Analysis of Life Expectancy and the factors on which it depends using Metabase and DOMO

About the dataset:

The **Global Health Observatory (GHO)** data repository under World Health Organization (WHO) keeps track of the health status as well as many other related factors for all countries The data-sets are made available to the public for the purpose of health data analysis. The data-set related to life expectancy, health factors for 193 countries has been collected from the same WHO data repository website and its corresponding economic data was collected from the United Nation website. Among all categories of health-related factors only those critical factors were chosen which are more representative.

Although there have been a lot of studies undertaken in the past on factors affecting life expectancy considering demographic variables, income composition and mortality rates, it was found that the effect of immunisation and human development index was not taken into account.

It has been observed that in the past 15 years , there has been a huge development in the health sector resulting in improvement of human mortality rates especially in the developing nations in comparison to the past 30 years. Therefore, in this project we have considered data from the years 2000-2015 for 193 countries for further analysis. The individual data files have been merged together into a single data-set. On initial visual inspection of the data showed some missing values. As the data-sets were from WHO, we found no evident errors. Missing data was handled in R software by using the Missmap command. The result indicated that most of the missing data was for population, Hepatitis B and GDP. The missing data were from less known countries like Vanuatu, Tonga, Togo, Cabo Verde etc. Finding all data for these countries was difficult and hence, it was decided that we exclude these countries from the final model data-set. The final merged file(final dataset) consists of 22 Columns and 2938 rows with 20 predicting variables. All predicting variables were then divided into several broad categories**: Immunisation related factors, Mortality factors, Economical factors** and **Social factors.**

This project aims to analyse these factors and provide suggestions to a country, in this case India, to increase the life expectancy of its population.

Why is increasing life expectancy important?

Increasing the life expectancy of a country is of paramount importance for various societal and economic reasons. A longer average lifespan signifies improvements in healthcare, nutrition, and living conditions, contributing to an enhanced overall quality of life for citizens. Beyond individual well-being, a population with an increased life expectancy also translates to a more experienced and skilled workforce, fostering economic productivity and growth.

The life expectancy of India has been below the global average across the years. It is therefore of utmost importance that we, as a country, take continual efforts to increase life expectancy so as to have a more functional and productive workforce and a stable economy.

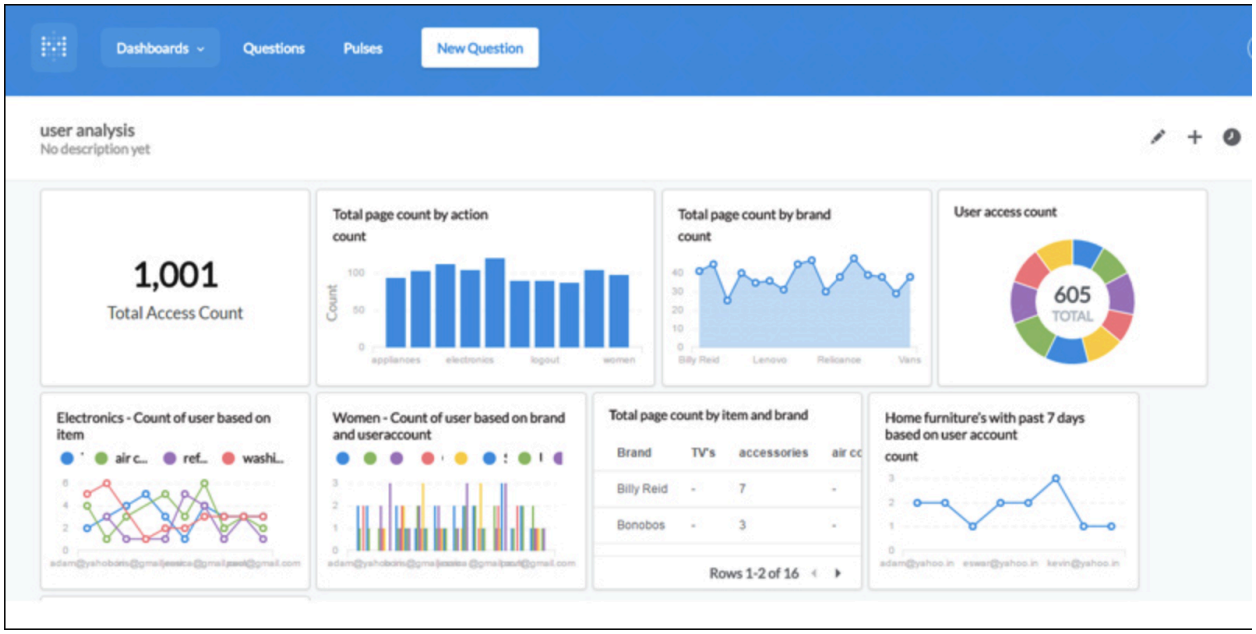
Tools Used:

We have used **Metabase** as our primary tool to visualise and analyse the data. We have then compared it by repeating the same process for tools like **DOMO** and **Tableau** so as to compare the results.

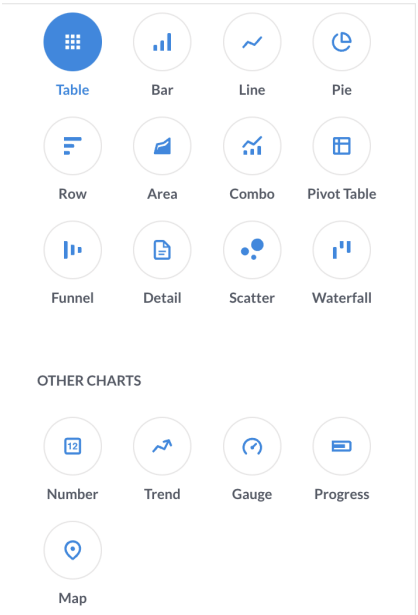
Metabase

Metabase is an open-source data visualisation tool designed for simplicity and ease of use. It allows users to generate charts and dashboards from their data without requiring extensive technical knowledge.
Companies that uses Metabase: CRED, BitPanda, Groww
Pros of using Metabase:
-Open-source and free to use, which makes it accessible for small businesses and startups.
-Simple and intuitive interface, making it easy for non-technical users to create visualisations.
-Supports a wide range of data sources, including SQL databases, NoSQL databases, and cloud services.
Cons of Metabase:
-Limited advanced features compared to paid tools like **Tableau and Domo**.
-Scalability may be an issue for very large datasets or complex analytics needs.
-Community support might not be as extensive as with commercial tools.

User Interface of Metabase



Types of Charts available in Metabase



Domo

Domo is a cloud-based BI platform that integrates data visualisation with business management features. It aims to provide a comprehensive solution for managing and analysing data across an organisation.

Companies that uses Domo: Infosys Ltd., The North Face, eBay

Pros of using Domo:

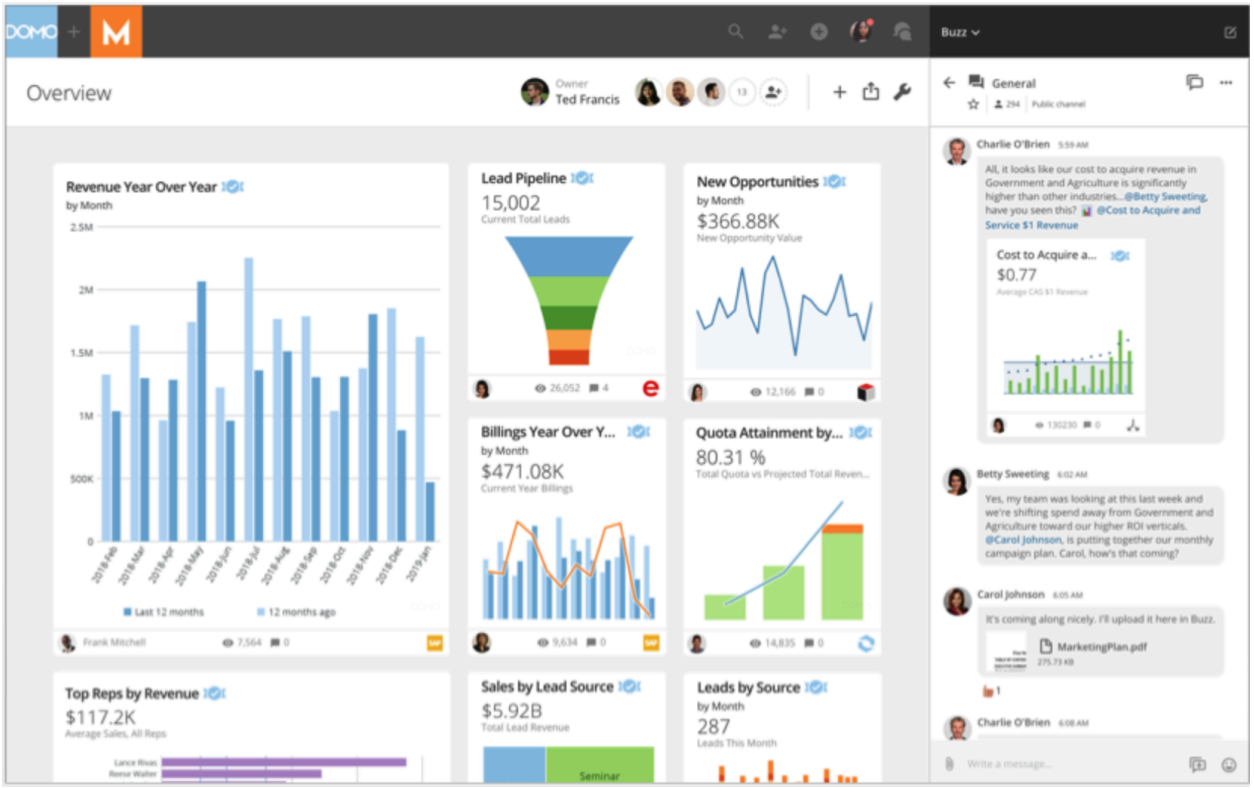
-Cloud-based platform, allowing for easy access to data from anywhere with an internet connection.

-Offers a wide range of pre-built connectors for popular data sources, simplifying data integration.
-Domo has more visualisation options than **Metabase**
-Features advanced analytics and collaboration tools, suitable for enterprise-level use.

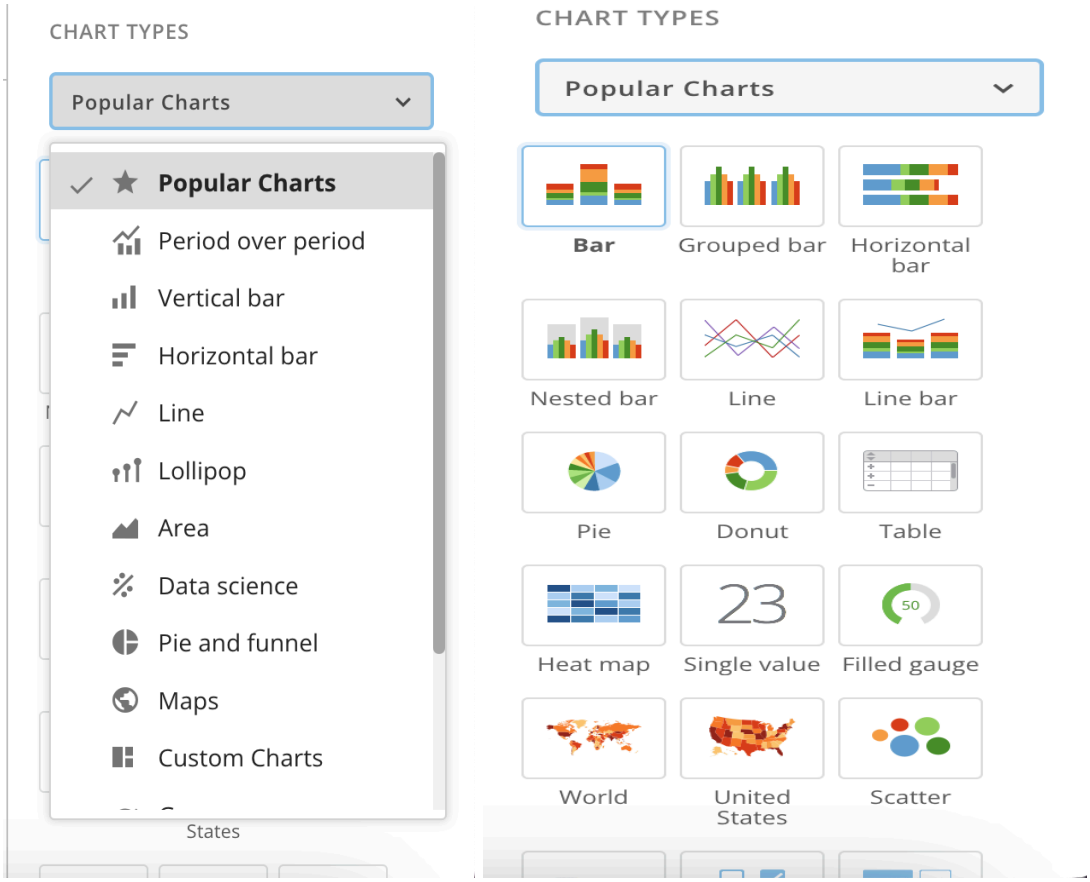
Cons of using Domo:

-Higher cost compared to open-source or self-hosted solutions like **Metabase**.
-Customization options may be limited compared to more flexible tools like **Tableau**.
-Requires some level of technical expertise for setup and configuration.

User Interface of Domo



Types of Charts in Domo



Tableau

Tableau is a powerful data visualisation and analytics platform that caters to a wide range of users, from individual analysts to large enterprises. It offers a variety of features for data exploration, visualisation, and storytelling.

Companies that uses Tableau: Netflix, Amazon, LinkedIn

Pros of using Tableau:

-Highly customizable and feature-rich, with a wide range of visualisation options and interactivity.

-Tableau has more visualisation options than **Metabase**.

-Excellent scalability, capable of handling large datasets and complex analytics tasks.

-Strong community support and a vast ecosystem of extensions and integrations.

Cons of using Tableau:

-Higher learning curve compared to simpler tools like **Metabase**.

-Cost can be prohibitive for small businesses or individual users.

-Requires dedicated infrastructure for on-premises deployment, although a cloud version is available.

User Interface of Tableau

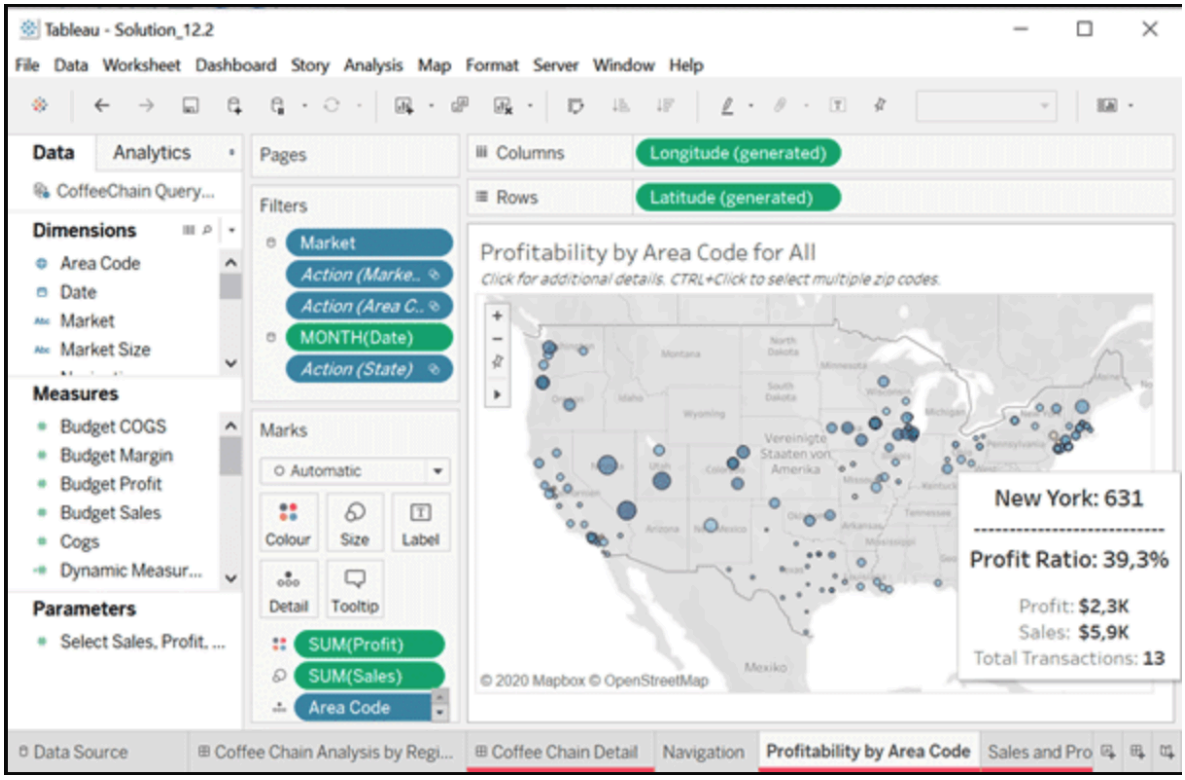


Chart types in Tableau


Show Me
For scatter plots try
0 or more Dimensions
2 to 4 Measures

Methodology: Creation of Dashboards

Metabase:

A. Overview

Life_Expectancy_BI

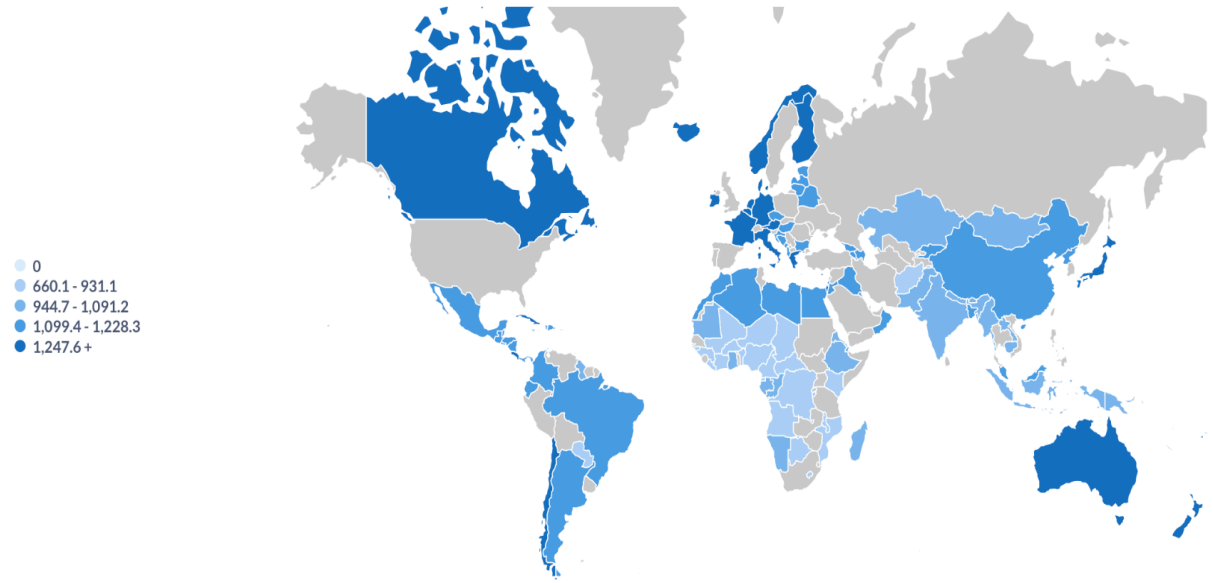
Overview | Health Factor | Economic Factor | Mortality Factor

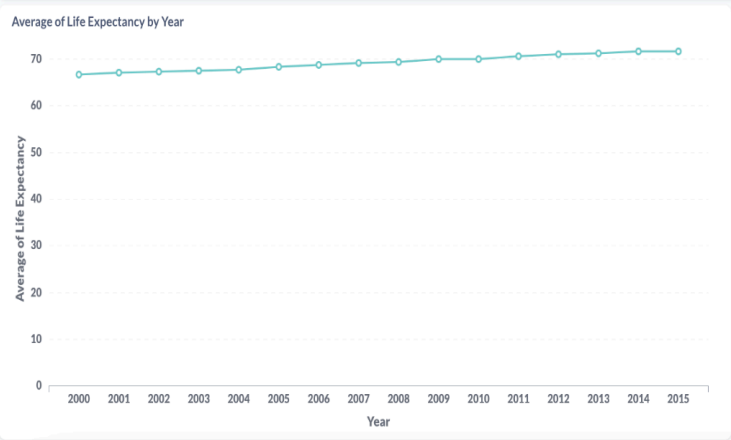
A comprehensive dataset from WHO and UN was compiled, focusing on critical health and economic factors for 193 countries between 2000-2015. Missing data, predominantly from lesser-known countries, were addressed using R software, resulting in a final dataset of 22 columns and 2938 rows. Key variables were categorized into Immunization, Mortality, Economic, and Social factors for analysis. The project aims to analyze these factors to offer recommendations for improving life expectancy, with India as a specific focus.

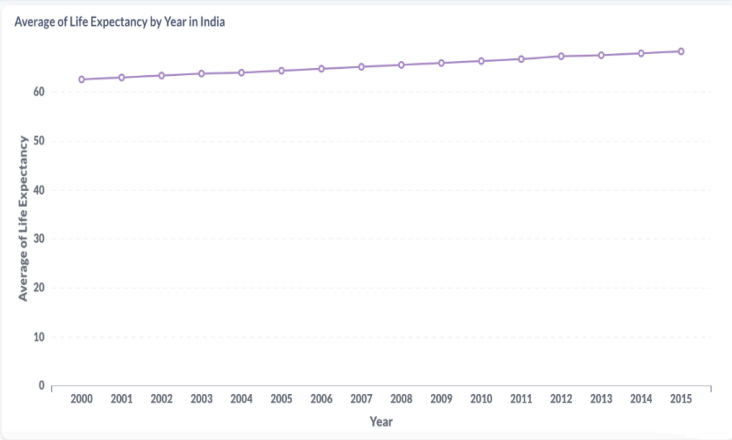
Life Expectancy

_mb_row_id	Country	Year	Status	Life Expectancy	Adult Mortality	Infant Deaths	Alcohol	Percentage Expenditure	Hepatitis B	Measles	Bmi	Under Five Deaths	Polio	Total Expenditure	Diphtheria	Hiv Aids	Gdp	Popu
1	Afghanistan	2,015	Developing	65	263	62	0.01	71.28	65	1,154	19.1	83	6	8.16	65	0.1	584.26	33,73
2	Afghanistan	2,014	Developing	59.9	271	64	0.01	73.52	62	492	18.6	86	58	8.18	62	0.1	612.7	32
3	Afghanistan	2,013	Developing	59.9	268	66	0.01	73.22	64	430	18.1	89	62	8.13	64	0.1	631.74	31,73
4	Afghanistan	2,012	Developing	59.5	272	69	0.01	78.18	67	2,787	17.6	93	67	8.52	67	0.1	669.96	3,69
5	Afghanistan	2,011	Developing	59.2	275	71	0.01	7.1	68	3,013	17.2	97	68	7.87	68	0.1	63.54	2,97
6	Afghanistan	2,010	Developing	58.8	279	74	0.01	79.68	66	1,989	16.7	102	66	9.2	66	0.1	553.33	2,88
7	Afghanistan	2,009	Developing	58.6	281	77	0.01	56.76	63	2,861	16.2	106	63	9.42	63	0.1	445.89	28
8	Afghanistan	2,008	Developing	58.1	287	80	0.03	25.87	64	1,599	15.7	110	64	8.33	64	0.1	373.36	2,72
9	Afghanistan	2,007	Developing	57.5	295	82	0.02	10.91	63	1,141	15.2	113	63	6.73	63	0.1	369.84	26,61
10	Afghanistan	2,006	Developing	57.3	295	84	0.03	17.17	64	1,990	14.7	116	58	7.43	58	0.1	272.56	2,58
11	Afghanistan	2,005	Developing	57.3	291	85	0.02	1.39	66	1,296	14.2	118	58	8.7	58	0.1	25.29	25
12	Afghanistan	2,004	Developing	57	293	87	0.02	15.3	67	466	13.8	120	5	8.79	5	0.1	219.14	24,11
13	Afghanistan	2,003	Developing	56.7	295	87	0.01	11.09	65	798	13.4	122	41	8.82	41	0.1	198.73	2,36

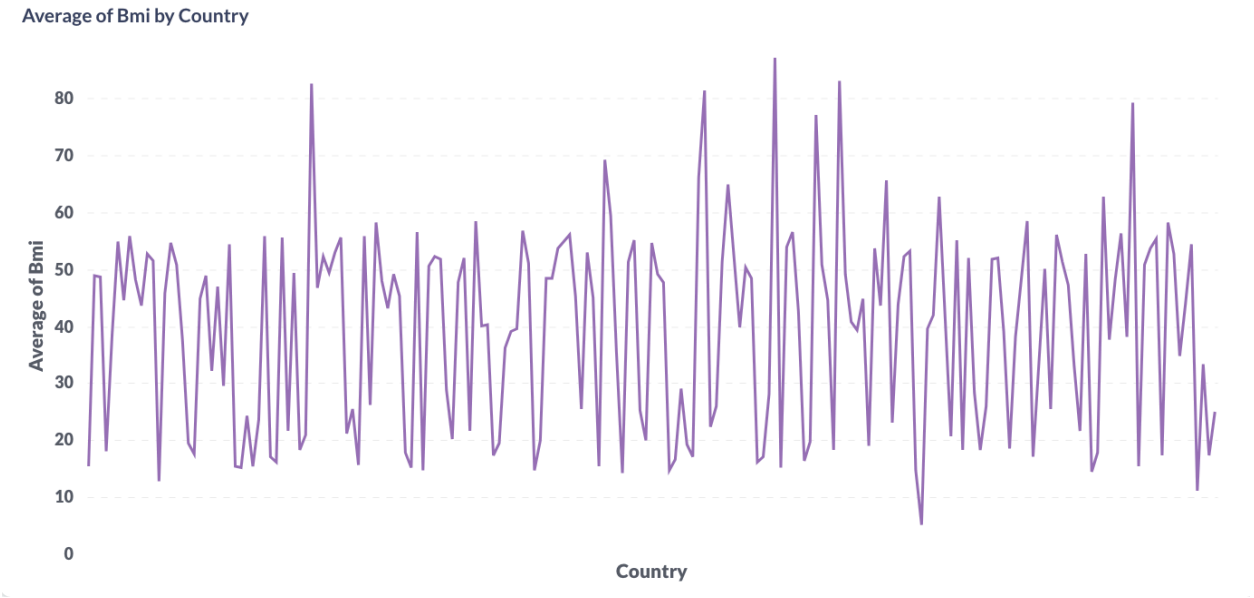
Life Expectancy across the globe

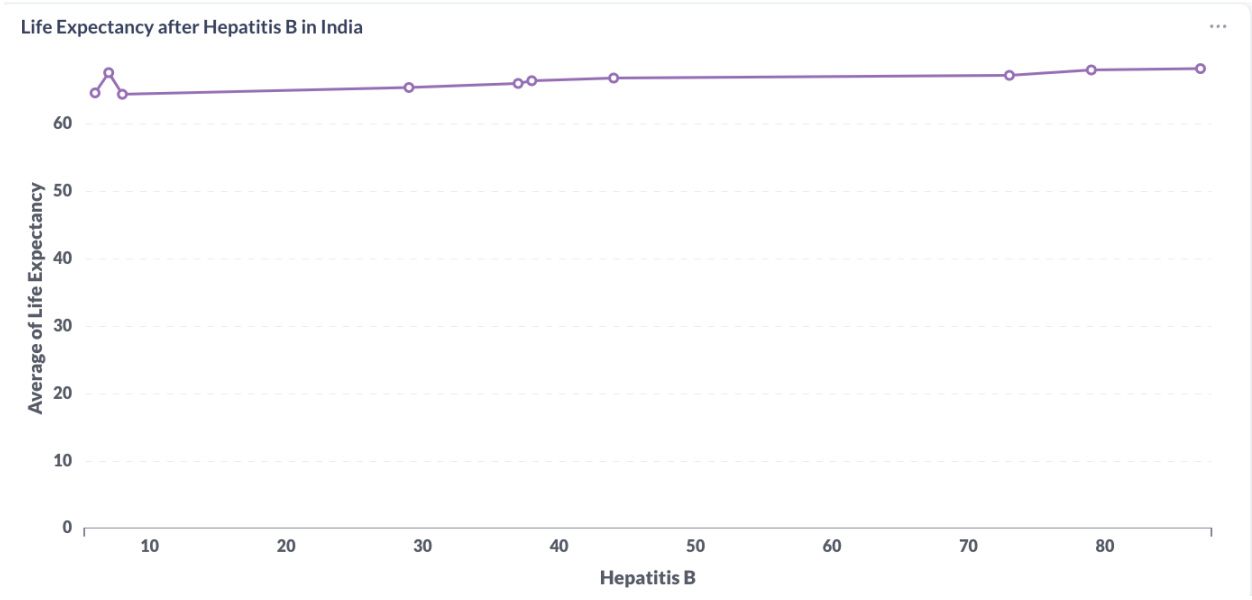


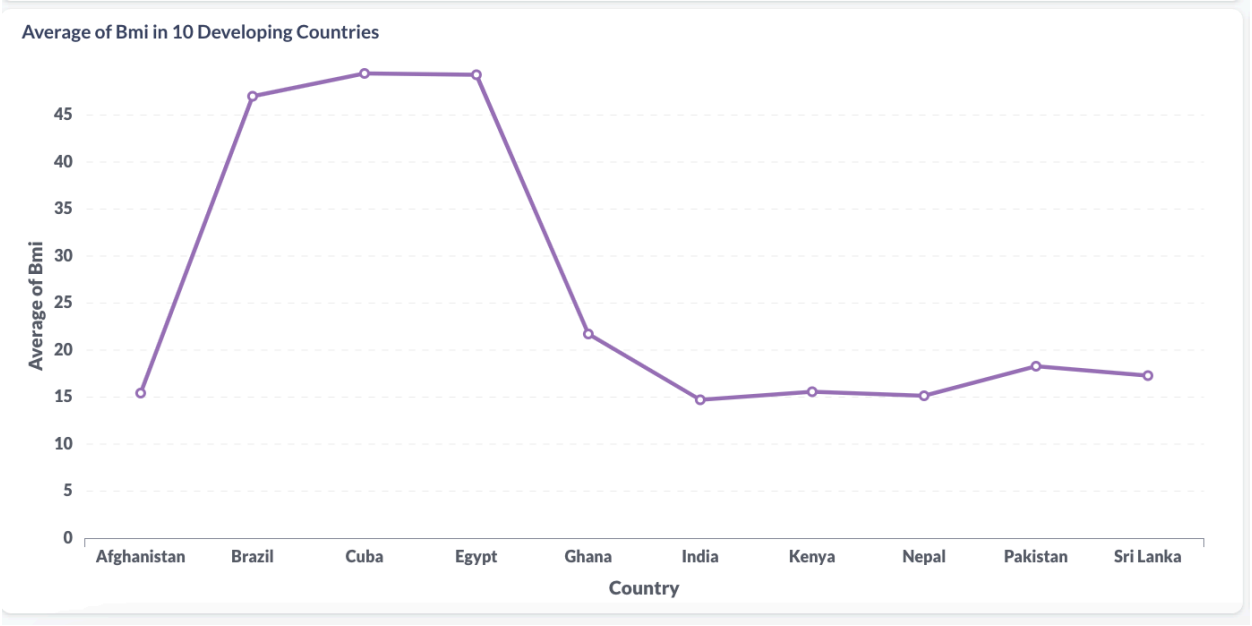


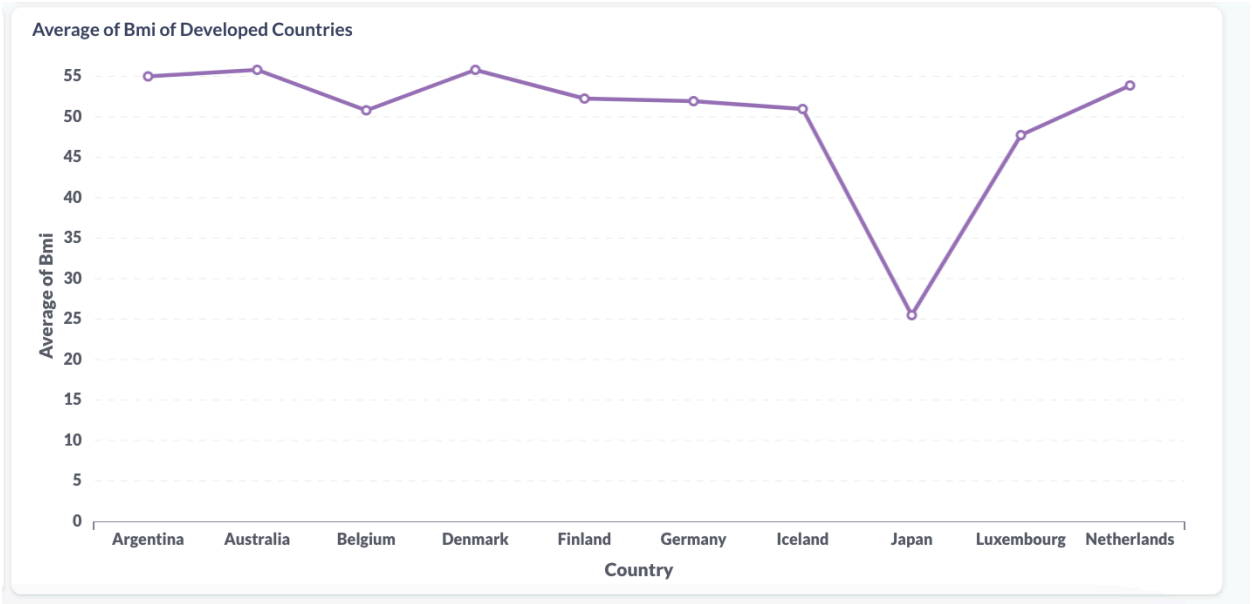


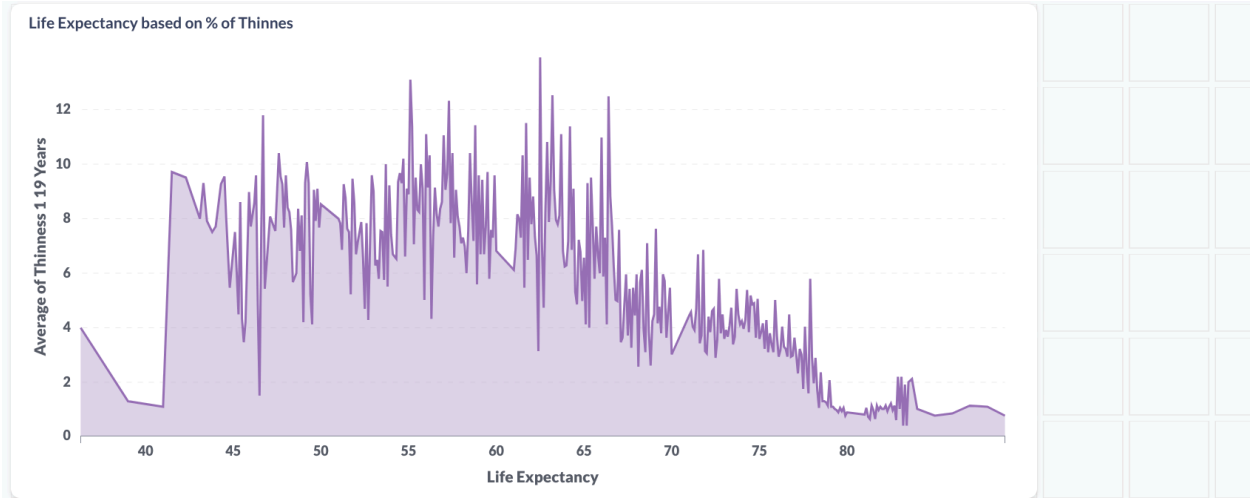
B. Health Factors

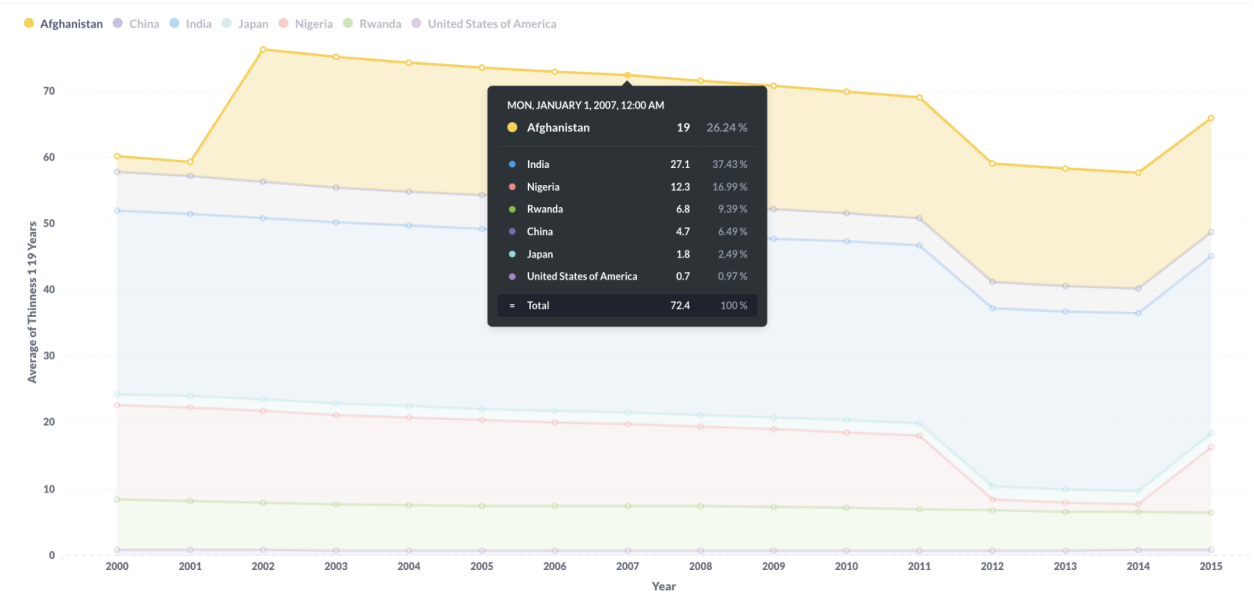


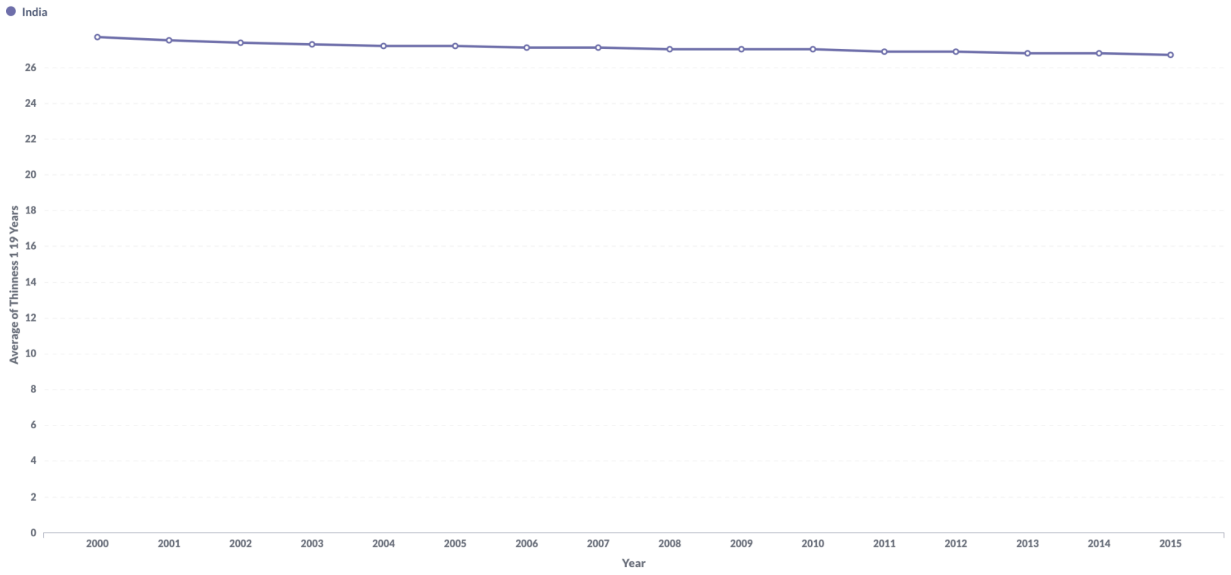

Life Expectancy after Hepatitis B in India
Average of Life Expectancy
60
50
40
30
20
10
0
10
20
30
40
50
60
70
80
Hepatitis B


Average of Bmi in 10 Developing Countries
Average of Bmi
45
40
35
30
25
20
15
10
5
0
Afghanistan
Brazil
Cuba
Egypt
Ghana
India
Kenya
Nepal
Pakistan
Sri Lanka
Country

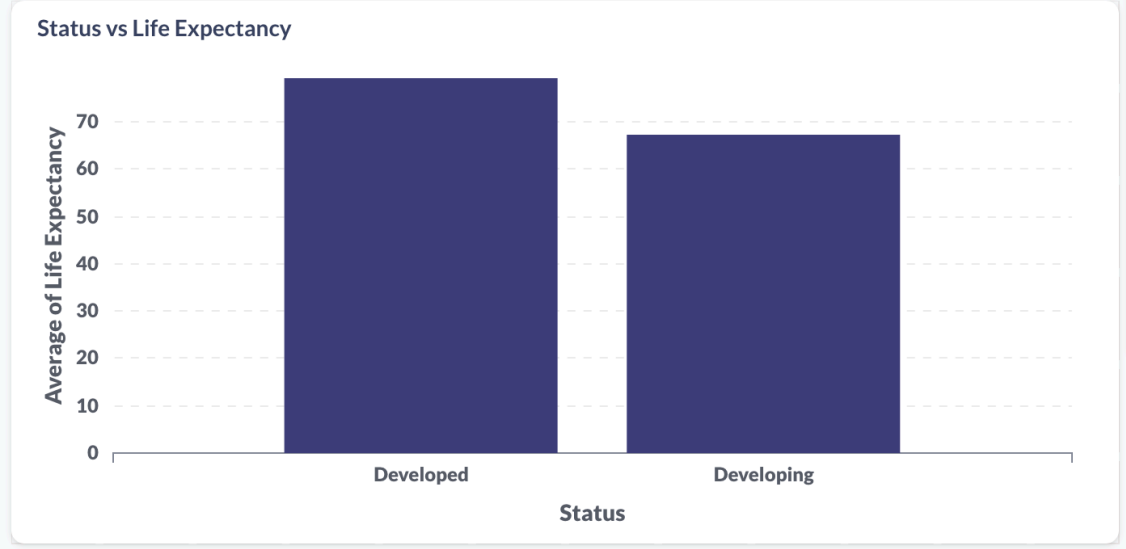

Average of Bmi of Developed Countries
Average of Bmi
55
50
45
40
35
30
25
20
15
10
5
0
Argentina
Australia
Belgium
Denmark
Finland
Germany
Iceland
Japan
Luxembourg
Netherlands
Country

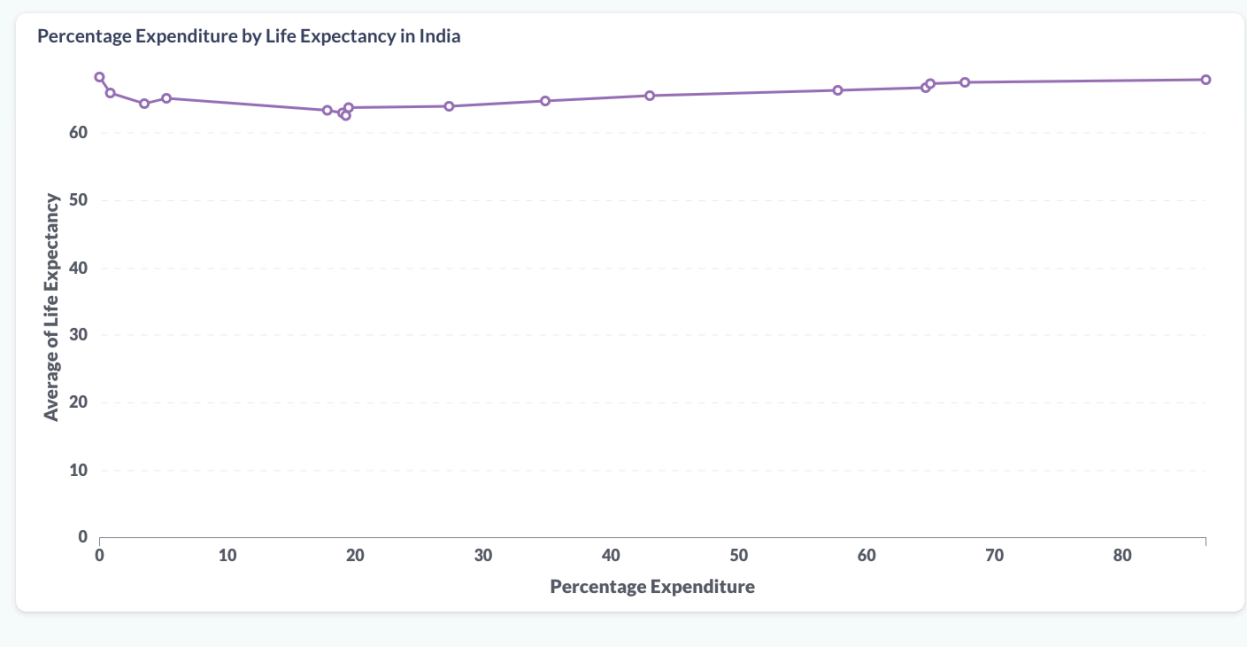

Life Expectancy based on % of Thinnes
Average of Thinness 1 19 Years
12
10
8
6
4
2
0
40
45
50
55
60
65
70
75
80
Life Expectancy


Afghanistan
China
India
Japan
Nigeria
Rwanda
United States of America
MON, JANUARY 1, 2007, 12:00 AM
Afghanistan 19 26.24 %
India 27.1 37.43 %
Nigeria 12.3 16.99 %
Rwanda 6.8 9.39 %
China 4.7 6.49 %
Japan 1.8 2.49 %
United States of America 0.7 0.97 %
= Total 72.4 100 %
Average of Thinness 1 19 Years
Year


India
Average of Thinness 1 19 Years
Year

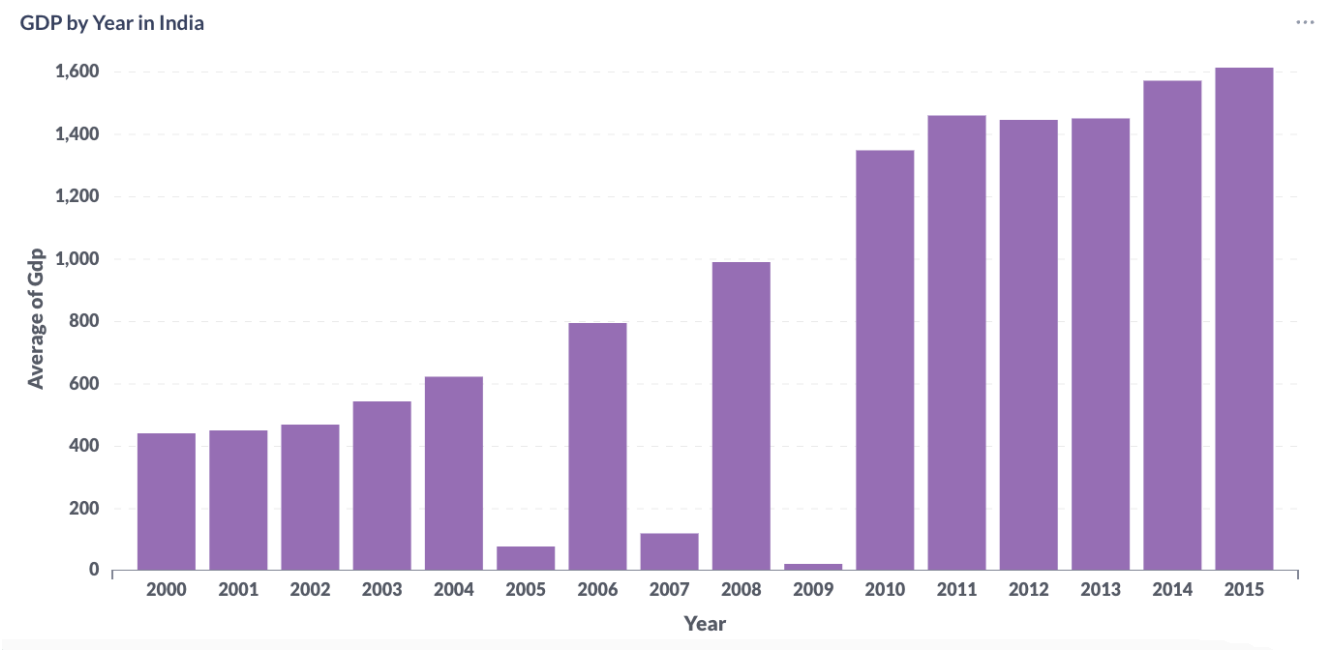
C. Economic Factors





Average of Life Expectancyby Percentage Expenditure in India

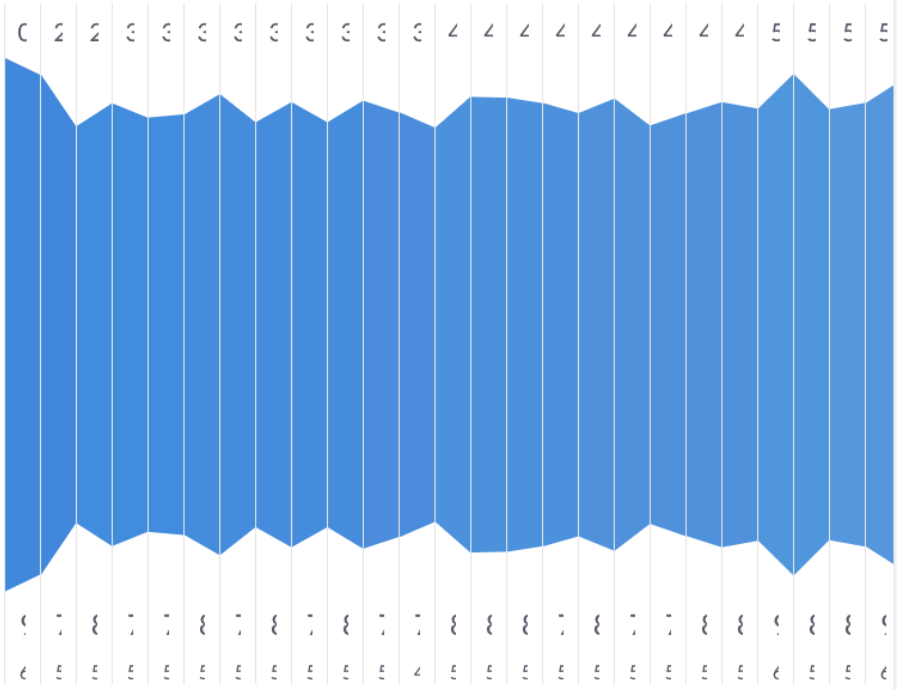
Percentage Expenditure	0
Average of Life Expectancy	68.3



D. Social Factors

Life Expectancy based on Schooling

67.07
Average of Life Expectancy



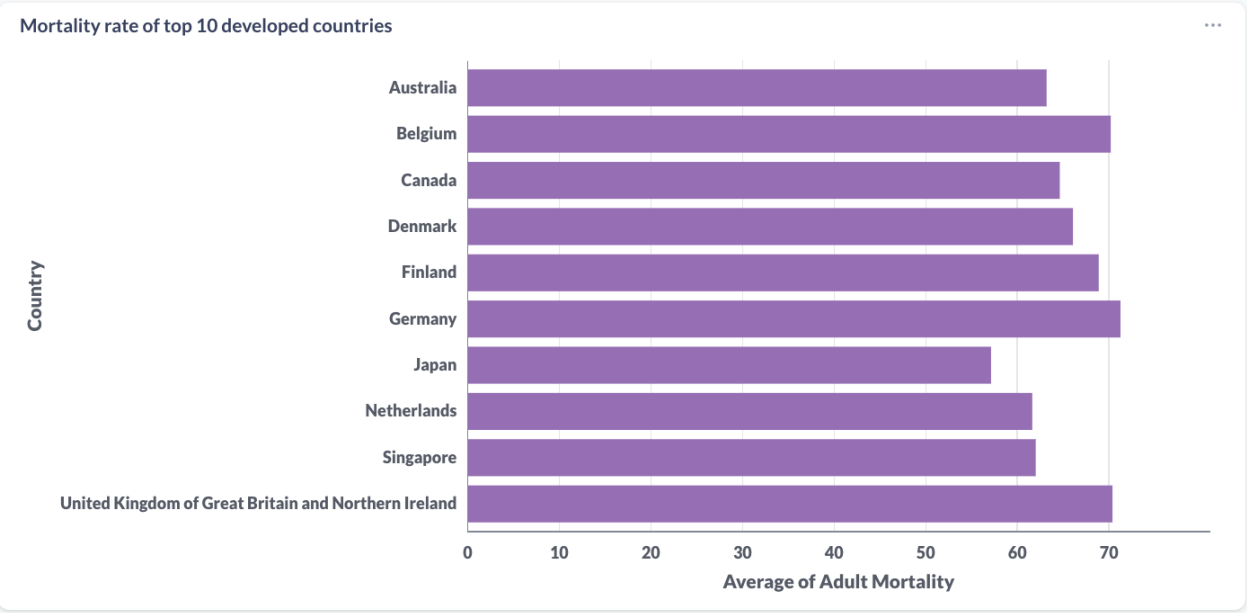
Alcohol Consumption in Developing countries

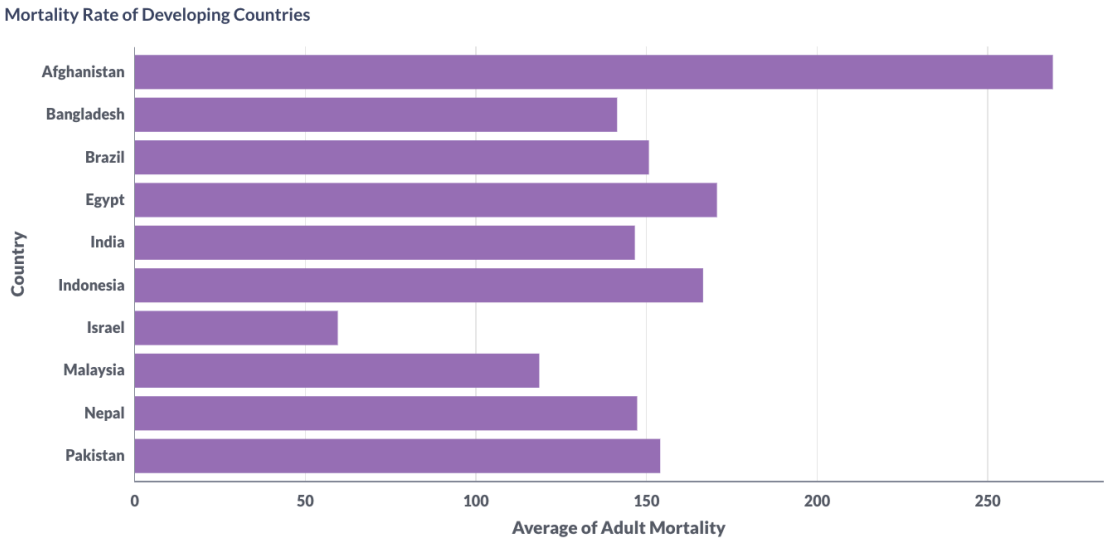
Country	Average of Alc...
Afghanistan	0.014
Bangladesh	0.01
Malaysia	0.49
Nigeria	8.65
South Africa	7.59

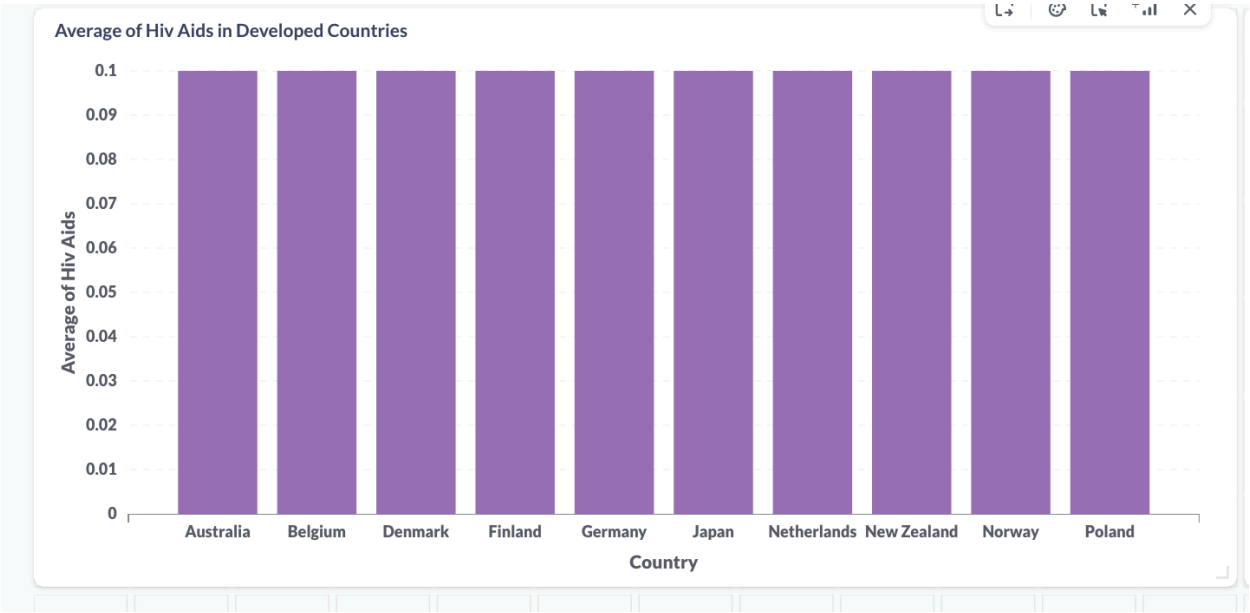
Alcohol Consumption in Developed countries

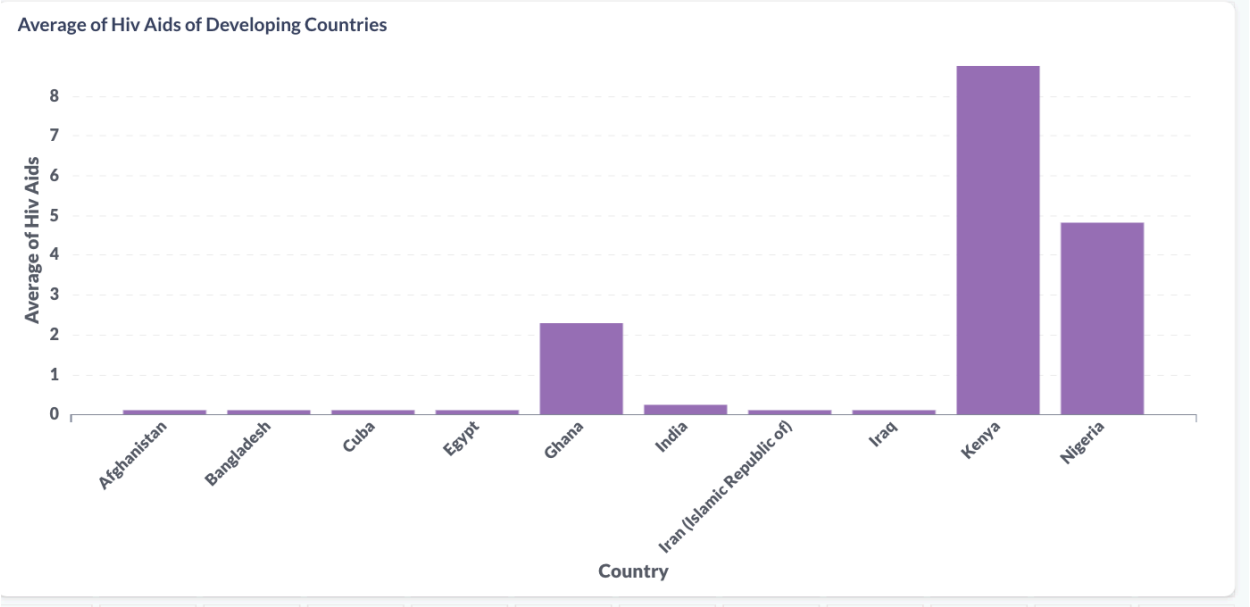
Country	Average of Alc...
Australia	10.16
Austria	12.24
Finland	9.55
Germany	11.63
Japan	7.04
Grand tot...	**10.12**

E. Mortality Factors



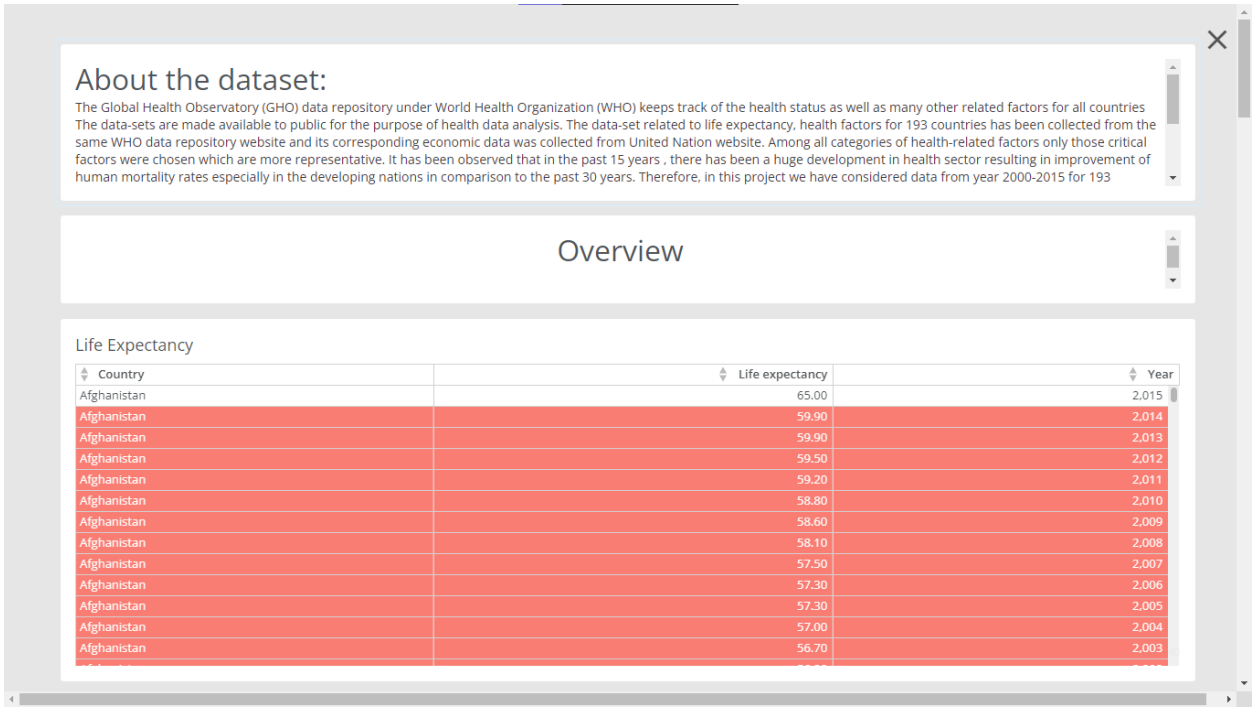


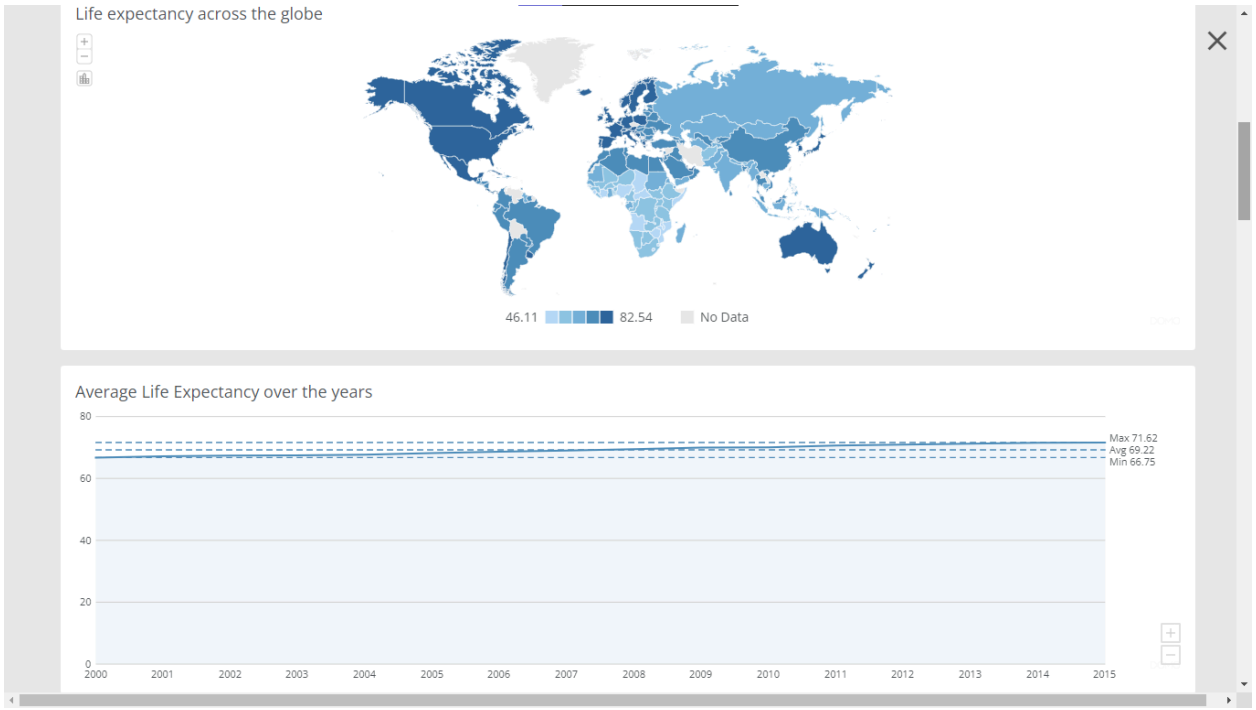

Average of Hiv Aids in Developed Countries
Average of Hiv Aids
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Australia
Belgium
Denmark
Finland
Germany
Japan
Netherlands
New Zealand
Norway
Poland
Country


Average of Hiv Aids of Developing Countries
Average of Hiv Aids
8
7
6
5
4
3
2
1
0
Afghanistan
Bangladesh
Cuba
Egypt
Ghana
India
Iran (Islamic Republic of)
Iraq
Kenya
Nigeria
Country

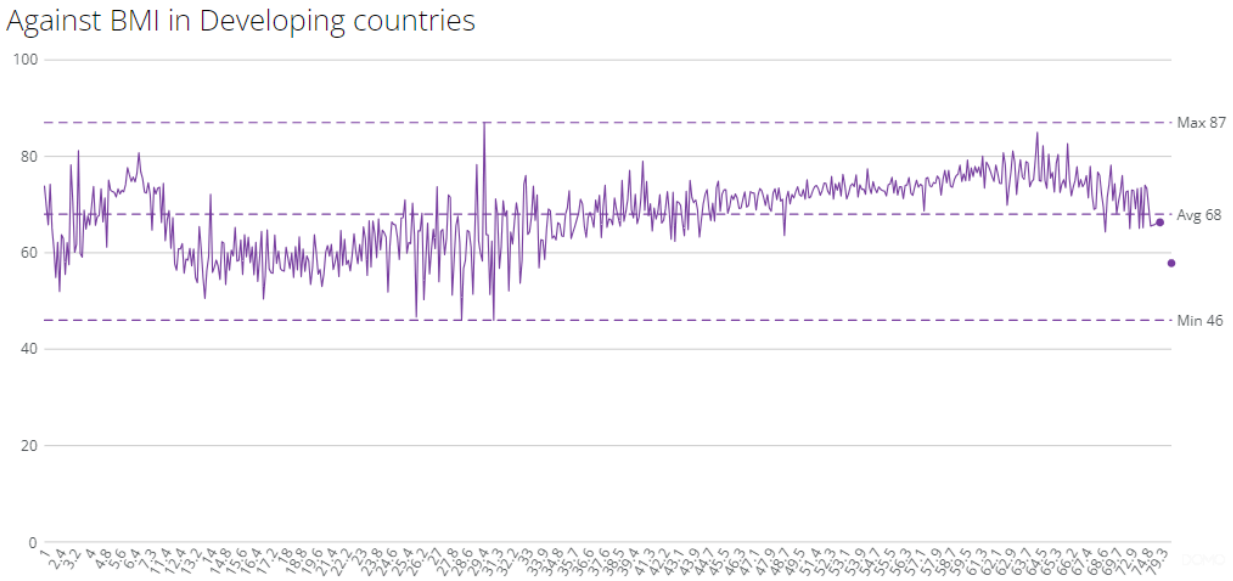
DOMO:

A. Overview

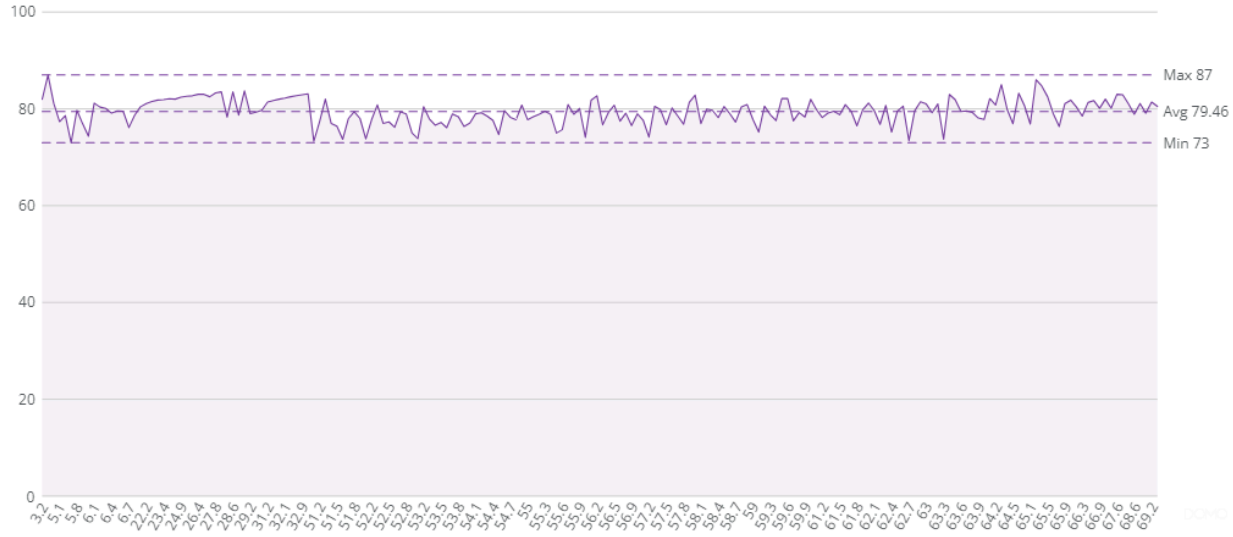




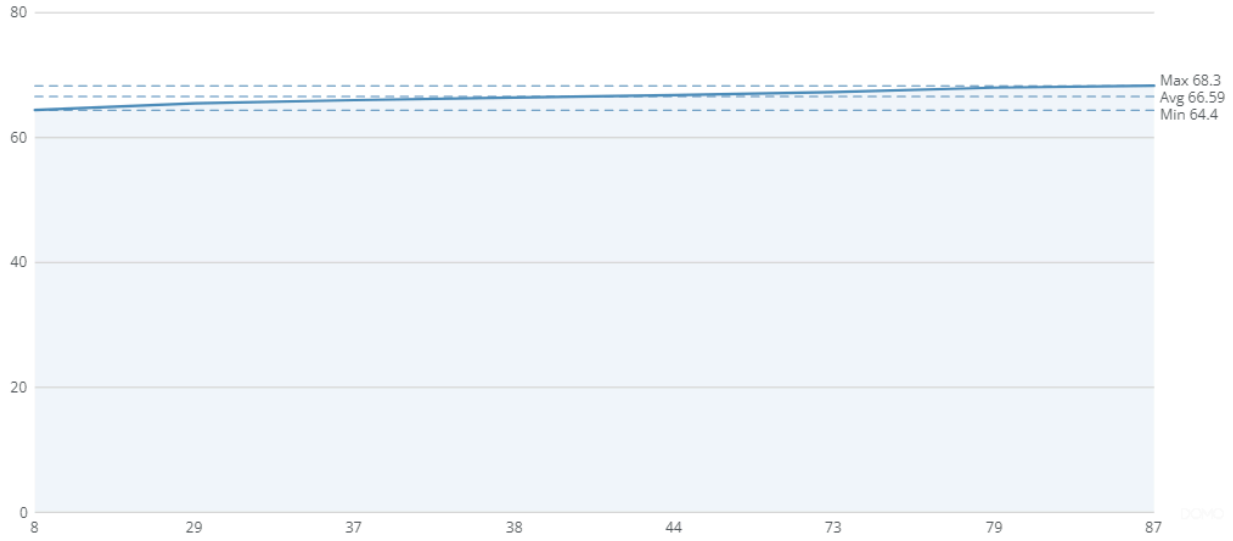
B. Health Factors



Against BMI in Developed countries

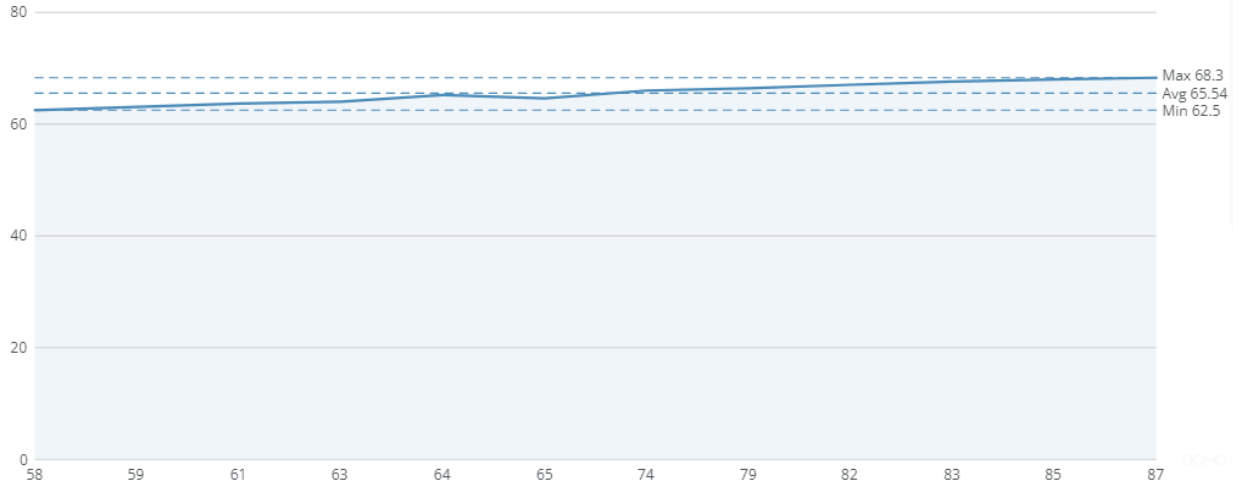


Life Expectancy after Hepatitis B Immunization in India

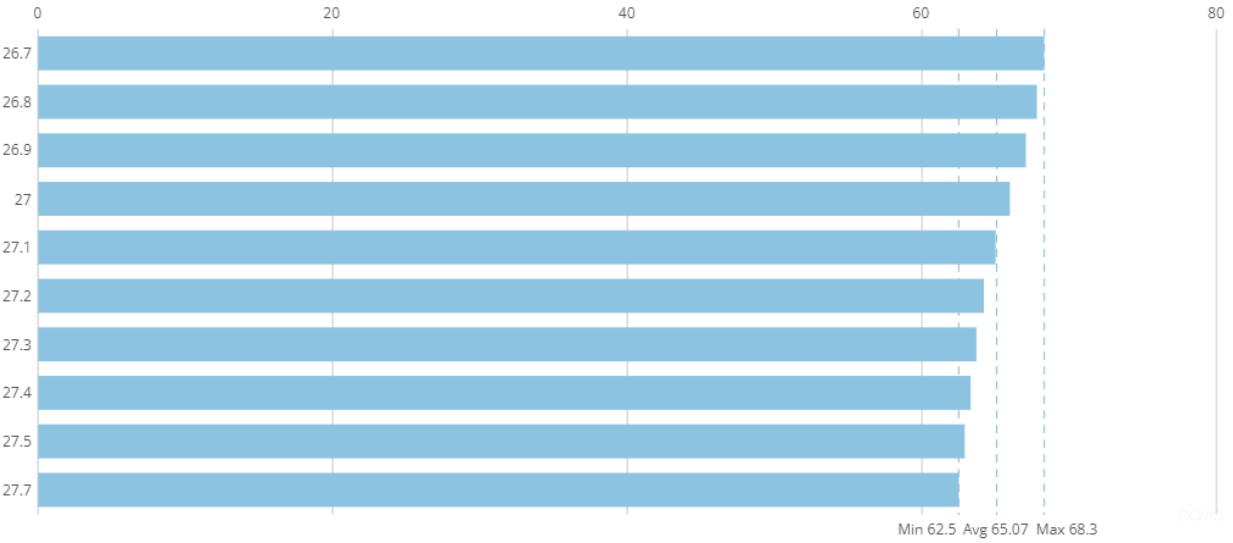


Life Expectancy after Diptheria Immunization in India

981 Sum of Life expectancy



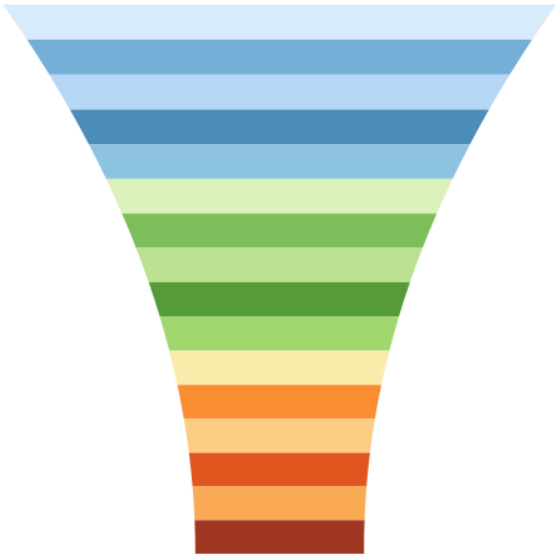
Life Expectancy varying with percentage of Thinness



%Thinness amongst age groups 10-19

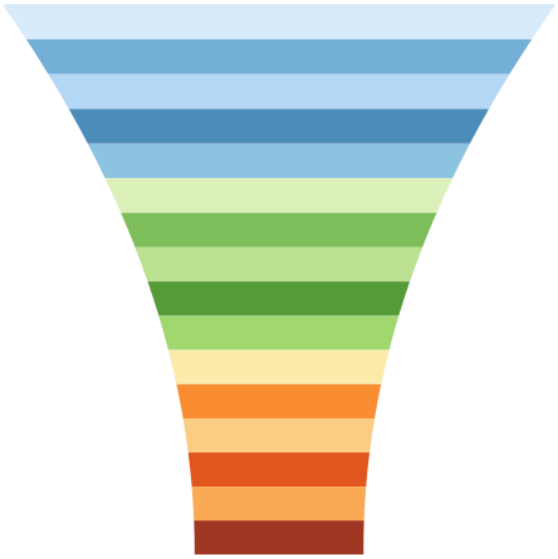
India: Thinness amongst age groups 5-9 across the years

2004	28.2	99.6%
2005	28.1	99.6%
2006	28	99.6%
2007	28	100%
2008	27.9	99.6%
2009	27.8	99.6%
2010	27.8	100%
2011	27.7	99.6%
2012	27.6	99.6%
2013	27.5	99.6%
2014	27.4	99.6%
2015	27.3	99.6%



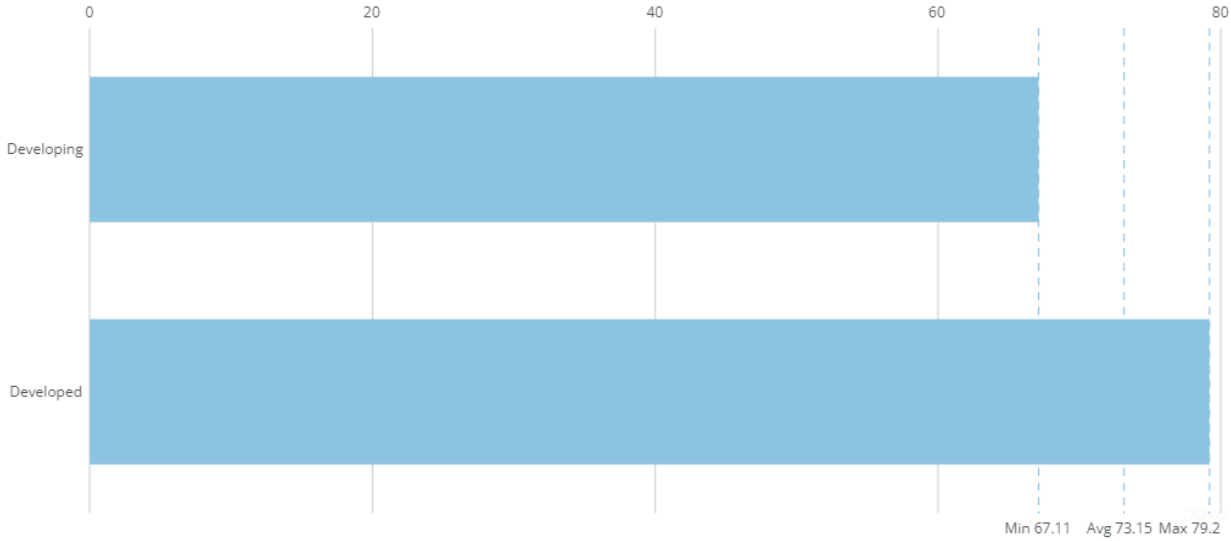
India: %Thinness amongst age groups 10-19

2004	27.2	99.6%
2005	27.2	100%
2006	27.1	99.6%
2007	27.1	100%
2008	27	99.6%
2009	27	100%
2010	27	100%
2011	26.9	99.6%
2012	26.9	100%
2013	26.8	99.6%
2014	26.8	100%
2015	26.7	99.6%

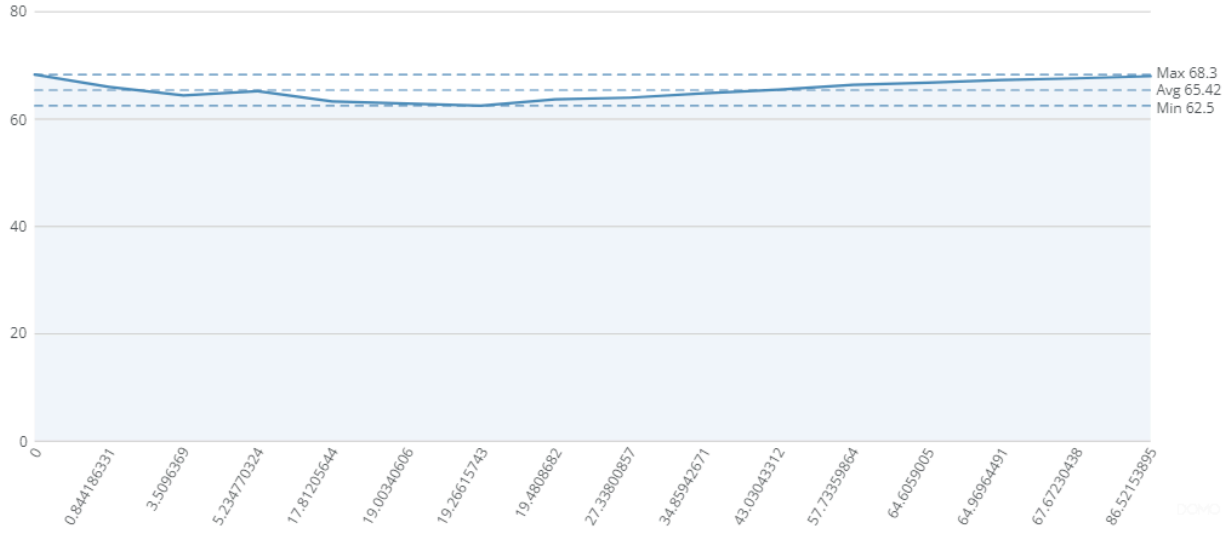


C. Economic Factors

Developed vs Developing countries



India: Expenditure on Health as percentage of total expenditure

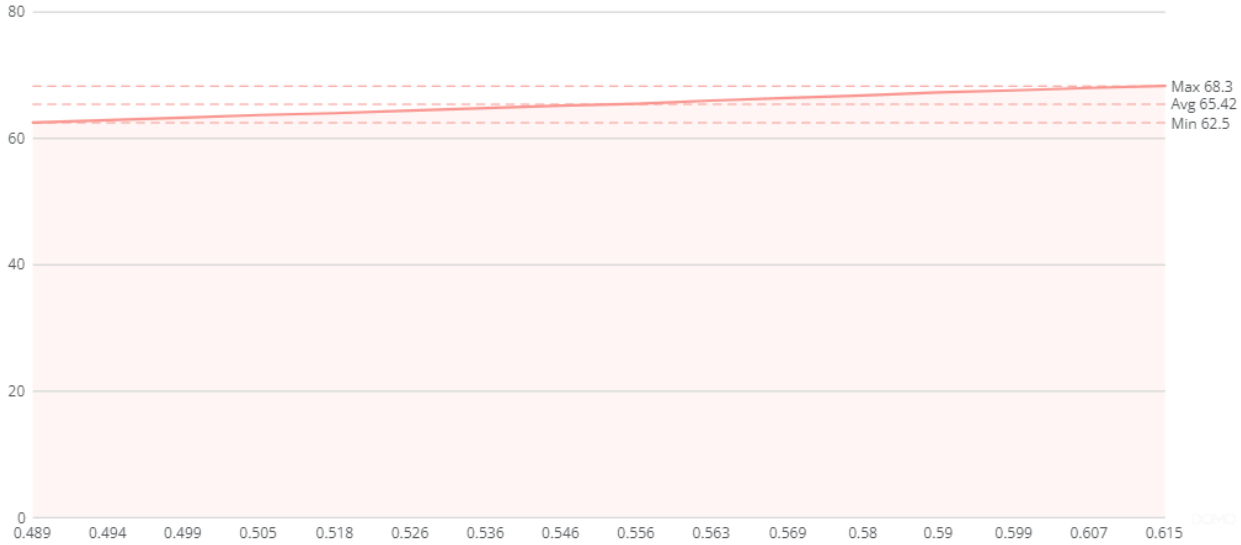


Percentage increase in life expectancy as a result of increase in health expenditure

68.3

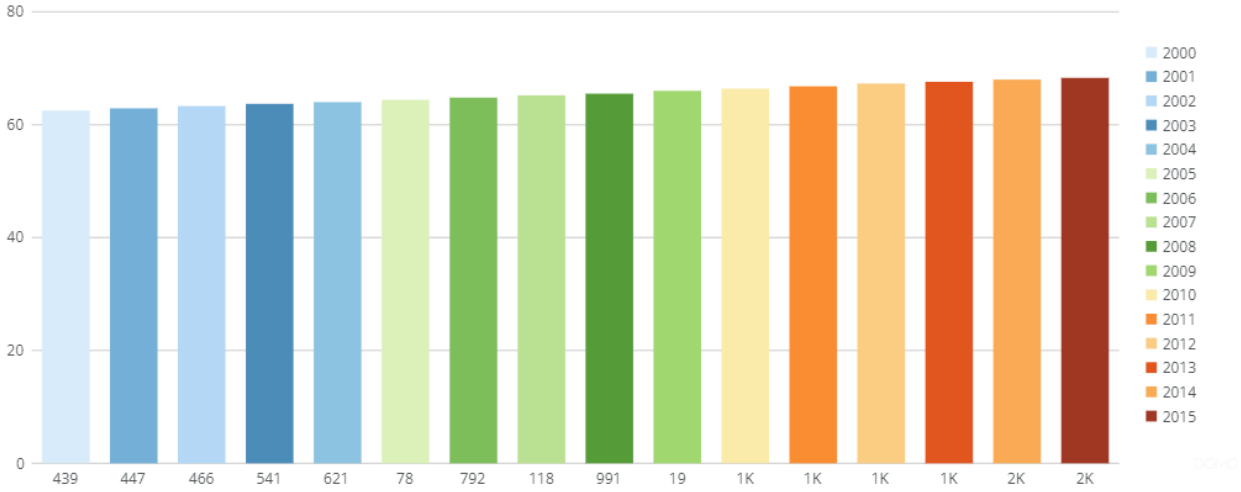
↗ 9.28%

India: Income composition

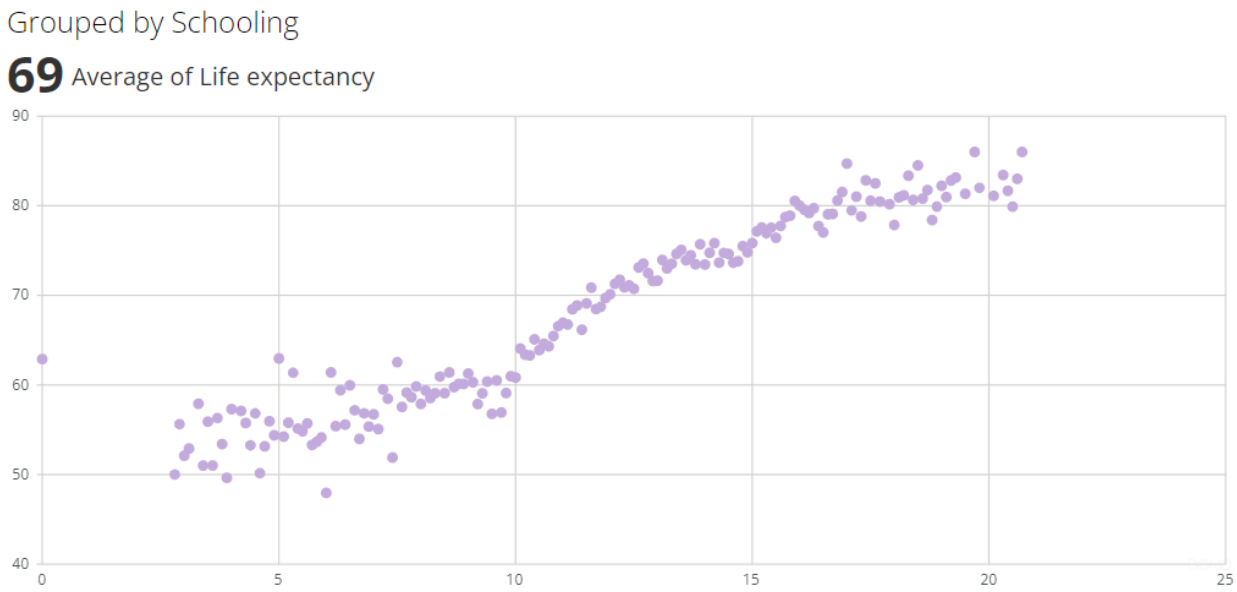


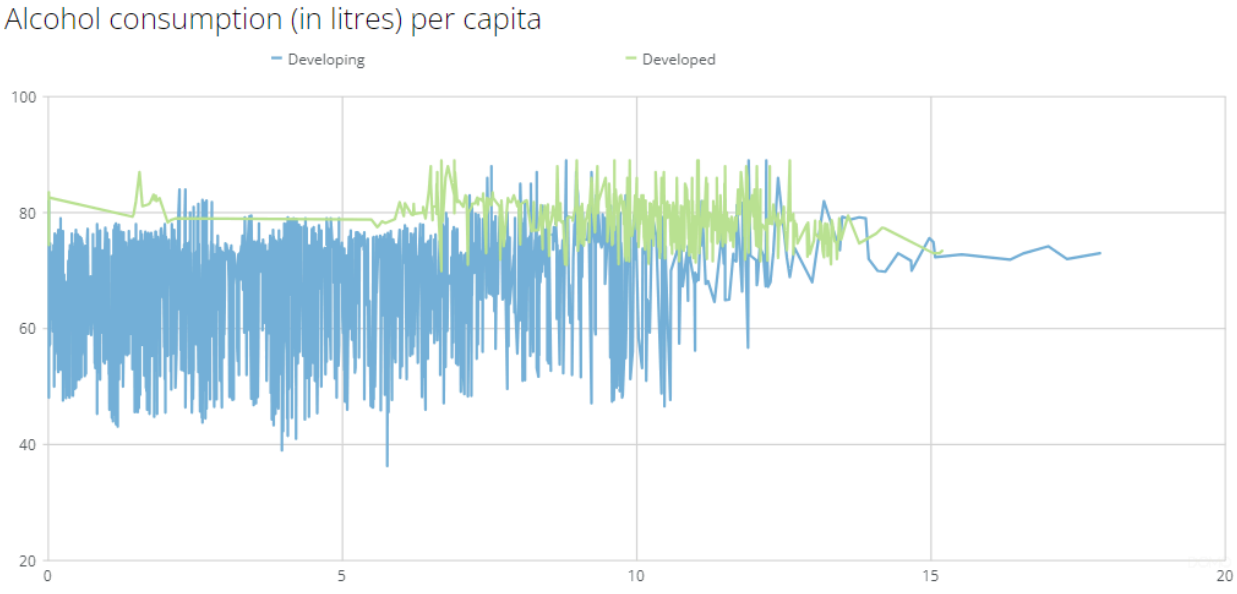
India: Grouped by GDP

1K



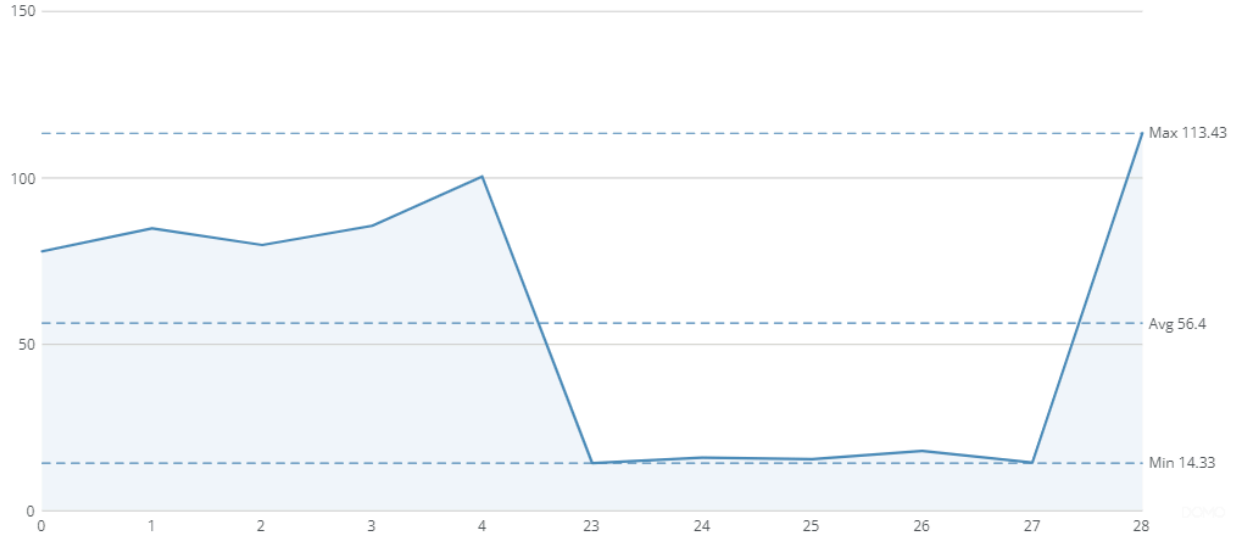
D. Social Factors



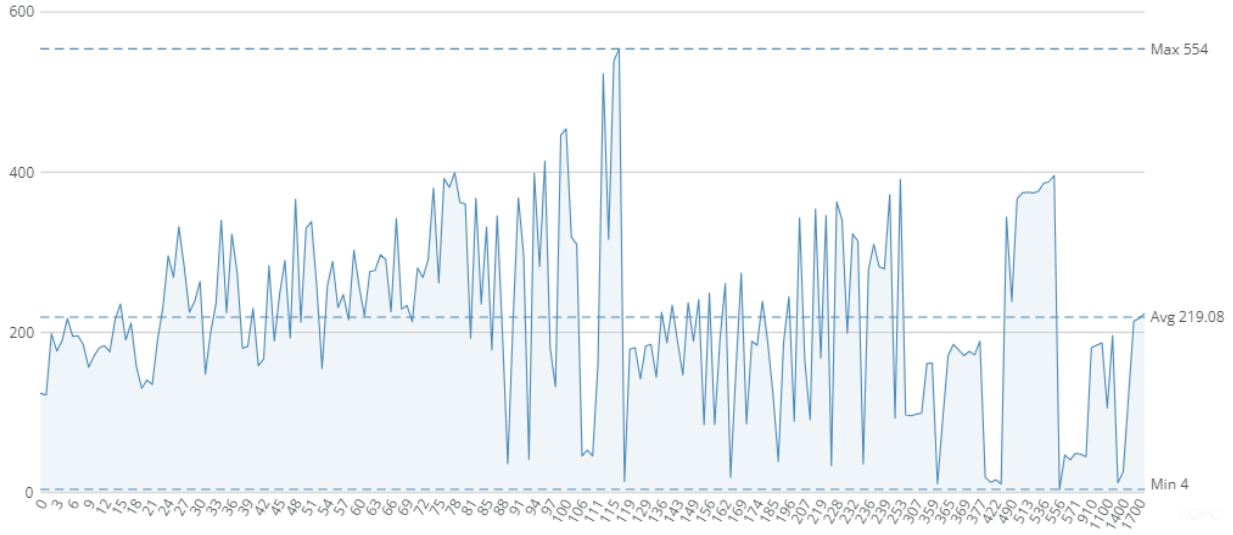


E. Mortality Factors

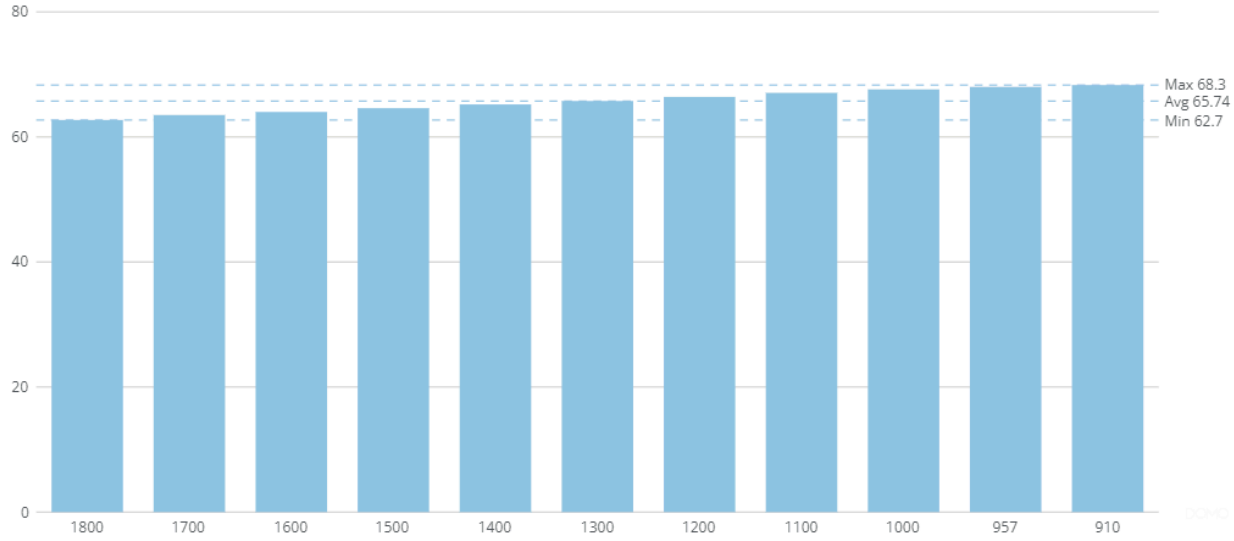
Infant deaths vs Adult Mortality in Developed countries



Infant deaths vs Adult Mortality in Developing countries



India: Infant deaths vs Life Expectancy



India: Adult Mortality vs Life Expectancy

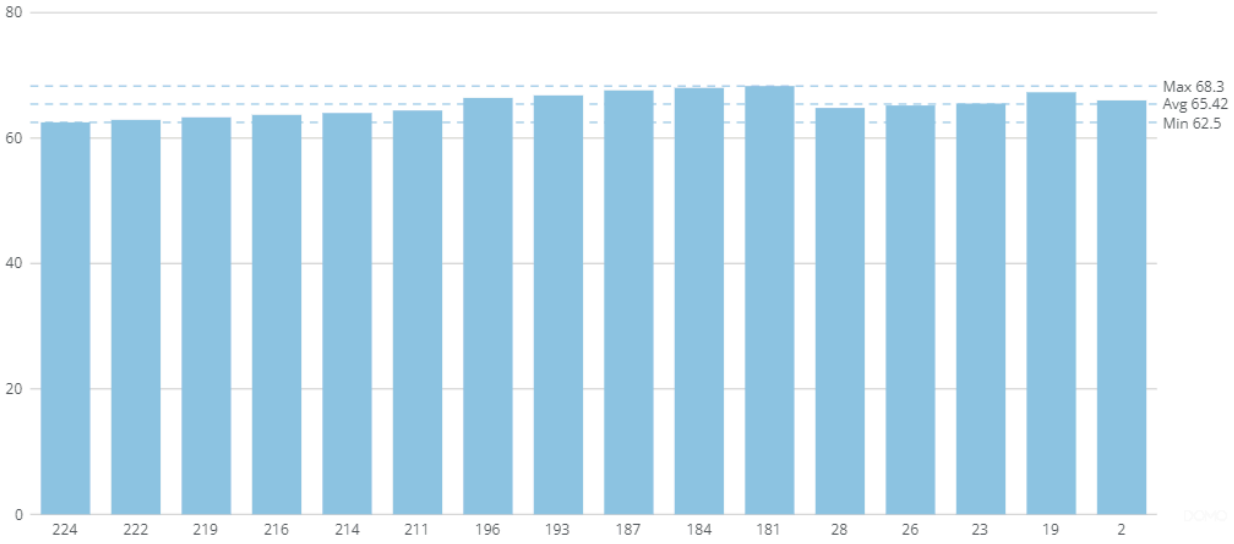
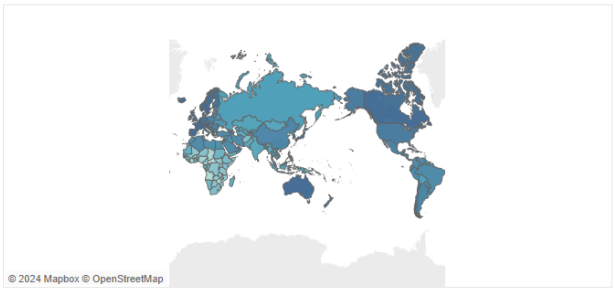


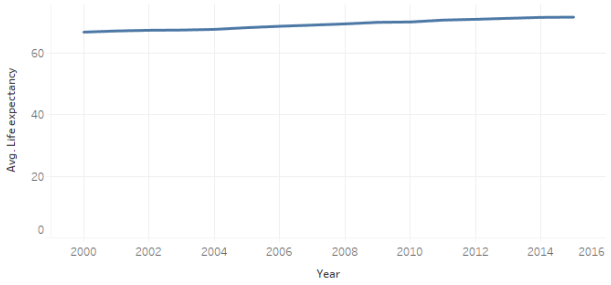
Tableau:

Overview

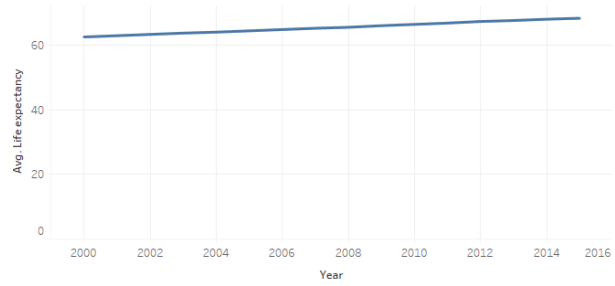
Life Expectancy across the globe



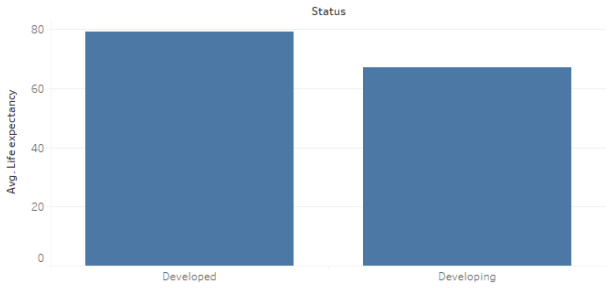
Global Life Expectancy across the years



Average Life Expectancy in India across the years

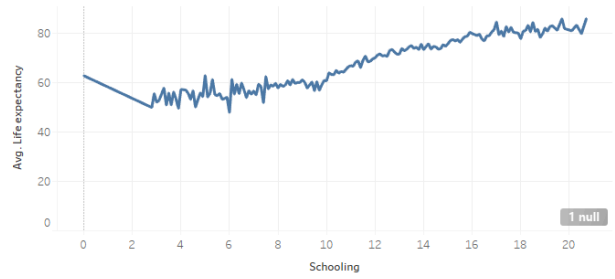


Dependent on Status

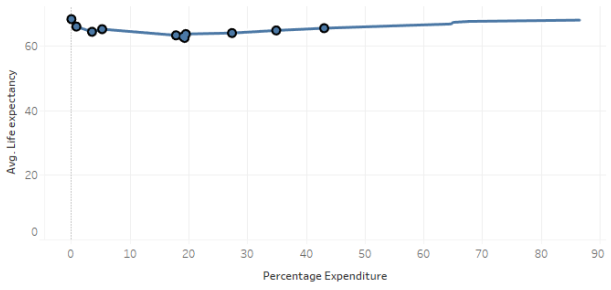


Factors

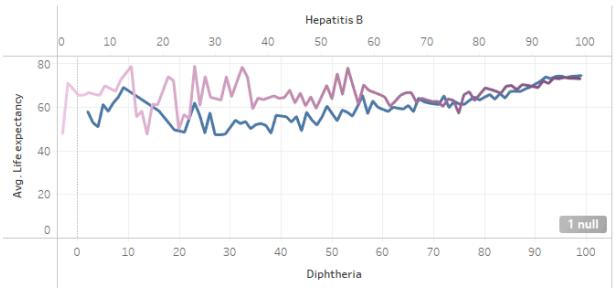
Dependent on Schooling



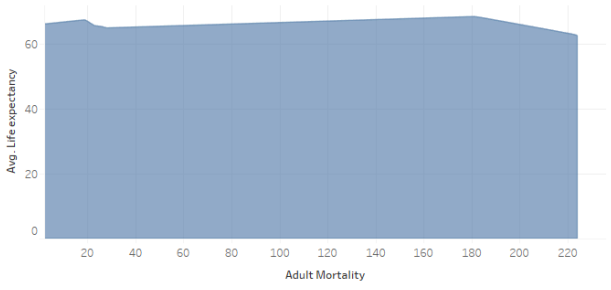
Dependent on Percentage Expenditure



Dependent on Diptheria and HepB Immunization



Dependent on Adult Mortality



Analysis:

After thorough analysis, we can draw the following conclusions:

1. The life expectancy of a developed country is much higher than that of developing nations.
2. The BMI of a person does not affect their life expectancy as much as expected in developed countries, however, this is a stark difference when it comes to developing countries.
3. Higher the number of years the population undergoes schooling, greater is the life expectancy.
4. Alcohol consumption in lesser quantities does not affect the life expectancy, however in large amounts, the life expectancy deteriorates sharply
5. As the HDI increases, the life expectancy also increases.
6. Schooling and HDI are highly correlated to life expectancy.
7. As the cases of infant deaths and under 5 deaths along with adult mortality rates decrease, life expectancy increases.

The following should be the rough action plan for India to increase its Life expectancy based off the given analysis:

1. Invest in schooling and introduce universal schooling schemes which in turn will improve the HDI score.
2. Maintain or increase the health expenditure as based on the given data, there has been a 9.28% increase in the life expectancy.
3. Carry out immunisation schemes such as mandatory diphtheria and hepatitis B immunisation across the country. This will result in lowering the number of infant deaths.
4. Restrictions on alcohol consumption would ensure a healthier workforce and thus help in improving the life expectancy,
5. Ensure food security as thinness is prevalent in almost 27% of the population between 5-19 years. This can be done by introducing more schemes similar to the mid-day meal scheme etc.

How is decision making made faster?

Metabase

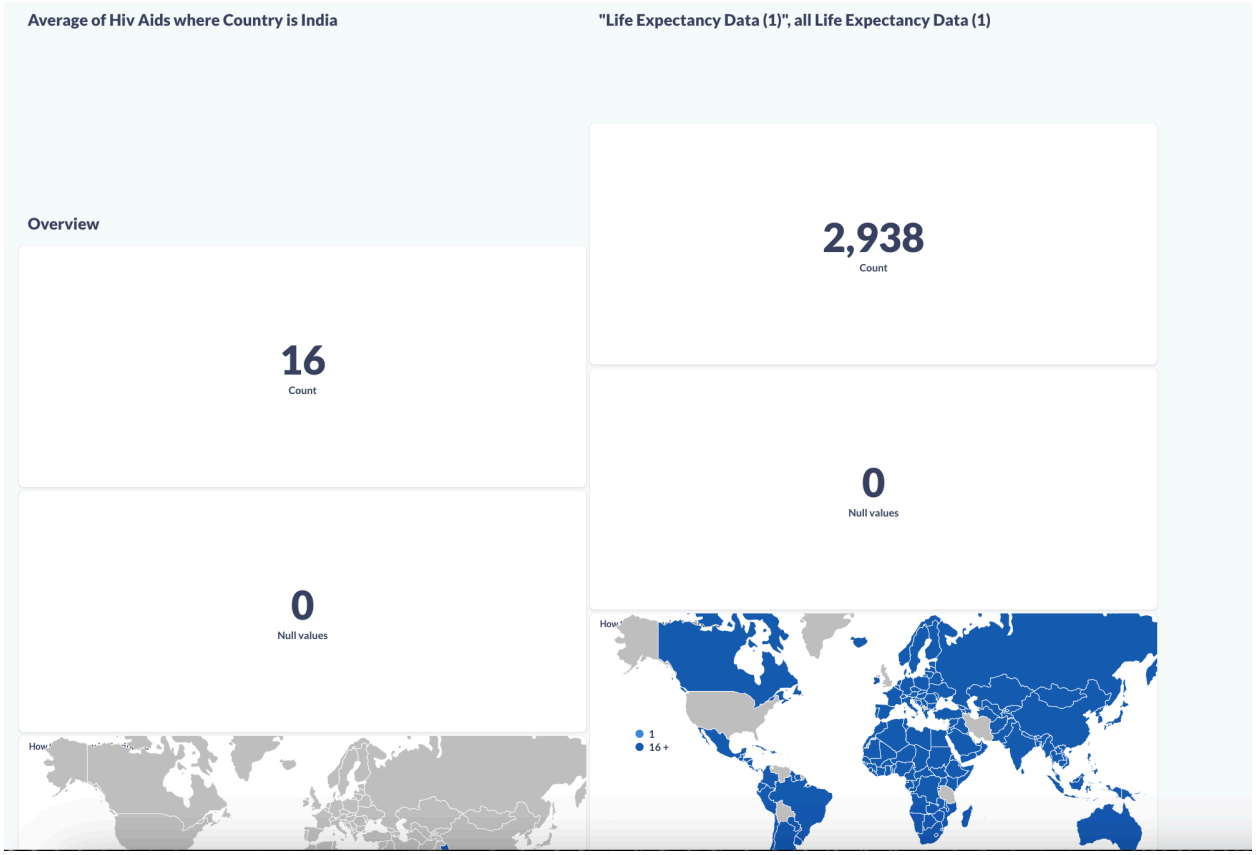
-Metabase lets you download the details of each analysis in CSV format

mortality_rate_of_top_10_developed_countries_2024-03-04T01_41_42.20

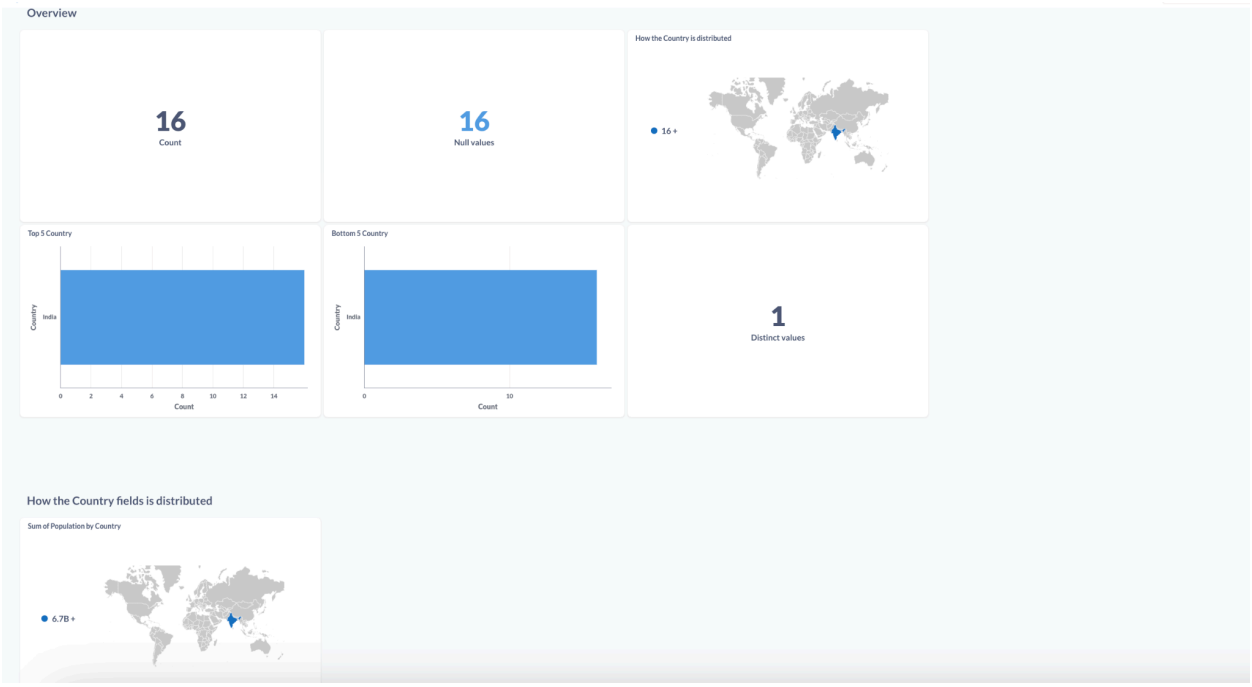
Country	Average of Adult Mortality
Australia	63.1875000000
Belgium	70.1875000000
Canada	64.6250000000
Denmark	66.0625000000
Finland	68.8750000000
Germany	71.2500000000
Japan	57.1250000000
Netherlands	61.6250000000
Singapore	62.0000000000
United Kingdom of Great Britain and Northern Ireland	70.3750000000

-It also gives you 2 more options to do Insights: Compare it with the rest and X ray.

1. Compare it with the rest:



2. X ray:



DOMO

DOMO creates insights for every card that you add to your dashboard.