



JOHNS HOPKINS  
BLOOMBERG  
SCHOOL of PUBLIC HEALTH

*Department of Biostatistics*

## **BIostatISTICS SEMINAR,**

### **Predicting Inpatient Deterioration: From Quality Improvement to Research (A Story in 5 Acts)**

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*Abstract:*

As Electronic Health Record (EHR) systems mature, the opportunity exists to implement real-time clinical decision support tools. One area of focus has been the prediction of who will deteriorate while in the hospital. In 2015, the National Early Warning Score (NEWS), with an associated best practice alert, was implemented into the Duke University Health Systems EHR system. After the score had been used for over year, we were asked to evaluate its effectiveness (Act 1). With effectiveness found lacking, we were asked to develop a better score (Act 2). After developing a better score, we implemented our model and evaluated its performance prospectively (Act 3). This raised additional questions about how much better we could do if our prediction model was not constrained by the limitations of the implementation environment of the EHR system. In response, we have developed a time-to-event deep learning recurrent neural network (RNN) model (Act 4). As we built out and tried to refine our models, new questions were raised regarding how changing clinical measurements relate to risk of deterioration (Act 5). Ultimately, what started as a question of quality improvement, turned into a research investigation. This story illustrates how partnerships with the health system can lead (hopefully) to better patient care and spur academic research. This work is joint with a variety of faculty, students and staff who are statisticians, clinicians and informaticists.

Johns Hopkins Bloomberg School of Public Health, Department of Biostatistics  
Monday, April 8, 2019, 12:15:1-15, Room W2008 (Refreshments 12:00pm)

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