



WHY DO PEOPLE DIE ?

► A study of leading causes of death since 1990

OUR TEAM OF UNDERTAKERS



Mathilde Bernard

Forecast and
regional insights



Romain Fernex

Forecast and
global insights



Maksym Verveha

Variable relation
and global
insights



Wang Wenyuan

Correlation analysis
and regional
insights

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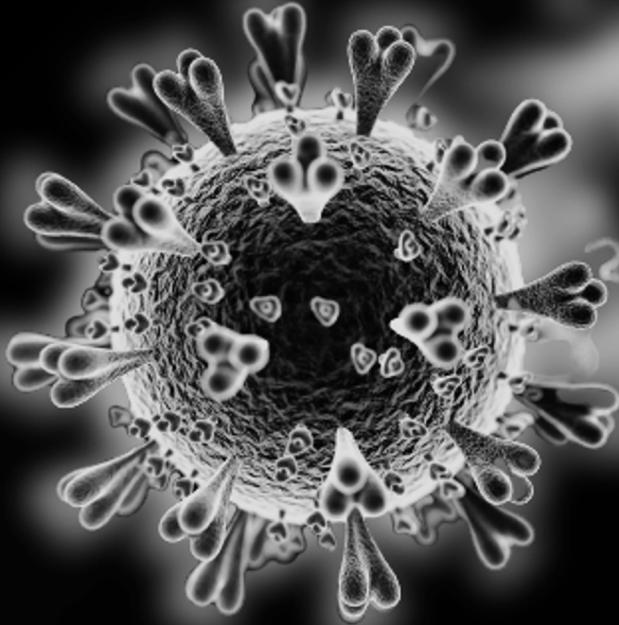
In depth view of our code
with our findings



01

Introduction

Literature review and thesis statement



OUR DATASET

TITLE : Cause of death around the world

Source

<https://www.kaggle.com/datasets/iamsouravbanerjee/cause-of-deaths-around-the-world?resource=download>

Geographic scope

Data about over 204 countries (OECD, LDC, BRICS...)

Death causes

31 different causes of death registered (pathology, accident..)

Timeframe

Covers nearly 30 years of data (1990-2019)

Country/Territory	Code	Year	Meningitis	Alzheimer's Disease and Other Dementias	Parkinson's Disease	Nutritional Deficiencies	Malaria	Drowning	Interpersonal Violence	...	Diabetes Mellitus	Chronic Kidney Disease	Poisonings	Protein-Energy Malnutrition	Road Injuries	Chronic Respiratory Diseases	Other Chronic Diseases	Fire, Heat, and Hot Substances	Acut Hepatiti	
Somalia	SOM	2008	4154	296	89	8756	1634	756	1817	...	1863	1346	494	8598	2729	2973	2851	4535	507	111
Cote d'Ivoire	CIV	2018	2367	1137	371	809	2758	609	2323	...	3450	3398	377	758	3404	3638	3958	6661	520	23
Turkmenistan	TKM	1999	146	295	54	23	1	481	311	...	372	477	58	11	446	613	1242	1507	352	10
Solomon Islands	SLB	2005	24	14	14	33	220	101	44	...	277	96	14	33	127	282	101	152	17	1
Lebanon	LBN	1994	50	418	90	13	0	73	279	...	462	650	33	12	370	737	377	586	89	16
Papua New Guinea	PNG	2018	609	387	191	206	945	378	972	...	4505	716	150	202	2185	6954	643	1336	708	9
Kuwait	KWT	2019	12	425	58	1	0	23	42	...	365	322	19	0	583	230	204	338	34	
Saint Kitts and Nevis	KNA	2015	1	8	3	4	0	3	14	...	26	26	0	3	7	9	10	19	2	
Italy	ITA	2006	216	34184	5876	469	0	419	666	...	18535	11204	100	325	7154	26286	13429	26019	436	9
Uganda	UGA	2004	6737	1048	261	6462	57092	793	1634	...	3518	2372	548	6296	4804	4639	4181	7092	595	39
Yemen	YEM	2004	8121	1048	584	6465	21085	180	1024	...	3248	3315	248	6258	1804	920	1484	1085	202	38
Uganda	UGA	2009	516	24194	9810	469	0	418	666	...	18522	11204	100	322	7184	26588	13459	26018	439	81

LITERATURE REVIEW

When describing a country's overall health performance, life expectancy and death rates are often hailed as the most popular indicators. However, as analyzed by many leading health institutions, looking at the causes of death has also proved to be a powerful predictor of a country's overall health status. This term refers, according to the WHO, to "**the disease or injury which initiated the train of morbid events leading directly to death, or the circumstances of the accident or violence which produced the fatal injury**" [1]. There are 3 main identifiable types of "cause of death" : injuries (road accidents, conflicts...), non-communicable disease (chronic diseases such as diabetes, long-term illnesses etc..) and **communicable diseases** (malaria, HIV...). While the wide majority of death - 73% - currently belong to the category of **non-communicable disease** [2] this proportion depends highly on the level of wealth and development of a given country. According to a WHO report on social determinants of health published in 2014 [3], the leading cause of death in **high income** countries is indeed **chronic diseases** but for middle income-countries the proportion of communicable diseases-related deaths is also significant. This proportion even overtakes that of chronic diseases for countries with **low income** where **infectious diseases** such as malaria and tuberculosis still take an important toll on the overall population.

[1] <https://www.who.int/standards/classifications/classification-of-diseases/cause-of-death>

[2] <https://ourworldindata.org/causes-of-death>

[3] <https://www.who.int/news-room/questions-and-answers/item/what-are-the-main-differences-between-rich-and-poor-countries-with-respect-to-causes-of-death>

LITERATURE REVIEW

In spite of these discrepancies, there is a global tendency, globally and especially in **OECD countries** [4], of death causes **switching rapidly from infectious diseases to ischemic heart, circulatory and respiratory diseases**. This increase in death due to chronic diseases has been strongest in the Western pacific region [5] where changes in living standards have brought about new forms of health risks. Covid also had a notable impact of leading cause of deaths, notably in the developed world, with it maintaining itself as the 3rd leading cause of death in the US for 3 years in a row since 2019 [6].

Finally, as pointed out by the Global Health Observatory of the WHO, monitoring the number of death and their cause is vital to help adapt countries' health systems to react to these risks [7]. This has ramifications in multiple sectors, such as the food industry in countries where an **increasing death rate linked to diabetes** might indicate that tougher regulations on food composition are necessary.

Therefore studying this data is useful both to analyze current health inequalities across the world and to predict future patterns that may have an influence on how future health systems are designed and incorporated in countries' health-related legislation.

[4] https://www.oecd-ilibrary.org/sites/ddcd9abf_en/index.html?itemId=/content/component/ddcd9abf-en

[5] <https://www.paho.org/en/news/9-12-2020-who-reveals-leading-causes-death-and-disability-worldwide-2000-2019>

[6] <https://www.healthsystemtracker.org/brief/covid-19-leading-cause-of-death-ranking/>

[7] <https://www.who.int/data/gho/data/themes/mortality-and-global-health-estimates/ghe-leading-causes-of-death>

SUMMARY : TRENDS AND DEFINITIONS

1

Rise of non-infectious diseases related deaths globally

2

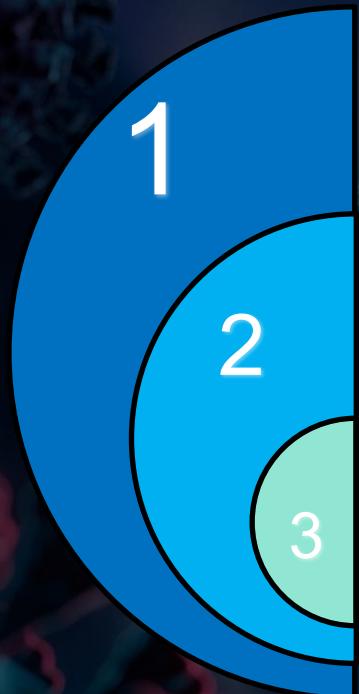
Resilience of infectious diseases related death in low income countries

3

Cardiovascular diseases dominating OECD and worldwide death

- **Infectious diseases :** Malaria, HIV, Diarrhea
- **Non-infectious diseases :** Diabetes, Ischemic Heart, Neoplasms
- **Neoplasms :** type of abnormal and excessive growth of tissues, its most extreme forms are cancers
- **Neonatal disorders :** prematurity, birth trauma, congenital malformations

OUR PROPOSAL



Find the leading causes of death worldwide

Look at the historical evolution of death causes

Find the leading cause of death per country

OUR OBJECTIVES

02

METHODS

Description of our research design

RESEARCH DESIGN

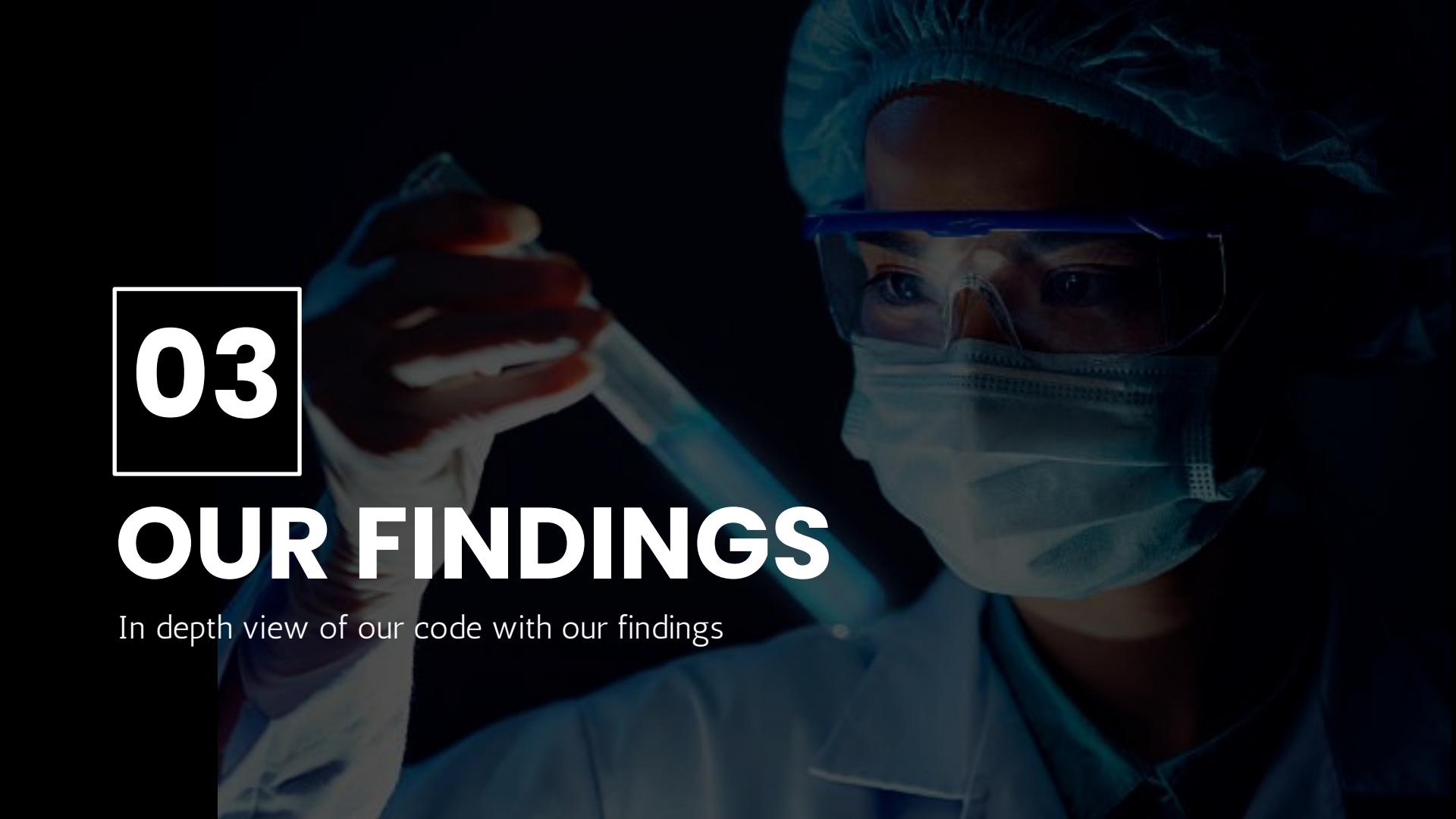


Ranking

Line chart

Color Map

OECD : pie chart

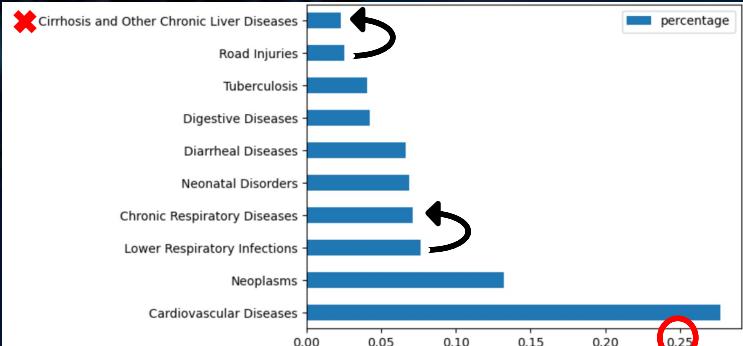
A close-up photograph of a surgeon's face. The surgeon is wearing a blue surgical mask, blue scrubs, and blue protective glasses. They are holding a long, thin surgical instrument, likely a scalpel or probe, in their gloved hand. The background is dark, making the surgeon stand out.

03

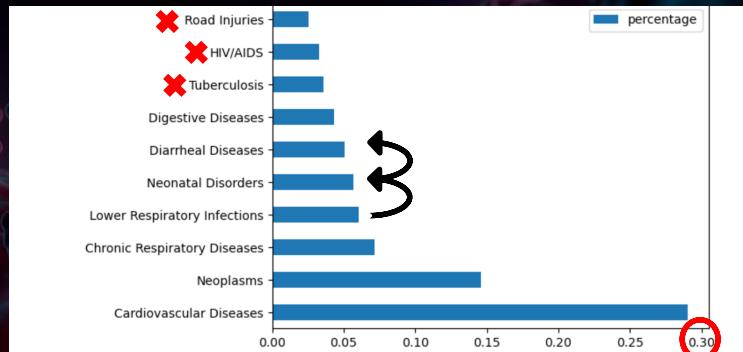
OUR FINDINGS

In depth view of our code with our findings

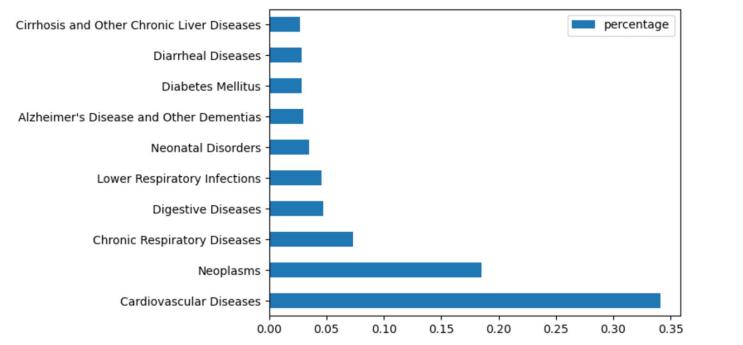
TOP 10 CAUSES OF DEATH: GLOBAL



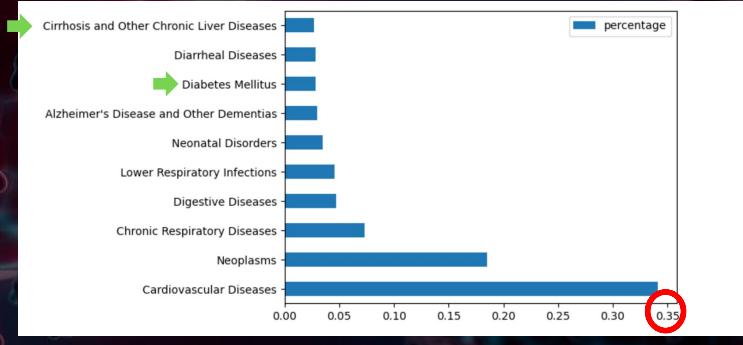
1990



2000



2019



2010

INSIDE THE CODE : RANK CHARTS

1

```
deathcause = pd.read_csv("./cause_of_deaths.csv")
deathcause.drop(["Country/Territory", "Code"], inplace=True, axis=1)
deathcausebyyear = deathcause.groupby("Year").sum()
# groups data by year in rows
```

Groups data by year to observe evolution over time

2

```
deathcausefinal_copy = deathcausefinal.copy()
deathcausefinal_copy['rank2019'] = deathcausefinal_copy[1990].rank(ascending=False)
#ranks the causes of death for a given year
deathcausefinal_copy.sort_values(by=1990, axis=0, ascending=False, inplace=True)
#sorts the data based in this ranking
```

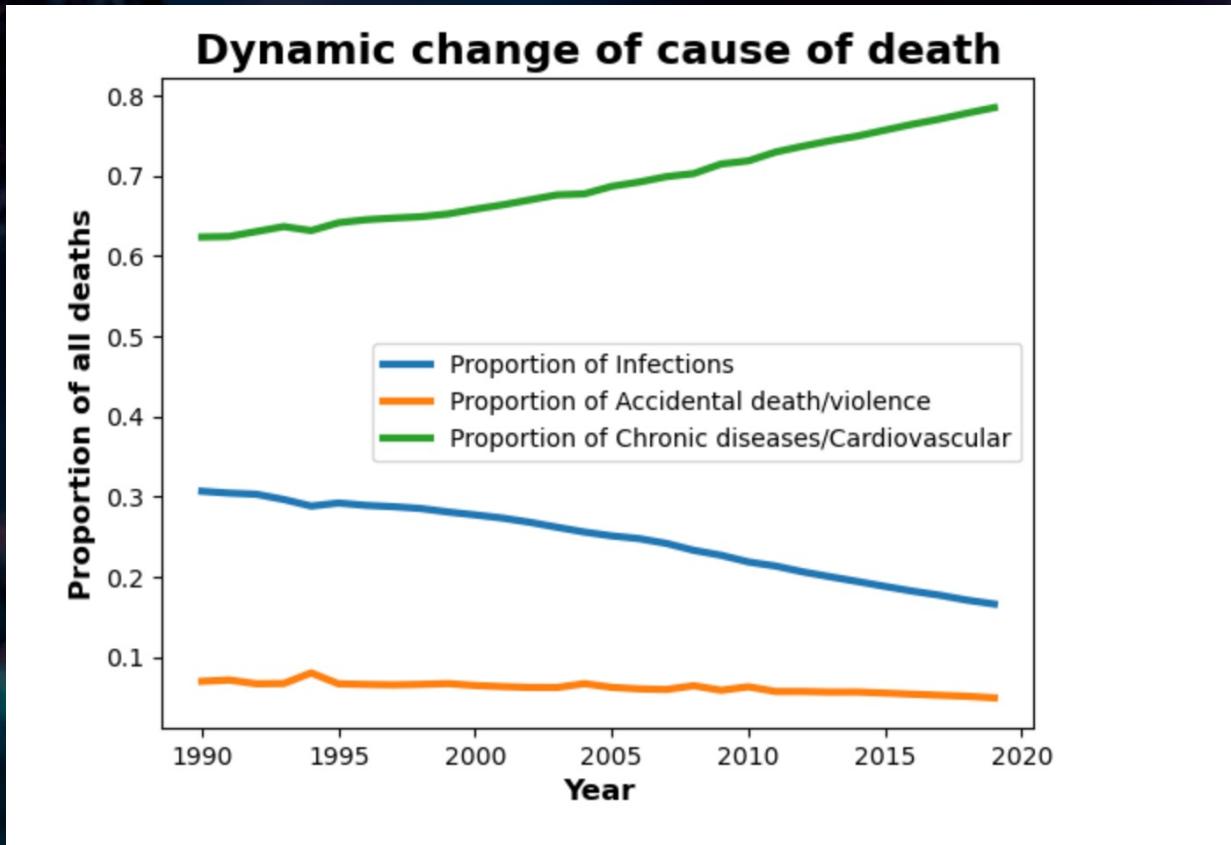
Ranks leading death causes and sorts them

3

```
deathcause_used = deathcausefinal_copy.head(10)
ax = deathcause_used.plot.barh(y="percentage")
#plots the horizontal bar chart
```

Plots the horizontal bar chart for a given year

EVOLUTION OF DEATH CAUSES



INSIDE THE CODE : LINE CHARTS

1

```
df['Developing world diseases/infections'] = df['Malaria'] + df['Diarrheal Diseases']
df['Accidental deat/violence']=df['Road Injuries']+df['Drowning']+df['Interpersonal V
df['Chronic diseases/Cardiovascular']=df['Meningitis']+df['Cardiovascular Diseases']+
```

#Death Categories

► Defines three main categories of death causes

2

```
df1['sum']=df1['Developing world diseases/infections']+df1['Accidental deat/violence']+df1['Chronic dis
df1['Proportion of developing world diseases']=df1[['Developing world diseases/infections']]/df1['sum']
df1['Proportion of Accidental death/violence']=df1[['Accidental deat/violence']]/df1['sum']
df1['Proportion of Chronic diseases/Cardiovascular']=df1[['Chronic diseases/Cardiovascular']]/df1['sum']
#Proportions from total count
```

► Determines their weight compared to total death count

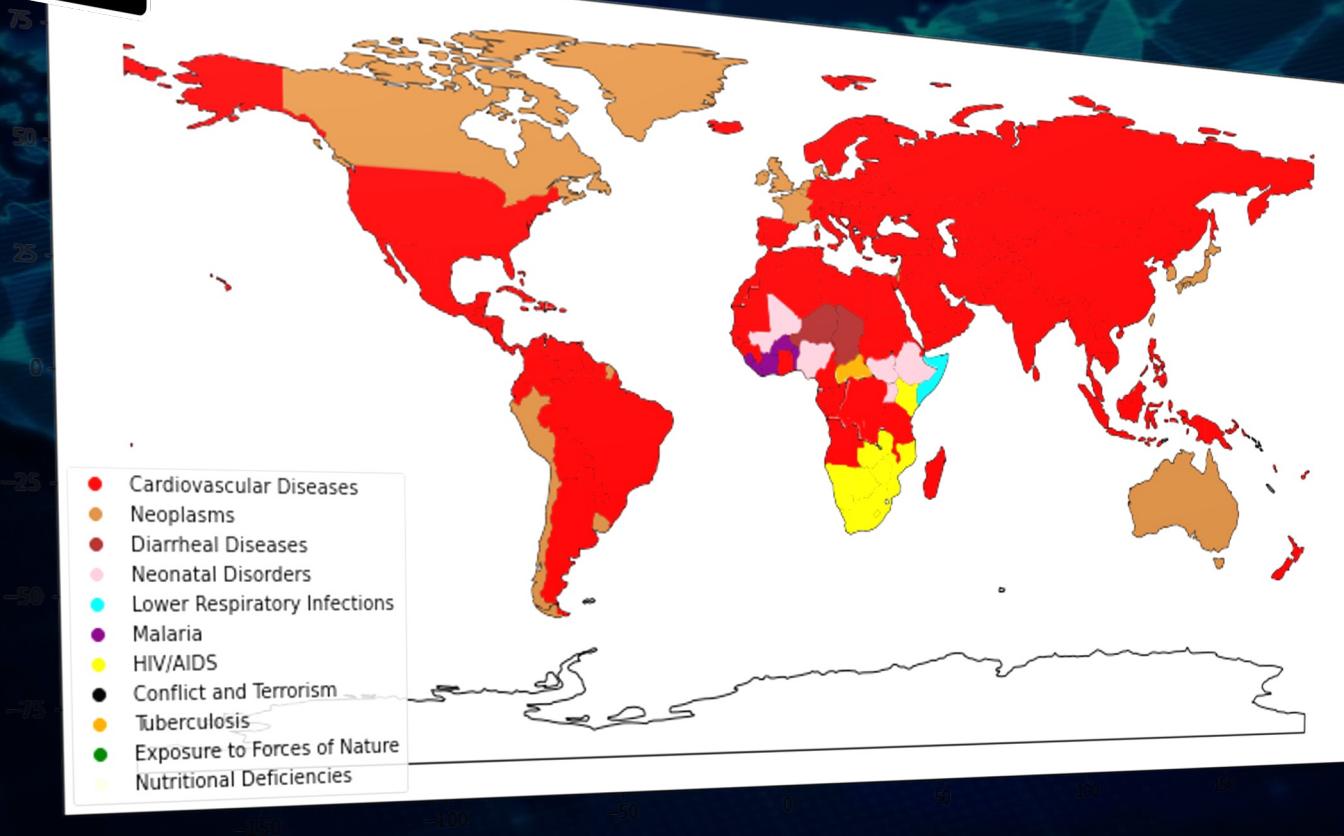
3

```
data1.set_index('Year').plot(linewidth=3);
plt.title('Dynamic change of cause of death',fontsize=17,fontweight='semibold')
plt.ylabel("Proportion of all deaths",fontweight='semibold',fontsize=12)
plt.xlabel("Year",fontweight='semibold',fontsize=12)
plt.show()
#Graph plot all variables against the year
```

► Plot their evolution over time one a line chart

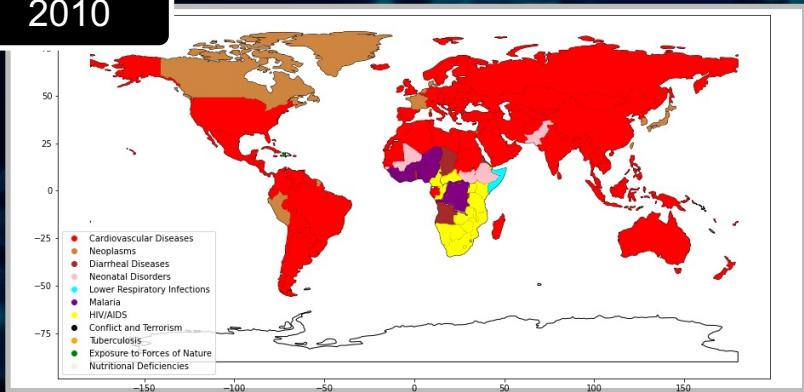
DEATH CAUSES PER COUNTRY (I)

2019

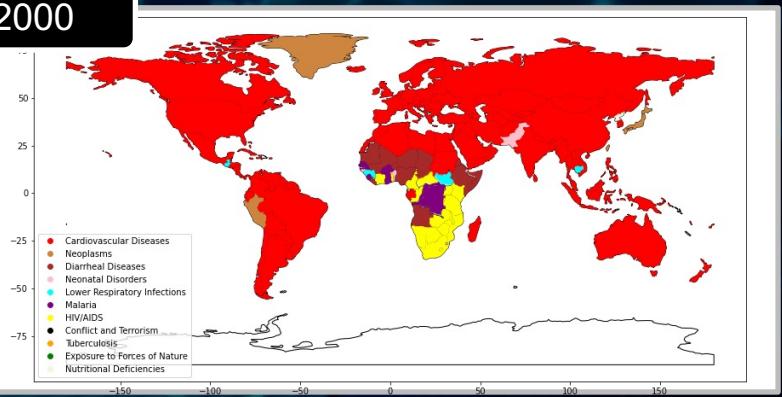


DEATH CAUSES PER COUNTRY (II)

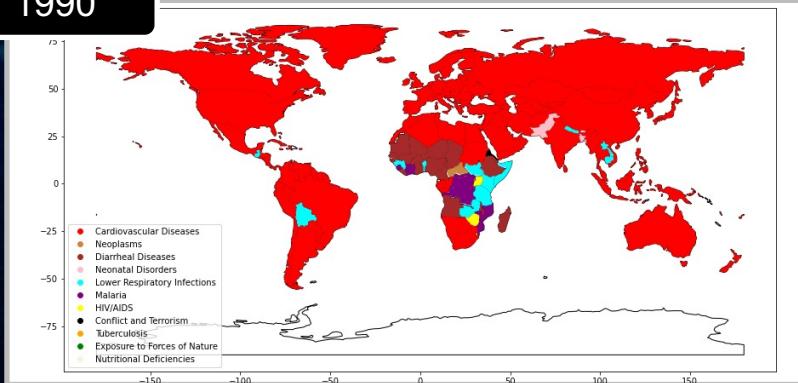
2010



2000



1990



INSIDE THE CODE : COLOR MAP

1

```
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Ranks leading death causes and sorts them

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#plots the horizontal bar chart
```

Plots the horizontal bar chart for a given year

INSIDE THE CODE : PIE CHART

1

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Groups data by year to observe evolution over time

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Ranks leading death causes and sorts them

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Plots the horizontal bar chart for a given year



04

CONCLUSION

Limitations and Further studies

MAIN INSIGHTS



GLOBAL:

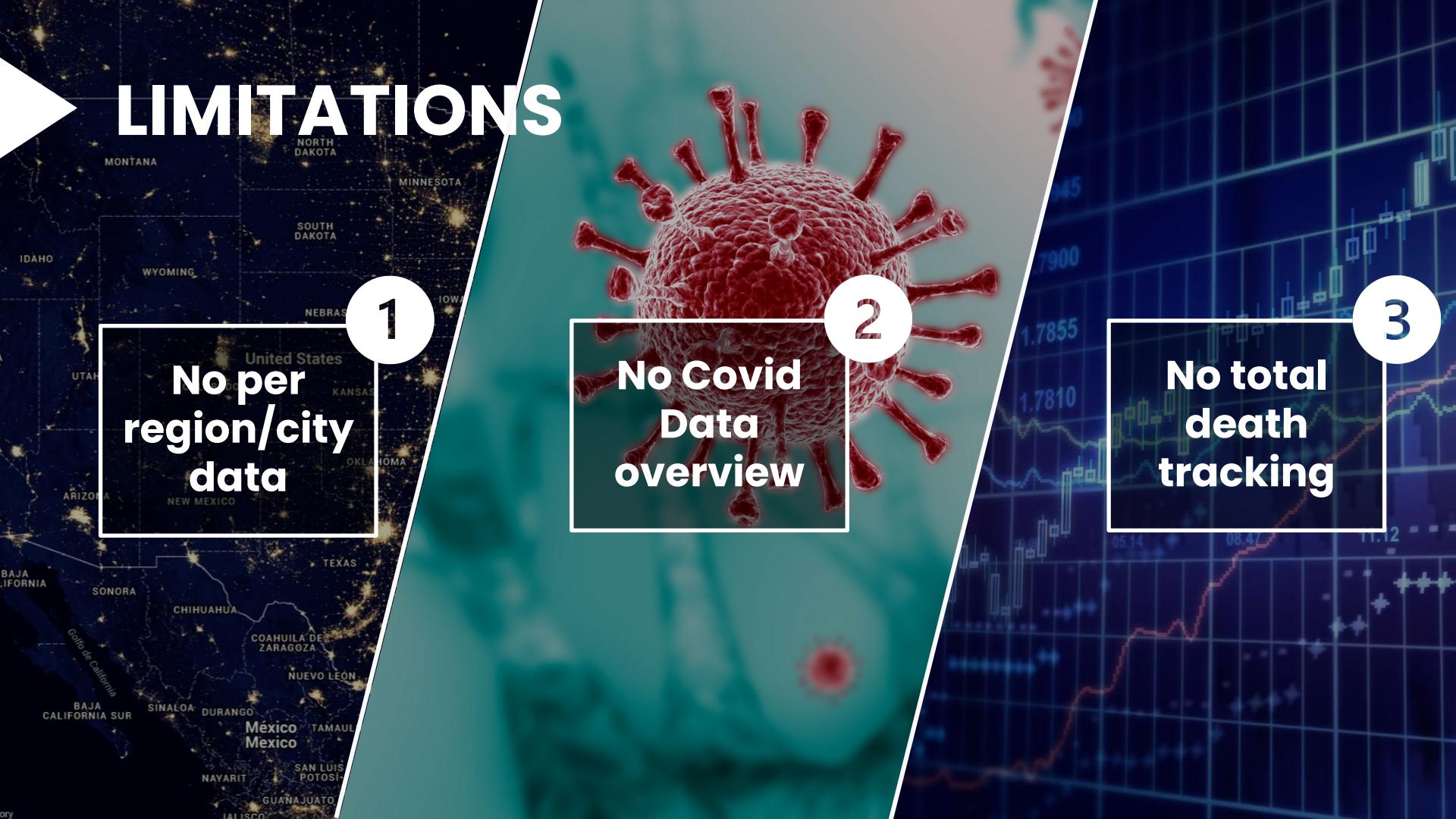
- Increasing number of death due to non-communicable/infectious diseases worldwide due to change in standards of living
- The proportion of deaths due to accidents or violence has remained relatively stable for the past 30 years



REGIONAL:

- Infectious diseases such as HIV still prevail in some LD countries, notably in Africa
- Rising importance of cancer and stroke related death in developed countries

LIMITATIONS



No per
region/city
data

1

No Covid
Data
overview

2

No total
death
tracking

3

FURTHER STUDIES



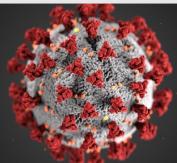
CAUSALITY STUDY :

- Study relation between change in food diet and type of leading death cause



PREDICTIVE STUDY :

- Perform a regression to see which trends will dominate leading death causes in the future



COVID IMPACT STUDY :

- Study the influence of COVID 19 on total death and deaths due to infectious respiratory diseases



**THANK
YOU!**