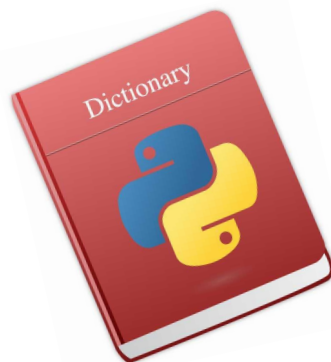




Analysis on Causes of Death in the United States

ECE 143 Group 15
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Ye Gao
Yuhan Zhang



Objective and Motivation

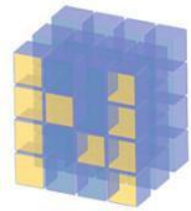
- Mortality is one of the healthcare outcome measurements
- To measure the quality of healthcare
- To evaluate how diseases/non-diseases affect the life expectancy over the variables

- ❖ The visualization of datasets are required
- ❖ The analysis would be useful to understand the leading causes of death, and help to choose good life styles in the future.



Data collection

- ❖ Dataset scraped from worldlifeexpectancy.com using Beautiful Soap
 - ◇ Including number of death of each state, cause, gender and age range.
 - 7 age ranges
 - 2 genders.
 - 51 states and their population.
 - 77 causes for the death
- ❖ The modules are used to manipulate and visualize data:



NumPy



SQLite

Pandas



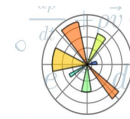
bokeh



Seaborn



plotly



matplotlib

Data process

- ❖ Clean data
- ❖ Organize data by age, gender and state
 - Search data in the health system (build-up by python)

Health System

Please input your age and gender, and the state you are living in to get health advice.

Age:

Gender:

State:

Health System

Please input your age and gender, and the state you are living in to get health advice.

Age:

Gender:

State:

Health System

Showing below are top 5 death causes for females of age 55 living in California in 2017

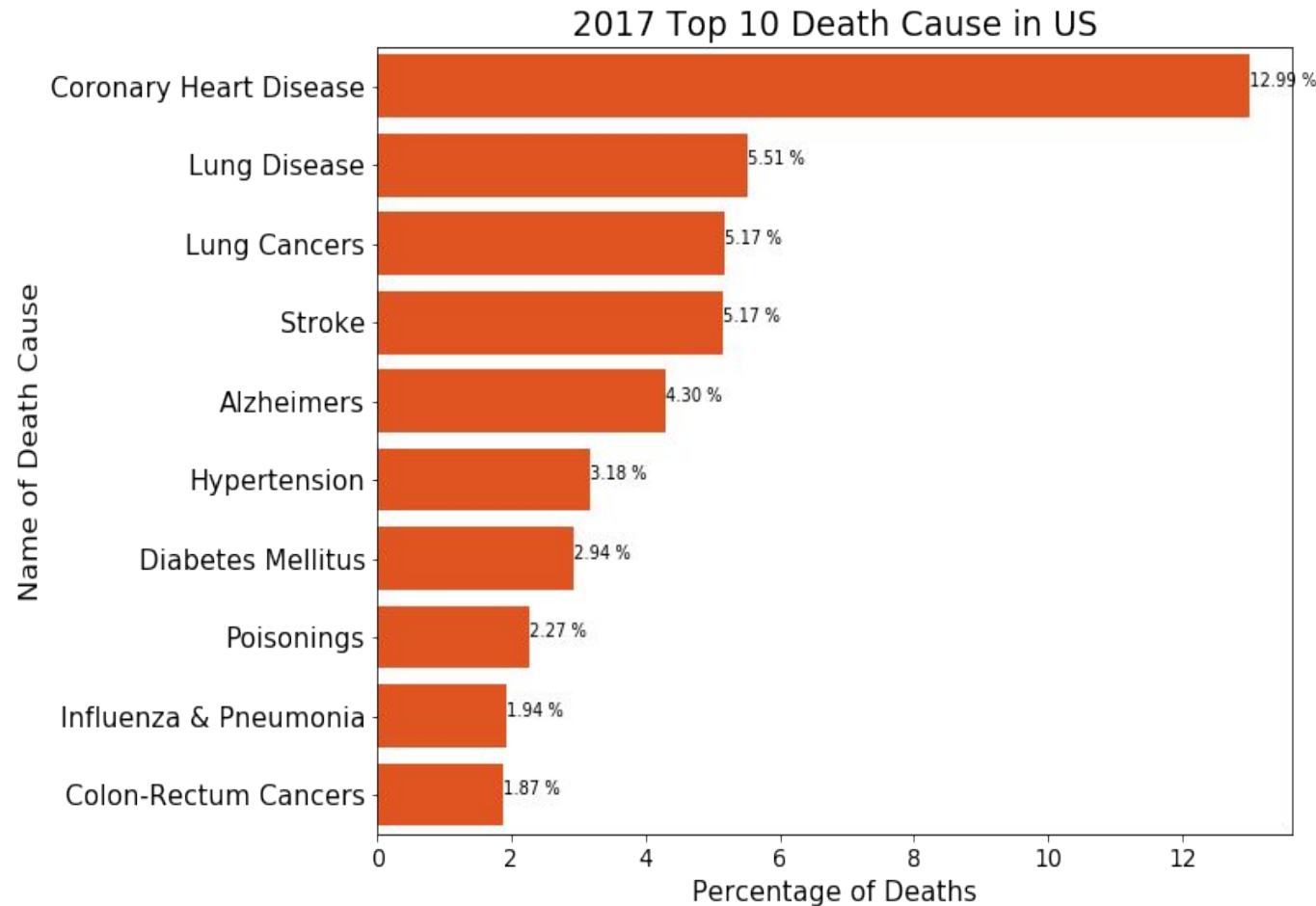
	cause_of_death	death_rate	death_number
0	Coronary Heart Disease	0.000506	1240.0
1	Breast Cancer	0.000416	1019.0
2	Lung Cancers	0.000344	843.0
3	Diabetes Mellitus	0.000246	603.0
4	Liver Disease	0.000227	557.0

Data visualization

Top 10 leading causes of death in the US

In 2017,

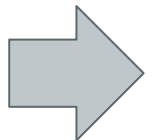
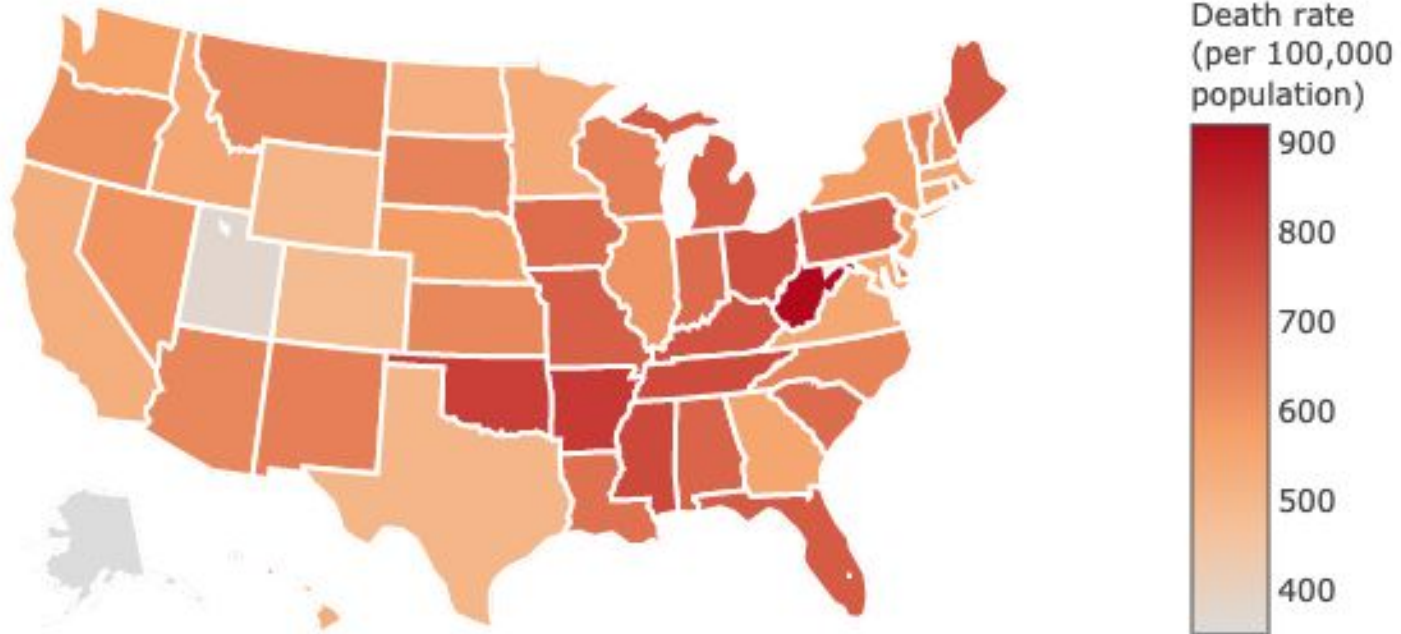
- ❖ 2,026,562 out of 2,813,503 deaths have specific causes, making a percentage of 72%
- ❖ Life expectancy for the U.S. population declined to 78.6 years.



Source: Centers for Disease Control and Prevention

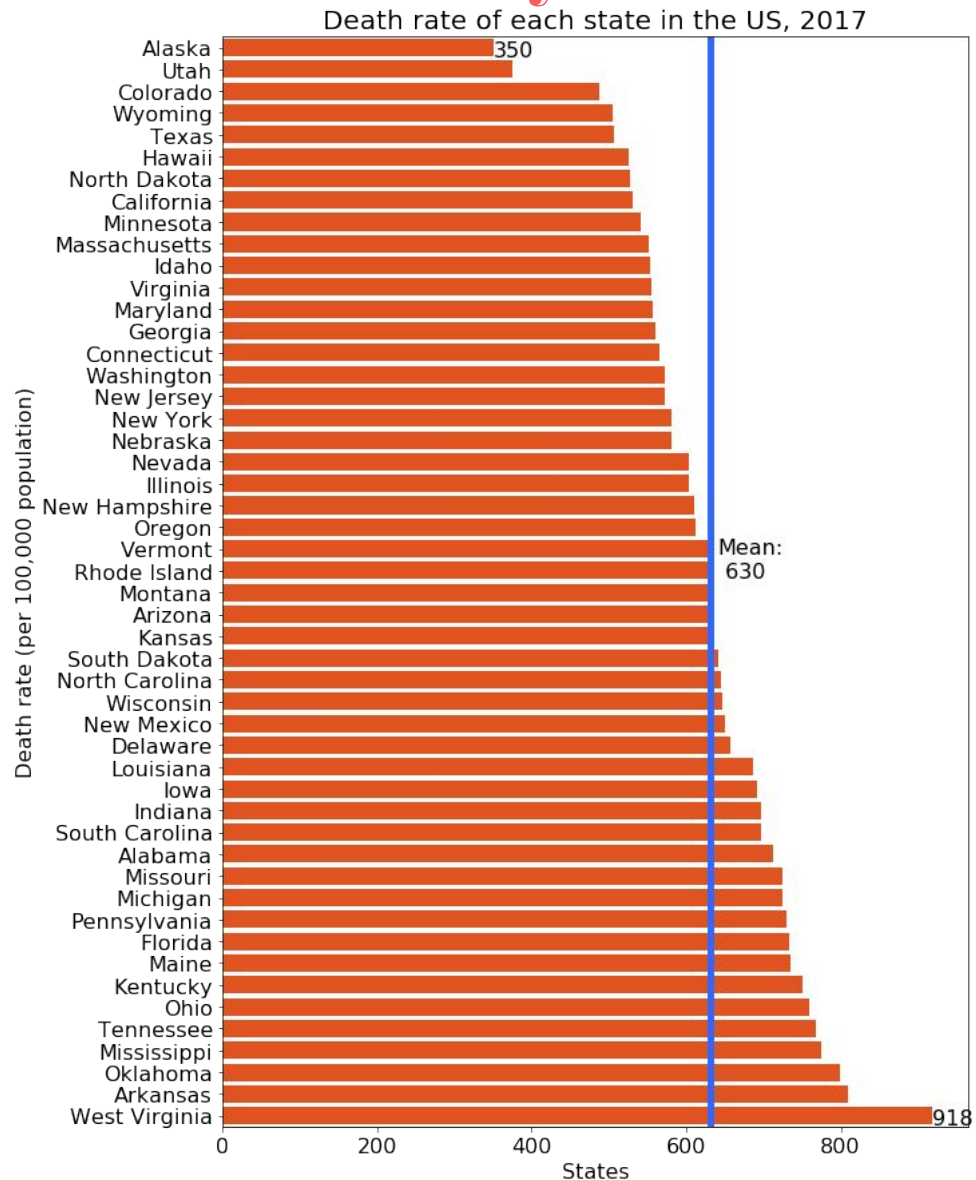
The highest and lowest mortality state in the US

Death rate of each state in the US, 2017



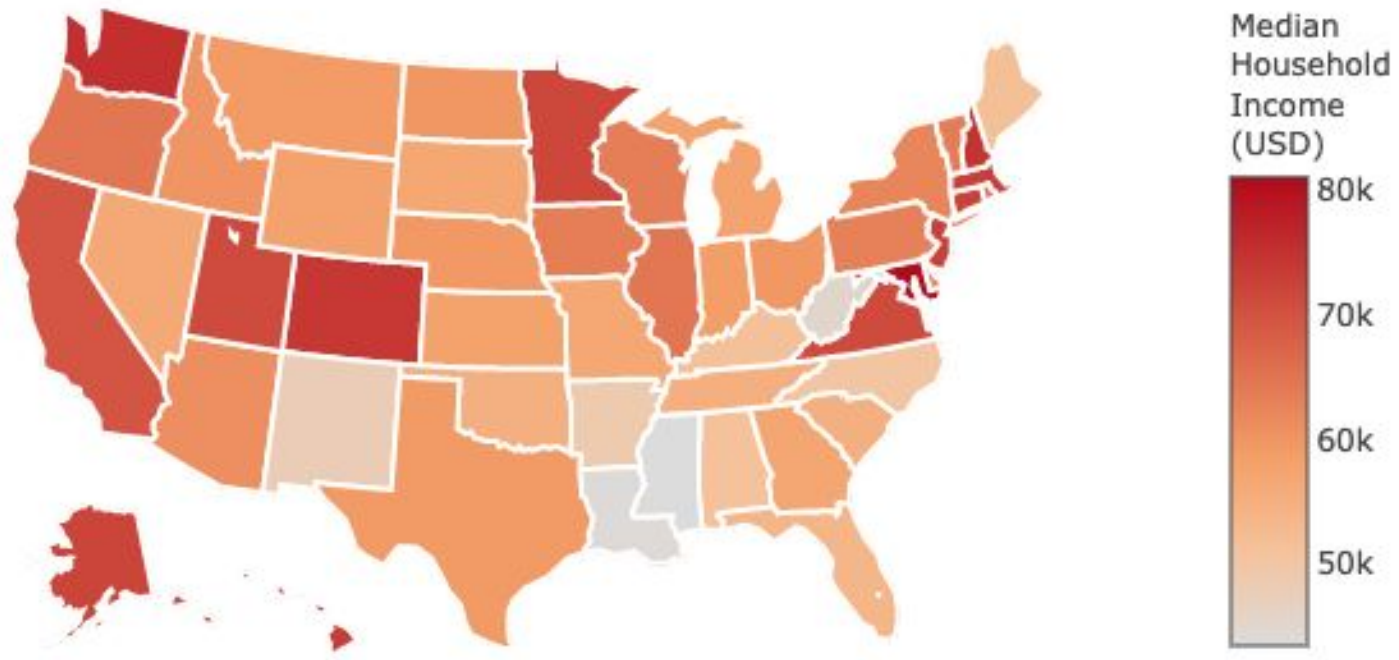
The highest and lowest mortality state in the US

- ❖ West Virginia has the highest death rate.
- ❖ Alaska has the lowest death rate.
- ❖ The average death rate of the United States in 2017 is 630 per 100,000 population.

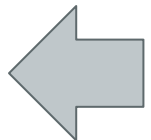


Is there any relationship between income and death rate?

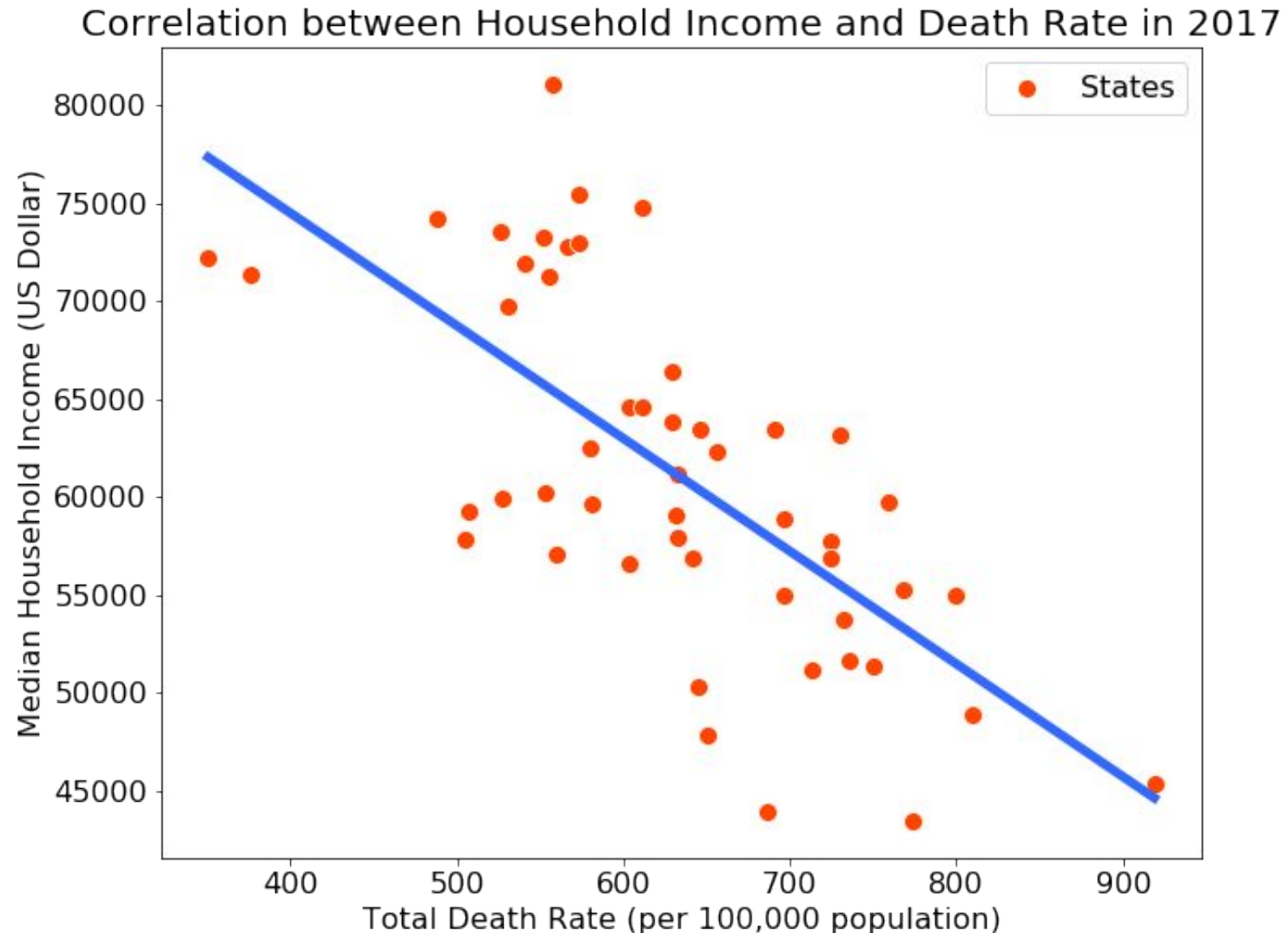
Median household income of each state in the US, 2017



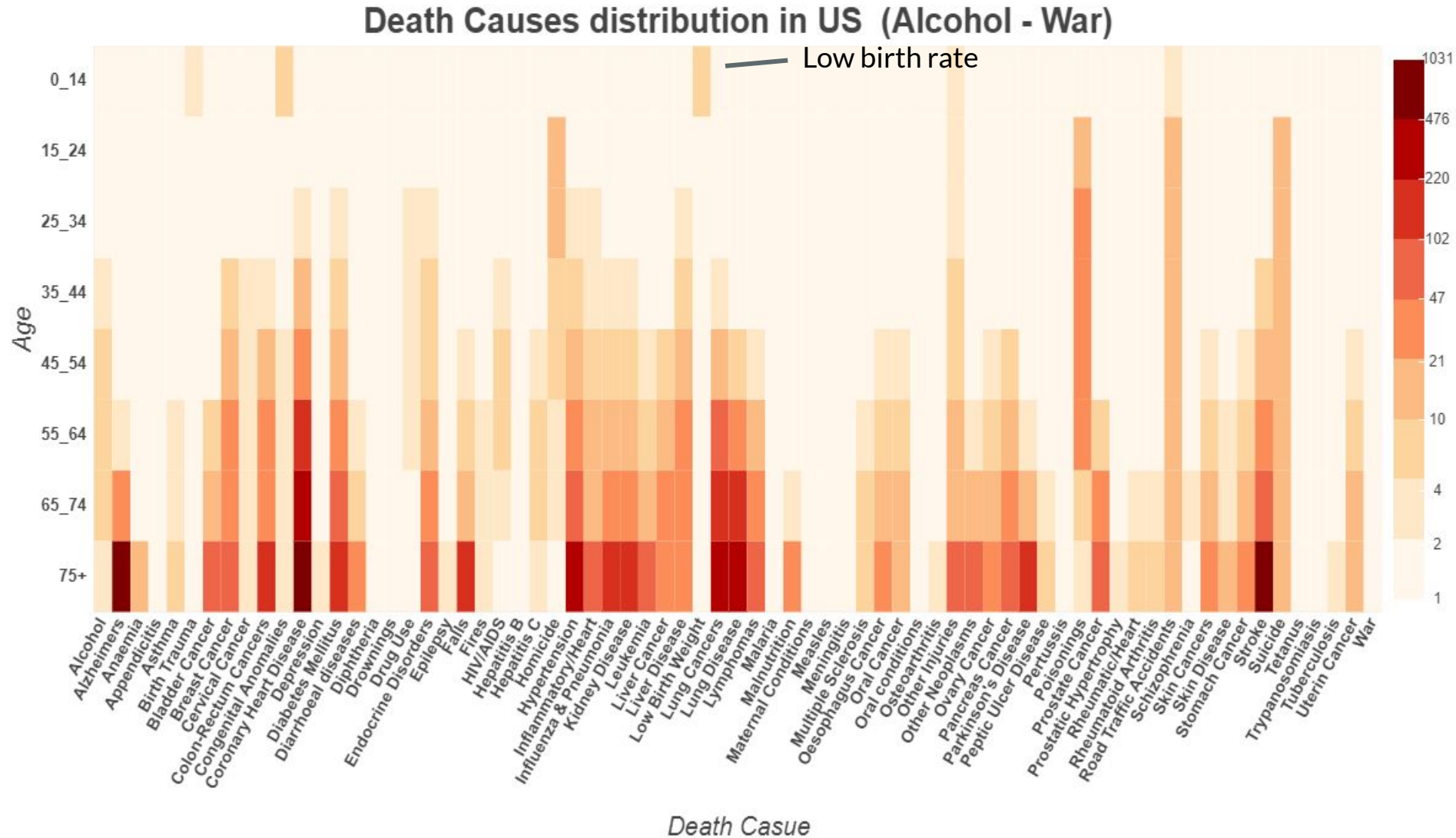
Source of data: U.S. Census Bureau, Current Population Survey, Annual Social and Economic Supplements



Is there any relationship between income and death rate?



What are the age-related death cause in the US?



What are the age-related death causes in the US?

By looking at the columns of the heatmap in the previous slide, we can divide the death causes into two categories:

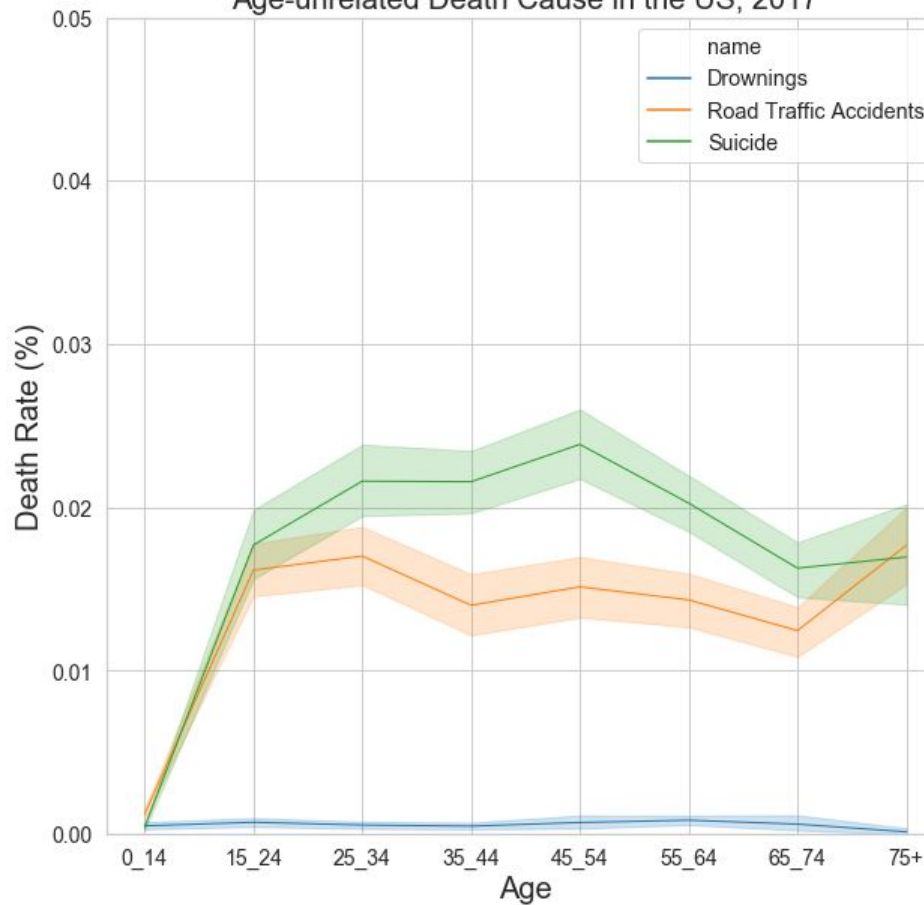
- ❖ Death causes not correlated to age.
- ❖ Death causes correlated to age.

We can further divide death causes correlated to age into 3 categories:

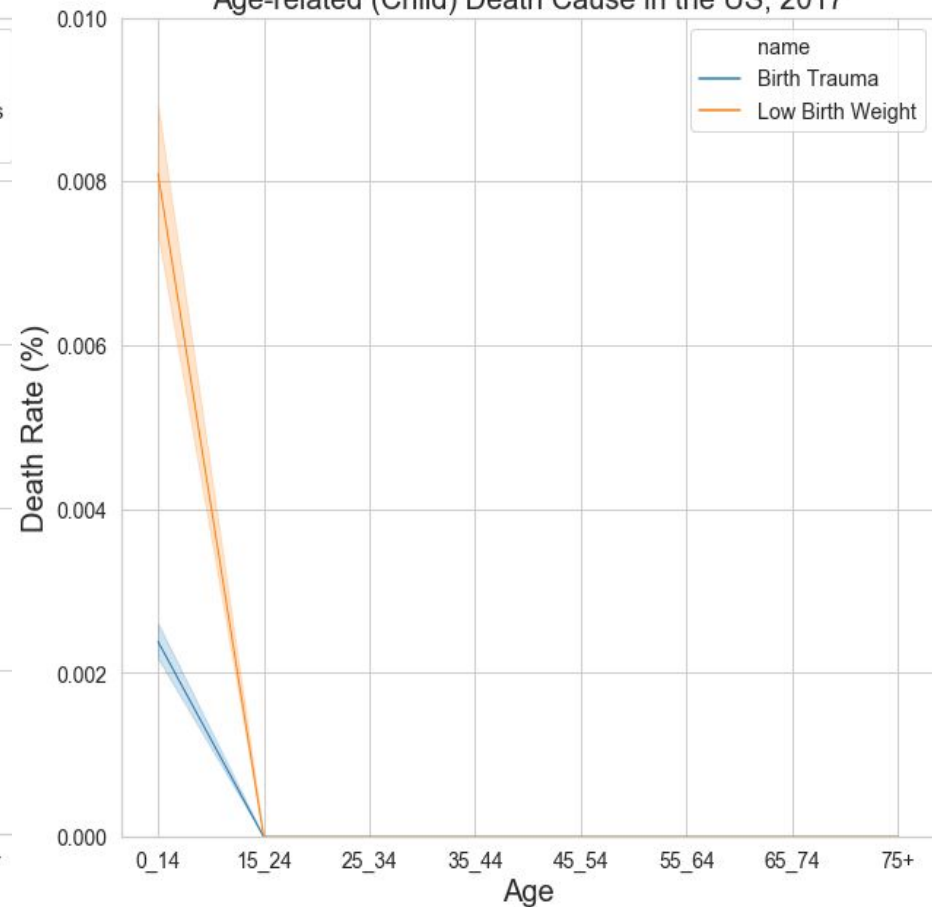
- ◇ Child
- ◇ The Middle-aged
- ◇ The Elderly

What are the age-related death causes in the US?

Age-unrelated Death Cause in the US, 2017

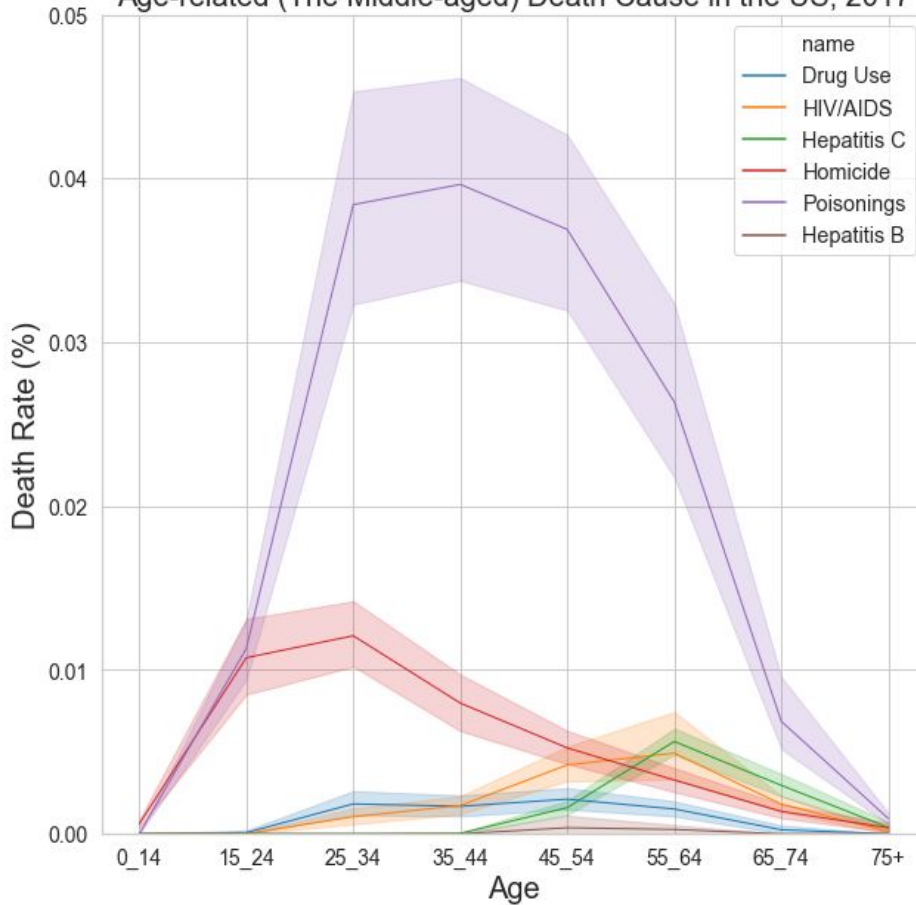


Age-related (Child) Death Cause in the US, 2017

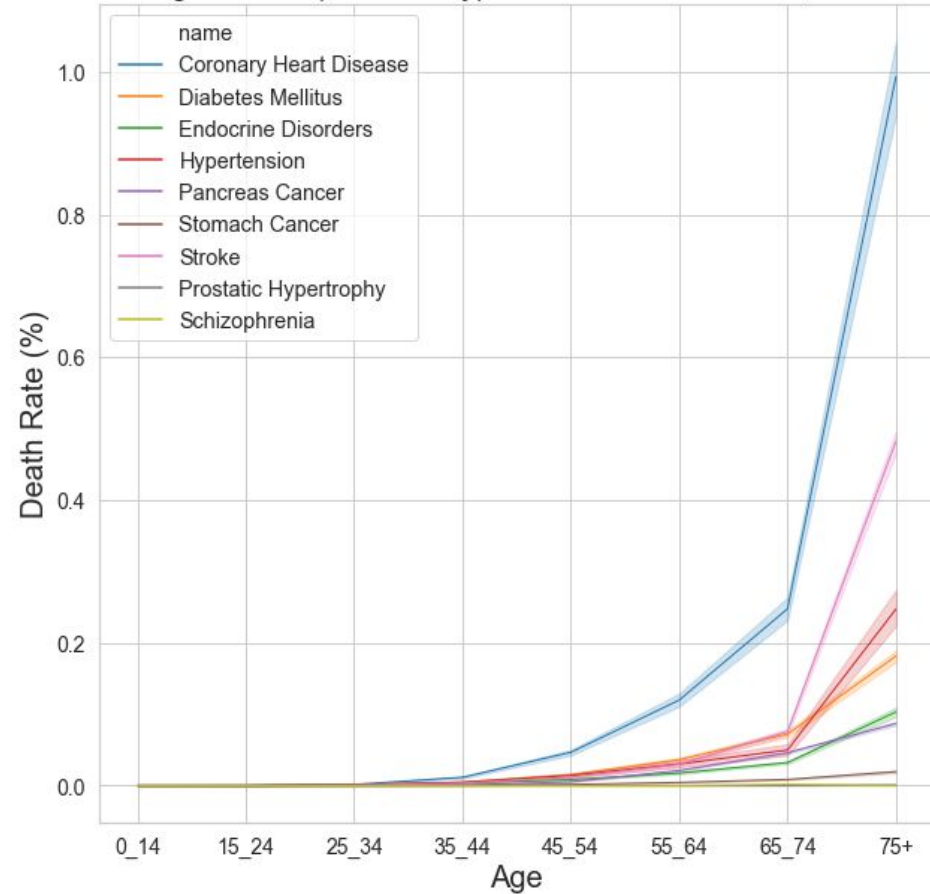


What are the age-related death causes in the US?

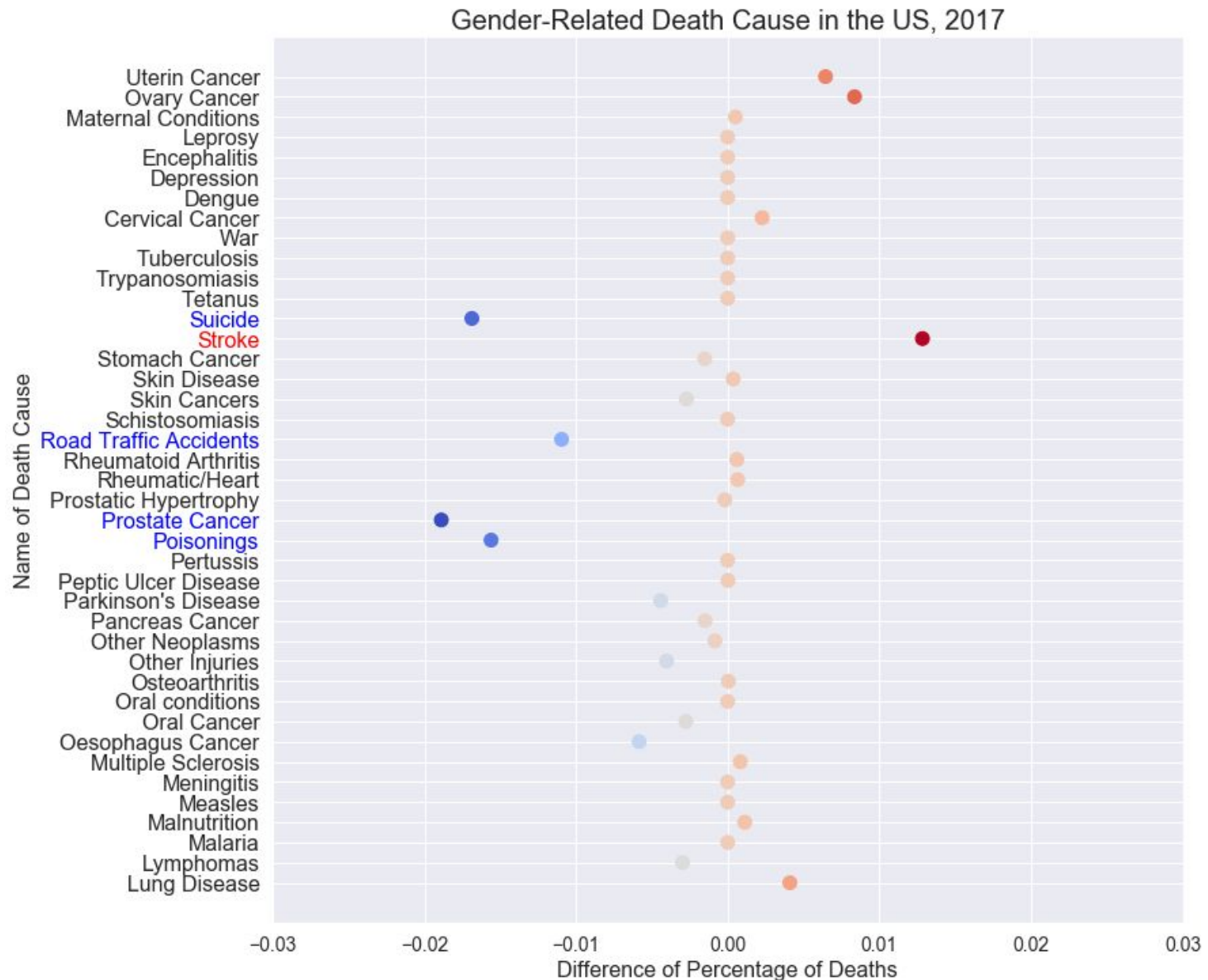
Age-related (The Middle-aged) Death Cause in the US, 2017



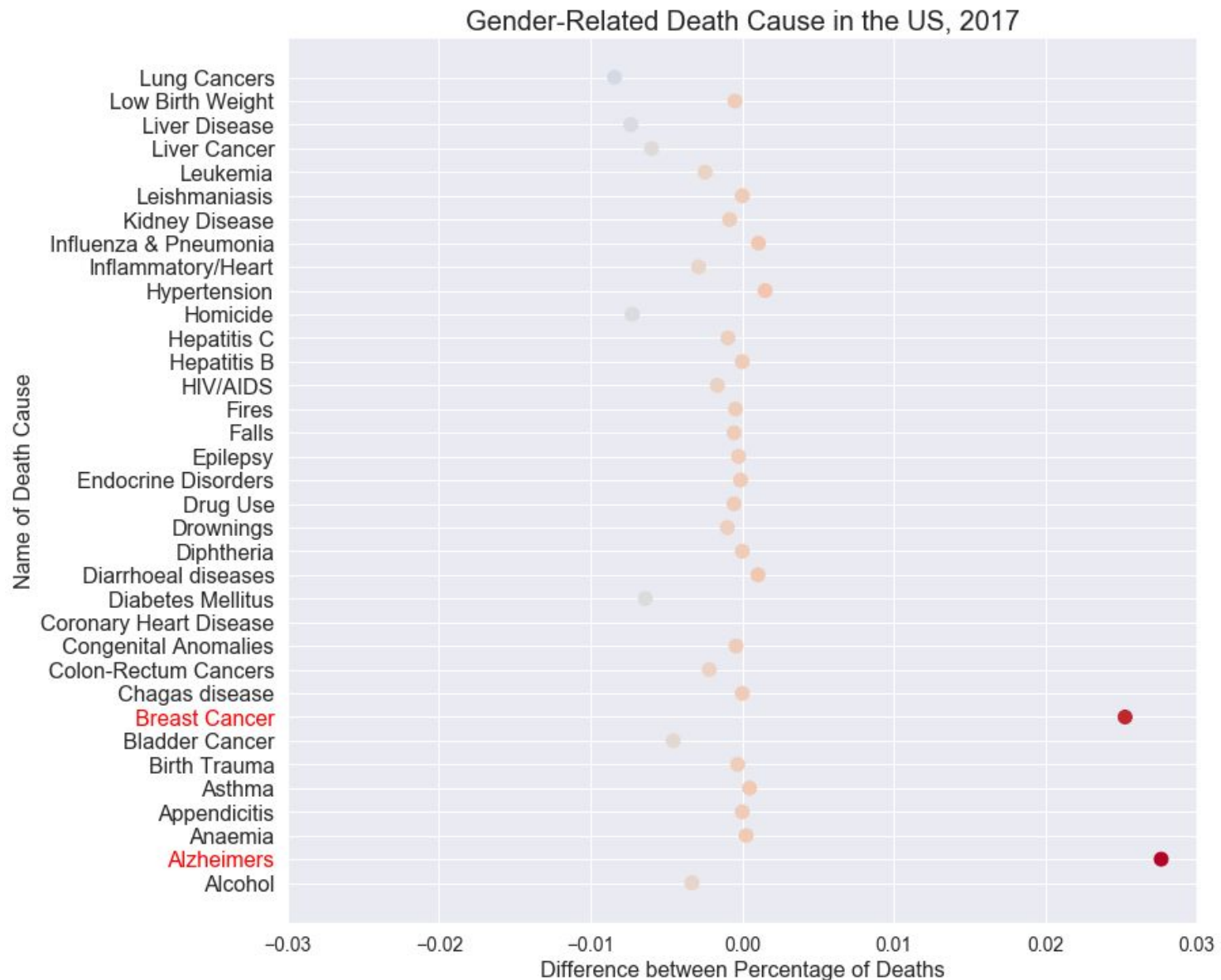
Age-related (The Elderly) Death Cause in the US, 2017



What are the gender-related death causes in the US?



What are the gender-related death causes in the US?



What are the gender-related death causes in the US?

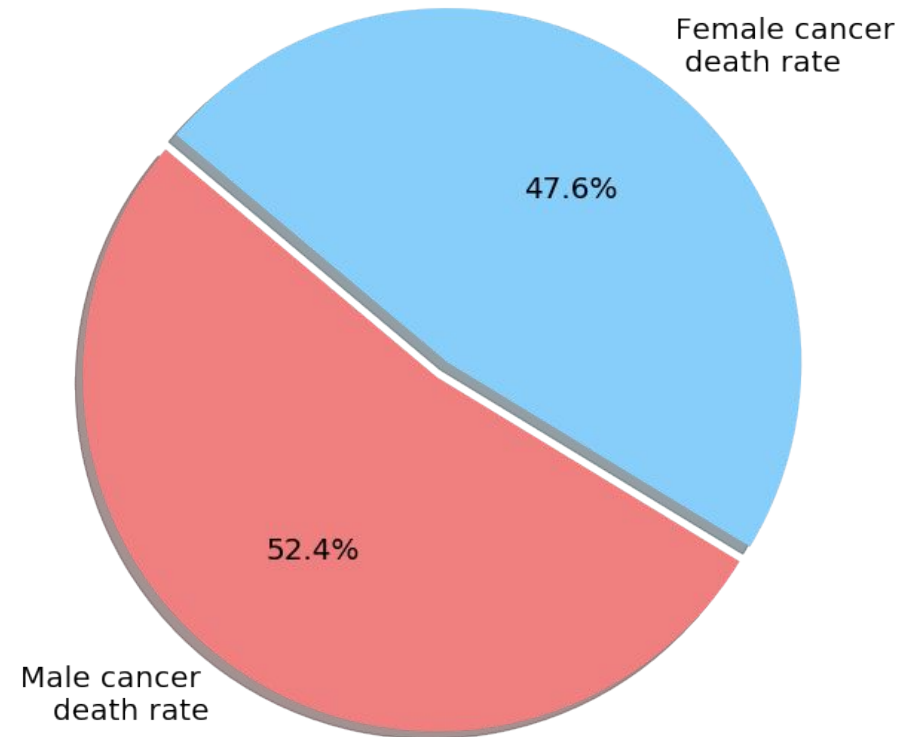
Male-related	Female-related
Suicide Road Traffic Accidents Prostate Cancer Poisonings	Stroke Breast Cancer Alzheimer's Uterine Cancer Ovary Cancer

Cancer death rate between male and female in the US

Types of Cancer diseases:

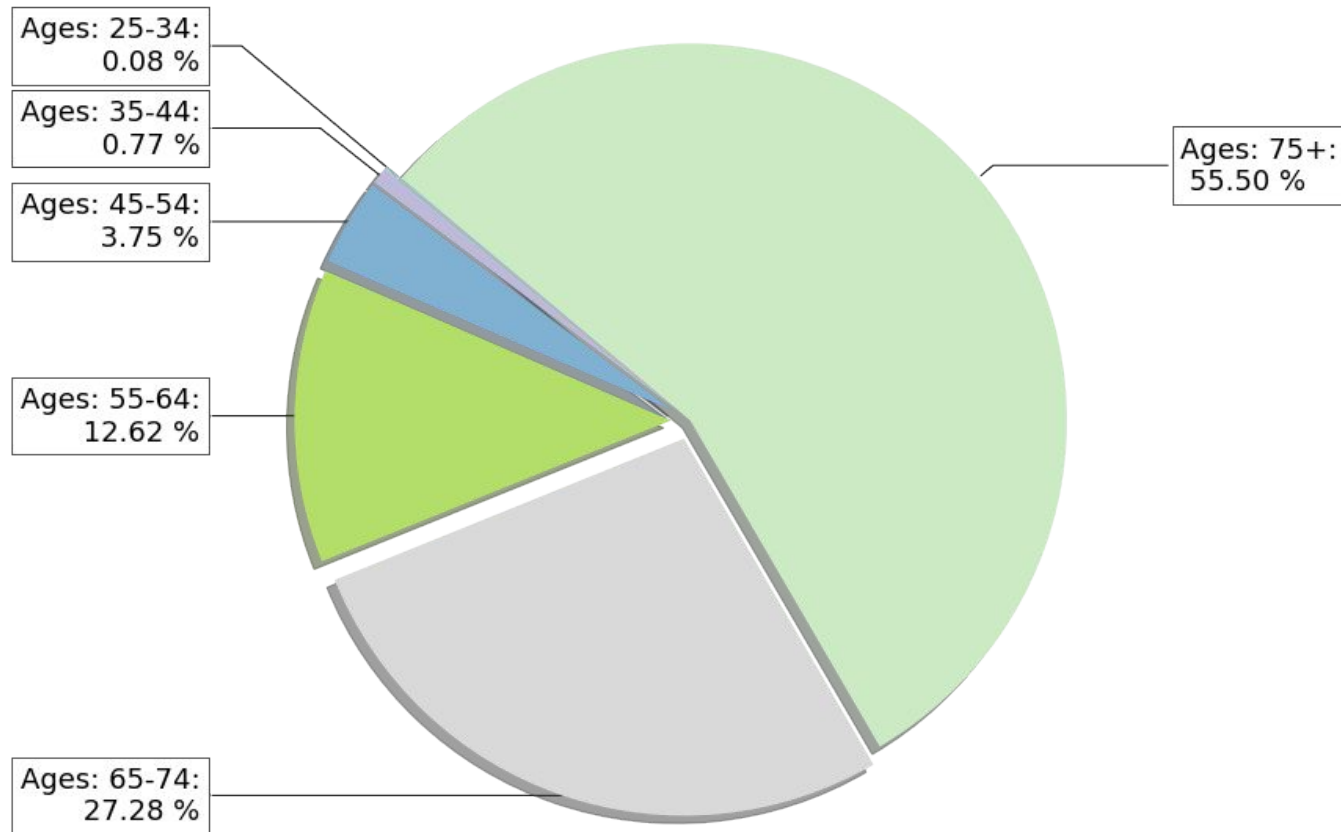
- ❖ Bladder cancer
- ❖ Colon-Rectum Cancers
- ❖ Liver Cancer
- ❖ Lung Cancer
- ❖ Oesophagus Cancer
- ❖ Oral Cancer
- ❖ Pancreas Cancer
- ❖ Prostate Cancer
- ❖ Skin Cancer
- ❖ Stomach Cancer
- ❖ Breast Cancer

Cancer disease death rate (Male vs Female) in 2017



Cancer death rate among different ages in the US

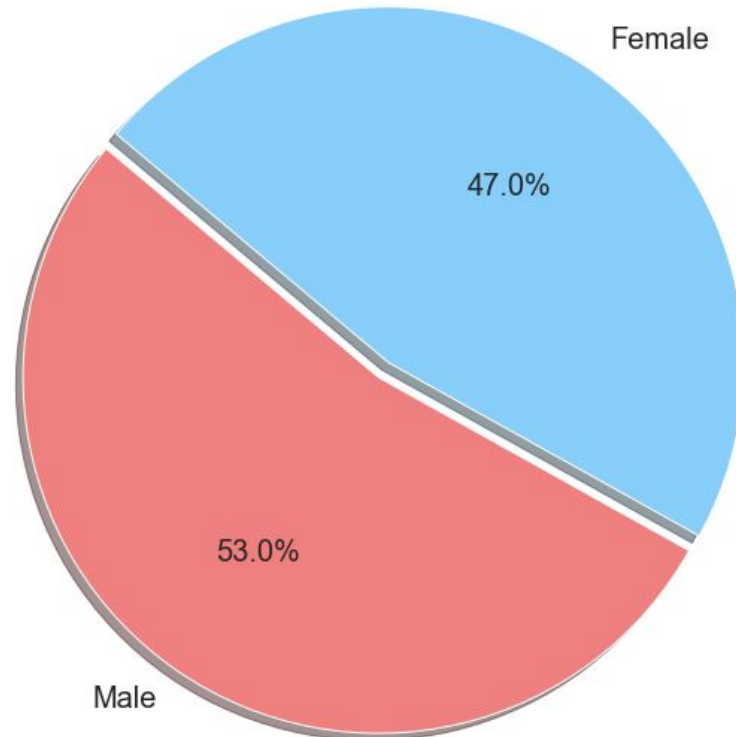
Cancer disease death rate based on different age range in 2017



Case Study: Comparison between male and female in CA

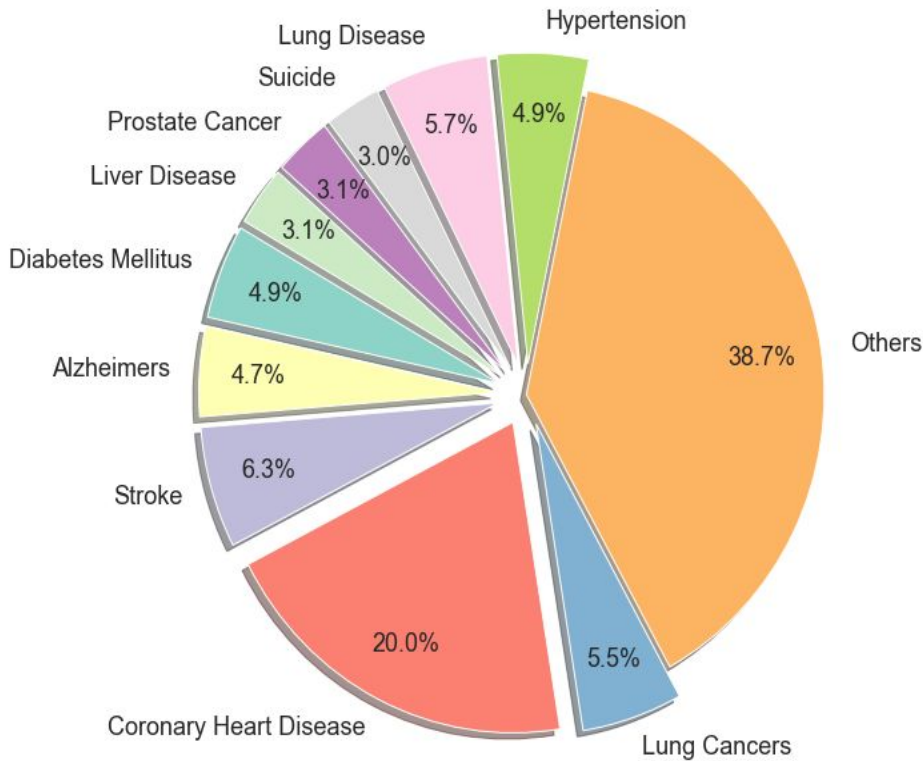


Death Rate (Male vs Female) in California, 2017

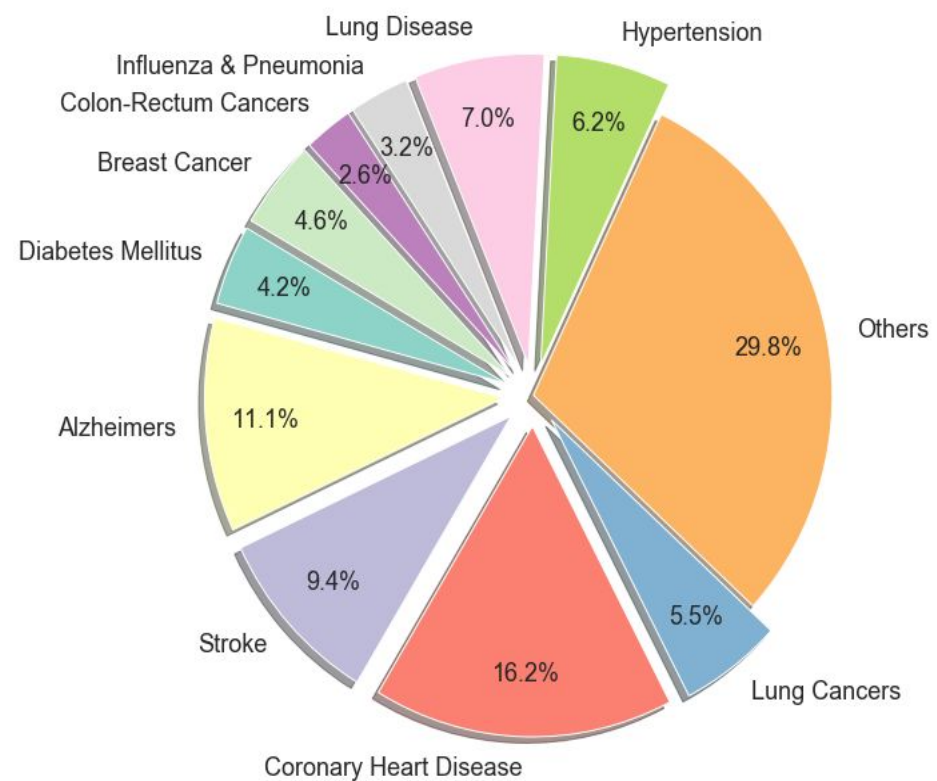


Case Study: Comparison between male and female in CA

Top 10 Death Causes (Male) in California, 2017

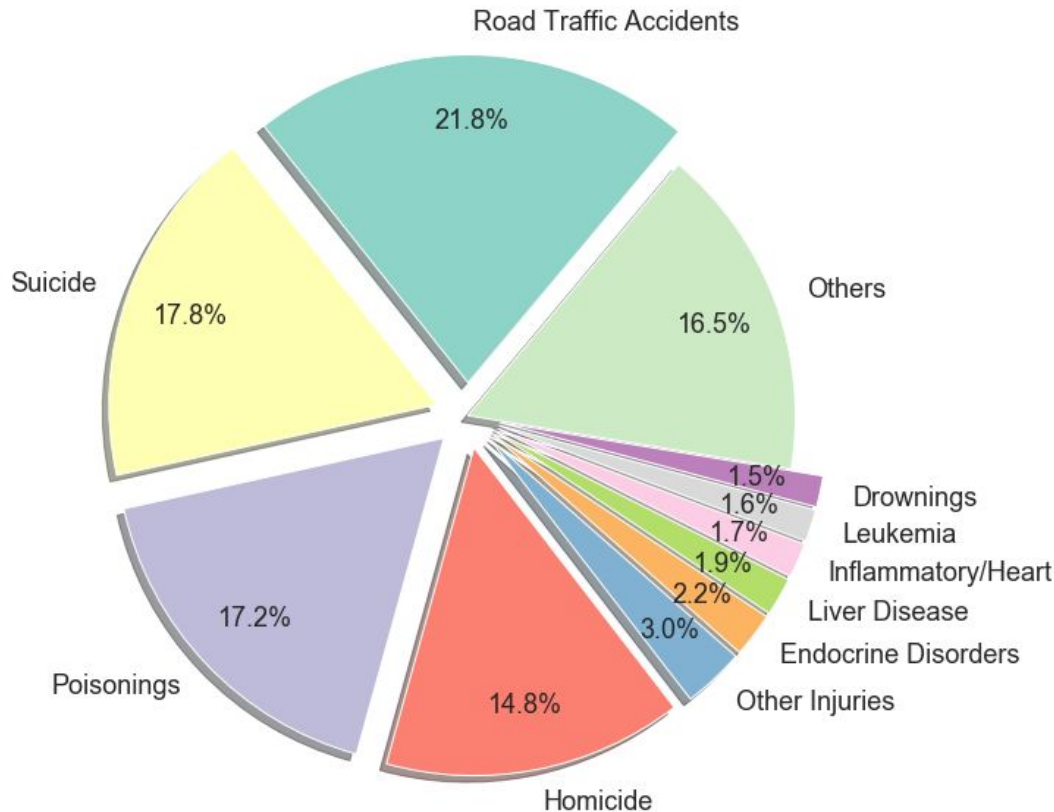


Top 10 Death Causes (Female) in California, 2017



Case Study: Comparison among different ages in CA

Top 10 Death Causes (Male & Female, 15-34) in California, 2017



In Adolescence and early adulthood, people should care more about **Road Traffic Safety** and **Mental Conditions**.

Summary

- Python is very popular for scientists to visualize and analyze the statistic data.
- The overall death rate is negatively correlated to income.
- The death rate of different causes of death are related to different factors. Age, gender etc.

Thank You

