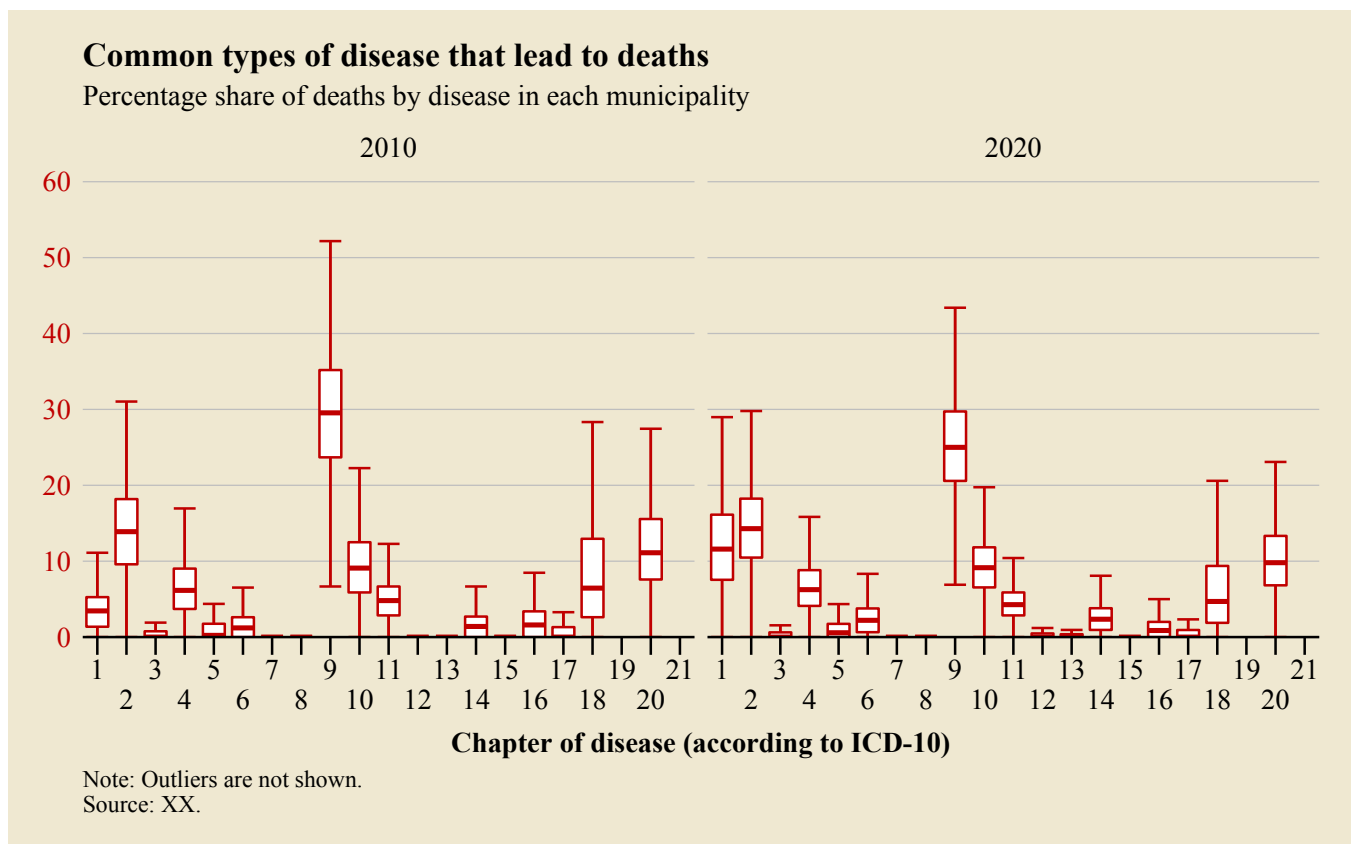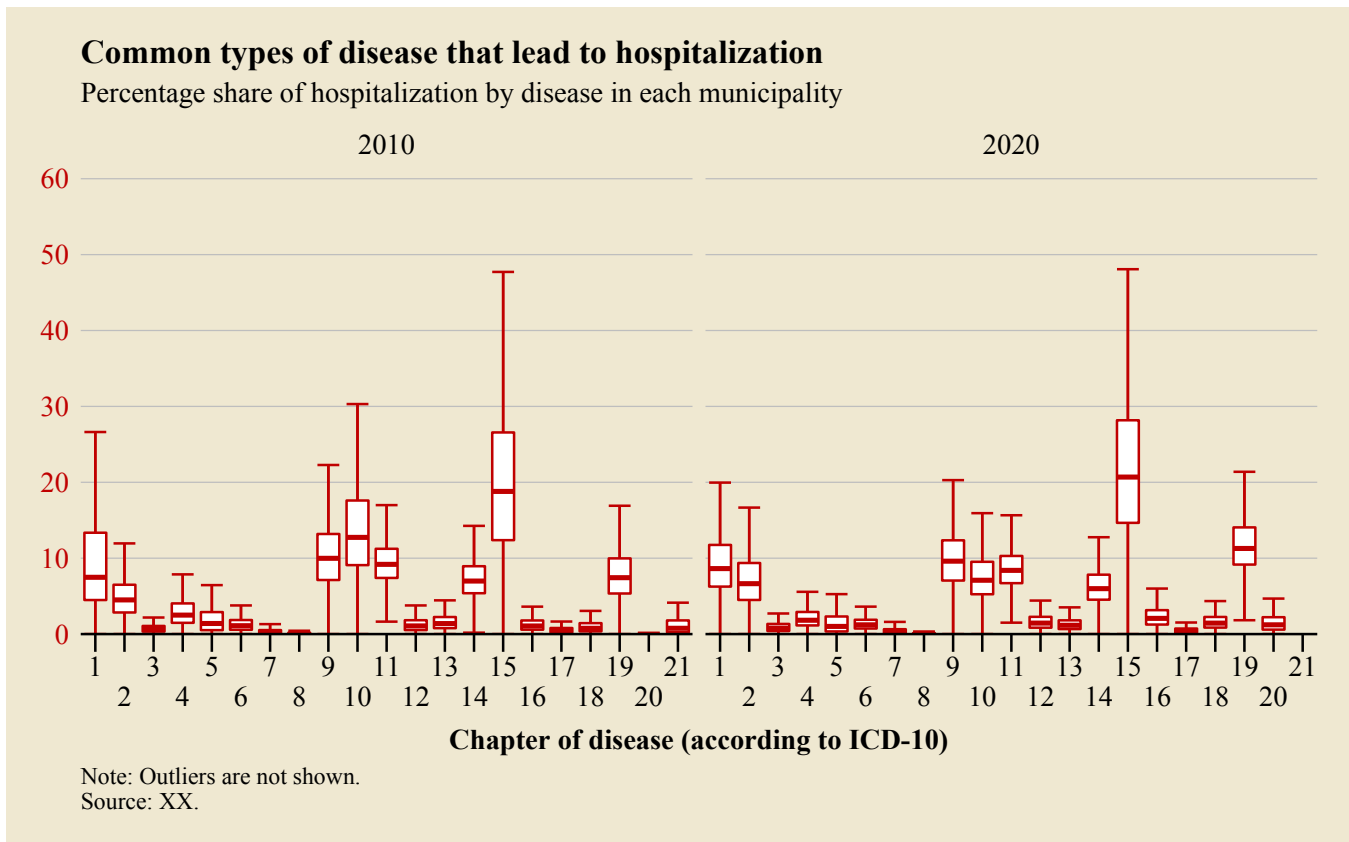**Update: 11/01/2022 (Masato)**

- Since we have agreed upon first digging into the current hospitalization and mortality rates, I did some quick look at the data. Here is the summary.

- **Motivation:** We want to predict the burden of diseases in each municipality, but how can the "burden of diseases" be defined? It is not like we have the number of new COVID-19 cases and the number of those among them who were registered to hospital, and it may be difficult to calculate the common kind of hospitalization or mortality. So, I thought it would be useful to first examine the major types of diseases that lead to either death or hospitalization in many municipalities.

- **Question:** *What are common types of diseases that leads to <u>death</u>?*

Common types of disease that lead to deaths
Percentage share of deaths by disease in each municipality

Note: Outliers are not shown.
Source: XX.

Key observation(s):

Chapter 9 (diseases of the circulatory system) is the biggest cause of death for municipalities. The pattern looks the same for both 2010 and 2020, even though Chapter 9 includes COVID-19. See Appendix for the list of ICD-10 chapters.

- **Question:** *What are common types of diseases that leads to <u>hospitalization</u>?*

Common types of disease that lead to hospitalization
Percentage share of hospitalization by disease in each municipality

Note: Outliers are not shown.
Source: XX.

Key observation(s):

- Chapters 1, 9, 10, 11, 15, 19 are popular causes of hospitalization.

- The biggest contribution of this quick analysis might be in the revelation that Chapter 15 (Pregnancy, Childbirth, and the Puerperium) is the biggest cause of hospitalization, because it would be up for discussion whether the hospitalization related to Chapter 15 should be considered a component of the burden of "disease" in the context of our analysis.

- **Do you think it would be better to create a sort of "hospitalization indicator" by summing up the numbers of hospitalization due to diseases classified as Chapters 1–-14 (items that include the word "disease") and dividing it by the population?** This indicator will allow us to make comparisons across municipalities with different population size.

- **What's left:**
  - ➢ What is the unit of the SIM and SIH data? (Where can I find this information?)
  - ➢ Where can I find the municipality information in the PNS data?

- **Next up:**
  - ➢ Calculate the population density. I will find the data on the area of each municipality and combine it with the Census data.
  - ➢ Look for the income data.
  - ➢ Tackle the CNES data (health professionals, facilities, equipment) to see if I can create indicators of human and health infrastructure. (I may not spend a lot of time on this because we might as well put every variable in this dataset into the LASSO regression model and let R do all the work.)

- **Misc:** I plan to update the below Dropbox folder where you can see the details of my work including R datasets and R codes (you should open the HTML file in your browser).

  https://www.dropbox.com/sh/g5f3ntf55snqcz8/AAC0P8tV-h_g8HmoAQX5YsEea?dl=0

Appendix: ICD-10 Chapter

Chapter	Description	SIM data		SIH data	
		2010	2020	2010	2020
1	Certain Infectious and Parasitic Diseases	✓	✓	✓	✓
2	Neoplasms	✓	✓	✓	✓
3	Disease of the blood and blood-forming organs and certain disorders involving the immune mechanism	✓	✓	✓	✓
4	Endocrine, Nutritional, and Metabolic Diseases	✓	✓	✓	✓
5	Mental, Behavioral and Neurodevelopmental disorders	✓	✓	✓	✓
6	Diseases of the Nervous System	✓	✓	✓	✓
7	Diseases of the Eye and Adnexa	✓	✓	✓	✓
8	Diseases of the Ear and Mastoid Process	✓	✓	✓	✓
9	Diseases of the Circulatory System	✓	✓	✓	✓
10	Diseases of the Respiratory System	✓	✓	✓	✓
11	Diseases of the Digestive System	✓	✓	✓	✓
12	Diseases of the Skin and Subcutaneous Tissue	✓	✓	✓	✓
13	Diseases of the Musculoskeletal System and Connective Tissue	✓	✓	✓	✓
14	Diseases of Genitourinary System	✓	✓	✓	✓
15	Pregnancy, Childbirth, and the Puerperium	✓	✓	✓	✓
16	Certain Conditions Originating in the Perinatal Period	✓	✓	✓	✓
17	Congenital malformations, deformations, and chromosomal abnormalities	✓	✓	✓	✓
18	Symptoms, signs, and abnormal clinical and laboratory findings, not elsewhere classified	✓	✓	✓	✓
19	Injury, poisoning, and certain other consequences of external causes			✓	✓
20	External Causes of Morbidity	✓	✓	✓	✓
21	Factors influencing health status and contact with health services			✓	