Genetic diversity in Influenza A virus of swine in Japan

Junki Mine

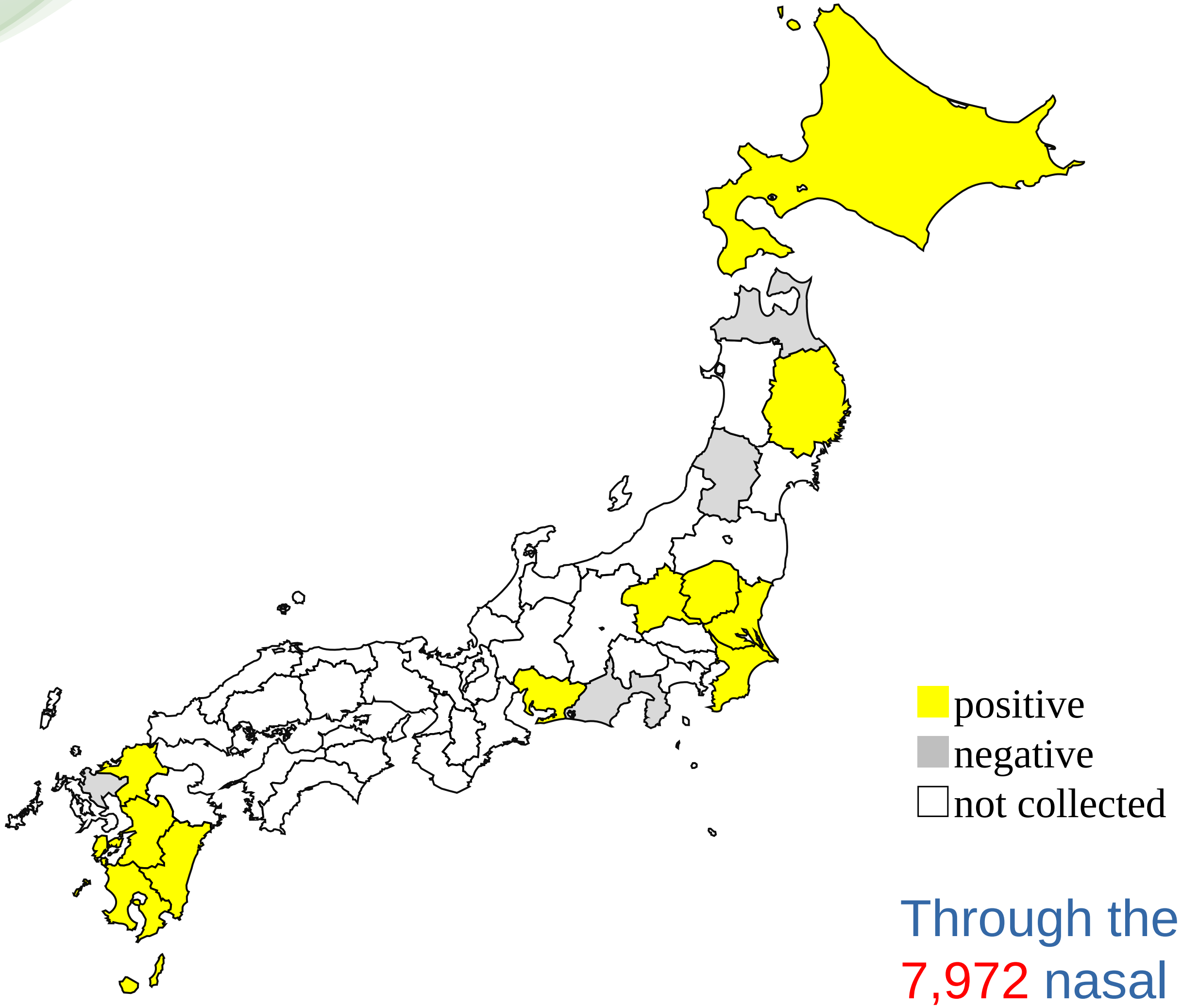
Researcher, NIAH, NARO, JAPAN

offlu
WOAH FAO
network of expertise on animal influenza

3 April 2024

Background information of the condition in Japan

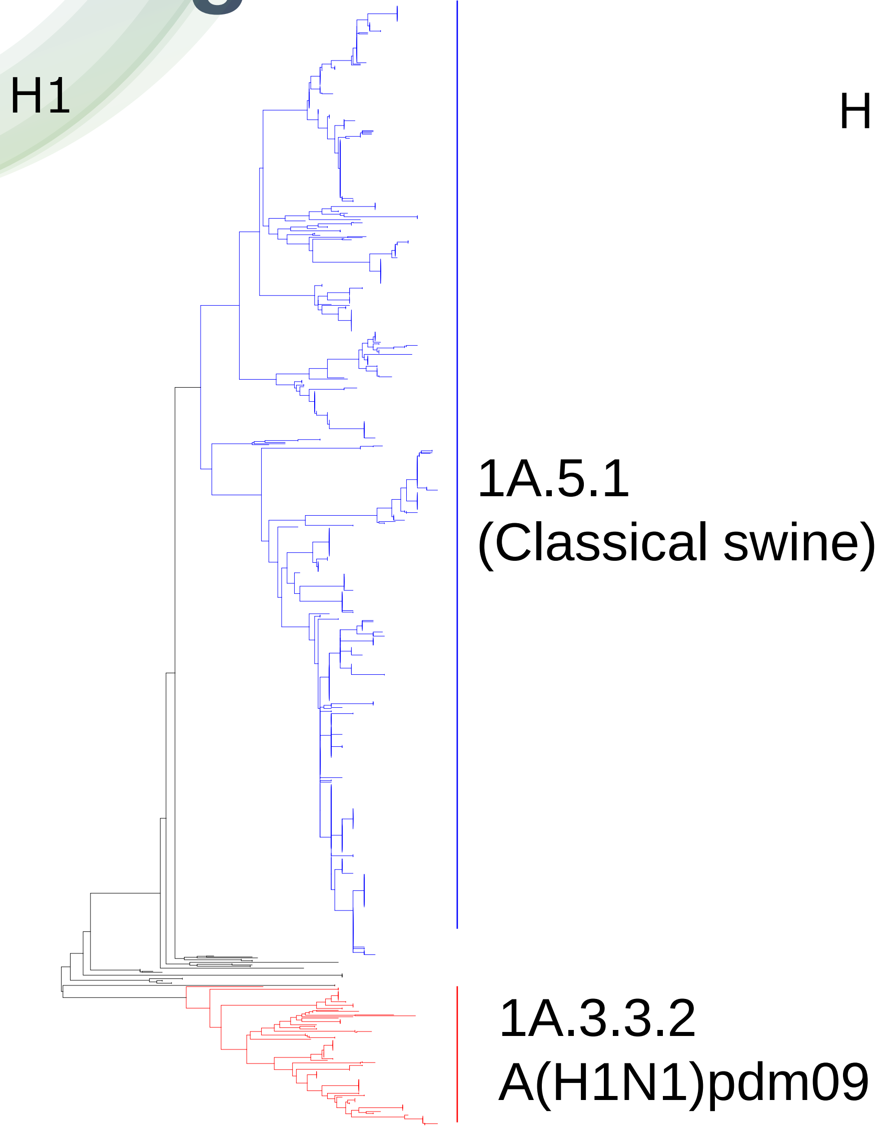
Collection of samples through Surveillance in Japan in 2018-2023

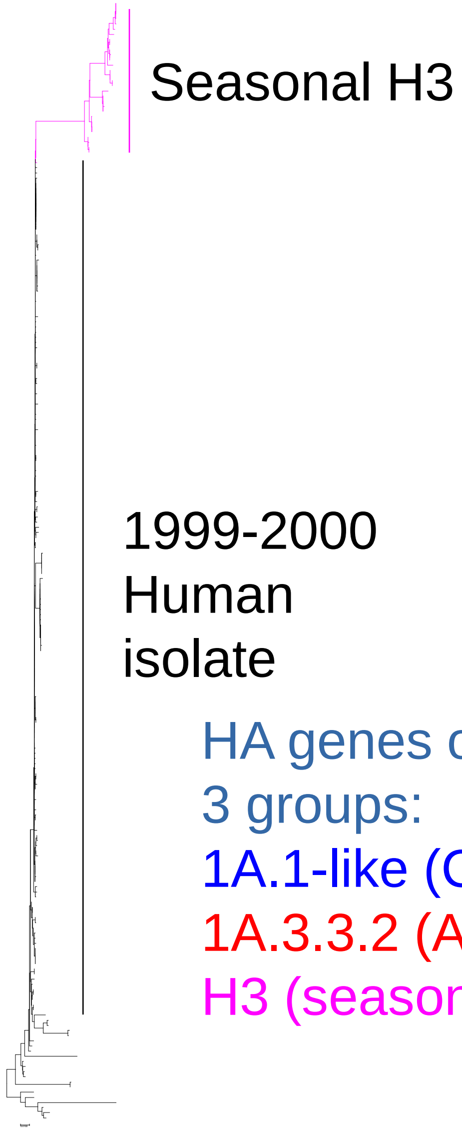


Prefecture	farm	swab	strain
Hokkaido	2	400	11
Aomori	1	111	0
Iwate	1	440	44
Yamagata	1	150	0
Tochigi	4	345	89
Ibaraki	2	500	38
Gunma	12	3141	241
Chiba	2	360	118
Shizuoka	2	90	0
Aichi	2	360	3
Fukuoka	1	180	8
Saga	1	95	0
Kumamoto	3	360	16
Miyazaki	3	309	10
Kagoshima	6	1131	41
	43	7972	619

Through the surveillance from 2018 to 2023, we collected 7,972 nasal swab samples and isolated 619 IAVs-S.

The phylogenetic trees on HA gene





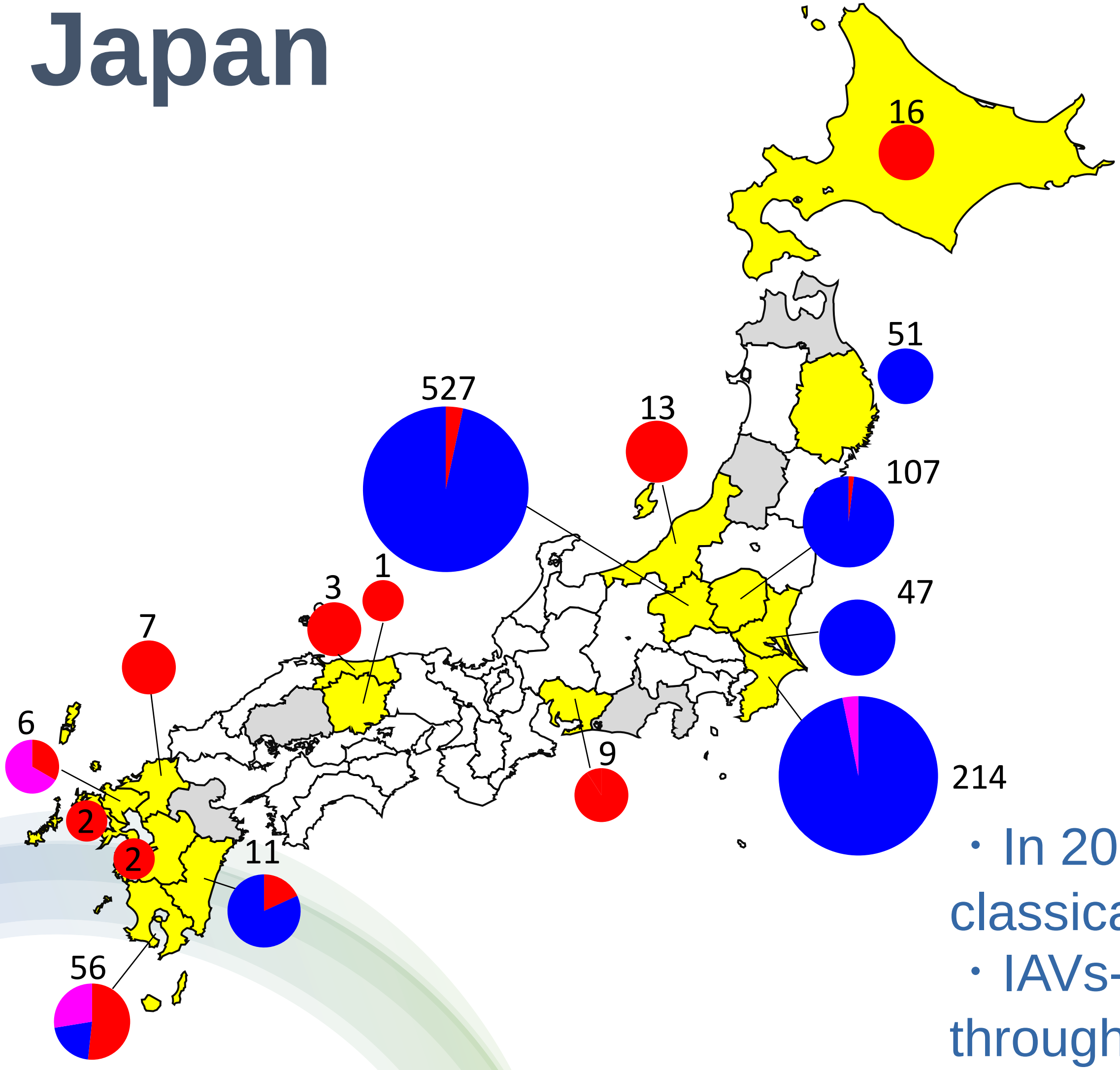
HA genes of Japanese IAVs-S are classified into 3 groups:

1A.1-like (Classical swine)

1A.3.3.2 (A(H1N1)pdm09)

H3 (seasonal)

The situation of IAVs-S in Japan



	HA clade
🟥	1A.3.3.2 A(H1N1)pdm09
🟦	1A.5.1 Classical swine
🟪	Human seasonal H3

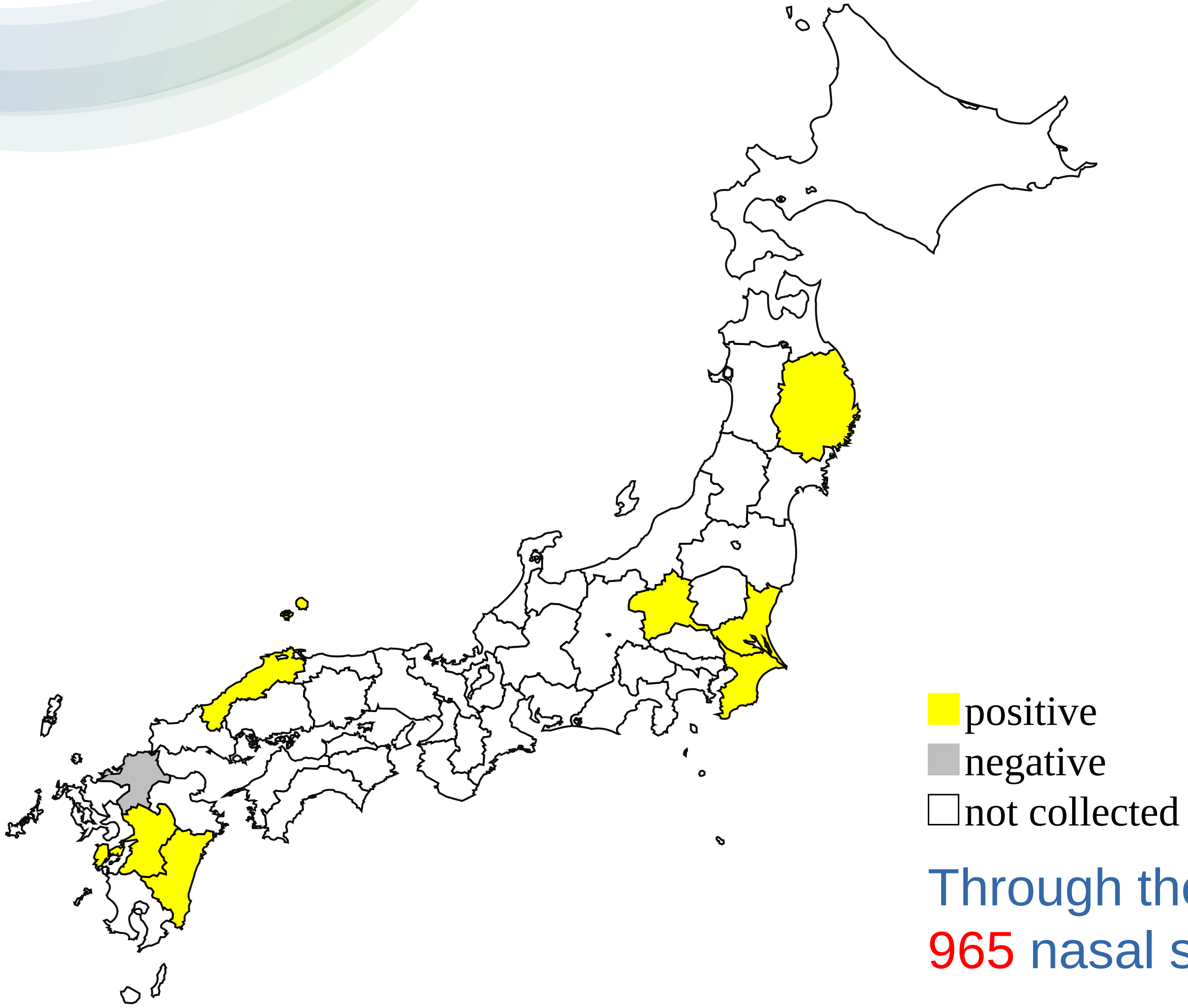
🟨 positive
⬜ negative
☐ not collected

- In 2015-2023, IAVs-S possessing HA gene of 1A.5.1 classical swine are most isolated.
- IAVs-S possessing 1A.3.3.2 A(H1N1)pdm09 are isolated throughout the country, while 1A.1 classical swine and human seasonal H3 are locally.
- Number of isolated H3N2 IAVs-S are few.

The situation in Japan in 2023-2024

offlu
WOAH FAO
network of expertise on animal influenza

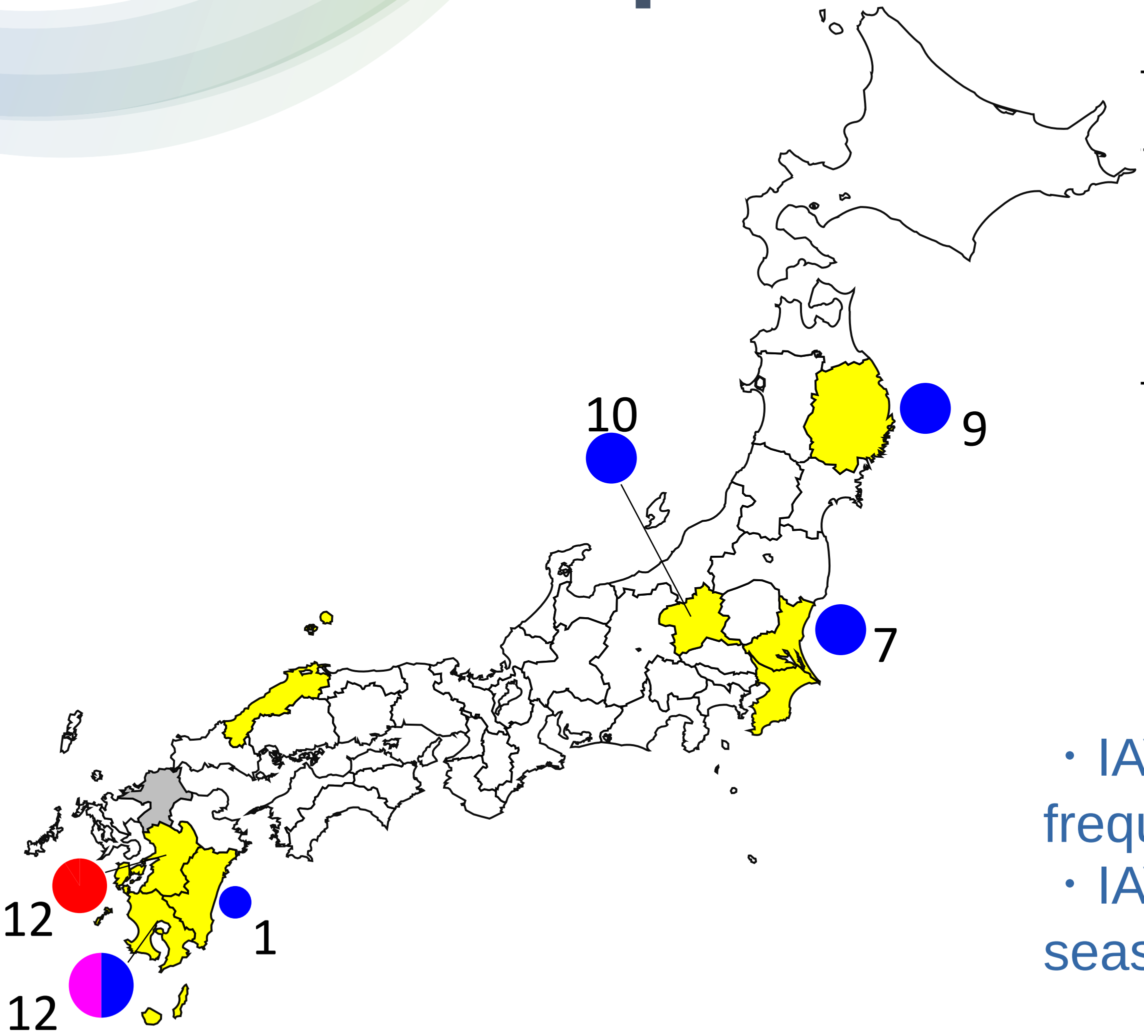
Collection of samples through Surveillance in Japan in 2023-2024



Prefecture	farm	swab	strain
Iwate	1	60	14
Ibaraki	2	125	21
Gunma	7	270	14
Chiba	1	30	7
Shimane	2	60	7
Fukuoka	1	40	0
Miyazaki	2	160	10
Kumamoto	2	80	12
Kagoshima	3	140	12
	21	965	97

Through the surveillance from 2023 to 2024, we collected 965 nasal swab samples and isolated 97 IAVs-S.

Classification of recent strains isolated in Japan



	HA clade
🔴	1A.3.3.2 A(H1N1)pdm09
🔵	1A.5.1 Classical swine
🟣	Human seasonal H3

🟨 positive
⬜ negative
☐ not collected

- IAVs-S possessing HA gene of 1A.5.1 classical swine are frequently isolated in Japan.
- IAVs-S possessing 1A.3.3.2 A(H1N1)pdm09 and human seasonal H3 are isolated in Kyusyu.

Summary

- Three genotypes (H1 1A.5.1; H1 1A.3.3.2; H3) are circulating in Japan.
- H1 1A.5.1 IAVs-S are most isolated recent years.
- H1 1A.5.1 and H3 IAVs-S are localized, while H1 1A.3.3.2 IAVs-S are sporadically isolated throughout Japan.

- H1 1A.5.1 and H3 IAVs-S might have adapted to swine, while H1 1A.3.3.2 IAVs-S might not enough.