One-Year Mortality Risk Estimates from Electronic Medical Record Data

Technology ID
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Random Forest Model Does Not Focus on Specific Disease

An algorithm uses prognostic models based on electronic medical record (EMR) data to predict one-year mortality risk. The random forest model, which predicts the risk of death within a year of the last day of hospitalization, is remarkable as a broadly applicable prognostic model that does not focus on a specific disease. The model is derived from about 100,000 hospital discharges, is validated on about 20,000 discharges and has a C-statistic of about 0.85 to 0.89 (depending on the variables selected) for predicting death within a year from the last day in the hospital. The algorithm uses commonly obtained EMR data (e.g., last set of vital signs, complete blood count, basic and complete metabolic panel, demographic information, ICD codes, etc.), physiological readings (e.g., blood pressure, pulse heart rate, etc.) and basic demographic information (e.g., patient age and length of hospital stay) to estimate the risk of one-year mortality to improve end-of-life planning and risk adjustment for research.

Uses Electronic Health Record Data

Currently, there is no broadly applicable, well-validated model using commonly obtained labs and vitals from last-available hospital data to predict one-year mortality in a heterogeneous set of patients. This new algorithm uses only structured data available in the EMR but also accommodates missing data; therefore, a clinician is not required to enter any data if the model is deployed in an EMR. In addition, a web-based API design is available that allows developers to query the model from anywhere in the world and use it in their applications.

BENEFITS AND FEATURES:

- Based on electronic medical record (EMR) data
- Predicts one-year mortality risk within a year of the last day of hospitalization
- Broadly applicable: does not focus on a specific disease
- Random forest model
- Web-based API design available
- Clinician data input not if deployed in an EMR

APPLICATIONS:

- Predicting one-year mortality risk within a year of the last day of hospitalization
- Clinical decision support tool (i.e., for end-of-life care)
- Improves end-of-life planning and risk adjustment for research
- Web-based API
- Automated risk estimation
- Flagging tool

Phase of Development - Prototype

Researchers

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Publications

Development and Validation of Machine Learning Models for Prediction of 1-Year Mortality Utilizing Electronic Medical Record Data Available at the End of Hospitalization in Multicondition Patients: a Proof-of-Concept Study

Journal of General Internal Medicine, Jan 30, 2018; pp 1-8

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