Coronary Heart Disease

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Coronary Heart Disease (CHD)

- Heart disease is the leading cause of death among men and women in the United States
- CHD - arteries cannot transport enough oxygen-rich blood to the heart
  - Most common heart disease
- Several causes:
  - Overweight, unhealthy eating
  - Smoking habits, alcohol consumption
  - Systolic blood pressure
  - Age
  - Family history
  - Low density lipoprotein cholesterol
  - Type A behavior (competitive, controlling, aggression, urgency)
- Understanding which variables play the largest role in causing CHD may help will prognosis and prevention

Research Question

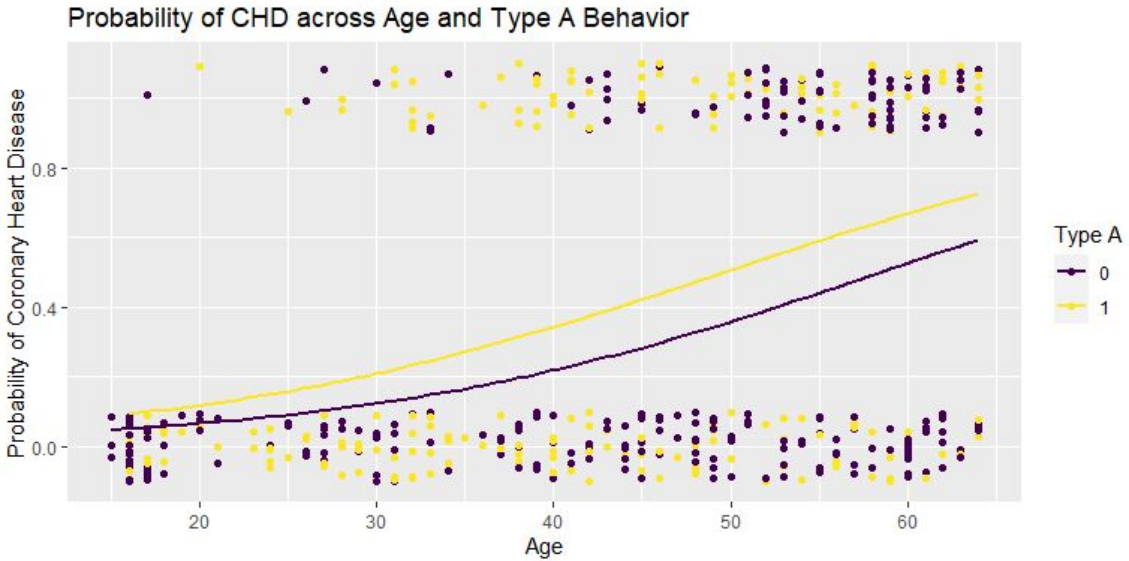
What’s the relationship between type A behavior and coronary heart disease after accounting for cumulative tobacco (kg), systolic blood pressure, and age?

CHD Data

- Western Cape, South Africa, a high-risk region for heart disease
- 462 all male observations
- Roughly ⅓ have CHD
- Taken from a larger dataset used in a South African Medical Journal

CHD	Mean SBP	Mean Tobacco	Mean Age	Mean Type A Prob.
0	135.46	2.63	38.85	0.42
1	143.74	5.52	50.29	0.51

Exploring Type A Behavior and the Data



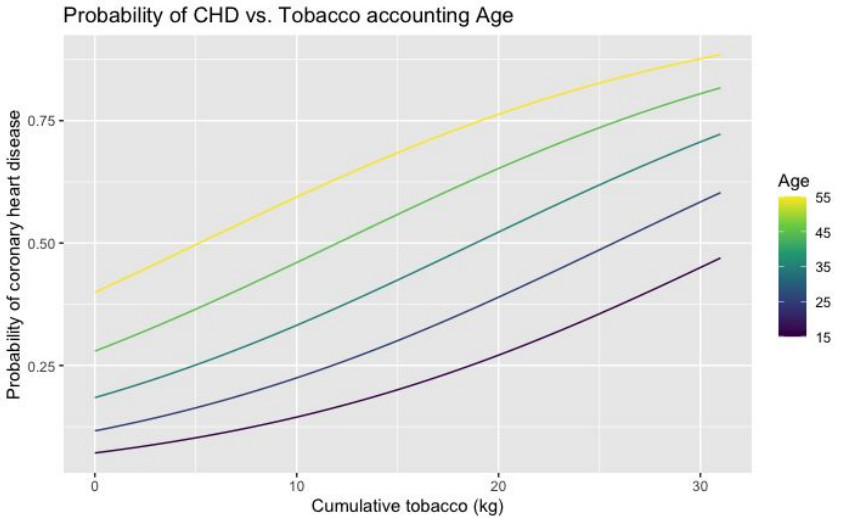
Variables	Correlation
CHD vs. Age	0.367
CHD vs. Tobacco	0.323
CHD vs. SBP	0.172
CHD vs. Type A	0.082

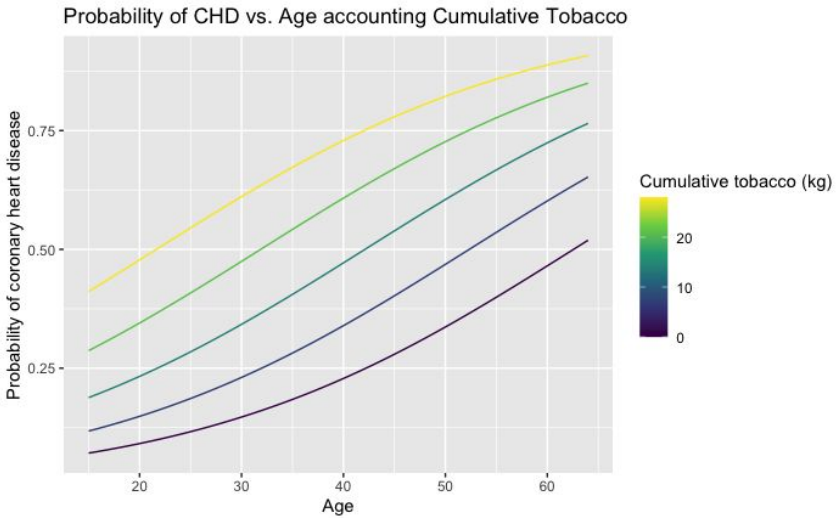
Initial Model

- Logistic regression was used because of the binomial nature of the coronary heart disease response variable in the dataset
- Started with a model with only age and tobacco, the variables that we found to have the largest correlation with the response

glm(chd ~ age + tobacco, family="binomial", data=chd.df)

Age, Tobacco, and CHD Initial Model Fits





Determining other Variables & Interactions via AIC

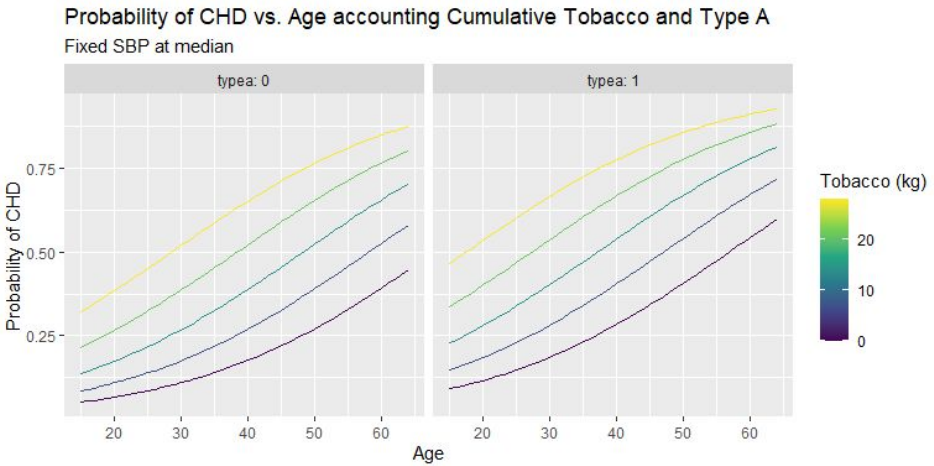
Model	AIC
Model with no interaction	516.683
Model with age:sbp interaction	518.612
Model with age:typea interaction	518.679
Model with tobacco:sbp interaction	518.682
Model with tobacco:typea interaction	518.365
Model with tobacco:sbp & sbp:typea interactions	519.305

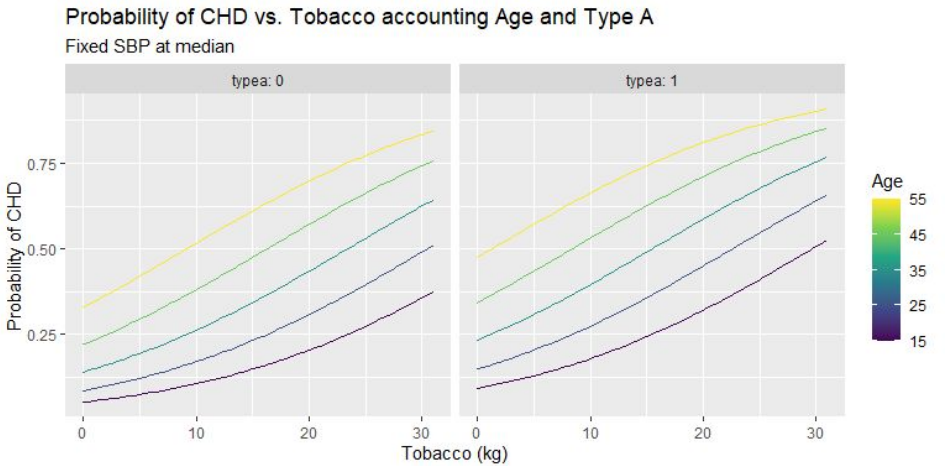
Model & Results

glm(chd ~ age + tobacco + sbp + typea, family="binomial", data=chd.df)

Intercept	**-4.525**
Age	0.055
Tobacco	0.078
SBP	0.006
Type A = 1	0.613

Model Results





Conclusion & Next Steps

Conclusions:

- After accounting for age, systolic blood pressure, and tobacco consumption, type A behavior plays an important role in increasing the likelihood of CHD
- People who are older, consume more tobacco, have higher systolic blood pressure, and perform type A behaviors (e.g., aggression, competitive, urgency, etc.) are more likely to have CHD

Next Steps:

- Consider the other variables in the data set to determine if there are better predictors for CHD that were not considered in the current study
    - Additionally, determine if adding other predictors to the model helps create a more complete picture of CHD
- Explore data from other locations to determine if these predictors are as important in other parts of the world
- Consider using a gam model

Thank you