Evolving trends in racial and ethnic disparities in syphilis prevalence among people who are pregnant in the United States, 2016-2023

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Background

- The number of syphilis diagnoses in the United States has risen progressively
- The incidence of congenital syphilis, vertical transmission of syphilis during pregnancy, has increased in parallel
- Notable racial and ethnic disparities
  - Different syphilis screening coverage
  - Different syphilis diagnoses and screening positives

Aims

- Estimate syphilis prevalence among pregnant women by race/ethnicity from 2016 to 2023
- Examine racial and ethnic disparity in syphilis prevalence

Statistical Modeling

A Bayesian mathematical model estimates syphilis prevalence by race and ethnicity from 2016 to 2023

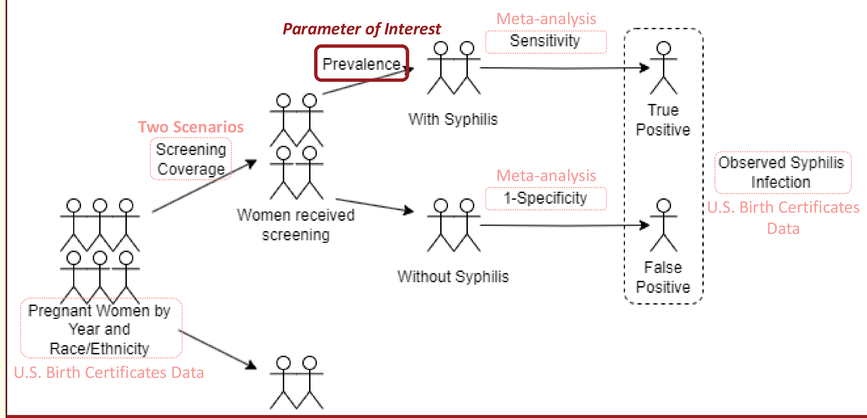
$$\theta_{yr} = \left[P_{yr} \times Sens + \left(1 - P_{yr}\right) \times \left(1 - Spec\right)\right] \times T_r$$

- θ_{yr}: Probability of observing a positive syphilis infection among people who are pregnant by year and race/ethnicity
- P_{yr}: Syphilis prevalence among people who are pregnant by year and race/ethnicity
  - *Parameter of Interest, non-informative prior*
- Sens and Spec: Sensitivity and Specificity of syphilis testing, assuming constant
  - *Beta priors estimated from Meta-analysis*
- T_r: Screening coverage by race/ethnicity, constant over years
  - *Beta priors under two scenarios*

$$Y_{yr} \sim \text{Binomial}\left(n_{yr}, \theta_{yr}\right)$$

- Y_{yr}: Number of detected syphilis cases in U.S. birth certificates data by year and race/ethnicity
  - *Calibration Target*
- n_{yr}: Number of women with live births by year and race/ethnicity

Model Scheme



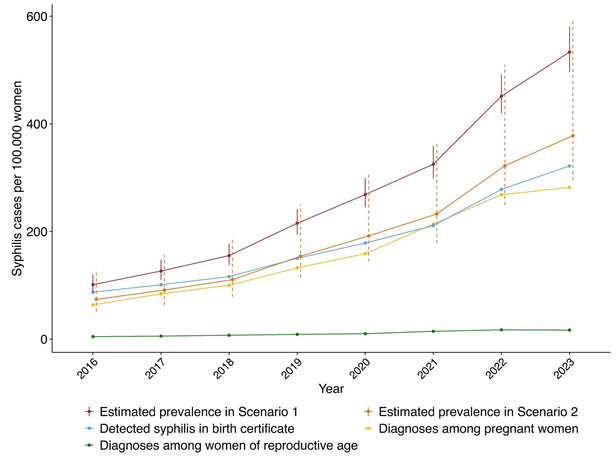
Calibration under Two Scenarios

Scenario 1: Screening coverage estimated from *Medicaid Claims* data

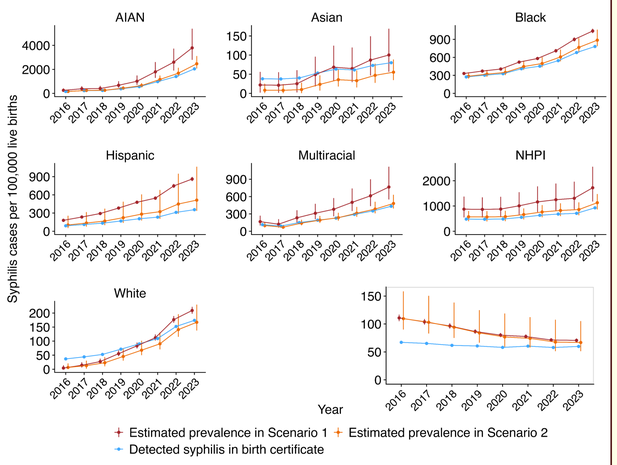
Scenario 2: Screening coverage ranges from *Medicaid claims estimates (lower)* to *Prop. of ≥ 1 prenatal visits (higher)*

Estimated Syphilis Prevalence in the US, 2016-2023

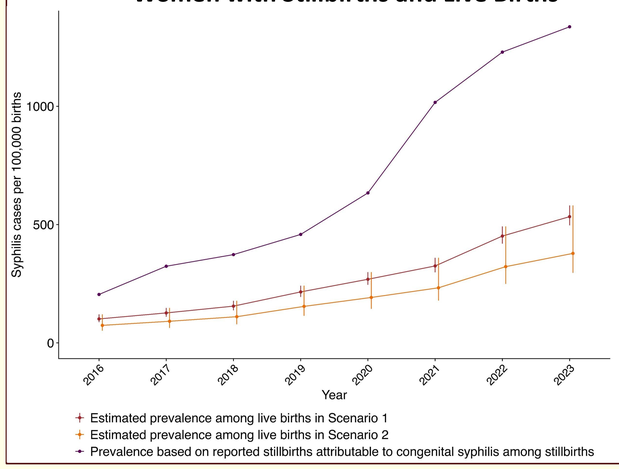
Comparison of Prevalence and Diagnoses



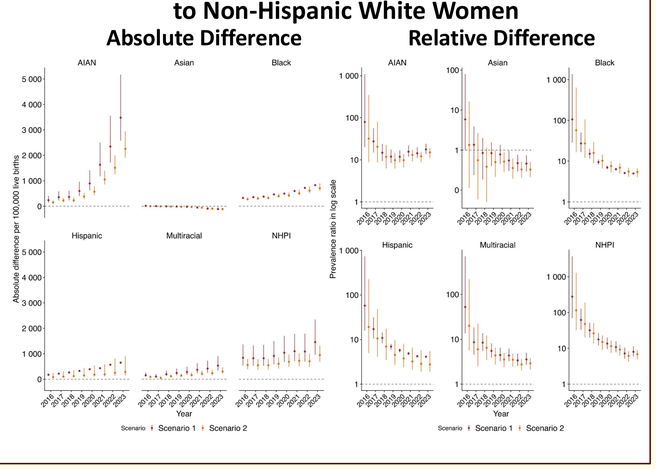
Prevalence by Race/Ethnicity and Index of Disparity



Comparison of Syphilis Prevalence Among Women with Stillbirths and Live Births



Racial and Ethnic Disparities Compared to Non-Hispanic White Women



Summary of Results

Increasing in syphilis prevalence for all races and ethnicities over time

- In scenario 1, syphilis prevalence among people who are pregnant with live births increased from 101.1 (95% uncertainty interval [UI]: 87.5–120.5) in 2016 to 533.4 (95% UI: 496.6–581.0) in 2023 per 100,000 live births
- In scenario 2, syphilis prevalence increased from 73.9 (95% UI: 51.2–130.0) in 2016 to 378.1 (95% UI: 295.5–592.0) in 2023 per 100,000 live births

Decreasing in racial and ethnic disparities over time

- In scenario 1, the index of disparity decreased from 110.8 in 2016 to 70.7 in 2023
- In scenario 2, the index of disparity decreased from 109.6 in 2016 to 66.8 in 2023

Discrepancy widening in syphilis prevalence between women with live births and stillbirths

Conclusions

- The syphilis burden is increasing in all pregnant women in the US, with the presence of racial and ethnic disparities
- Improved estimates of screening coverage are needed to understand the gaps in congenital syphilis prevention

More Details

GitHub

medRxiv

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