Data Studio

1:30–3:00pm, Wednesday, November 6, 2019
Conference Room X393, Medical School Office Building, 1265 Welch Road, Stanford, CA

Investigator: Qian Zhao  Doctoral Candidate, Department of Statistics

Title: Forecasting Platelet Demand to Reduce Inventory Wastage

Summary (1:30–2:15 PM)
Platelets are the blood component responsible for clot formation. The greatest demand for this blood product comes from trauma, oncology, and major surgery patients. Hospitals must always maintain a sufficient inventory of platelets. Platelets have a shelf life of only five days but spend two in testing for bacterial and viral contamination. This means that hospitals have only three days to use platelets upon receiving them. This constraint, along with highly variable demand, a smaller donor pool, longer donation process, and less collection capacity due to the cost of specialized equipment, makes platelets the most difficult blood product for hospitals to manage. It is estimated that nationwide, 11% of all collected platelet units, or 250,000 units, expire before being transfused, amounting to $80 million lost and 500,000 donor-hours wasted. In 2017, the Stanford Blood Center sought to address this wastage problem by engaging a team of researchers to forecast platelet demand using daily aggregated hospital data. They formulated a three-day ordering strategy by solving an optimization problem using features aggregated from the available data. However, the ordering strategy was not put into production due to lack of trust in model predictions by the inventory manager. In order to address this problem, we decided to separately predict platelet demand, and develop ordering strategy as a secondary step. The goal of our current study is to supply the user with a decision support tool which will build confidence in the accuracy of computer predictions. Our four-day daily prediction is based on both aggregate data and patient-level information. Our questions concern how to improve the prediction models.

Investigator: Valerie Chock  Associate Professor of Neonatology, Department of Pediatrics

Title: Cerebral Oxygenation and Autoregulation in Preterm Infants

Summary (2:15–3:00 PM)
Improved understanding of the relationship between altered hemodynamics and cerebral oxygenation may inform future strategies to prevent brain injury in preterm infants. The objective of this study is to determine whether decreased cerebral oxygenation or altered cerebral autoregulation in the first 96 hours of life is associated with mortality or severe neuroradiographic abnormalities in preterm infants. The study design is a prospective cohort over multiple centers. We enrolled 111 preterm infants from 6 neonatal intensive care units. These preterm infants had birth weight less than 1250 g during the first 24 hours of life and received simultaneous monitoring of mean arterial blood pressure and cerebral oxygenation using near-infrared spectroscopy until at least 96 hours of age. The primary outcome measure is mortality before hospital discharge or severe neuroradiographic abnormalities. Among the enrolled preterm infants, 103 had sufficient spectroscopic data for analysis. We computed positive or negative moving window correlations between cerebral oxygen saturation (Csat) and mean arterial blood pressure (MAP) to determine time periods with altered cerebral autoregulation. We compared percentage of time with altered autoregulation using Spearman rank correlation between infants with and without adverse outcome. We have specific questions about how to analyze the longitudinal data collected from these preterm infants.

For more information about Data Studio: