Model performance is strongly correlated with measures of rurality and socioeconomic disadvantage

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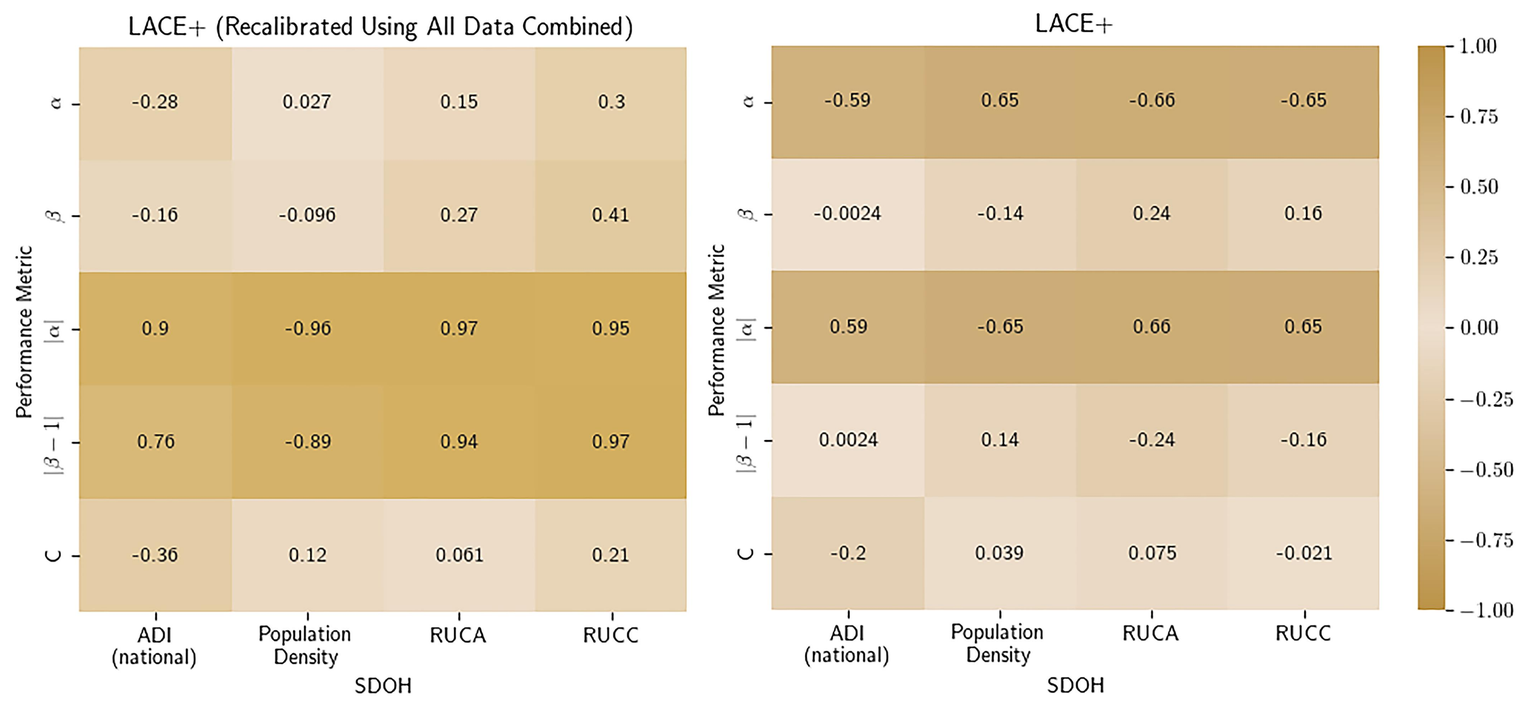
INTRO

- Clinical prediction models trained at one site can deteriorate when applied at other sites
- There is evidence that model performance is correlated with clinical factors
- **Hypothesis:** Socioeconomic factors associated with rurality of hospital location are correlated with model performance

METHODS

1. Collected 30-day unplanned hospital readmission status from 3 Middle TN hospitals: S_0, S_1, S_2
2. Predicted likelihood of readmission using the LACE+ prediction model
3. Analyzed a) model predictions without recalibration (LACE+) and b) recalibrated models using all data (LACE+ Recalibrated)
4. Evaluated Pearson's correlation coefficient between socioeconomic measures and model performance

Site	Rural	Area Deprivation Index	Population Density	Rural-Urban Continuum Codes	Rural-Urban Commuting Area Codes
S_0		< 100	< 1500	1	1
S_1	✓	≥ 100	< 100	5.5	5.4
S_2	✓	≥ 100	< 150	4	4.5



Discussion

- LACE before recalibration has moderate correlation to socioeconomic factors of rurality
- Upon recalibration, this correlation sharply increases
- The sparsity of catchment areas for S_1 and S_2 may reduce data available and overall magnify model miscalibration at these sites
- Understanding the impact of these socioeconomic factors on model performance is imperative to ensuring equitable model performance for all populations.

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