

39 - Title: Predicting Maternal Adverse Outcomes following Delivery: Identifying Risk Factors for Clinicians' Pre-Delivery Attention

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Background: In March 2024, maternal mortality was 18.7 per 100,000 live births according to the CDC. There has been a great deal of literature published, pointing to both medical and socioeconomic status (SES) factors in maternal morbidity and mortality. The purpose of this work is to evaluate the important risk factors associated with maternal adverse outcomes and to identify characteristics requiring clinicians pre/postdelivery attention by creating a predictive tool that clinicians can use at bedside. Additionally, the predictive value added of SES or hospital-specific variables into the final risk models was evaluated.

Methods/Research Design.

Using de-identified SPARCS data, this retrospective cohort analysis identified pre-delivery risk factors predicting post-delivery maternal adverse outcomes for adult residents (> 18 years old; n = 2,737,700). The study population included all adult New York State deliveries from 2005 to 2022; duplicate and incomplete records (e.g., missing age or gender; n=547,520) were excluded. Deliveries were classified based on vaginal or c-section type, chorioamnionitis diagnosis, admission (e.g., elective or urgent) status, race/ethnicity, insurance, and pre-/full- term delivery. The primary composite endpoint was death or major complications (e.g. bleeding, clotting, infection, or other). Secondary endpoints included this composite's subcomponents (e.g., bleeding complications), and post-delivery length of stay. Bivariate analyses evaluated factors associated with study endpoints including (but not limited to): high-risk pregnancy factors; Elixhauser comorbidity score; lifestyle/behavioral factors (e.g., smoking, obesity, etc.); socioeconomic factors (e.g., insurance coverage, regional location, etc.); and demographic factors (e.g., age, race/ethnicity, etc.). Four models were created; these included models for the composite comprised of major morbidity or mortality, and the three major complications (i.e., bleeding, clotting, or infectious complications).

Results (or Preliminary Results, as applicable for a project in progress):

Using multivariable regression, all four models demonstrated excellent predictive power, with the major morbidity/mortality model having a c-index of 0.7179, the bleeding model 0.7468, the infection model 0.7654, and the clotting model 0.8364. Each of these models included medical and SES variables along with hospital-based characteristics that were statistically significant predictors. When socioeconomic factors were removed from the model, the c-indices for morbidity/ mortality, bleeding, and infection, dropped to 0.7113,

0.7385, and 0.7368, respectively. Thus, SES variables appear to be important to include in risk model predictions. A set of online risk models has been programmed as a prototype to compare to clinician's independent estimates of a patient's risk.

Conclusion (or Preliminary Conclusion, as applicable for a project in progress):

Using this new online downloadable risk model, obstetricians in New York State will now be able to predict delivery outcomes to evaluate each patient's unique pre-delivery risk. Based on comparing their own risk estimate to the model's risk prediction, clinicians may identify modifiable risk factors for additional consultative care (e.g., renal or cerebrovascular disease specialists) or post-discharge follow ups. Importantly, this will be the first predictive delivery model that incorporates both medical and SES factors, enabling clinicians to take a more holistic view of patients to assess their pre- and post-delivery needs