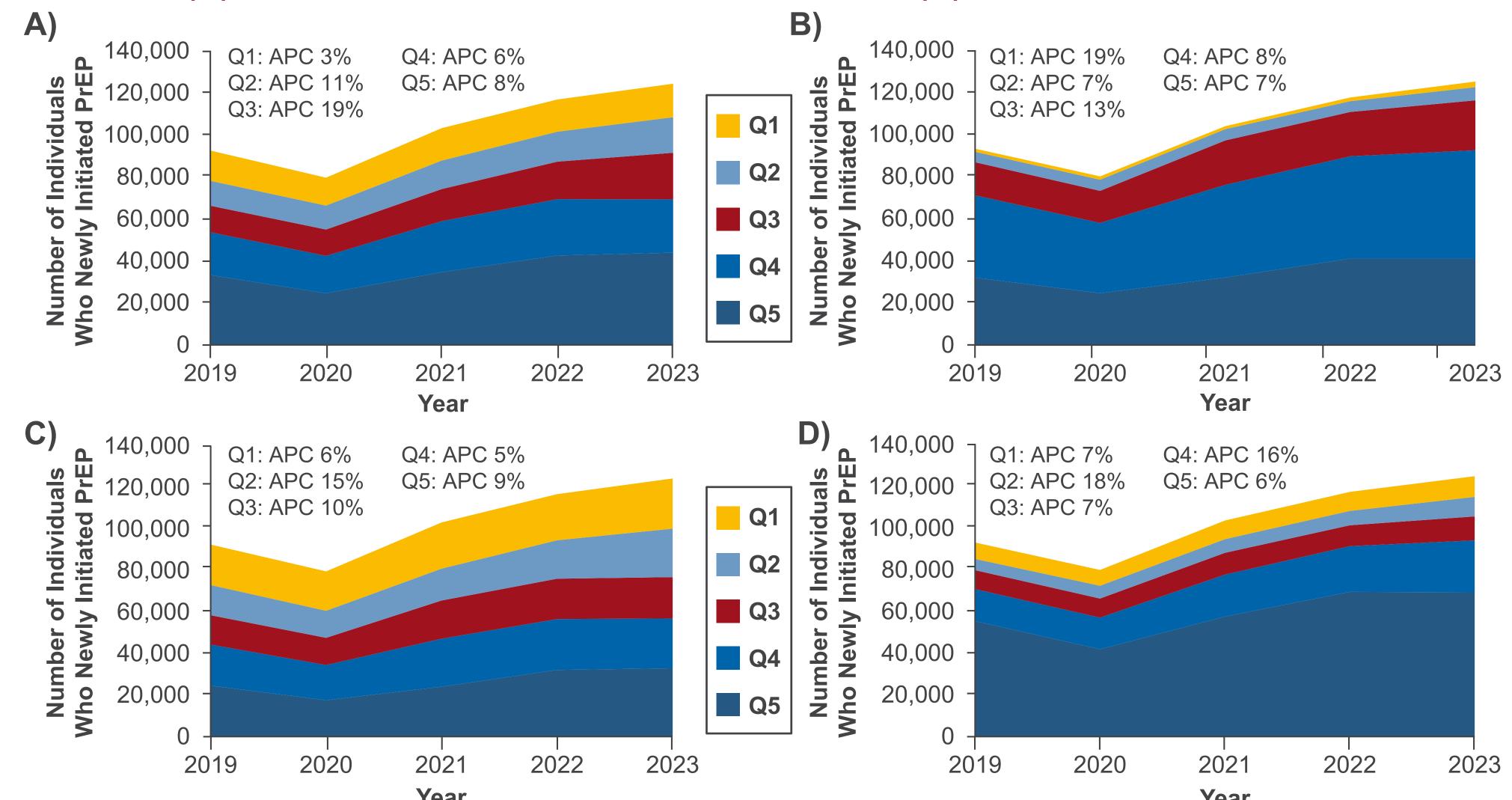
- Trends in the number of individuals who newly initiated PrEP in each ICE quintile were assessed by year
- Unmet needs were evaluated using the PrEP-to-Need Ratio (PNR) for each ICE quintile over time<sup>7</sup>; lower PNR indicates higher unmet needs
- Logistic regression was used to compare the odd ratios and 95% confidence intervals of PrEP claims being dispensed in each ICE quintile with reference to the most privileged quintile (Q5)

### Results

#### Individuals Who Newly Initiated PrEP

 From 2019 to 2023, PrEP uptake increased steadily, but showed generally slower growth in underprivileged communities (predominantly Black and/or low-income, low-education neighborhoods) compared with privileged communities (Figures 1A–D)

# Figure 1. Individuals Who Newly Initiated PrEP in (A) ICE Income Quintile, (B) ICE Race Quintile\*, (C) ICE Combined Race/Income Quintile, and (D) ICE Education Quintile

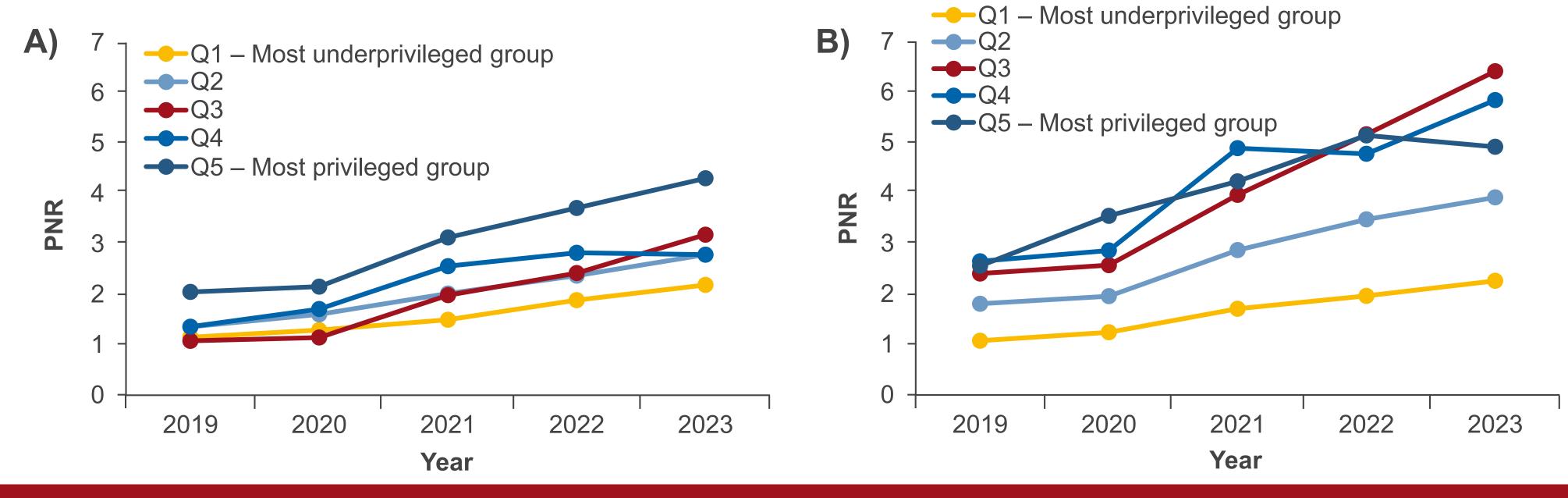


Percentage net change (APC) between 2019 and 2023 is presented, calculated as the number of individuals who newly initiated PrEP in: ([2023 – 2019]/2019) ÷ 4. Q1 indicates the most underprivileged community (lowest income/education or predominantly Black neighborhoods); Q5 indicates the most privileged community (highest income/education or predominantly White neighborhoods). \*Absolute values for ICE race were used (all other ICE quintiles were based on national distributions) to identify the areas with most racial segregation. APC, annual percent change; ICE, Index of Concentration at the Extremes; PrEP, pre-exposure prophylaxis; Q, quintile.

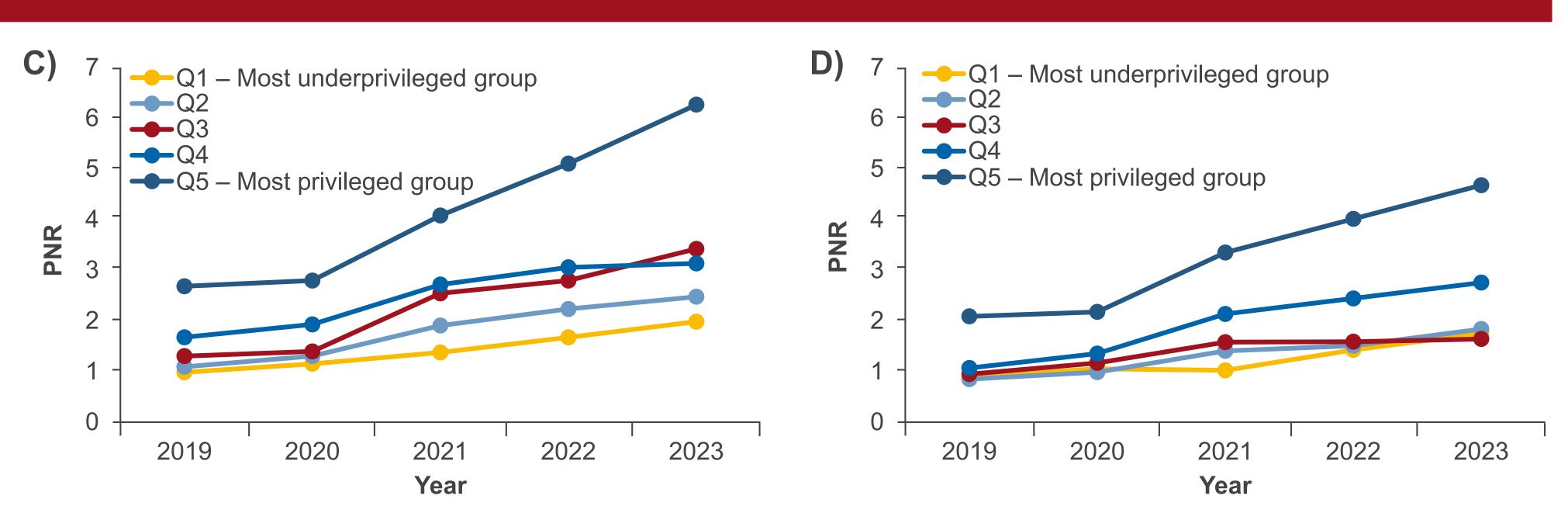
#### PNR Trends by Racialized Economic Segregation in the USA

- Substantial unmet needs for PrEP were evident in the most underprivileged communities and were generally lowest in the most privileged, with the difference in PNR between Q1 and Q5 increasing over time for all four ICE scores (Figures 2A–D)
- In 2019, predominantly Black/low-income communities had 2.7 times greater unmet needs versus predominantly White/high-income communities; this ratio increased to 3.2 in 2023

# Figure 2. PNR Trends by Racialized Economic Segregation for (A) ICE Income Quintile, (B) ICE Race Quintile, (C) ICE Combined Race/Income Quintile, and (D) ICE Education Quintile



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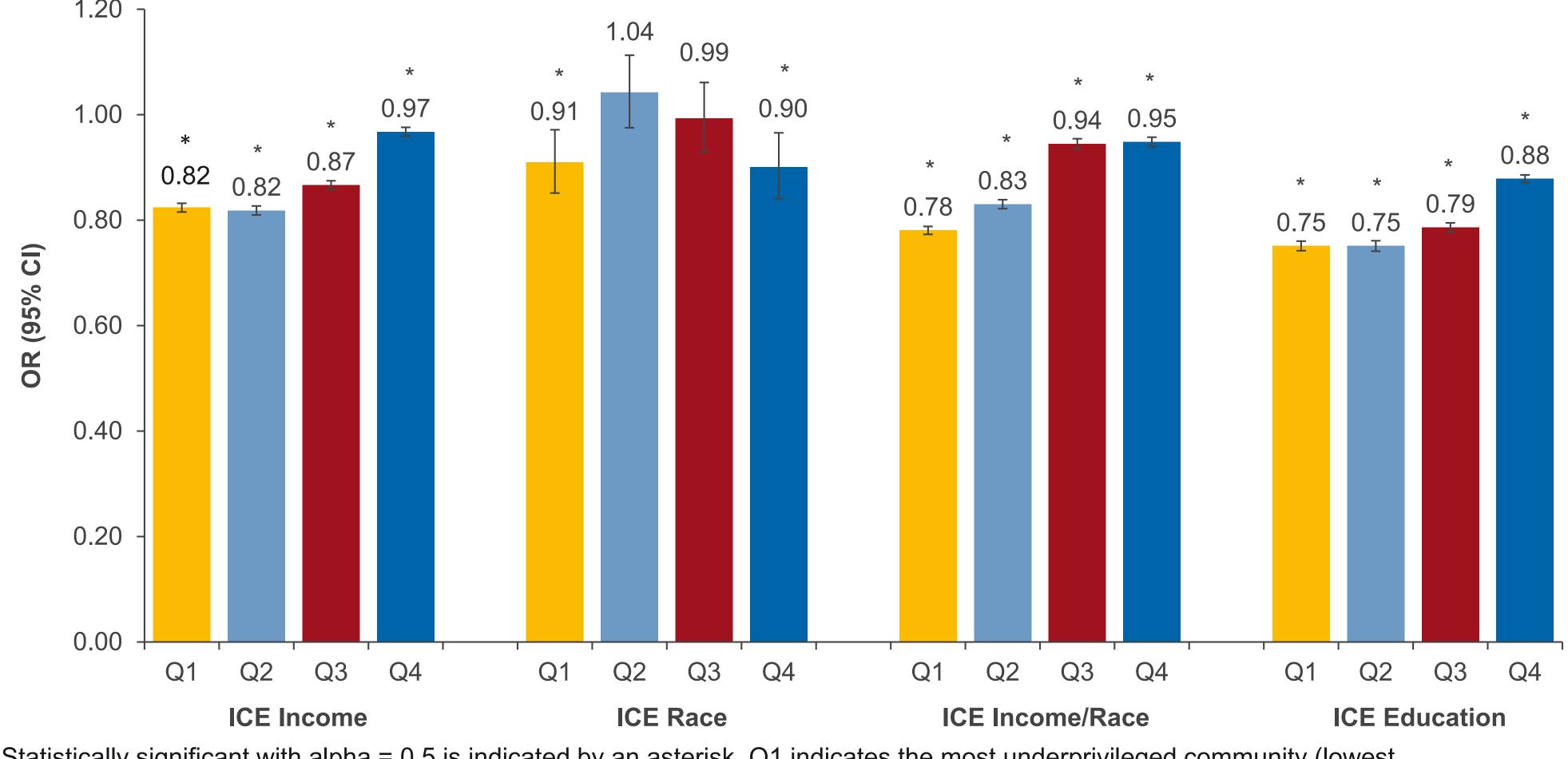


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Lower PNR indicates higher unmet needs. Q1 indicates the most underprivileged community (lowest income/education or predominantly Black neighborhoods); Q5 indicates the most privileged community (highest income/education or predominantly White neighborhoods). ICE, Index of Concentration at the Extremes; PrEP, pre-exposure prophylaxis; PNR, PrEP-to-Need Ratio; Q, quintile.

#### Likelihood of PrEP Claims Being Dispensed by ICE Groups

 Individuals in socioeconomically underprivileged communities were less likely to have PrEP claims dispensed versus those in privileged communities (Figure 3)



#### Figure 3. Odds of PrEP Claims Dispensed by ICE Quintile, Compared With ICE Q5

Statistically significant with alpha = 0.5 is indicated by an asterisk. Q1 indicates the most underprivileged community (lowest income/education or predominantly Black neighborhoods); Q5 indicates the most privileged community (highest income/education or predominantly White neighborhoods).

CI, confidence interval; ICE, Index of Concentration at the Extremes; OR, odds ratio; PrEP, pre-exposure prophylaxis; Q, quintile.

### Limitations

- The ICE is an area-level measure and may not accurately reflect individual-level socioeconomic experiences or PrEP uptake
- The ICE focuses on socioeconomic extremes but may miss other critical determinants of PrEP uptake, such as healthcare access, stigma, or cultural barriers; therefore, causal inferences cannot be drawn from this descriptive study
- The ICE can mask within-area heterogeneity, potentially overlooking pockets of unmet need in regions classified as privileged

**Conflicts of Interest: LT, JY, CN, JG, KB,** and **WZ** are employees and shareholders of Gilead Sciences, Inc. This study was funded by Gilead Sciences, Inc.