acute care readmits for diabetic patients

problem statement

What factors of a diabetic's health profile are most likely to predict that a patient will have at least 1 readmission for any acute care admission and can be researched in the next 2 years to explore alternative care and treatment options to prevent the readmission?

context

After the Affordable Care Act, acute care readmissions have significantly impacted hospital financials. Diabetics in particular are prone to readmission as the disease affects so much of the body and complicates care. With healthcare moving to a pay-for-performance model, providers often do not get compensated for the readmission and total compensation is decreased when they occur. In addition to the obvious patient safety and quality of life concerns, preventing readmissions can also protect a hospital's revenue.

criteria for success

This analysis will be considered successful if it delivers at least 1 hypothesis for future research into what can be done during a diabetic's acute care stay to prevent a future readmission.

scope of solution space

This analysis will be scoped to interventions, procedures, administrations and protocols that can be conducted inside an acute care facility or provided by nurse care managers after discharge.

constraints

The dataset is limited to hospitals using a particular electronic medical record (EMR) that have also enrolled in that EMR's data sharing program. They number 130. These hospitals are also all in the United States and have only included data for patients admitted between 1999 and 2008. The diversity in these systems as well as the general nature of healthcare data has left several fields missing and unobserved. Additionally, privacy laws mandate that limited demographic information is collected and de-identification of these records introduces the chance for errors in identification of the target variable, readmission.

stakeholders

Stakeholders include medical research organizations interested in improving care for diabetic patients, providers interested in delivering care, payors interested in keeping members out of healthcare facilities and patients with diabetes interested in a higher quality of life away from healthcare facilities.

data source

The primary data source to be used in this analysis is provided for public use by the University of California at Irvine via their machine learning repository. It was collected as part of this study. The data is downloadable as a .csv file and has information on limited patient demographics, acute care encounters, diagnoses, medications, lab results and calculations on readmission. This data could be supplemented with additional diagnoses information such as hierarchical condition codes (HCC) or clinical classification software codes (CCS). Additionally, medication data could be supplemented with standardized groupings.

methodology

Analysis will begin with an examination of the data, including any cleaning necessary. It will then progress into exploration including reviewing distributions, scaling, encoding and discovering interactions. Additional data may be merged during exploration as needed and available. Analysis will then move into finding an appropriate model to describe how the data can be used to describe the chance of readmission. Once a model has been found, various scenarios will be modeled and a report and presentation developed on the findings.

deliverables

This analysis will yield 3 artifacts.

1. A document of the full analysis in the form of a digital notebook that includes reproducible code for review and examination.
2. A report of the project including a summary of the analysis, findings, history and avenues to continue the work.
3. A presentation of the report.