神奈川県立保健福祉大学
イノベーション政策研究センター

スタンフォード大学医学部・神奈川県共催セミナー
「コロナの調査研究と再生医療の日米最新動向」

“Public Health Research and Policies to combat COVID-19 in Kanagawa Prefecture”

The Stanford-Kanagawa Online Symposium

Byung-Kwang (BK) Yoo, M.D., M.S., Ph.D.
Professor
Graduate School of Health Innovation
Kanagawa University of Human Services

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Road Map

- Ongoing burdens and threats of COVID-19
  - Vaccination rates
  - Global mortality ranking
  - Time trends of mortality in Japan
  - Potential under-utilization of clinical tests
- Kanagawa prefecture's efforts
- Next steps

Global ranking of COVID-19 vaccination rates among G7 countries (as of Oct. 29 2022)

Country	Date updated	Cumulative number of persons fully vaccinated per 100 population	Global Ranking
Canada	2022-10-21	83.5	33
Japan	2022-09-16	81.3	39
Italy	2022-10-16	79.7	43
Germany	2022-10-16	78.0	55
France	2022-10-16	77.5	56
The United Kingdom	2022-09-11	74.6	65
United States of America	2022-10-21	67.6	94

Source: https://covid19.who.int/data, accessed 10-31-2022

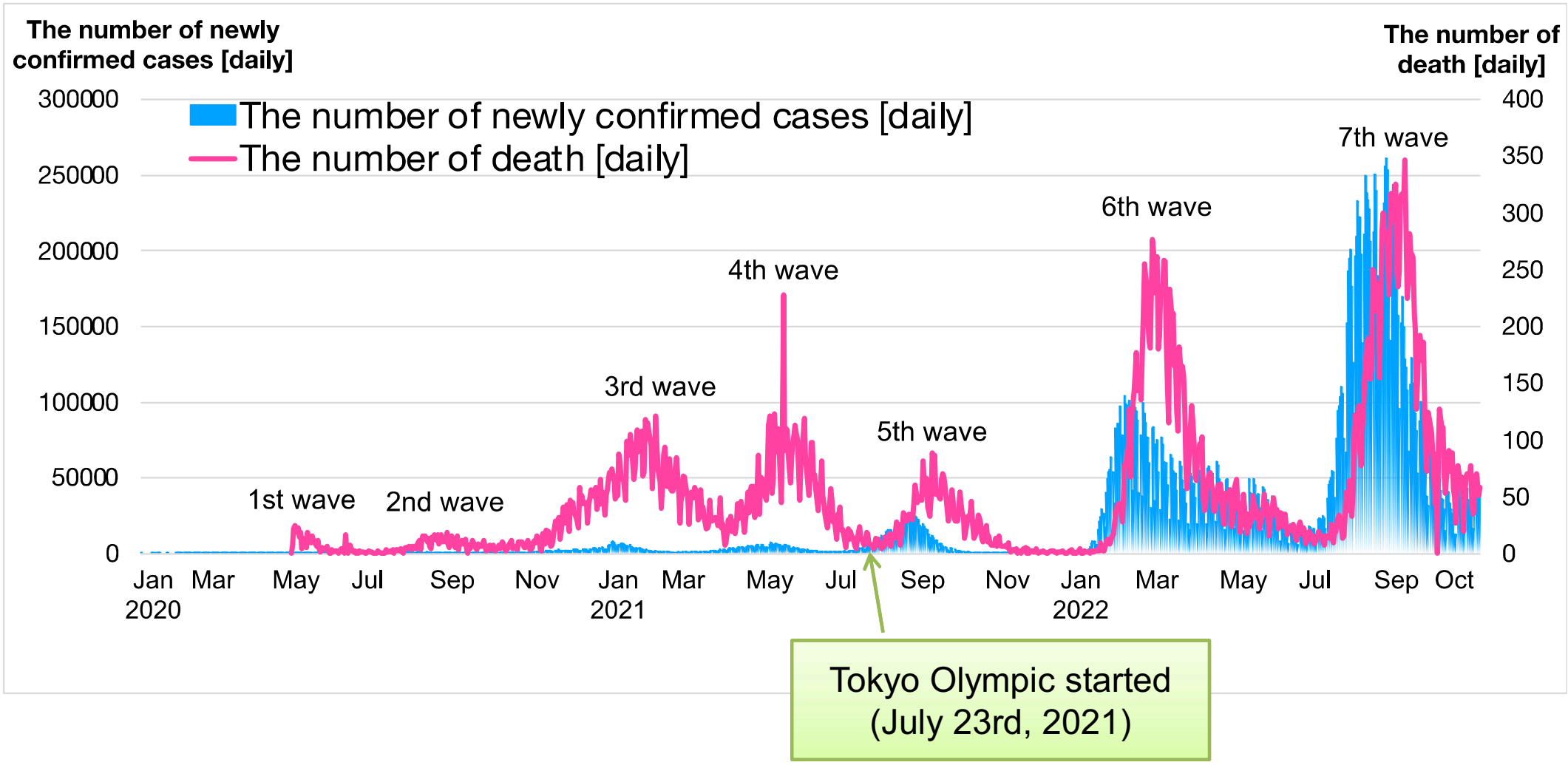
Global ranking for mortality rates from COVID-19 (as of Oct. 29 2022)

Country	# of deaths (per million)	Global Ranking
United States	3,271	16
Italy	2,971	23
United Kingdom	2,827	26
Germany	1,830	60
Hong Kong	1,363	79
Canada	1,208	87
New Zealand	630	122
Australia	601	125
South Korea	568	130
Taiwan	531	133
Japan	371	145

Source: https://www.worldometers.info/coronavirus/, accessed 10-29-2022

Time trends of epidemic cases & deaths in Japan

BLUE: New (+) case per day; RED: Death per day



Source: Ministry of Health, Labour and Welfare, Visualizing the data: information on COVID-19 infections, https://covid19.mhlw.go.jp/en/, accessed 10-29-2022

Estimating excess mortality due to the COVID-19 pandemic: a systematic analysis of COVID-19-related mortality, 2020–21

COVID-19 Excess Mortality Collaborators

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8912932/

Lancet 2022; 399: 1513–36

This online publication has been corrected.

The corrected version first appeared at thelancet.com on April 14, 2022

Yoo's evaluation report is available below

https://www.ric.u-tokyo.ac.jp/topics/2020/ig.html

https://www.ric.u-tokyo.ac.jp/topics/2020/ig-20220509.pdf

The larger values in column (5) indicates less reliable data.
Japan: >500% deaths under-reported?

	(1)	(2)	(3)	(4)	(5)
	Reported COVID-19 deaths (unit 1000)	Reported COVID-19 mortality rate (per 100 000)	Estimated excess deaths (unit 1000)	Estimated excess mortality rate (per 100 000)	Ratio of (=(4)/(2))
Global ave.	5 940	39·2	18 200	120·3	3·07
Japan	18·4	7·3	111	44·1	6·02
S. Korea	5·62	5·4	4·63	4·4	0·82*
U.S.	824	130·6	1 130	179·3	1·37
China	4·82	0·2	17·9	0·6	3·71
Germany	112	66·4	203	120·5	1·82
U.K.	173	130·1	169	126·8	0·97

(*) Negative values indicate a possible mortality reduction due to strict lockdowns etc.

Road Map

- Ongoing burdens and threats of COVID-19

- Kanagawa (K.) prefecture's efforts
  - Evidence Based Policy Making (EBPM) collaboration b/w K. prefecture gov't & K.Univ.H.S.
    - Development/Use of epidemic prediction models
    - Wastewater survey

- Next steps

EBPM Project

EBPM joint team of SHI and KPG

- Started: June 2021
- Press Release: August and September 2021

Activities

- To develop the “prediction model for COVID-19 infection.”
- To predict (a) hospitalized (esp. (b) severe patients) and (c) cumulative test positive cases (excluding recovered) at 8 regions w/in the prefecture (1st in Japan).
- To post the predictions weekly at the KPF homepage
  - ➢ Suspended since February 2022 due to insufficient reliable data
  - ➢ Preparing to resume Nov. 2020, using Wastewater survey data

Why wastewater (WW) survey/PCR tests?

What is WW PCR test?

- 66% of covid infected cases discharge virus in feces
- Sampling from (a) sewage treatment plant (covering 200,000 residents) or (b) one building

Advantages

A) High sensitivity proved empirically

- One building: can prove negative for all building users
- One sewage treatment plant: can detect 10 cases per 1 million residents (new technology developed in Japan)

B) To address disadvantages of clinical PCR tests

- To complement insufficient clinical PCR test capacity
- To improve representativeness
- To detect viral variants earlier

WW survey in Kanagawa Pref. (funded by SHI research grant)

Publicly available at Kanagawa Prefectural Government's Homepage

https://www.pref.kanagawa.jp/docs/ga4/covid19/simulation.html

(Overview) To observe the infectious status of COVID-19 by detecting its viral genes in sewage, as part of the "EBPM project: information analyses on COVID-19 infection," conducted in collaboration with Kanagawa prefectural government (KPG) and Kanagawa University of Human Services (SHI)

(1) WW survey target facilities (2 locations in the Sagami River basin)

- Yanagi-shima sewage treatment plant (targeted approx. 1.26 million residents on the left bank; Sagamihara City, etc.)
- Shinomiya sewage treatment plant (targeted approx. 0.54 million residents on the right bank; Hiratsuka City, etc.)

(2) Surveillance period and method (following advice from Prof. Kitajima at Hokkaido Univ.)

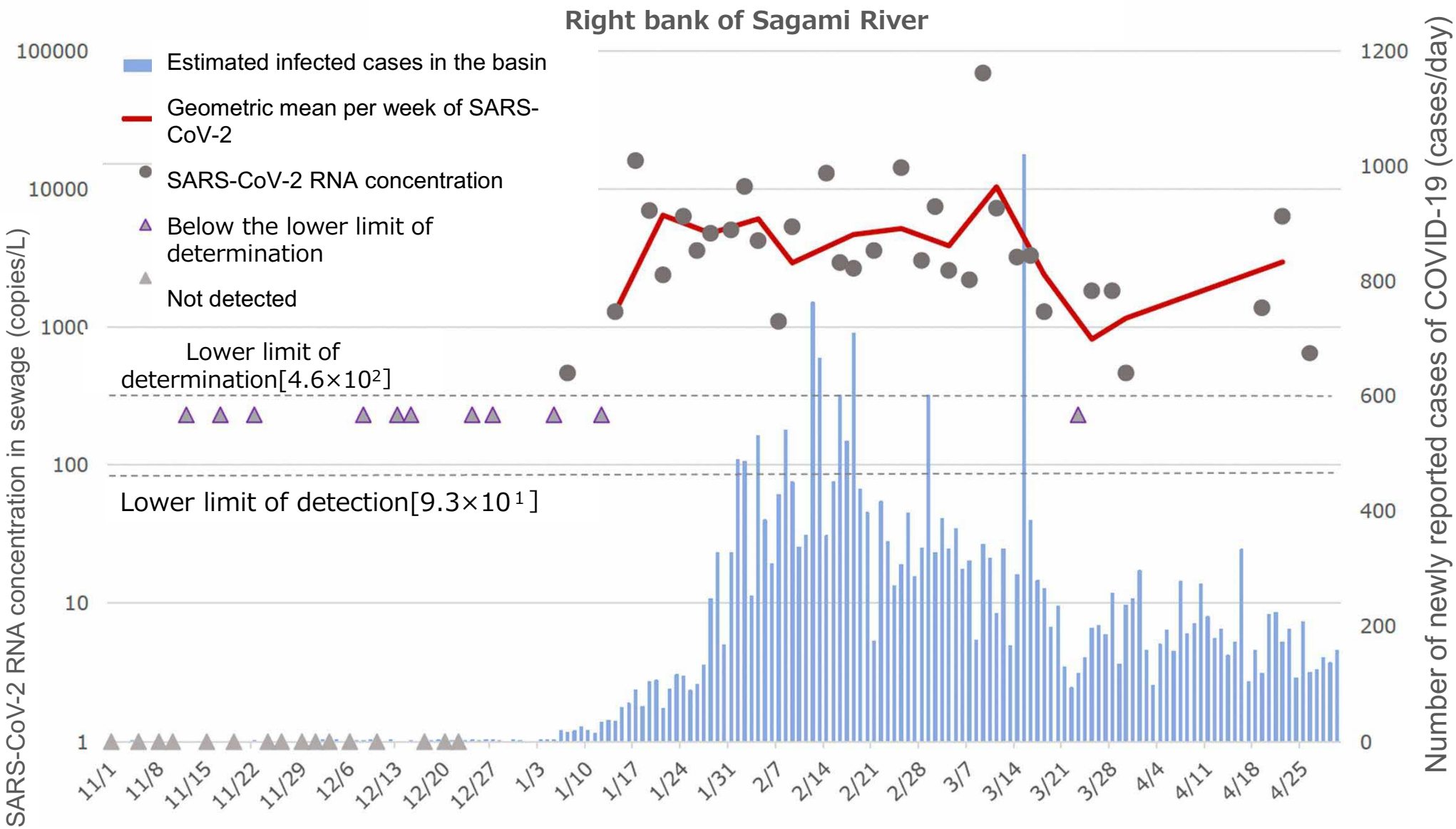
- Since November 2021 to present

(Frequency) measuring viral load twice a week/ analyzing variants once a week

(3) Results (Data analyzed by Shionogi & Co., Ltd.; explained in the following 2slides)

- After January 7, 2022: rise to a quantifiable level
- January 17, 2022: Conducted the first analysis on variants
- Found that the pattern of increase and decrease in the number of new positive cases and the concentration of virus in wastewater are generally consistent.

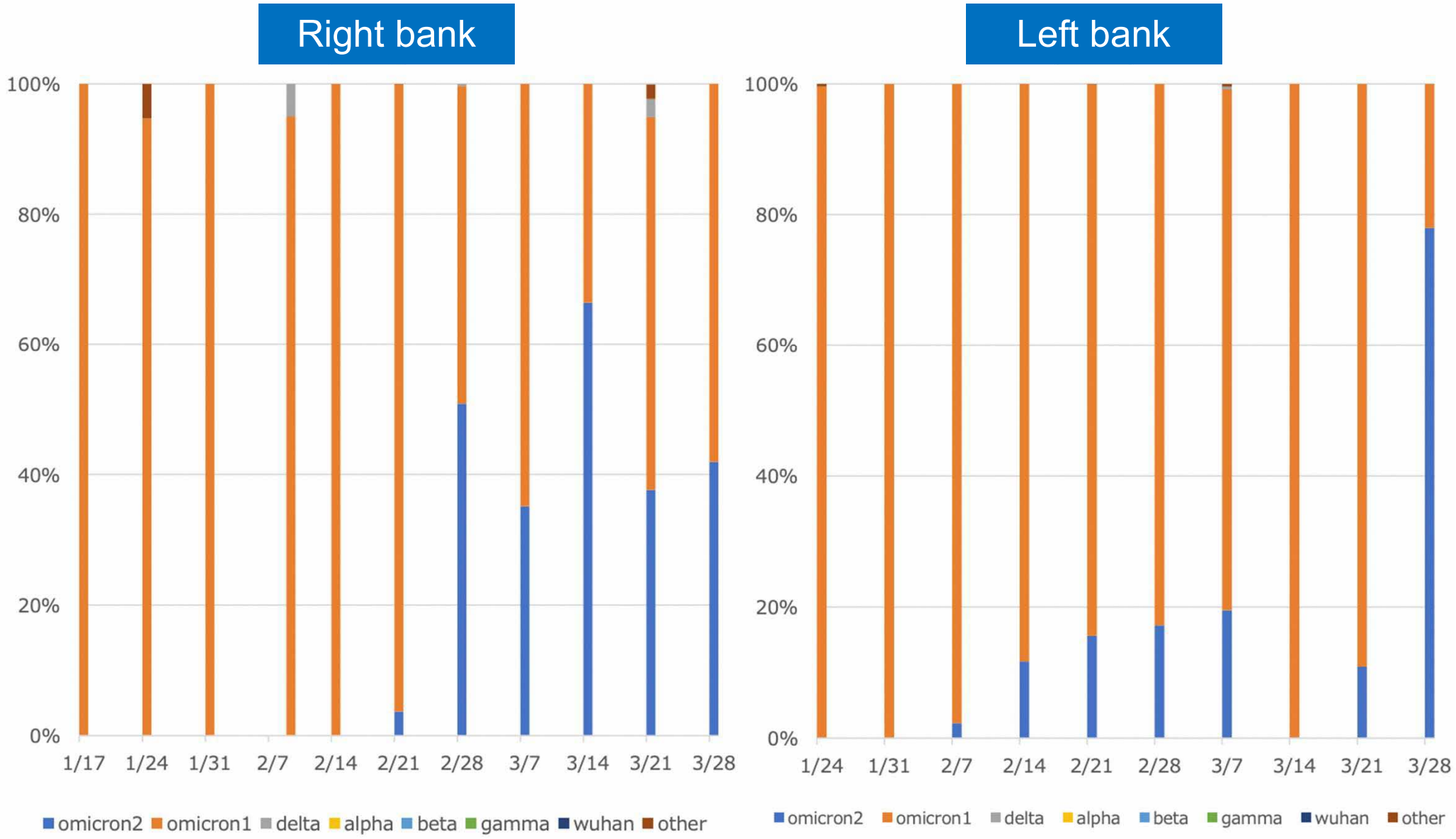
WW survey results of right bank of Sagami River between Nov. 2021 and Apr. 30, 2022



Publicly available at: https://www.pref.kanagawa.jp/documents/79278/amounto-of-virus.pdf

(1st survey in Japan) Time-trends in the proportions of variants,

Right/Left bank of Sagami River between Jan. 17 and Mar. 28, 2022



Publicly available at: https://www.pref.kanagawa.jp/documents/79278/mutanto-strain-ratio.pdf

Road Map

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  - To add seasonal flu to wastewater survey
  - Economic evaluations of wastewater survey

Economic evaluations of wastewater (ww) survey

General goal: To explore an efficient combination of WW PCR tests (as 1st screening) and clinical PCR tests (as 2nd screening) to achieve cost-saving (of future medical expenditure and broader economic ($) loss)

Our preliminary cost-benefit analysis of clinical PCR tests

at institutions such as a long-term care facility, schools, offices etc. :

- Magnitude of cost-saving ↑, if the prevalence ↑ (unknown a priori)
- Break-even point (threshold prevalence) varies across institutions
- Lower threshold prevalence, if (+) case causes greater $ loss

→ WW PCR tests estimate an area's prevalence, triggering some institutions to start (or change frequency of) clinical PCR tests