

Comparative performance of obstetric comorbidity indices within categories of race and ethnicity: an external validation study

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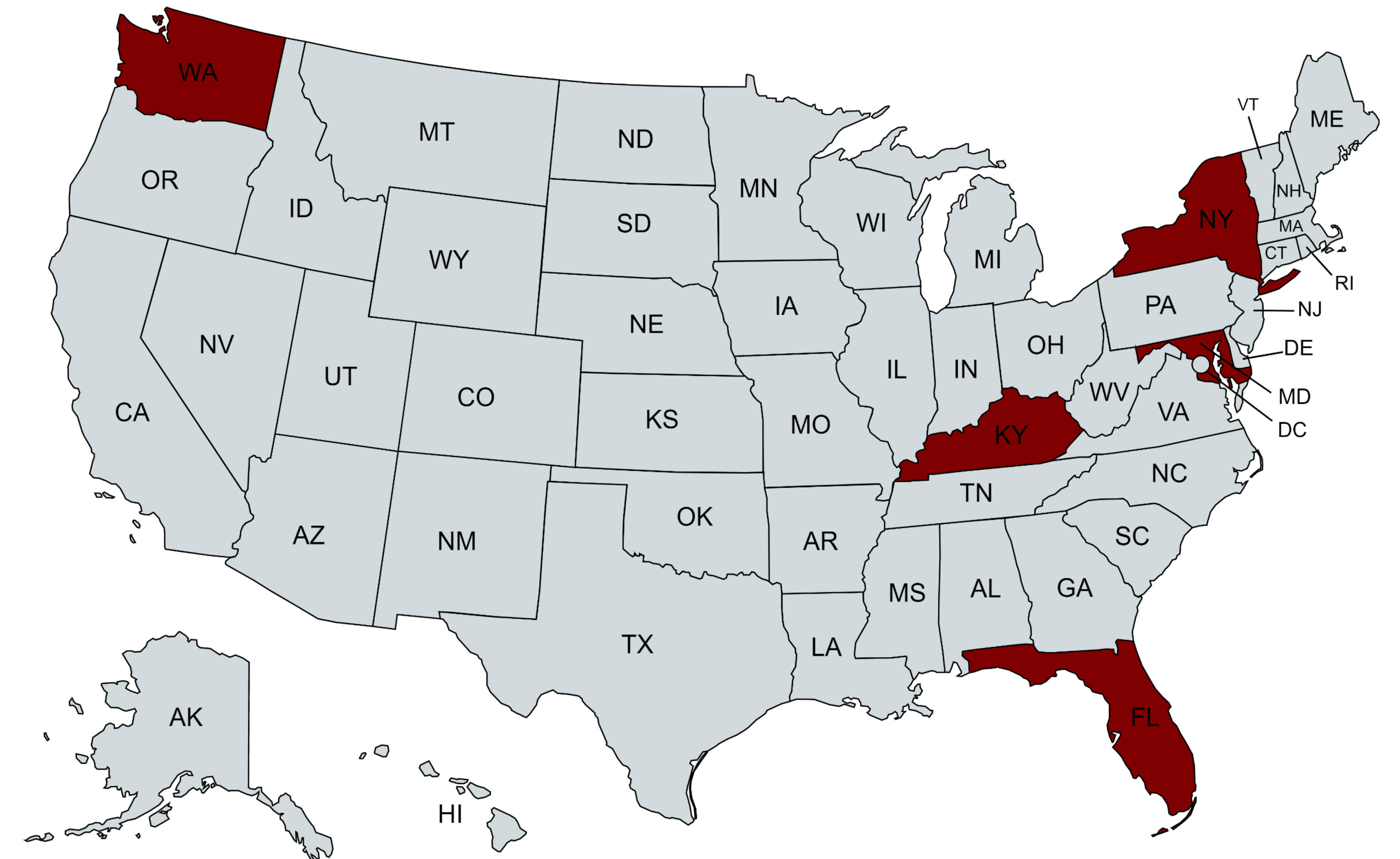
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- Obstetric comorbidity scores have been created to predict risk of maternal mortality and severe maternal morbidity^{1,2}.
- Racial and ethnic disparities in obstetric care and outcomes exist³, yet these scores do not explicitly account for sociodemographic diversity.
- Comorbidity adjustment indices in obstetrics have not been extensively validated.
- We conducted an external validation of obstetric comorbidity indices and evaluation of performance within categories of race and ethnicity.



Delivery hospitalizations (2015-2018) for validation

- N=1,604,203 delivery hospitalizations
- 1.6% experienced severe maternal morbidity(SMM)
- 0.4% SMM excluding blood transfusions only (nontransfusion SMM)
- 0.5% suffered maternal end-organ injury/mortality

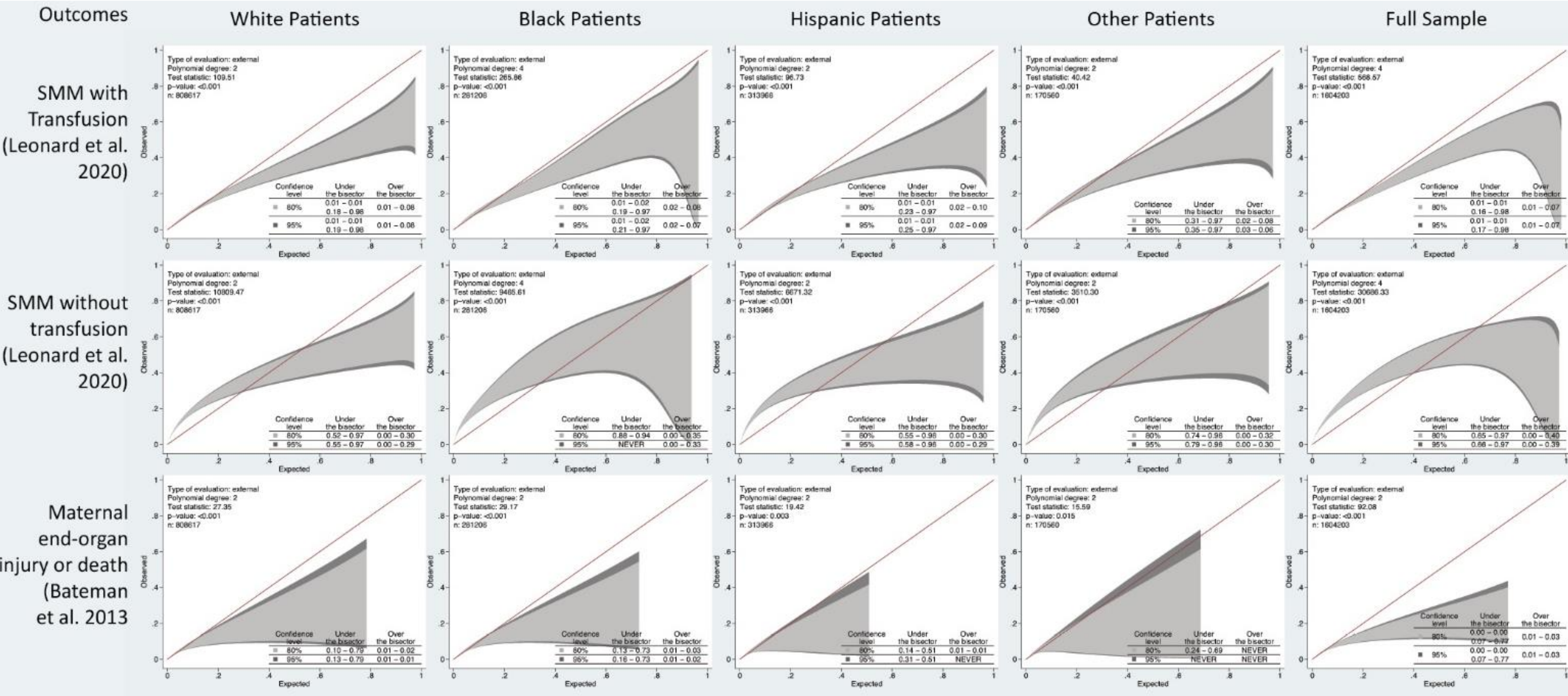
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Table 1. Model performance

Outcome	AUROC (95% CI)	AUPRC (95% CI)	Brier score
<i>SMM with transfusion (Leonard et al. (1))</i>			
White	0.70 (0.70-0.71)	0.06 (0.06-0.07)	0.0117
Black	0.74 (0.73-0.74)	0.10 (0.10-0.11)	0.0235
Hispanic	0.71 (0.70-0.71)	0.08 (0.07-0.08)	0.0159
Other	0.69 (0.68-0.70)	0.08 (0.07-0.09)	0.0169
All	0.72 (0.71-0.72)	0.08 (0.07-0.08)	0.0152
<i>Nontransfusion SMM (Leonard et al. (1))</i>			
White	0.74 (0.73-0.75)	0.05 (0.04-0.05)	0.0035
Black	0.77 (0.76-0.78)	0.07 (0.06-0.08)	0.0063
Hispanic	0.75 (0.73-0.76)	0.06 (0.05-0.07)	0.0043
Other	0.73 (0.71-0.75)	0.06 (0.04-0.07)	0.0049
All	0.75 (0.75-0.76)	0.06 (0.06-0.07)	0.0043
<i>Maternal end-organ injury or death (Bateman et al. (2))</i>			
White	0.65 (0.64-0.65)	0.02 (0.02-0.02)	0.0051
Black	0.68 (0.67-0.69)	0.03 (0.03-0.03)	0.0086
Hispanic	0.63 (0.62-0.64)	0.02 (0.01-0.02)	0.0061
Other	0.63 (0.62-0.65)	0.02 (0.02-0.02)	0.0071
All	0.65 (0.65-0.66)	0.02 (0.02-0.02)	0.0062

AUROC: Area under the receiver operating characteristic
AUPRC: Area under the precision recall curve

Figure 1. Calibration plots for all models. For reference, perfect calibration would be represented by the grey shaded areas overlapping entirely with the diagonal line



- All scores exhibited poor calibration across categories.
- No substantial variation was found within categories of race and ethnicity score performance.



- Externally validated indices showed similar performance on discrimination metrics in earlier studies.
- Index performance did not differ substantially between race and ethnicity groups.
- Model calibration was universally poor.
- Researchers should weigh the benefits of each index when choosing which model is preferable for comorbidity adjustment.

1. Bateman et al. Obstet Gynecol. 2013; 122(5):957-65
2. Leonard et al. Obstet Gynecol. 2020; 136(3):440-49
3. Tangel et al. Am J Perinato. 2019; 36(8):835-48

