# Project proposal

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2021-03-29

## Section 1. Introduction

By telling us the average age of death in a population, life expectancy is key metric for understanding a country's health. According to Max Roser, Esteban Ortiz-Ospina and Hannah Ritchie from Our World in Data, "Broader than the narrow metric of the infant and child mortality, which focus solely at mortality at a young age, life expectancy captures the mortality along the entire life course."[1] Over the course of history, life expectancy has risen dramatically. It is estimated that in pre-modern times, life expectancy worldwide was only about 30 years. Since the Industrial Revolution in the 18th and 19th centuries, many countries had huge gains in this number. And since the beginning of the 20th century, global average life expectancy has risen to about 70 years. However, there remain huge inequalities in this number. Currently (as of 2019), the Central African Republic has the lowest life expectancy of 53 years while Japan has the highest with 83.

In addition to the more obvious health-related connections to life expectancy, numerous pieces of academic literature have delved into the non-medical factors behind life expectancy. A major example is a longitudinal study conducted by Charles Lin, Eugene Rogot, Norman Johnson, Paul Sorlie, and Elizabeth Arias which examined life expectancy by socioeconomic factors.[2] Academic literature such as this provides us with motivations to examine this topic on an international level, looking at various health-related and non-health-related factors that connect to life expectancy.

In this project we plan on using various regression analysis methods including, but not limited to, multiple linear regression, statistical inference, analysis of variance, and model selection in an attempt to understand country and region-level life expectancy, as well as the health, social, and economic relationships behind this number.

In terms of initial hypotheses of model selection, we expect that the strongest predictors of life expectancy will be `Adult Mortality`, `infant deaths`, and `GDP`. We also predict that countries that have `status` equal to "Developed" will have higher life expectancy than those that have `status` equal to "Developing". We also predict that, on average, life expectancy will have increased internationally in the 15 years that are documented in the data set.

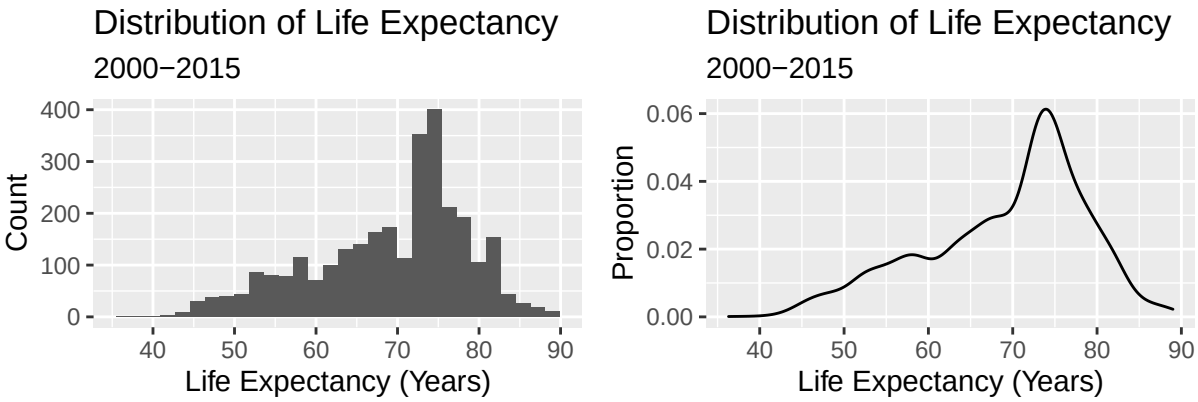
Sources:
[1] https://ourworldindata.org/life-expectancy
[2] https://europepmc.org/article/med/12785422/reload=0#impact

## Section 2. Data description

Our data set is comprised of information that individuals gleaned from the websites of the World Health Organization and the United Nations. Each row gives values of various health, social, and economic variables for one of 193 countries in a given year from 2000 to 2015.

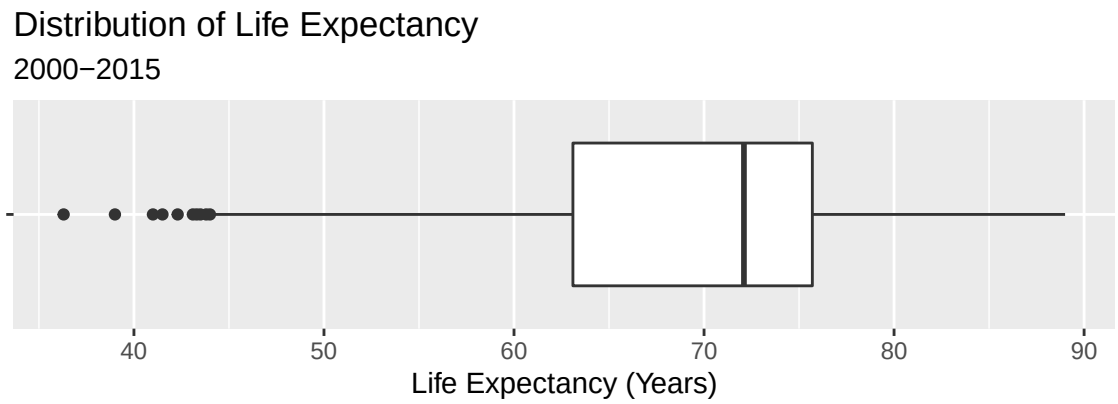
## Section 3. Analysis approach

The response variable we will be using in this project is `Life expectancy`. This is a measure of the average age of death in year for the given country during that year.










In terms of predictor variables, the full model that will have all potential predictor variables will include, all variables in the data set apart from `Life expectancy` which is the response variable and `Country` which is the identifier variable.

In terms of regression model technique we will be using multiple linear regression because our response variable is quantitative.