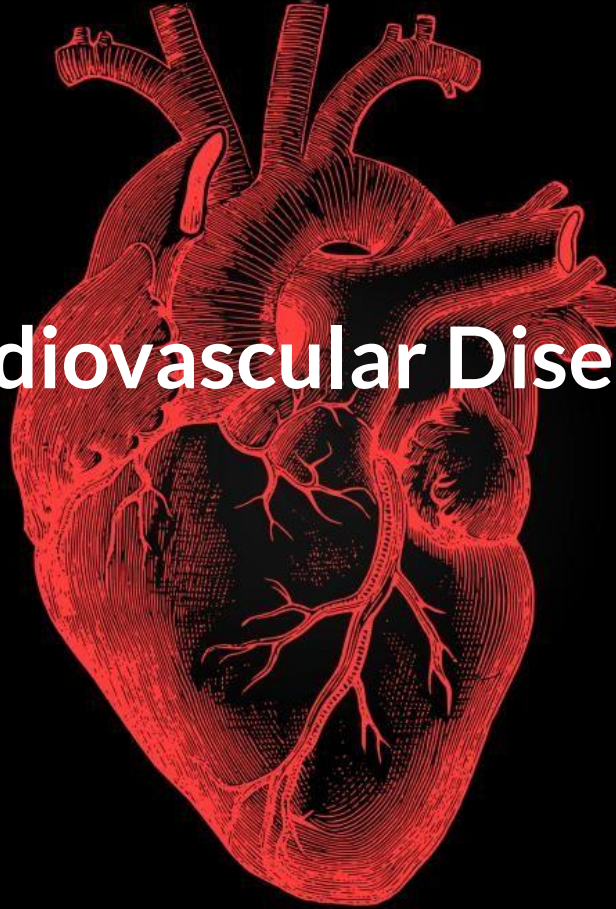


# Cardiovascular Diseases



# What are Cardiovascular Diseases?

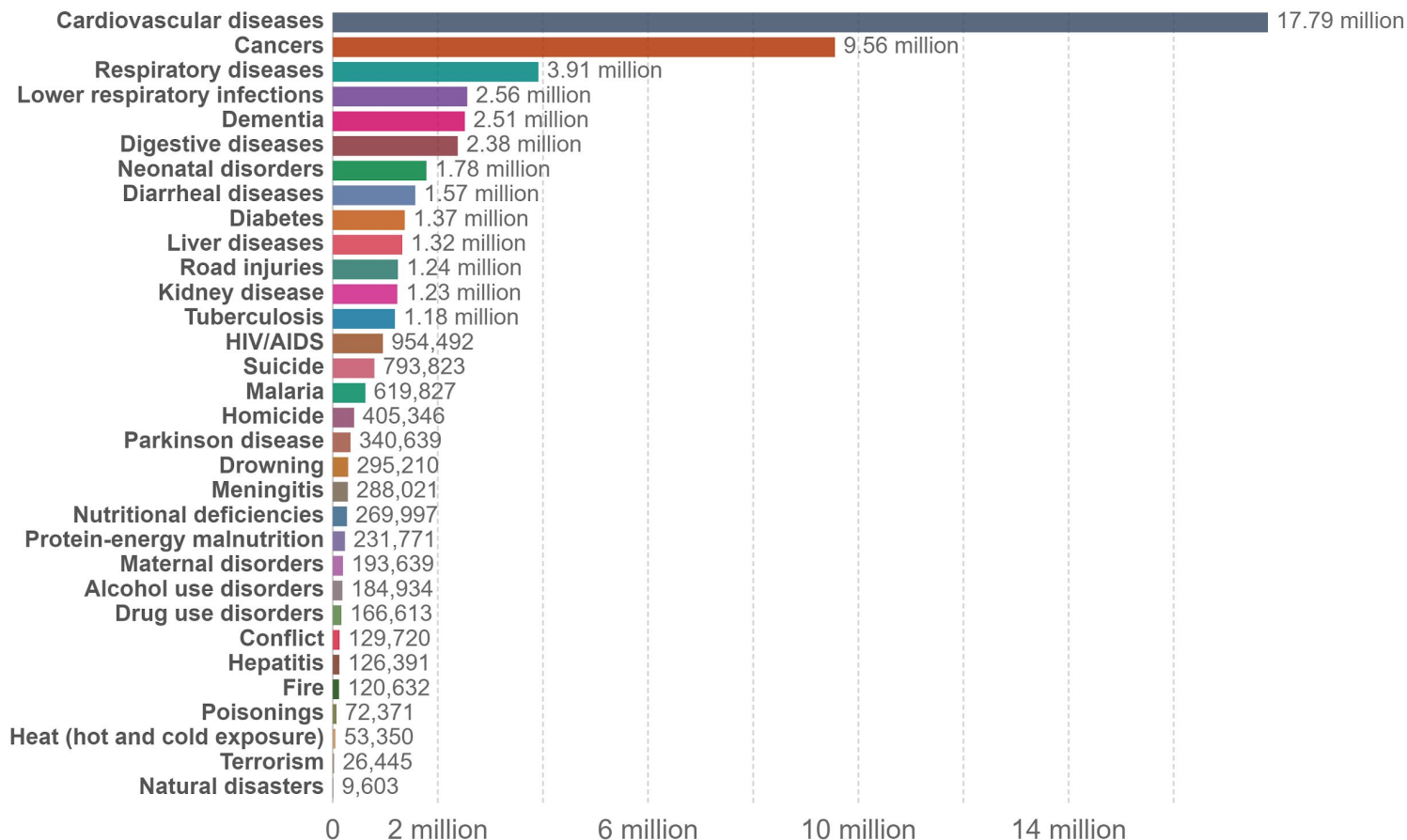
According to WHO (World Health Organization), “Cardiovascular diseases are a group of disorders of the heart and blood vessels.”

Some CVD Examples:

- Coronary Heart Disease
- Deep Vein Thrombosis & Pulmonary Embolism
- Cerebrovascular Disease
- Peripheral Arterial Disease



# Number of deaths by cause, World, 2017



# Our Goal

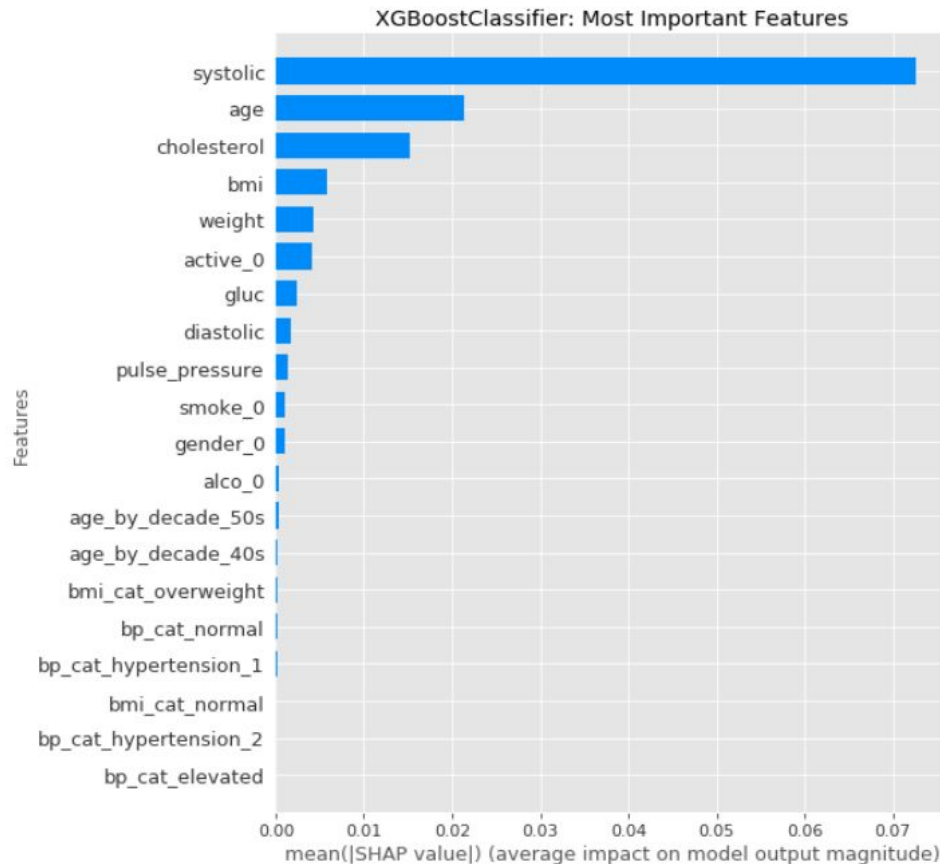
## How Can We Help Prevent CVD Casualties?

1. What factors are most important when determining protective and risk factors?
2. Is there a certain population group that is most affected by CVDs?
3. What's the best way to spread knowledge of CVDs and how to reduce risk?

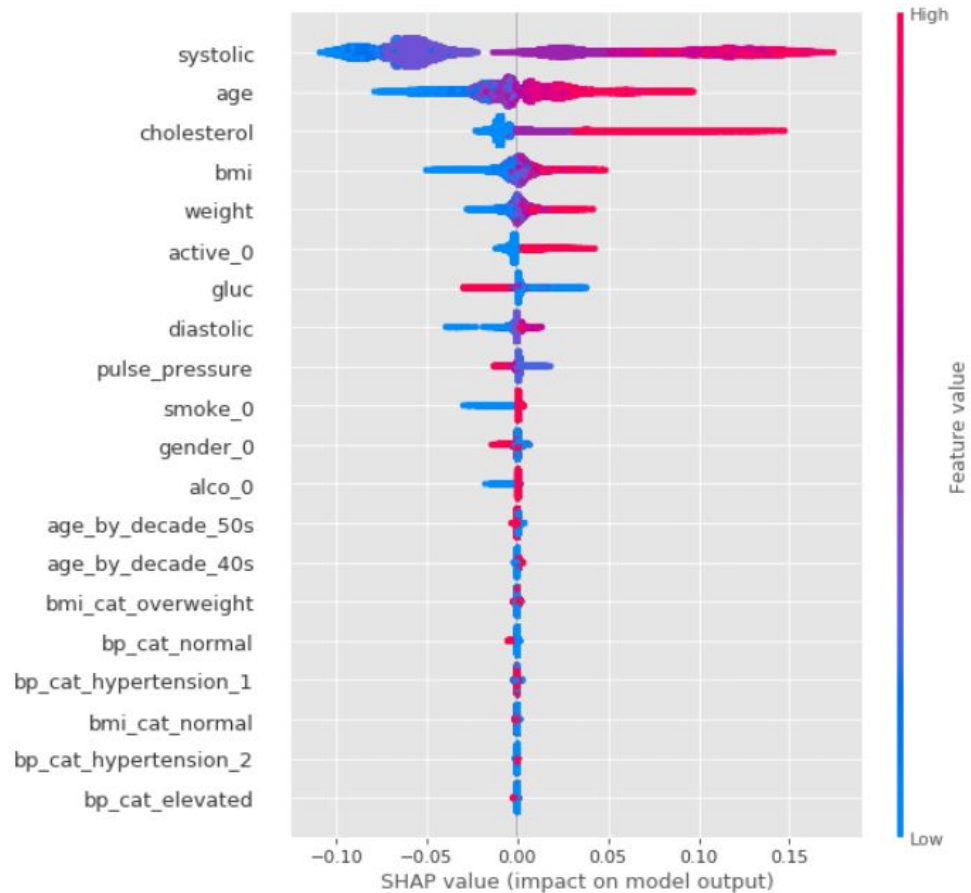
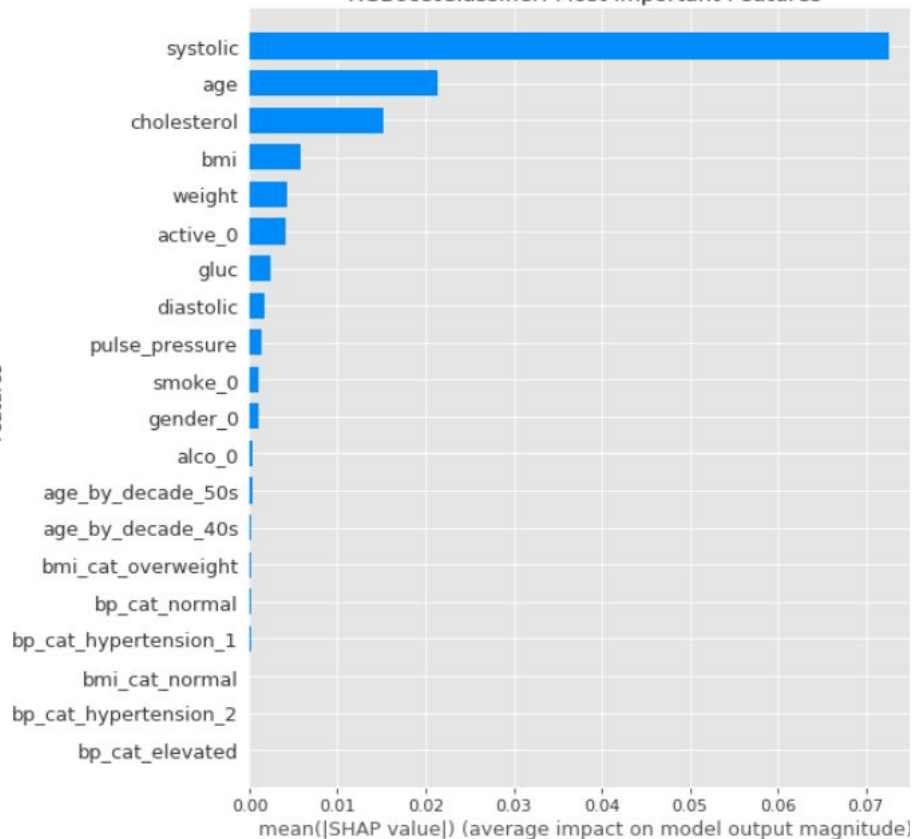
# Our Model

## XGBClassifier

- Robust to outliers
- Does not need to be scaled
- Can handle missing values

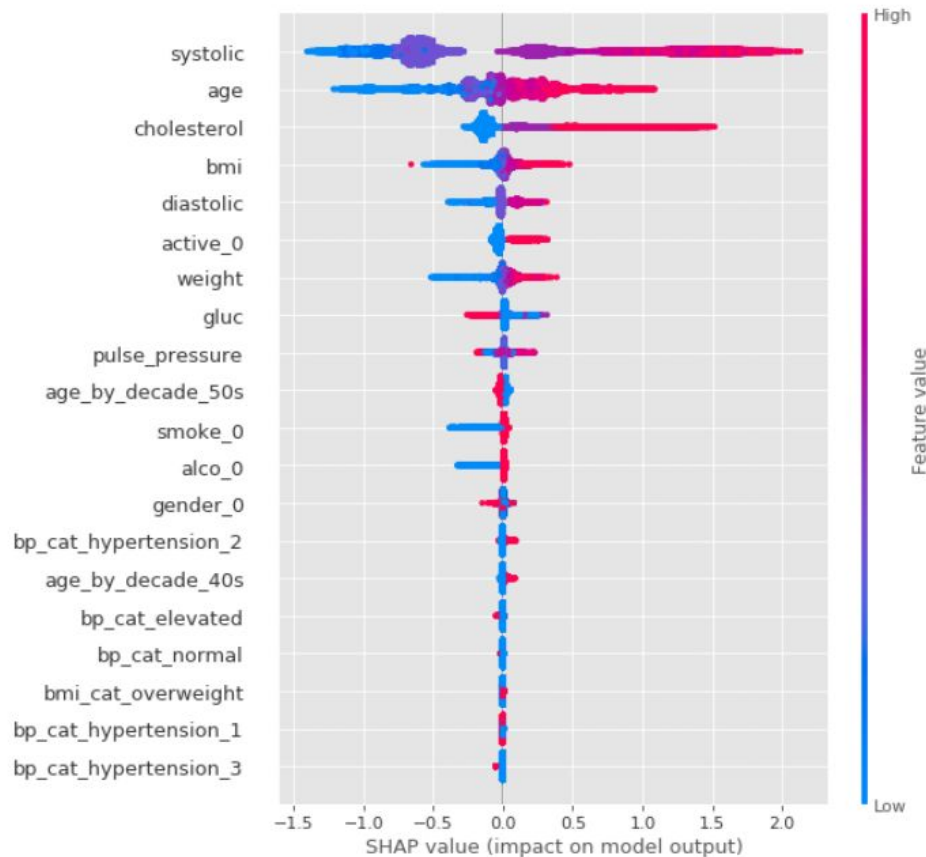


XGBoostClassifier: Most Important Features



# Most Important Factors Associated w/ CVDs

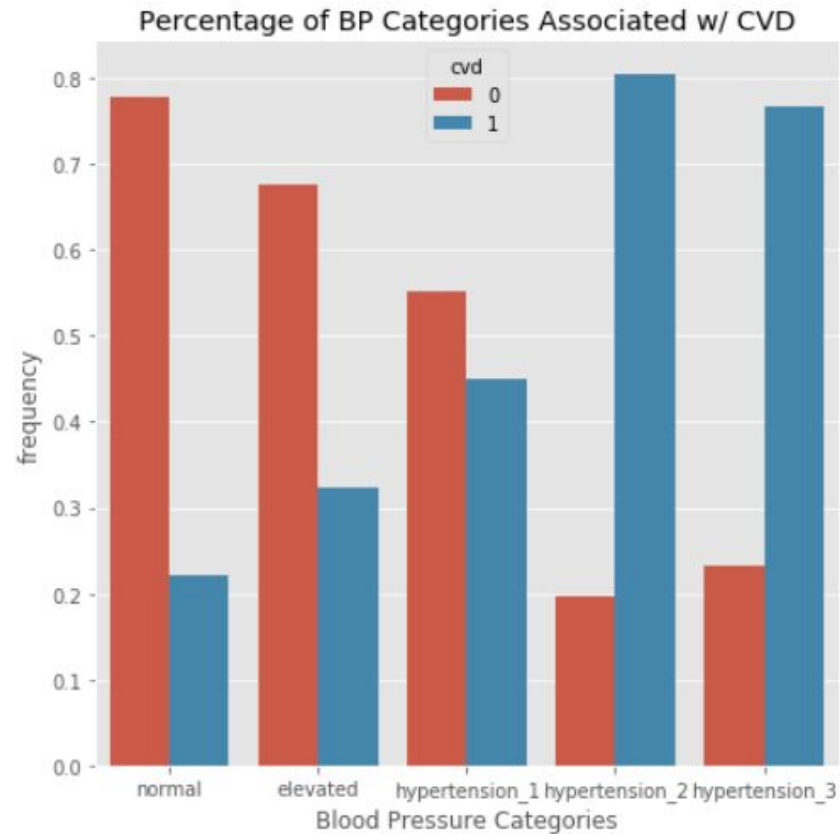
- Systolic Pressure
- Age
- Cholesterol Level
- BMI
- Diastolic Pressure
- Sedentary Lifestyle (Not Active)



# Blood Pressure

## Systolic / Diastolic Pressure

BLOOD PRESSURE CATEGORY	SYSTOLIC mm Hg (upper number)		DIASTOLIC mm Hg (lower number)
NORMAL	LESS THAN 120	and	LESS THAN 80
ELEVATED	120 – 129	and	LESS THAN 80
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1	130 – 139	or	80 – 89
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2	140 OR HIGHER	or	90 OR HIGHER
HYPERTENSIVE CRISIS (consult your doctor immediately)	HIGHER THAN 180	and/or	HIGHER THAN 120

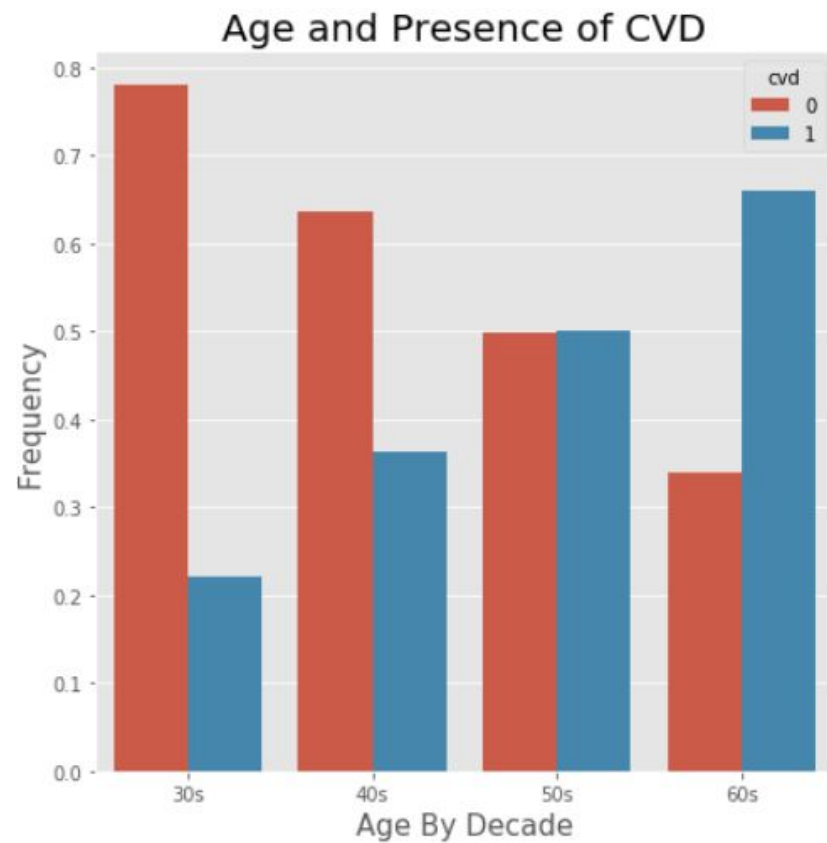


### Recommendation:

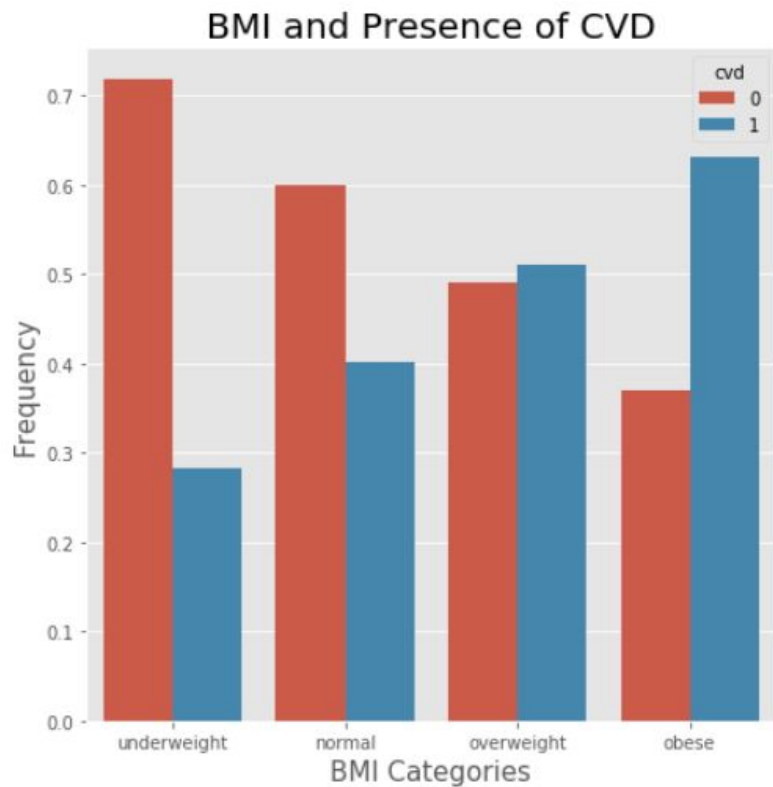
- Reduce Blood Pressure by: Reducing caffeine intake, reducing stress, reducing sodium intake in diet



# Age



# BMI



## BMI Classification

BMI	Category
Lower than 18.5	Underweight
18.5 up to 25	Optimal
25 up to 30	Overweight
30 upwards	Obese

### Recommendation:

- Keep BMI lower through maintaining a physically active lifestyle and eating correct portion sizes of healthy foods

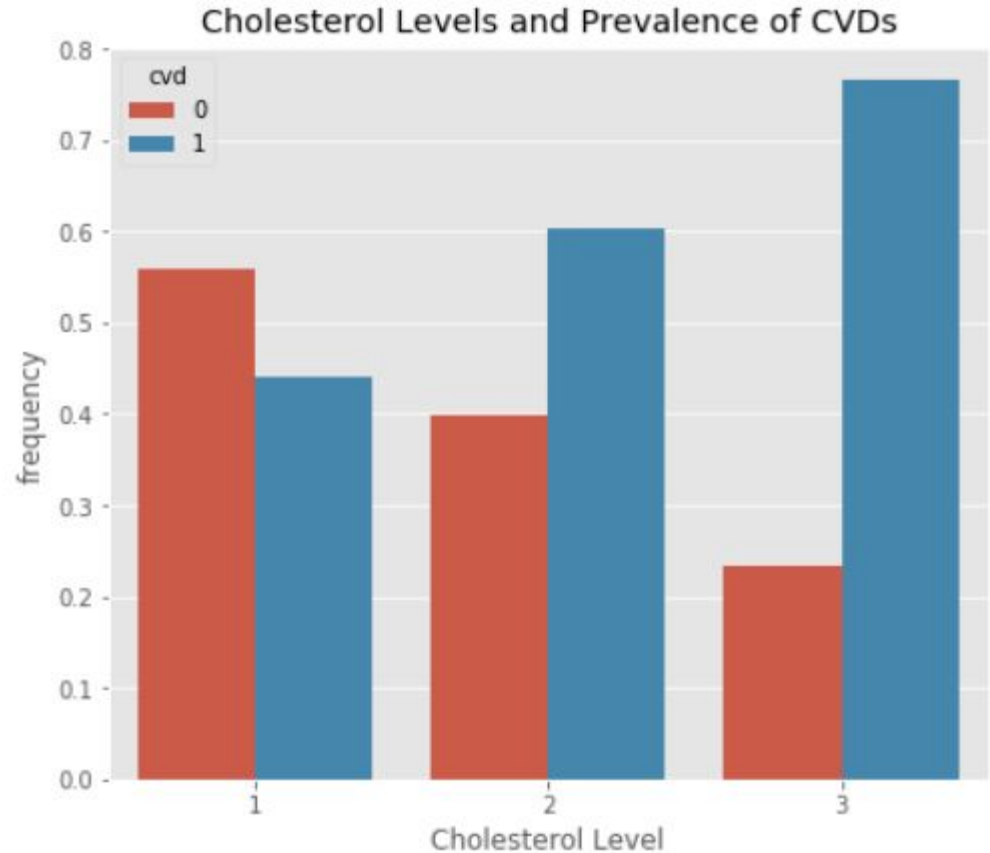
# Cholesterol

What causes high cholesterol?

- Unhealthy eating habits
- Sedentary lifestyle
- Smoking (lowers our HDL)

**Recommendation:**

- Don't smoke
- Eat healthier foods and correct portion sizes



# So How Do We Protect Against CVDs?

- Maintain a healthy lifestyle (Staying active, eating healthy)
- Understand that as we get older, it becomes more and more important to maintain a healthy lifestyle
- All factors are intertwined to some extent



# Further Research

- Details on smoking, physical activity, and drinking (more than just boolean values). E.g. On average, how many times a week do you work out?
- Include average eating habits
- Type of work lifestyle (if any)
- Average Stress Level (1-10 scale)
- On Average, number of hours sleep a night
- Any pre-existing family history of CVDs
- Multiclass (What type of CVD)
- Relative Fat Mass Index

**Thank You!**



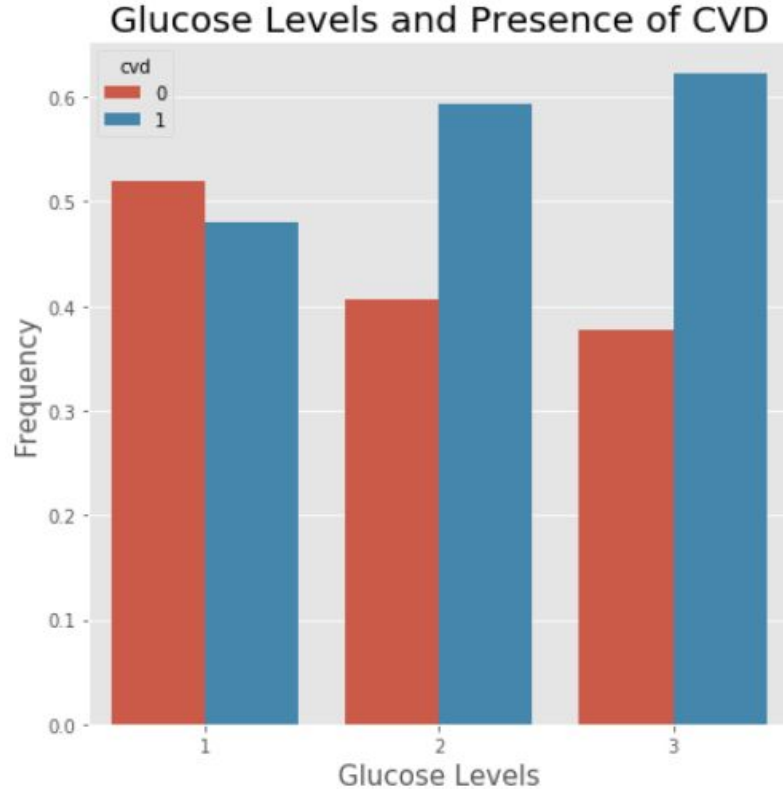
# References

1. Cardiovascular Diseases (CVD), World Health Organization.  
[https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-\(cvds\)](https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds)). Accessed October 1st, 2020.
2. "All About Adult BMI" Centers for Disease Control and Prevention.  
[https://www.cdc.gov/healthyweight/assessing/bmi/adult\\_bmi/index.html](https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html). Accessed October 4th, 2020.
3. Yildiran, Tansel et al. \*"Low pulse pressure as a predictor of death in patients with mild to advanced heart failure."\* Texas Heart Institute journal vol. 37,3 (2010): 284-90.
4. "Understanding Blood Pressure Readings." American Heart Association,  
[www.heart.org/en/health-topics/high-blood-pressure/understanding-blood-pressure-readings](http://www.heart.org/en/health-topics/high-blood-pressure/understanding-blood-pressure-readings). Accessed October 4th, 2020.
5. Narloch, J A, and M E Brandstater. \*"Influence of breathing technique on arterial blood pressure during heavy weight lifting."\* Archives of physical medicine and rehabilitation vol. 76,5 (1995): 457-62.
6. Dr G. M. C. Rosano, C. Vitale, G. Marazzi & M. Volterrani (2007) \*Menopause and cardiovascular disease: the evidence\*, Climacteric, 10:sup1, 19-24, DOI: 10.1080/13697130601114917

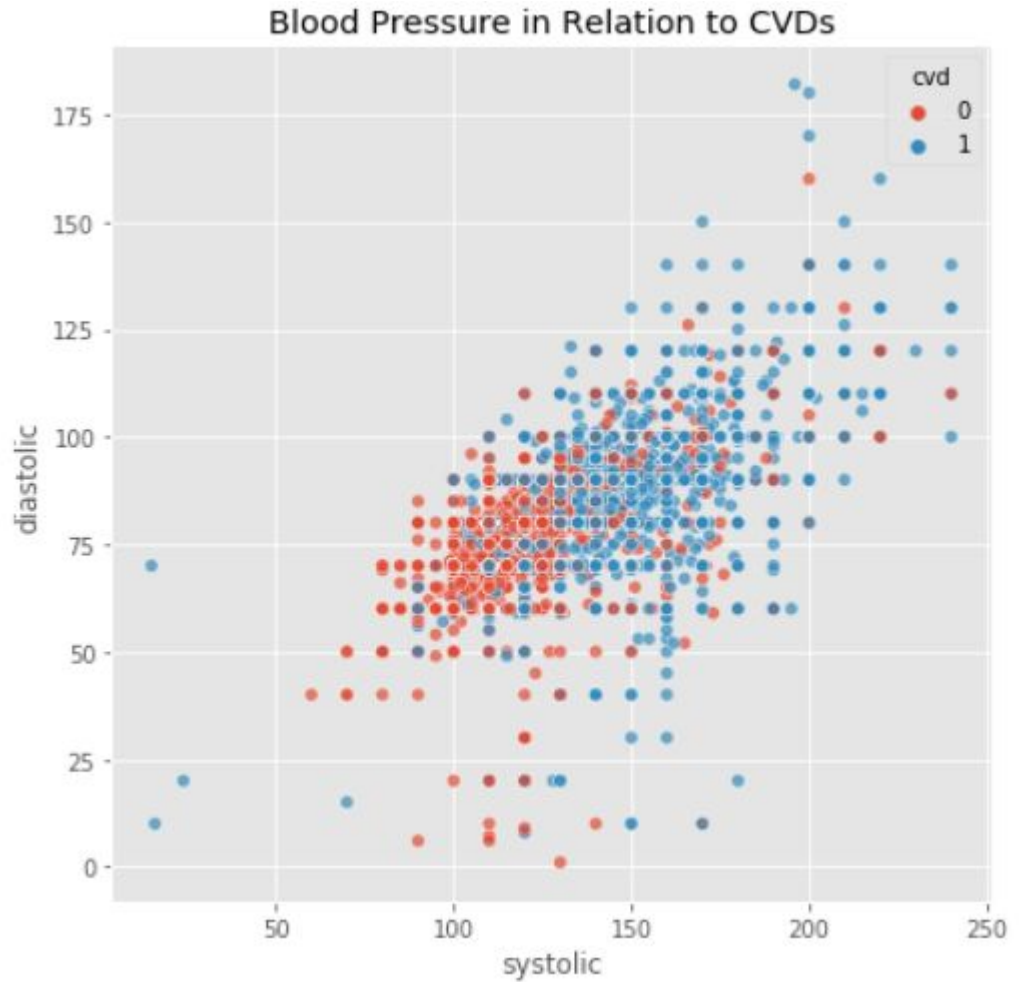
# Appendix



# Glucose Levels

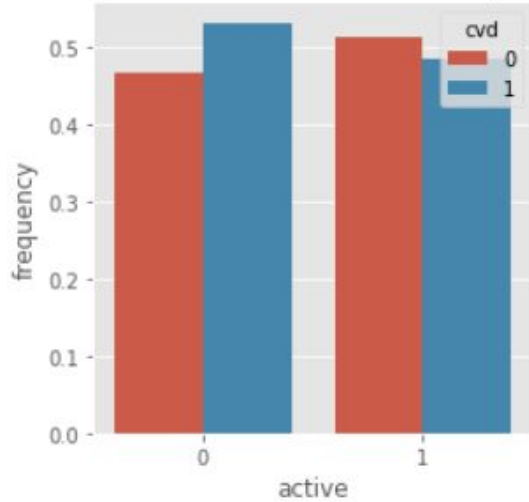


# Blood Pressure Scatterplot

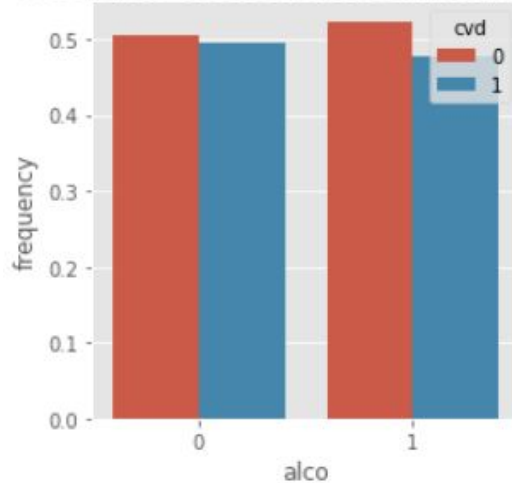


# Smoking, Alcohol, and Activity Compared to CVD

Prevalence of CVD in Non-Active/Active



Prevalence of CVD in Non-Drinker/Drinker



Prevalence of CVD in Non-Smokers/Smokers

