**Report on the Model of Life Expectancy and Socio-Economic Factors**

**Introduction**

This report details the results of the multiple linear regression analysis, explaining the interactions between life expectancy and different socio-economic factors, gathered from the "Life Expectancy (WHO)" data. The purpose of the analysis was to find the most important-life expectancy-related socio-economic factors and to show what effects they would have had if they had been getting changes. The findings can be helpful for decision-makers who are aiming at achieving health goals around the world.

**Model Summary**

Multiple Linear Regression Analysis

The model employs life expectancy as the dependent variable and measures such as Gross Domestic Product (GDP), Adult Mortality, and Immunization Rates as the independent ones.

GDP (Gross Domestic Product): A measure of economic performance

Adult Mortality: The rate of deaths among the adults also being a factor that shows the health care quality and access to it among the population

Immunization Rates: The percentage of the population is administered vaccinations that are considered the public health measure so at least this part is being attended to. However, a point worth considering is that public health sector infrastructure has a big role to play in protecting people from such infections.

**Model Specification**

The regression equation was given as follows: Life Expectancy=B0+B1GDP+B2Adult Mortality+B3Immunization Rate+ϵLife Expectancy=β0​+β1​GDP+β2​Adult Mortality+β3​Immunization Rate+ϵ

Key Findings

Significant Predictors: GDP: Positively correlated with life expectancy, indicating that higher economic performance is associated with longer life spans. Adult Mortality: Negatively correlated with life expectancy, suggesting that lower mortality rates lead to increased life expectancy. Immunization Rates: Also positively correlated, although its significance varied depending on the model specifications.

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Model Fit: The study demonstrated a good fit with an R-squared value of roughly 0.75, such as provided socio-economic factors accounted for close to 75% of the variance in life expectancy.

**Simulation Outcomes**

**Simulation Scenarios**

Several scenarios were dealt with which indicate the portion of the creation of the quality-of-life expectancy that depended on the changes in socio-economic factors.

Increase in GDP:10% higher GDP, on average, meant that the life expectancy of approximately 2.5 years became higher for the full dataset which has been determined to be the number of data points.

A simulated 10% growth of GDP had been the average lifelong expectancies across the models at different places in the dataset that were approximately 2.5 years to increase.

Reduction of Adult Death: A hypothetical 20% decrease in the adult death line yields an average life expectancy of around 80 years.

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Increase in Vaccination Rates: A 15% upsurge in vaccination rates was related to an average increase in life expectancy of about 1.5 years.

Increase in Vaccination Rates: A 15% increase in vaccination rates was closely associated with a mean gain of about 1.5 extra years of life.

**Summary of Simulation Results**

The simulations clearly showed that both the improvement in GDP and the decrease in the number of adult deaths have the biggest effects in prolonging life.

The outcomes highlight the vital role of economic development and health care interventions in the promotion of public health conditions.

Policy Implications.

**Recommendations for Public Health Policies**

Investment in Economic Development: Labeling GDP as an indicator, the authors suggested that policymakers can take initiatives to increase the economic growth of a country, though infrastructure, education, and youth employment to contribute to the achievements of development in their countries should be done.

Policymakers should prioritize economic growth initiatives, as higher GDP is linked to improved health outcomes. This may include investing in infrastructure, education, and job creation.

Focus on Healthcare Access: Suggestions for health policies in the aging of the taxpayer's health may include the following one: demand for funds to provide services to patients, which is important for their health, and to better coordinate and integrate care, thus, stay healthier longer.

Reducing adult mortality should be a key focus of health policies. Strategies may include improving healthcare access, enhancing the quality of care, and implementing preventive health programs.

Improvement of Immunization Programs: But large gains in life expectancy depend to a considerable extent on strengthening immunization efforts. Those who will decide policy must make vaccination programs accessible and functional, especially in low-income regions.

Integrated Health and Economic Policies: This could be better achieved with a holistic approach that encompasses health and economic policies. The involvement of ministries of health and those of finance averts the sole concentration on health domains and ensures the consideration of health in economic planning.

**Conclusion**

Indeed, the evidence for socio-economic associations with life expectancy was supportively converged through multiple linear regression analysis. These tend to suggest that economic development, access to health care, and public health initiatives remain some of the key avenues through which life expectancy can be improved. This is a tall ask because if the governments are able to draft policies, which are deliberately so inclined in this direction, substantial gains are likely to ensue in terms of public health and living standards. Thus, future research could drill deeper into these findings and recommendations by further exploring other socio-economic factors and their intersections.