

# Hospital Readmission Prediction for Diabetic Patients

This project aims to help hospitals reduce readmission rates of diabetic patients by predicting which patients are most at risk of being readmitted to the hospital in 30 days, ultimately improving patient care and resource management.

# **Project Team**

Jaimin Babaria

jbaba5@uic.edu

Vishak Baddur Sadanand

vbadd@uic.edu

Rujuta Avinash Tambewagh

rtamb@uic.edu

Simran Mishra

smish46@uic.edu

Sudha Sree

Yerramsetty

syerr7@uic.edu

Varsha Balaji

vbala7@uic.edu

Github classroom - https://github.com/cs418-fa24/project-check-in-team-7

## Problem Statement

1 Focus

Hospital readmissions and analyzing risk factors.

2 Key Issue:

Hospital readmissions disrupt operations and impact patient care.

3 Objective

Use machine learning to help hospitals make data-driven decisions to reduce readmissions.

4 Hypothesis

Factors such as medical history, length of stay, and chronic conditions, contribute significantly to readmission rates.

### Data

1 Source

Data sourced from VCU Center for Clinical and Translational Research

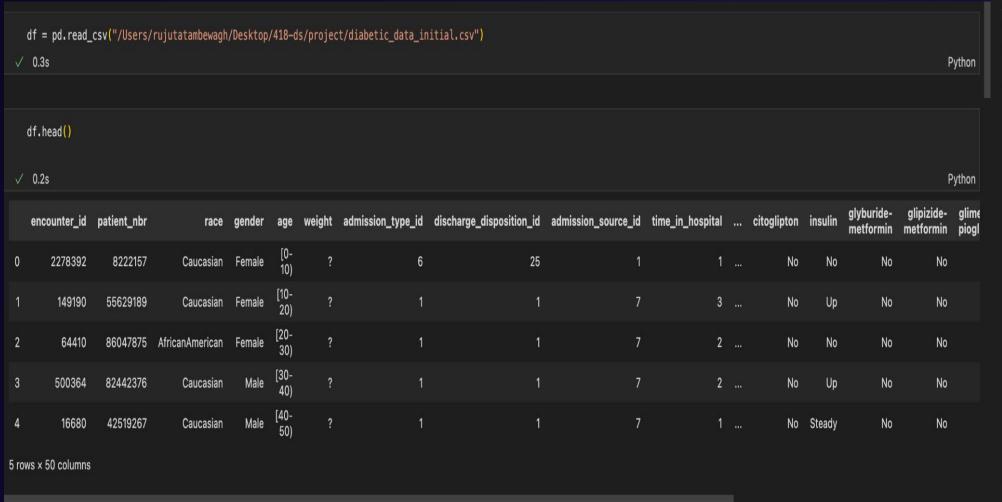
Reference: <a href="https://doi.org/10.1155/2014/781670">https://doi.org/10.1155/2014/781670</a>

- Details
  Database contains data systematically collected from participating institutions electronic medical records and includes encounter data (emergency, outpatient, and inpatient), provider specialty, demographics (age, sex, and race), etc.
- Data Types

  Numerical and categorical(e.g., age, medical history, medications).
- 4 Feasibility

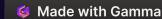
Ready access to data ensures timely completion of the project.

# Sample Data



```
df.info()
 ✓ 0.1s
Output exceeds the size limit. Open the full output data in a text editor
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 101766 entries, 0 to 101765
Data columns (total 50 columns):
   Column
                             Non-Null Count Dtype
   encounter id
                             101766 non-null int64
                             101766 non-null int64
    patient_nbr
   race
                             101766 non-null object
                             101766 non-null object
    gender
                             101766 non-null object
   weight
                             101766 non-null object
6 admission_type_id
                             101766 non-null int64
7 discharge_disposition_id
                             101766 non-null int64
   admission_source_id
                             101766 non-null int64
   time in hospital
                             101766 non-null int64
10 payer code
                             101766 non-null object
11 medical_specialty
                             101766 non-null object
12 num_lab_procedures
                             101766 non-null int64
13 num procedures
                             101766 non-null int64
14 num medications
                             101766 non-null int64
15 number_outpatient
                             101766 non-null int64
16 number_emergency
                             101766 non-null int64
17 number_inpatient
                             101766 non-null int64
                             101766 non-null object
18 diag_1
19 diag 2
                             101766 non-null object
48 diabetesMed
                             101766 non-null object
49 readmitted
                             101766 non-null object
dtypes: int64(13), object(37)
```

memory usage: 38.8+ MB



# Solution Approach

1 Data Pipeline

Implement data preprocessing, focusing on data cleaning, imputation of missing values, and transforming categorical variables into actionable insights.

2 Techniques

Correlation Analysis, Principal Component Analysis to name a few.

3 Models

We start with Logistic Regression, explore advanced options like Decision Trees and other models.

**Future Potential** 

If time permits, build an Interactive Dashboard for data visualization and decision.