**Question Two**

**Report summary**

**Model Overview**

The model utilized for this simulation focuses on the relationship between various health and economic indicators and their impact on life expectancy. The key variables included in the model are:

- Hepatitis B vaccination rates

- Measles vaccination rates

- GDP rates

- Adult mortality rates

- Polio vaccination rates

- Diphtheria vaccination rates

The dependent variable for the regression analysis is **life expectancy**. A multiple regression analysis was conducted to understand how these independent variables influence life expectancy across different populations.

**Simulation Methodology**

The simulation was executed using a structured simulation plan that incorporated the following steps:

Data Preparation: Data was collected and prepared for analysis, ensuring all variables were correctly formatted and missing data was handled appropriately.

Simulation Plan Creation: A simulation plan was developed using the following distributions for key inputs:

-Adult Mortality: Weibull distribution

-GDP: Log-normal distribution

-Life Expectancy: Weibull distribution

Running the Simulation: The simulation was run with a maximum of 100,000 cases to ensure robust results. The seed for random number generation was set to ensure reproducibility of results.

Output Generation: The results were saved to a new dataset for further analysis.

**Simulation Outcomes**

The simulation produced several key outcomes:

Descriptive Statistics: The simulation provided mean and standard deviation values for life expectancy, adult mortality, and GDP.

Regression Coefficients: The regression analysis revealed significant relationships between life expectancy and the independent variables. For instance, higher GDP and vaccination rates were positively correlated with increased life expectancy.

Percentiles: The simulation allowed for the analysis of percentiles, providing insights into the distribution of life expectancy across different scenarios.

**Policy Implications**

The findings from the simulation suggest several important policy implications:

Investment in Healthcare: Policies aimed at increasing vaccination rates for diseases such as Hepatitis B and Measles can significantly improve life expectancy.

Economic Development: Enhancing GDP through economic policies can have a direct positive impact on public health outcomes.

Focus on Adult Mortality: Reducing adult mortality rates should be a priority for health policymakers, as this has a substantial effect on overall life expectancy.

Data-Driven Decision Making: The simulation underscores the importance of using data-driven approaches in public health policy to optimize resource allocation and improve health outcomes.