How to Improve Lifespan Through National Policy

Group 2

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1.1 Introduction

There are many aspects when it comes to having a healthy life. Measuring a healthy life and determining the factors that lead to a healthy life is a tricky task, but if we were to take a broad view of health, one could simply quantify this by measuring similar individuals’ lifespans. An easy and convenient way to group similar individuals is by country. Although most countries contain residents from many different ethnicities, social statuses, religions, etc., they share the same government policies and a general geographical area.

Our research topic is related to the World Health Organization’s (WHO) sustainable development goal of “good health and well-being.” We describe individuals with good health and well-being as those who have a longer than average lifespan. We feel that the indicators below are a good resource to model an individual’s average longevity. There have been numerous studies linking BMI, education level, alcohol consumption, and disease prevalence along with other factors to lifespan. We plan to use this data to find solutions for countries with shorter life expectancies.

1.2 Objectives

1. To create easily understandable data visualizations that effectively show our results.

2. To determine the most important variables for improving countries’ average lifespan.

3. To determine whether there are better ways to group countries other than the developed and undeveloped for the purpose of modeling life expectancy.

1.3 Data Mining Techniques

We will conduct clustering to account for cultural and geographical differences and use a cross-validation approach to lasso or ridge regression to model life expectancy for each cluster. If clustering does not improve our ability to model life expectancy, we will use our original data set to fit our model.

2.1 Data

Our data comes from the Kaggle data set titled Life Expectancy (WHO) and contains 21 variables. We will be using the average life expectancy by country as our response variable and the remaining variables will be our potential regressors. Our regressors include both qualitative and quantitative data. The quantitative regressors are:

1. Country – name of the county
2. Development status – differentiates developed and undeveloped countries.

The quantitative regressors are:

1. Life Expectancy – life expectancy in age
   1. Healthy life expectancy (HALE) at birth (years)
   2. Healthy life expectancy (HALE) at age 60 (years)
2. Adult Mortality – mortality rate per 1000 people aged 15-60
3. Infant Deaths – Infant mortality rate (between birth and 11 months per 1000 live births)
4. Alcohol – Recorded alcohol consumption (ages 15+) per capita in liters of pure alcohol
5. Percentage Expenditure – Domestic general government health expenditure (GGHE-D) as a percentage of general government expenditure (GGE) (%)
6. Hepatitis B – Hepatitis B (HepB3) immunization coverage among 1-year-olds (%)
7. Measles – number of reported cases per 1000 population
8. BMI – Mean body mass index trends among adults, crude (kg/m²)
9. Polio – polio (Pol3) immunization coverage among 1-year-olds (%)
10. Total expenditure – Domestic general government health expenditure (GGHE-D) as a percentage of gross domestic product (GDP) (%)
11. Diphtheria – diphtheria tetanus toxoid and pertussis (DTP3) immunization coverage among 1-year-olds (%)
12. HIV/AIDS – deaths per 1000 live births with HIV/AIDS (0-4 years)
13. Thinness 5-19 years – prevalence of thinness among adolescents age 5 to 19, BMI < -2 standard deviations below the median (crude estimate) (%)