



PROJECT TITLE: Machine Learning & Decision Support to Improve Patient Outcomes in CDI

PROPOSAL NUMBER: 09-06191.UAB

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RESEARCH THEME: Care Coordination

BUDGET: \$50,000

UNIVERSITY: UAB

PROJECT YEAR: 2

PROJECT DESCRIPTION:

Hospital Acquired Infections (HAI), infections acquired after admission to the hospital, consume about \$25 to \$31 billion. Clostridium Difficile infection (CDI) is the most common cause of infectious diarrhea occurring in hospitals. Treatment costs per patient is approximately \$8,911 to \$30,049. The goal of this research is to improve patient outcomes in CDI by testing our findings from earlier phases by using Cerner Health Facts data warehouse. There is a need for better predictive models that allow the development of patient-specific risk scoring.

HOW THIS IS DIFFERENT THAN RELATED RESEARCH:

Healthcare providers are vulnerable to penalties for Healthcare Associated Infections (such as CDI) by the payers. CDI risk prediction model is important for providers to develop more targeted prevention strategies. Patients would benefit from better informed clinical care through CDI risk prediction model. CDI risk prediction models would lead to potential interventions such as (1) developing intervention strategies targeted at high-risk patients that may reduce the risk of contracting CDI, (2) diagnosing preexisting CDI resulting in quicker treatment for patient & prevent HAI penalty for hospitals, and (3) potentially reducing the length of stay thereby potentially reducing hospital costs.

EXPERIMENTAL PLAN:

- (1) Use Cerner Health Facts Data Warehouse which contains about 70 million unique patient records over 16 years.
(2) Link historical patient electronic encounter records with information on diagnosis, lab, treatment, medication, and demographics
(3) Develop CDI risk prevention model by utilizing standard statistics (i.e. linear regression) and machine learning approaches

EXPECTED MILESTONES:

- Month 1-2: Acquiring IRB Approval
Month 3-6: Preliminary data work and some descriptive statistics
Month 7-8: Development of analytical models and the research plan
Month 9-12: Write grant proposal on the results of risk prediction model of CDI

BENEFITS TO INDUSTRY:

Hospitals would be able to develop more targeted testing strategies for CDI and deploy patient-specific interventions through decision support systems.

EXPECTED DELIVERABLES:

- (1) CDI risk prevention model that can ultimately be integrated into the EHR of healthcare providers
(2) Manuscript publication based on findings
(3) Poster presentation at professional meeting