THE UNIVERSITY OF IOWA

Iowa Summer Institute in Biostatistics

2020

11th Annual

Iowa Summer Research Symposium

University of Iowa

Iowa City, Iowa

July 16th, 2020

Zoom Conference

College of Public Health

Table of Contents

Iowa Summer Institute in Biostatistics Presentations

ISIB Program sponsored by the National Heart Lung and Blood Institute (NHLBI) HL-147231

Grace Gerdts
University of Iowa
Micah Marshall
University of Hawaii
Sarah Maebius
Reed College

Iowa Summer Institute in Biostatistics - University of Iowa
Department of Biostatistics

Modeling Optimal Treatment Decisions for Large Vessel Occlusion in Acute Stroke Patients

Large Vessel Occlusion in Acute Stroke is a significant cause of morbidity and mortality. Particularly in communities located far from large medical centers, difficult transport and treatment decisions must be made. In this project, we develop a stan model to drive optimal decisions as applied to the state of Iowa, performing Bayesian spatial analyses to determine, based on location and available healthcare, when it would be better to transport patients directly to a major hospital, and when it would be better to rush to the nearest hospital for triage and transfer. By comparing outcome probabilities, we develop maps to show how optimal treatment outcomes vary throughout the state of Iowa based on geographic location.

Dr. Grant Brown, Assistant Professor, Department of Biostatistics, University of Iowa
Amy Hahn, Graduate Student Mentor, Department of Biostatistics, University of Iowa

Jasmine Li
Wellesley College
Stephanie Lewis
University of Hawaii at Hilo
Alena Figueroa
University of Hawaii - West Oahu

Iowa Summer Institute in Biostatistics - University of Iowa
Department of Biostatistics

A Longitudinal Analysis of DaTscan Data from Parkinson's Disease Subjects with and without REM Sleep Behavior Disorder

Parkinson's disease (PD) is a degenerative neurological disorder caused by the loss of cells in the brain that produce dopamine. Currently, there is not a fully validated progression biomarker for PD. The Parkinson's Progression Markers Initiative (PPMI) is a multisite clinical study working towards identifying biomarkers for PD progression using imaging, sampling, and diagnostic tests. One such test is for rapid eye movement (REM) sleep behavior disorder (RBD). Individuals with RBD display abnormal or violent behaviors during REM sleep due to the loss of mechanisms that control muscle paralysis. PD patients with RBD often experience a more aggressive disease course than those without RBD. PPMI assesses subjects for RBD symptoms using the REM sleep behavior disorder screening questionnaire (RBDQS). PD subjects enrolled in PPMI also undergo DaTscan imaging to measure the density of dopamine transporters in the brain. Using longitudinal data from PPMI, our project evaluates changes in DaTscan imaging measures over time for PD subjects with and without RBD.

Ryan Cho, PhD, Assistant Professor, Department of Biostatistics, University of Iowa
Janel Fedler, PhD, Biostatistician, Clinical Trials Statistical and Data Management Center

Monica Colon-Vargas
University of Puerto Rico at Mayagüez
Tori Penalver
University of Hawaii
Andy Peterson
Wheaton College

Iowa Summer Institute in Biostatistics - University of Iowa
Department of Biostatistics

Investigating the Relationship Between Food Contamination and Enteric Pathogen Infections in Infants Living in Low-to-middle-income Countries

Enteric diseases are infections occurring in the gastrointestinal system in consequence of different pathogens and are transmitted by eating and drinking contaminated food and water. Currently, dozens of enteric pathogens are transmitted by fecal contamination of the environment in low to middle-income countries, causing 2.5 billion episodes of diarrhea and 580,000 deaths in children under five years of age each year. We utilize data from the Safe Start study in Kenya to investigate concentration and prevalence of enteric pathogens in 734 infants from low-income villages in Kenya. With the provided data, we perform a PCA analysis and formalize the results with a network latent space model to determine if there are relationships between the pathogens. Furthermore, using data from the Market-to-Mouth study we perform logistic regression to determine if these pathogens are good predictors for an infant having diarrhea. We conclude that there are several different clusters among the pathogens implying that given that an infant is infected with a certain pathogen, the probability of the infant being infected with another pathogen located in the same cluster is increased even after accounting for the pathogen's varying prevalence. Also, based on the lack of relationship between the pathogens and presence of diarrhea examined with logistic regression, we conclude that self-reported diarrhea is not an excellent predictor for pathogen colonization.

Dr. Dan Sewell, Assistant Professor, Department of Biostatistics, University of Iowa

Dr. Kelly Baker, Assistant Professor, Department of Occupational and Environmental Health, University of Iowa