Century of Death

# Background & Purpose - The 100+ years of California mortality project seeks to:

* The 100+ years of California mortality project seeks toGather and standardize/sort data concerning California mortality from 1990 to present day
* Analyze this data in order to identify patterns and create tools that will empower public health professionals to make more informed decisions.
* Present the results of this project with useful visualizations (bar graphs, trend plots, etc.)

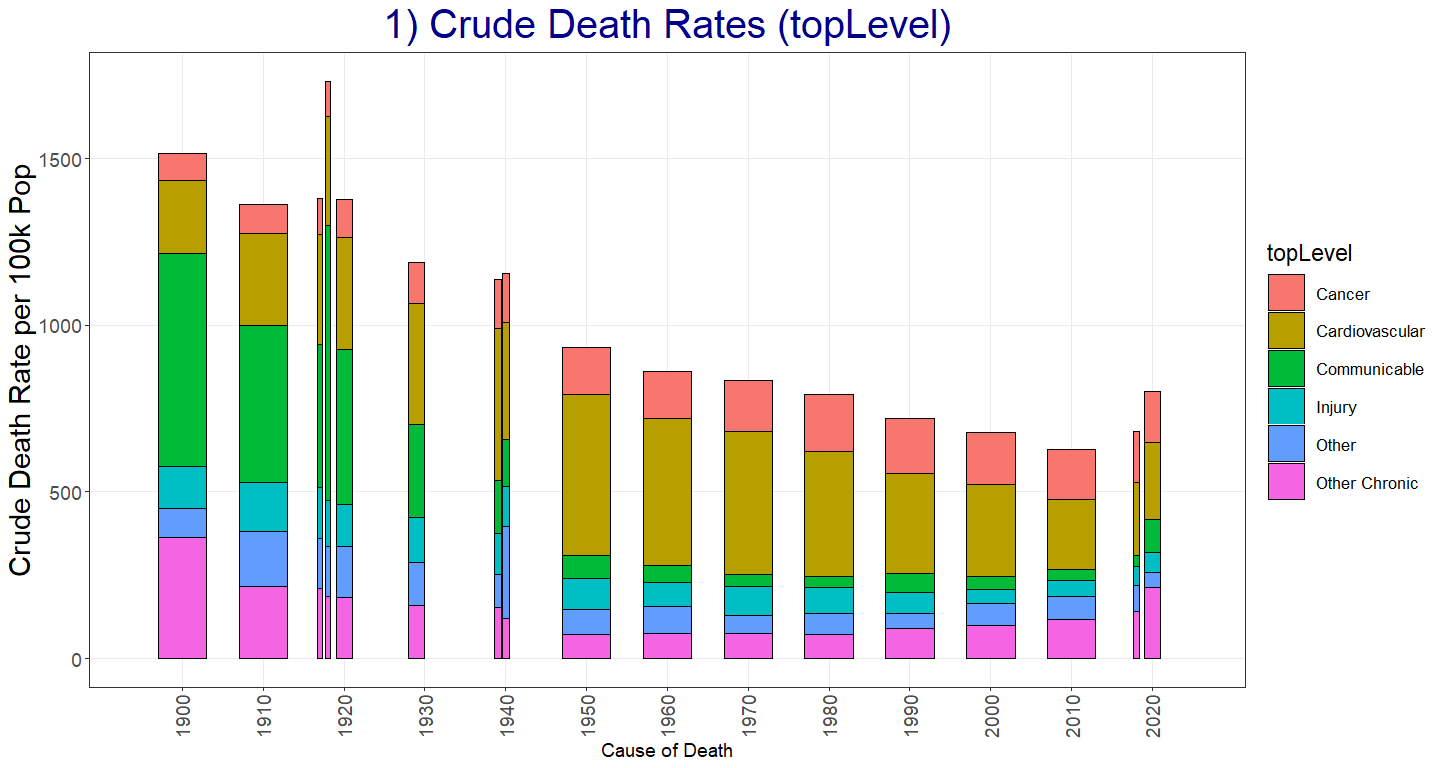
# Methods:

* Data for the years 1900-1990 was extracted from historical vital statisticsreports published by the CDC National Center for Health Statistics. The data was presented as pdf scans of printed reports, and thus needed to be manually transferred to a digital spreadsheet (e.g., excel). Data for years 2000 and beyond was provided by the CDPH CCB (California Community Burden of Disease and Cost Engine).
* Different years had different names and groupings for diseases, so the data was standardized to allow comparison between years. This standardization involved creating multiple cause groups, each of which contained a set list of diseases maintained across all years. Each disease within a given year was “sorted” into the four cause groups. The cause groups are as follows:
  + specificLevel: This was the most thorough/stratified grouping, and attempted to assign an appropriate name to the mortality cause (many of which had outdated names).
  + troubleshooting: This cause group provided alternative names/classifications to the specificLevel group (many mortality causes, especially those in earlier years, met the criteria for multiple specificLevel classifications).
  + displayLevel: The purpose of this cause group was to group the mortality causes so that they are more relevant/comprehendable to a general audience. Only 17 different classifications are contained in this cause group.
  + topLevel: This is the most condensed cause group and containins only 6 classifications. -Data from the CCB was compared to data obtained for the same years from CDC WONDER in order to verify proper sorting/classification of death causes. -These spreadsheets were then inputted into R to allow for statistical analysis and the development of visual aides.

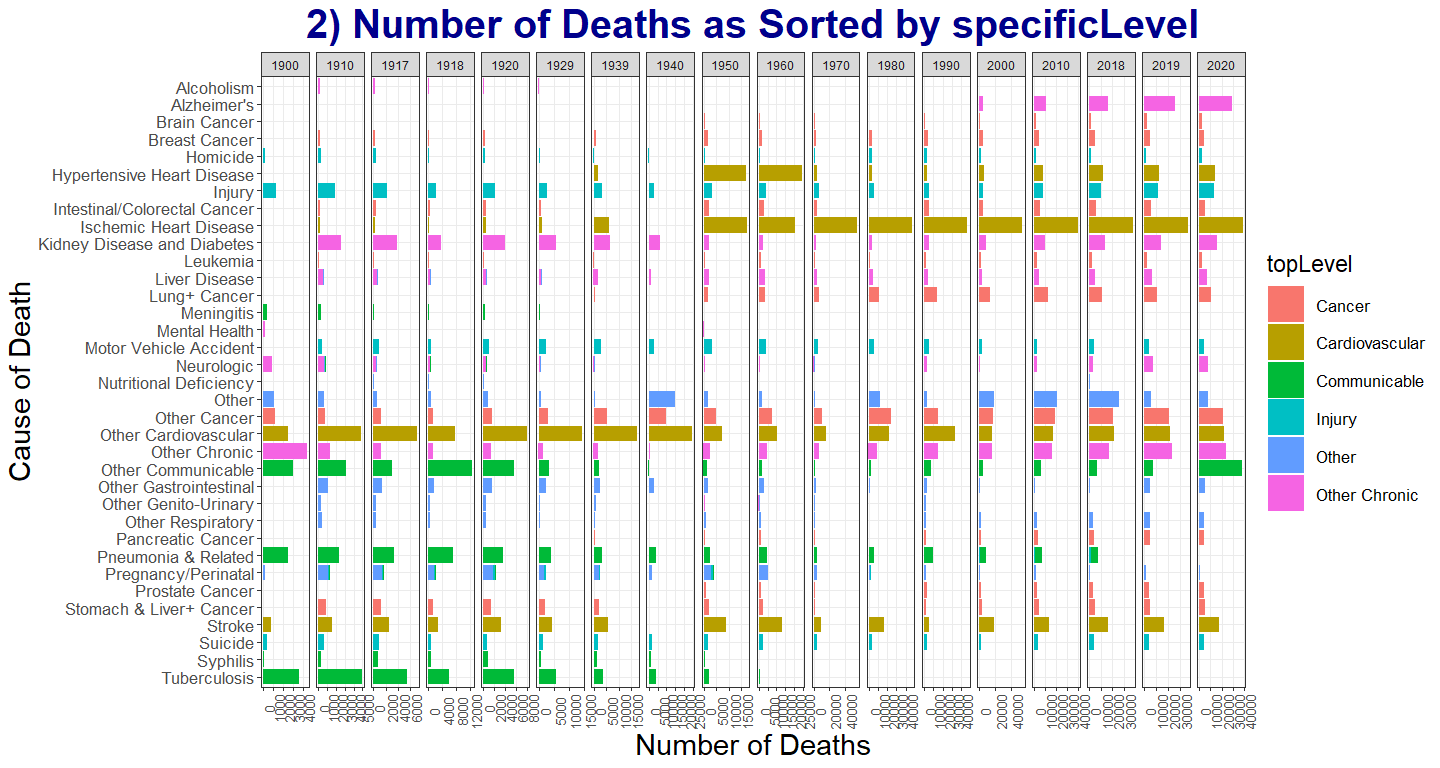
# Selected Findings:

* Since 1900, overall causes of California mortality have shifted from communicable diseases to chronic diseases. More specifically, communicable diseases sharply decreased until around the 1980’s when HIV and drug-resistant strains emerged (see figure 5).
* A significant decrease in death rates has occured (death rate in 1900 was 1,516 deaths per 100,000 individuals, whereas death rate for 2020 was 801 deaths per 100,000 persons). This decrease in death rates can be somewhat attributed to advances in medical care, but perhaps even more important are the strides made through the work of public health professionals.
* The crude death rate plots — particularly the line plots — should be interpreted carefully, as although the crude rate line plot shows that death rates for communicable disease have significantly decreased since the 1900’s, a line plot of the number of deaths since 1900 reveals that though mortality from communicable disease trended downward during the early-mid 20th century, the HIV pandemic (around the 1980’s) caused a surge in communicable disease mortality, as did the COVID-19 pandemic.
* In 1900, the leading cause of death was Tuberculosis, followed by other communicable diseases (primarily communicable respiratory diseases). This is in contrast to the leading causes of death on 2020, where the leading causes of death were mostly chronic diseases (Ischemic heart disease and Alzheimer’s disease), though it should be noted that COVID-19, a communicable disease, was one of the leading causes of death in 2020 (this is a departure from prior years where the leading causes of death were mainly chronic in nature).
* The COVID-19 pandemic, similar to the HIV pandemic, shows that communicable diseases are here to stay and can cause immense death, morbidity, and economic damage.

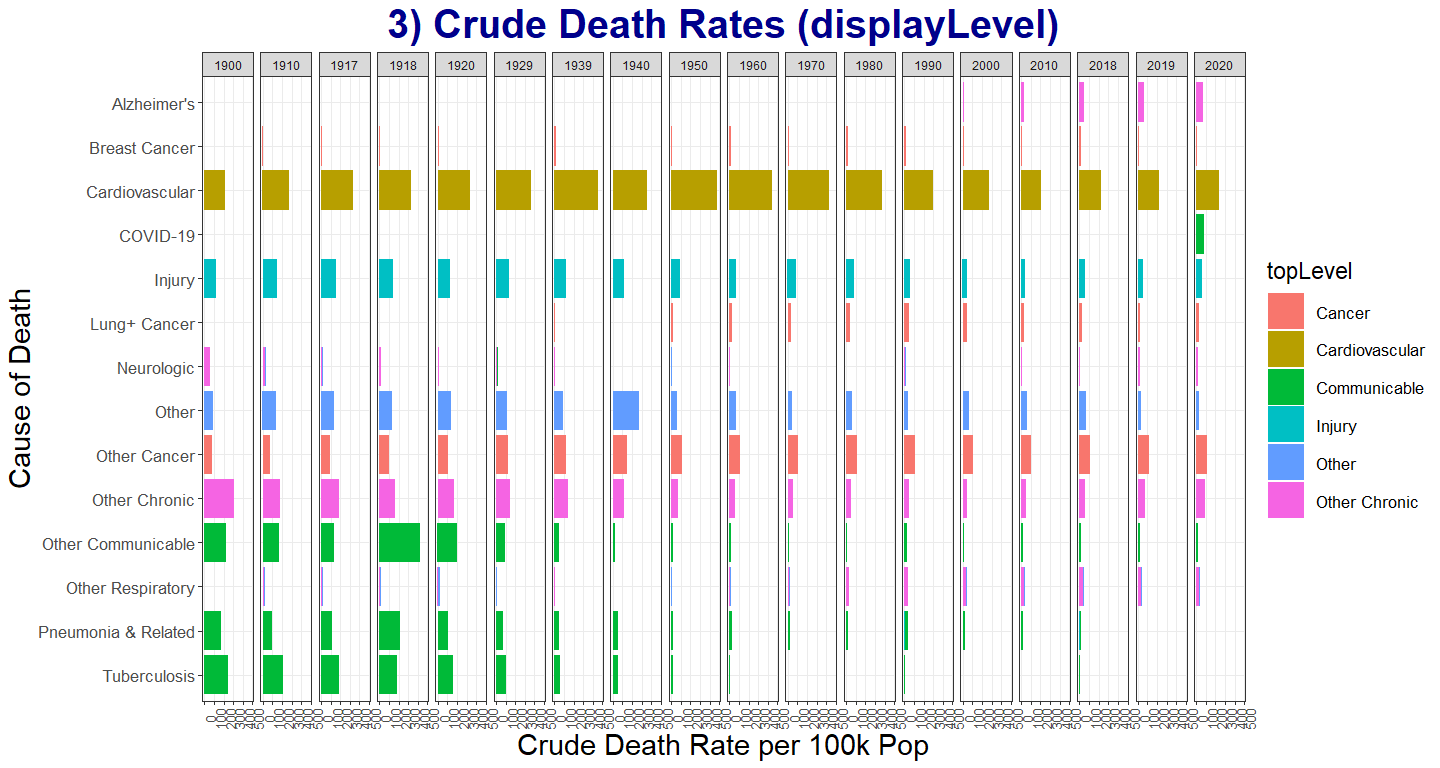
# Figure 1. Yearly crude death rate per 100,000 is stratified by topLevel with the purpose of revealing long-term mortality trends



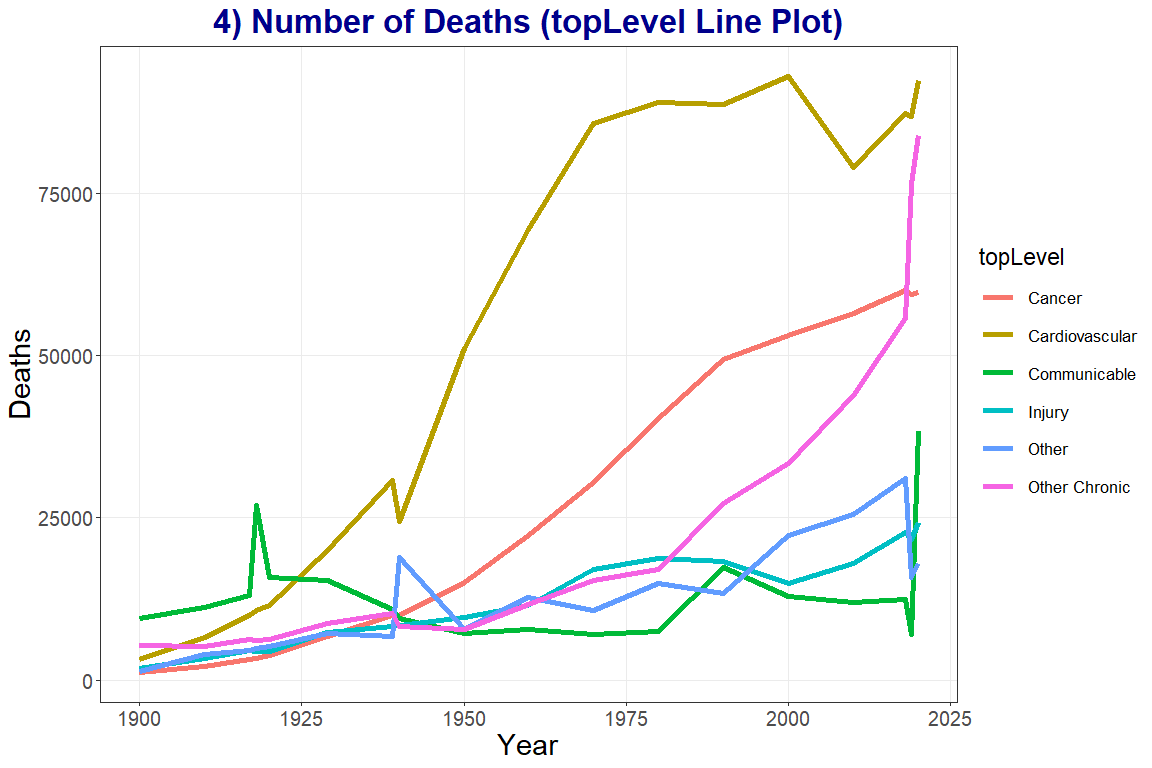
# Figure 2. Change in specificLevel mortality between 1900 and 2020 grouped by topLevel. Each year has an x-axis of varying magnitude, depending on the number of deaths in that year.



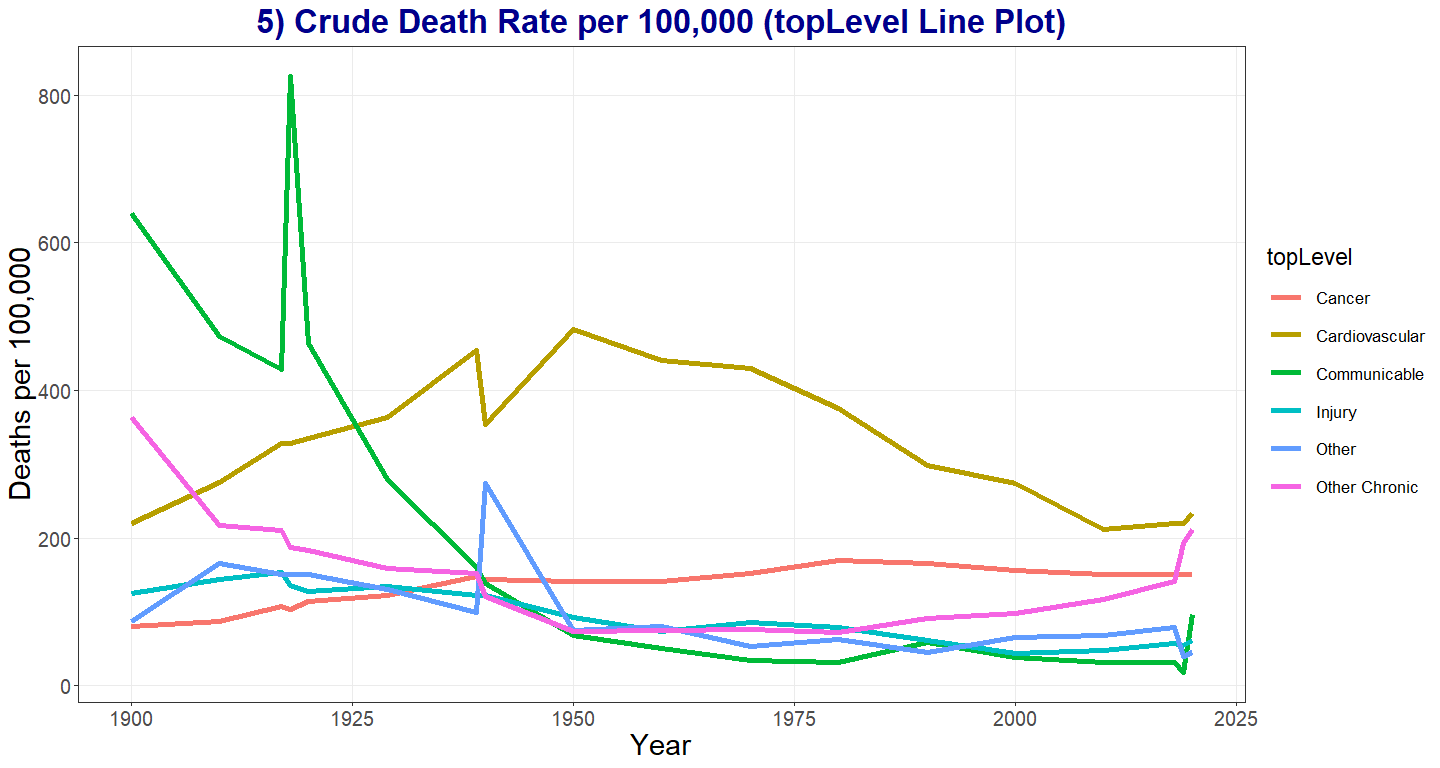
# Figure 3.



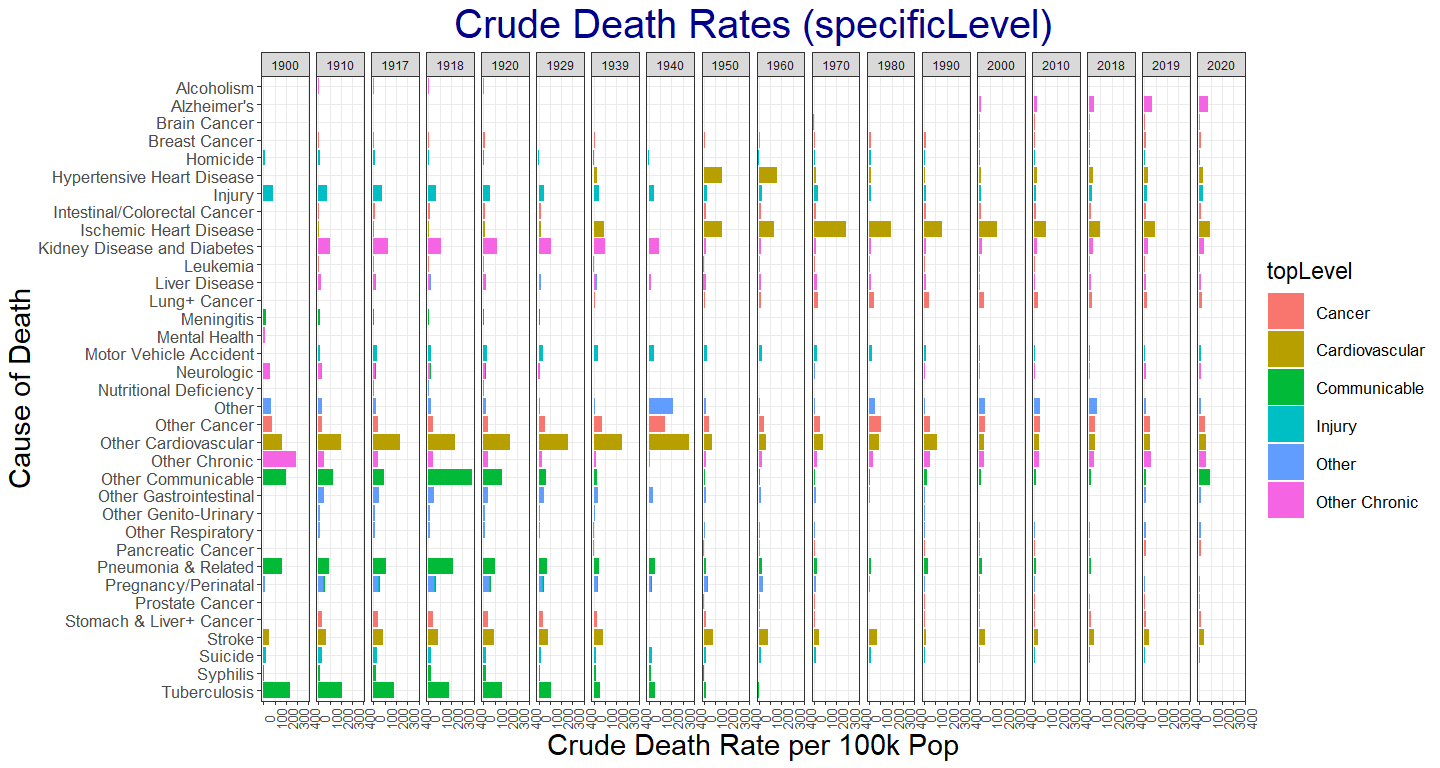
# Figure 4.

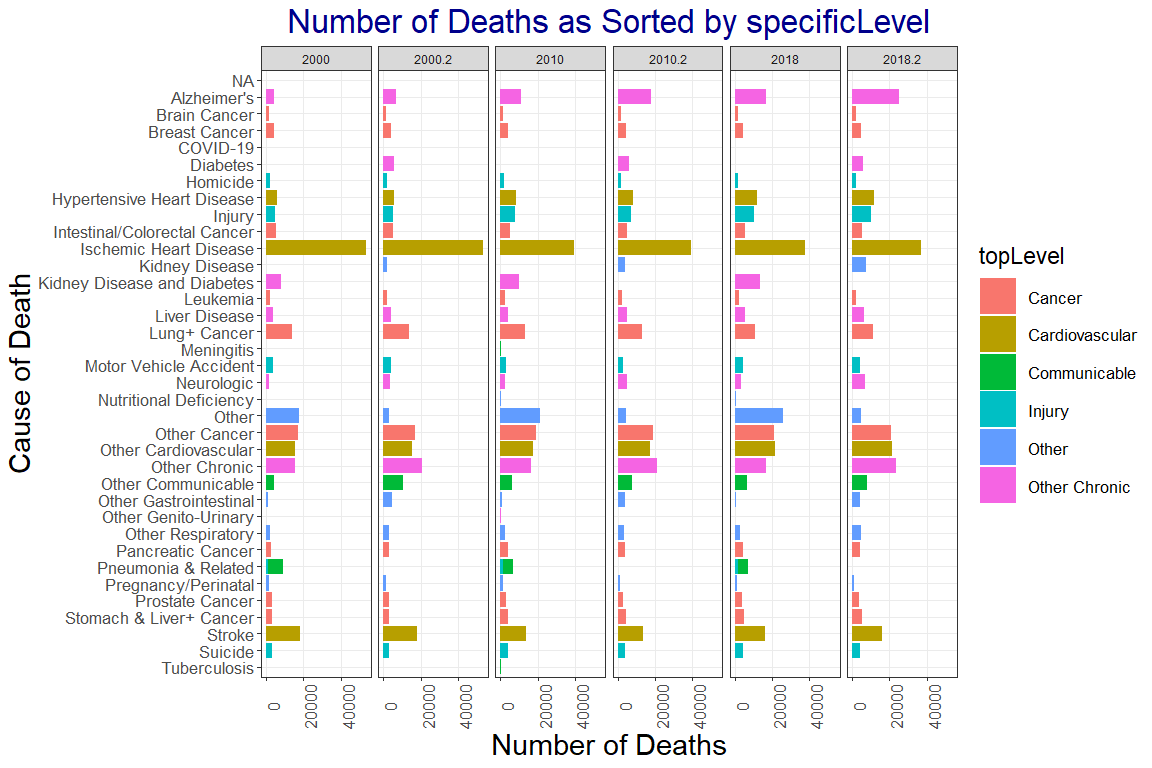


# Figure 5.



Appendix





specificLevel

CDC2000

CCB2000

CDC2010

CCB2010

CDC2018

CCB2018

DIF2000

DIF2010

DIF2018

Alzheimer’s

4419

6767

10856

17906

16627

25070

-2348

-7050

-8443

Brain Cancer

1380

1707

1528

1803

1958

2172

-327

-275

-214

Breast Cancer

4283

4263

4265

4244

4608

4579

20

21

29

Homicide

2128

2151

2022

1961

1979

1967

-23

61

12

Hypertensive Heart Disease

5828

5867

8202

8119

11856

11817

-39

83

39

Injury

4939

5421

7837

7336

10370

10324

-482

501

46

Intestinal/Colorectal Cancer

5245

5248

5243

5224

5468

5449

-3

19

19

Ischemic Heart Disease

53585

53593

39663

39133

37465

37099

-8

530

366

Kidney Disease and Diabetes

7975

NA

10173

NA

13423

NA

NA

NA

NA

Leukemia

2123

2104

2359

2344

2403

2382

19

15

21

Liver Disease

3666

4154

4287

5027

5390

6204

-488

-740

-814

Lung+ Cancer

13703

13697

12968

12899

11083

11073

6

69

10

Meningitis

133

133

76

75

72

79

0

1

-7

Motor Vehicle Accident

3966

4073

3083

2986

4319

4219

-107

97

100

Neurologic

1484

3677

2238

4813

3519

6732

-2193

-2575

-3213

Nutritional Deficiency

192

NA

214

NA

660

NA

NA

NA

NA

Other

17882

3319

21100

4468

25670

4845

14563

16632

20825

Other Cancer

17217

17225

18906

18786

20984

20886

-8

120

98

Other Cardiovascular

15384

15424

17433

17182

21504

21287

-40

251

217

Other Chronic

15772

20980

16175

21400

16738

23597

-5208

-5225

-6859

Other Communicable

4463

10616

5961

7977

6613

8318

-6153

-2016

-1705

Other Gastrointestinal

923

4579

672

4209

766

4504

-3656

-3537

-3738

Other Genito-Urinary

95

NA

104

NA

106

NA

NA

NA

NA

Other Respiratory

1928

2984

2272

3506

2952

4630

-1056

-1234

-1678

Pancreatic Cancer

2884

2879

3818

3792

4546

4528

5

26

18

Pneumonia & Related

9105

NA

7017

NA

7299

NA

NA

NA

NA

Pregnancy/Perinatal

1419

1631

1317

1465

1079

1182

-212

-148

-103

Prostate Cancer

3013

3008

3065

3045

3723

3707

5

20

16

Stomach & Liver+ Cancer

3305

3305

4301

4287

5189

5172

0

14

17

Stroke

18185

18101

13662

13551

16457

16331

84

111

126

Suicide

2969

3113

3913

3805

4491

4423

-144

108

68

Tuberculosis

104

135

110

115

100

103

-31

-5

-3

COVID-19

NA

0

NA

0

NA

0

NA

NA

NA

Diabetes

NA

6000

NA

6332

NA

5936

NA

NA

NA

Kidney Disease

NA

2127

NA

3871

NA

7545

NA

NA

NA

NA

NA

NA

NA

NA

NA

NA

NA

NA

NA