

Life Expectancy

Introduction and Dataset Description

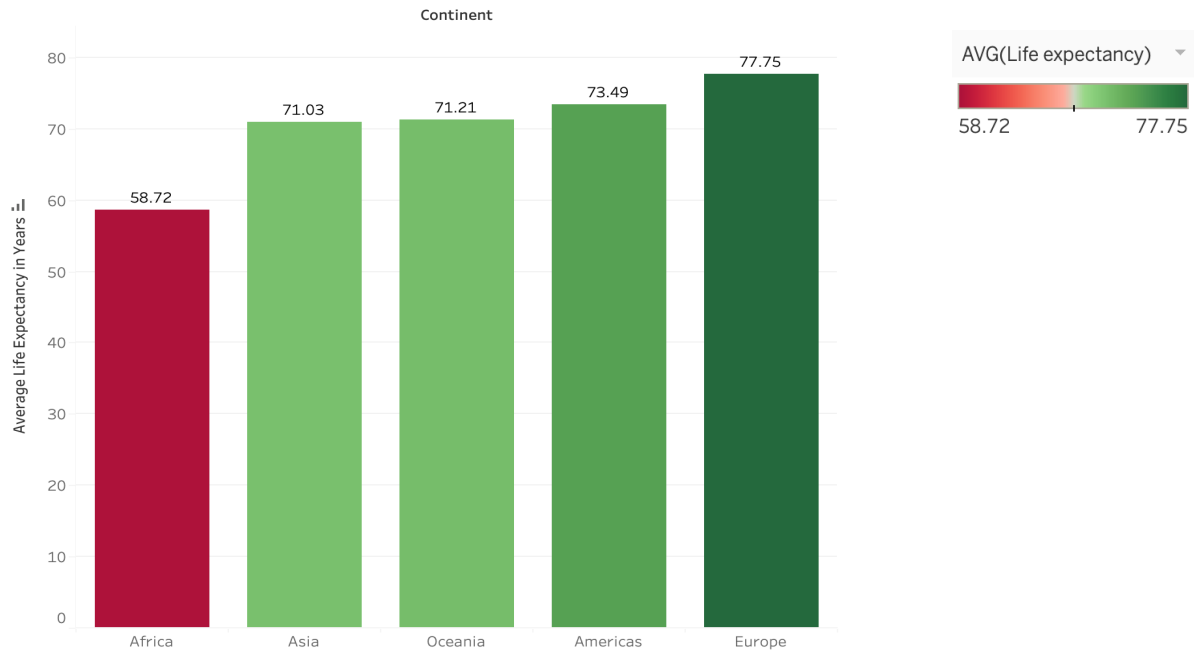
The aim of this report is to analyse several predicting variables that determine life expectancy, through analysing how different continents differ in the effect of these predicting variables. Immunization factors, mortality factors, economic factors, social factors and other health related factors are considered in the analysis. This analysis builds on this speculation to find more interesting insights.

This report utilizes the data made available on [www.kaggle.com](https://www.kaggle.com/kumarajarshi/life-expectancy-who) and can be found here (<https://www.kaggle.com/kumarajarshi/life-expectancy-who>). This dataset was made available publicly by the World Health Organisation under the Global Health Observatory data repository. The corresponding economic data was collected from the United Nations websites. This data is representative of the years 2000 - 2015, as there has been a huge development in the health sector resulting in improvement of human mortality rates. This dataset originally contained 22 columns. The dataset only consisted of countries and did not have a column with the respective continents. I concluded it would be helpful to analyse data based on the continents instead of countries because the dataset consisted of 193 countries and so much data would have been difficult to portray effectively. Therefore, I found a dataset on Kaggle (<https://www.kaggle.com/statchaitya/country-to-continent>) which I then merged with the original dataset to get the column of continents. For this purpose, I had to use the union functionality in Tableau. However, the countries to continents dataset had some countries with special characters, which I cleaned up to match the countries column in the original dataset after which I performed the union on both datasets on the column "Country".

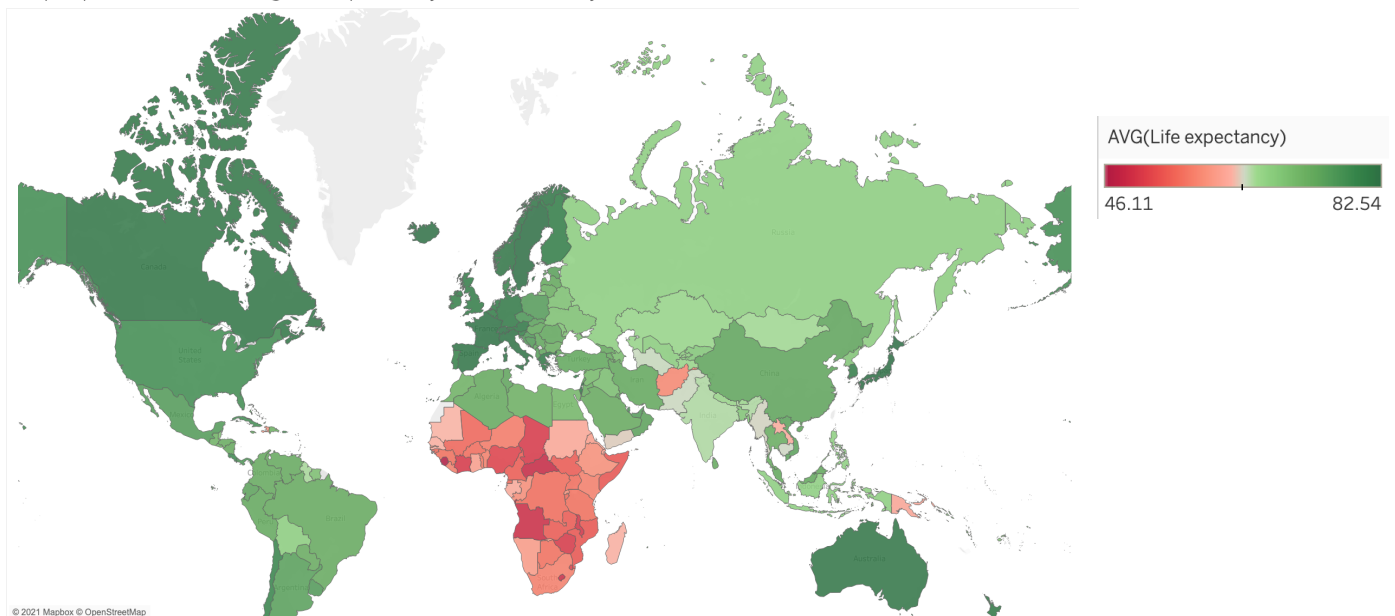
Analysis

To analyse the main question, what factors affect life expectancy the most, I start by analysing the continents that have the highest and lowest life expectancies.

Average life expectancy in different continents

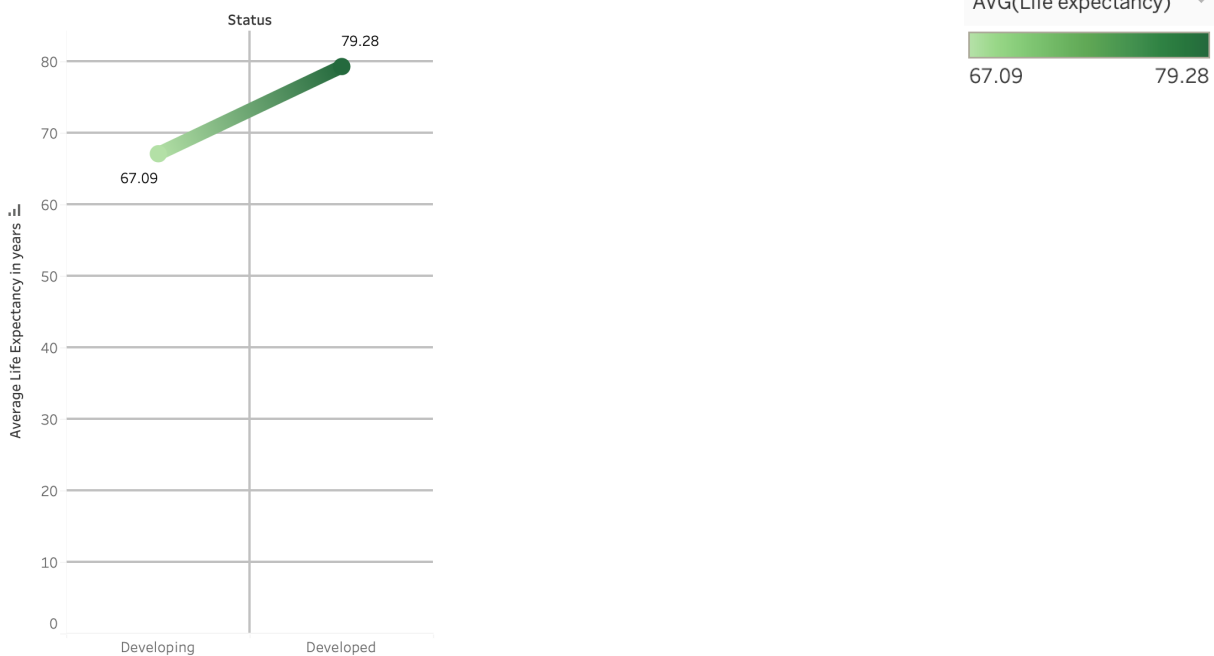


Map representation of avg life expectancy in each country



I also visualised the status (developing or developed) of countries to get a better idea of whether the status has a correlation with the average life expectancy.

Difference in average life expectancy of developed and developing countries

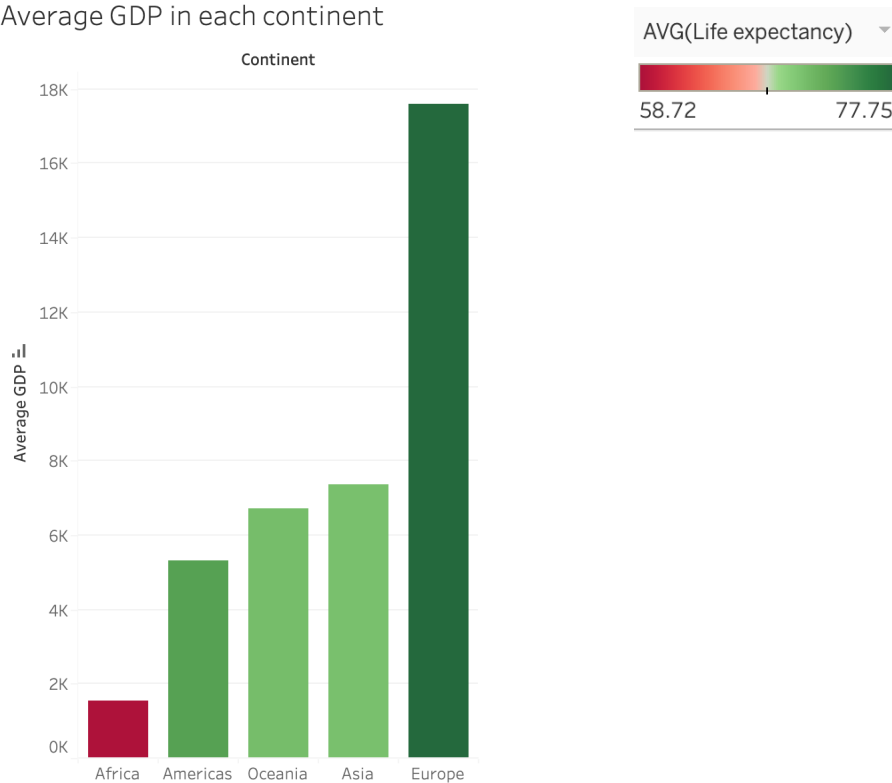


From the above visualisations, we can note that Africa has the lowest average life expectancy in years and Europe has the highest average life expectancy in years. Asia, Oceania and the Americas have a very close life expectancy. Americas consists of North and South America, according to the new dataset which was adopted to introduce continents to the original dataset.

We also observe that developed countries have a much higher average life expectancy than developing countries. This coincides with the fact that Africa has a large number of developing countries, whereas Europe has majorly developed countries. This tells us that life expectancy is directly related to how developed a country is.

However, how developed a country is often depends on the GDP of a country. Therefore, how did the GDP vary in the different continents? This is where we analyse the economic factor.

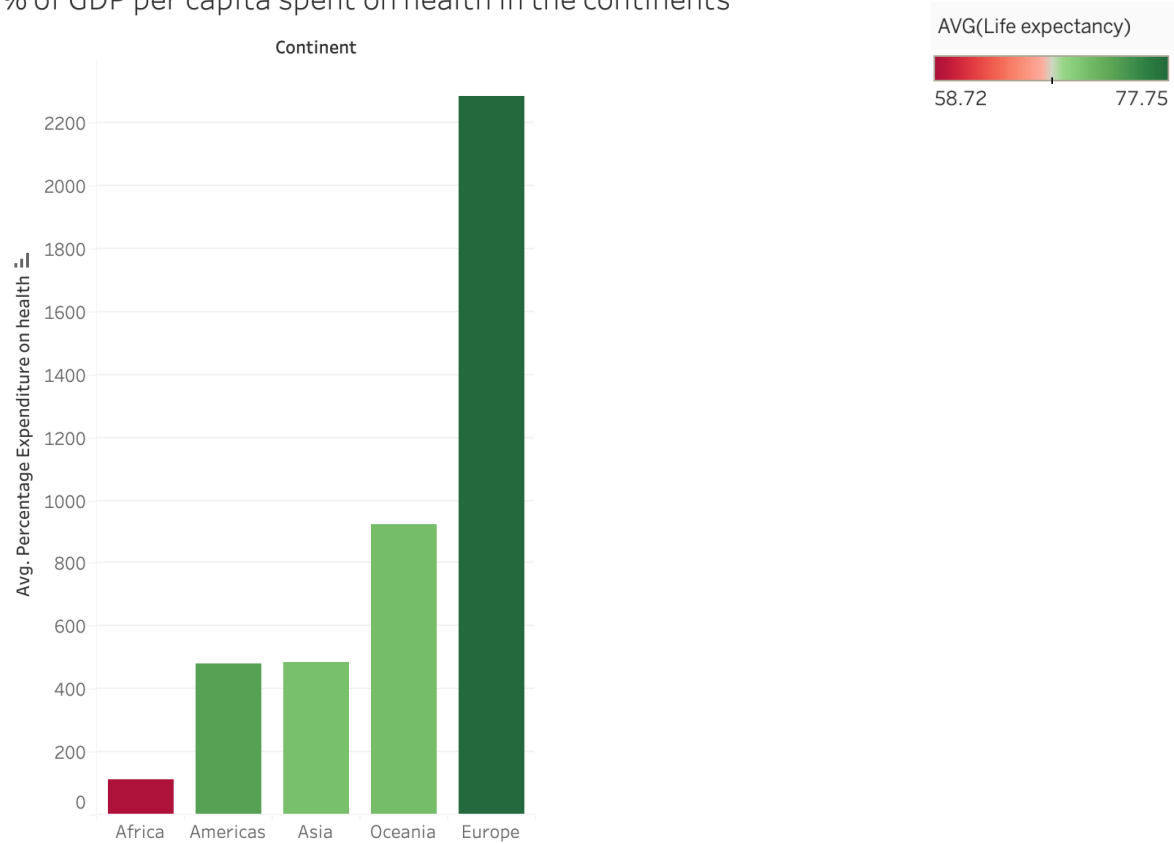
Average GDP in each continent



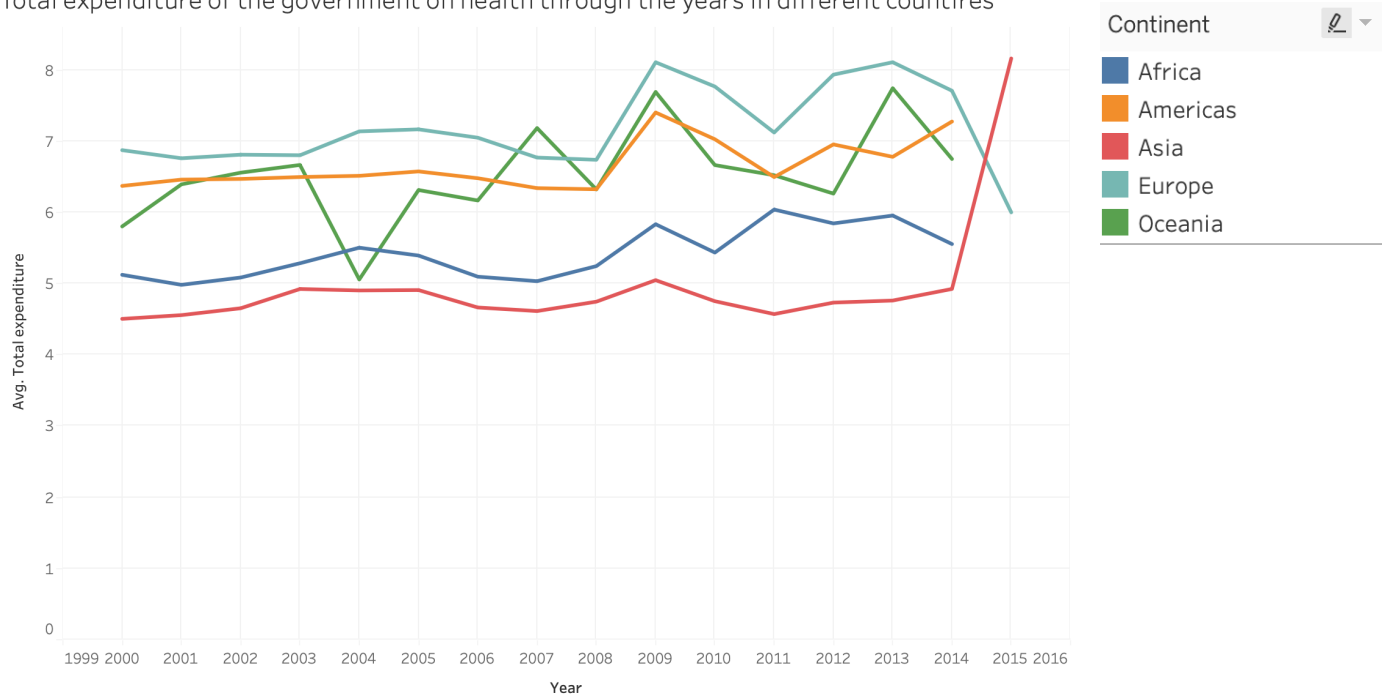
We observe that the GDP was lowest in Africa and the greatest in Europe. It confirms that continents with higher GDP are developed and hence have a higher life expectancy. On the other hand, continents with a lower GDP, which are developing, have a lower life expectancy.

Now that we have established that continents with higher GDPs have a higher life expectancy, we can further speculate how much percentage of GDP is spent on healthcare and how it affects life expectancy to see if it improves with a higher % of spending.

% of GDP per capita spent on health in the continents



Total expenditure of the government on health through the years in different countries

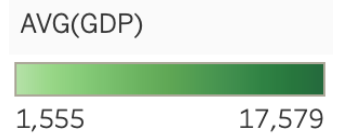
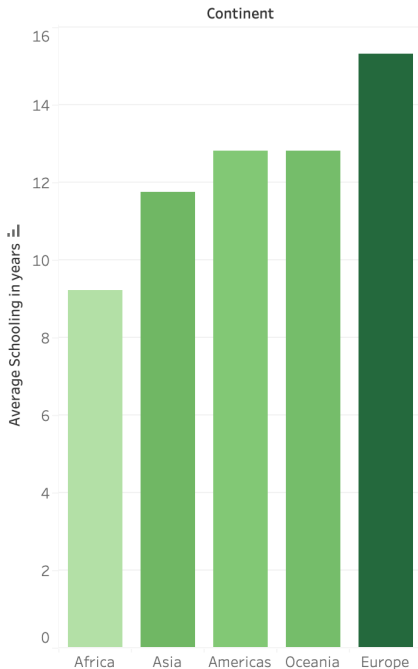


From the first graph, we notice that as the expenditure on health as a % of GDP increases, life expectancy in general increases. Africa has the lowest expenditure on health and Europe has the most expenditure on health. However, the Americas and Asia are tied and Oceania is very high in terms of their expenditure on health.

The second graph shows the average total expenditure of the government on health. We notice that Europe is the highest: it was stable at first, went up around 2008 and then went down from 2009 to 2011. In more recent years of 2015-2016, this expenditure has fallen. Asia's total expenditure on health by the government is even lower than Africa's. Oceania and the Americas are close in terms of their expenditure.

Does education/schooling have an effect on the GDP and hence the life expectancy of the different continents?

Average years in schooling as compared to the average GDP in the continents

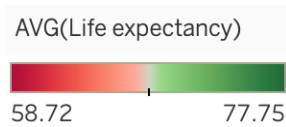


Average Life Expectancy in years compared to Schooling in years

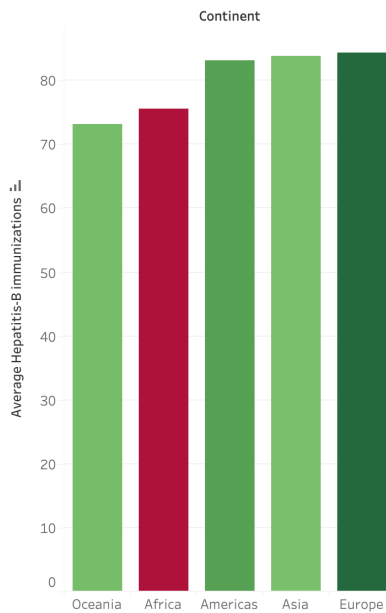


In the first visualisation, we observe that people living in Africa had a lower number of years of schooling as compared to Europe, which had a much higher average number of years of schooling. In the second visualisation, we can see how the average life expectancy varies with changing years of schooling. Hence, we can see that the average GDP is related to the average number of years of schooling, because as the number of years of schooling increases, GDP also increases. From the second visualisation, we can conclude that life expectancy increases as the number of years of schooling increases, and hence there is a positive relation between the two.

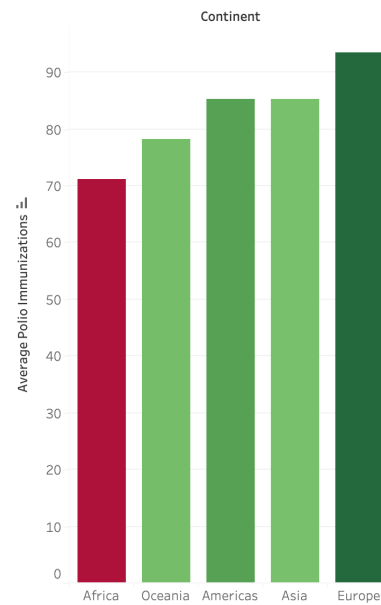
Now, we begin to analyse the health factors to find how they affect life expectancy. We begin by analysing the coverage of immunisations of 1 year olds for Hepatitis-B, Polio and Diphtheria.



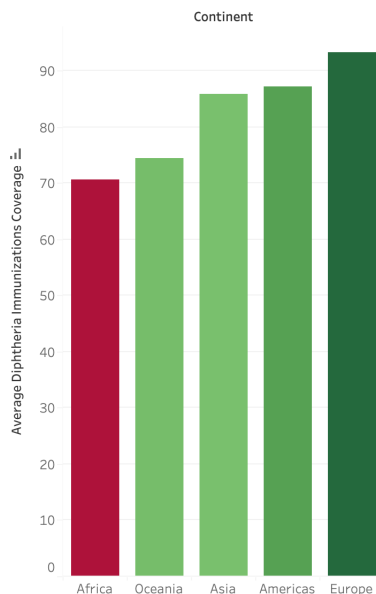
Hepatitis-B immunizations coverage among 1 year olds in continents



Average Polio Immunization Coverage among 1 year olds in continents



Average Diphtheria immunization coverage among 1 year olds in continents



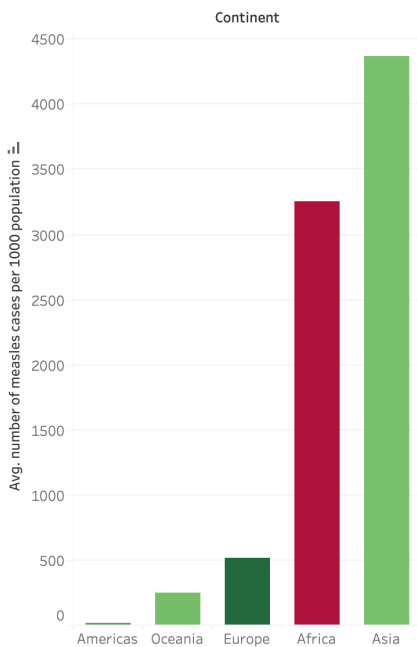
The above 3 graphs visualise how immunizations of diseases such as Hepatitis-B, Polio, and Diphtheria affect life expectancy. These cover the immunisations given to 1 year olds. From these, we can see that Africa, in general, had the lowest immunisation coverages as well as the lowest average life expectancy. Europe had the highest immunization coverages and also the highest average life expectancy. We can see that immunization coverage in adolescents is positively related to life expectancy.

Now, we analyse diseases like HIV/AIDS and Measles to see how they correlate with life expectancy.

Average deaths per 1000 live births due to HIV/AIDS and Life Expectancy in continents



Average Measles cases per 1000 population and Life Expectancy in continents

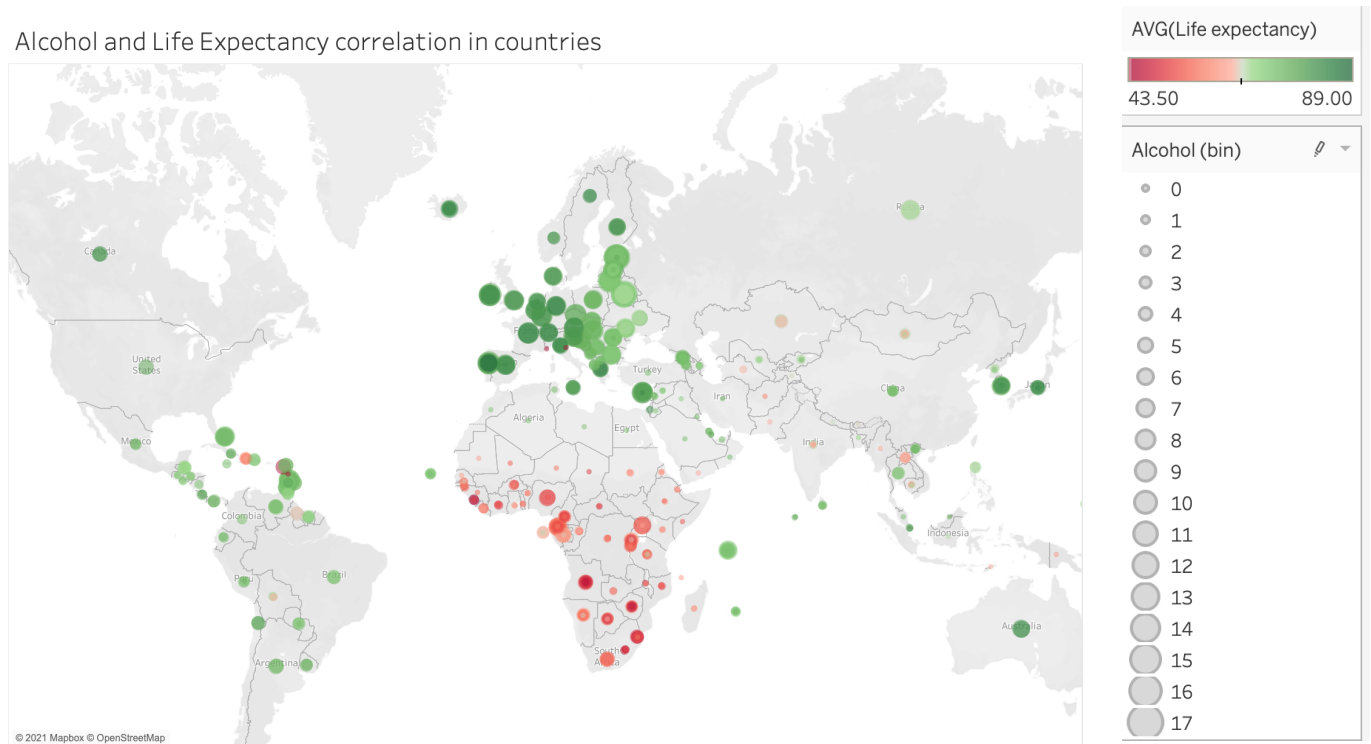


From the first visualisation, we can clearly see that Africa, with the least life expectancy, had the highest average number of deaths per 1000 people. There is a drastic difference in the level for Africa vs. other continents. It is possible that HIV/AIDS happens to be a leading cause of fatality in Africa. From the

second visualisation, we can see that Africa is second highest in the average number of cases and Asia is first. Asia being the highest in terms of the measles cases is surprising, but yet has a higher life expectancy than Africa nevertheless.

In terms of social factors, how did alcohol consumption affect life expectancy?

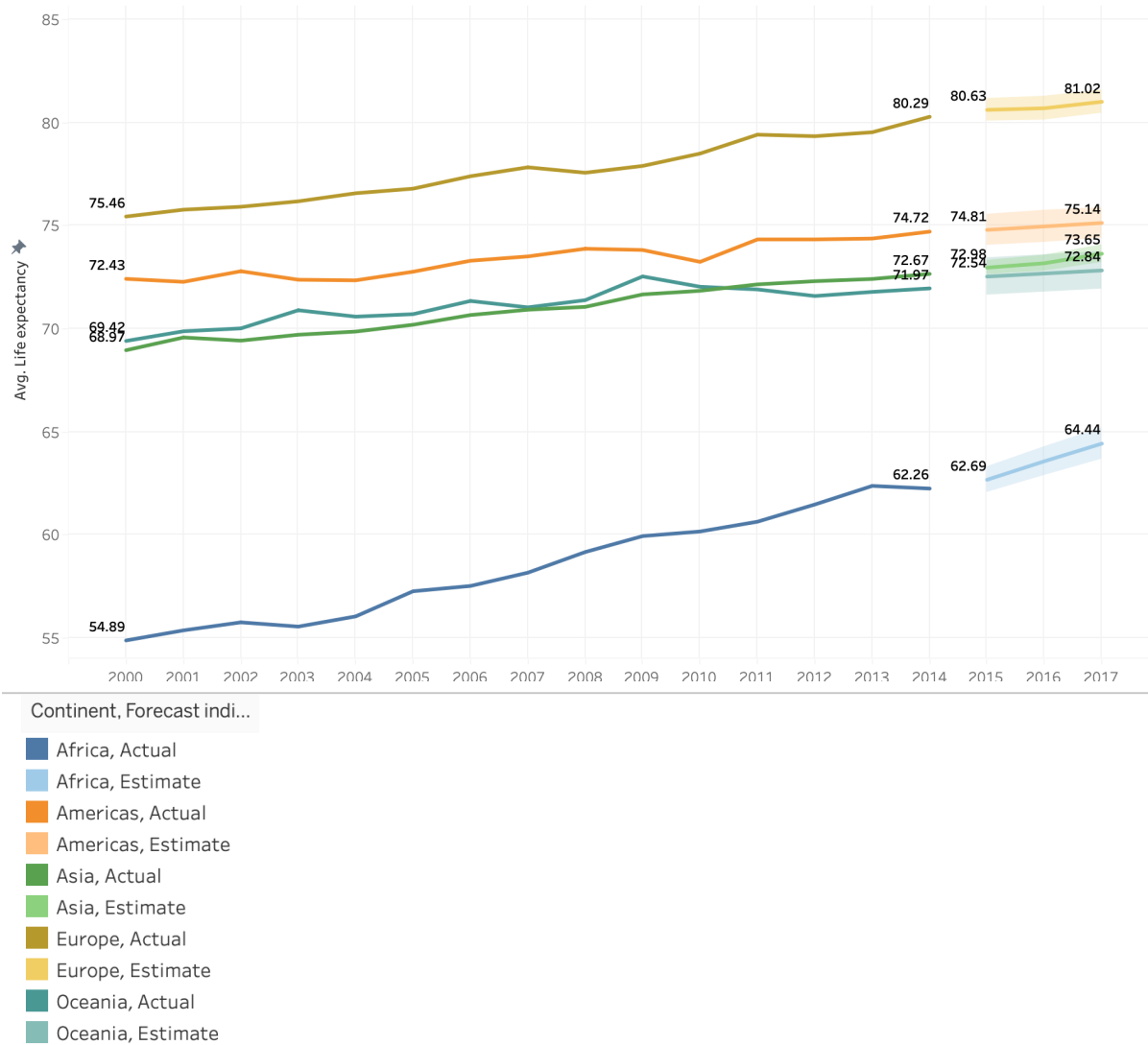
Alcohol and Life Expectancy correlation in countries



From the above visualisation, we note that Europe had the highest consumption of alcohol but also had the highest life expectancy. Africa has the lowest life expectancy and fairly low alcohol consumption (consumption in litres per capita). Other continents have an average consumption of alcohol with a life expectancy in the middle of both Africa and Europe.

Based on the parameters above, I decided to use regression to obtain predictions for the life expectancy in different continents.

Life Expectancy through the years for different continents and its prediction



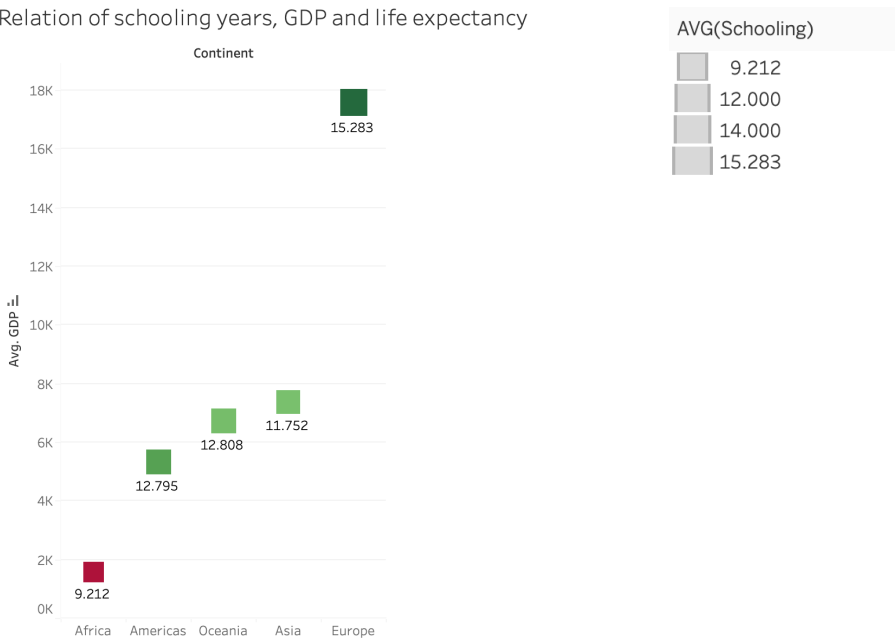
We observe that the life expectancy, for all continents, will increase. It is to be noted that Africa has one of the biggest changes in life expectancy, from 62.69 to 64.44. The other continents grow steadily.

The following visualisation summarises how immunisations, GDP and schooling affect GDP.

Immunisation coverages and life expectancy



Relation of schooling years, GDP and life expectancy



Main Lessons:

In conclusion, we note that GDP plays a huge role in determining the life expectancy of any place. An increase in GDP is noted through an increase in years of schooling. The expenditure on health, be it as a percentage of GDP or by the government, plays a role in determining the life expectancy of a place. The more the expenditure, the higher the life expectancy. We also note that certain immunization coverages also play a role in determining the life expectancy of an individual. Continents with higher immunisation rates had higher life expectancies. This analysis shows us that Africa has the lowest life expectancy due to the above mentioned factors and Europe has the highest life expectancy.