

What determines health insurance costs?

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Our Research Questions

- Which independent variables are correlated with each other?
 - Examples: age and smoking, BMI and smoking, gender and BMI
- Which factors are most closely associated with insurance costs?
- Why do these factors influence insurance costs?



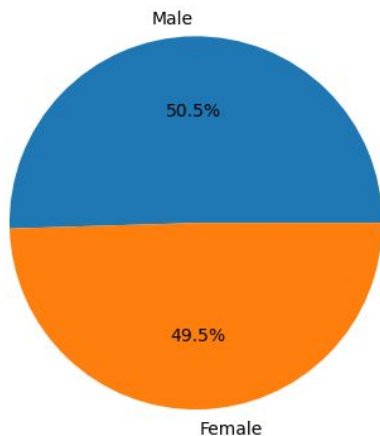
Our Dataset

- Dependent variable: **Insurance Costs (charges)**
- Independent variables
 - BMI
 - Smoking Habits
 - Region of the US
 - Number of children
 - Gender
 - Age
- Number of observations: 1338

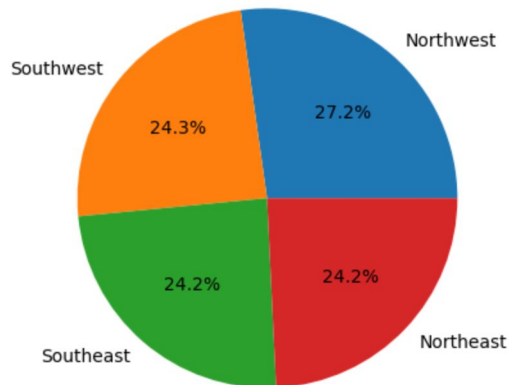


Overview of our independent variables

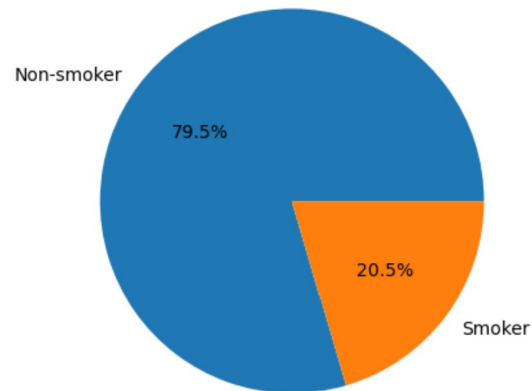
Gender Breakdown of Insurance Recipients



Location Distribution of Insurance Recipients



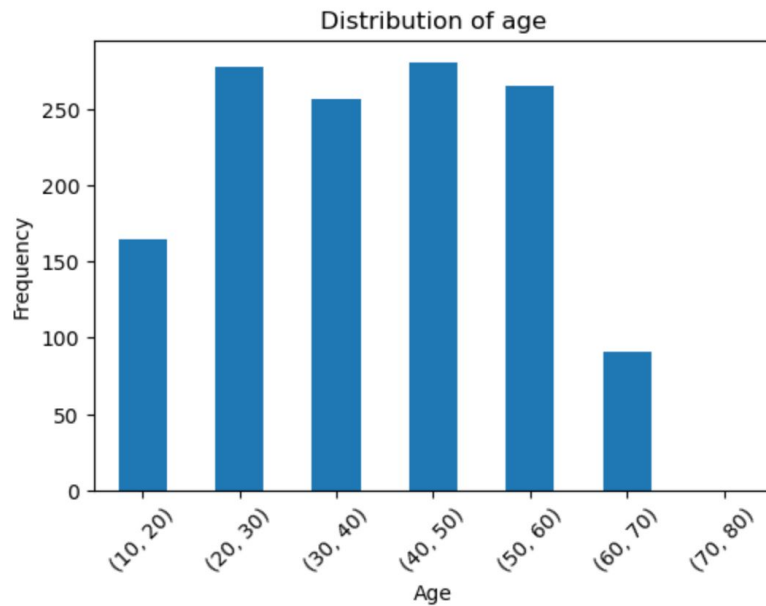
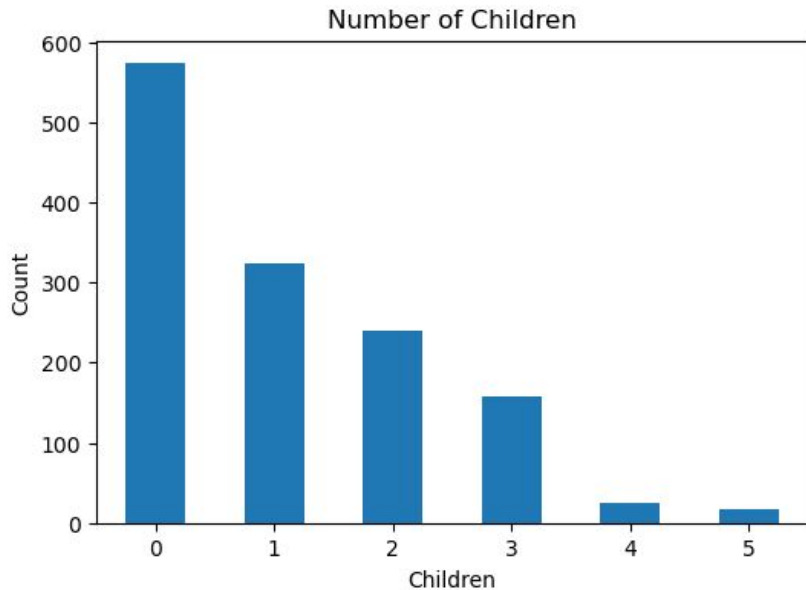
Smoking Habits of Insurance Recipients



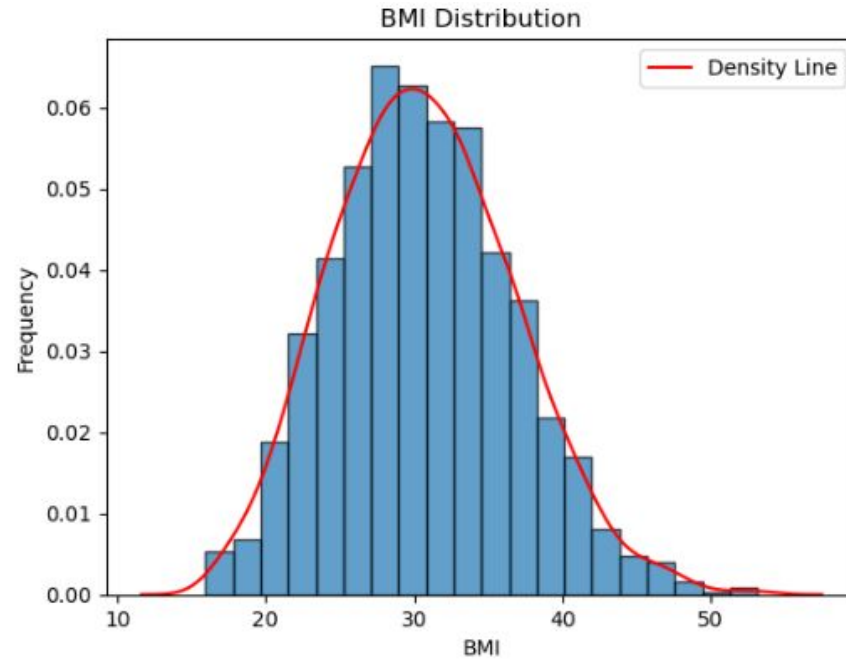


Overview of our independent variables

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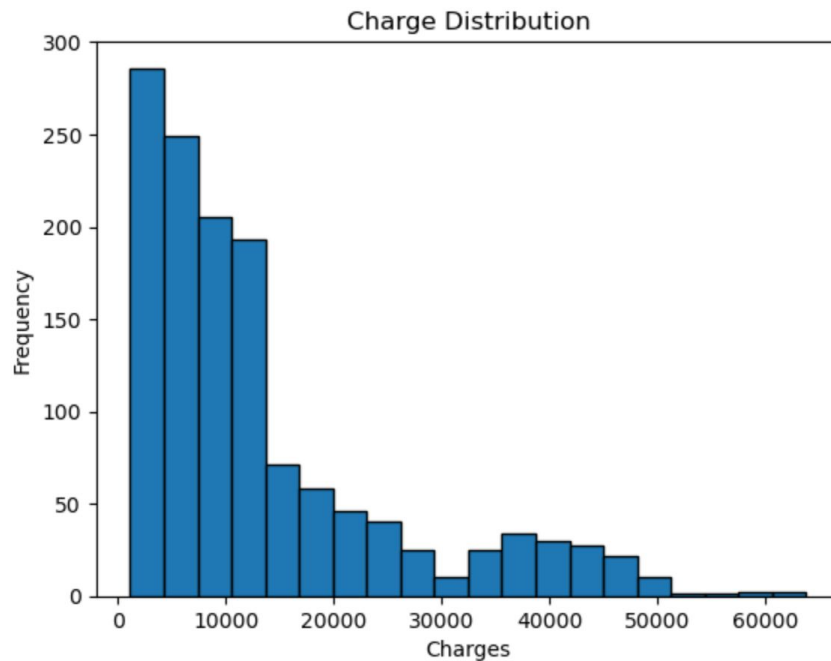


Overview of our independent variables



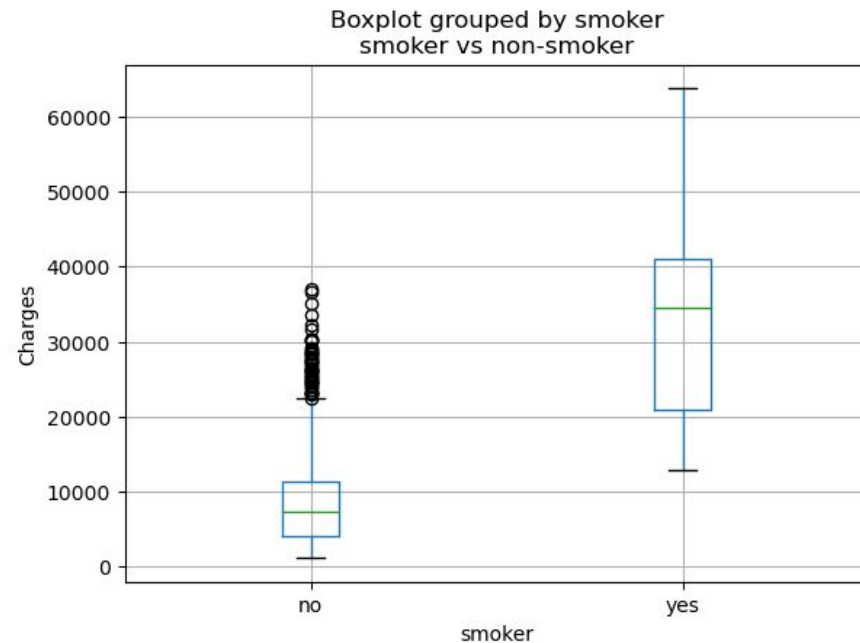
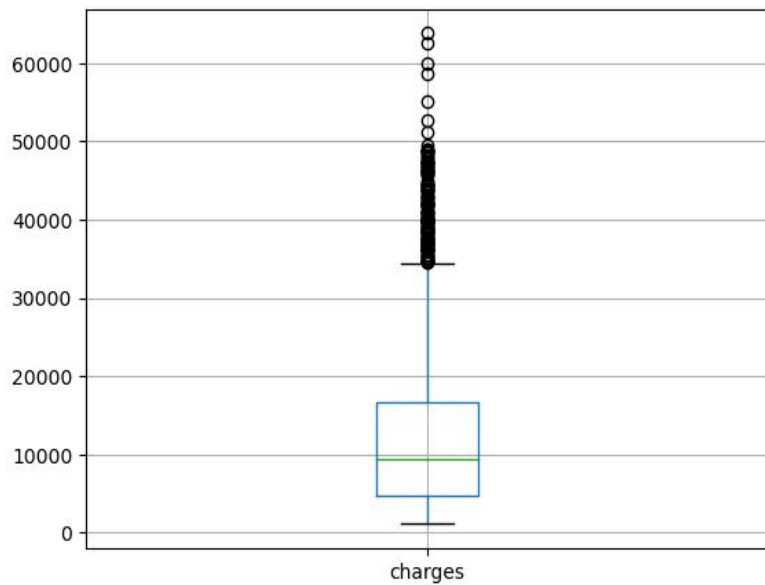



Distribution of insurance charges






Outliers?





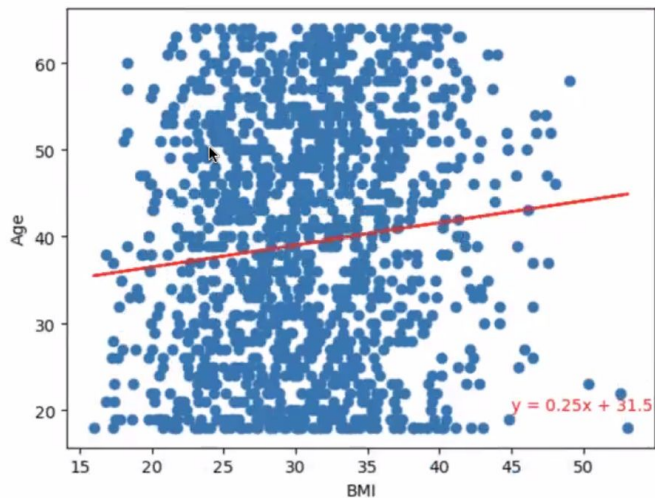
**Question 1: Are any of our
independent variables
related to each other?**



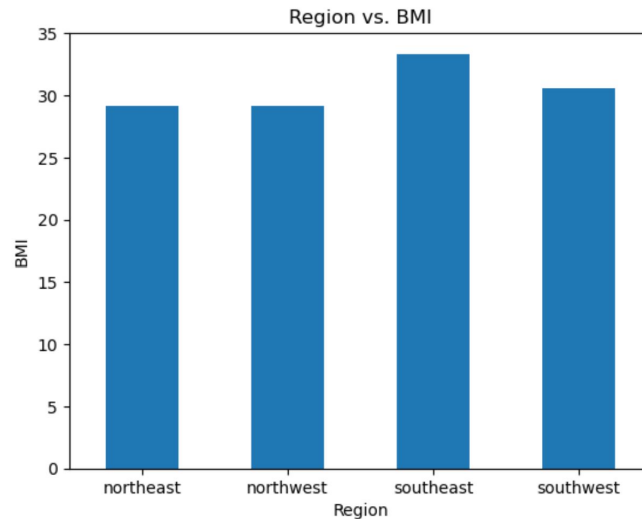
Question 1: Are any of our independent variables related to each other?

Age and BMI

The correlation between bmi and age is 0.11.

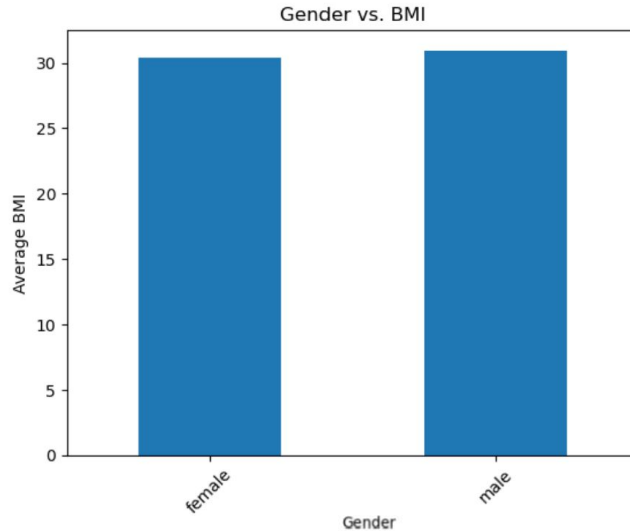


US region and Average BMI

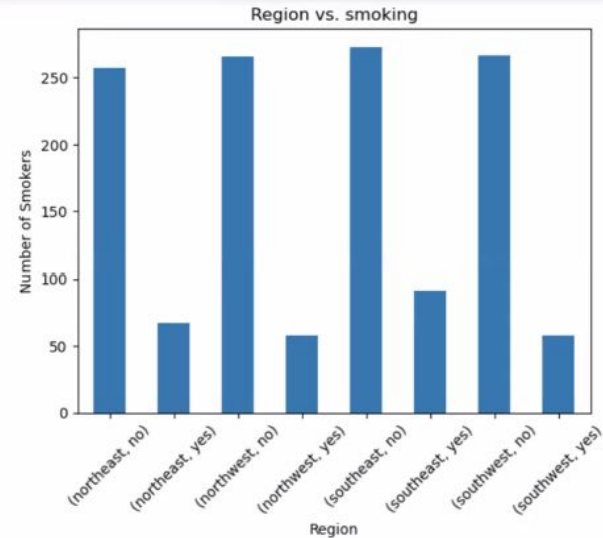


Question 1: Are any of our independent variables related to each other?

Gender and BMI



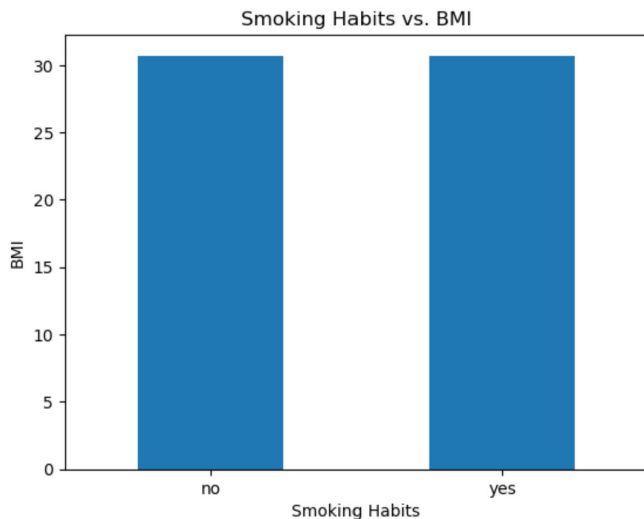
Region and smoking habits



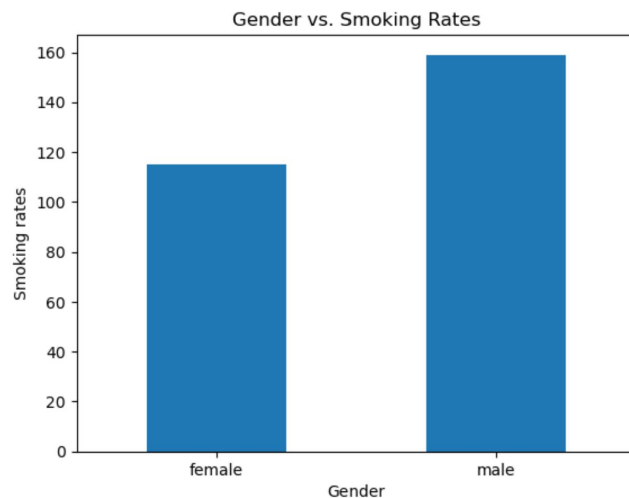


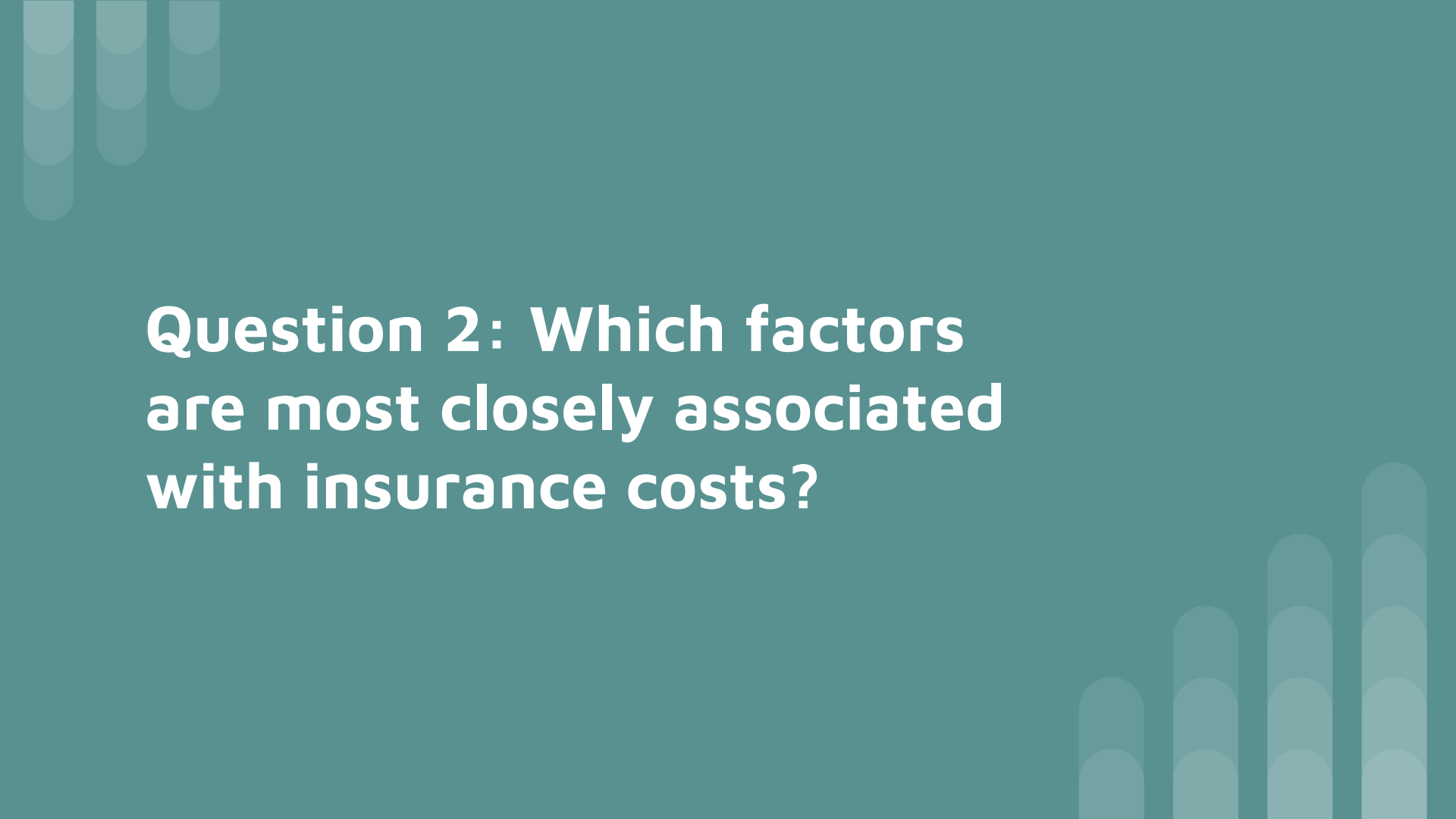
Question 1: Are any of our independent variables related to each other?

BMI (average) and smoking habits



Gender and smoking habits

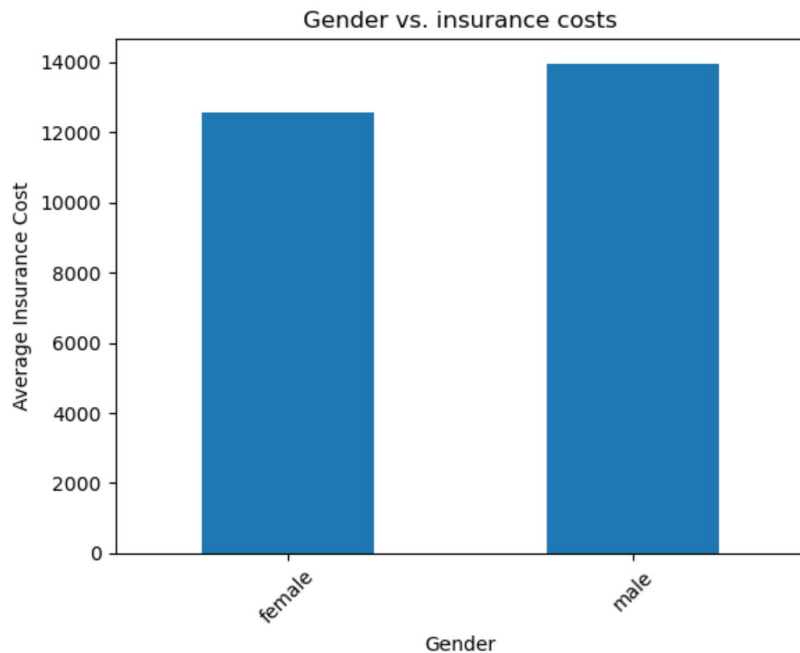




**Question 2: Which factors
are most closely associated
with insurance costs?**

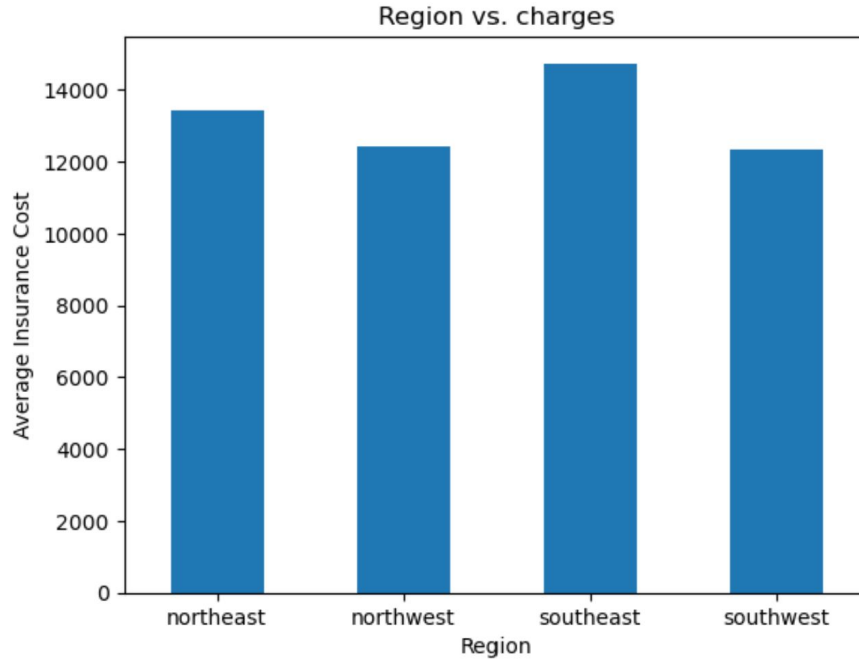


Gender and insurance costs





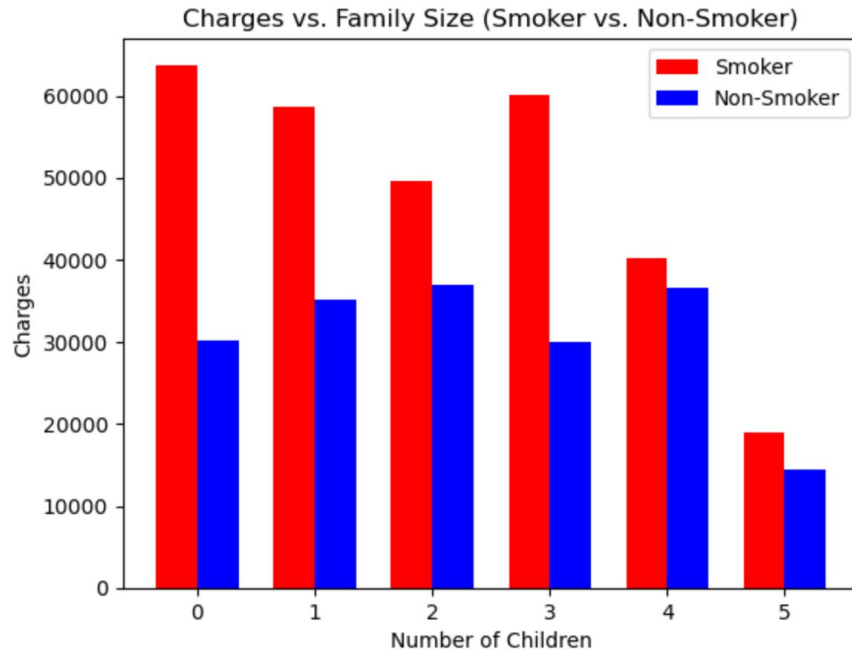
Region and insurance charges



Key Takeaways:

- People in the southeastern United States incur the largest insurance cost, followed by people in the northeast.
- Could be due to high BMIs, more likely to smoke?

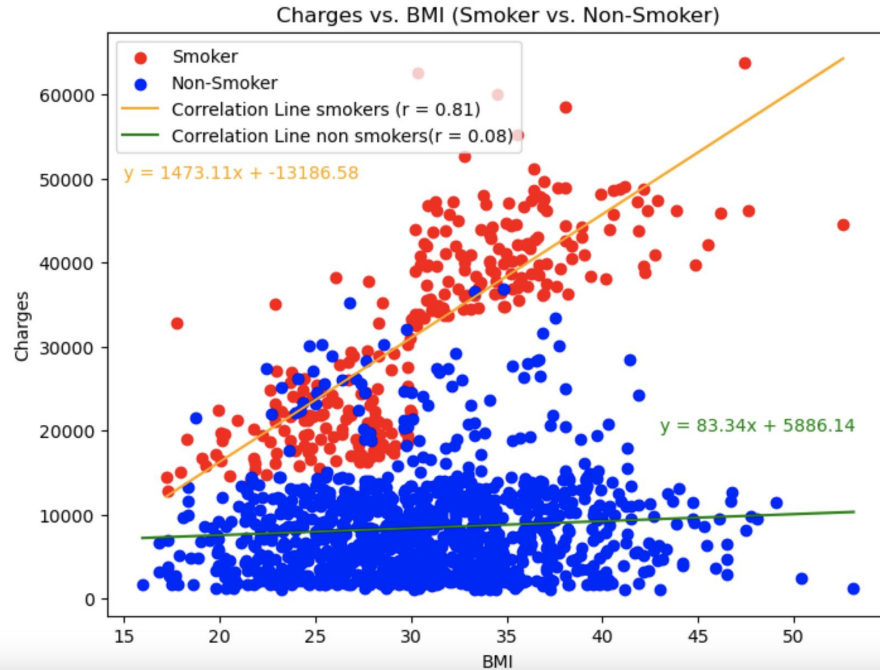
Family size, smoking habits, and insurance charges



Key Takeaways:

- Smokers: The number of children generally decreases one's insurance costs. (More kids= less money to spend on cigarettes= more mild smoking habit?)
- Non-smokers: The number of children generally increases one's insurance costs.

Insurance Costs, Smoking Habits, and BMI

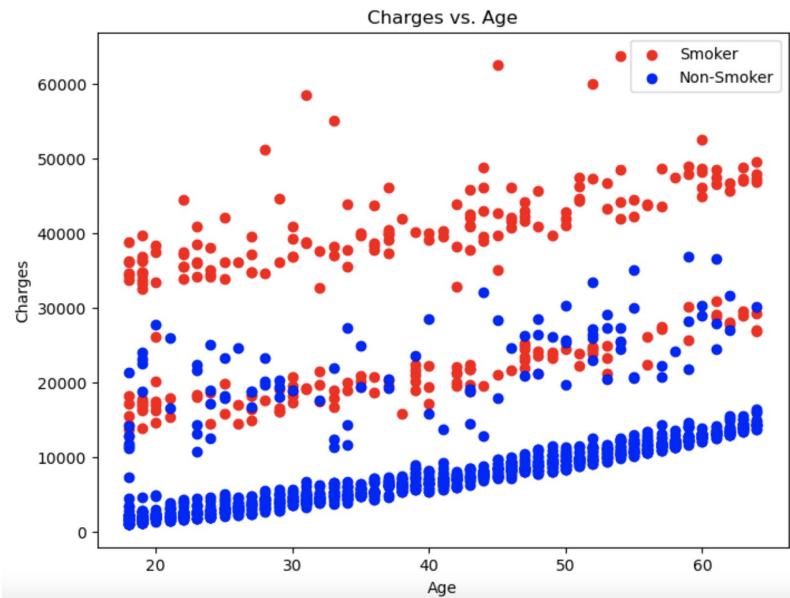
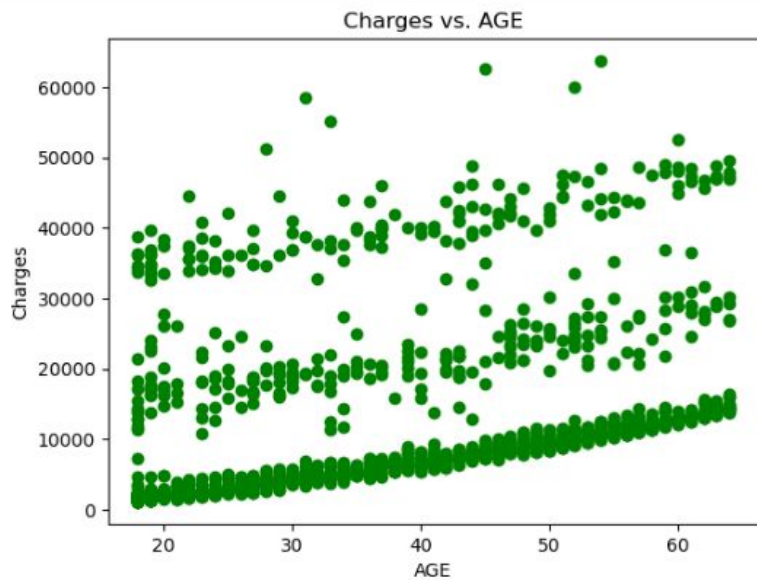


Key Takeaways:

- Nonsmokers: There is a low positive correlation between BMI and insurance costs.
- Smokers: There is a strong positive correlation between BMI and insurance costs.

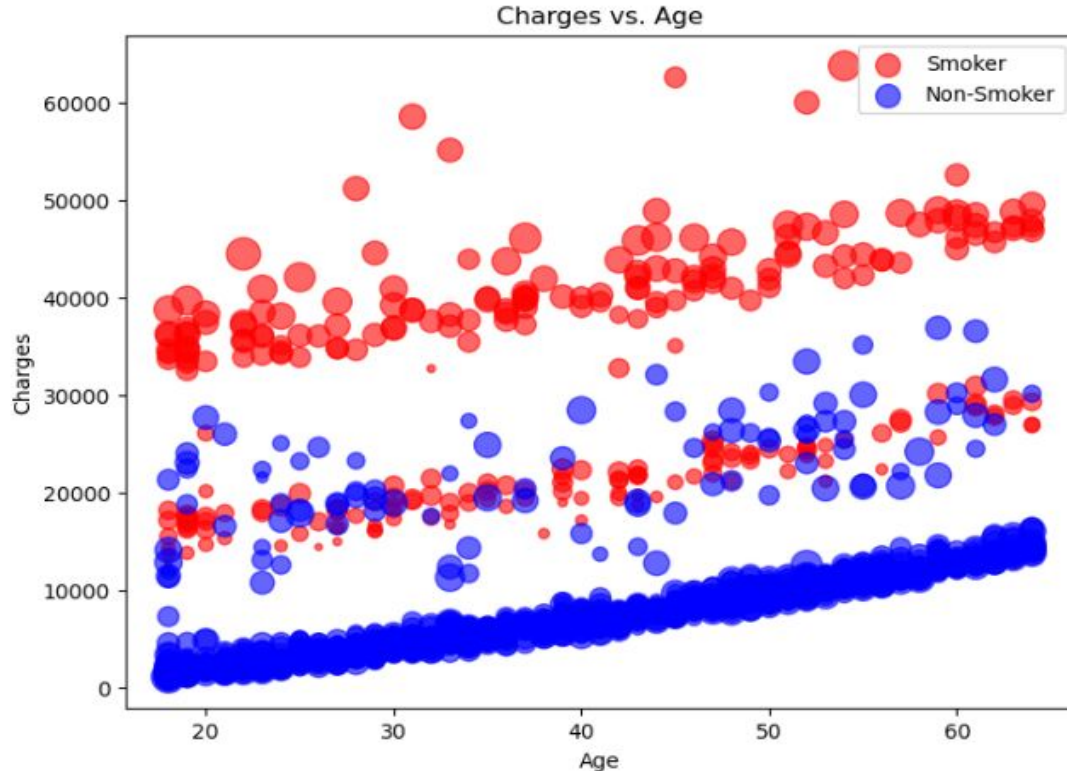


Ages and Insurance Charges






Age, BMI, and insurance charges

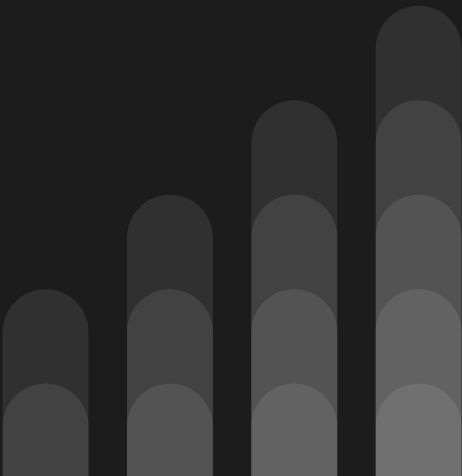


Key Takeaways:

- The highest insurance costs are accrued by smokers with high BMIs.
- The middle range of insurance costs are incurred by smokers with low BMIs or non-smokers with high BMIs.
- The lowest insurance costs are incurred by non-smokers with low BMIs.

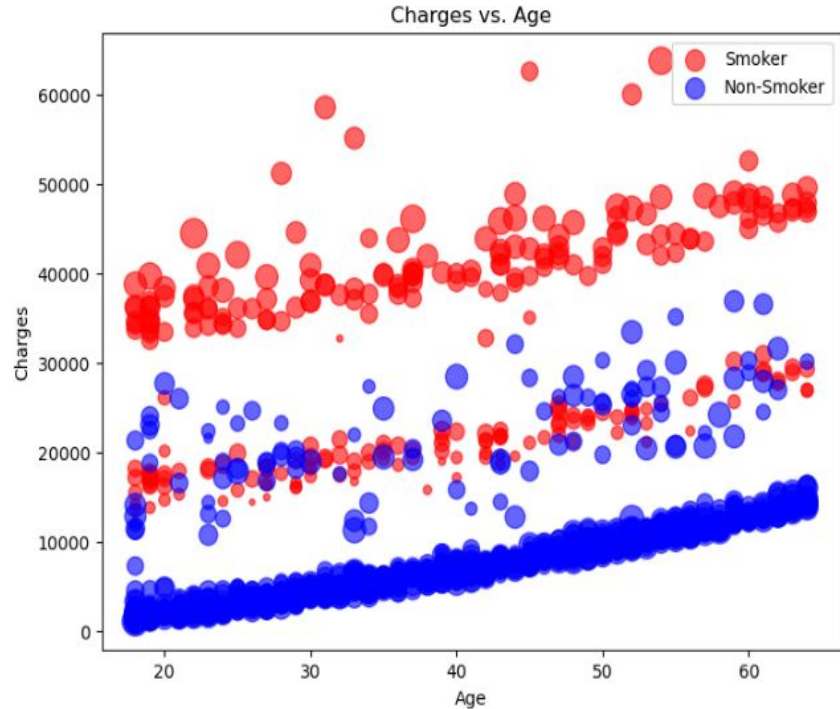


Conclusion: Smoking and BMI have the most significant effects on health insurance costs.



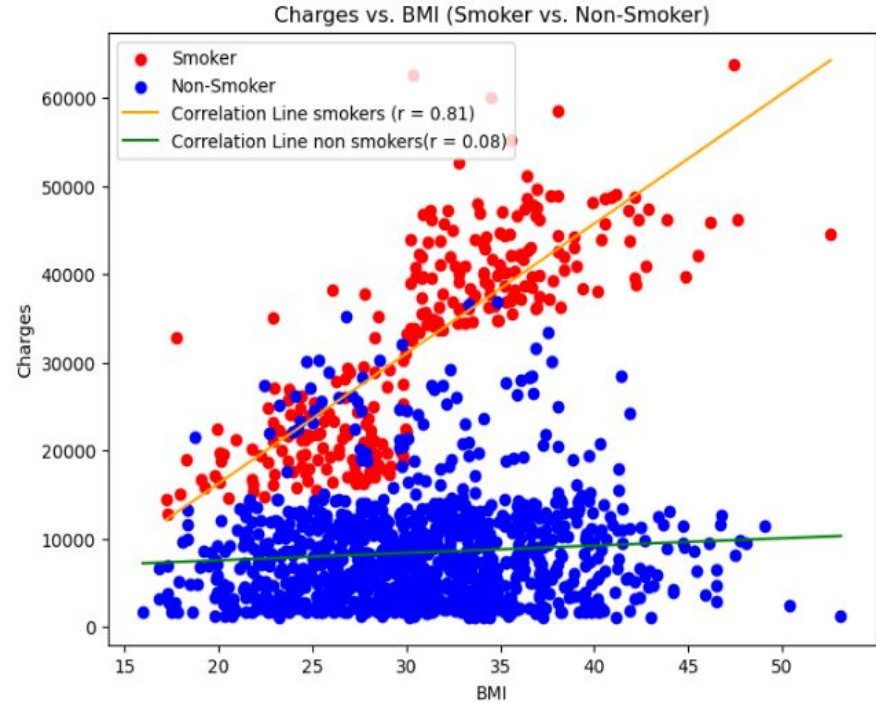
Discussion

- Based on the graphs to the right, smoking is the biggest factor on cost of insurance followed by BMI.
- Regardless of one's smoking habits and BMI, insurance costs increase with age.



Discussion

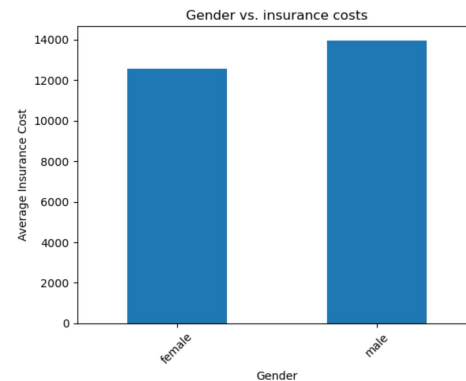
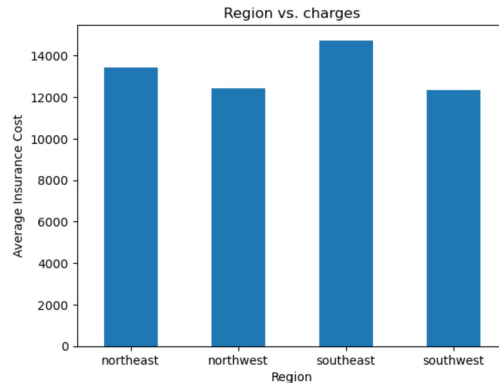
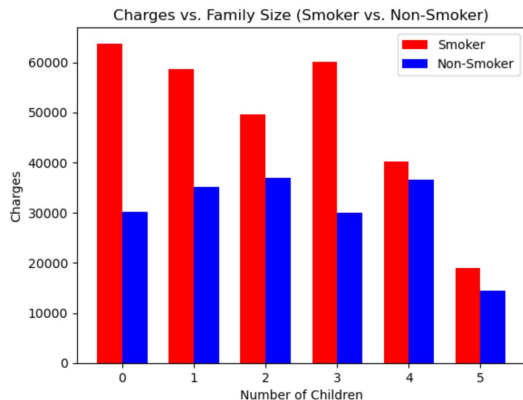
- The R-Value found in the smokers graph for the smokers is 0.81 vs non-smokers is 0.08. This means BMI and charges for smokers have a linear relationship.

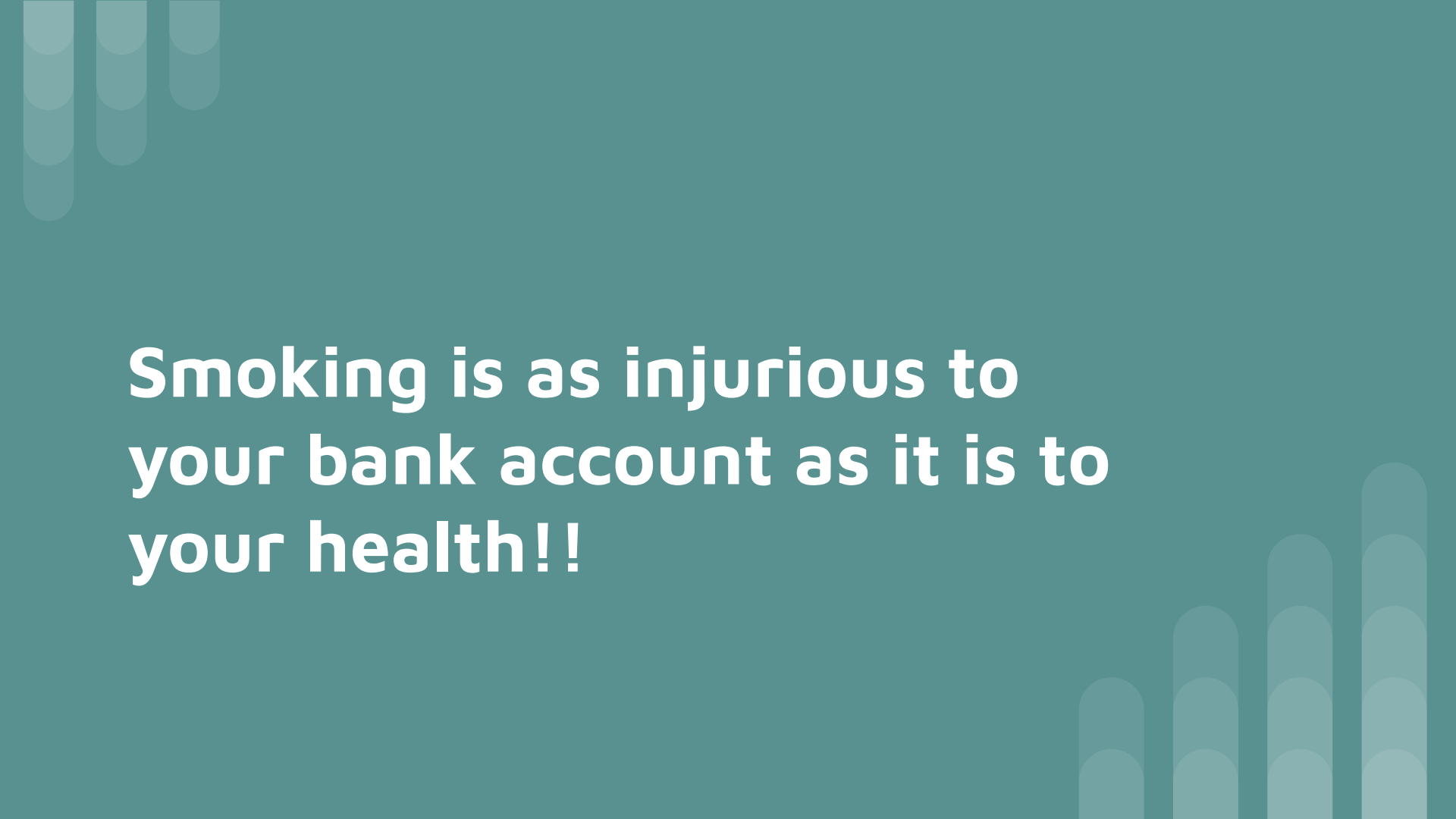




Discussion

- Number of kids, gender, and region of the United States do not have as significant of impacts on the cost of insurance, because they are correlated with other factors in the dataset.
 - Number of kids slightly increases insurance costs for non-smokers.
 - People in the southeast have higher charges, but this is because they have higher BMIs and smoke more.
 - Men have higher insurance costs, because they have higher BMIs and are more likely to smoke.





**Smoking is as injurious to
your bank account as it is to
your health!!**



Any questions?

