**Project 1 Analysis**

This project was conducted to analyze two primary factors related to healthcare in the U.S. One data source was the amount of people insured. For this data we have used the years 2010 to 2020, a total of eleven years. The variable of total health care expenditure is how much all the citizens of a state spent on health care costs in a year. This was measured over a decade period of 2011 to 2020. The data for the total amount of people insured was pulled from the United States Census. The data for total health care expenditure was pulled from KFF an organization dedicated to health policy research.

**Key Findings**

1. **Trends in Insurance Coverage**

The data for percentage insured has been shown state by state. As a general trend the amount of people insured has gone up from 2010 to 2020 with no state having a lower percentage of people covered in 2010 compared to 2020. One of the most telling statistics from this is that in 2010 only 10 states had an insurance coverage rate of above 90 percent. By 2020 only seven states were below a 90 percent insurance coverage rate. Nevada 11.8 percent increase was the greatest increase seen from any state. Delaware had the smallest increase with the percentage only going up 3.5 percent.

1. **Private Insurance Enrollment**

We looked at the number of people covered by private insurance and public insurance over the years of 2010 to 2020. In terms of private insurance, the number of people only went down in 2011. From there the number of people covered went up each year. A significant enrollment growth occurred from 2013 to 2016 with the total enrollments going up 246 million people in that period alone. Before that, the number of people insured from 2010 to 2012 went up 41 million people. From 2017 to 2020 enrollment increased by 10 million people. As evident between 2013 to 2016 enrollment rate had the most significant change with regards to enrollment rates of private insurance.

1. **Public Insurance Enrollment**

When looking at public insurance, its coverage enrollment rate has grown every year from 2010 to 2020. It has been a steady rate of growth in coverage from year to year. The biggest growth for public insurance was from the years of 2013 to 2015, highlighting a consistent upward trend in enrollment.

1. **Comparison of Public and Private Insurance Growth**

Public and private insurance had similar enrollment growth in the U.S. between 2010 and 2020. The major difference is that during their highest enrollment growth rates from 2013 to 2016, private insurance had a higher growth rate during that period.

1. **Relationship Between Insurance Coverage and Healthcare Expenditure**

When looking at the data of total health care expenditure to number of insured people, our data used the r squared to calculate how much our dependent variable of total health care expenditure by people was affected by our independent variable in this case the number of people insured. The points in the data accumulate all 50 states citizens total health care expenditure of each year between 2010 to 2020. One thing to note is that there seems to be three clusters of data with very few outliers. With this it is no surprise that for this test we have a very high r squared value of .976. This combined with looking at the direction of line of best fit indicates that it is likely the more people a state has insured the higher the total health expenditure for a state is going to be.

When looking at the data for total health care expenditure compared to the amount of people covered by private healthcare and the total health care expenditure a r squared analysis was run. The total amount of people insured the data clusters around three major spots. The difference to the total people insured is that the r squared value is .148. This value indicates that the amount of people covered on private insurance is not likely to affect the total health expenditure citizens spend for a given state. Certainly not as likely to affect as total people insured. However, similarly to total people, the line indicates there is an effect with the higher private insurance enrollments, the higher the health care expenditure.

When looking at the data for total health care expenditure compared to the amount of people covered by public healthcare an r square analysis was run. A similar three data clusters are found to both number of total people insured, and total people insured by private health care. Its r squared value is .159 which is higher than private insurance, but far less then total people insured. We can therefore say is has slightly more likelihood of having affected total health care expenditure than private insurance. However, this is not statistically significant. Similarly to total people, the line of best indicates if there is an affect it is the effect of the total people enrolled on private insurance, the higher the health care expenditure. Whereas it is much less likely to have affected total health care expenditure than total people covered by all insurance.

1. **Overall Insights**

The amount of total healthcare expenditure states spend does not seem to be significantly affected by either the number of people who have private insurance or the number of people who have public insurance. However, the amount of health care expenditure does seem to be significantly affected by the amount of people covered by any type of health insurance. In other words, the total number of insured individuals is the primary factor influencing healthcare cost by state.

**Research Questions Analysis**

1. **How does the amount of coverage of public vs private insurance impact how all citizens in a state spend on healthcare in a year?**

Based on the project data sets, the null hypothesis is proven true.

1. **How has the yearly trend in insurance coverage varied by state from 2011 to 2020?**

There is significant variation seen in the change rates in the number of states that had above 90 percent health care coverage from 2010 to 2020. Therefore, we can disprove the null hypothesis.

1. **What are the trends in private insurance enrollment by state from 2011 to 2020?**

There is significant variation as seen especially in the huge growth in amount insured from 2013 to 2016. Therefore, we can disprove the null hypothesis.

1. **What are the trends in public insurance enrollment by state from 2011 to 2020?**

There is steady growth in the amount of people covered by public insurance. We can disprove the null hypothesis due to this.

1. **What is the relationship between the number of insured people and the total healthcare expenditure for each year from 2011 to 2020?**

There is a clearly a relationship between the total health care expenditure increases and the amount of people insured increase. The evidence of this is the high r squared value. We can disprove the null hypothesis that there is no significant relationship.

1. **What is the relationship between the number of insured people on public vs private insurance and the total healthcare expenditure for each year from 2011 to 2020?**

Based on the low r value there seems to very little relationship between number of people insured privately and total health care expenditure. The same holds for people insured publicly with the r value being a bit larger for public but not enough for notable difference. Therefore, we cannot disprove the null hypothesis.

**Further Study Opportunities**

When looking at our study there are some opportunities for further studies. One aspect that could be changed is taking health care expenditure per capita or person. In our study we only looked at raw state health care expenditure. The size of a state’s population should have a significant influence on the total health care expenditure by state and evaluating individual people may provide more granular insights. Some other things to investigate are diving more into that significant increase of coverage from 2013 to 2016 and whether expenditure changed in the same type of way. If it did that would further support the effect of insurance coverage on health care expenditure, or we might be able to discover other potential factors. One other thing that could be expanded on is comparing individual states or regions on these factors. This study mostly used states as points in an overall larger look as expenditure overall. Comparing things by region or highest spending to lower spending states would be an interesting continuation.