Comprehensive Insurance Analysis Report

1. Introduction:

The dataset encompasses information for 1,338 insurance contractors, covering key variables such as Age, Sex, BMI, number of Children, Smoking status, Region, and Insurance Charges.

2. Key Findings

a. Descriptive Statistics:

- Age: Ranging from 18 to 64 years, with an average of 39 years.
- BMI: Varying from 16kg/m2 to 53kg/m2, averaging at 31kg/m2.
- Children: Ranges from 0 to 5, with an average of 1 child.
- Charges: Wide-ranging, with a mean of $13,270.42.

b. Trends and Patterns:

- **Charges vs Age:** Generally, insurance charges increased with age, so the older insurance contractors   faced higher medical costs until age 50years and above when the charges started decreasing again. Ages 10-19 paid charges as low as $1,163.00 and Ages 60years and above paid as high as about $1.6M

- **Charges vs BMI:** There is a positive correlation between BMI and insurance charges, indicating that higher BMI is associated with increased healthcare expenses. Highest Insurance contractor BMI of 30- 39 kg/m2 paid charges of about $2.9M and the lowest BMI of 10-19kg/m2 paid charges of $17,180.00

- **Charges vs Smoker:** Smokers tend to have significantly higher insurance charges compared to non-smokers, highlighting the impact of smoking on health costs. Southeast Region has

the highest Smokers at a count of 79 between the ages of 40- 49years and are all Male with the highest average charges at $33,042.00 with the highest percentage of dependents at 51.47%

- **Charges vs Region:** Insurance Contractors from the southeast region appear to have higher average insurance charges above $2.8M compared to other regions with Males with the highest charges at about $1.8M

c. Outliers:

- Outliers in Charges: Some insurance contractors have notably higher charges compared to the majority.
    - For BMI between 30-39kg/m2 we has charges as high as $2.234M which is notably higher compared to other BMI within the range.
    - Insurance charges increases as the BMI increases but for ages 60years and above we have the charges as low as $13,304.00 compared to other charges within the age range.
    - Further investigation is needed to understand the reasons behind these extreme values.

d. Smoking Status Impact:

- Smokers, on average, have substantially higher insurance charges compared to non-smokers. The highest smokers are found with Males at a count of 79 between the ages of 31-40years in the Southeast region with an average charge of $33,042.00.This shows the correlation between smoking and insurance charges and also emphasizes the significant role of smoking habits in determining healthcare costs.

e. Regional Disparities:

- The Southeast region stands out with higher average insurance charges with a Total of $2, 348, 468.00 compared to other regions. Exploring regional factors affecting healthcare costs is recommended.

3. Recommendations:

- Conduct a detailed analysis of outliers to understand the factors contributing to extremely high insurance charges.
- Investigate regional disparities and sex of insurance contractors by considering socio-economic factors, healthcare infrastructure, or lifestyle choices that may impact healthcare costs.
- Consider targeted health promotion and prevention programs, especially in regions with higher average charges.

4. Conclusion:

- The analysis highlights age, sex, BMI, smoking status, and region as significant factors influencing insurance charges. Understanding these patterns can inform policy decisions, risk assessment, and the development of targeted healthcare interventions.