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Longitudinal risk assessment of neonatal morbidities in newborns utilizing artificial intelligence and electronic health records

Stanford researchers have developed a method for assessing neonatal health risk by using longitudinal electronic health records (EHR) utilizing a machine learning model comprising deep learning neural networks.

Accurate risk prediction and prognostication is crucial in perinatal and neonatal medicine. Most clinical prediction calculators have limited predictive power and clinical utility owing to the small number of parameters considered and the single time point utilized. Additionally, right now any assessment of morbidity related to neonate occurs after birth and might include diagnostics that are potentially harmful to the neonate. The novel method developed here overcomes these challenges by integrating serial and rich neonatal and maternal information contained in electronic health records (EHR) collected before and after birth, enabling assessments prior to birth or as quickly as possible after birth, leading to appropriate interventions as early as possible.

Utilizing data at a single center collected from > 27,000 mothers linked with > 32,000 neonates between 2014 - 2020, the inventors have demonstrated that predictions of neonatal outcomes from various maternal conditions extracted exclusively from the EHR is possible.

Stage of Development

Proof of concept

Applications

- Providing individualized care
- Understanding longitudinal population level risk
- Allow clinicians to make better informed assessments and pursue interventions
- Aids recruitment of appropriate patients for clinical trials based on longitudinal risk for a given disease

Advantages

- Improved precision of newborns risk assessment
- Automates the process for prediction, providing a simultaneous assessment for multiple conditions
- Better than existing technologies
- Automatic reports if EHR is streamed directly from hospitals

Patents

- Published Application: [WO2023164308](#)

Innovators

- Davide De Franchesco
- Jonathan Reiss
- David Stevenson
- Nima Aghaeepour

Licensing Contact

Kimberly Griffin

Technology Licensing and Strategic Alliances Manager

[Email](#)