

Maternal Vulnerability Index (MVI) Predicts Severe Maternal Morbidity (SMM) Independent of Clinical Risks

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OBJECTIVE

To evaluate whether the **Maternal Vulnerability Index (MVI)**—a community-level metric incorporating 40 community determinants of health—**predicts SMM independently** of individual clinical risk factors.

BACKGROUND

- Maternal morbidity and mortality rates remain high, with significant disparities linked to socioeconomic, demographic, and clinical factors.
- While social determinants of health (SDOH) are known to play a role in shaping health outcomes, the extent to which this relationship is mediated by clinical risk factors remains unclear.

METHODS

The **U.S. Maternal Vulnerability Index** provides zip-code level data to identify where and why mothers in the United States are vulnerable to poor health outcomes. The MVI is composed of 43 indicators grouped into 6 thematic domains: Reproductive Healthcare, Physical Health, Mental Health and Substance Abuse, General Healthcare, Socioeconomic Determinants, and Physical Environment.

MVI data was linked using ZIP5 data to 191,673 pregnancies at 21 sites participating in the **Obstetric Care Outcomes Assessment Program (OB COAP)** in Washington State between 2016 and 2022. Pregnancy outcomes were analyzed for severe maternal morbidity.

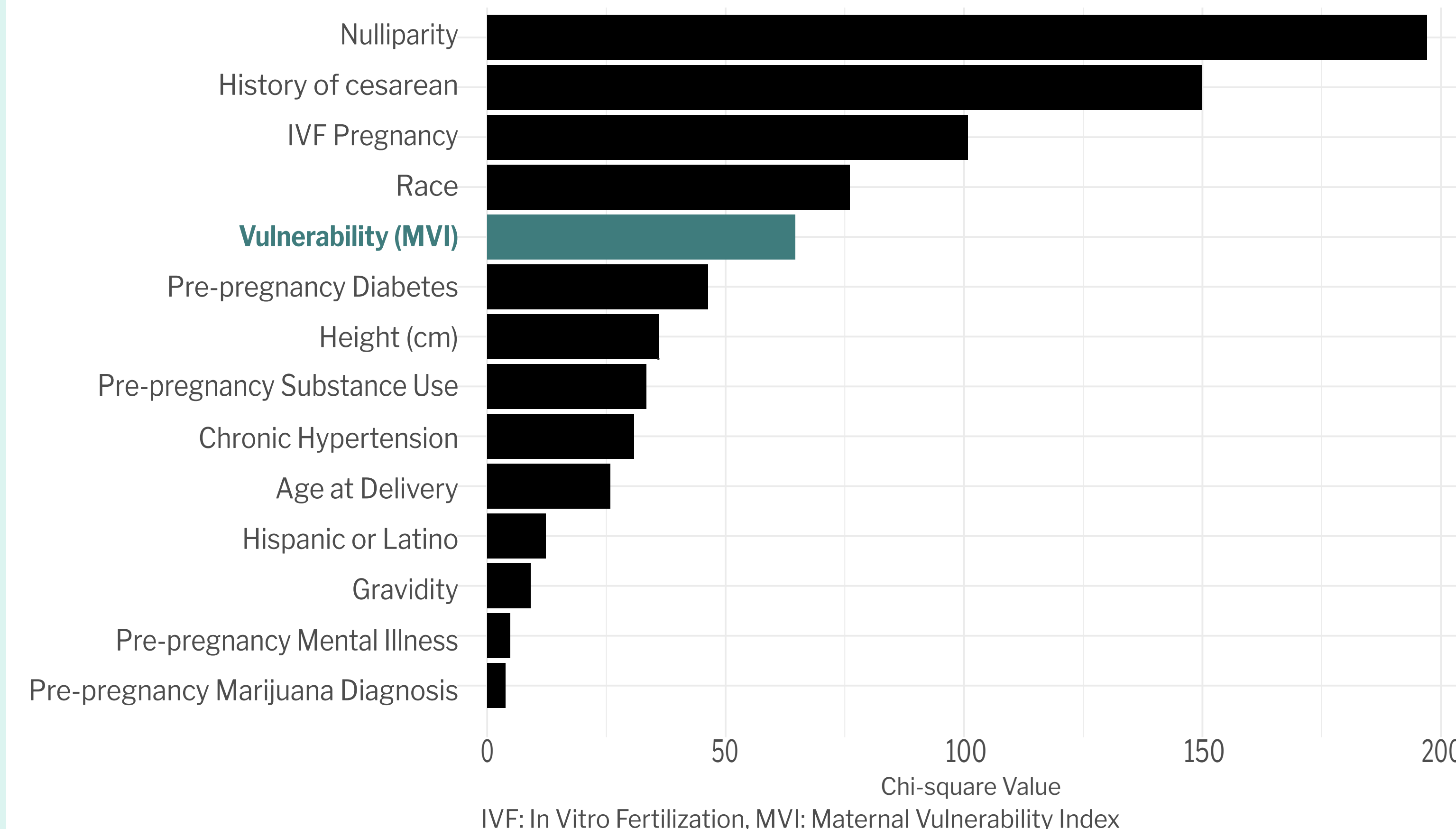
RESULTS

Significance of MVI

Those in the highest MVI quintile had **1.55 times greater odds of experiencing SMM** compared to the lowest quintile.

Even after adjusting for all clinical risk factors known in the postnatal period—which includes all preceding risk factors—the odds of SMM were still 1.66 times higher for those in the highest MVI quintile compared to those in the lowest quintile.

Significant Predictors of SMM



Odds Ratio Table

Covariates	OR (95% CI) for Top Quintile of the MVI (ref: Bottom Quintile)
MVI Only	1.55 (1.36-1.77)
Pre-pregnancy variables	1.79 (1.55-2.07)
During pregnancy variables	1.70 (1.46-1.97)
At delivery variables	1.67 (1.42-1.98)
Postpartum variables	1.66 (1.41-1.97)

CONCLUSION

Our findings demonstrate that the **MVI is a significant predictor of SMM even after adjusting for individual clinical factors**. These findings suggest that clinical risk factors are insufficient alone to fully address SMM disparities.

MVI contributes to prediction of SMM risk at a level comparable to race and greater than age, while offering granular insights into the community-level factors driving outcomes. The MVI offers a practical and effective means to enhance risk assessment and inform targeted interventions.