**Title:** Exploring relationships between Hospital readmission rates and mortality rates

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**Summary of Analysis on Hospital Mortality and Readmission Rates**

**Statistical/Hypothetical Question**

The main statistical question explored in this analysis was: "Do hospitals with higher readmission rates also have higher mortality rates?" This hypothesis aimed to uncover potential correlations between two vital healthcare performance metrics, providing insights that could impact patient outcomes and hospital management.

**Outcome of Exploratory Data Analysis (EDA)**

The exploratory data analysis revealed several important findings. First, the mortality scores exhibited a non-normal distribution, characterized by a right skew and potential outliers indicative of hospitals with high mortality rates. The cumulative distribution function (CDF) analysis showed that most hospitals had relatively low mortality scores. However, the permutation test yielded a p-value of 0.1346, indicating that the difference in mortality scores between hospitals with high and low readmission rates was not statistically significant. This suggested a lack of evidence to reject the null hypothesis, pointing to no substantial relationship between readmission and mortality rates.

**Areas for Improvement in Analysis**

Despite the thorough approach, several areas were overlooked that could have enriched the findings. A more detailed examination of confounding variables, such as patient demographics, hospital characteristics, and regional differences, would have enhanced the analysis and provided a clearer picture of the factors at play.

**Variables That Could Have Enhanced Analysis**

Incorporating additional variables like patient age, pre-existing health conditions, hospital capacity, and service types could have significantly influenced the results. These factors are crucial in understanding both readmission and mortality rates and could have provided deeper insights into the relationship under investigation.

**Assumptions and Challenges Faced**

Several assumptions made during the analysis. For instance, assuming a linear relationship between mortality and readmission scores could overlook the complexities inherent in healthcare data. Additionally, the violation of normality assumptions limited the applicability of certain statistical tests.

Challenges included interpreting non-linear relationships and the implications of non-normal distributions on the analysis. This highlighted the need for further exploration of non-parametric methods and alternative modeling approaches to address these complexities.

**Conclusion**

In summary, while the analysis provided useful insights into the connection between hospital readmission and mortality rates, there remains significant potential for further research. By incorporating additional variables and employing diverse analytical methods, future investigations could offer a more comprehensive understanding of the factors influencing patient outcomes in healthcare settings.