EXECUTIVE SUMMARY

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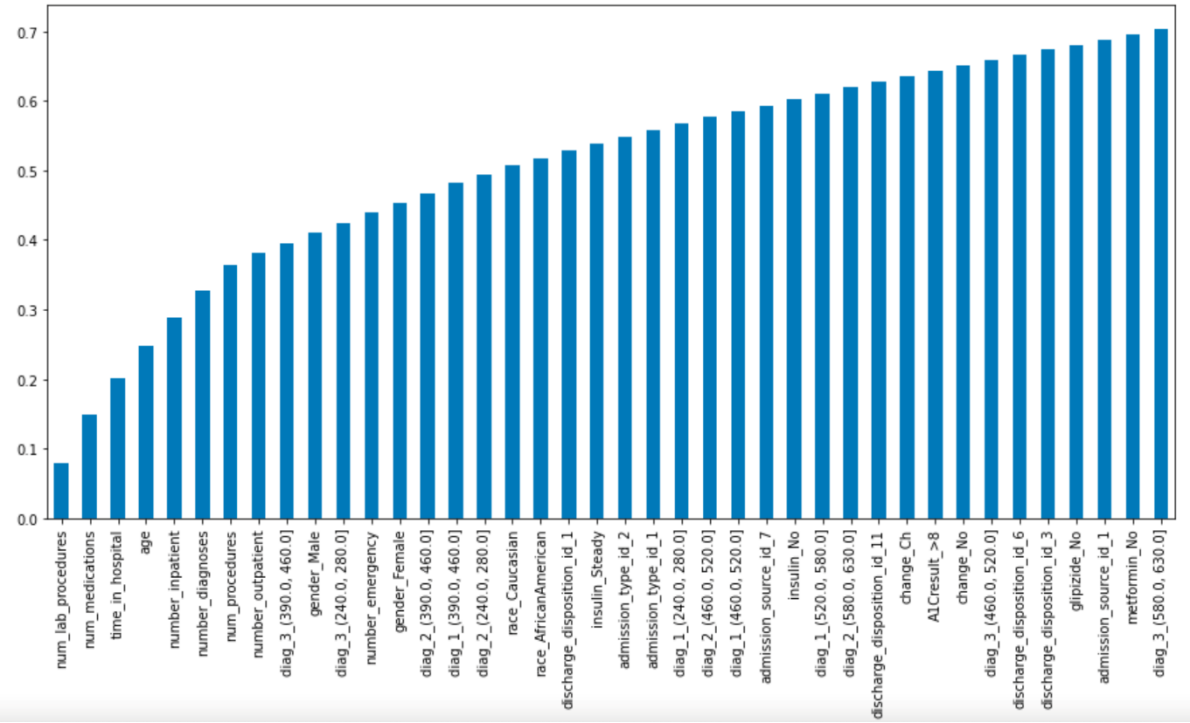
Many people with diabetes mellitus (DM), a major noncommunicable chronic illness, are hospitalized frequently due to poor disease management. Readmitted patients are those who have been readmitted to the same facility within a specified period because of the same condition. Misdiagnosis, recurrence, early discharge, and other factors contribute to inadvertent readmission. Medicare and Medicaid Services have adopted the 30-day readmission rate following an index hospitalization as a key measure of hospital performance, and this rate is increasingly scrutinized as a signal of poor patient care. Unplanned readmission not only raises the financial burden on patients but also wastes medical resources repeatedly. The cost of diagnosed diabetes in the United States was expected to be over $327 billion in 2017, including $237 billion in direct medical expenses. However, as compared to the total 30-day readmission rate of inpatients, individuals diagnosed with DM had a much higher readmission rate (14.4–22.7 percent). Furthermore, according to statistics from the Agency for Healthcare Research and Quality's Nationwide Inpatient Sample from 2012, a modest 5% reduction in admissions per year would result in a $1.2 billion yearly cost savings. Readmission, without a doubt, plays an important role in rising hospital-related costs and is becoming more common among elderly diabetic patients; as a result, DM readmissions are becoming a growing and costly economic burden on both patients and government budgets, and they deserve our full attention.



Patients with readmission tended to have certain features arranged in order of importance. Admission times, age, diagnosis, the frequency of crises, and sex were the primary factors considered in determining the likelihood of unintentional readmissions. More than 90 percent of patients who had extended admission periods were readmitted within 30 days, and the majority were older. Their illnesses also caused them to stay in the hospital longer than the younger individuals. Additionally, elderly individuals visit the emergency room more frequently due to rapid deterioration in their health. Diag 2 was more important than the diag 1, indicating that each patient's condition might be more accurately represented by the following diagnosis in the EHR. For diabetics with many admissions, particularly senior patients, medical personnel need to offer education and follow-up in order to prevent problems and select appropriate therapies in accordance with patients' ages.

Finally, machine learning might aid healthcare practitioners in identifying patients who are at risk of short-term readmission and modifying risk variables to lower the likelihood of readmission within 30 days. Our goal includes predicting if a patient based on relevant variables will be re-admitted within 30 days, re-admitted after 30 days or not been re-admitted. We also observed that ~40 features were important to predict the output out of 50 input features available in the dataset of 10 years (1999-2008) of clinical care at 130 US hospitals and integrated delivery networks.

References:

- https://bmcmedinformdecismak.biomedcentral.com/articles/10.1186/s12911-021-01423-y#Fig8
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- Attribute Information https://www.hindawi.com/journals/bmri/2014/781670/
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