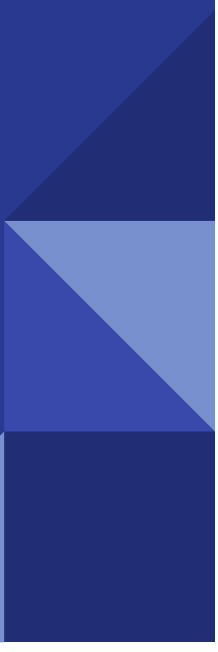


Predicting Strokes



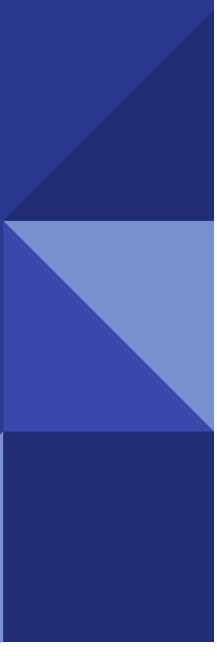
The Problem



According to the American Stroke Association, **80% of strokes are preventable.**



Client Needs



Kaiser Permanente's - Stroke Prevention Public Health Campaign

Goal

Provide an unofficial stroke-risk assessment to individuals through and app or online based interface.

Target Audience

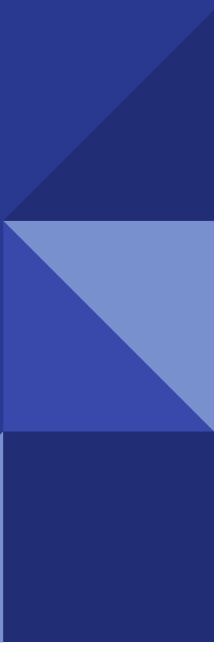
People who are 50 + years.

Needs

Easy to answer, multiple choice, questions that that can be read and answered quickly.

**This is not an official diagnosis and is instead meant to direct people to conversations with their primary physician by giving them an interactive way to take their health into their own hands*

Looking at the data



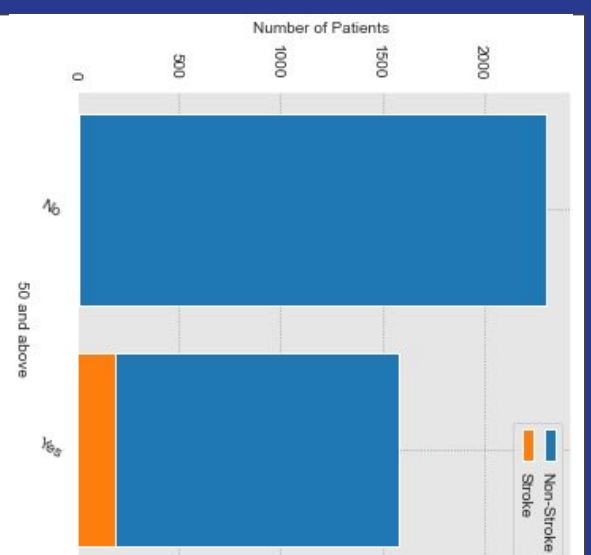
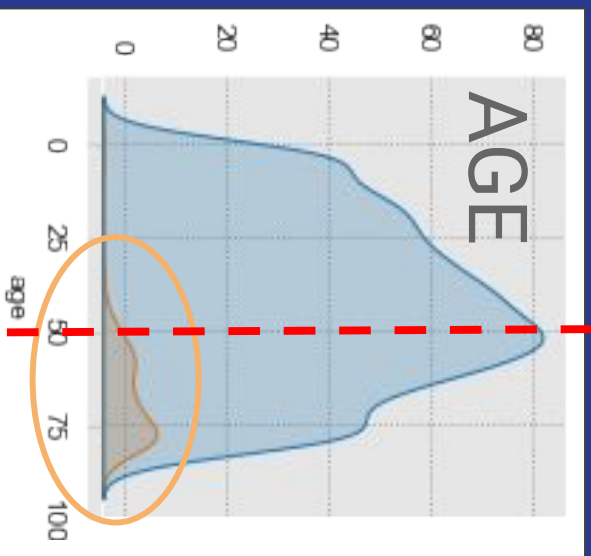
5110 Patients

95.13% Did Not
have a Stroke

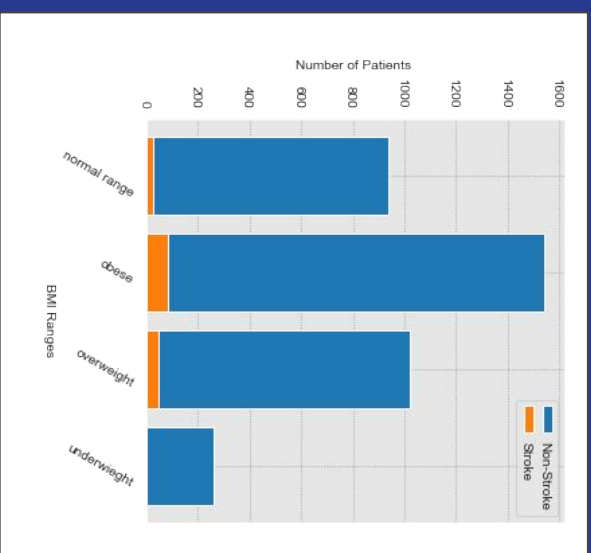
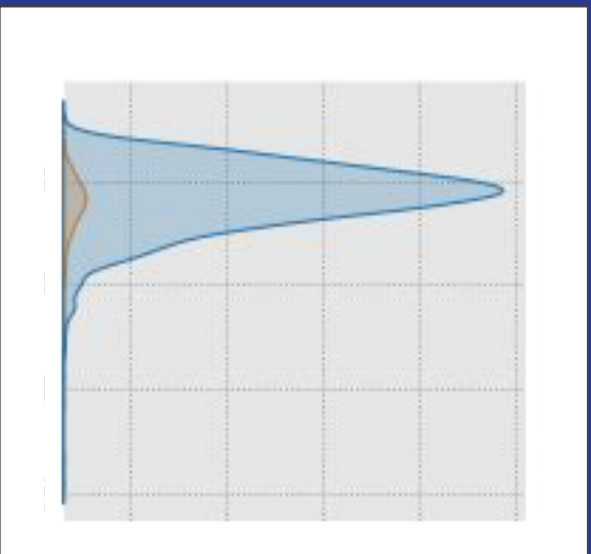
4.87% Had a
Stroke

Features Used to Model

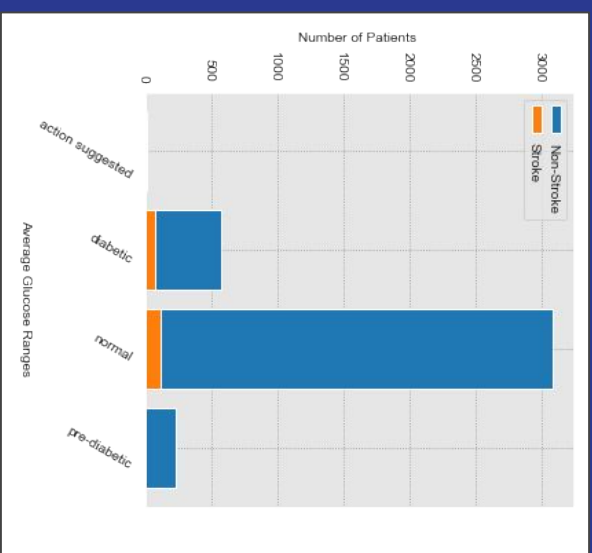
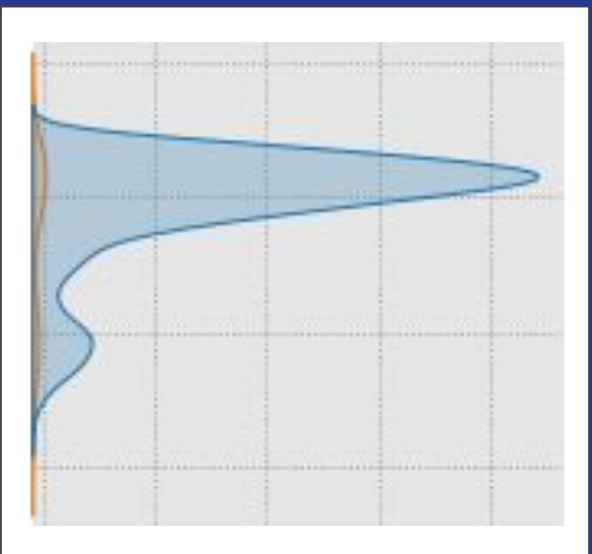
- ★ Age
- ★ Gender
- ★ BMI
- ★ Average Glucose Level
- Hypertension
- Heart Disease
- Smoking Status



Age
transformed
to 50 and
above



- # BMI transformed
- Normal range
 - Obese
 - Overweight
 - Underweight



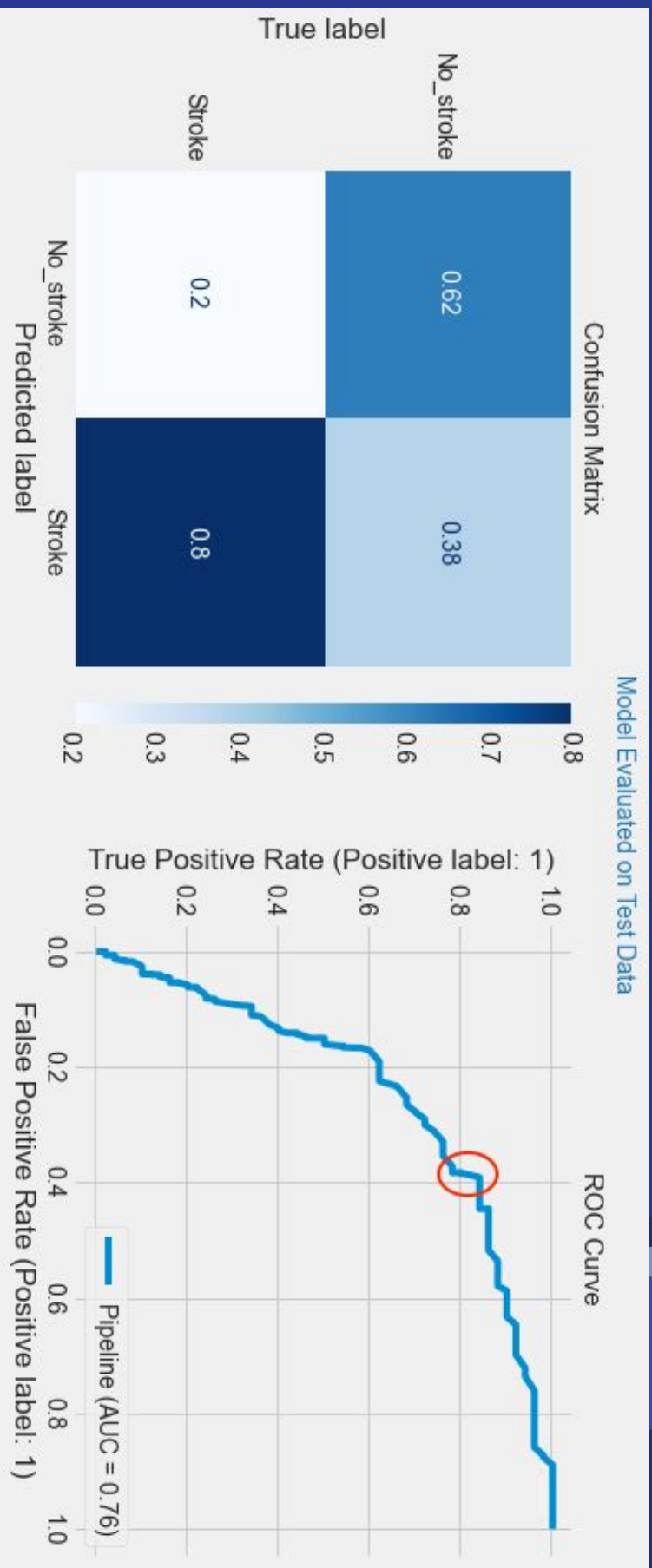
Average Glucose Level transformed

- Action
- Suggested
- Diabetic
- Normal
- Pre Diabetic

Final Model

On unseen data:

- The model was able to capture 80% of the patients who had a stroke.
- Of patients who did not have a stroke, the model captured 62%



Next Steps

- Change the way AGE is divided
- Change number of features used to model
- Higher false positives
- Change from “middle of the road” metric. What is a bigger problem, False Positives or False Negatives?



Thank You

Original Features:

1. Age
2. Gender
3. BMI
4. Average Glucose Level
5. Hypertension
6. Heart Disease
7. Smoking Status
8. Residence Type
9. Work Type
10. Ever Married

BMI Ranges:

- 'Underweight': bmi < 18.49
- 'Normal range': bmi 18.5 - 24.9
- 'Overweight': bmi 25.0 - 29.9
- 'Obese': bmi 30 or greater

Values for bmi ranges determined by 'WHO classification of weight status' table ([National Library of Medicine](#))

Average Glucose Ranges:

Values for young children, determined by 'Nationwide Children's Hospital Diabetes Center Target Blood Glucose Ranges' table ([Nationwide Children's Hospital](#)). Note: I used 'action suggested' for this age range as I did not find much information and I was uncomfortable labeling them 'diabetic' or 'pre-diabetic'.

- 0-5 years old:
 - "normal": patients with average glucose level < 180
 - "action suggested": if greater
- 6 and 10
 - 'normal': patients with average glucose level < 140
 - 'action suggested': if greater

Values for adult ranges determined by 'A1C and Estimated Average Glucose Levels' table ([Medical News Today](#)).

- Patients older than 10
 - 'normal': patients with average glucose level < 116.99
 - 'prediabetic': patients with average glucose level between 117 and 136.99
 - 'diabetic': if greater than 137

How models were selected

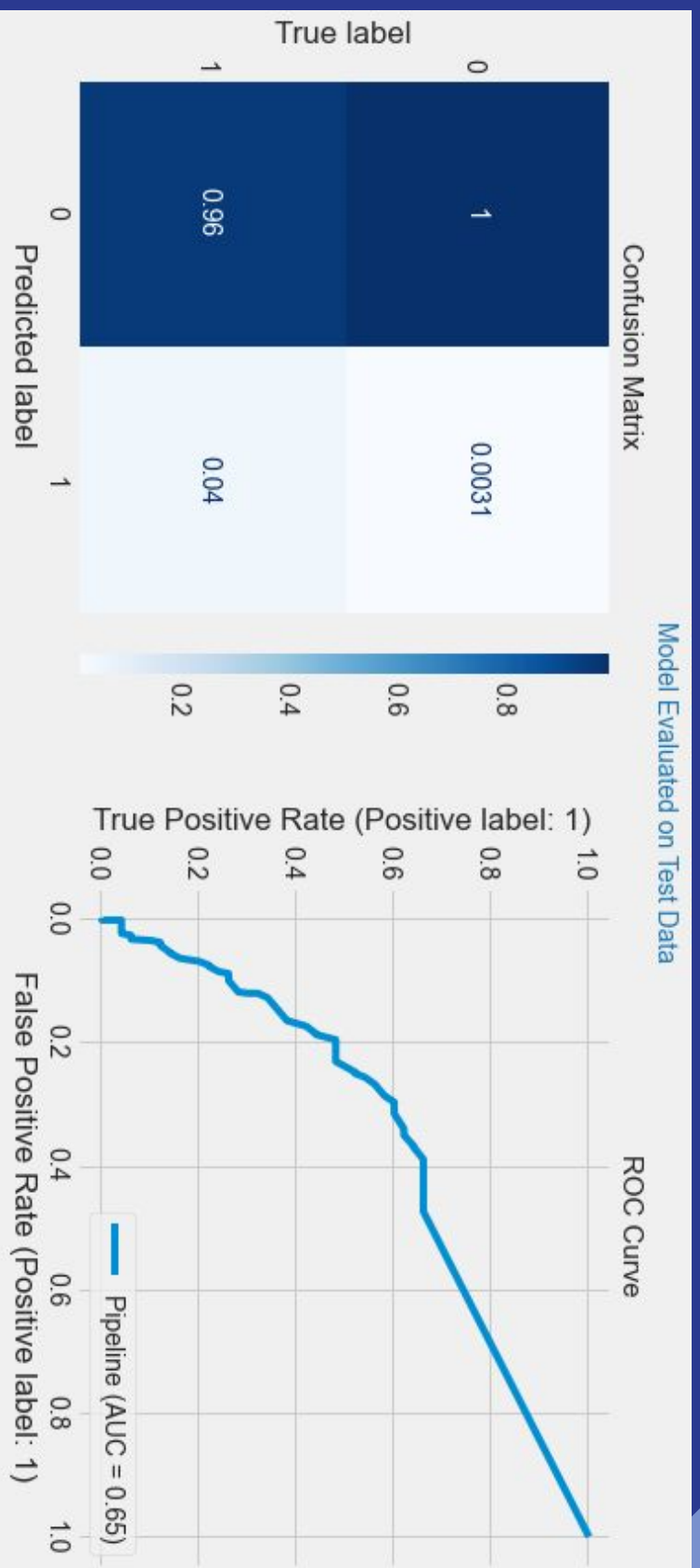
True
Negatives



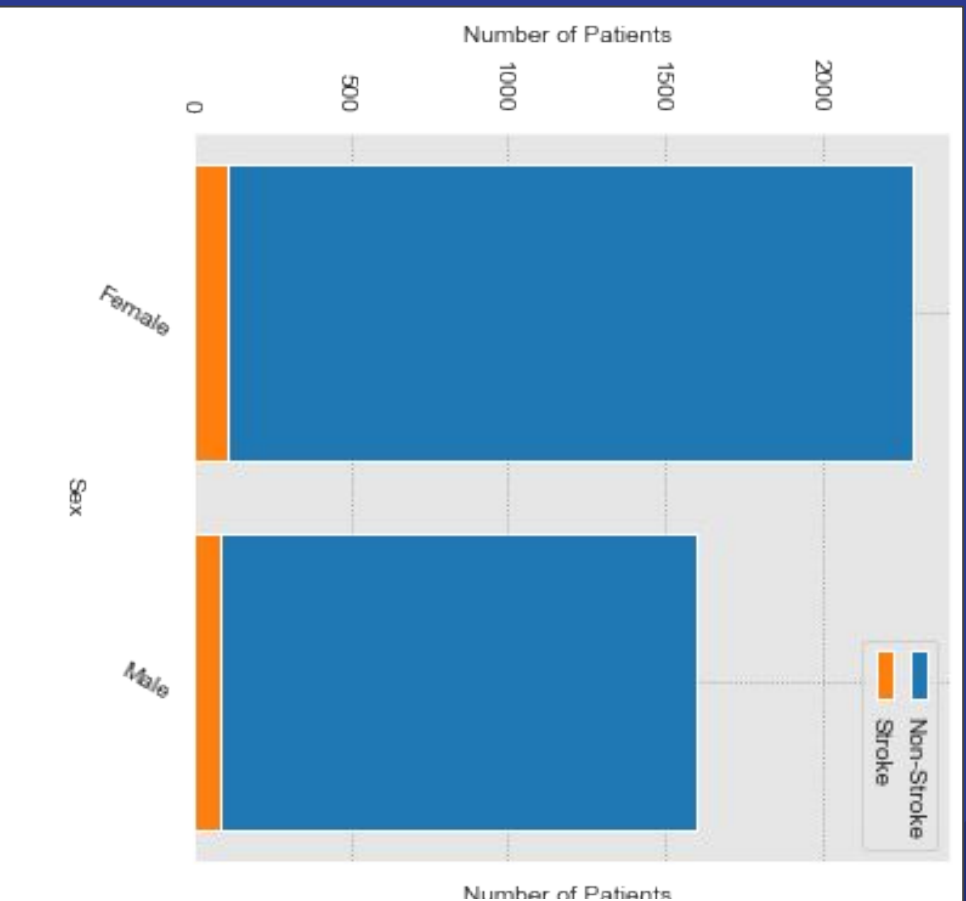
True
Positives

What is more important?

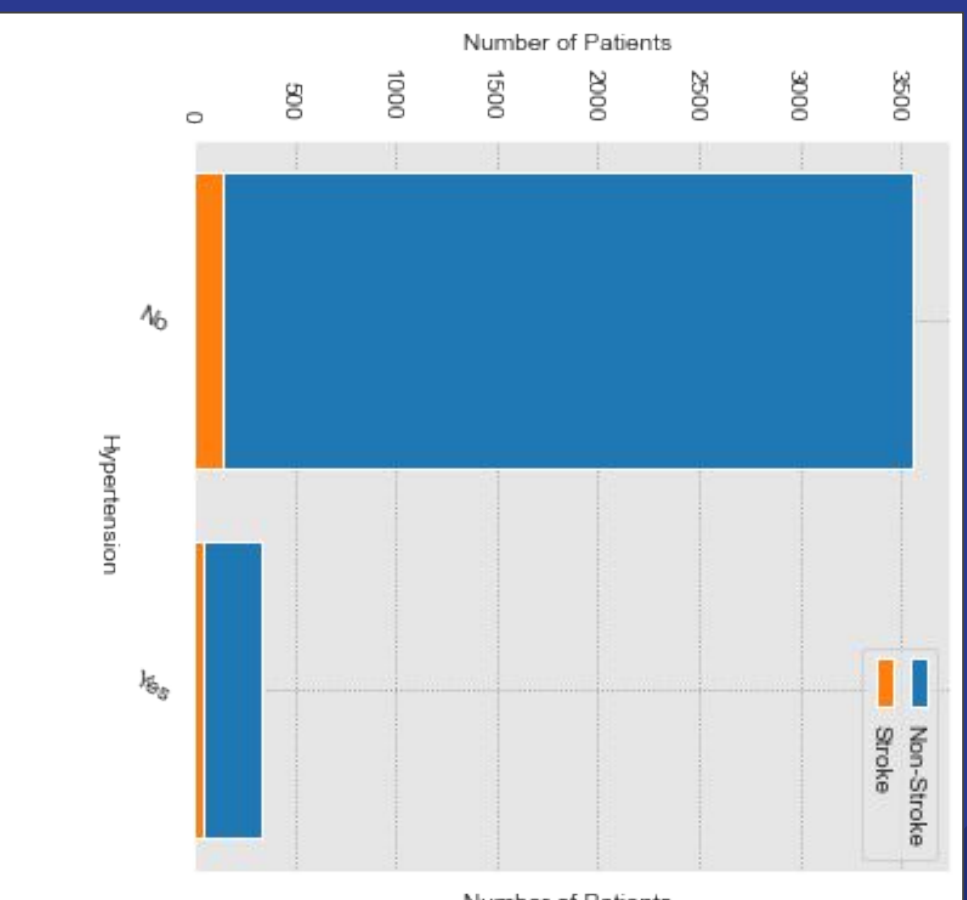
Baseline Model:



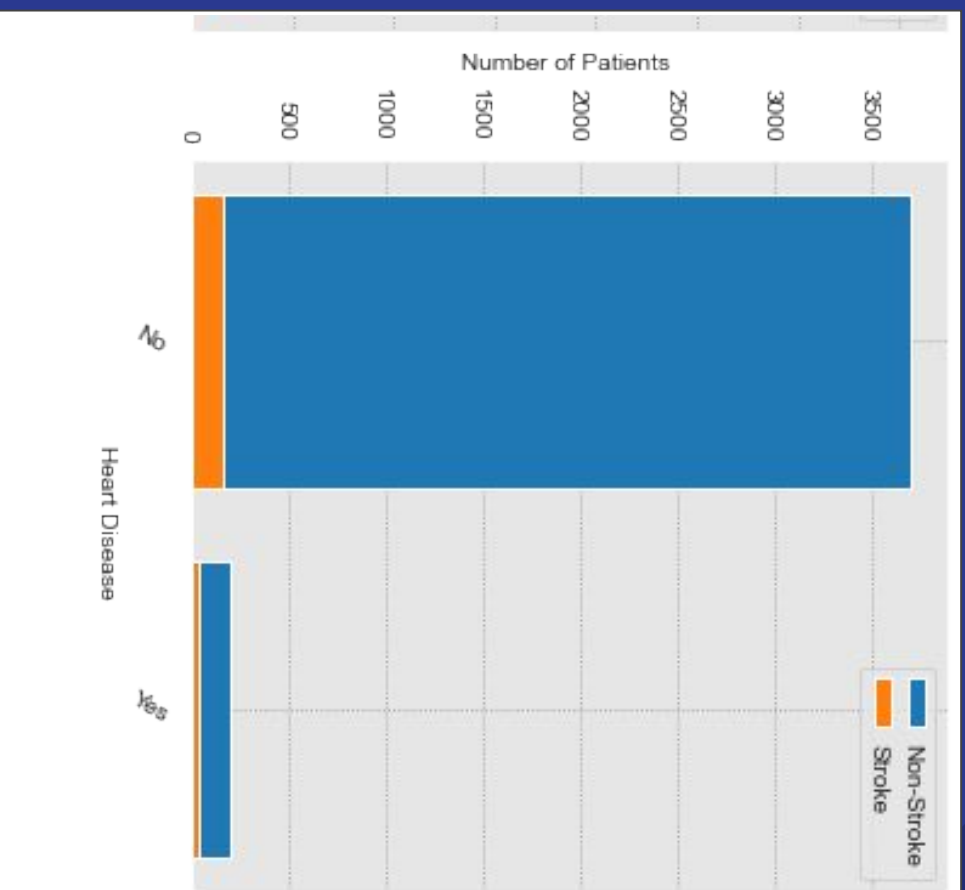
Sex



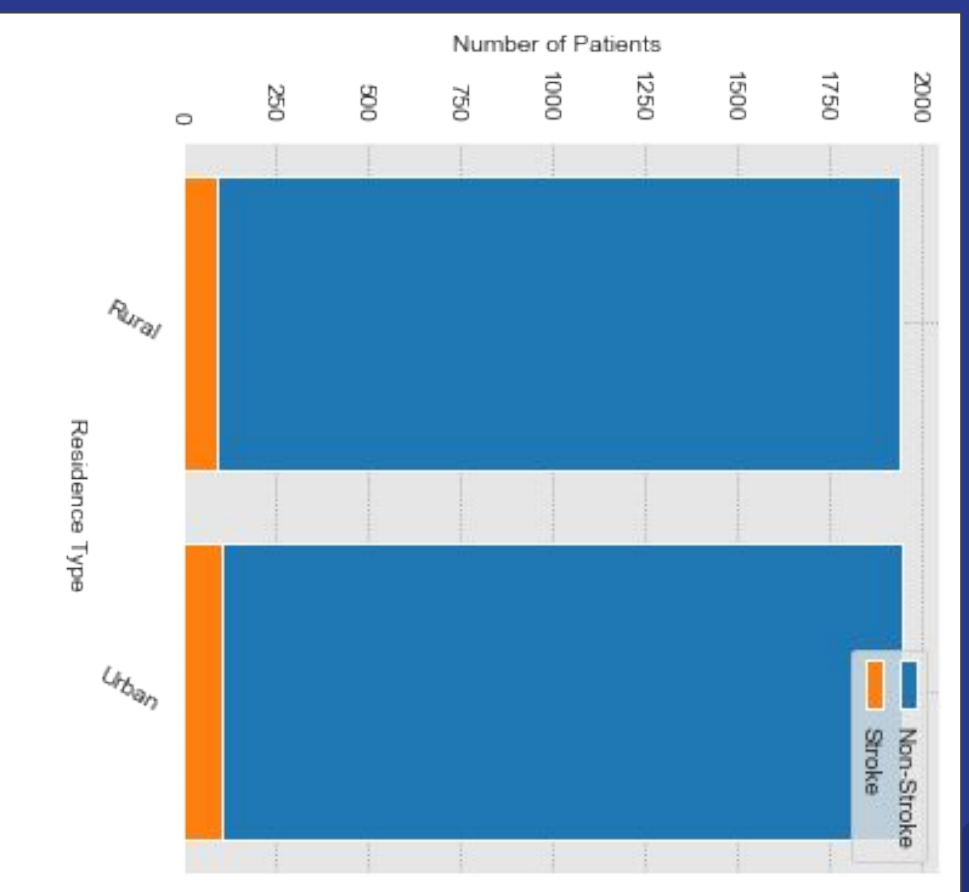
Hyper- tension



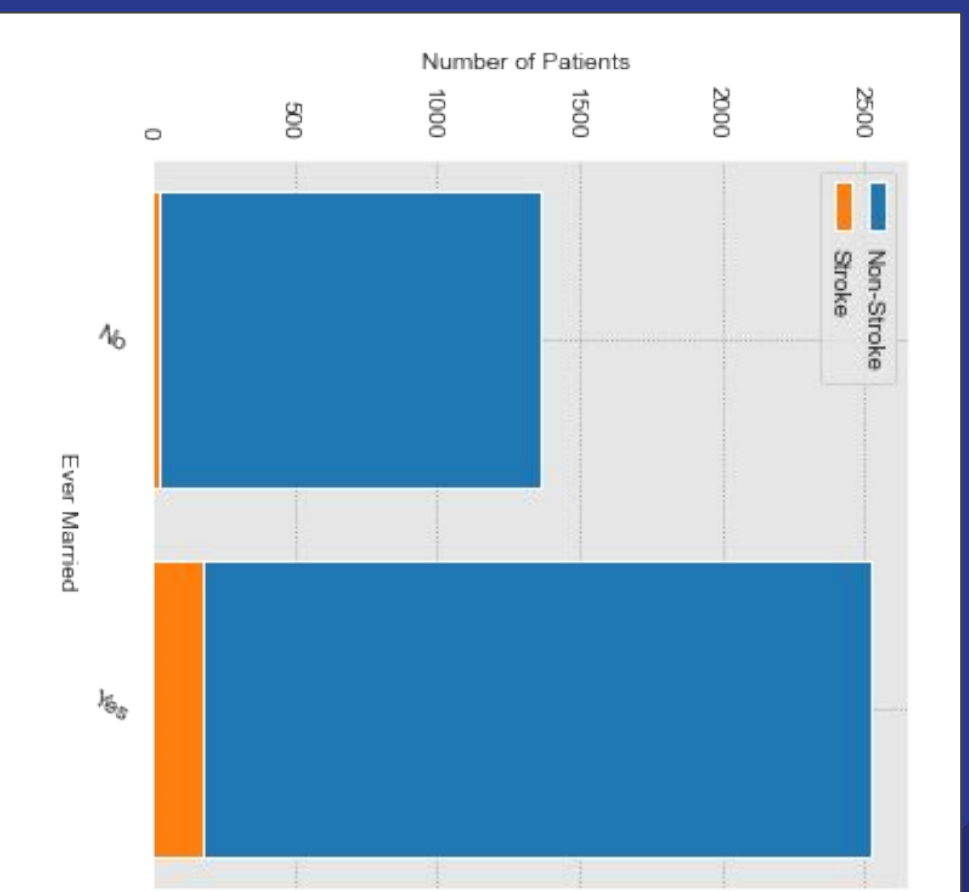
Heart Disease



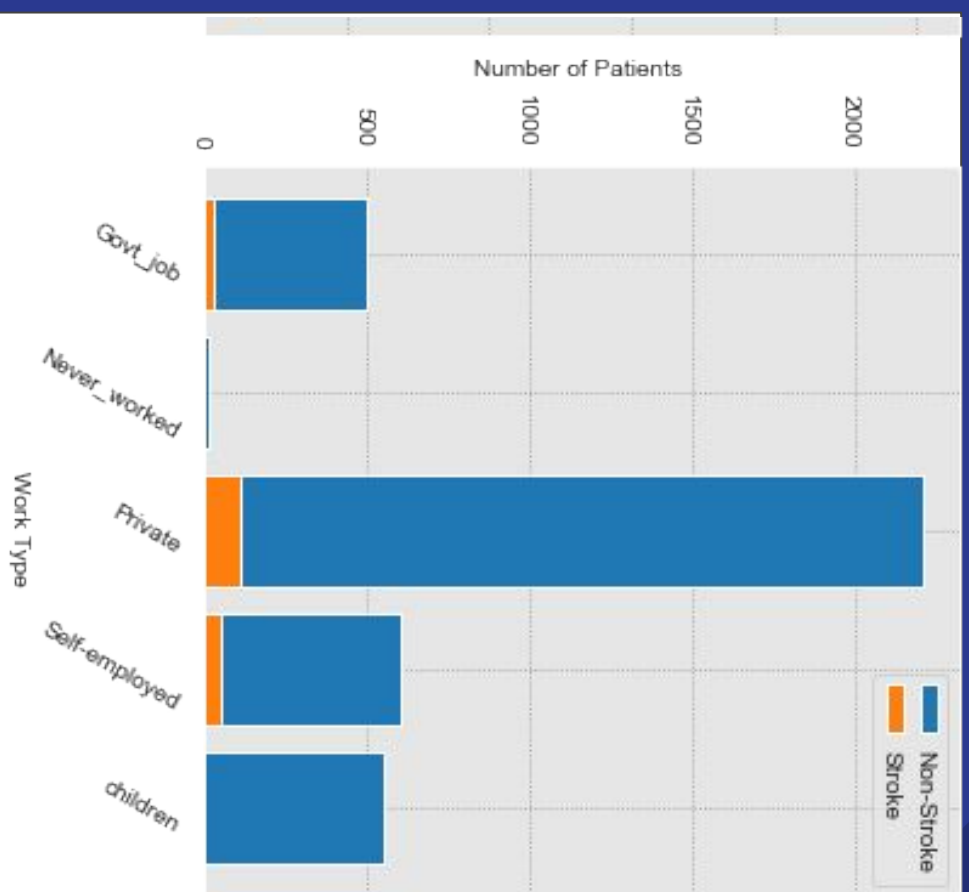
Residence Type



Ever Married



Work Type



Smoking Status

