Understanding Heart Disease and How to Avoid It

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Problem Definition

- According to a study done by PHAC (Public Health Agency of Canada), about 1 in 12 (~2.6 million) Canadians aged 20 and older live with diagnosed heart disease
- Also reported that every hour, ~14 Canadian adults aged 20 and older with diagnosed heart disease die
- This project aims to identify what these factors are as well as the impact they have on heart disease, to help individuals better understand what things they can do in their day to day life to avoid getting heart disease as well as things they can do to reduce its effects if they do already have it

Data

- The data is from the CDC, which comes from the United States, but the overall idea of prevention can still be applied to those in Canada
- The dataset contains 18 variables, with no N/A values
- The only data cleaning done was:

  1) Change the “Yes/No” rows to “1/0” for certain count/frequency visualizations, which require only numerical variables

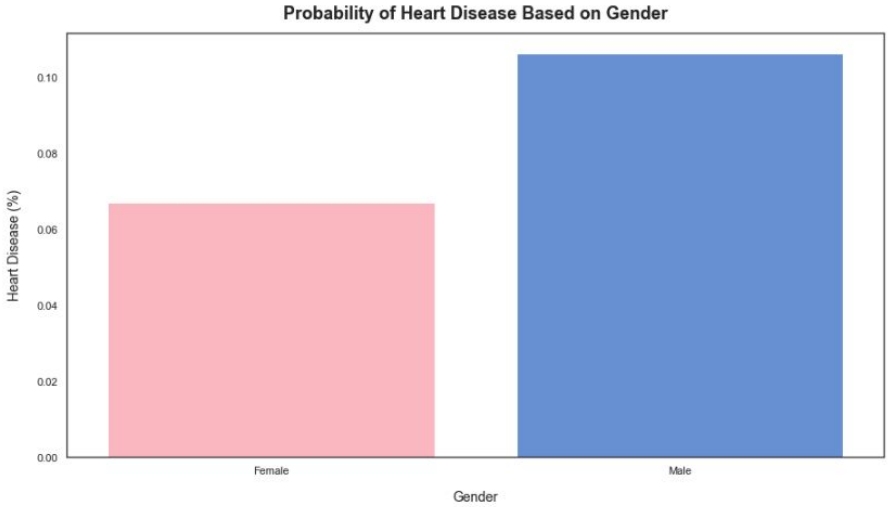
  2) Creating segmented bins to group certain variables such as BMI

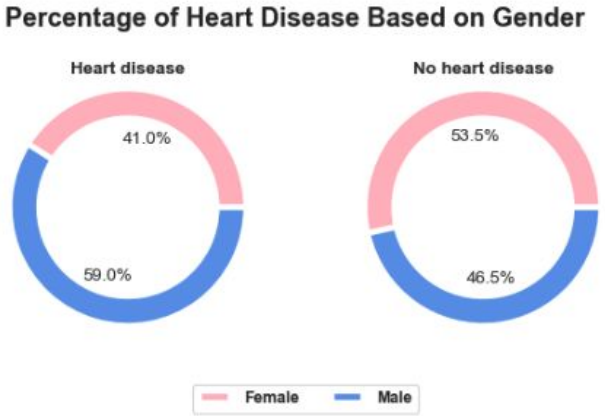
HeartDisease	BMI	Smoking	AlcoholDrinking	Stroke	PhysicalHealth	MentalHealth	DiffWalking	Sex	AgeCategory	Race	Diabetic	PhysicalActivity	GenHealth	SleepTime	Asthma	KidneyDisease	SkinCancer
No	16.6	Yes	No	No	3	30	No	Female	55-59	White	Yes	Yes	Very good	5	Yes	No	Yes
No	20.34	No	No	Yes	0	0	No	Female	80 or older	White	No	Yes	Very good	7	No	No	No
No	26.58	Yes	No	No	20	30	No	Male	65-69	White	Yes	Yes	Fair	8	Yes	No	No
No	24.21	No	No	No	0	0	No	Female	75-79	White	No	No	Good	6	No	No	Yes
No	23.71	No	No	No	28	0	Yes	Female	40-44	White	No	Yes	Very good	8	No	No	No
Yes	28.87	Yes	No	No	6	0	Yes	Female	75-79	Black	No	No	Fair	12	No	No	No
No	21.63	No	No	No	15	0	No	Female	70-74	White	No	Yes	Fair	4	Yes	No	Yes
No	31.64	Yes	No	No	5	0	Yes	Female	80 or older	White	Yes	No	Good	9	Yes	No	No
No	26.45	No	No	No	0	0	No	Female	80 or older	White	No, borderline diabetes	No	Fair	5	No	Yes	No

Research Questions

1. Does being a certain gender or age lead to a higher chance of getting heart disease?
2. Are those with other health issues (diabetic, asthma, kidney disease) more likely to get heart disease than those with none? If so, which of these issues is most linked to heart disease?
3. Does general health and BMI have any effect on getting heart disease?
4. Is there any correlation between physical and mental health and getting heart disease?
5. Does alcohol consumption and smoking have any effect on a person getting heart disease?
6. Is there any correlation between sleeping and getting a heart disease? Are those that sleep less, still able to avoid heart disease through other factors (physical activity, etc.)?

Gender vs Heart Disease

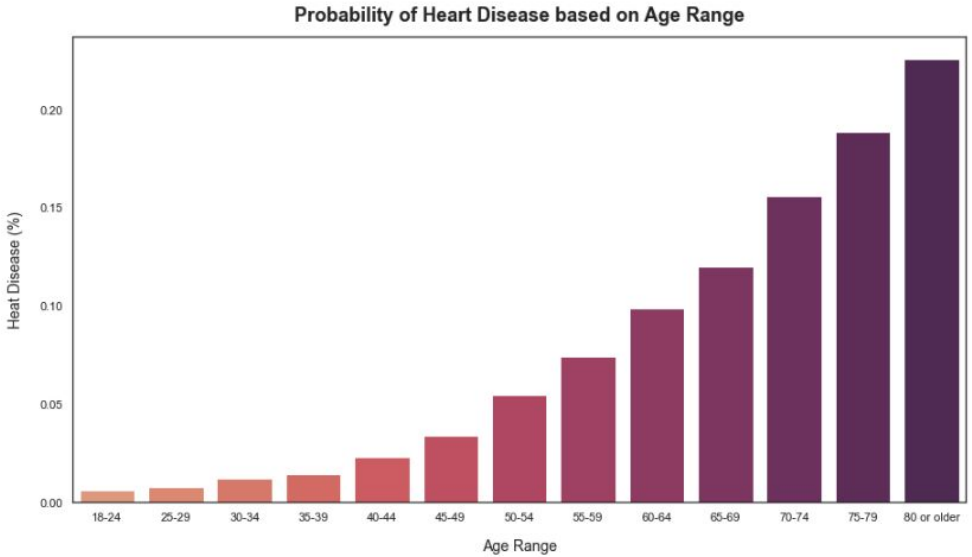




Insights

- Males are more likely to get heart disease than females (11% vs 7% with the data provided)
- For those that don't have heart disease, the split between male and female is pretty even

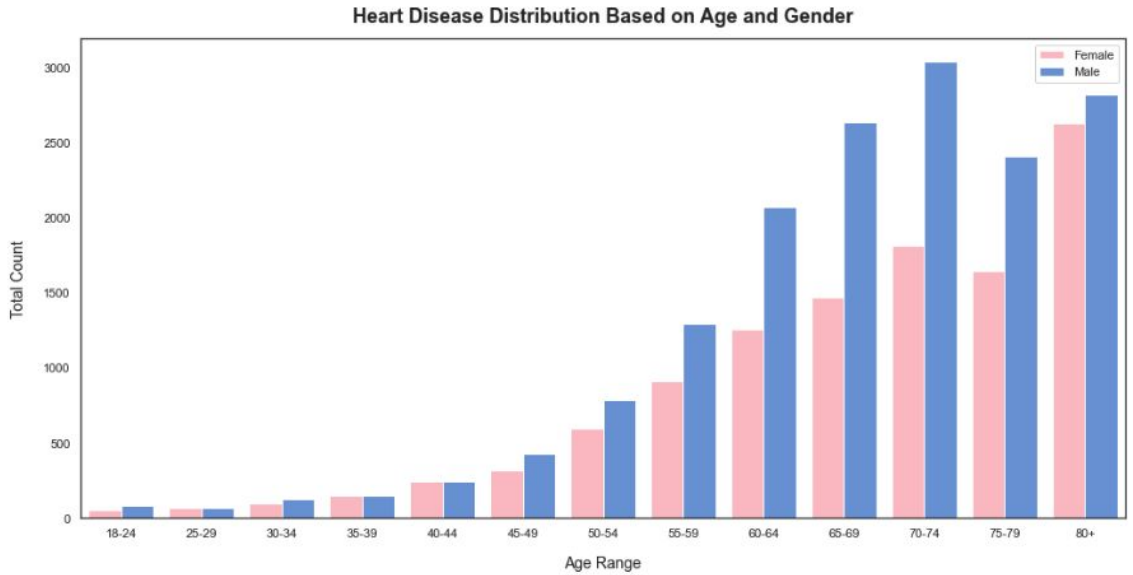
Age Range and Heart Disease



Insights

- The probability of getting heart disease based on age range follows an exponential distribution and the older you get, the more likely you are to get heart disease
- Once above the age of 60, your chances of getting heart disease are at least 10%

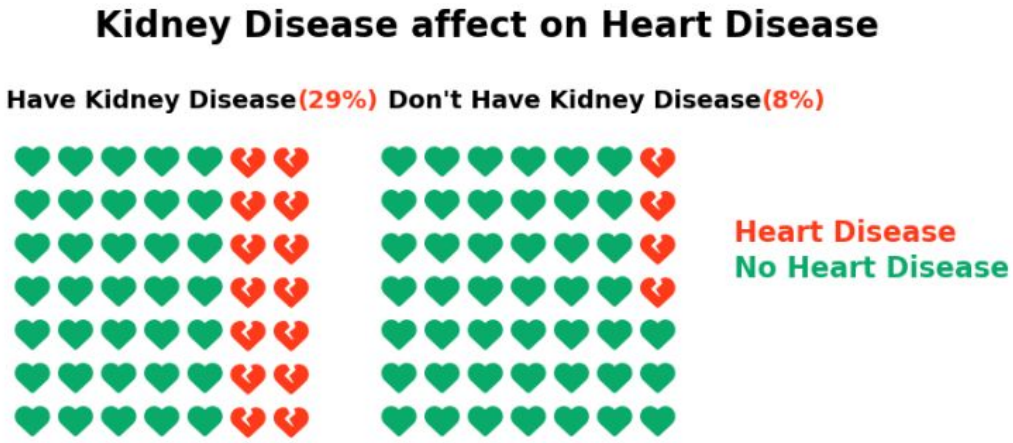
Heart Disease based on Age and Gender

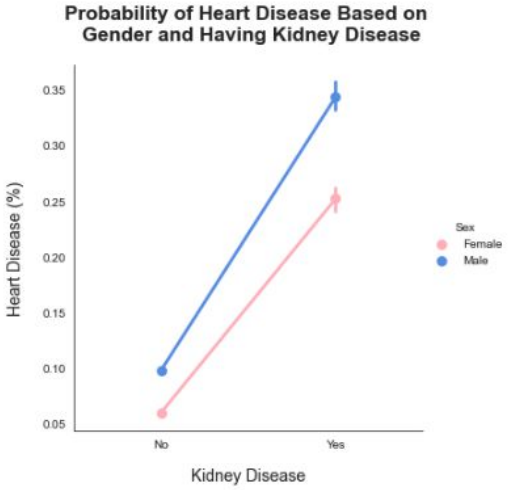


Insights

- For each age range, there are more males that get heart disease than females
- Under the age of 50 (25-29, 35-39, 40-44), the amount of males and females that get heart disease are almost all equal, but as the ages increase, the difference becomes more skewed

Kidney Disease affect on Heart Disease

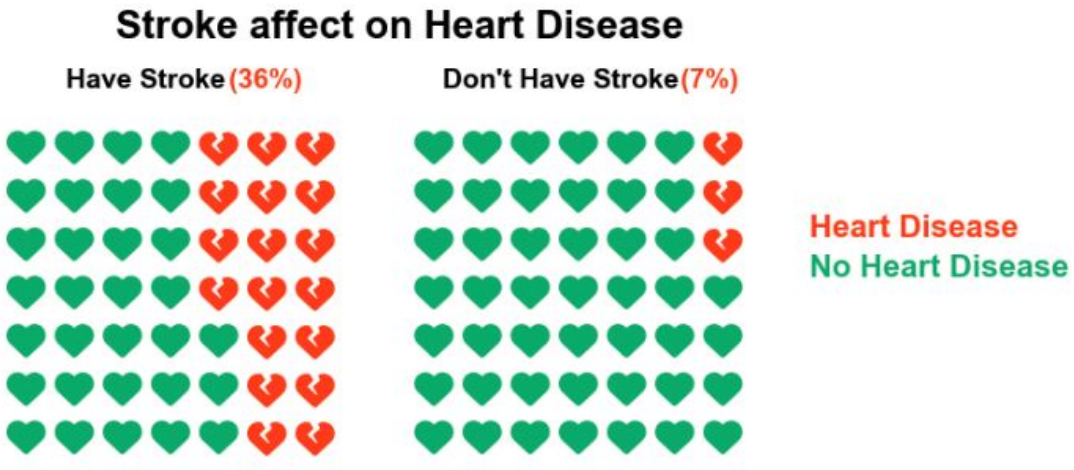


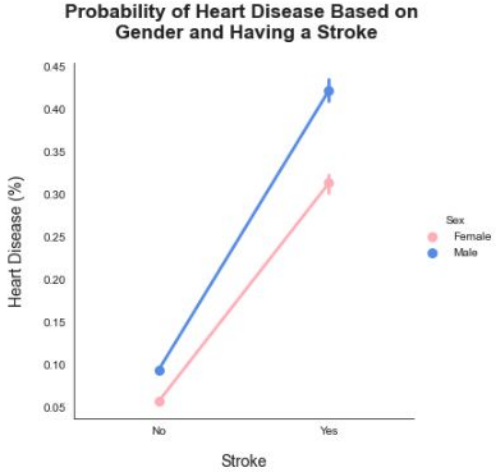


Insights

- Kidney disease is one of the major diseases linked to heart disease
- For males and females both, the chances of getting heart disease based on having kidney disease or not is quite large (6-10% all the way to 25-35%)

Stroke effect on Heart Disease

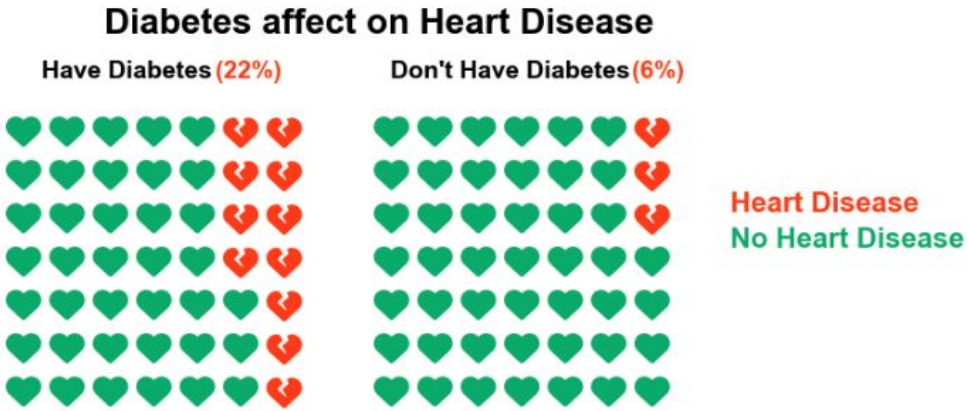


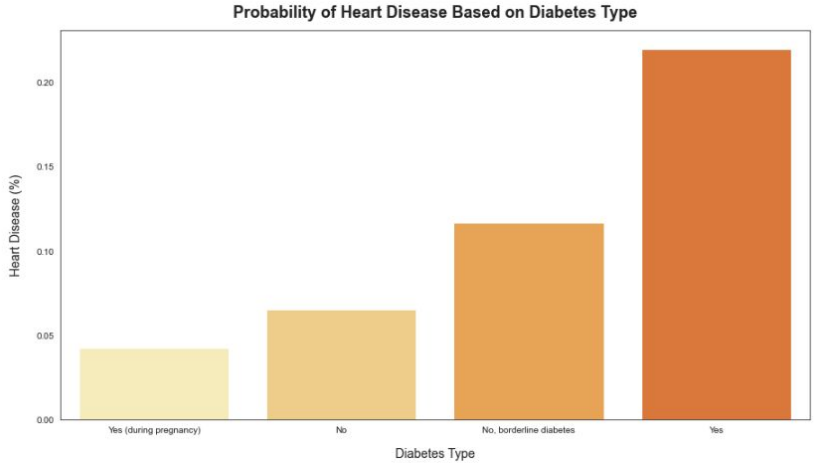


Insights

- Having a stroke is significantly linked to getting heart disease
- For males and females both, the chances of getting heart disease based on having a stroke or not is quite large (5-10% all the way to 30-**43**%)
- For males the correlation between having a stroke and getting heart disease is huge (almost 45%)

Diabetes effect on Heart Disease

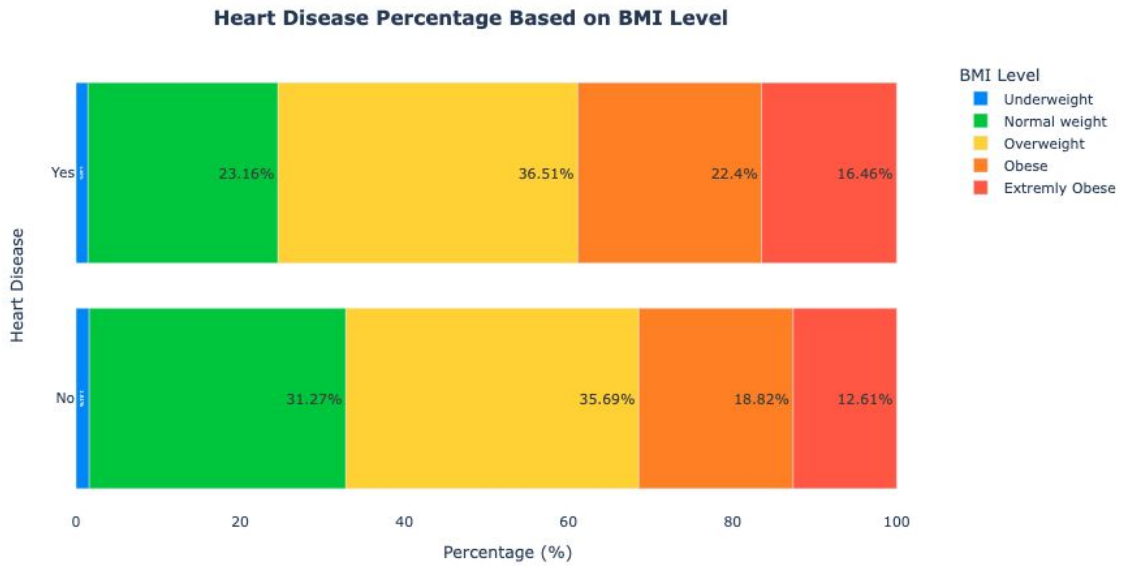




Insights

- Having diabetes can also be significantly linked to getting heart disease (for that matter, almost all health conditions improve this chance)
- Those that are on the borderline of having diabetes or not do see an increase in getting heart disease, but have a better chance of both preventing diabetes and heart disease through personal prevention strategies

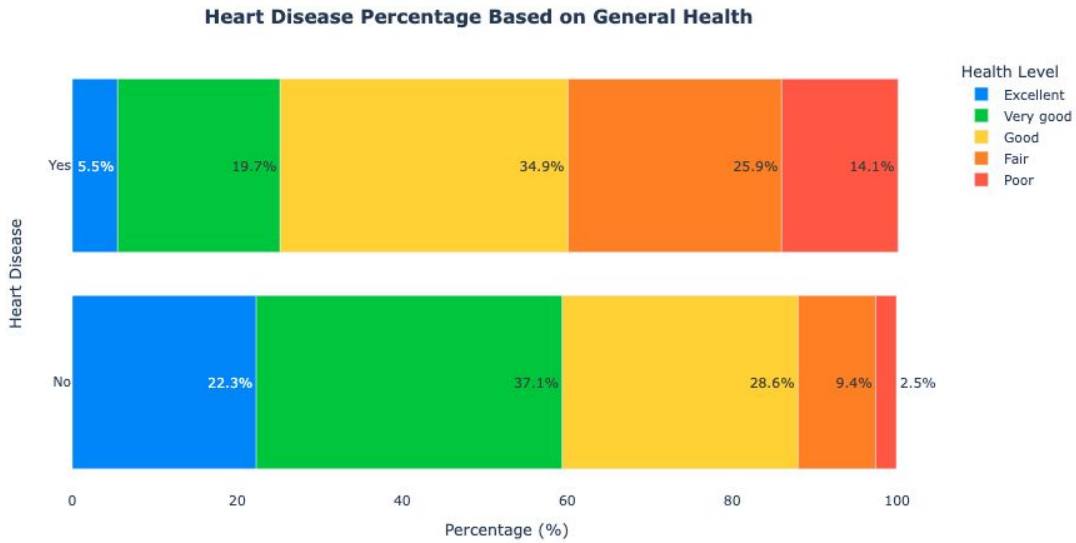
BMI effect on Heart Disease



Insights

- Those that are overweight make up the majority of people that get heart disease
- There is an increase of percentage from overweight - extremely obese for those that do have heart disease vs dont

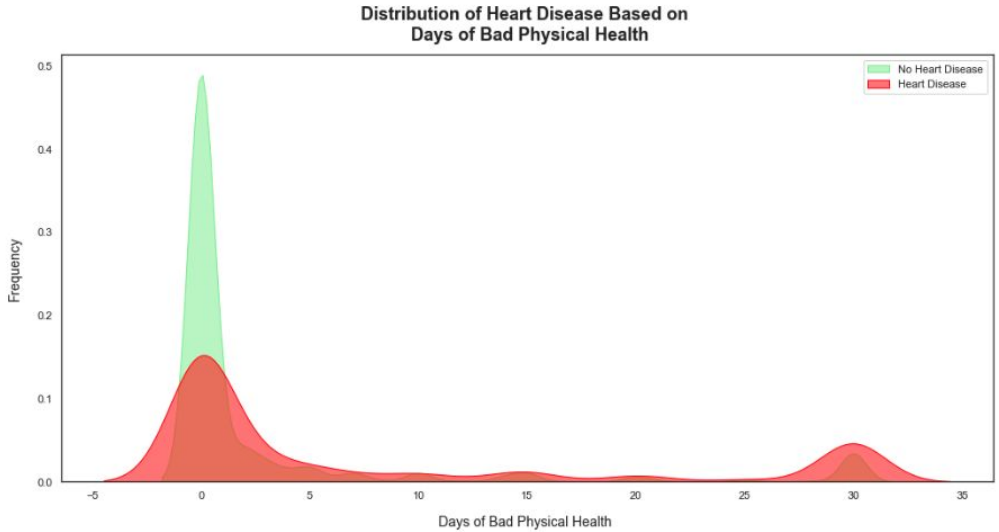
General Health affect on Heart Disease



Insights

- Those that are overweight make up the majority of people that get heart disease, and those that are of normal weight make up the majority of people that don't get heart disease
- 60% of those that have a good health level did not get heart disease compared to only 25% for those that did

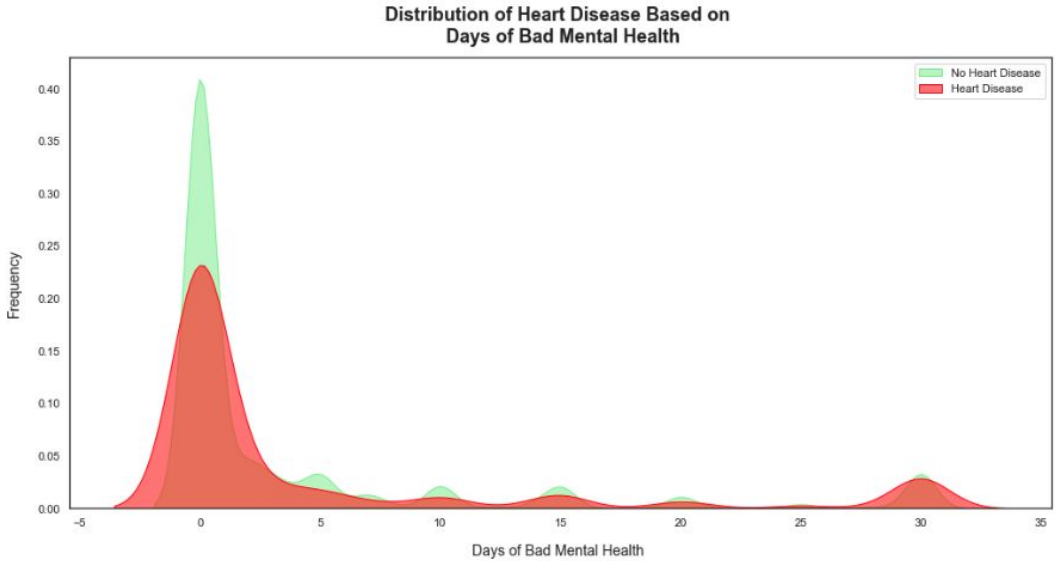
Physical Health affect on Heart Disease



Insights

- Between 2-4 days of bad physical health does see an increase in getting heart disease vs not
- Around 15 days and 30 days also sees an increase of more people getting heart disease vs not

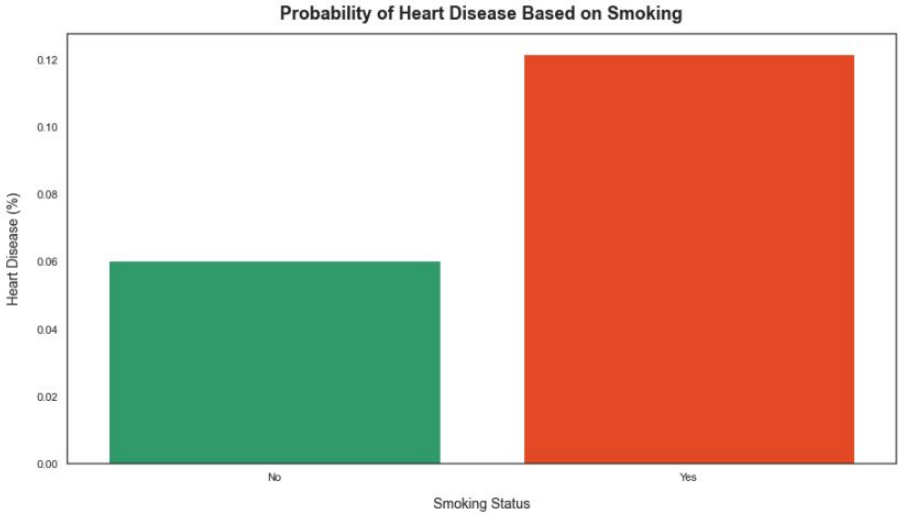
Mental Health affect on Heart Disease

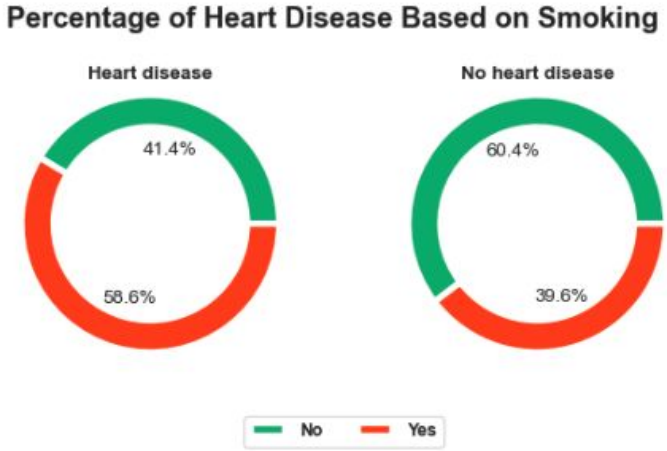


Insights

- Mental health does not have as much of an effect on getting heart disease than physical health (based on each peak)
- Either 0 days or around 30 days of bad mental health sees the largest correlation to getting heart disease

Smoking effect on Heart Disease

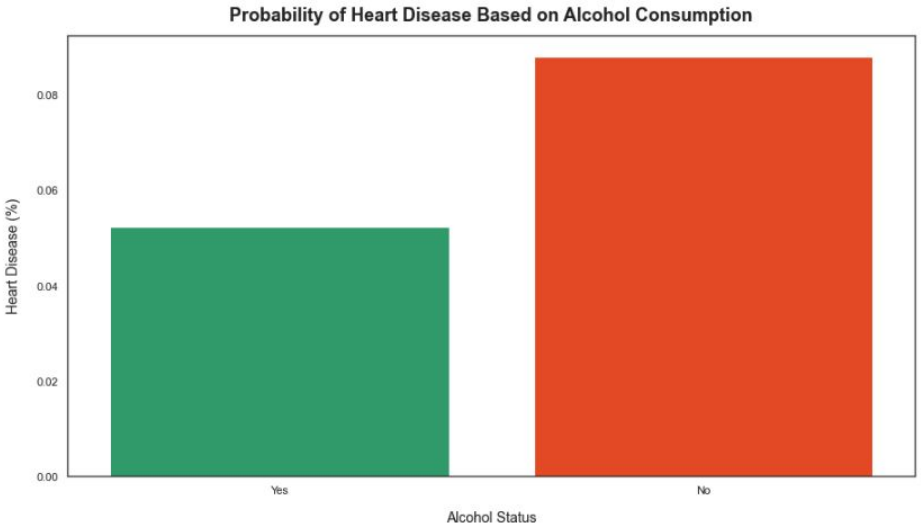


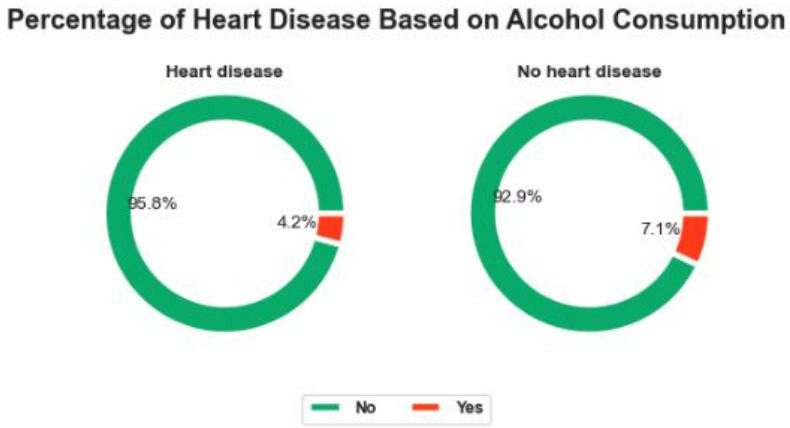


Insights

- The percentage of those that get heart disease is almost doubled for those that smoke
- For those that do have heart disease, almost 60% are smokers, vs those that didn't where 60% weren't smokers

Alcohol Consumption effect on Heart Disease

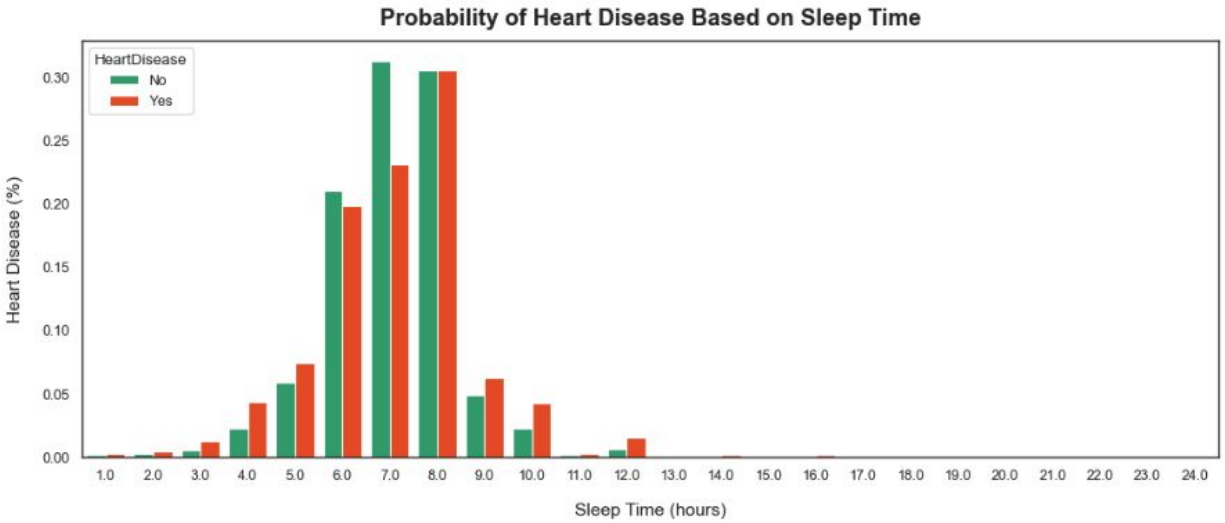




Insights

- Alcohol consumption does not have as much of an effect on getting heart disease than smoking (% increase is roughly 3%)
- For both cases of getting heart disease vs not, almost everyone has consumed alcohol

Sleep effect on Heart Disease



Insights

- For those that sleep in the ranges outside 6-8 hours, there is a higher percentage probability of getting heart disease
- Sleep only has an effect on heart disease when sleeping outside the 6 to 8 hour range. Within that range, the proportion of those that get heart disease vs not is almost identical (outside 7 hours)

Conclusion

- Males predominantly have a higher chance of getting heart disease than females
- Your chances of getting heart disease exponentially increase as you get older
- Having a kidney disease, diabetes or a stroke is very correlated with getting heart disease
- Having bad physical health for 30 days or more can lead to heart disease
- Alcohol consumption does not have an effect on getting heart disease

Prevention Tips

- A BMI of 18.5-24 (normal weight) as well as having very good health can lead to prevention of heart disease
- Smoking will double your chances of getting heart disease
- Getting sleep outside of 6-8 hours can also negatively impact your chances of getting heart disease