COVerAGE-JP: COVID-19 Deaths by Age and Sex in Japan

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Introduction

This database (<https://github.com/fumiyau/COVerAGE-JP>) collects COVID-19 deaths by age, sex, date, and region in Japan. As with other causes of deaths, deaths related to COVID-19 are reported by local public health center (*Hokenjo*), which is located in every prefecture and major metropolitan/large cities.¹ 47 prefectures and some metropolitan cities then collect the information about COVID-19 cases and deaths to report the Ministry of Health, Labour, and Welfare (MHLW). Although MHLW provides a summary statistics about the COVID-19 cases and deaths on their webpage,² the distribution broken down by age and sex is not available, that leads many volunteering organizations to collect COVID-19 information based on prefectural/municipality reports. These databases are provided by, for example, NHK (Nihon Hoso Kyokai, Japan's public broadcasting association),³ Toyo Keizai Shimpō,⁴ J.A.G. Japan,⁵ or National Institute of Population and Social Security Research.⁶ However, even these databases do not provide COVID-19 deaths by age and sex. This database thus aims to fill in the gap by collecting COVID-19 related deaths reported by various sources as I discuss below, including prefectures' press releases or media sources.

Data sources

Collection of data sources

Information about COVID-19 deaths is based on periodic reports by prefectures, major metropolitan cities, and news sources. The priority was given to the local government's website to see if there are any COVID-19 deaths reported. Some prefectures with larger COVID-19 cases, like Tokyo, Osaka or Hokkaido, release daily reports on cases and deaths with information about the date of death, age, sex. Other prefectures, where the number of COVID-19 deaths tends to be small, deliver a daily briefing but do not necessarily upload their press release online. This leads to the value to look at media sources based on the prefectural or municipality briefings.

For these prefectures, I collected death information about COVID-19 cases from news sources. Priorities are local newspapers, followed by NHK and other major newspapers like

¹ As of 2020, there are 469 public health centers. The detailed history of this public health institution is summarized by Katsuda (2011). Links to each local public health center is available at the MHLW's webpage

(https://www.mhlw.go.jp/stf/seisakunitsuite/bunya/kenkou_iryuu/kenkou/hokenjo/).

Katsuda N, Hinohara Y, Tomita K, Hamajima N. Structure and roles of public health centers (hokenjo) in Japan. *Nagoya J Med Sci*. 2011;73(1-2):59-68.

² https://www.mhlw.go.jp/stf/seisakunitsuite/bunya/newpage_00032.html

³ <https://www3.nhk.or.jp/news/special/coronavirus/>

⁴ <https://toyokeizai.net/sp/visual/tko/covid19/en.html>

⁵ <https://gis.jag-japan.com/covid19jp/>

⁶ <http://www.ipss.go.jp/projects/j/choju/covid19/index.asp>

Asahi Shimbun. In collecting information, I tried to omit news sources published in news aggregators (like Yahoo Japan which often makes older articles not available after a short period of time). The list of references used to construct the database is provided in Table 1. After creating the database where the unit is based on individuals, I aggregated the data by date (occurrence and reporting), age, sex, and region (prefecture). With information for cases, the data are integrated into a cross-national comparative project on COVID-19 cases and deaths by age and sex, COVerAGE-DB.⁷

Illustration: What we can do by using the data

One advantage of the Japanese data is the availability of region-specific, although the definition of deaths is not necessarily consistent across municipalities as one of the major national newspapers in Japan reported based on their survey for municipalities with COVID-19 deaths.⁸ To take this advantage, as an illustration of the data, this section presents how (1) the number of deaths, (2) the proportion of deaths among those aged 70 or over, and (3) sex ratio of COVID-19 deaths differ across regions. Maps with jiscodes to identify each prefecture with its name and tables for outcomes examined here are provided in appendix Figure 1 and Table 1.

Figure 1 shows the geographical distribution of COVID-19 related deaths in Japan (as of June 19, 2020). As we can see, many prefectures report no COVID-19 deaths so far, while deaths are concentrated in a few prefectures like Tokyo (313 deaths),⁹ Hokkaido (94 deaths), or Kanagawa (94 deaths), Osaka (84 deaths) or Saitama (51 deaths). While the population for these prefectures is relatively larger except for Hokkaido (13 million for Tokyo, 9 million for Kanagawa and Osaka, 7.2 million for Saitama, and 5.5 million for Hokkaido), which explains the number of COVID-19 deaths relative to that of other prefectures, other few prefectures like Ishikawa (27 deaths) or Toyama (22 deaths) had a relatively larger number of COVID-19 deaths despite their smaller number of population (about 1 million). According to news reports, a majority of deaths in these prefectures are clustered in one location; 21 out of 27 deaths in Ishikawa were patients at a hospital where the outbreak occurred in late April,¹⁰ and 14 out of 22 deaths in Toyama were residents in a geriatric health care facility (*roken*), one of the long-term care facilities.¹¹

The concentration of deaths in hospitals or long-term care facilities results in a larger proportion of older people among the COVID-19 deaths, as Figure 2 presents. 81.5% of deaths in Ishikawa or 91% of deaths in Toyama are people aged 70 or over, while the proportion of these older people among the COVID-19 deaths tends to be smaller in Tokyo (72%), Hokkaido (71%), or Saitama (65%). Outbreaks in these facilities were also reported in other prefectures with a larger share of older people in COVID-19 deaths like Fukuoka or Gunma. As studies on other countries noted, residents in care homes or patients in hospitals are at high risk of fatality due to

⁷ COVerAGE-DB: A database of COVID-19 cases and deaths by age:

https://github.com/timriffe/covid_age

⁸ <https://www.yomiuri.co.jp/national/20200614-OYT1T50084/>

⁹ Several deaths in Tokyo are omitted because they do not record either the date of death or the date of occurrence. The same procedure was applied to other prefectures but the lack of reporting date is especially the case for Tokyo.

¹⁰ <https://www.chunichi.co.jp/article/71941>

¹¹ <https://webun.jp/item/7669412>

the COVID-19, the geographical difference in the share of older people in the COVID-19 deaths suggests that outbreaks in these settings play an important role in explaining the variation of COVID-19 outcomes across places, especially ones where major outbreaks do not happen.

One important demographic context in these facilities, especially for the long-term care facilities is a larger share of women, because of the longer life expectancy of women over men. About two-thirds of care home residents are women in the United States (Center for Disease Control 2019), while the share of women tends to be larger (77%) in Japan (Ministry of Health, Labour, and Welfare 2016). While numerous studies pointed out that men are more likely to die due to the COVID-19 than women, this suggests that the larger share of COVID-19 deaths in care home settings results in a relatively lower share of men among the deaths. Figure 3 presents that this is the case, as prefectures with a larger share of COVID-19 deaths in care homes or hospitals tend to have a lower sex ratio (men relative to women) of the COVID-19 deaths (1 for Ishikawa and 0.9 for Toyama). In contrast, the sex ratio tends to be higher in Saitama (2.5), Hokkaido (1.96), Osaka, (1.69), Tokyo (1.59) which are characterized by a larger number COVID-19 deaths and deaths reported in various settings.

As these results presented, COVID-19 deaths broken down by age, sex, and regions provide important insights into understanding the variations in the COVID-19 outcomes. Another advantage of this database is that it reports the daily cumulative number of deaths, so researchers can examine, for example, whether the distribution of deaths changes with time.

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Table 1 List of data sources (prefectures without COVID-19 deaths not listed)

Pref	id	Sources	Link to prefecture/municipality (if any)	Link to local media (if any)
Hokkaido	1	Prefecture	http://www.pref.hokkaido.lg.jp/hf/kth/kak/hasseijoukyou.htm	
Aomori	2	NHK		
Miyagi	4	Kahoku Shimpō		https://www.kahoku.co.jp/
Ibaraki	8	Prefecture	https://www.pref.ibaraki.jp/1saigai/2019-ncov/index.html	
Gunma	10	Prefecture	https://www.pref.gunma.jp/07/z87g_00025.html	
Saitama	11	Prefecture, Municipality, NHK	https://www.pref.saitama.lg.jp/index.html (prefecture), https://www.city.saitama.jp/index.html (Saitama), https://www.city.kawaguchi.lg.jp/juwo/30172.html (Kawaguchi), https://www.city.kawagoe.saitama.jp/kenkofukushi/byoki_iryō/kansensho/COVID19-p-C.html (Kawagoe)	
Chiba	12	Prefecture	https://www.pref.chiba.lg.jp/shippei/press/2019/ncov-index.html#sibou	
Tokyo	13	Prefecture	https://www.metro.tokyo.lg.jp/tosei/hodohappyo/press/index.html	
Kanagawa	14	Prefecture, Municipality	https://www.pref.kanagawa.jp/prs/list-2020-1-1.html (prefecture), http://www.city.kawasaki.jp/350/page/0000115886.html (Kawasaki), https://www.city.yokohama.lg.jp/city-info/koho-kocho/press/covid-19/ (Yokohama), https://www.city.sagamihara.kanagawa.jp/shisei/koho/1019191.html (Sagamihara)	
Toyama	16	Kitanishion Shimbun, NHK, Asahi		https://webun.jp/
Ishikawa	17	Fukui Shimbun, NHK, Asahi		https://www.fukuishimbun.co.jp/
Fukui	18	Fukui Shimbun, NHK, Asahi		https://www.fukuishimbun.co.jp/
Yamanashi	19	NHK		
Gifu	21	Prefecture	https://www.pref.gifu.lg.jp/kinkyu-juyo-joho/shingata_corona_kansendoko.html	
Shizuoka	22	NHK		
Aichi	23	Prefecture, NHK	https://www.pref.aichi.jp/site/covid19-aichi/ (prefecture), http://www.city.nagoya.jp/kenkofukushi/page/0000126920.html (Nagoya), https://www.city.toyohashi.lg.jp/41805.htm (Toyohashi), https://www.city.okazaki.lg.jp/1550/1562/1615/p025980.html (Okazaki)	
Mie	24	You Yokkaichi		https://www.you-yokkaichi.com/
Shiga	25	Prefecture	https://www.pref.shiga.lg.jp/ippan/kenkouiryouhukushi/yakuji/311404.html	
Kyoto	26	Kyoto Shimbun		https://www.kyoto-np.co.jp/
Osaka	27	Prefecture	http://www.pref.osaka.lg.jp/hodo/index.php?site=fumin	
Hyogo	28	Kobe Shimbun		https://www.kobe-np.co.jp/
Nara	29	Prefecture	http://www.pref.nara.jp/55062.htm	
Wakayama	30	NHK, Asahi		
Hiroshima	34	Chugoku Shimbun		https://www.chugoku-np.co.jp/
Ehime	38	Ehime Shimbun		https://www.ehime-np.co.jp/
Kochi	39	NHK		
Fukuoka	40	Nishinippon Shimbun		https://www.nishinippon.co.jp/
Nagasaki	42	NHK		
Kumamoto	43	Kumamoto NichiNichi Shimbun		https://kumanichi.com/
Oita	44	Asahi		
Okinawa	47	Prefecture	https://www.pref.okinawa.jp/site/hoken/chiikihoken/kekkaku/press/20200416_covid19_pr.html

Figure 1 Geographical distribution of COVID-19 related deaths in Japan as of June 19, 2020

Note: prefectures with no deaths are omitted as NA

Figure 2 Geographical distribution of % over age 70 as of June 19

Note: prefectures with less than 10 deaths for population aged 70 or over are omitted as NA

Figure 3 Geographical distribution of sex ratio for COVID-19 deaths as of June 19

Note: prefectures with less than 10 deaths for men or women are omitted as NA

Appendix Figure 1 Prefecture map with jiscode

Appendix Table 1 COVID-19 death outcomes across prefectures

jiscode	name	death	% over70	Sex ratio
1	Hokkaido	94	71.28	1.96
2	Aomori	1	NA	NA
3	Iwate	0	NA	NA
4	Miyagi	1	NA	NA
5	Akita	0	NA	NA
6	Yamagata	0	NA	NA
7	Fukushima	0	NA	NA
8	Ibaraki	10	NA	NA
9	Tochigi	0	NA	NA
10	Gunma	19	89.47	NA
11	Saitama	51	64.71	2.5
12	Chiba	45	71.11	1.11
13	Tokyo	313	71.88	1.59
14	Kanagawa	94	77.66	1.3
15	Niigata	0	NA	NA
16	Toyama	22	90.91	0.91
17	Ishikawa	27	81.48	1
18	Fukui	8	NA	NA
19	Yamanashi	1	NA	NA
20	Nagano	0	NA	NA
21	Gifu	7	NA	NA
22	Shizuoka	1	NA	NA
23	Aichi	34	67.65	NA
24	Mie	1	NA	NA
25	Shiga	1	NA	NA
26	Kyoto	17	94.12	NA
27	Osaka	86	83.72	1.69
28	Hyogo	43	62.79	NA
29	Nara	2	NA	NA
30	Wakayama	3	NA	NA
31	Tottori	0	NA	NA
32	Shimane	0	NA	NA
33	Okayama	0	NA	NA
34	Hiroshima	3	NA	NA
35	Yamaguchi	0	NA	NA
36	Tokushima	1	NA	NA
37	Kagawa	0	NA	NA
38	Ehime	4	NA	NA
39	Kochi	3	NA	NA
40	Fukuoka	31	87.1	1.23
41	Saga	0	NA	NA
42	Nagasaki	1	NA	NA
43	Kumamoto	3	NA	NA
44	Oita	1	NA	NA
45	Miyazaki	0	NA	NA
46	Kagoshima	0	NA	NA
47	Okinawa	7	NA	NA