Stroke Events: Data Preparation and Preliminary Analysis

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Background & Research Goals

- According to the World Health Organization (WHO), stroke is the 2nd leading cause of death globally, responsible for approximately 11% of total deaths.

- We will use Exploratory and Preliminary Data Analysis to answer the research questions that are posed in next slide.

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Research Questions ????

- Is the myth true, males have more strokes than females?
- Does age have a direct impact on stroke?
- People having hypertension are more prone to stroke!
- Common understanding is that a person with heart disease will suffer a stroke most of the time!
- Do married people get strokes more than unmarried people?
- Do people working in the private sector have a higher chance of stroke?
- Are people living in the city at higher risk of stroke?
- Is there a relationship between glucose level or bmi and stroke?
- Are smokers at more risk of getting a stroke?

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Dataset and Description of Variables

❖Dataset Link: Stroke Prediction Dataset | Kaggle

❖Numerical Features:

- Age
- BMI
- Avg_glucose_level

❖Categorical Features:

- gender
- hypertension
- heart_disease
- ever_married
- work_type
- stroke(target)
- smoking_status
- Residence_type

❖Total Observations: 5110

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Data Cleaning and Visualizations

Count number of unique values:

gender	3
age	104
hypertension	2
heart_disease	2
ever_married	2
work_type	5
Residence_type	2
avg_glucose_level	3979
bmi	418
smoking_status	4
stroke	2

- **No duplicate rows**
- **Checked missing values:**

	Missing_Number	Missing_Percent
bmi	201	3.933464
id	0	0.000000
gender	0	0.000000
age	0	0.000000
hypertension	0	0.000000
heart_disease	0	0.000000
ever_married	0	0.000000
work_type	0	0.000000
Residence_type	0	0.000000
avg_glucose_level	0	0.000000
smoking_status	0	0.000000
stroke	0	0.000000

- **Replaced missing BMI values by median since this is more robust to outliers compared to mean.**

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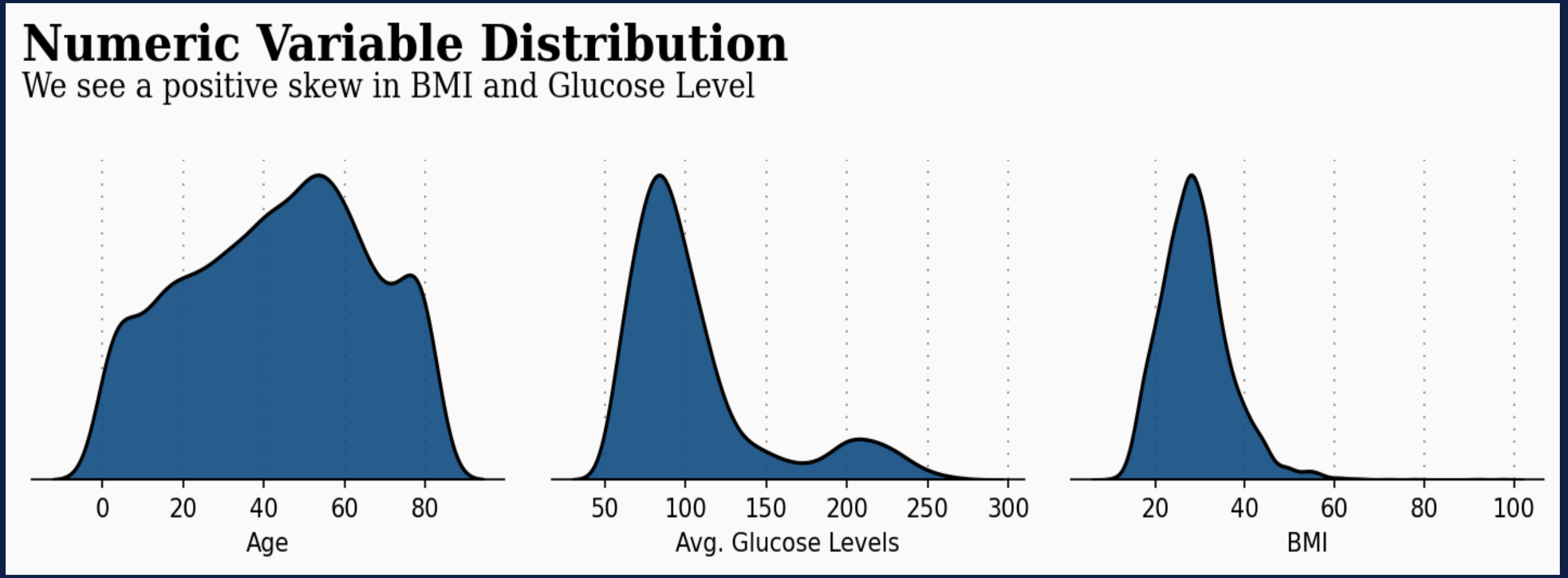
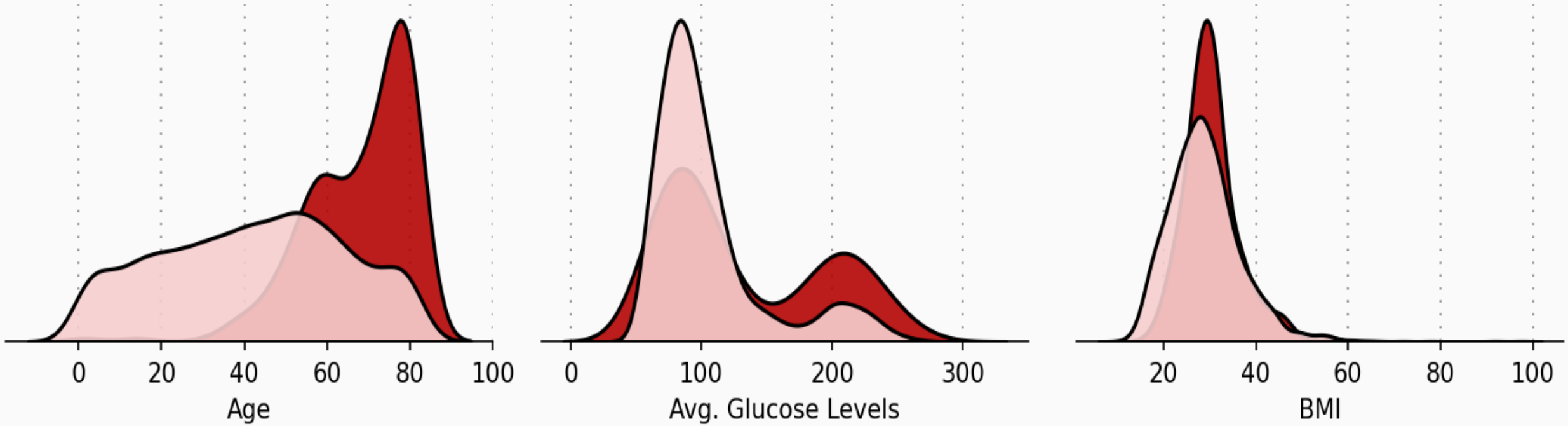
Explore Numerical Features



Explore Numerical Features

Numeric Variables by Stroke & No Stroke

Age looks to be a prominent factor



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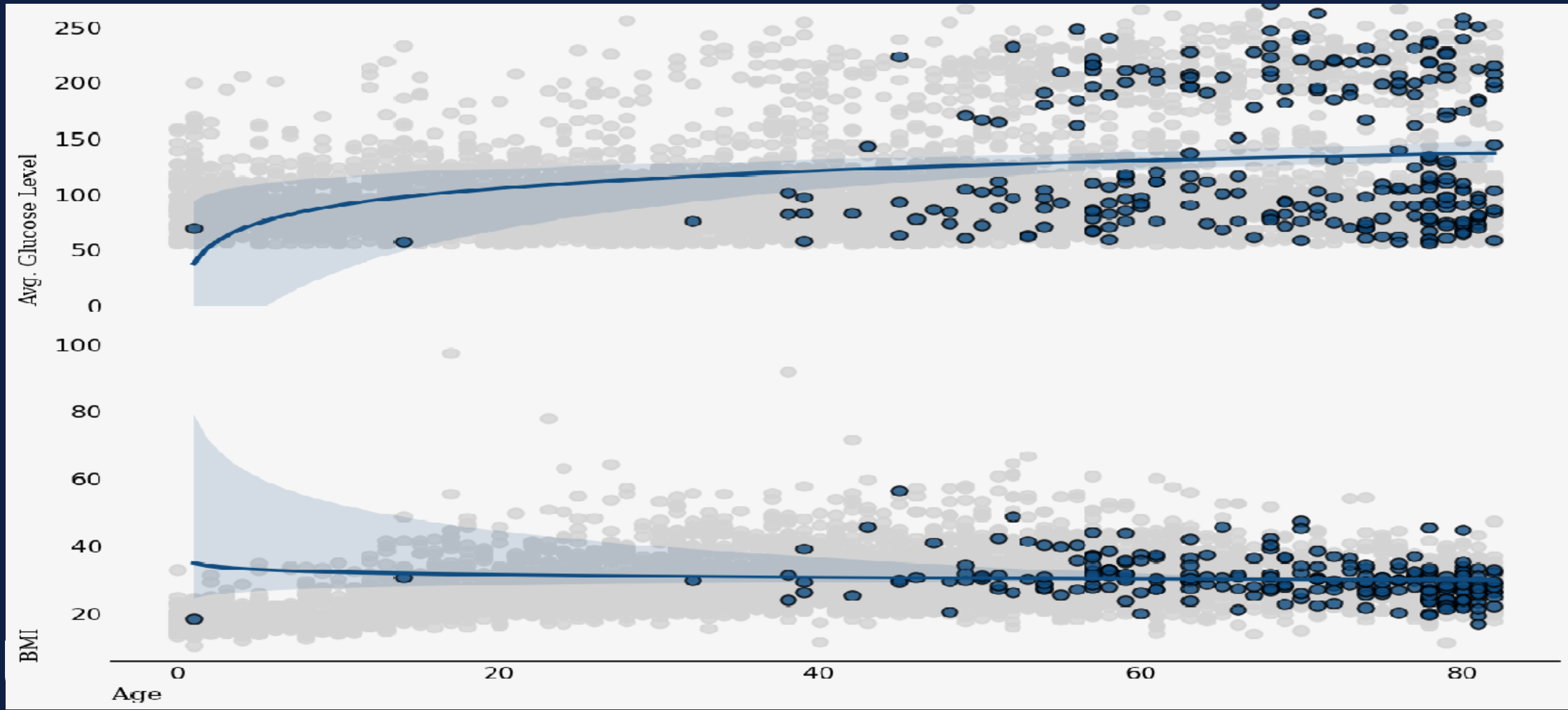
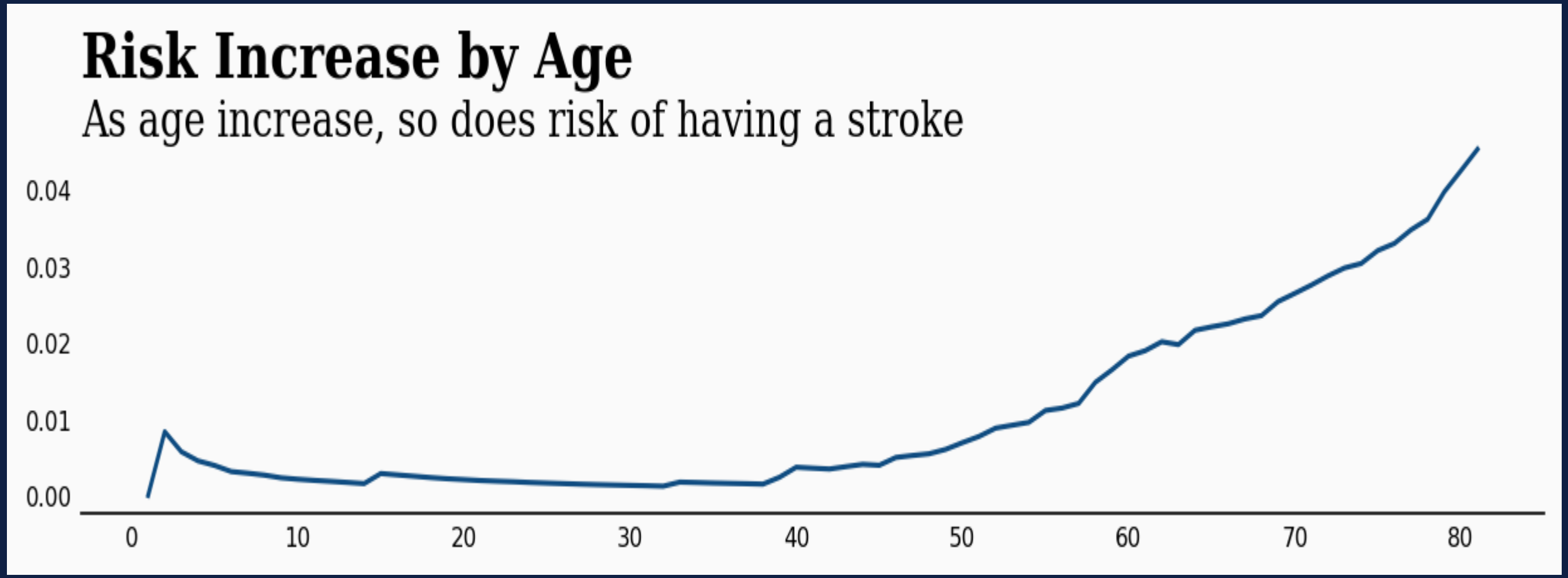
Strokes by Age, Glucose level, and BMI



Age Versus Stroke



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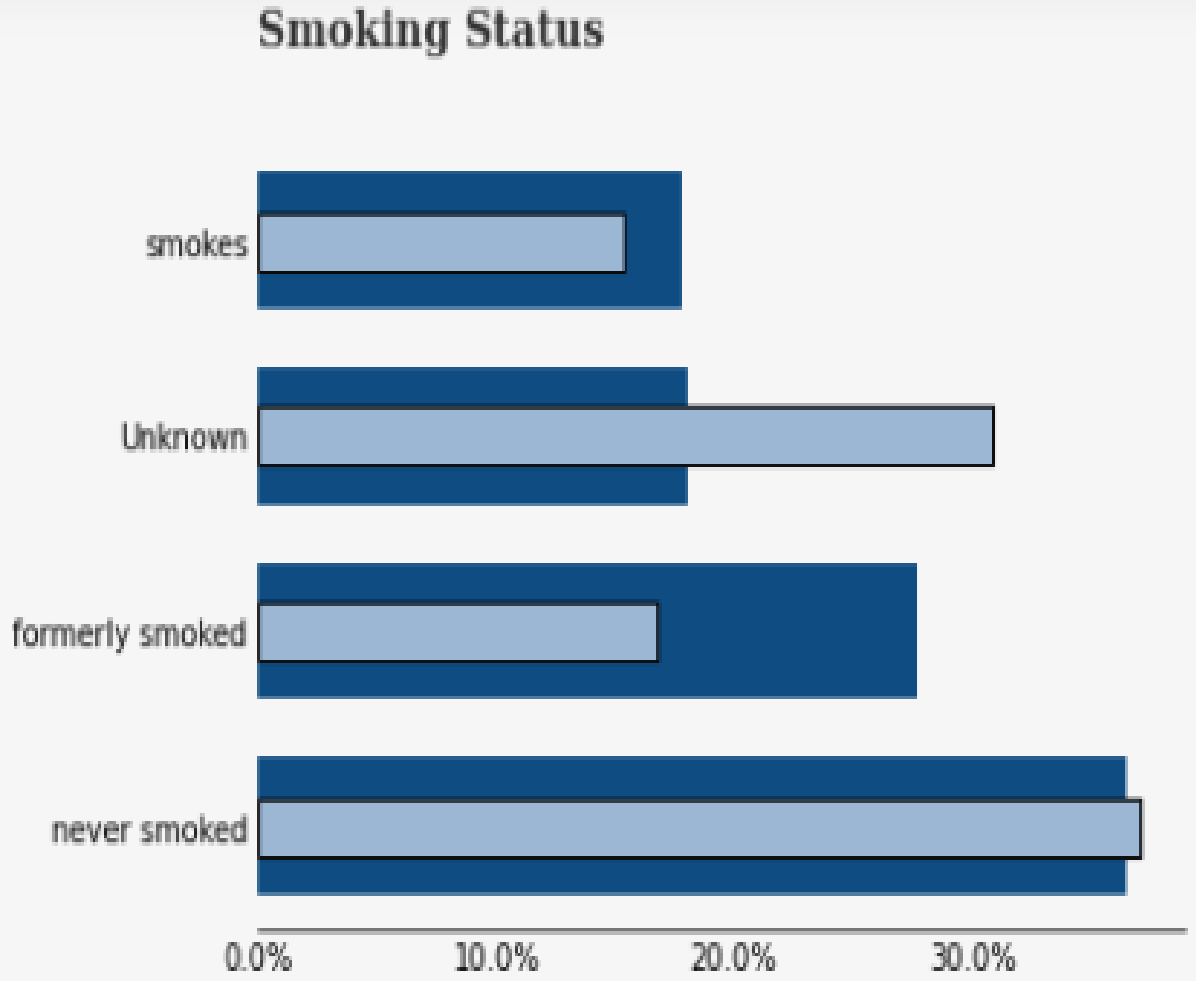
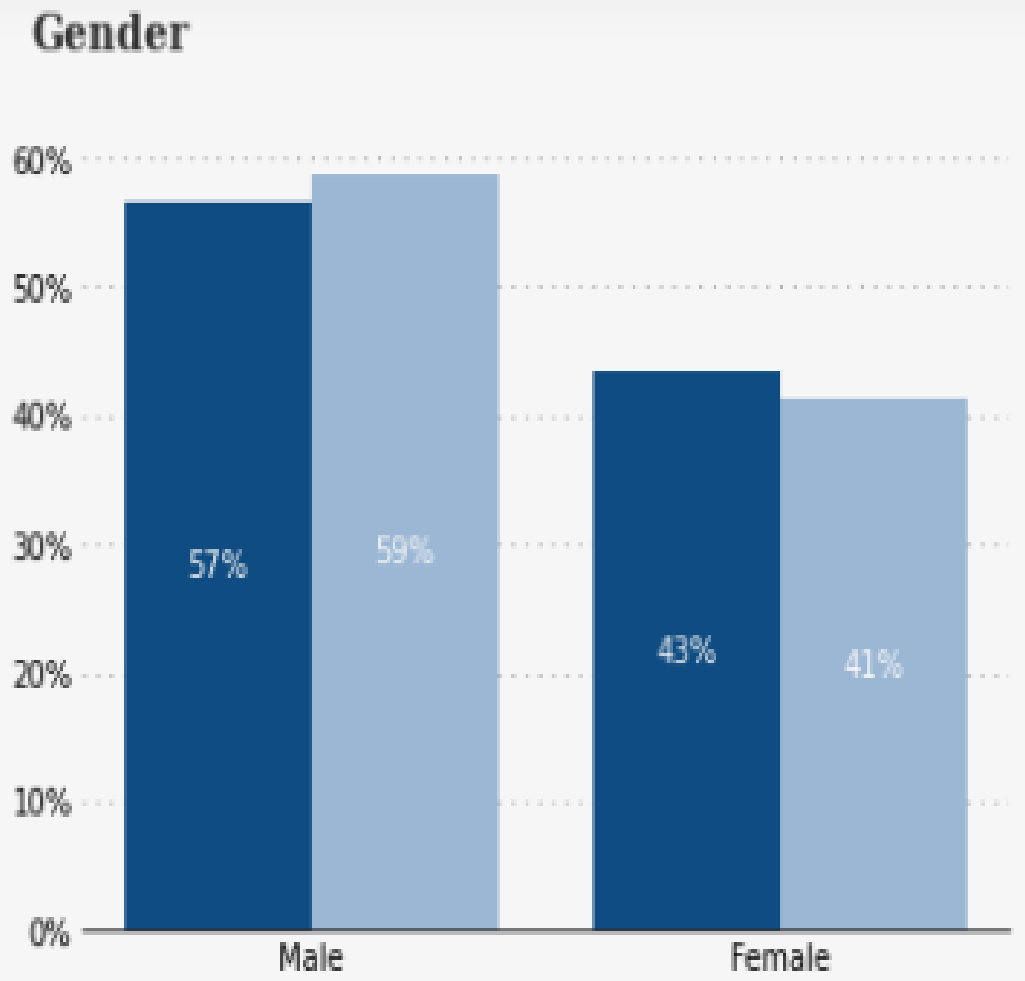
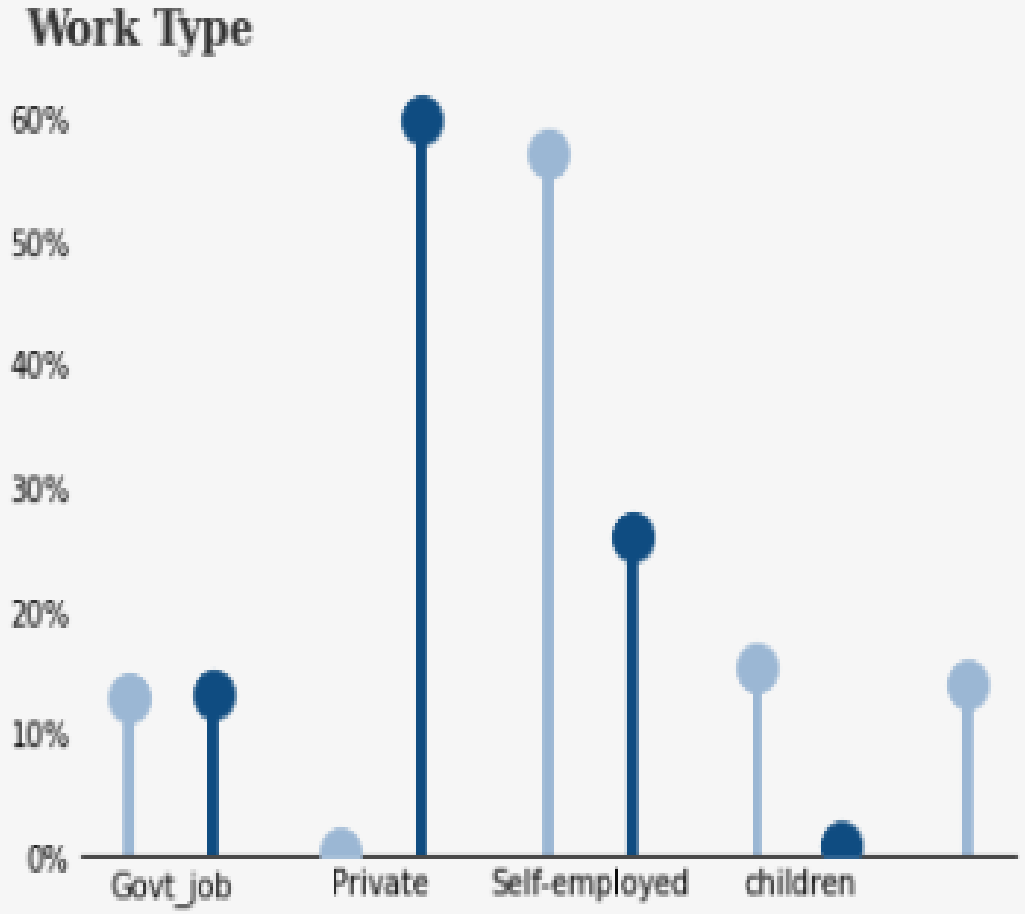
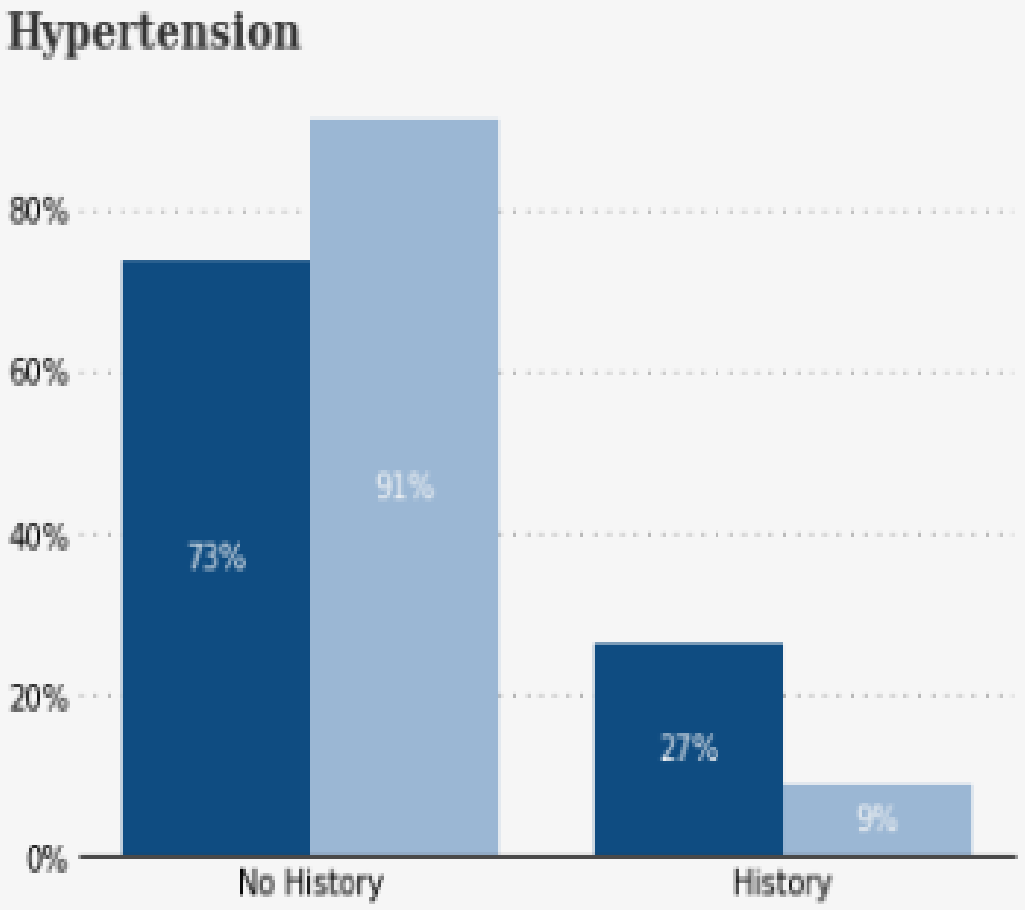
Explore Categorical Features





Work Type & Hypertension





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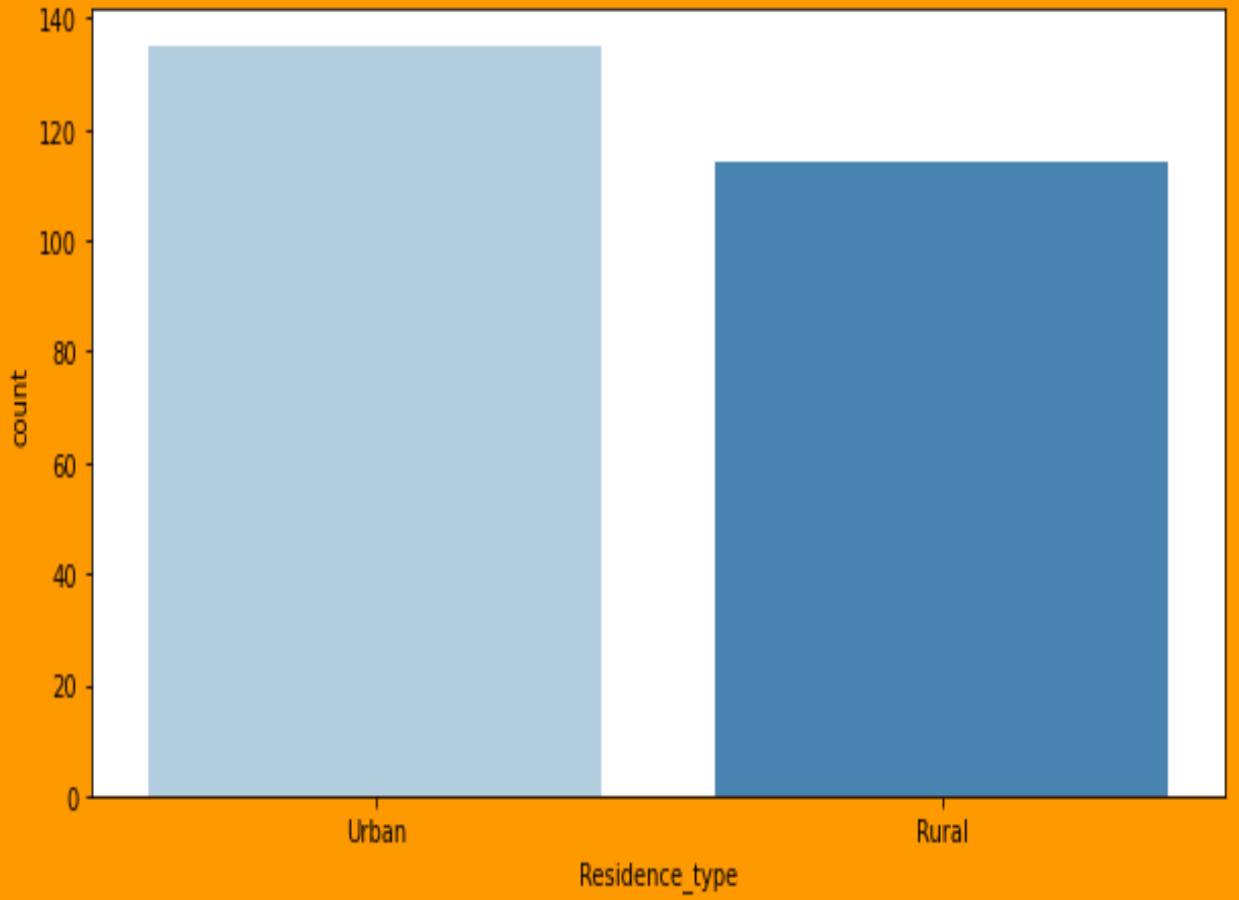
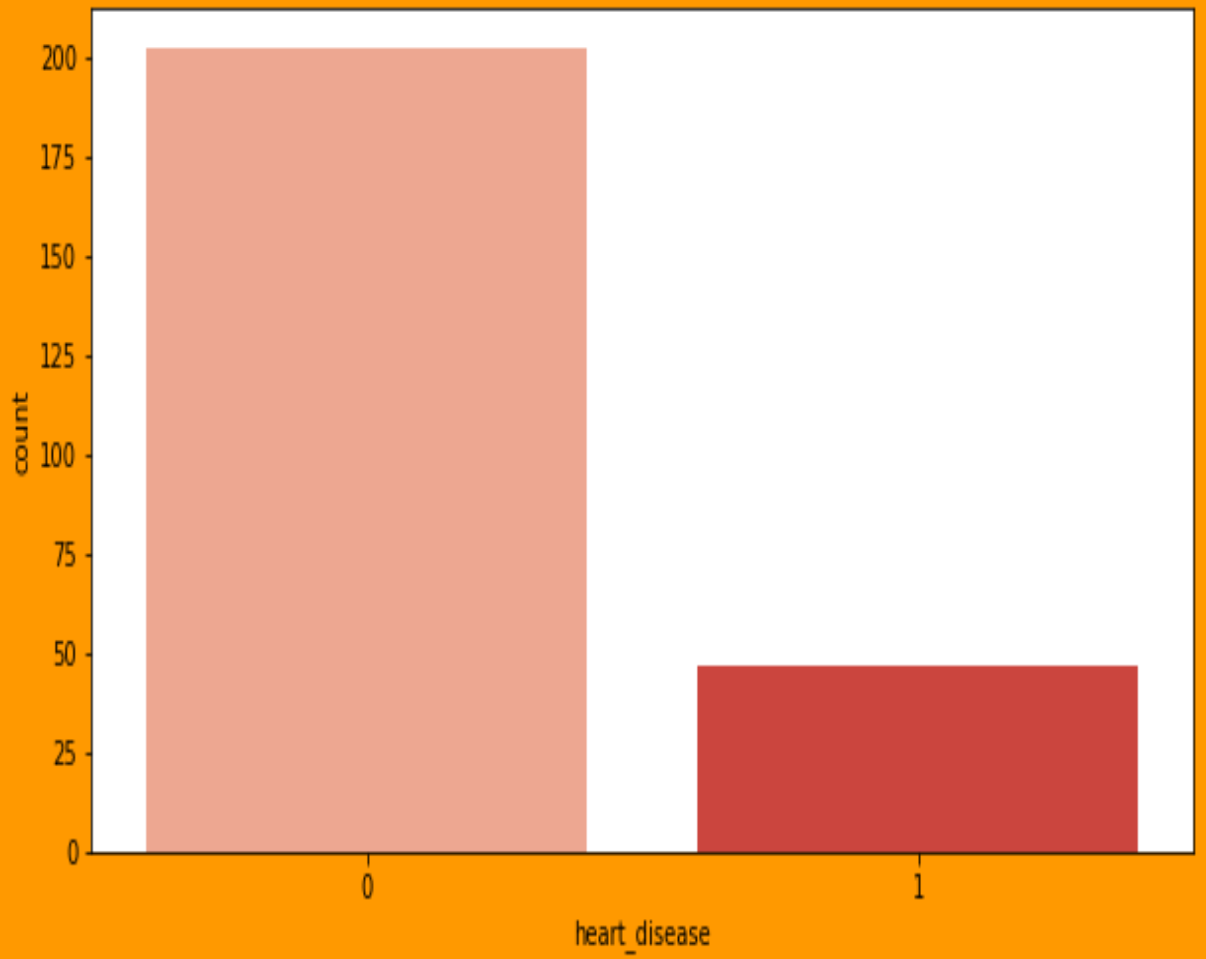
Residence Type & Heart Disease





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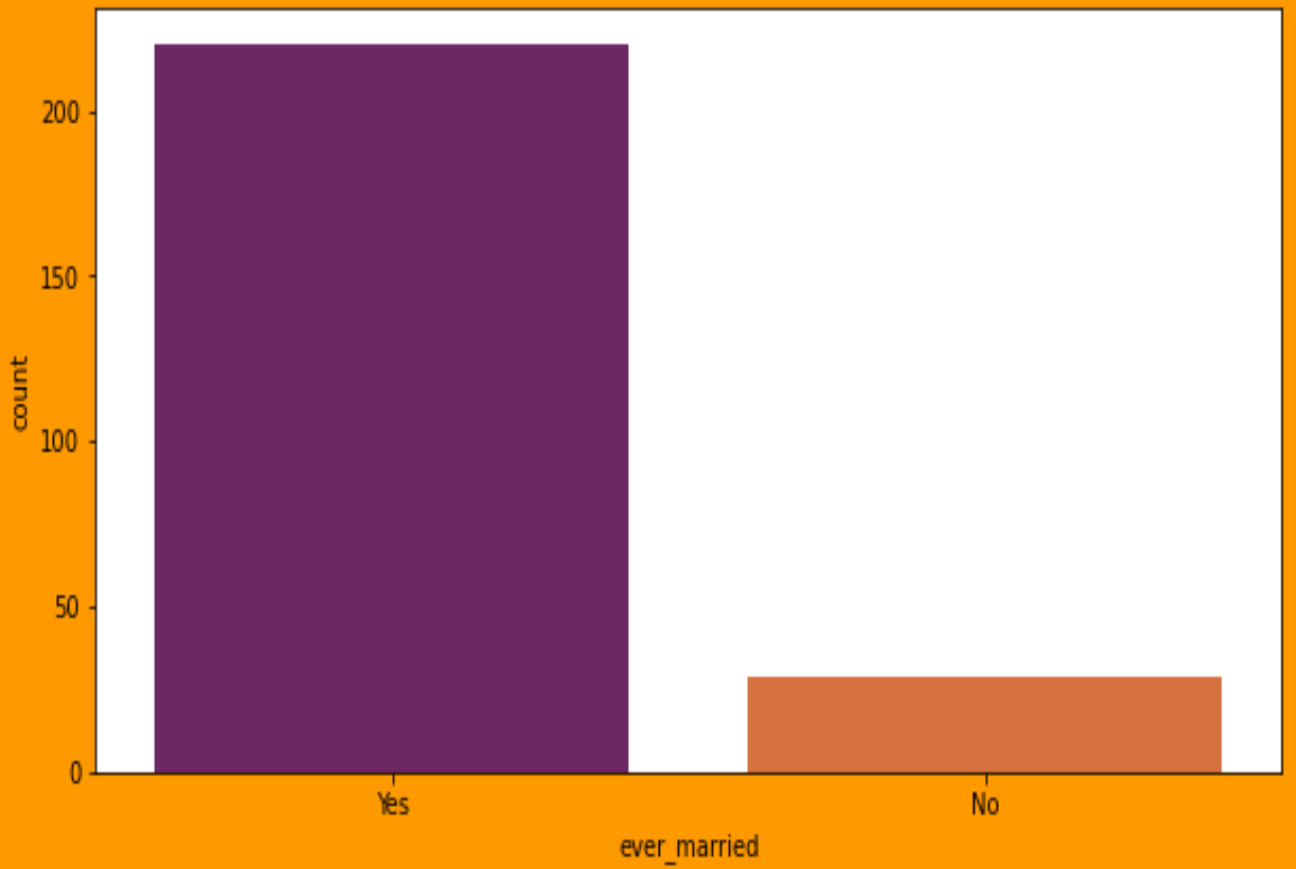
Stroke vs Marital Status



That was expected, wasn't it 👀

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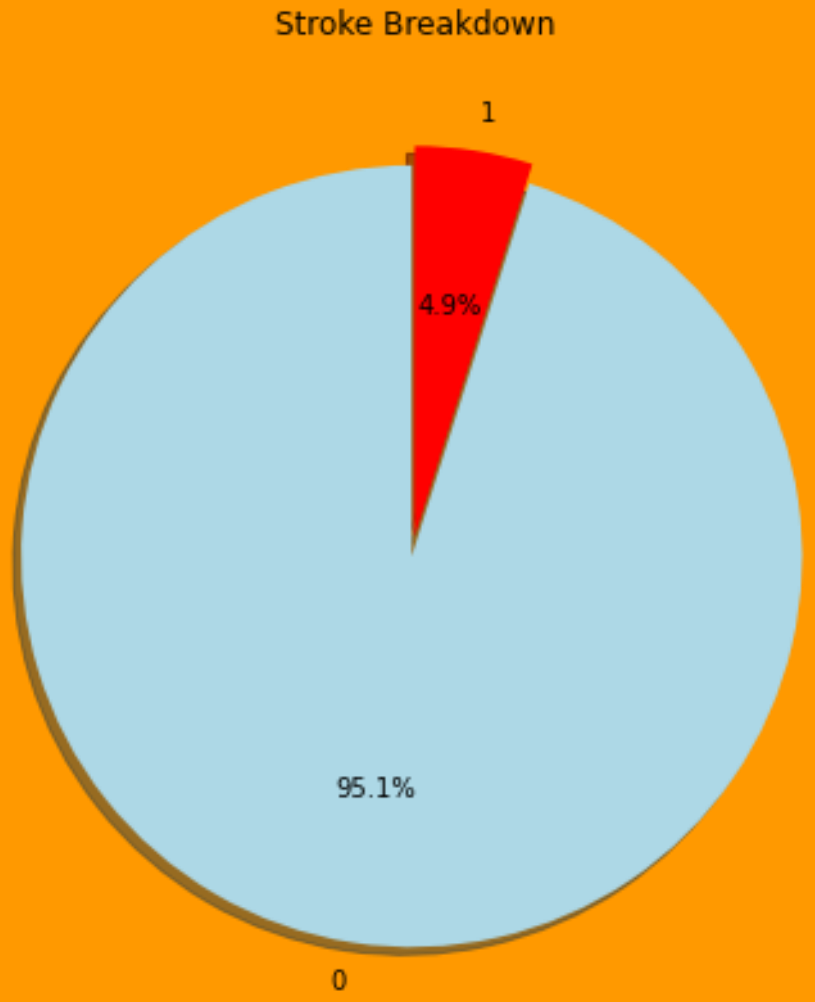
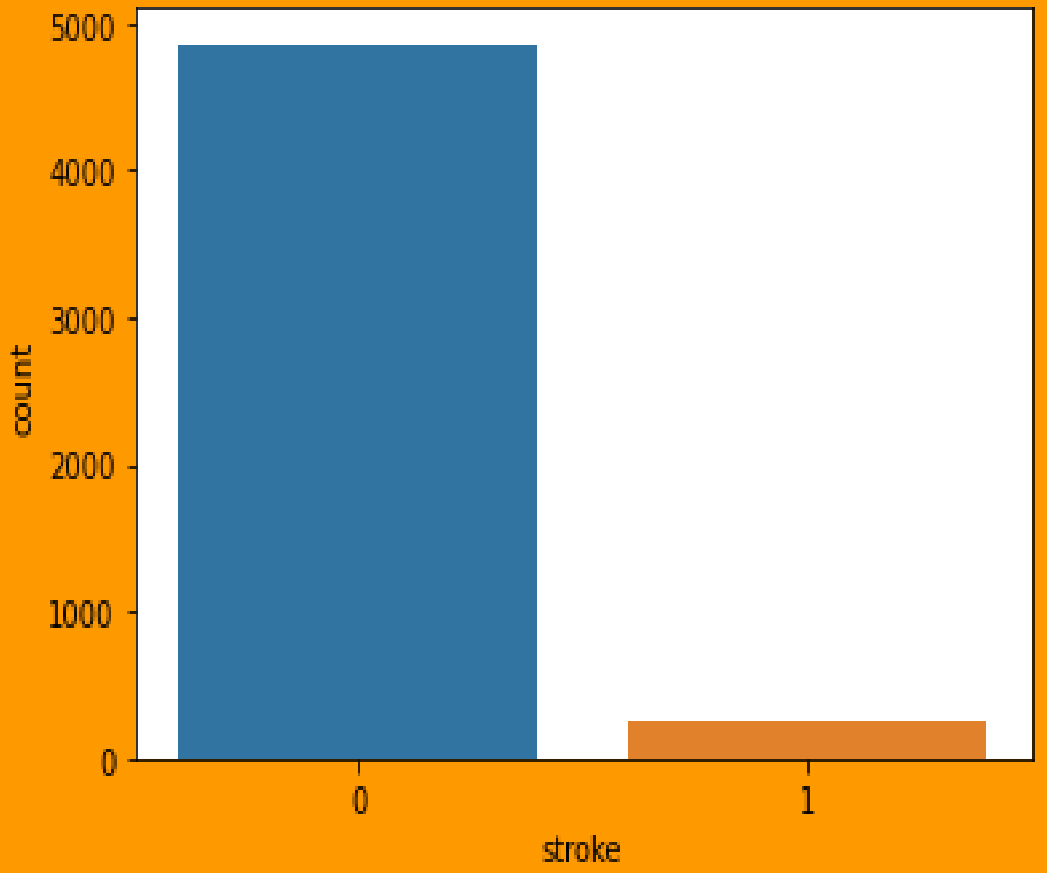
Stroke Breakdown





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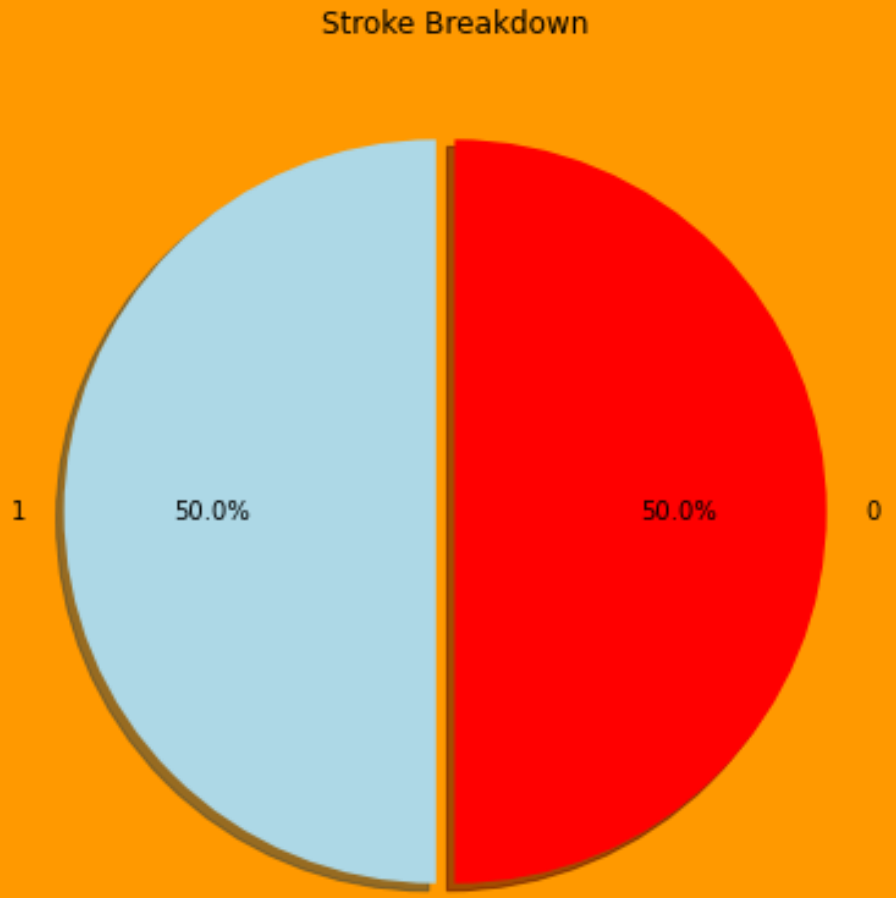
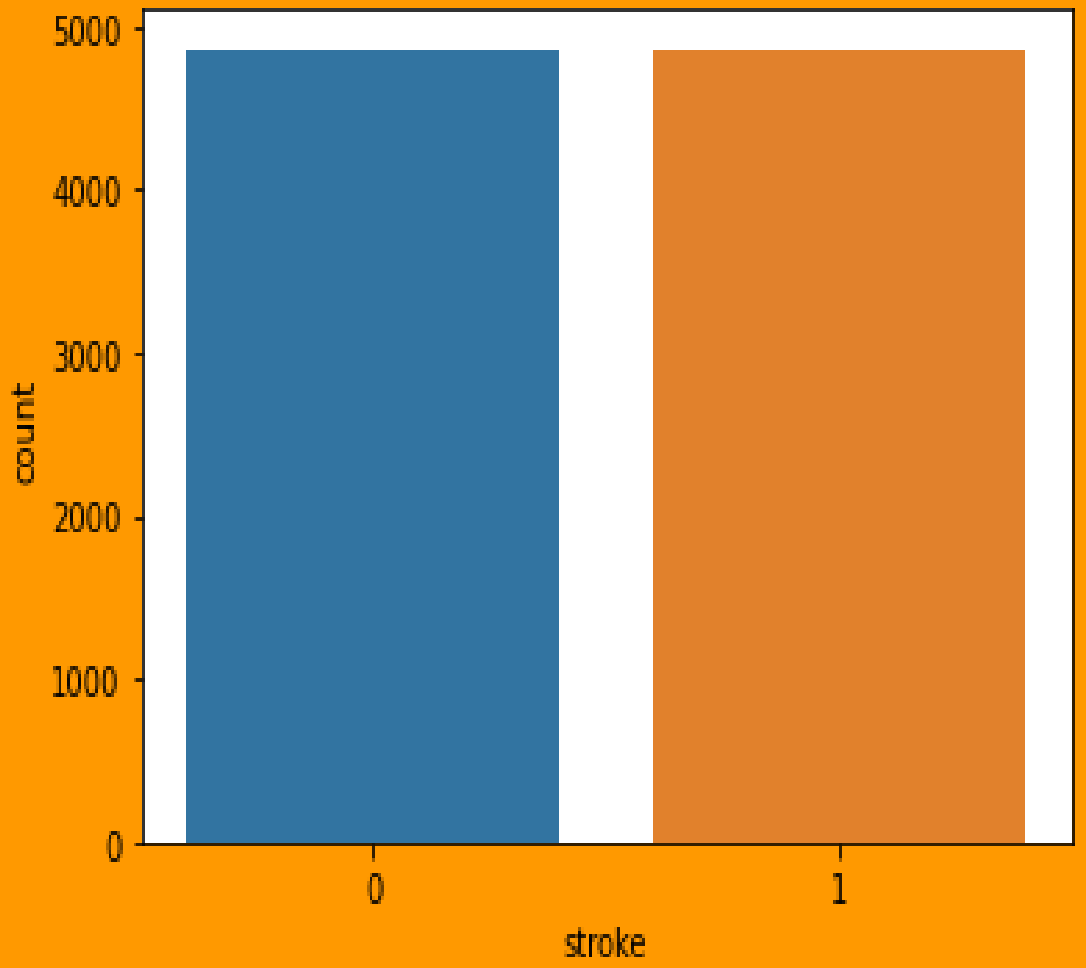
Stroke Breakdown after Upsampling





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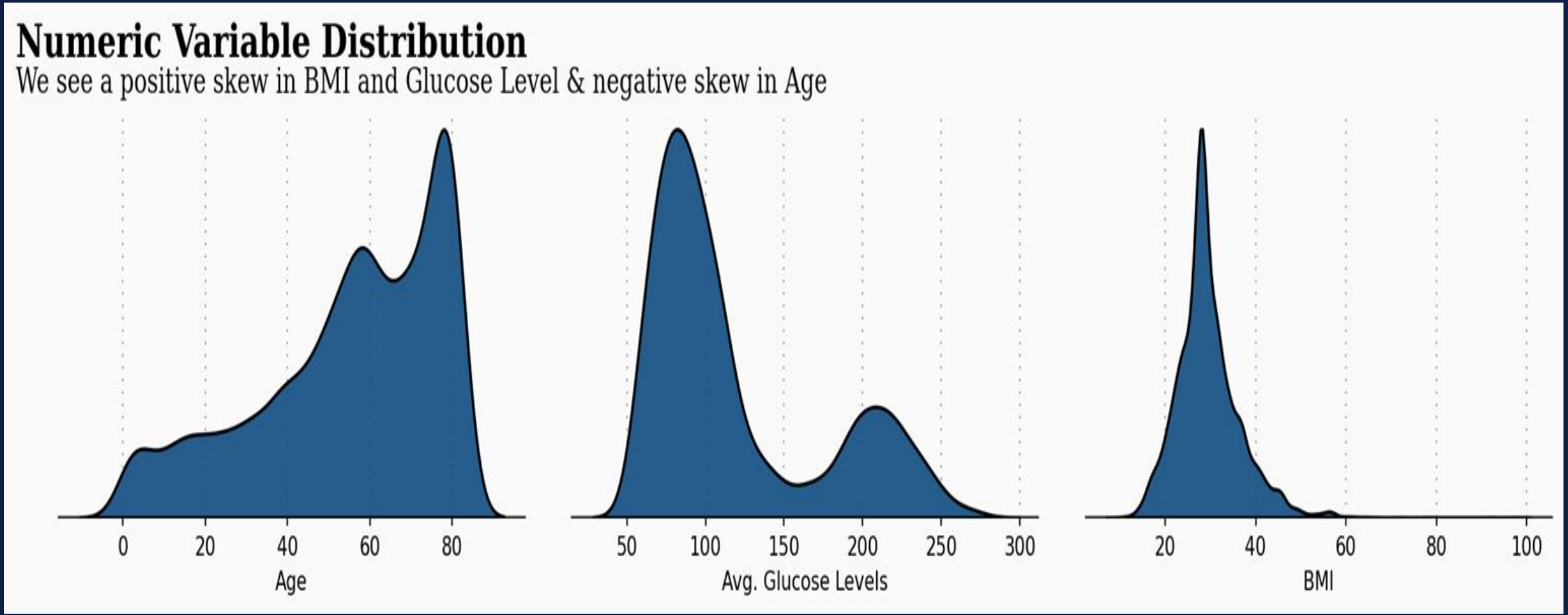
Explore Numerical Features(upsampled)



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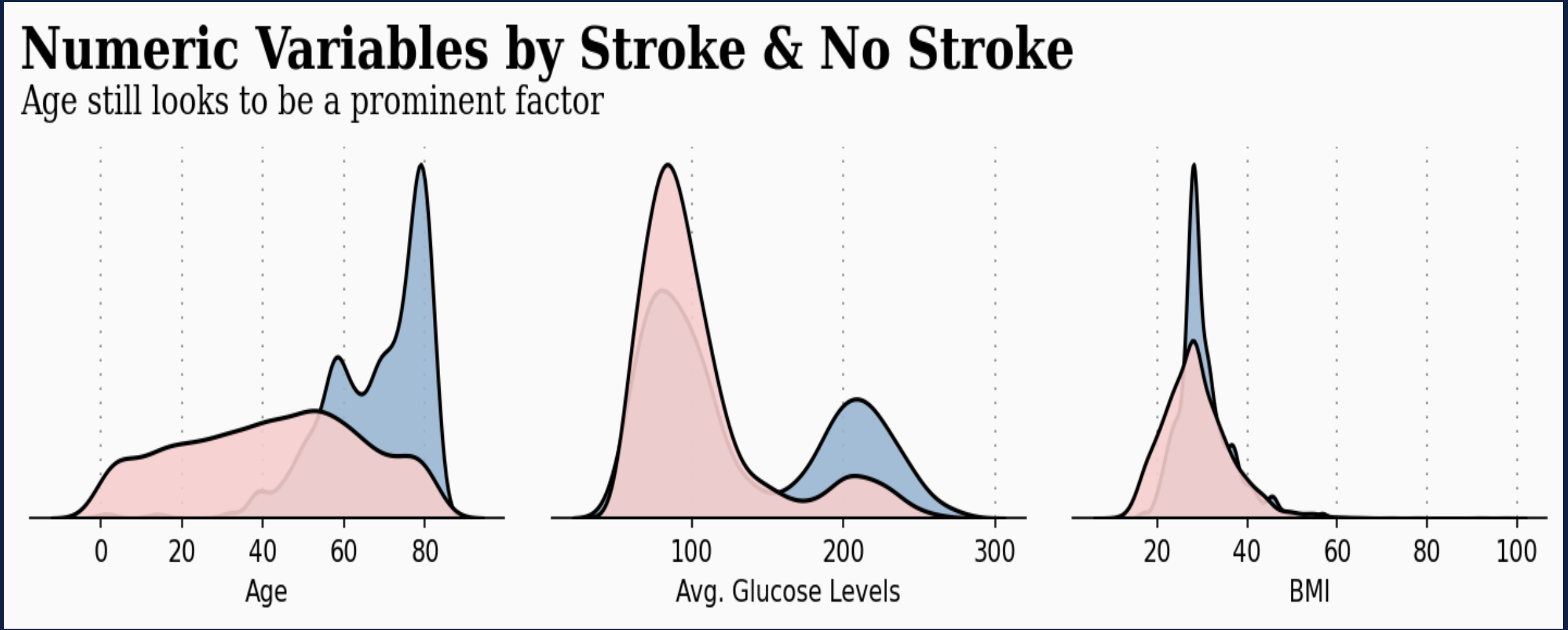
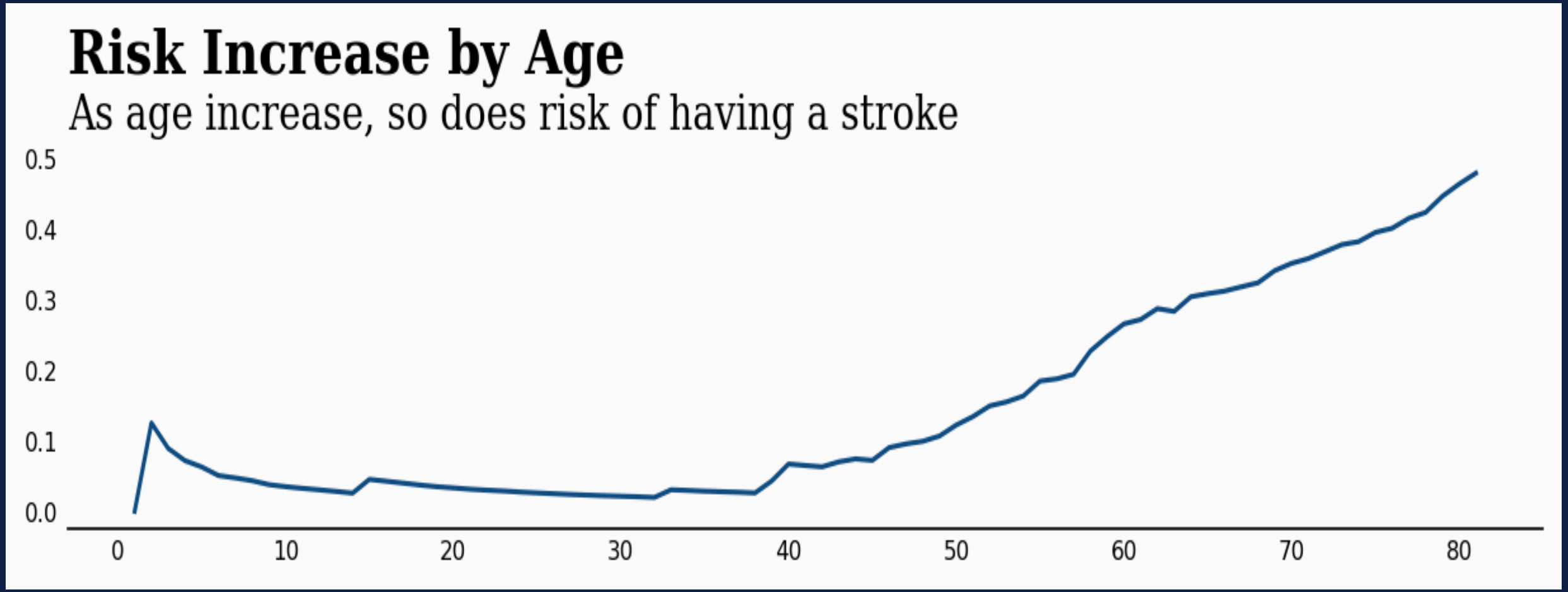
Explore Numerical Features(Upsampled)



Age Versus Stroke(upsampled)



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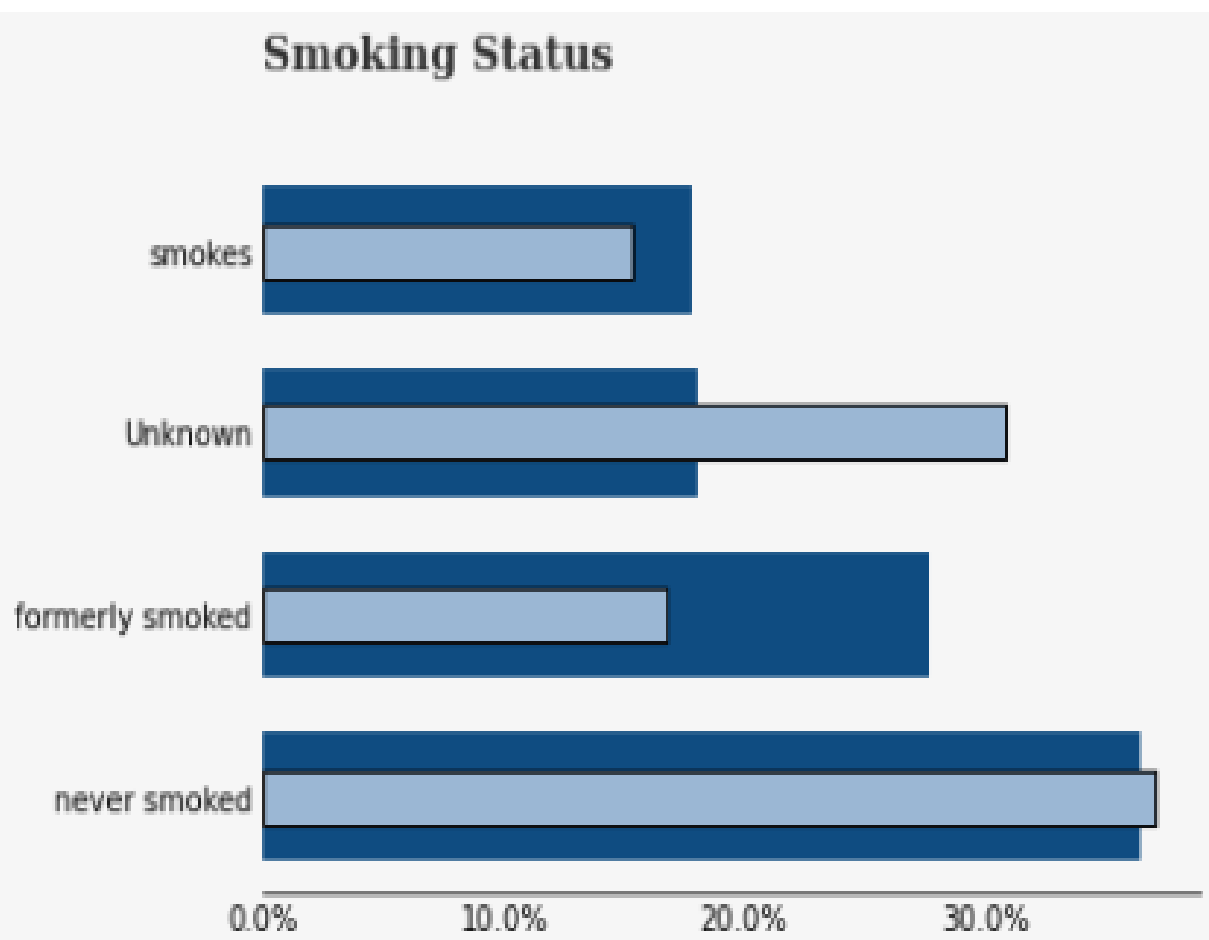
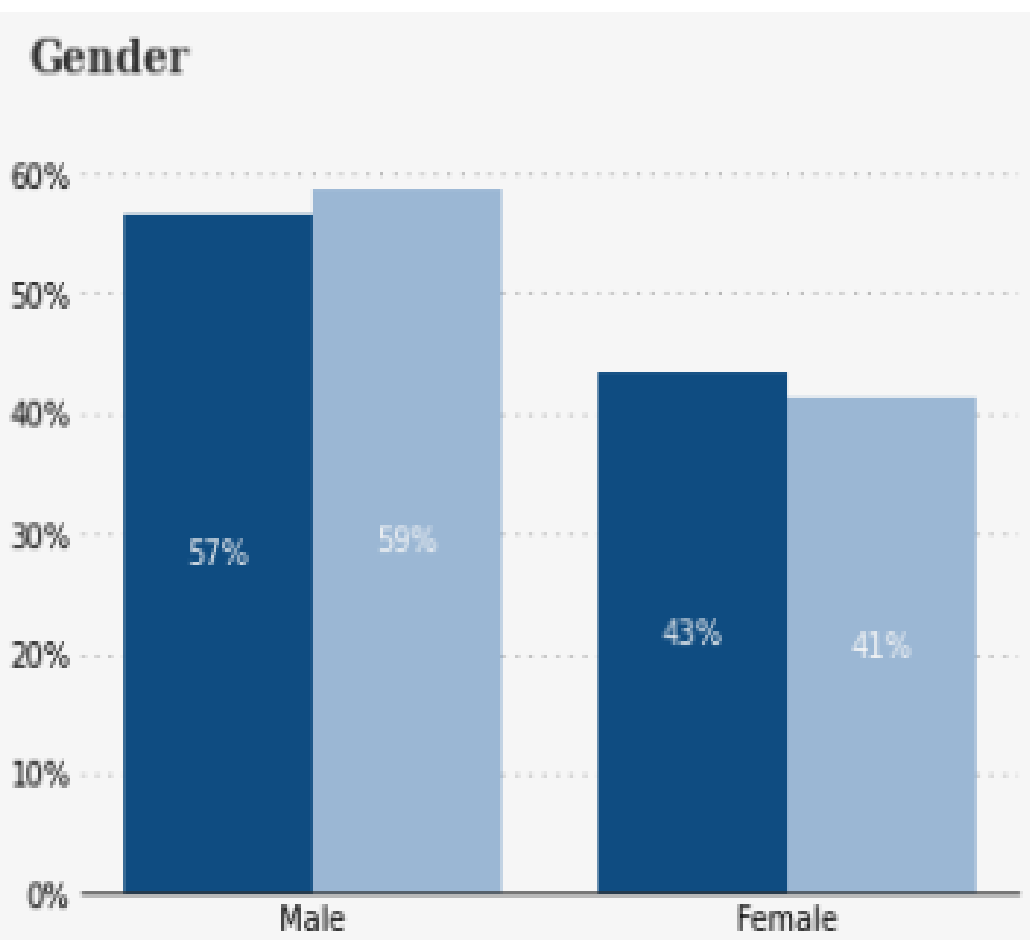
Explore Categorical Features (Upsampled)





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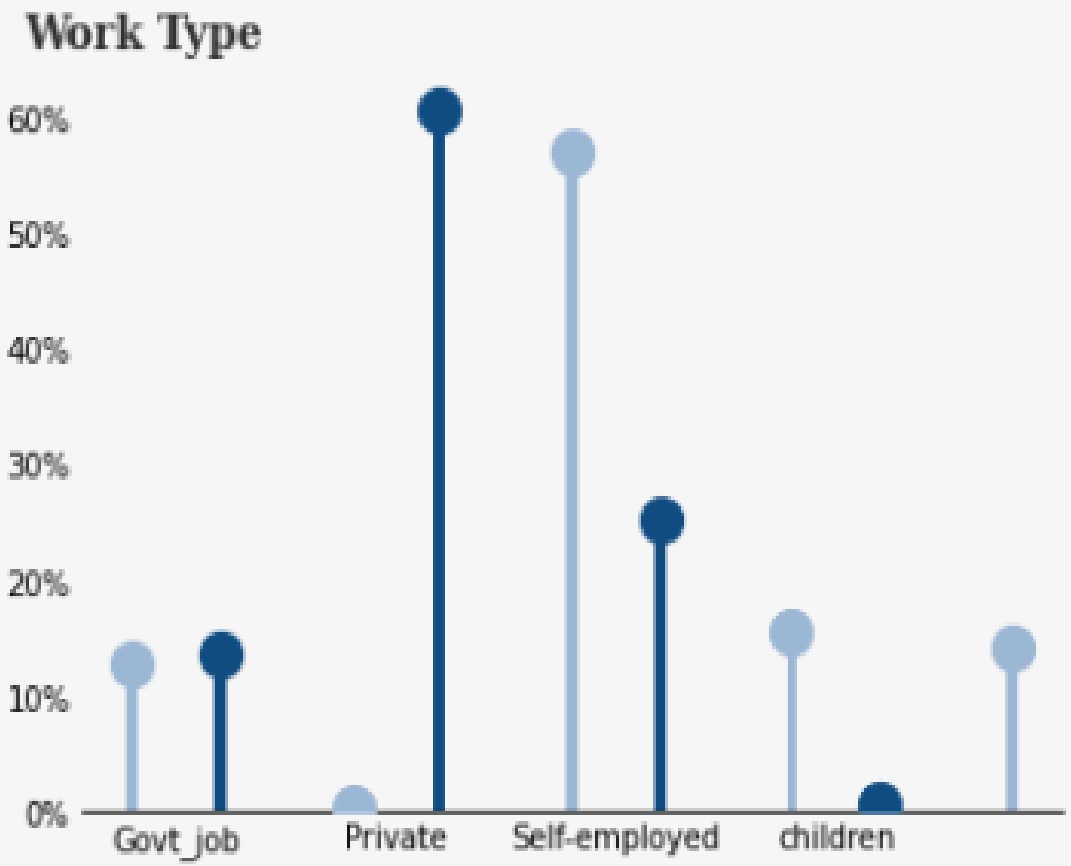
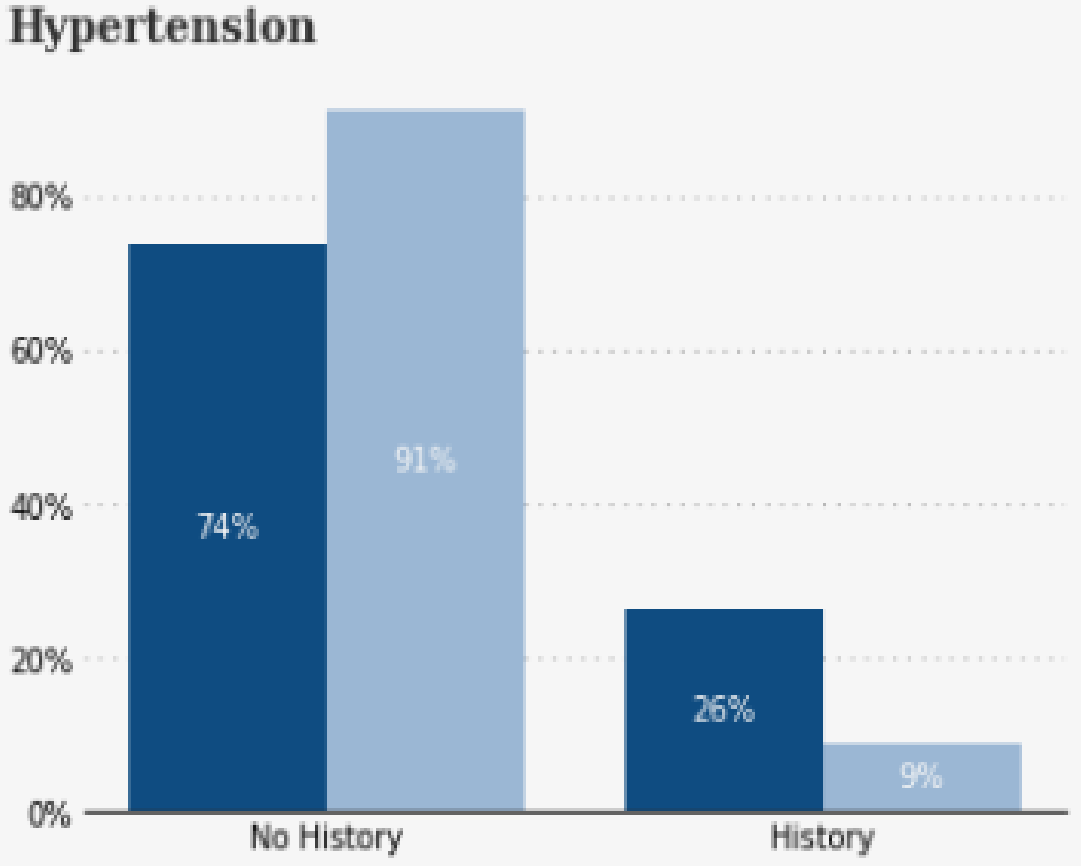
Work Type & Hypertension (upsampled)





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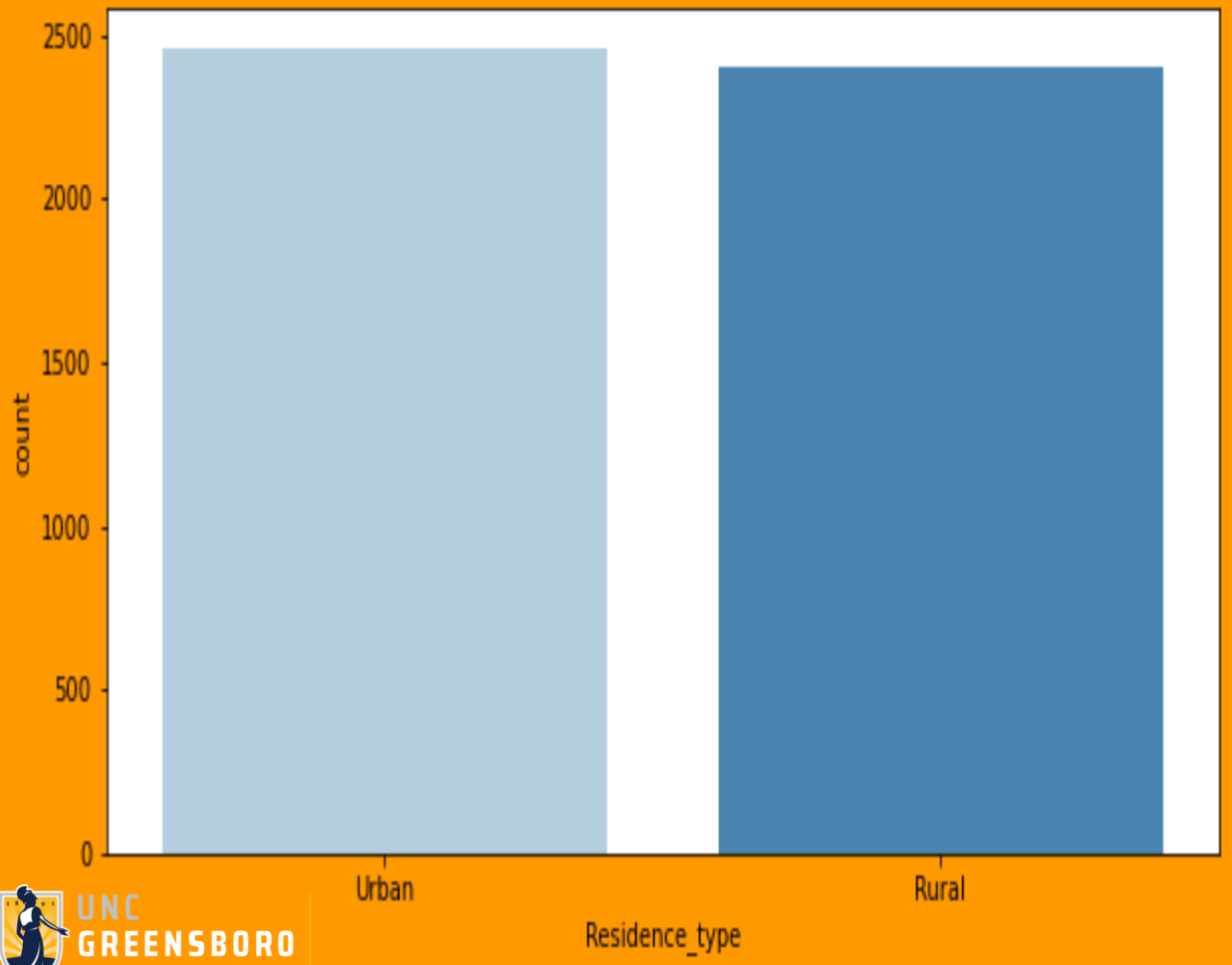
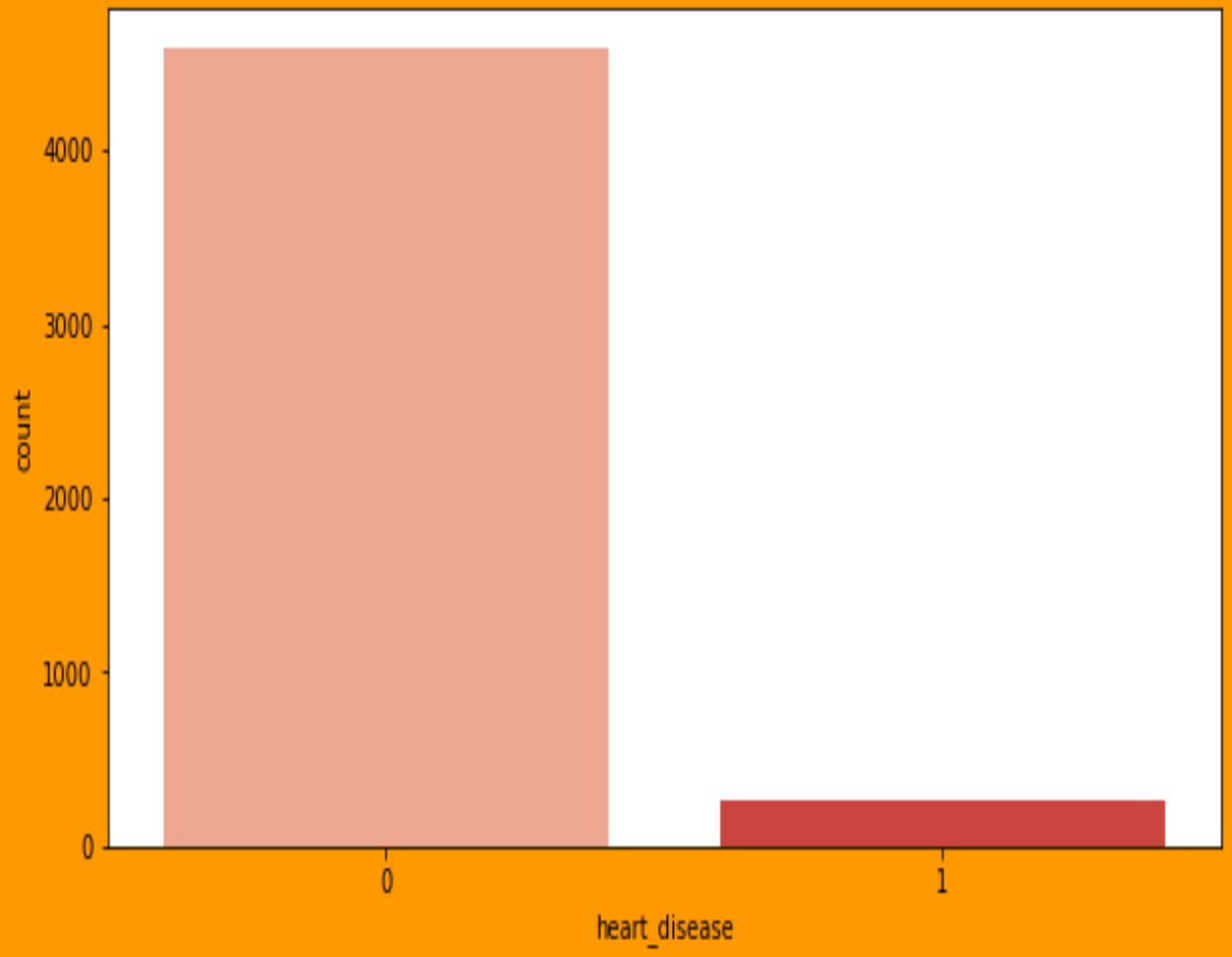
Residence Type & Heart Disease (Upsampled)





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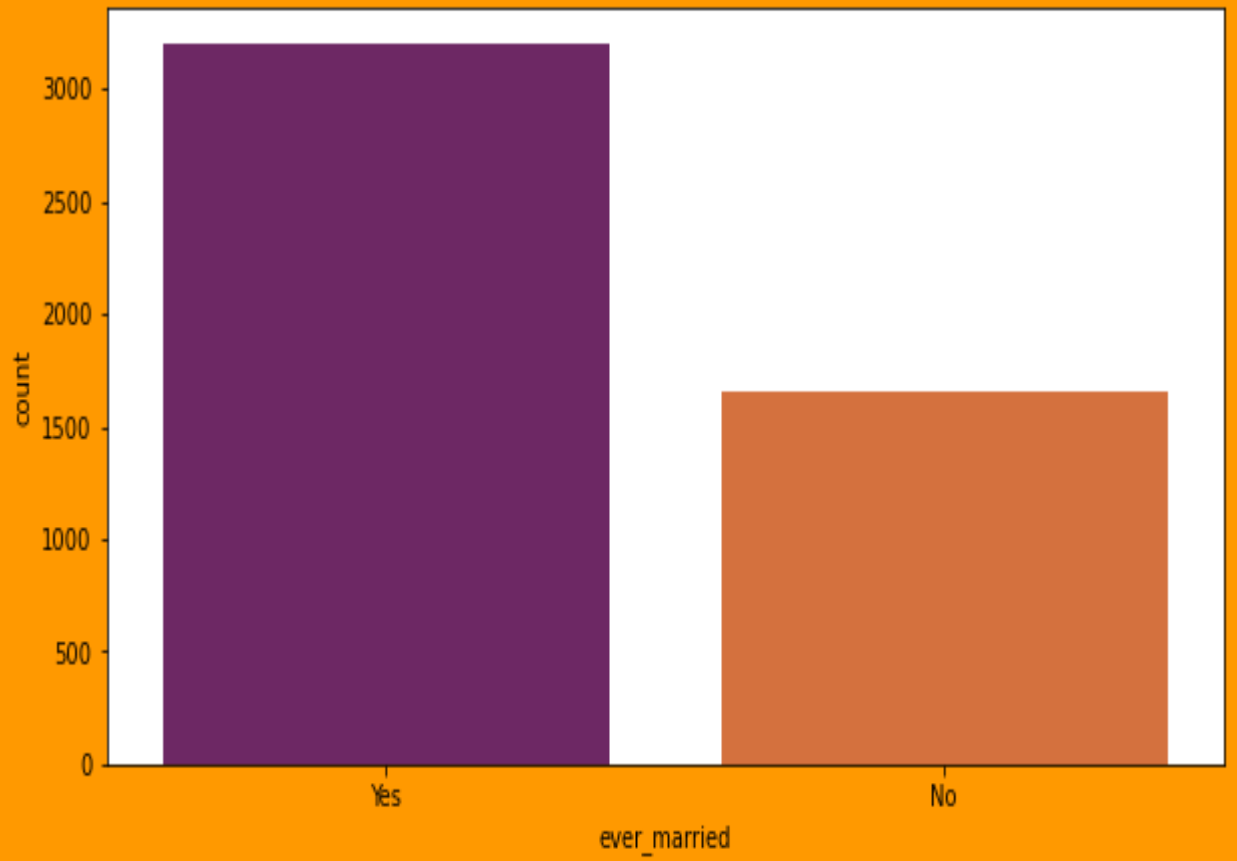
Stroke vs Marital Status(upsampled)



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Conclusions!

- Age is a big factor in stroke patients ---the older you get the more you are at risk of stroke.
- Being a smoker or a former smoker does not relatively increase the risk of having a stroke.
- Location(Rural vs. Urban) does not appear to be significant factor.
- Most of the people who have had a stroke do not have any heart disease, but that does not prevent it being an influential factor.
- More than 25% of stroke cases, they had hypertension.
- Male are more likely to get stroke compared to female!!

Thank You!!

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