THE UNIVERSITY OF ARIZONA
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A Data Analytics Prespective on Hospital Readmissions

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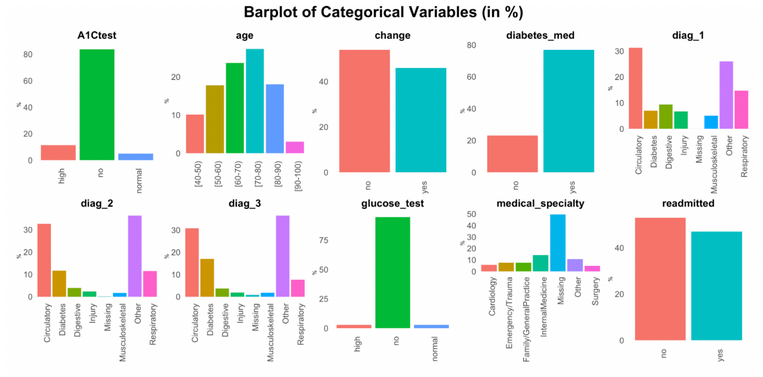
Background

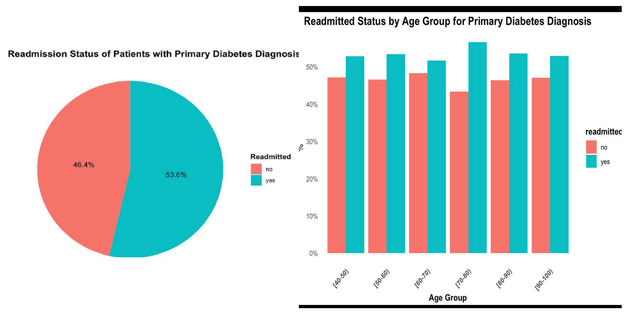
Hospital readmissions present a significant challenge for healthcare systems, impacting both patient quality of life and overall healthcare costs. Understanding the factors that lead to readmission is essential for creating targeted interventions to reduce these occurrences. This analysis draws on ten years of clinical care data from 130 US hospitals, covering 25,000 hospital records to identify key risk factors that contribute to readmission. By examining 17 critical variables, our study aims to shed light on the demographic, clinical, and procedural factors that influence hospital readmissions, ultimately guiding strategies for proactive patient care and reducing readmission rates.

Key Demographics and clinical factors affecting readmissions



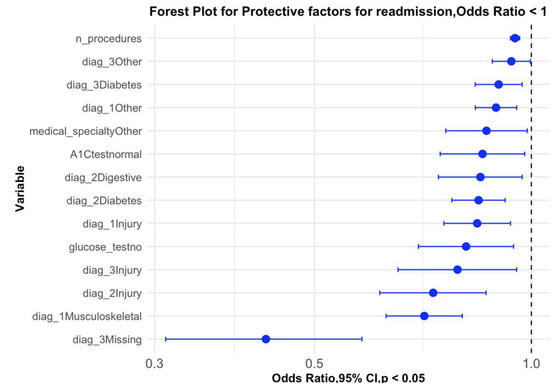
- Non-Diabetes Variables: Most common diagnoses include circulatory and respiratory issues; majority of patients were aged 60–90, with frequent mentions of internal medicine.
- Diabetes Variables: A1C tests mostly showed higher than the normal or healthy range, and blood glucose tests were few, evenly split between elevated and normal levels.
- Medication: 50% had their medication changed, and 75% were prescribed diabetes-specific medication.
- Around 47% of patients are readmitted.

Effects of primary Diabetes diagnosis on readmissions



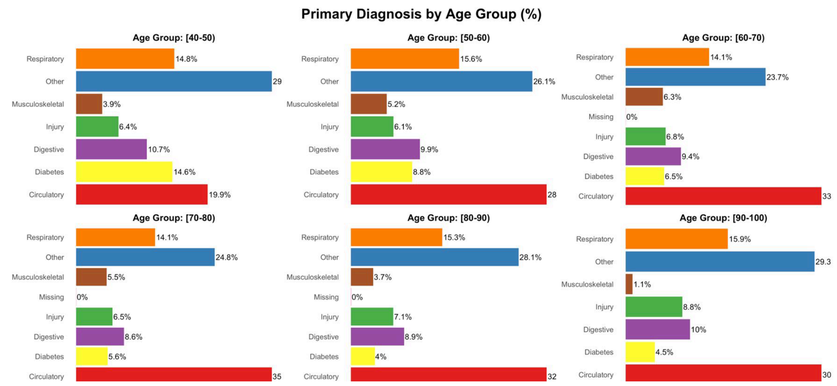
- A Chi square hypothesis test was done to check whether a connection exists between hospital readmissions and patients with primary or secondary diabetes conditions.
- A p- value of less than 0.05 was achieved on conducting the test confirming the hypothesis that a corelation exists between primary diabetes diagnosis and readmission rates
- Readmission rates are high for primary diabetes diagnoses (53.6%)
- Patients aged 70-80 experience the highest readmission rates for primary diagnoses.

Protective Factors for Readmissions



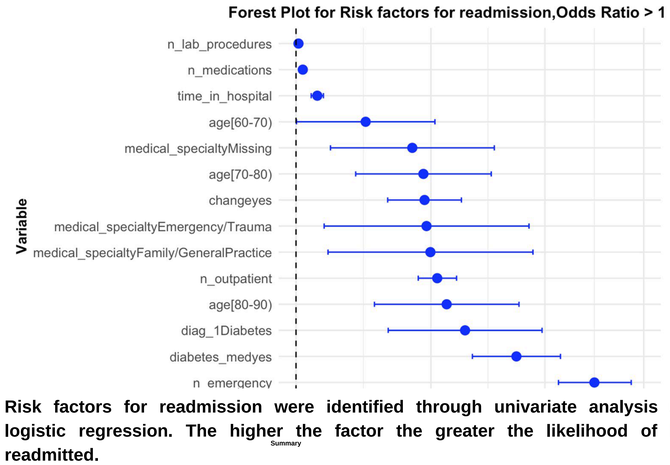
- Protective factors for readmission were identified through univariate analysis using logistic regression the smaller the factor the greater the likelihood of not being readmitted
- Fewer comorbidities (1-2 diagnoses) are associated with lower readmission risk
- Protective factors:
  - Primary musculoskeletal diagnosis
  - Secondary injury diagnosis

Factors affecting Readmissions by Age Group



- Patient Demographics: Predominantly elderly population (40-100 years), admitted mainly for circulatory, respiratory and digestive issues.
- Testing Insights: Glucose and A1C testing were conducted for only a small fraction of patients.
- Hospital Stay Characteristics: Patients exhibited a high average of laboratory procedures and medications administered during their hospital stay.
- Comorbidities and Readmissions: High prevalence of comorbidities and polypharmacy likely contributed to elevated readmission rates.

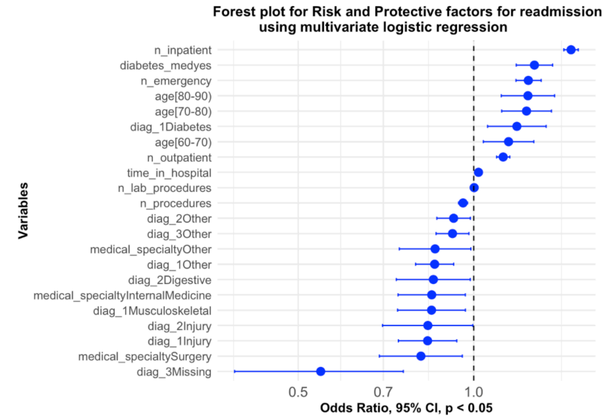
Risk Factors for Readmissions



- Risk factors for readmission were identified through univariate analysis using logistic regression. The higher the factor the greater the likelihood of being readmitted.

- Key risk factors for readmission are:
  - Prior hospitalizations
  - ER visits
  - Primary diagnosis of diabetes
  - Diabetes medication prescriptions

Risk and Protective Factors for Readmissions



- Key risk factors:
  - prior healthcare use
  - diabetes as primary diagnosis
  - diabetes medication prescriptions.
- Ages 70-90 face higher readmission risk.
- Protective factors: missing tertiary diagnosis and general surgery specialty.

Summary

Our findings indicate a readmission rate of 47.01%, with key factors including age, diagnosis type, and prior healthcare usage. The most common diagnoses by age were circulatory, respiratory, and diabetes, with older age groups (70-90) facing the highest risk. Patients with primary diabetes and those who had frequent hospital visits were at greater risk, while treatments involving internal medicine or musculoskeletal issues showed a lower readmission likelihood. Targeted interventions could help mitigate these risks effectively.

References

- **Diabetes Data and Statistics** https://www.cdc.gov/diabetes/php/data-research/data-statistics/index.html
- **Diabetic_data** https://www.kaggle.com/datasets/mathchi/diabetes-data-set
- **Diabetes 130-US Hospitals for Years 1999-2008** https://archive.ics.uci.edu/dataset/296/diabetes+130-us+hospitals+for+years+1999-2008