



The Causes of Death around the World

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0.1 Introduction

Do you know around 56 million people die each year? What caused their death? How did the causes of death change over time and difference between countries and world regions? And can we prevent death early. There are the big questions we are answering in our presentation. Our data is from “data in our world”, It counts more than 20 causes of death in countries around the world from 1990 to 2018. For this table¹, here is a list of the causes of death covered by this report. From this plot¹, we can see Cardiovascular diseases are the leading cause of death globally. The second biggest cause is Neoplasms. What about the specific situation in the different countries? The four members of our group will choose two countries of interest and make an analysis.

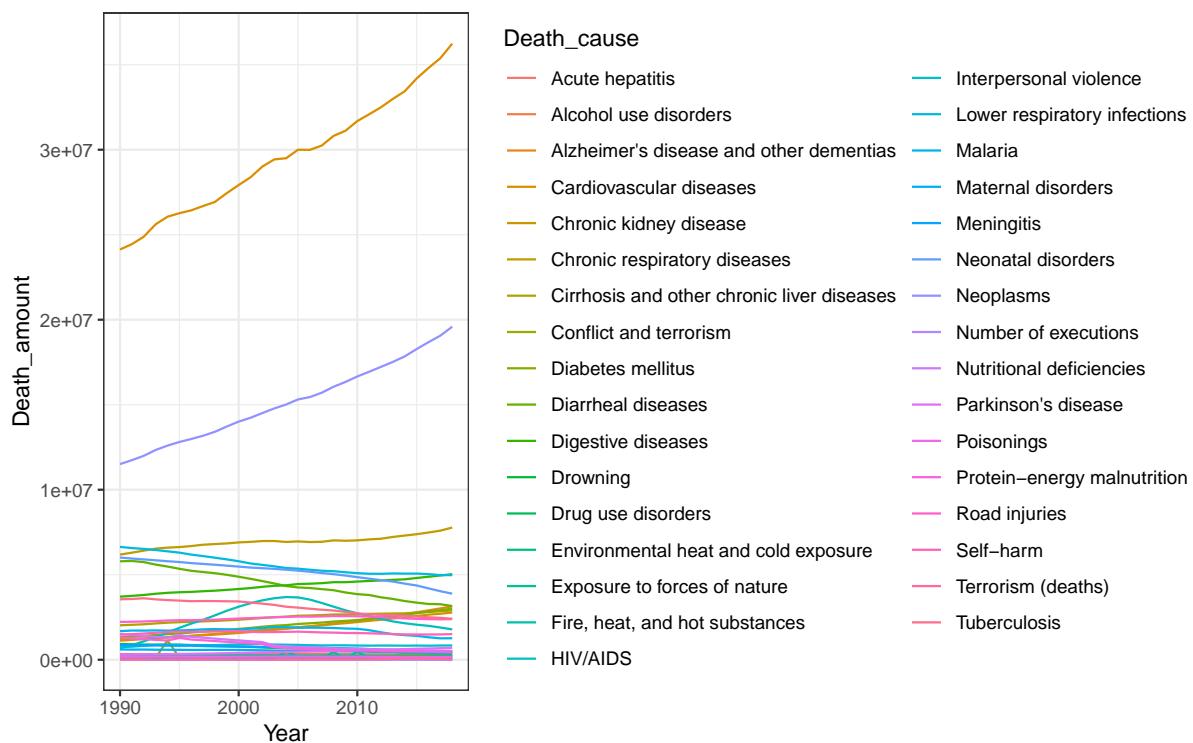


Figure 1: Number of deaths by cause, World, 1990 to 2019

Table 1: *The causes of death*

X
Acute hepatitis
Alcohol use disorders
Alzheimer's disease and other dementias
Cardiovascular diseases
Chronic kidney disease
Chronic respiratory diseases
Cirrhosis and other chronic liver diseases
Conflict and terrorism
Diabetes mellitus
Diarrheal diseases
Digestive diseases
Drowning
Drug use disorders
Environmental heat and cold exposure
Exposure to forces of nature
Fire, heat, and hot substances
HIV/AIDS
Interpersonal violence
Lower respiratory infections
Malaria
Maternal disorders
Meningitis
Neonatal disorders
Neoplasms
Number of executions
Nutritional deficiencies
Parkinson's disease
Poisonings
Protein-energy malnutrition
Road injuries
Self-harm
Terrorism (deaths)
Tuberculosis

0.2 Main body

0.2.1 Australia and Switzerland

Q1: What can be observed in the chart of causes of death due to disease?

Q2: What can be observed in the chart of causes of death due to others?

(1).Plot death due to disease factors

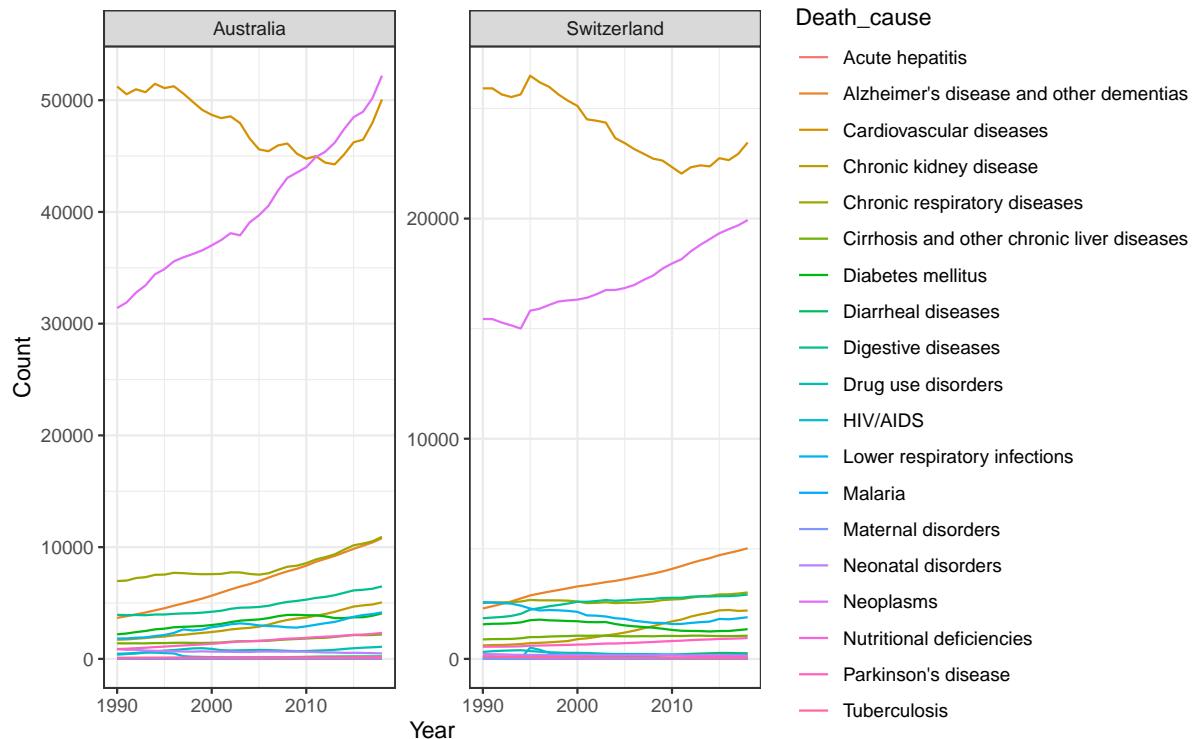


Figure 2: Number of deaths by disease causes, 1990 to 2018

As we can see from this graph², cardiovascular disease and Neoplasm are the leading causes of death in both Australia and Switzerland, with cardiovascular disease decreasing but starting to rise again after about 2011, and the number of deaths from Alzheimer's and neoplasm rising sharply.

This result confused me. I would have thought that because of the advancement of medicine, the causes of death from disease should gradually decrease. So I looked up these three conditions online, all of which are highly prevalent in older people, and then in this table ², I listed life expectancy in Australia and Switzerland from 1990 to 2019. As can be seen from the table², life expectancy increases as the years go by, meaning that more people are living old enough so that the number of people who are sick increases.

Table 2: Life Expectancy in Australia and Switzerland

Country	Year	Life_expectancy
Australia	1990	76.933
Australia	1991	77.223
Australia	1992	77.505
Australia	1993	77.772
Australia	1994	78.024
Australia	1995	78.267

In plot3, I have added this life expectancy line to the first graph for better visualisation and you can see that it is all on an up trend.

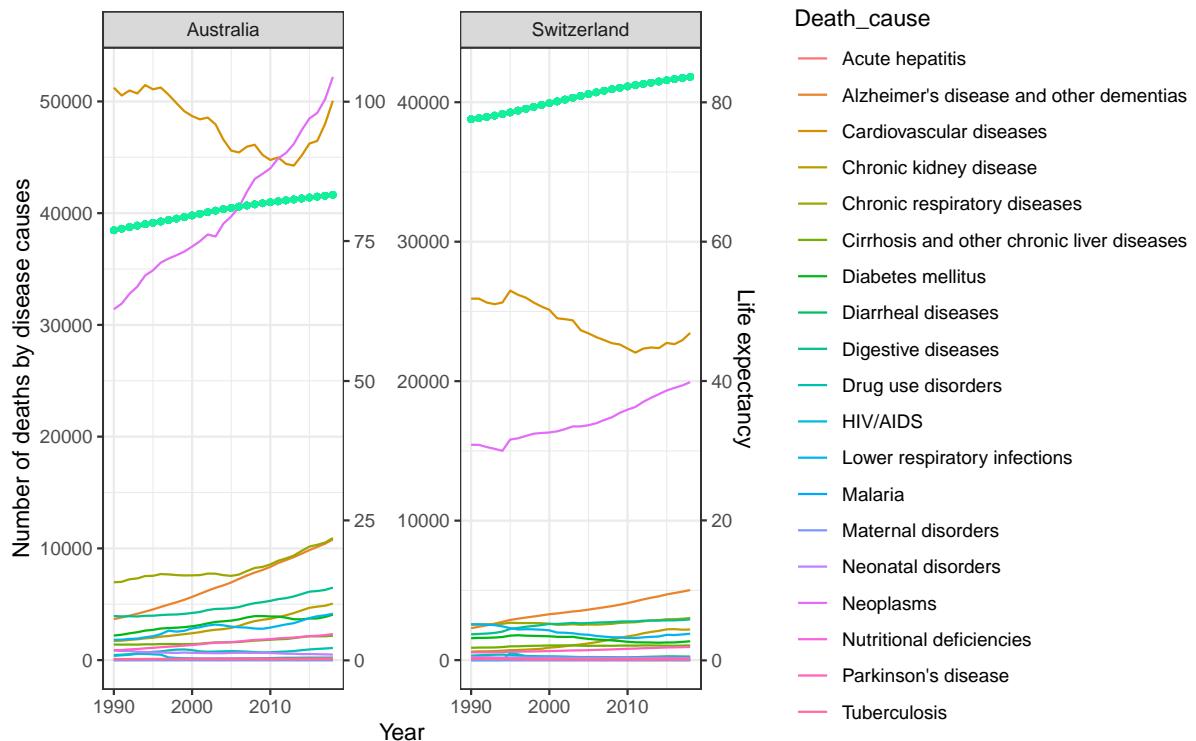


Figure 3: Add the line of life expectancy to fig1.

(2).Plot death due to other factors

For other causes. This graph 4 shows that self-harm, road injuries are the main causes of death from other causes. Road injuries have been decreasing and I think this is closely related to the improving traffic laws and the popularity of driving tests. I noticed that Australia had an unusual peak in 2009. I searched Google for three keywords: Australia Fire 2009 and I got the information that there was a very serious forest fire in Vic in 2009. Hub (2009) said that the Black Saturday fires started on 7 February 2009. Approximately 400 fires were recorded across Victoria, affecting 78 communities.

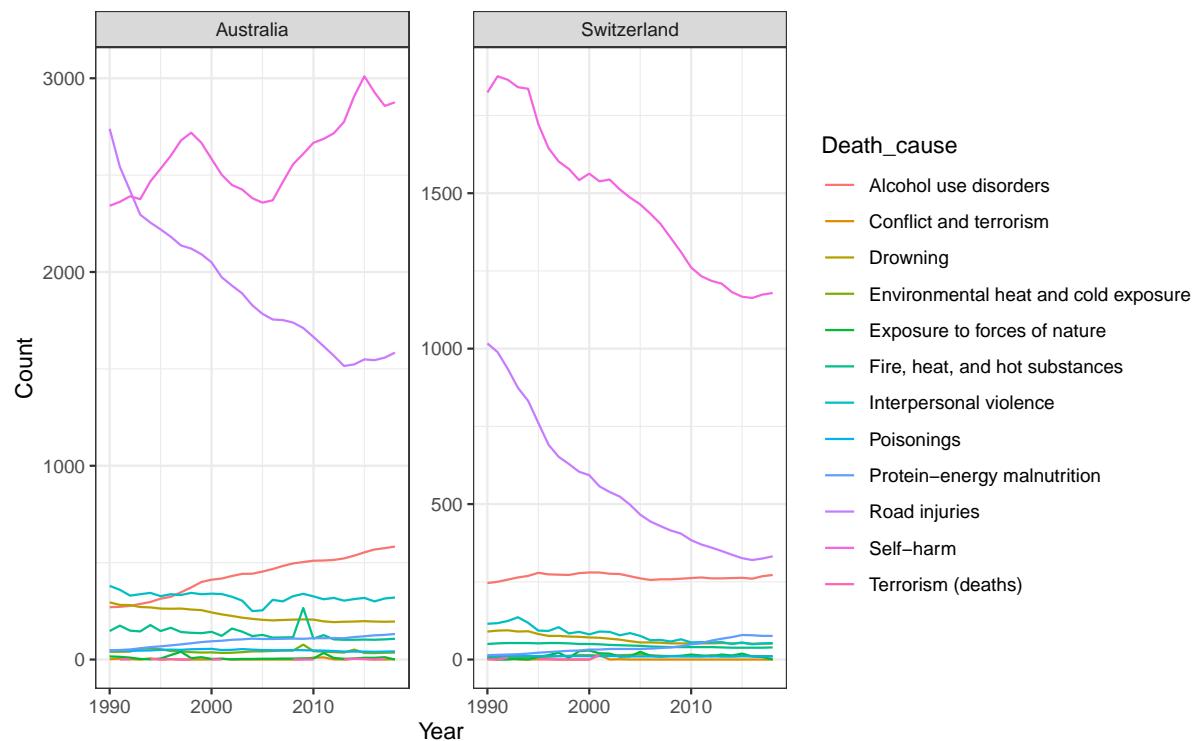


Figure 4: Number of deaths by other causes in Australia and Switzerland.

A total of 173 people died in the fires, and 2029 houses were lost. So in 2009 an unusually high number of people died in fires in Australia.

In order to read data used R package Wickham, Hester, and Bryan (2022), clean the data used R package Wickham et al. (2019), plotting picture used R package Wickham (2016).

1 China and India

The health conditions are different due to the resources that different countries control. Which leads to an inequality in health in different areas Emadi, Delavari, and Bayati (2021). Countries in different developing conditions would have different health conditions. This section will focus on 2 typical developing countries : China and India. Investigate diseases that cause the most death in China and India, and how they are related with the GDP per capita.

1.1 Research Question:

Q1: What are the diseases that cause the most death in China and India?

Q2: How the death caused by those diseases change with the change of GDP per capita?

We will focusing on 6 typical diseases: they are : Cardiovascular Diseases, Diabetes mellitus, HIV, Neoplasms, Nutritional deficiencies and, Malaria

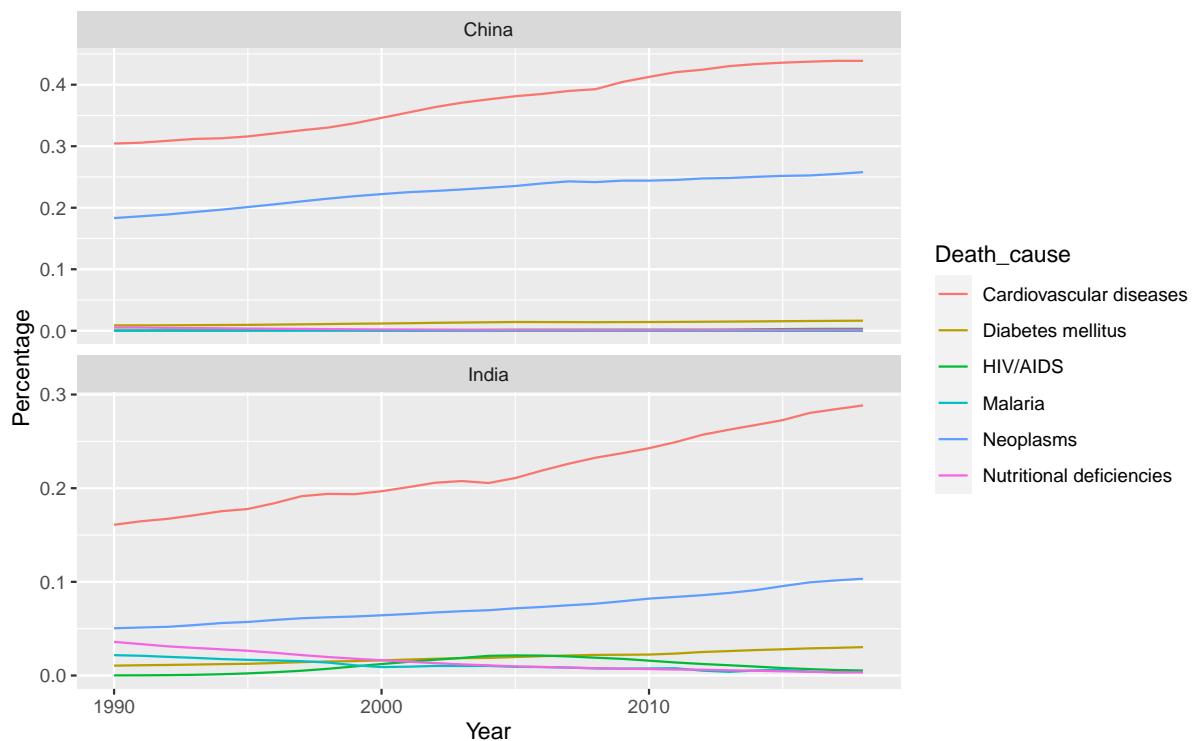


Figure 5: Percentage of different causes of death by year

In this graph 5 , it is clear that both Cardiovascular Diseases and Neoplasms contribute the most among other diseases we are interested in both China and India and the trend is still increasing. So we will mainly focus on these 2 diseases. There are 43% deaths caused by Cardiovascular diseases and 26% caused by Neoplasms in China. 29% deaths caused by Cardiovascular diseases and 10% caused

Table 3: Parameters of model

Country	Death_cause	r.squared	intercept	slope
China	Cardiovascular diseases	0.96	2085613.4	181.99
China	Neoplasms	0.90	1404129.3	90.30
India	Cardiovascular diseases	0.98	1031131.3	221.18
India	Neoplasms	0.98	306150.6	85.49

by Neoplasms in India. So, diseases that cause the most deaths in China and India are Cardiovascular diseases and Neoplasms.

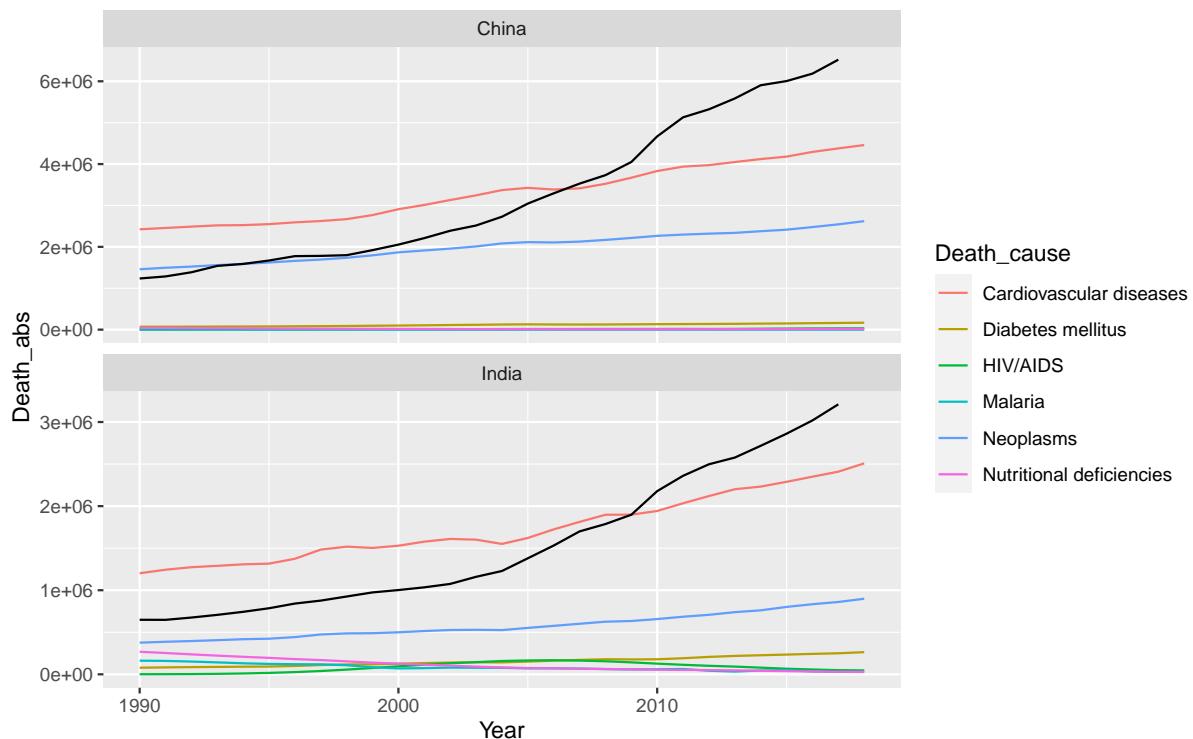


Figure 6: Total number of death by year and GDP per capita

In this graph 6, we combine them with the GDP per capita graph, which is the black line. There is a clear trend that the death caused by these 2 diseases are highly correlated with GDP per capita. To find out the relations between them.

I run a regression, using the death caused by “Cardiovascular diseases” and “Neoplasms” against GDP per capita shown in the table 3. The r^2 is quite high means they fitted into the linear model quite well

More than 90% of deaths caused by Cardiovascular diseases and Neoplasms can be explained by the model. In China, for every 1 unit increase in the GDP per capita, the deaths caused by Cardiovascular

diseases and Neoplasms will increase for 182 and 90. In India, for 1 unit increase in the GDP per capita, the deaths caused by Cardiovascular diseases and Neoplasms increased by 221 and 85 respectively.

It is corresponding to common sense as well. Because both Cardiovascular Diseases and Neoplasms occur more in the area with higher income. The longer one lives, the higher the possibility one can get these 2 diseases. Richer a country is, more resources can be used on transmitted diseases. therefore we can observe that death caused by transmitted diseases decreased to a very low level

In this part, I used package `readr` Wickham, Hester, and Bryan (2022) to read data, package `broom` Robinson, Hayes, and Couch (2022) to get statistic data from model, package `knitr` Xie (2014) to make table, package `tidyverse` Wickham et al. (2019) for basic calculation and package `ggplot2` Wickham (2016) to plot.

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