Click here to view the source code for the visualizations.

Objective

To determine the patterns of morbidity over time and space among various districts of Karnataka.

Research Questions

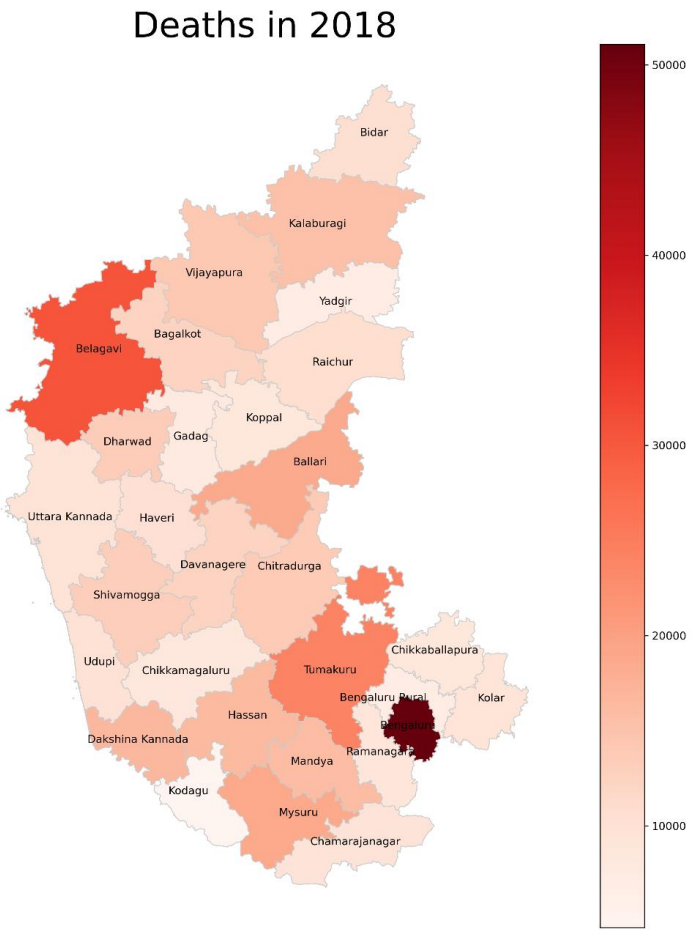
a. Determine district wise death rates. The death rates can be computed as number of deaths per 1000.
b. Perform concentration analysis to determine the diseases contributing to highest mortality.
c. Perform Spatial analysis to determine the diseases contributing to highest mortality district wise.

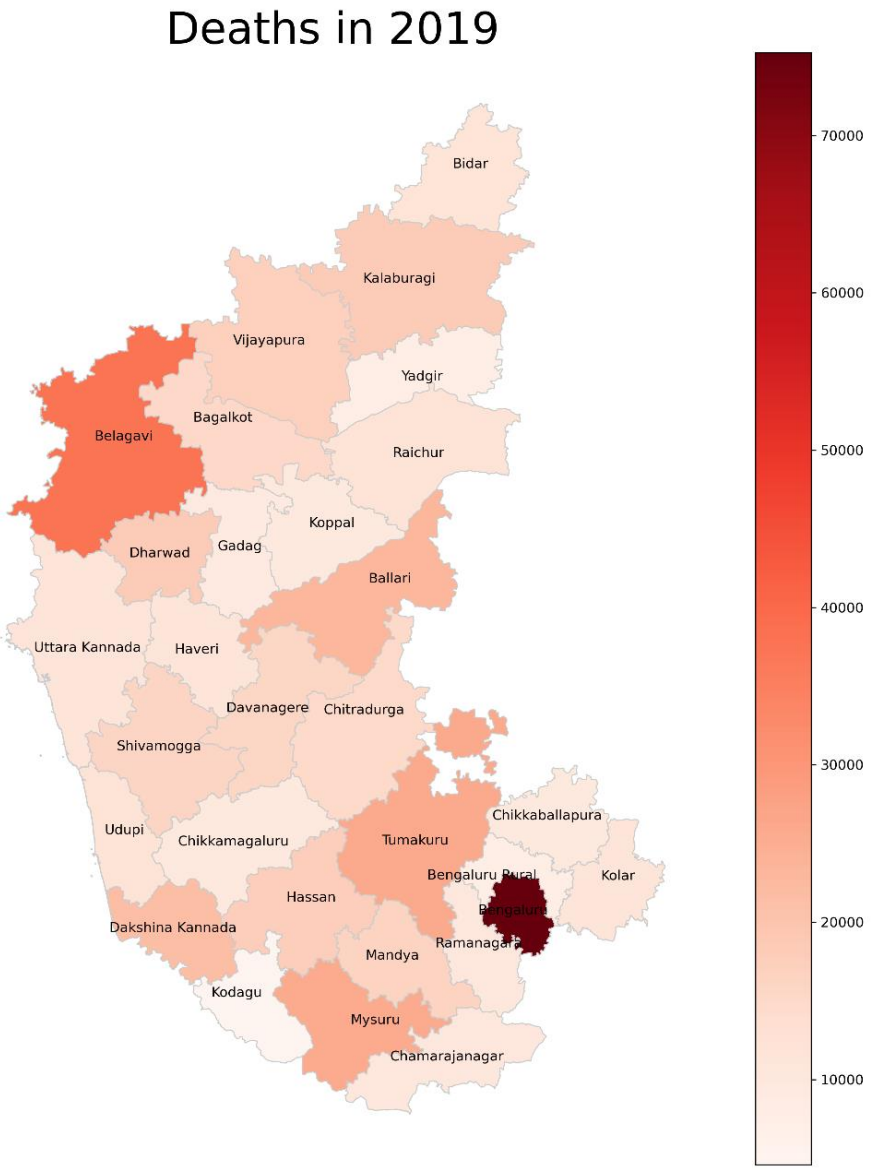
Data Sources

District wise of cause of death data for the years 2018 and 2019.

Analysis

Bangalore had the highest death count and Kodagu had the lowest death count in both the years, 2018 and 2019.

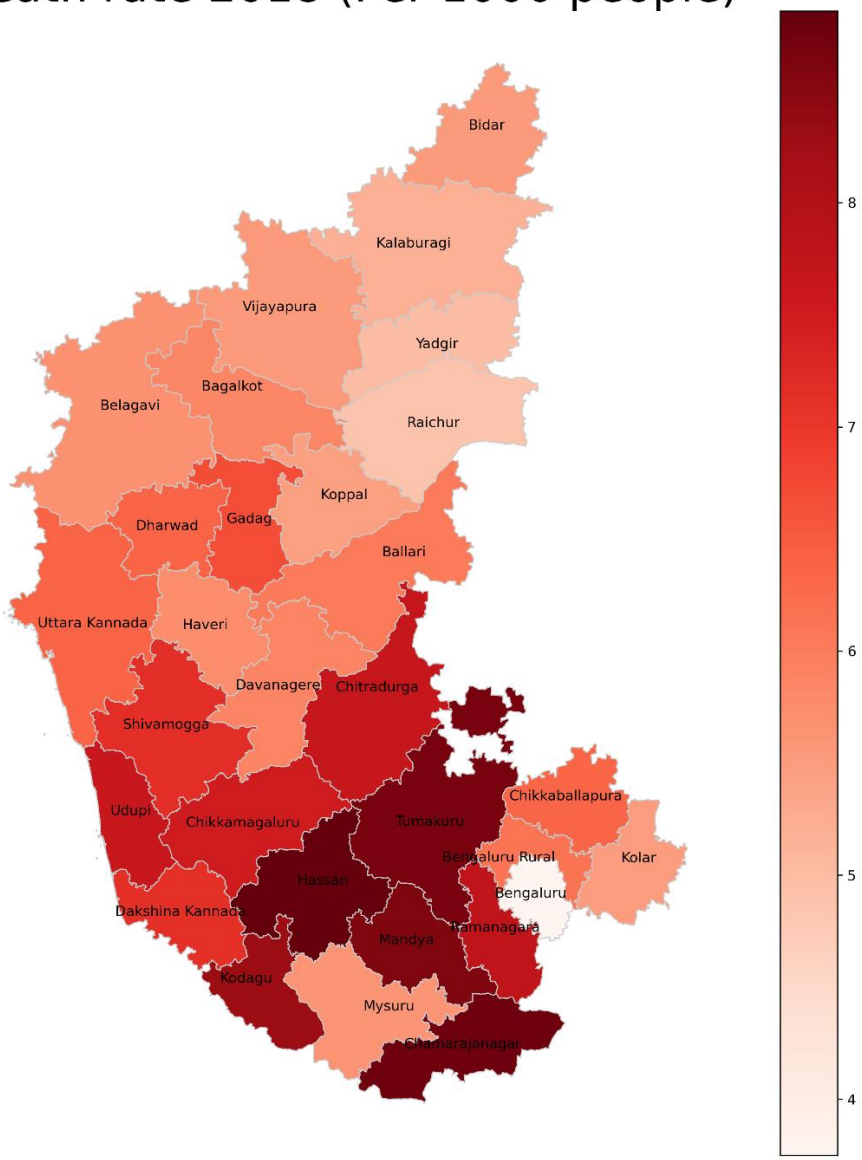




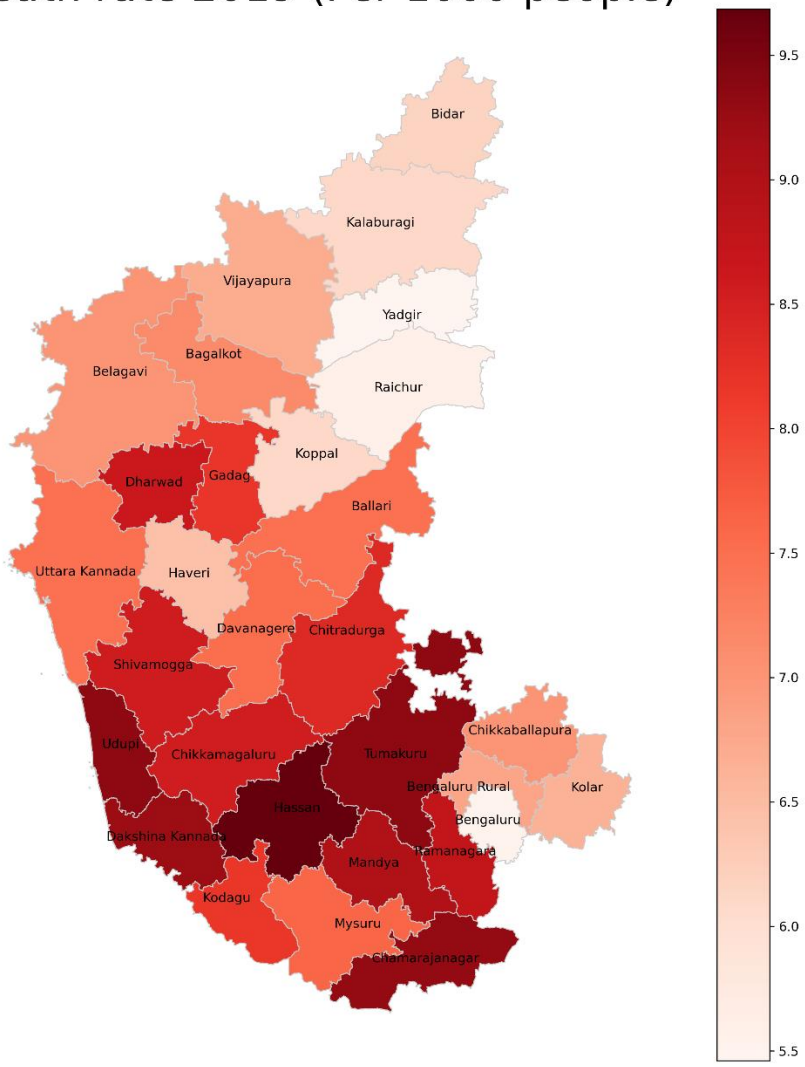
The death rates are calculated using the predicted population for 2020 from here. It was calculated by summing up all the deaths for each district, dividing it by the predicted population for the district and finally multiplying by 1000. This gives the number of deaths for 1000 people in the district.

For 2018 Bengaluru(urban) has the lowest and Hassan has the highest death rate out of all districts. For 2019, Yadgir has the lowest death rate and Hassan has the highest. A possible reason for this could be population being registered in a different district as the death. In the case of Bangalore and Hassan, it is possible that a significant number of people got themselves registered in Bengaluru, but their deaths registered back in their native districts. This will cause the deaths in Bengaluru to be underestimated and the deaths in the neighbouring districts to be overestimated. Just as easily, this could be any abnormality resulting from the data also. Since the population that is considered here is not the actual population but the projected number from the 2011 census, whereas the deaths are records that are up to date for years 2018 and 2019. It is possible that the projection underestimated the urbanisation of Bengaluru and did not account for the people that moved to Bengaluru from other districts. It is inconclusive.

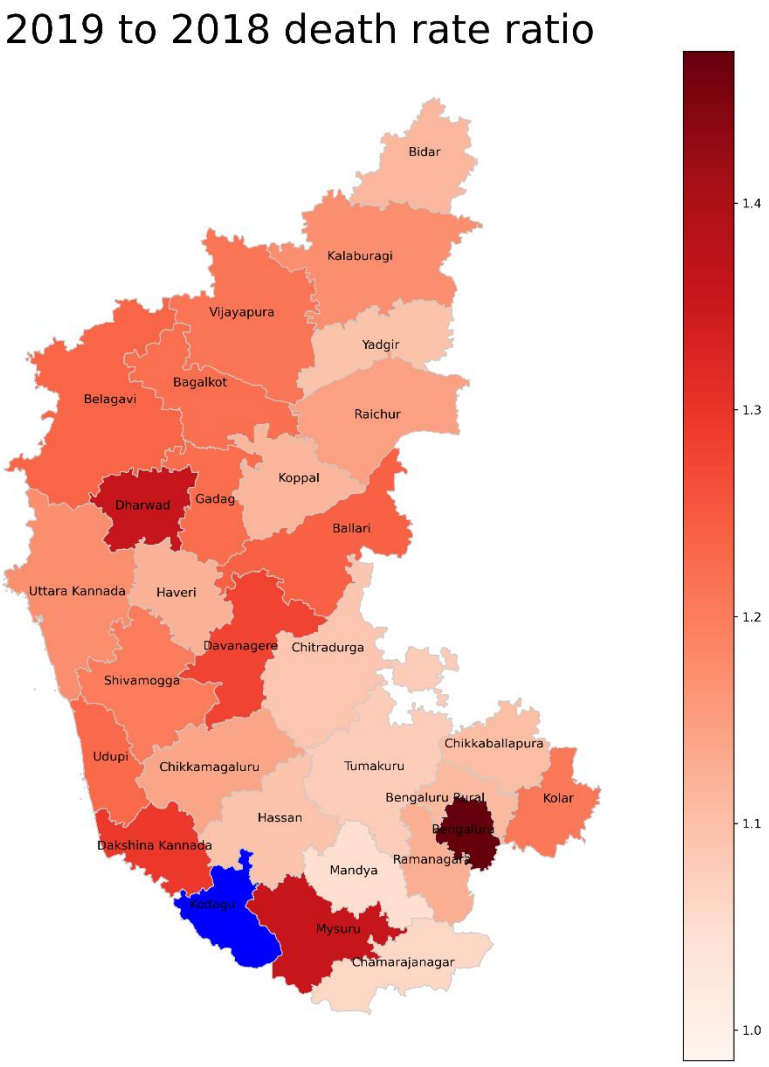
Death rate 2018 (Per 1000 people)



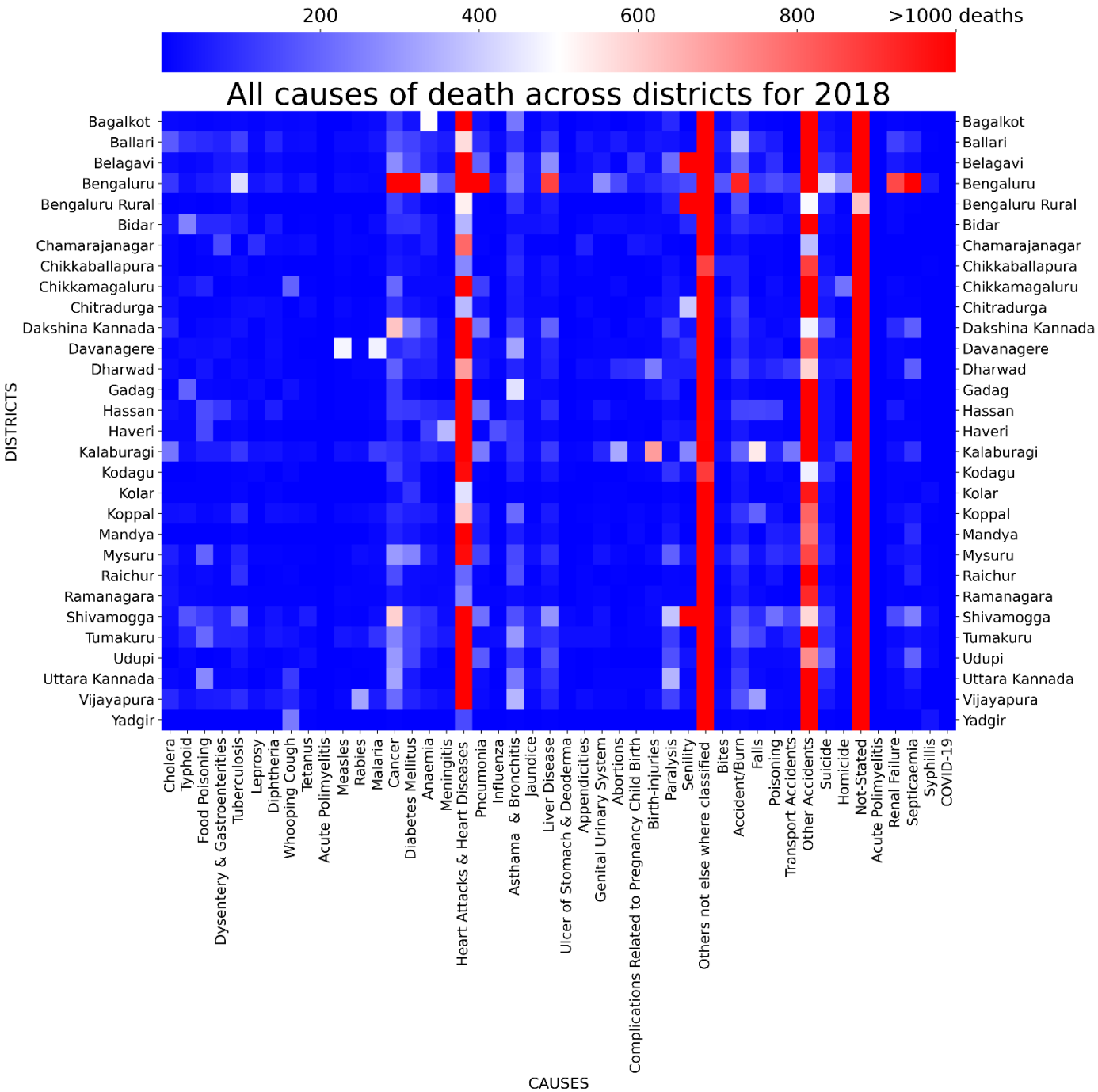
Death rate 2019 (Per 1000 people)



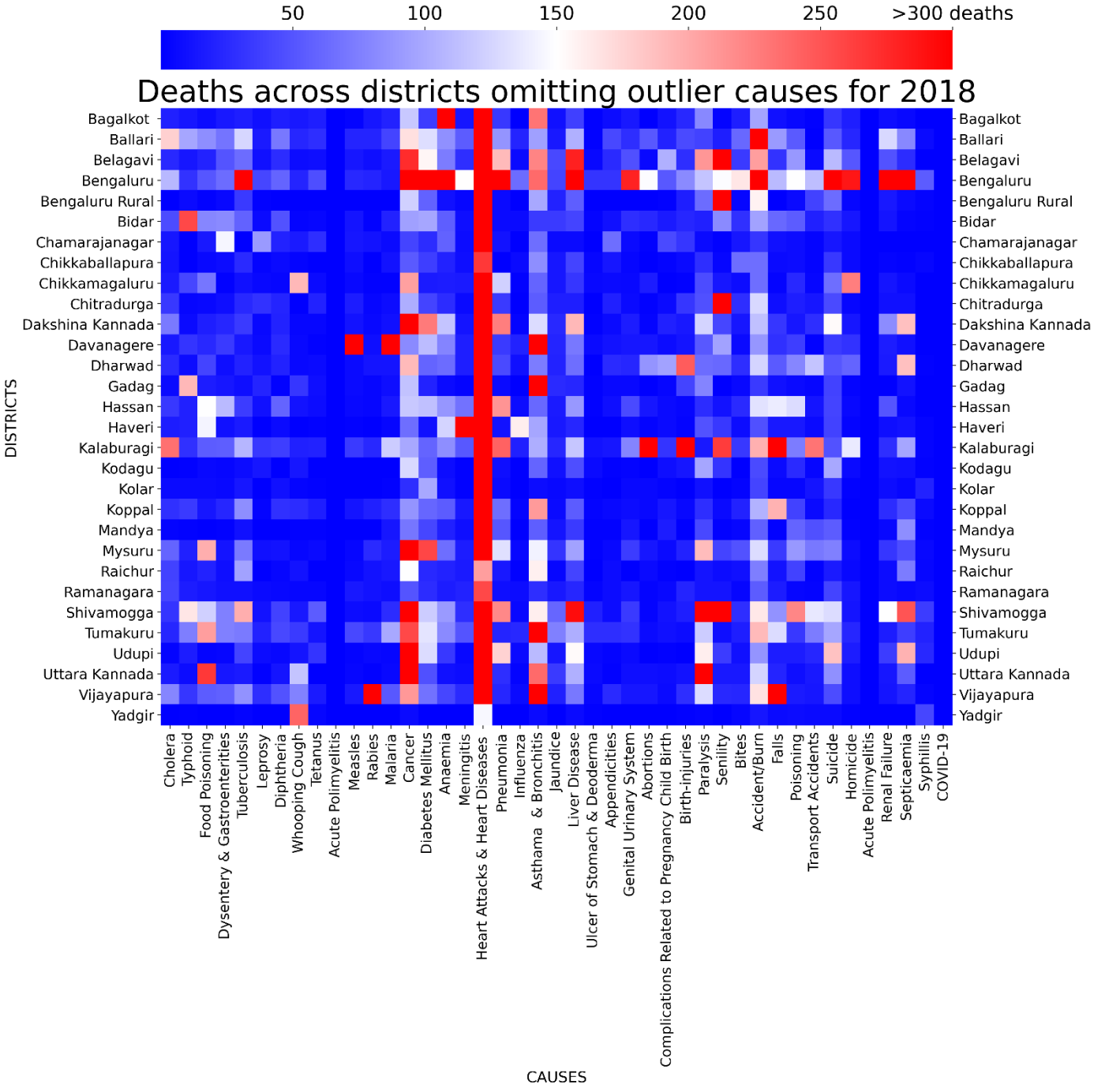
The ratio of death rate of 2019 to 2018 is visualised on the map below. The only district where the death rate reduced from 2018 to 2019 was Kodagu. In most other districts there was a significant increase in death rate. With a 47% increase, Bengaluru had the highest increase in death rate. Again, it can be noted that all the districts surrounding Bengaluru were amongst the districts that have the lowest increase in death rate.

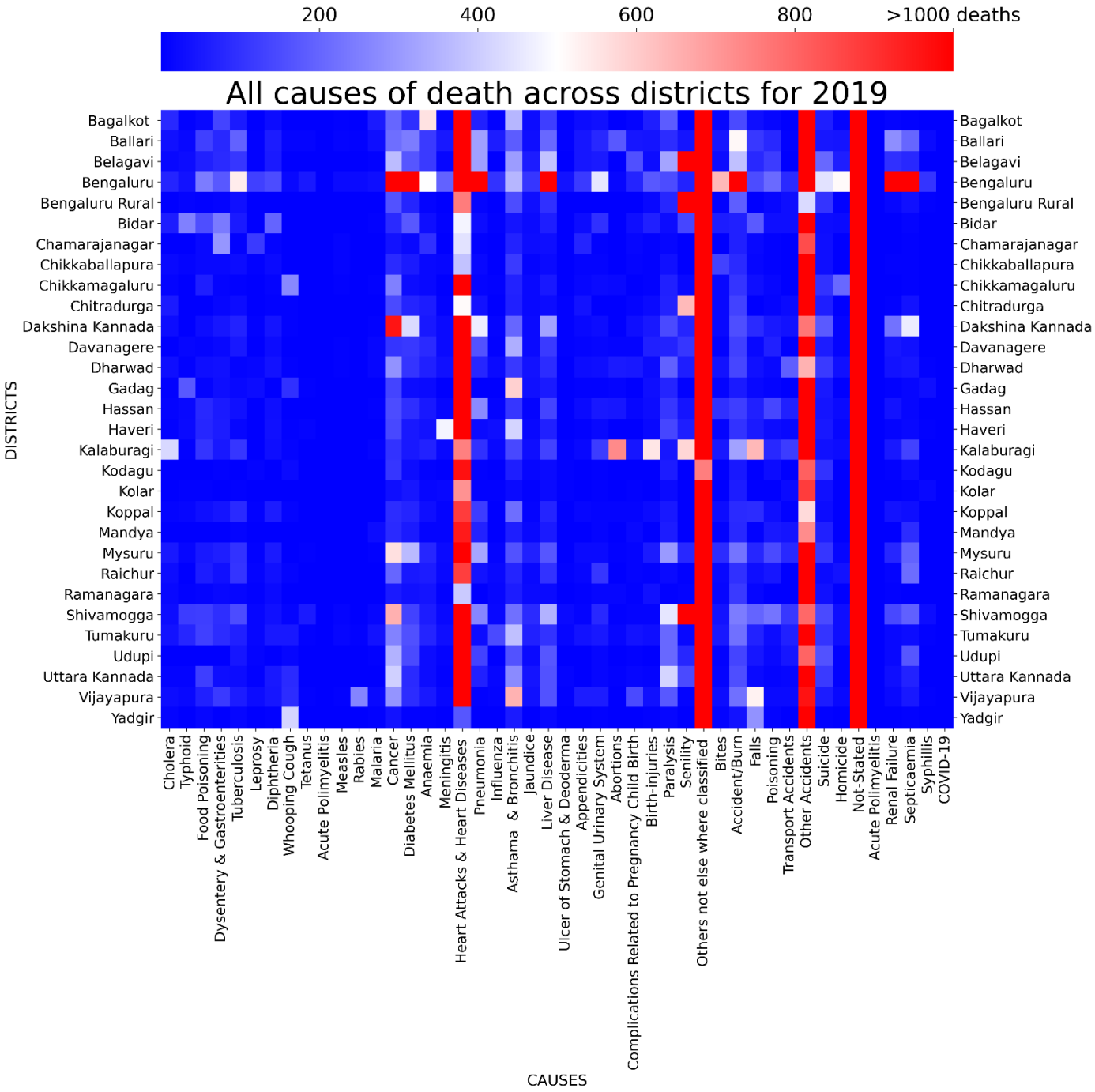


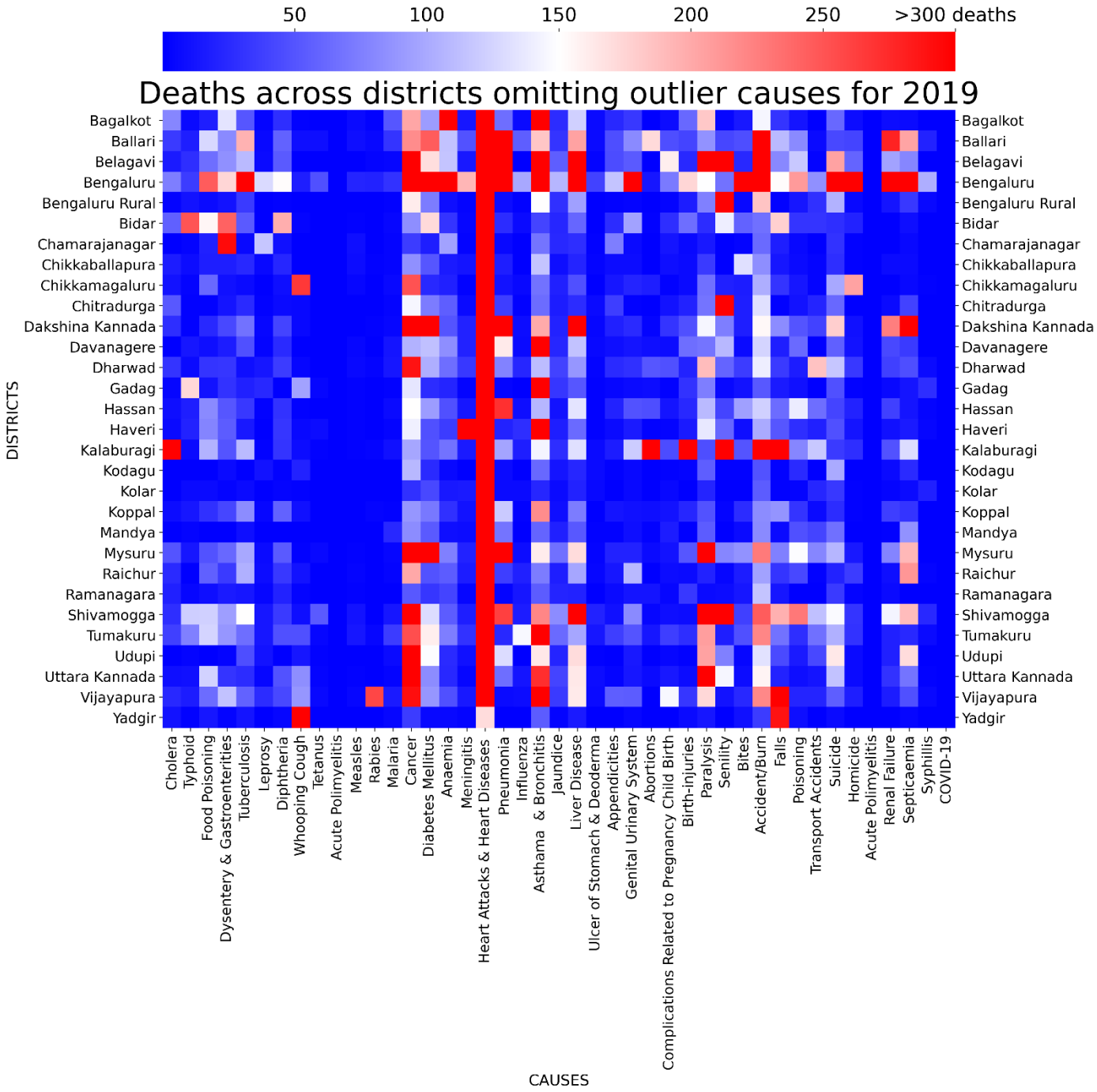
All the causes of death are plotted against all the districts for the year 2018 and 2019 separately. Also, for each year, a separate heatmap is plotted where the causes with very high number of associated deaths are omitted. The three omitted causes are: "*Others not else where classified" , "Other Accidents" , "Not-Stated".*



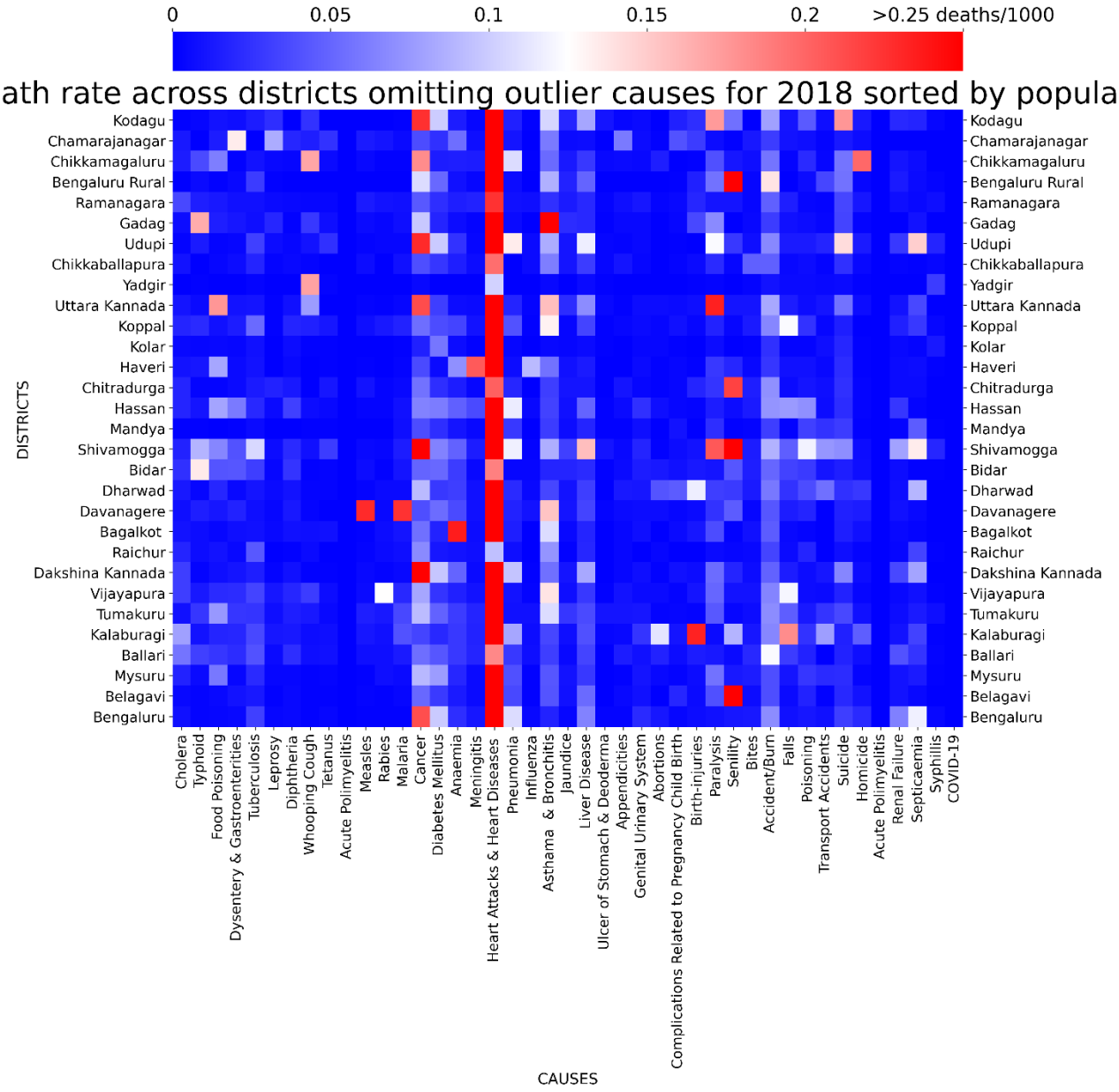
Some of these causes are omitted in the plot below. This is done because these outliers skew the scale and make it hard to visualise the other important causes for mortality which are significant but lower in number.




200
400
600
800
>1000 deaths
All causes of death across districts for 2019
DISTRICTS
Bagalkot
Ballari
Belagavi
Bengaluru
Bengaluru Rural
Bidar
Chamarajanagar
Chikkaballapura
Chikkamagaluru
Chitradurga
Dakshina Kannada
Davanagere
Dharwad
Gadag
Hassan
Haveri
Kalaburagi
Kodagu
Kolar
Koppal
Mandya
Mysuru
Raichur
Ramanagara
Shivamogga
Tumakuru
Udupi
Uttara Kannada
Vijayapura
Yadgir
Cholera
Typhoid
Food Poisoning
Dysentery & Gastroenterities
Tuberculosis
Leprosy
Diphtheria
Whooping Cough
Tetanus
Acute Polimyelitis
Measles
Rabies
Malaria
Cancer
Diabetes Mellitus
Anaemia
Meningitis
Heart Attacks & Heart Diseases
Pneumonia
Influenza
Asthama & Bronchitis
Jaundice
Liver Disease
Ulcer of Stomach & Deoderma
Appendicities
Genital Urinary System
Abortions
Complications Related to Pregnancy Child Birth
Birth-injuries
Paralysis
Senility
Others not else where classified
Bites
Accident/Burn
Falls
Poisoning
Transport Accidents
Other Accidents
Suicide
Homicide
Not-Stated
Acute Polimyelitis
Renal Failure
Septicaemia
Syphilis
COVID-19
CAUSES



Some of the main causes of deaths in all cases are *"Heart attacks and heart diseases", "Cancer", "Asthama and Bronchitis", "Diabetes Mellitus", "Liver disease", "Pneumonia" and "Accident/Burn*". Although the above four heatmaps highlight major causes of deaths, it fails to compare the causes between districts because of the varying population of districts. Hence heatmaps are plotted using the death rates for each of the causes in each of the districts for the years 2018 and 2019 separately.


0
0.05
0.1
0.15
0.2
>0.25 deaths/1000
Death rate across districts omitting outlier causes for 2018 sorted by population
DISTRICTS
Kodagu
Chamarajanagar
Chikkamagaluru
Bengaluru Rural
Ramanagara
Gadag
Udupi
Chikkaballapura
Yadgir
Uttara Kannada
Koppal
Kolar
Haveri
Chitradurga
Hassan
Mandya
Shivamogga
Bidar
Dharwad
Davanagere
Bagalkot
Raichur
Dakshina Kannada
Vijayapura
Tumakuru
Kalaburagi
Ballari
Mysuru
Belagavi
Bengaluru
Cholera
Typhoid
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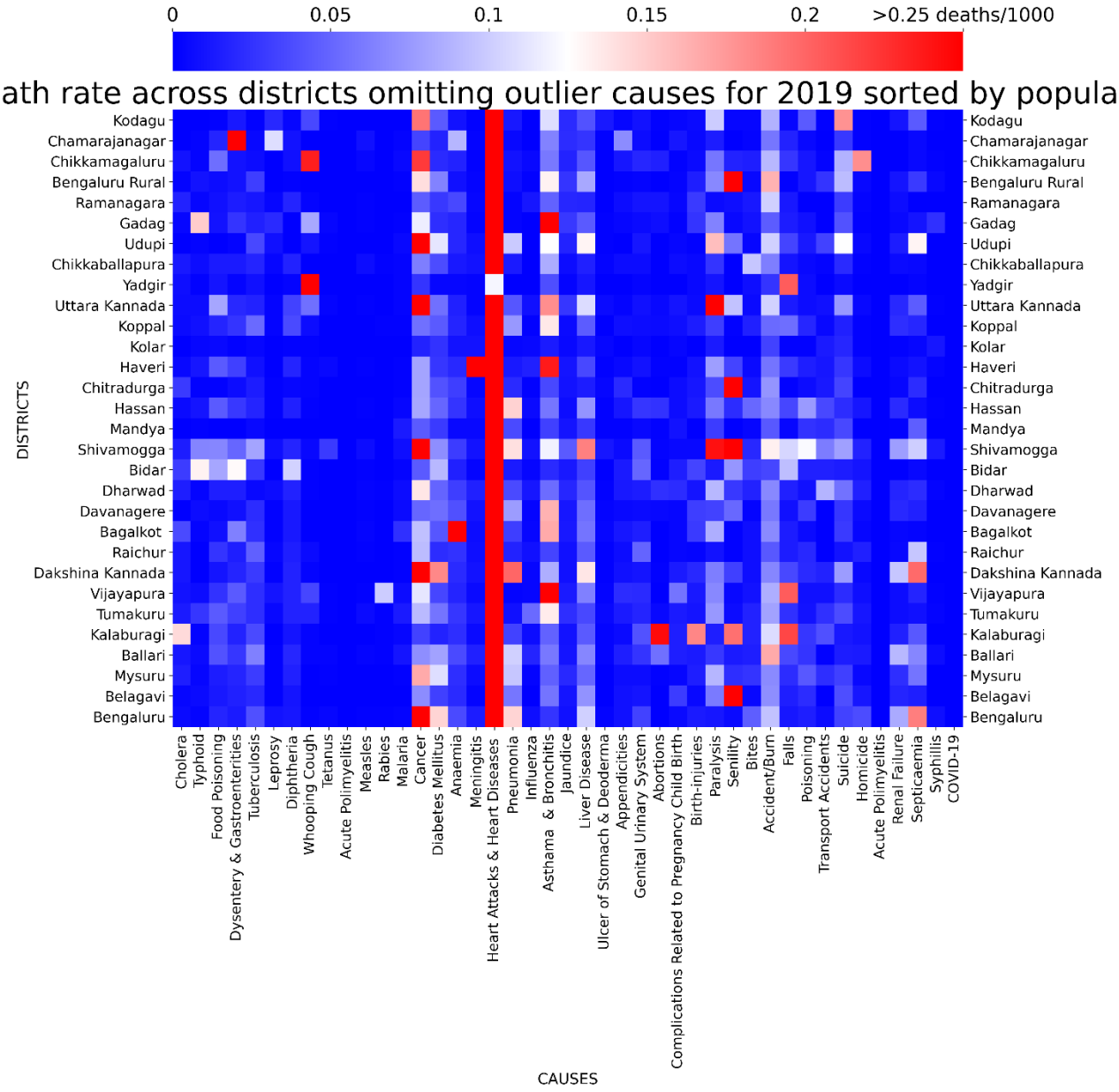
Tuberculosis
Leprosy
Diphtheria
Whooping Cough
Tetanus
Acute Polimyelitis
Measles
Rabies
Malaria
Cancer
Diabetes Mellitus
Anaemia
Meningitis
Heart Attacks & Heart Diseases
Pneumonia
Influenza
Asthama & Bronchitis
Jaundice
Liver Disease
Ulcer of Stomach & Deoderma
Appendicities
Genital Urinary System
Abortions
Complications Related to Pregnancy Child Birth
Birth-injuries
Paralysis
Senility
Bites
Accident/Burn
Falls
Poisoning
Transport Accidents
Suicide
Homicide
Acute Polimyelitis
Renal Failure
Septicaemia
Syphilis
COVID-19
CAUSES


0
0.05
0.1
0.15
0.2
>0.25 deaths/1000
Death rate across districts omitting outlier causes for 2019 sorted by population
DISTRICTS
Kodagu
Chamarajanagar
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Chitradurga
Hassan
Mandya
Shivamogga
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Dharwad
Davanagere
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Raichur
Dakshina Kannada
Vijayapura
Tumakuru
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Cholera
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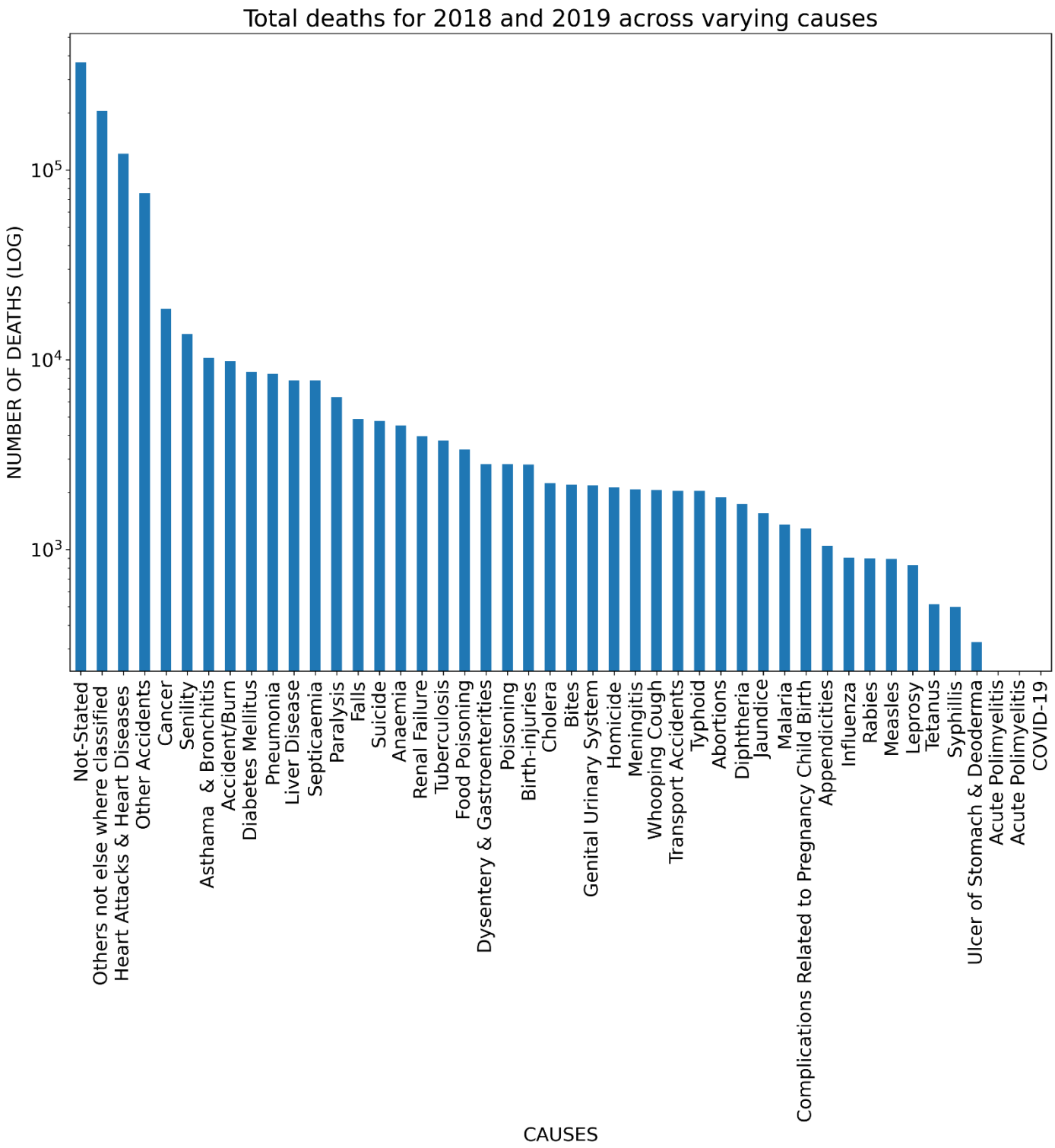
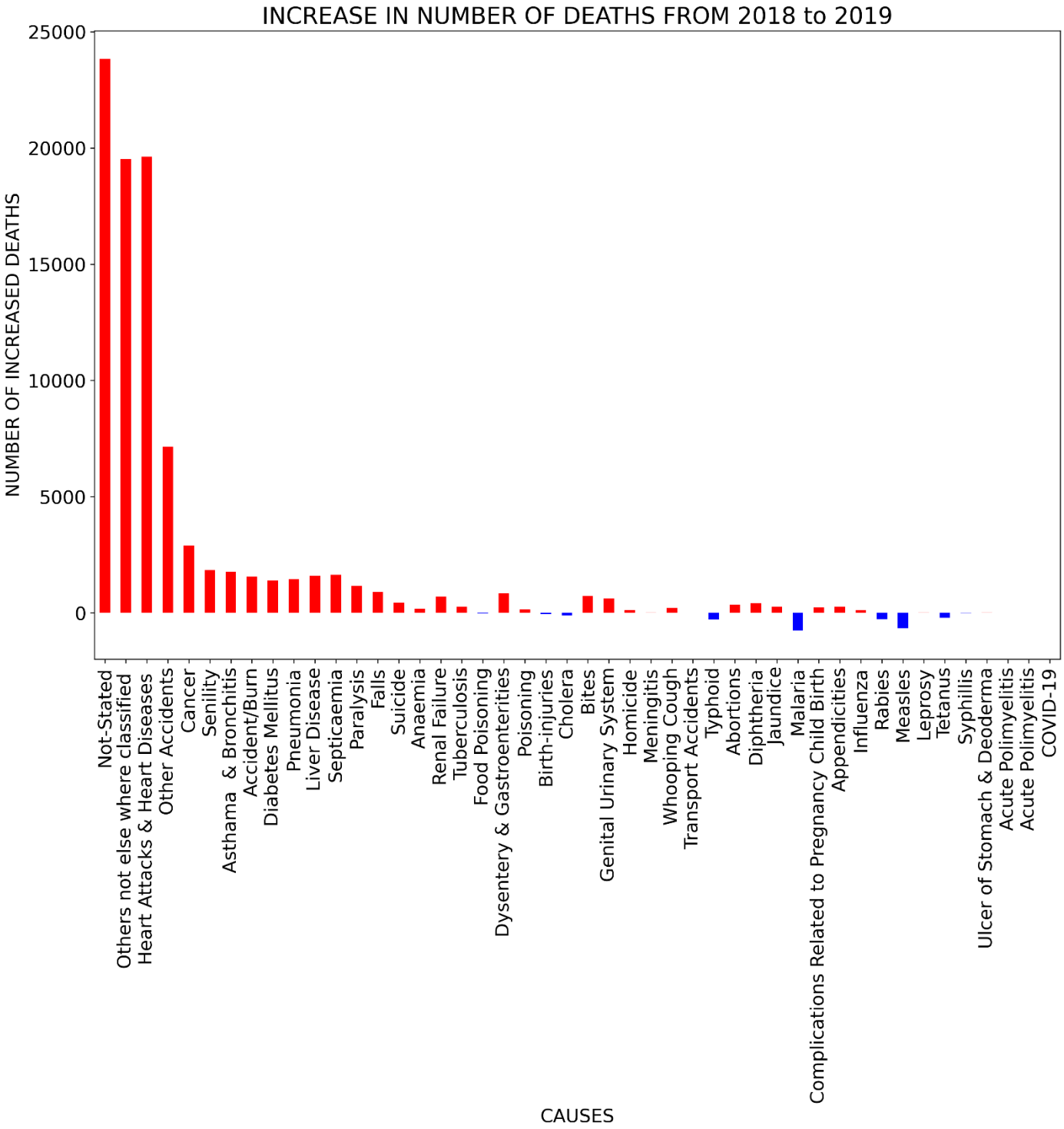
Suicide
Homicide
Acute Polimyelitis
Renal Failure
Septicaemia
Syphilis
COVID-19
CAUSES

The total number of deaths summed up for years 2018 and 2019 are shown below. The y-axis is in log scale.



The below chart shows how the number of deaths varied from 2018 to 2019 for each of the causes. The red bars show the magnitude of increase and the blue bars show the magnitude of decrease.



There was a significant increase in the number of deaths in 2019 compared to 2018. This can also be visualised in the geographic chart “2019 to 2018 death rate ratio”.