Hospital Patient Readmissions

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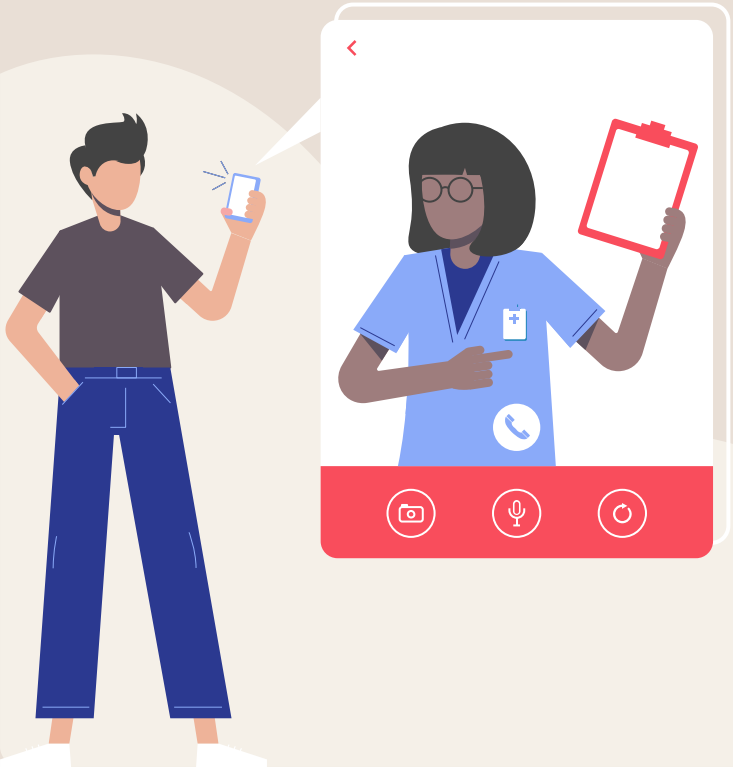
The Problem:

Readmissions account for extra costs and even penalizations for U.S. hospitals.

2013 – Affordable Care Act (ACA)

The federal government has created several new programs that penalize hospitals for readmissions.



Future Losses:

Under Medicare's Hospital Readmissions Reduction Program, hospitals now lose up to 3% of their total Medicare payments for high rates of patients readmitted within 30 days of discharge.

$1.9 Billion

$528 Million in the year 2017!

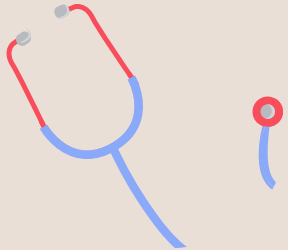
01

What Can Hospitals Do?

Keep readmissions low by analyzing previous patient encounters.

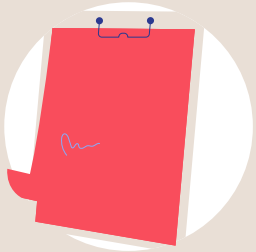
THE DATA:

PATIENT DEMOGRAPHICS



GENDER, RACE AND AGE

DIAGNOSES



PRIMARY DIAGNOSES LINKED TO “EXCESS” READMISSIONS

DISCHARGE DISPOSITIONS

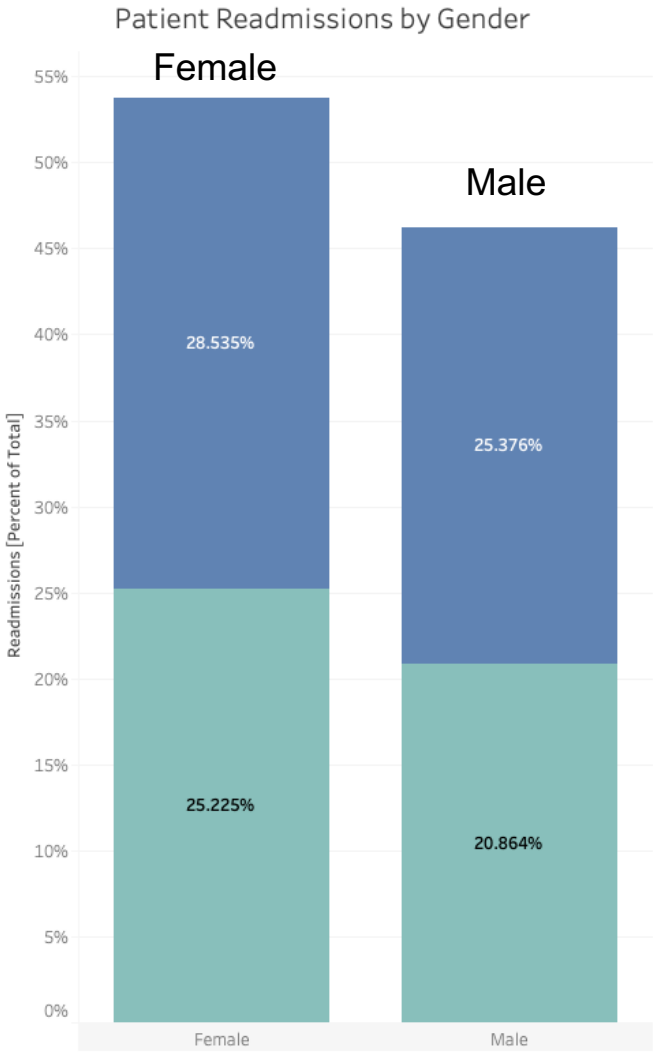
HOME, TRANSFERS TO NURSING FACILITIES, HOME HEALTH

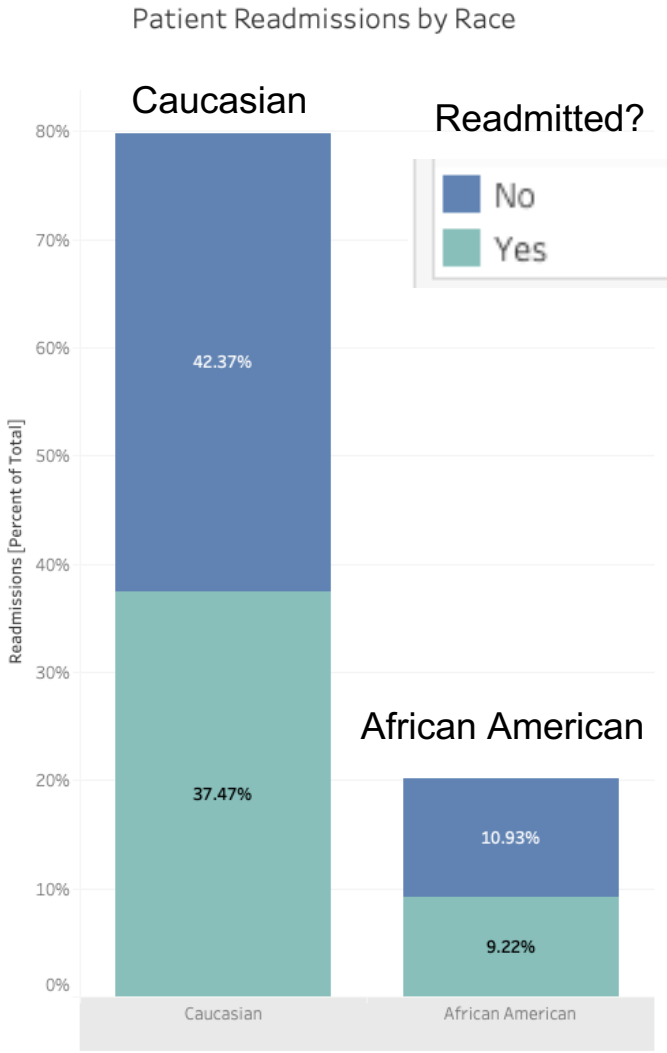
PATIENT DEMOGRAPHICS

Gender and Race

Interactive graph

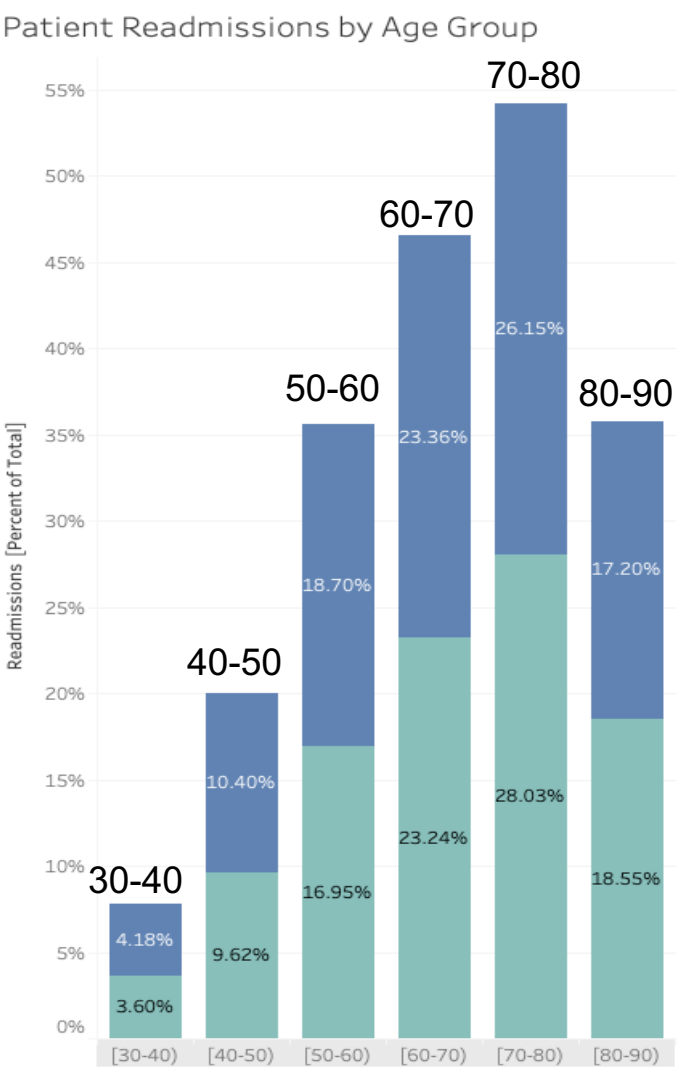
** implies possible bias

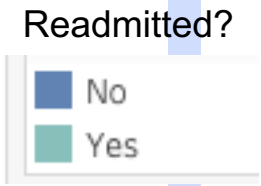




PATIENT DEMOGRAPHICS

age

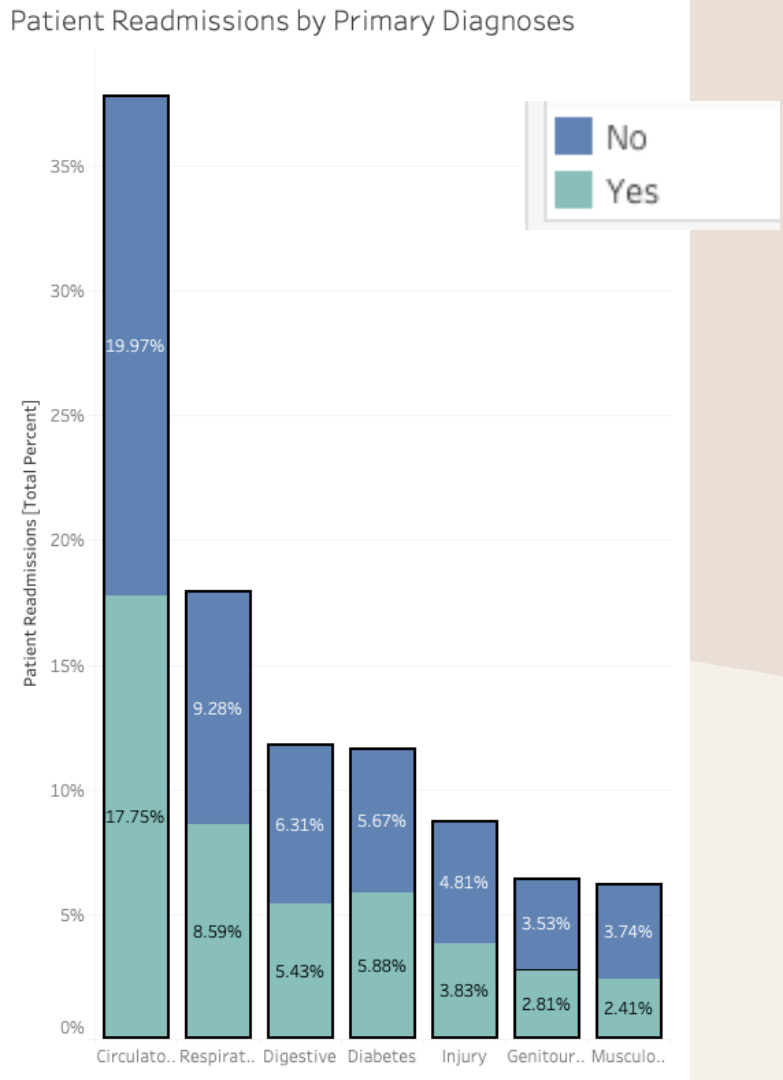




Patients aged 50-90 have the highest rate of readmissions.

Interactive graph

** implies possible bias



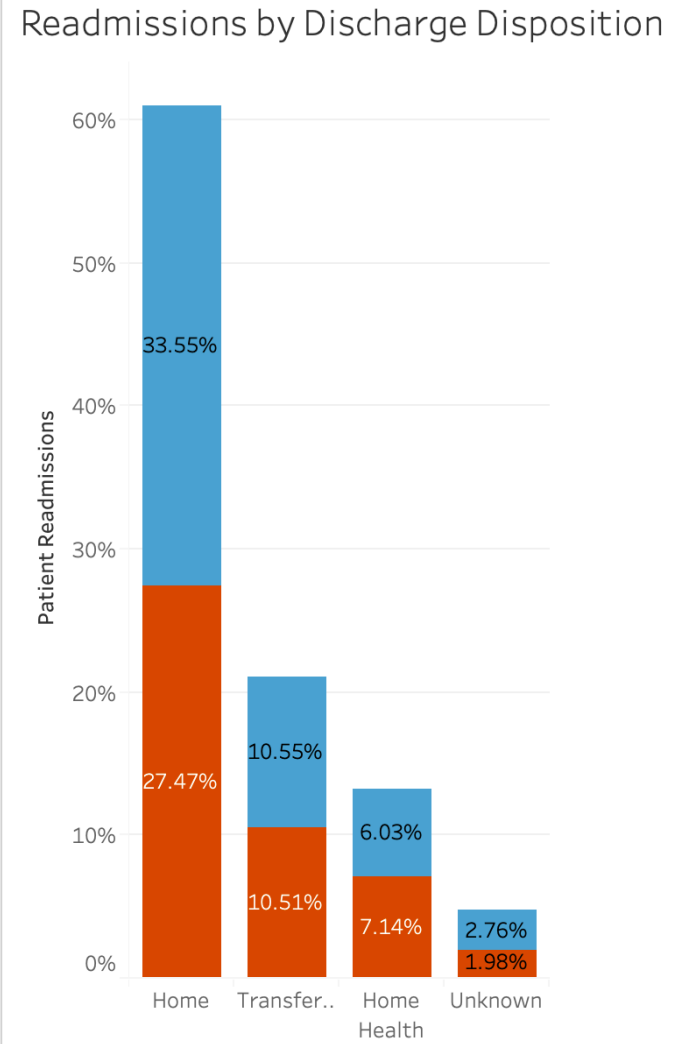
PRIMARY DIAGNOSES

Circulatory / Cardiac Related Diagnoses:

- **38% of all admissions**
- **18 % of readmissions**

- Respiratory Diseases
- Diabetes
- Digestive Diseases
- Injuries (Traumas)
- Genitourinary Diseases
- Musculoskeletal Diseases

Interactive graph



Discharge Dispositions in Relation to Readmissions

Home Discharges

- Home without home health care
- Follow up patient's responsibility

Facility Transfers

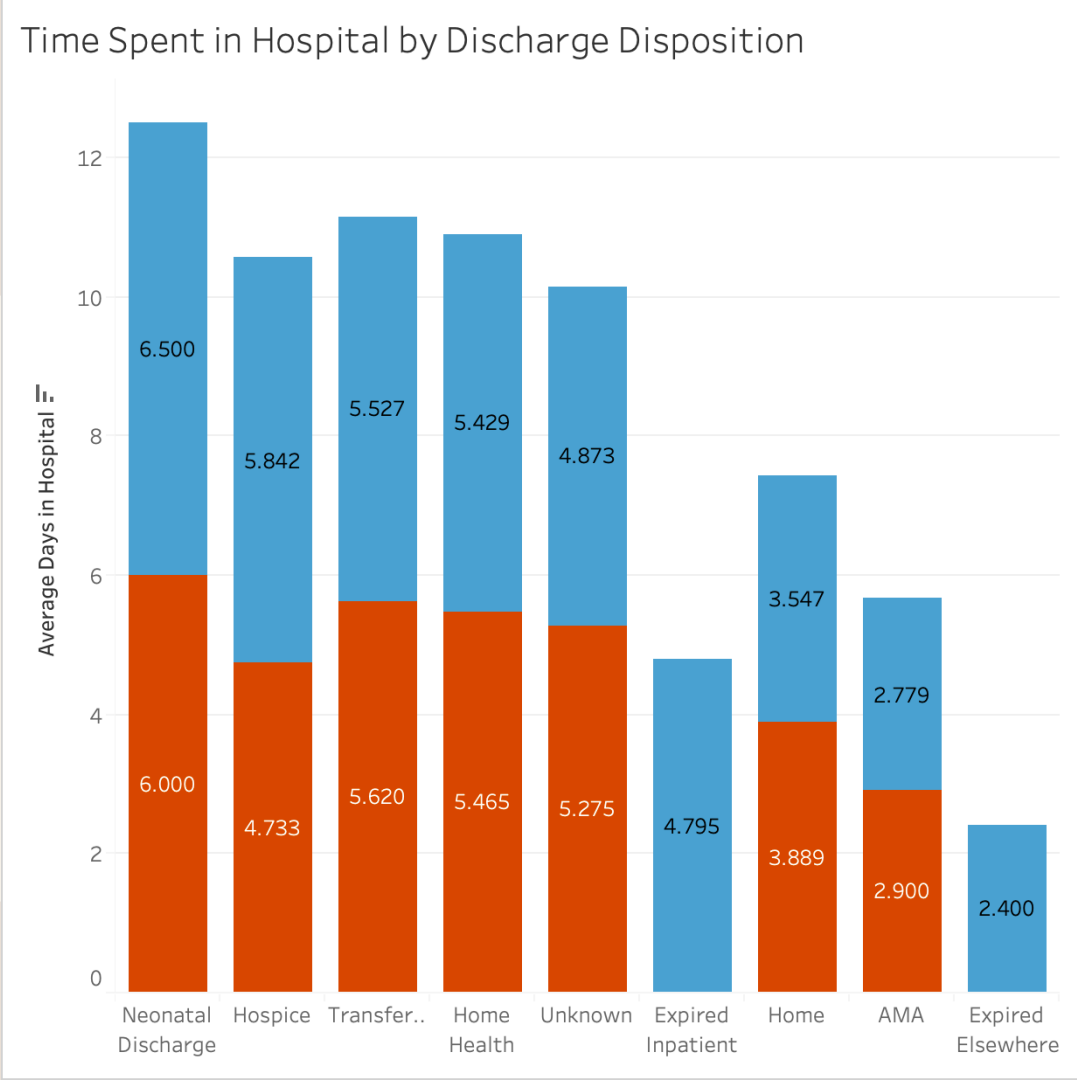
- Physical Rehabilitation Centers
- Skilled Nursing
- Other Hospitals

Interactive graph

Discharge Dispositions and Average Hospital Stay

Noteworthy insight:

- Facility transfers
- Home health
- Pregnancies
- Unknown
- Hospice
- Home
- Against Medical Advice



02

Predicting Patient Readmissions

Keep readmissions low by predicting high risk patient encounters.

Factors for Predicting Patient Readmissions:

01 Patient Demographics

02 Discharge Disposition

03 Primary Diagnoses

04 Time Spent in Hospital

Evaluating the Prediction Model:

True Positive (TP): • Reality: A wolf threatened. • Shepherd said: "Wolf." • Outcome: Shepherd is a hero.	**False Positive (FP):** • Reality: No wolf threatened. • Shepherd said: "Wolf." • Outcome: Villagers are angry at shepherd for waking them up.
False Negative (FN): • Reality: A wolf threatened. • Shepherd said: "No wolf." • Outcome: The wolf ate all the sheep.	**True Negative (TN):** • Reality: No wolf threatened. • Shepherd said: "No wolf." • Outcome: Everyone is fine.

True Positives:

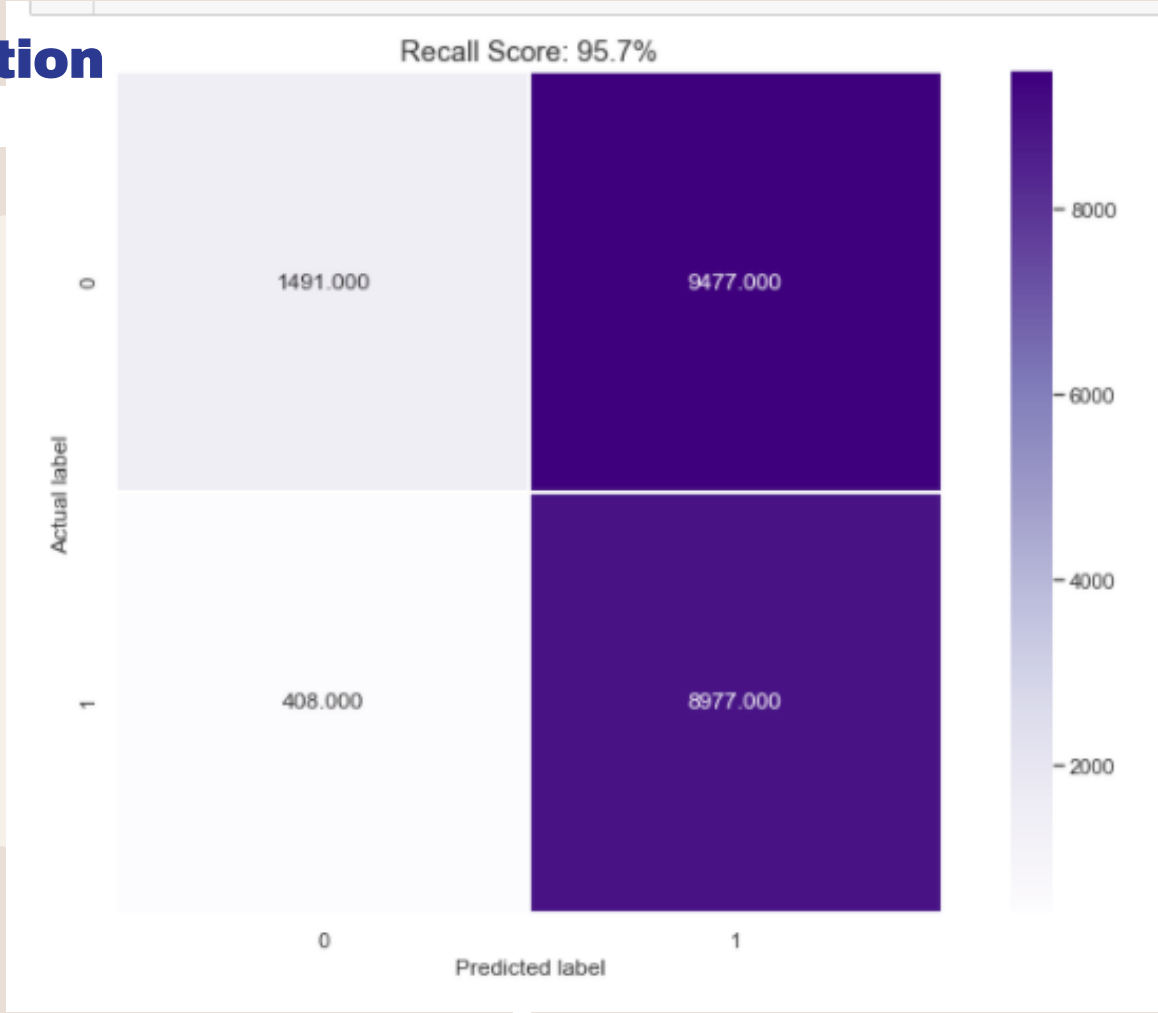
Our model correctly predicts that a patient is at high risk for readmission.
AND they are actually high risk

False Negatives:

Our model incorrectly predicts that a patient is not at high risk for readmission. BUT they actually are high risk.

Prediction Model Evaluation

- Recall (Sensitivity) Score of about 96 %
- High True Positives
- Low False Negatives



Data Analysis Findings:

A patient's age , main diagnoses and home discharges are leading predictors of high rates of "excess" readmissions.

- Educational programs aligned with primary care facilities
- Patient incentives for preventative care

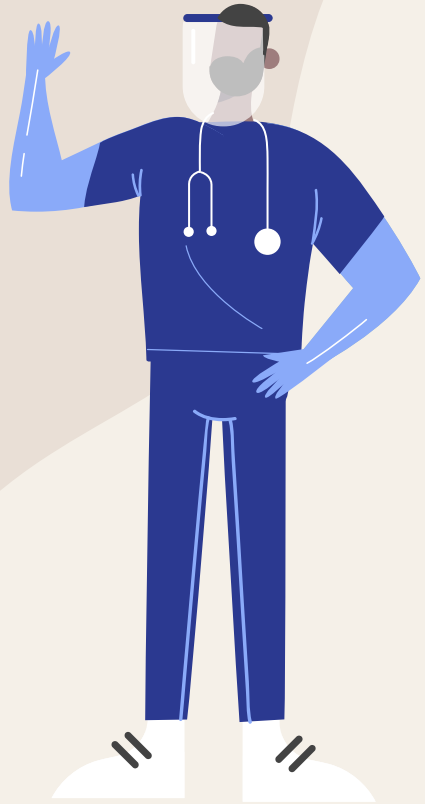
Recommendations:

Incentives

Patient and primary care physician incentives for preventative care and regular physical exams.

Education

Provide more substantial educationon and resource support to patients with high risk diagnoses.



Recommendations:

Discharge Planning

Case management and discharge planners have systems in place to ensure safe discharge and provide follow-up care plan.

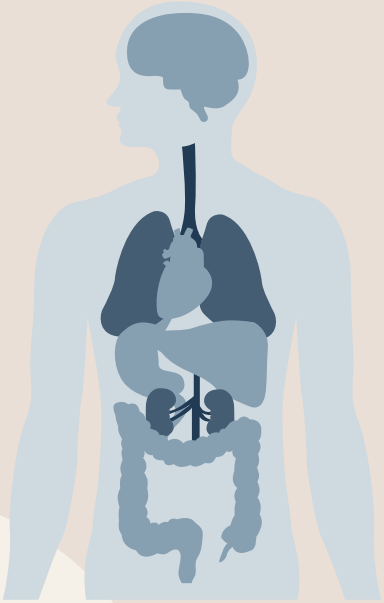
03

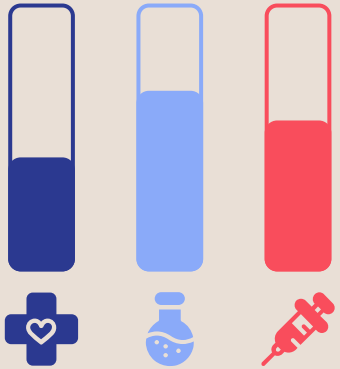
NEXT STEPS

Limitations, future work
wishes and goals...

Limitations and Biases

- Not all patient demographics are represented.
- Race and gender biases.
- Missing features that could assist with predictions.





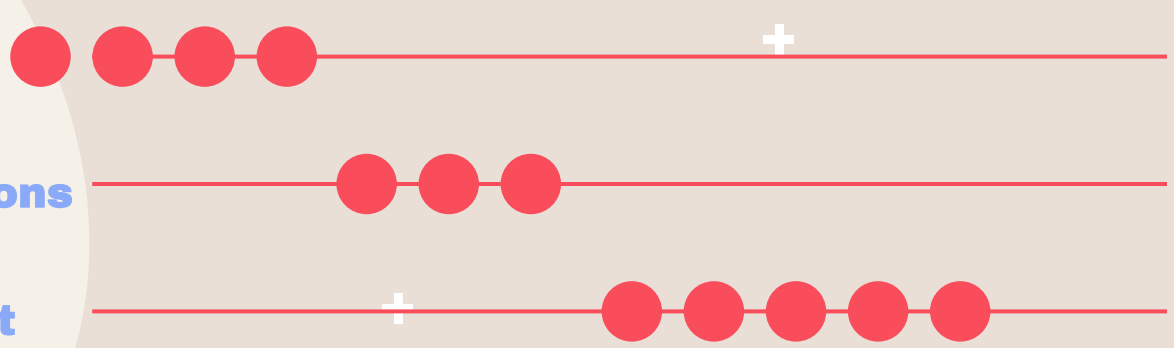
Push the Biases

What other features could be collected for readmissions analysis?

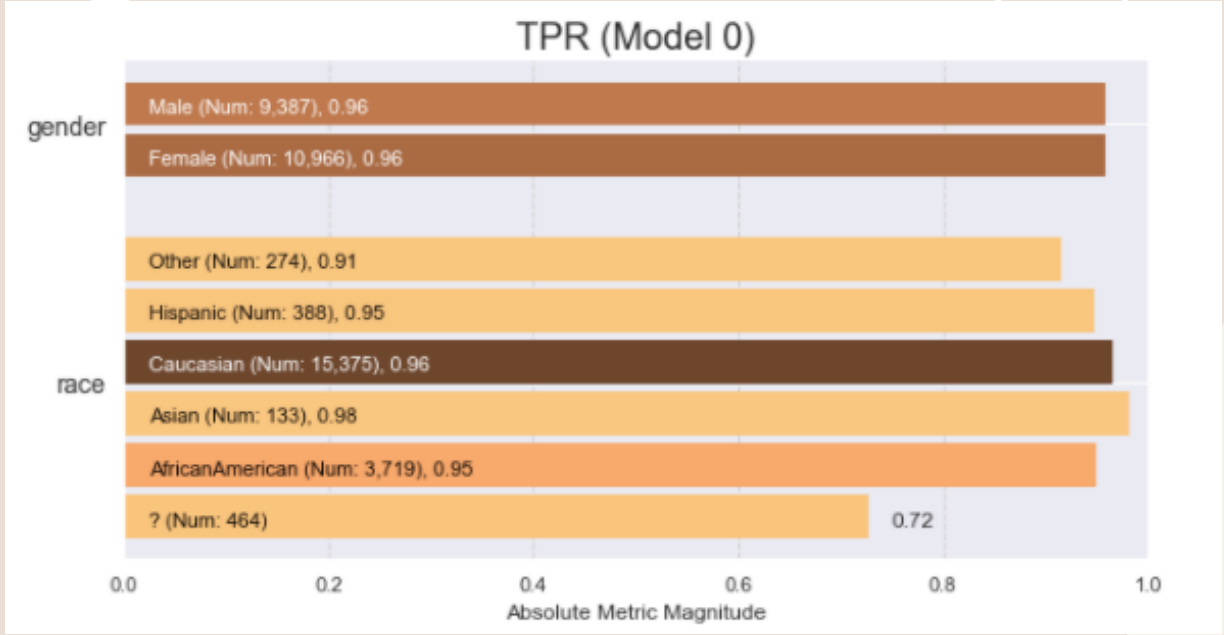
Time between admissions

Demos across regions

Cardiac subset diagnoses



Aequitas Biases Check:

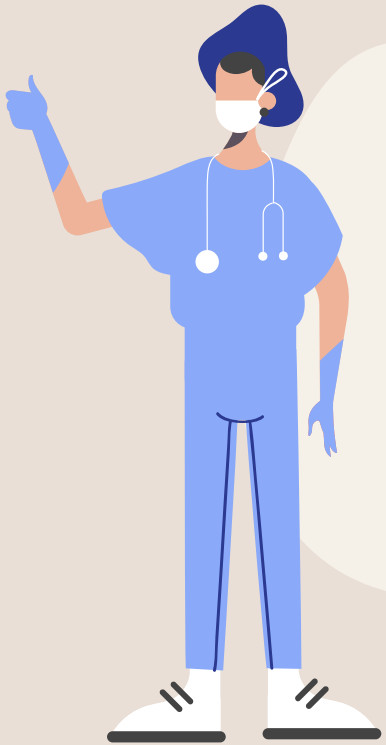


Gender and Race

No significant bias in the model across gender and race when looking at model's True Positive Rate.

Resources and Further Reading

- *The Hidden Financial Incentives Behind Your Shorter Hospital Stay* – The New York Times
- American Hospital Association – *Readmissions Reduction Fact Sheet*
- *Average hospital expenses per inpatient day across 50 states* – Becker's Hospital Review
- *Length of stay has minimal impact on the cost of hospital admissions* – Journal of the American College of Surgeons
- *Explanation of data* – BioMed Research International



Our Team Thanks You!

Leighanna Hooper

Patient Health and Wellness Advocate

John Doe

Imaginary affirmation giver and cheerleader