Transitions in Omicron sublineages

Update 2022/08/15

Bette Korber, Will Fischer, Hyejin Yoon, James Theiler

Contents:

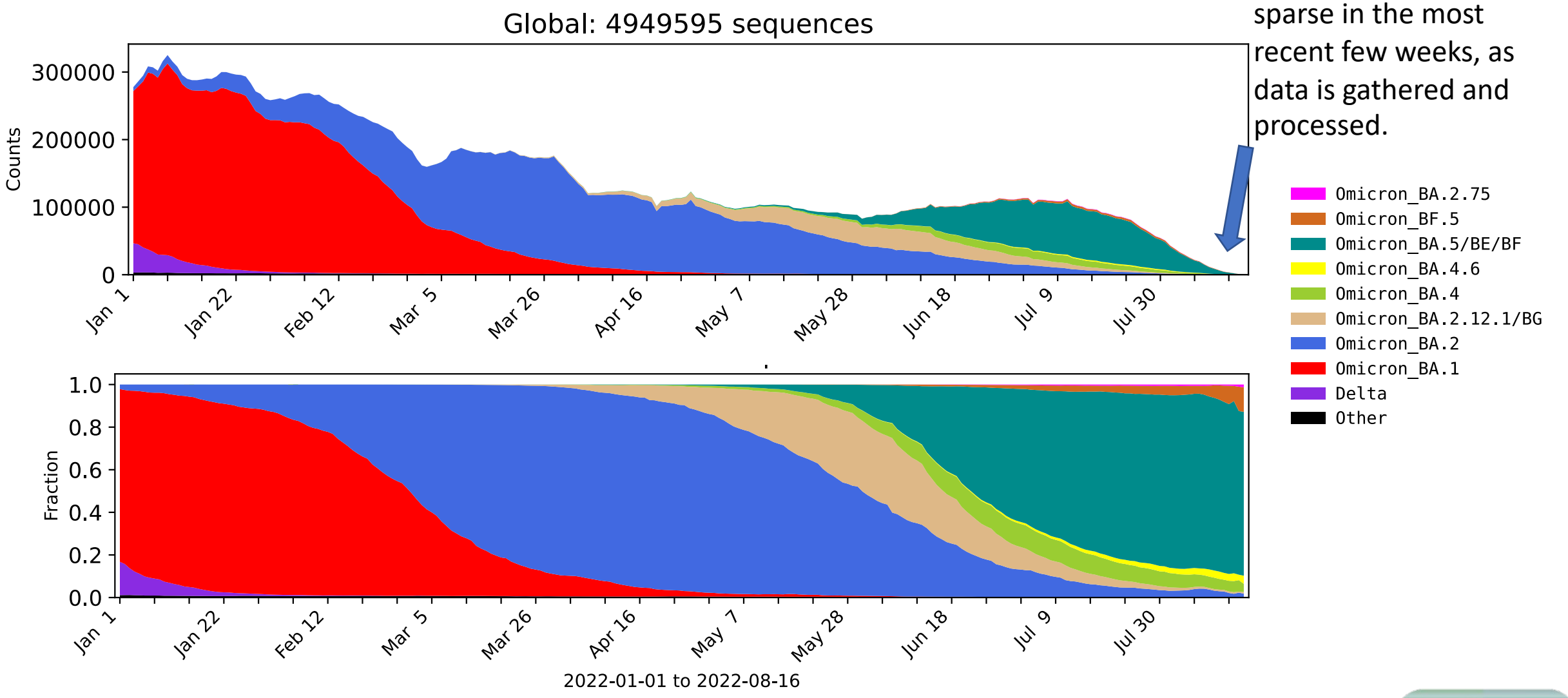
Los Alamos NATIONAL LABORATORY

GISAID

LA-UR-21-28226

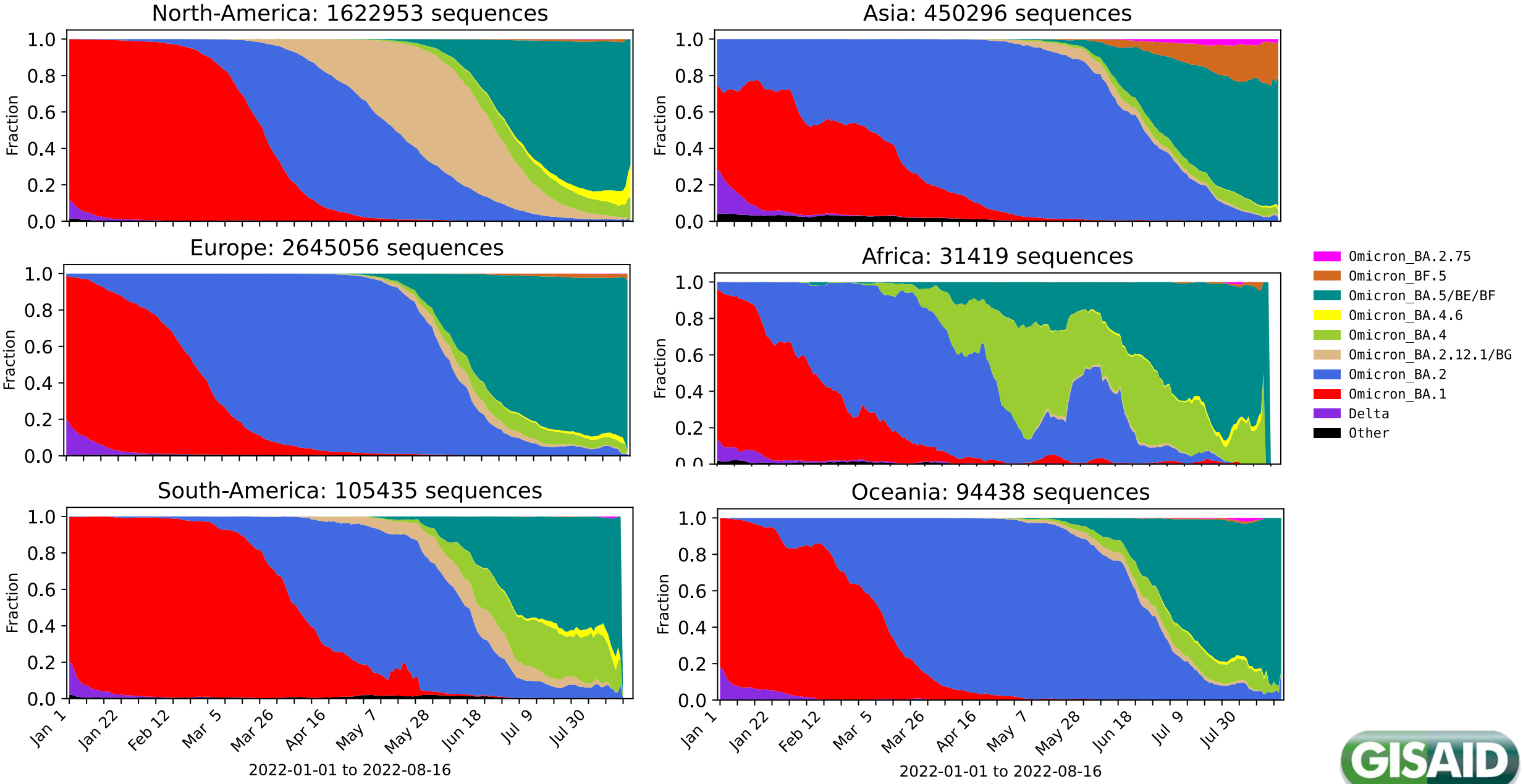
Global transitions in major Omicron Pango Lineages in 2022

Through August 15



Sampling is always sparse in the most recent few weeks, as data is gathered and processed.

Transitions in major Omicron Pango Lineages by continent in 2022



BA.2.75

BA.2.75 was declared by the WHO as a VOC-LUM. The data included here support this being an important variant.

BA.2.75 is a BA.2 sublineage that differs from BA.2 in the following positions: [K147E.W152R.F157L.I210V.G257S.G339H.G446S.N460K]_revert[Q493R]

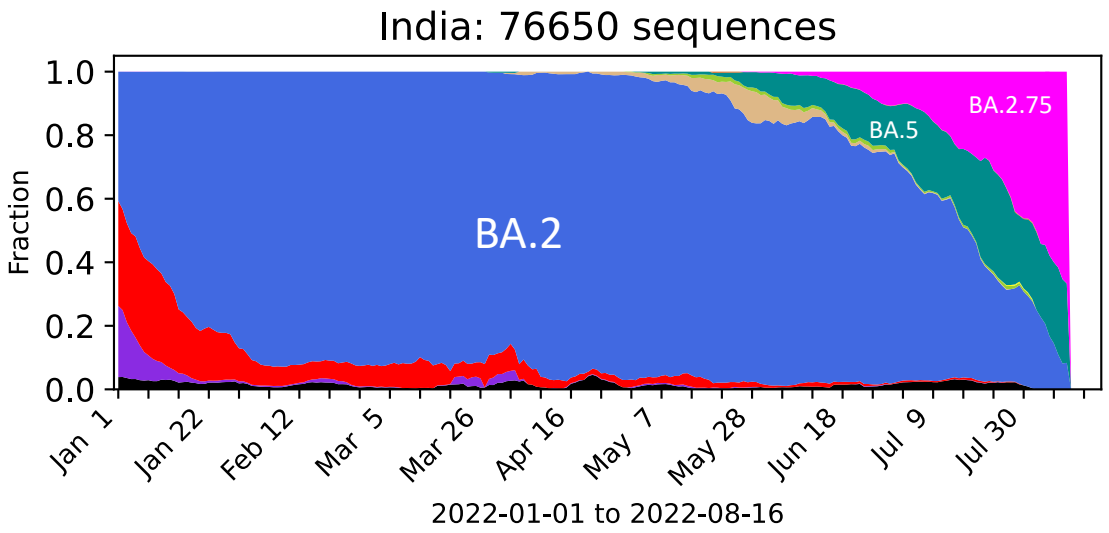
It started to increase in prevalence in India in late May, and is now approaching about ~50% sampled variants in India.
It is increasing simultaneously in states throughout India.

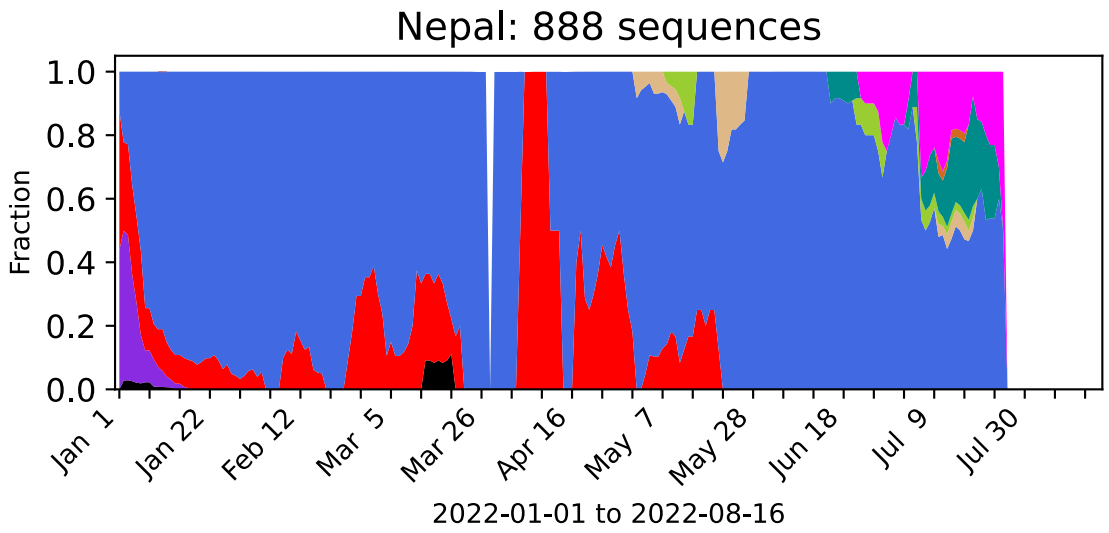
2,940 GISAID entries are BA.2.75, and it is found in 30 countries.

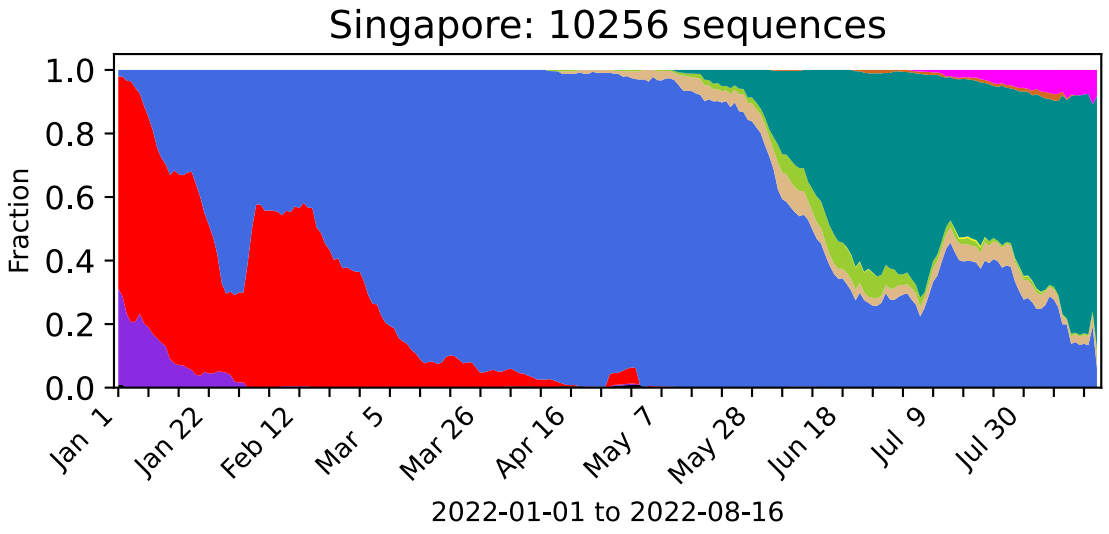
It is increasingly prevalent in every country where it has been found more than 10 times

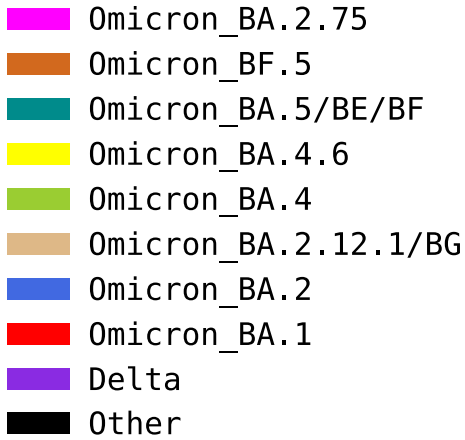
In countries where places where BA.5 is co-circulating with BA.2.75, it is increasing at a faster pace than BA.5

3 examples of nations where BA.2.75 is currently relative common









BA.2.75 is increasingly sampled in countries where it has become established.

Isotonic regression analysis, cov.lanl.gov

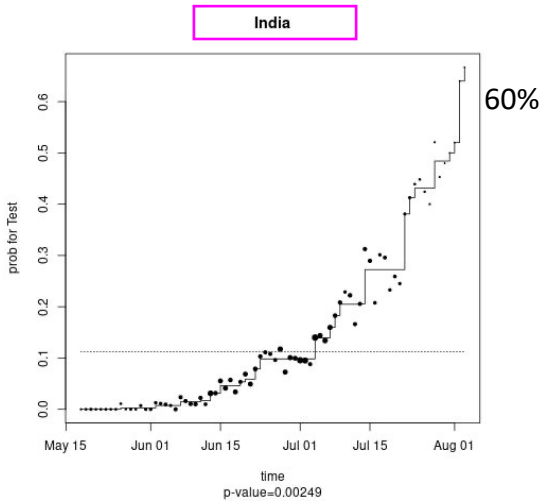
Significantly increasing over time

BA.2.75 All other

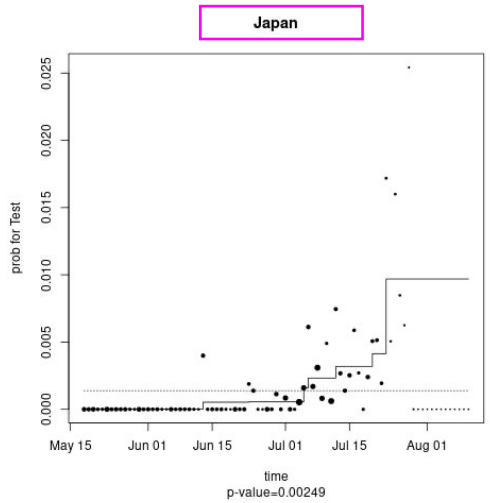
	# Test	# Others	Total	Test/Total (%)	# days	Time window	p-val
Australia	56	25623	25679	0.22	86	85	0.00249
Austria	15	31067	31082	0.05	80	79	0.00249
Canada	39	31934	31973	0.12	79	78	0.00249
Denmark	24	42053	42077	0.06	83	82	0.00249
Germany	21	95078	95099	0.02	83	82	0.00249
India	1994	15776	17770	11.22	78	77	0.00249
Israel	37	41327	41364	0.09	86	85	0.00249
Japan	65	46875	46940	0.14	85	84	0.00249
Nepal	17	132	149	11.41	46	60	0.00249
Russia	11	2253	2264	0.49	76	78	0.10448
Singapore	88	4535	4623	1.90	85	84	0.00249
USA	119	371332	371451	0.03	86	85	0.00249
United-Kingdom	40	95498	95538	0.04	85	84	0.00249

Above: summary of all countries where BA.2.75 was sampled ≥10 times. A p-value < 0.05 indicates that BA.2.75 is gaining in sampling frequency between 2022-05-16 and 2022-08-16.

In the examples on the right, size of the dot reflects the sample size on given day and the y axis represents the sampling frequency of BA.2.75



60%



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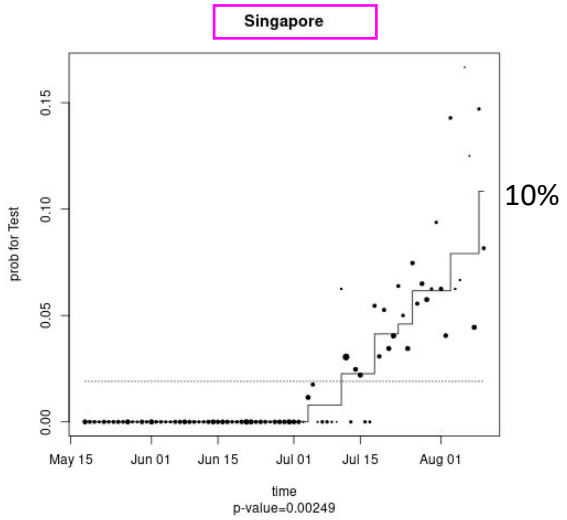
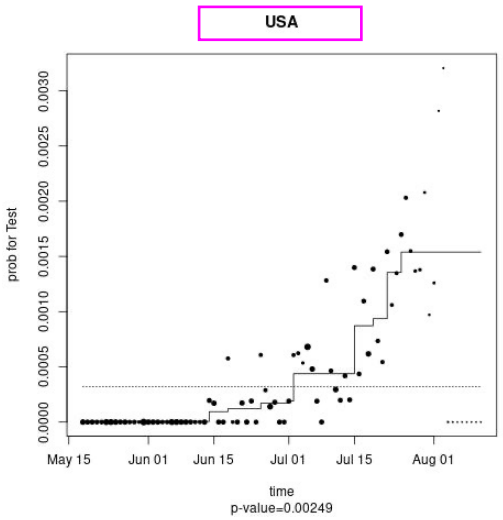


10%



0.15%

Sampling is very sparse in recent days, so still rare variants go undetected.

In 10/13 countries where BA.2.75 and BA.5 are co-circulating, BA.2.75 is increasing *relative* to BA.5

Isotonic regression analysis, cov.lanl.gov

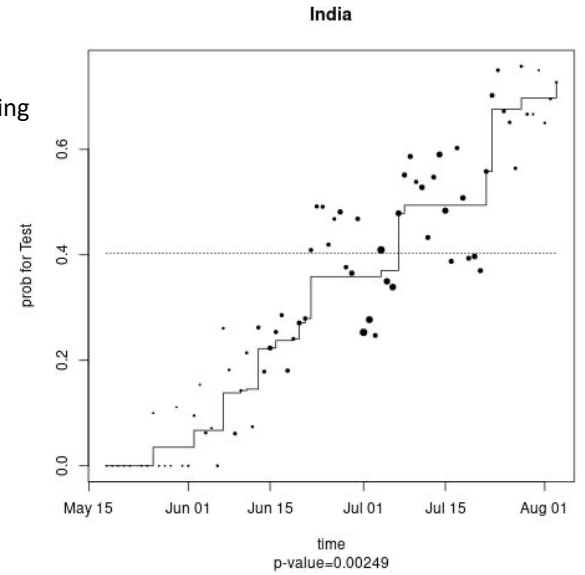
Significantly increasing over time

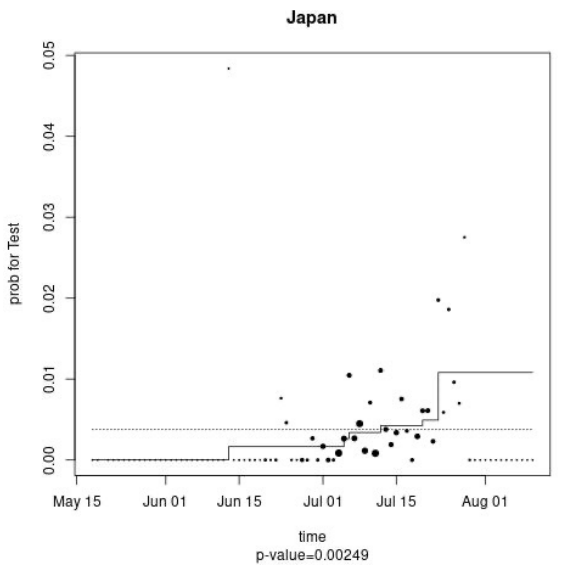
BA.2.75 BA.5

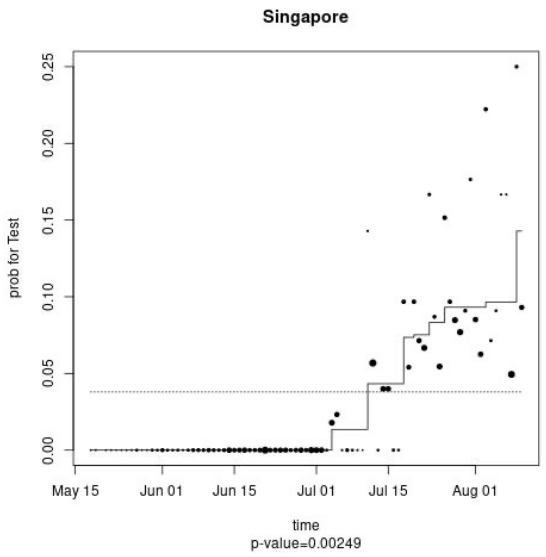
	# Test	# Others	Total	Test/Total (%)	# days	Time window	p-val
Australia	56	10231	10287	0.54	86	85	0.00249
Austria	15	3030	3045	0.49	74	79	0.00249
Canada	39	13463	13502	0.29	79	78	0.5796
Denmark	24	28980	29004	0.08	83	82	0.00249
Germany	21	58612	58633	0.04	83	82	0.00249
India	1994	2949	4943	40.34	77	77	0.00249
Israel	37	27733	27770	0.13	85	84	0.00249
Japan	65	17208	17273	0.38	84	84	0.00249
Nepal	17	16	33	51.52	15	34	0.31592
Russia	11	1833	1844	0.60	52	73	0.35821
Singapore	88	2232	2320	3.79	84	84	0.00249
USA	119	151007	151126	0.08	86	85	0.00249
United-Kingdom	40	62666	62706	0.06	85	84	0.00498

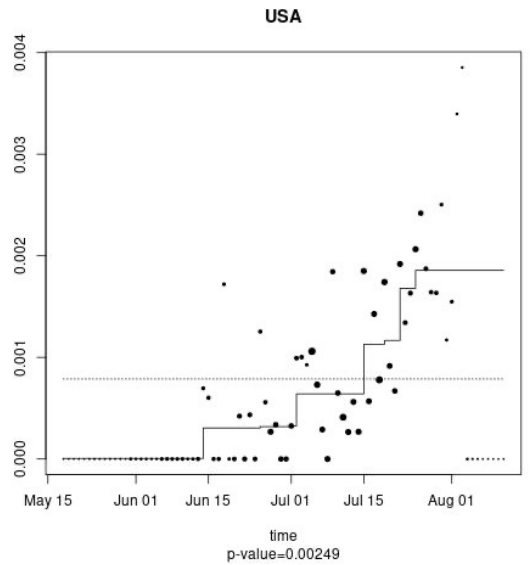
Above: summary of all countries where BA.2.75 and BA.5 were co-circulating and each was found ≥10 times. A p-value < 0.05 indicates that BA.2.75 is gaining in sampling frequency relative to BA.5. Sampling between 2022-05-16 and 2022-08-16.

In graphs on the right, size of the dot reflects the sample size on given day and the y axis represents the sampling frequency of BA.2.75/(BA.2.75+BA.5)



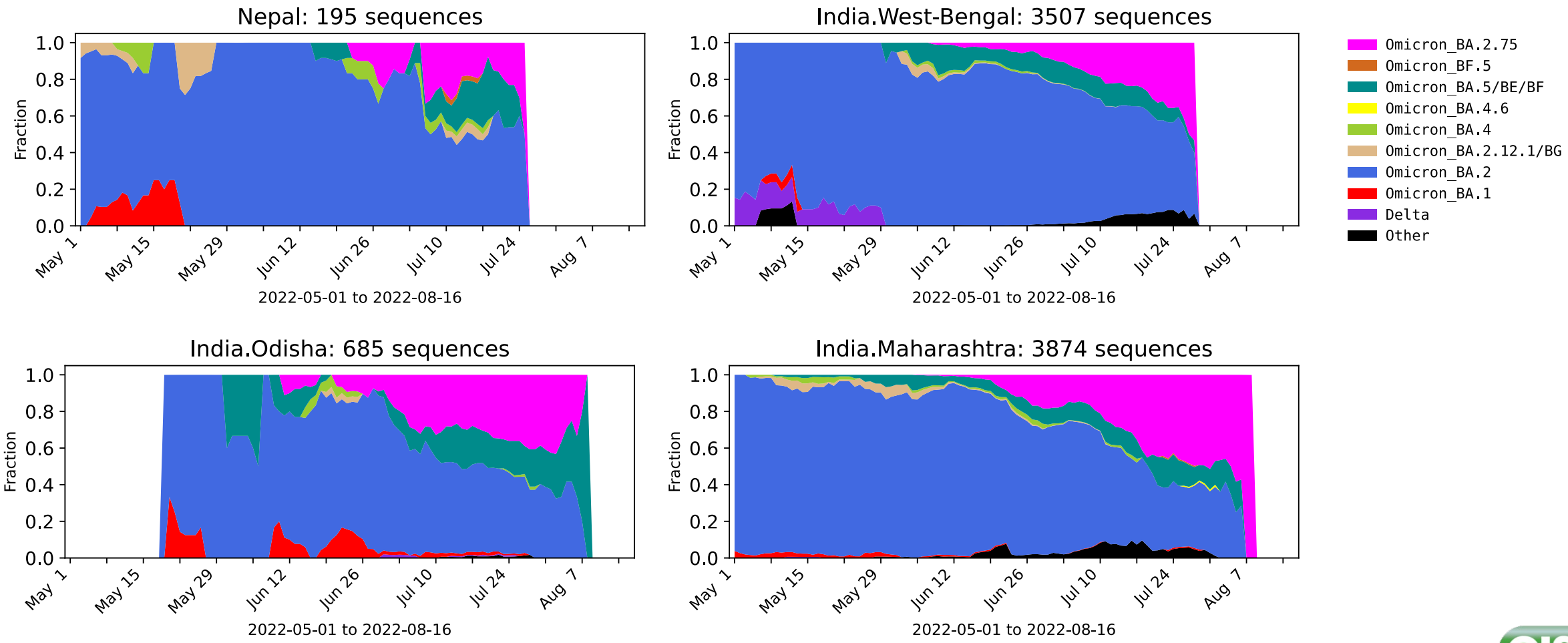






Nepal and examples of states within India where BA.2.75 is increasing

BA.5 and BA.2.12.1 arrived in these areas first and began expanding, yet BA.2.75 is becoming more prevalent



The most recent time points are generally very sparsely sampled…

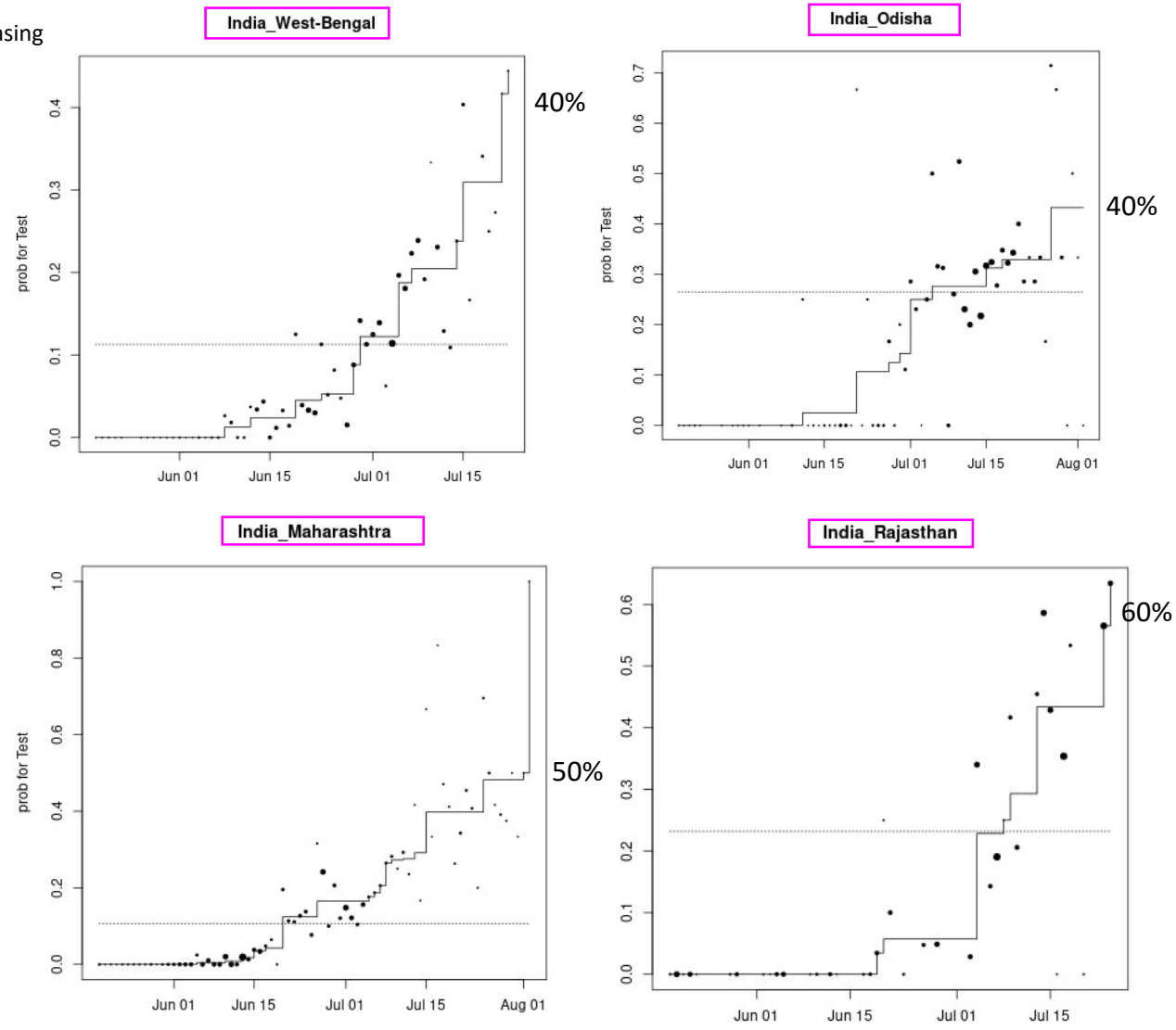
BA.2.75 is increasingly sampled in states where it has become established, a consistent pattern throughout India.

Significantly increasing over time

BA.2.75 All other

	# Test	# Others	Total	Test/Total (%)	# days	Time window	p-val
Australia_New-South-Wales	36	6916	6952	0.52	84	83	0.00249
Austria_Vienna	14	7404	7418	0.19	67	76	0.00249
Canada_Alberta	10	4428	4438	0.23	65	64	0.03483
Canada_Ontario	22	13148	13170	0.17	78	77	0.00995
Denmark_Sjaelland	11	6481	6492	0.17	82	81	0.00249
India_Assam	24	350	374	6.42	28	49	0.00249
India_Chhattisgarh	30	127	157	19.11	43	55	0.00249
India_Delhi	71	1202	1273	5.58	65	68	0.00249
India_Gujarat	104	997	1101	9.45	60	59	0.00249
India_Haryana	31	191	222	13.96	37	50	0.00249
India_Himachal-Pradesh	38	111	149	25.50	47	58	0.00249
India_Karnataka	63	289	352	17.90	48	67	0.00249
India_Maharashtra	382	3227	3609	10.58	76	75	0.00249
India_Manipur	11	70	81	13.58	23	53	0.52736
India_Odisha	189	524	713	26.51	66	75	0.00249
India_Punjab	130	151	281	46.26	43	46	0.03234
India_Rajasthan	231	765	996	23.19	39	66	0.00249
India_Sikkim	18	87	105	17.14	18	32	0.00746
India_Tamil-Nadu	61	2249	2310	2.64	67	66	0.00249
India_Telangana	177	1341	1518	11.66	77	76	0.00249
India_West-Bengal	406	3192	3598	11.28	62	64	0.00249
Japan_Tokyo	15	12103	12118	0.12	70	74	0.00249
USA_California	26	69231	69257	0.04	82	81	0.00249
USA_New-Jersey	18	14426	14444	0.12	77	76	0.00249
USA_New-York	17	40035	40052	0.04	81	80	0.00249
USA_Washington	12	13998	14010	0.09	75	74	0.00249
United-Kingdom_England	33	70503	70536	0.05	84	83	0.00249

4 examples



All states in the GISAID sample where BA.2.75 was found ≥10

BF.5

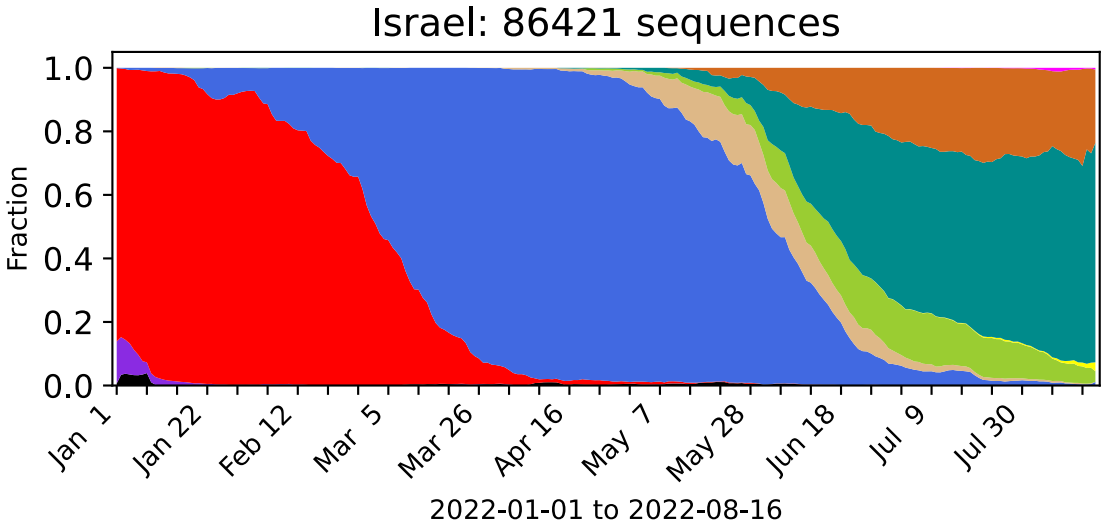
BF.5 is a BA.5 sublineage that adds A1020S to BA.5's baseline Spike

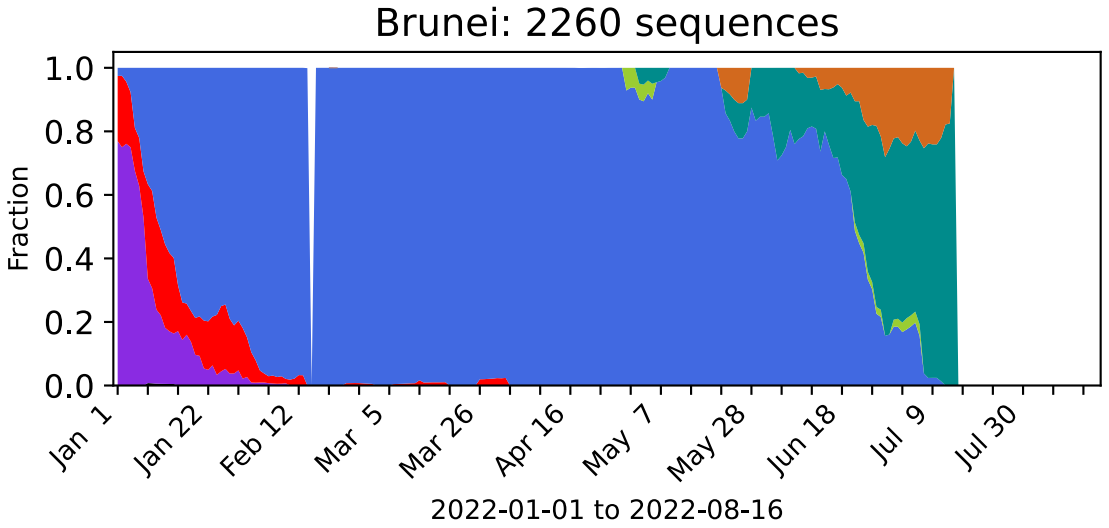
It is very common globally, sampled 17,976 times in GISAID, and is particularly common Israel.

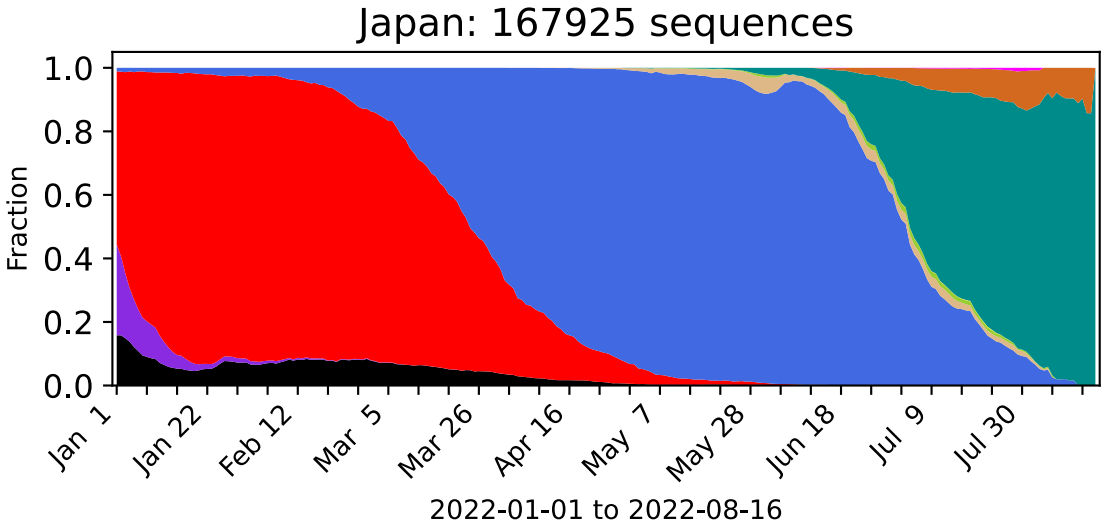
While it is increasing globally, it is not consistently increasing *faster* than other BA.5s, so its upsweep in prevalence may just be part of the global transition to the BA.5 lineage that is underway.

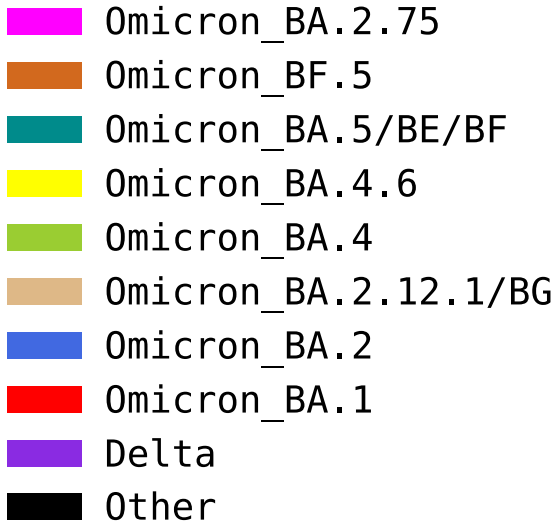
3 examples of nations where BF.5 is currently relative common

It is most common in Israel, but not increasing relative to other BA.5s, maintained at ~30% of BA.5 since June







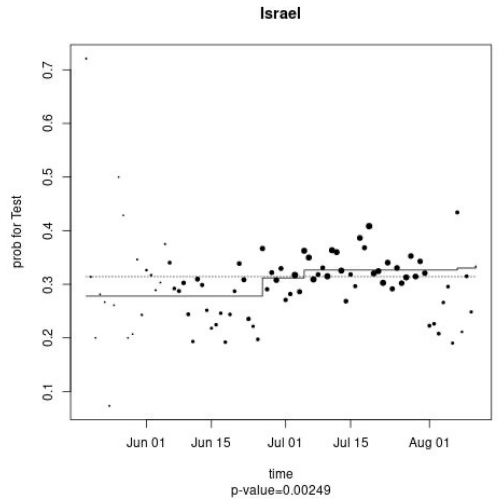


BF.5 has increased overall in 36/37 countries BUT it is not consistently increasing relative to other BA.5s, and where it is increasing it usually is *very* gradual and stable since June, suggesting it is not increasing relative to other BA.5s

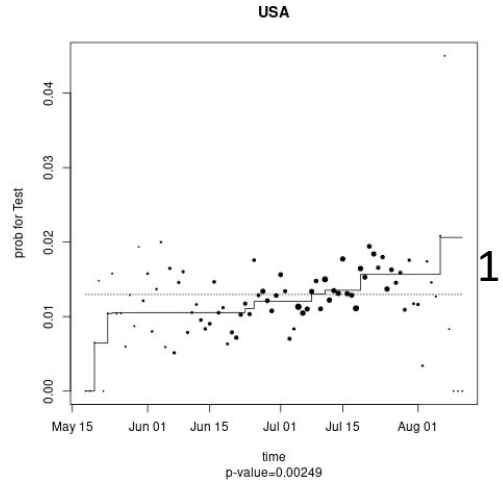
BF.5 BA.5

	# Test	# Others	Total	Test/Total (%)	# days	Time window	p-val
Australia	81	10150	10231	0.79	86	85	0.00746
Austria	45	2985	3030	1.49	74	79	0.63184
Belgium	173	9395	9568	1.81	84	83	0.00249
Brunei	68	203	271	25.09	38	48	0.27363
Canada	140	13323	13463	1.04	79	78	0.00249
Czech-Republic	61	2303	2364	2.58	73	79	0.71393
Denmark	758	28222	28980	2.62	83	82	0.00249
Finland	19	1828	1847	1.03	67	69	0.03483
France	461	33522	33983	1.36	83	82	0.00249
Georgia	15	138	153	9.80	38	61	0.00249
Germany	693	57919	58612	1.18	83	82	0.00249
Greece	63	877	940	6.70	45	49	0.12935
Iceland	16	893	909	1.76	67	66	0.01493
India	11	2938	2949	0.37	77	77	0.67413
Indonesia	194	5459	5653	3.43	75	76	0.56716
Ireland	45	5153	5198	0.87	68	68	0.19154
Israel	8714	19019	27733	31.42	85	84	0.00249
Italy	63	6475	6538	0.96	84	83	0.00249
Japan	1764	15444	17208	10.25	84	84	0.00249
Luxembourg	54	4185	4239	1.27	66	67	0.00249
Malaysia	24	703	727	3.30	66	79	0.5796
Netherlands	108	6465	6573	1.64	81	81	0.00249
Poland	18	828	846	2.13	60	71	0.4801
Portugal	26	4021	4047	0.64	74	76	0.00249
Puerto-Rico	16	289	305	5.25	43	70	0.26617
Romania	20	466	486	4.12	45	65	0.01244
Russia	55	1778	1833	3.00	51	73	0.57214
Singapore	27	2205	2232	1.21	84	84	0.05473
Slovakia	223	1284	1507	14.80	68	71	0.37313
Slovenia	10	1451	1461	0.68	65	66	0.07463
South-Korea	48	2146	2194	2.19	63	64	0.00498
Spain	30	8207	8237	0.36	79	78	0.00498
Sweden	123	6590	6713	1.83	82	81	0.00249
Switzerland	31	2983	3014	1.03	75	75	0.00498
Turkey	17	850	867	1.96	20	81	0.8607
USA	1959	149048	151007	1.30	86	85	0.00249
United-Kingdom	780	61886	62666	1.24	85	84	0.00249

A significant but very slight increase, steady at ~30%

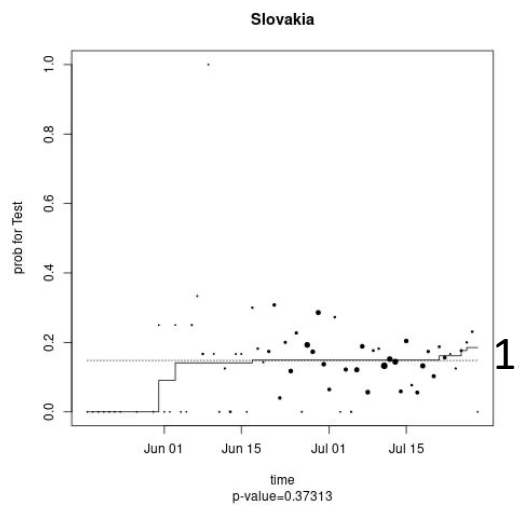


30%

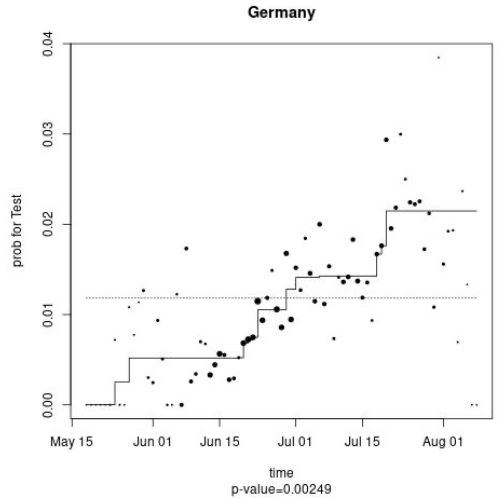


1.2%

A significant but slight increase steady at ~15%



15%



2%

Exception: Germany

Above: summary of all countries where BF.5 and other BA.5s were co-circulating and BF.5 was found >10 times. A p-value < 0.05 indicates that BF.5 is gaining in sampling frequency relative to other BA.5.
Sampling between 2022-05-16 and 2022-08-16.
In the four example graphs on the right, size of the dot reflects the sample size on given day and the y axis represents the sampling frequency of BF.5/BA.5

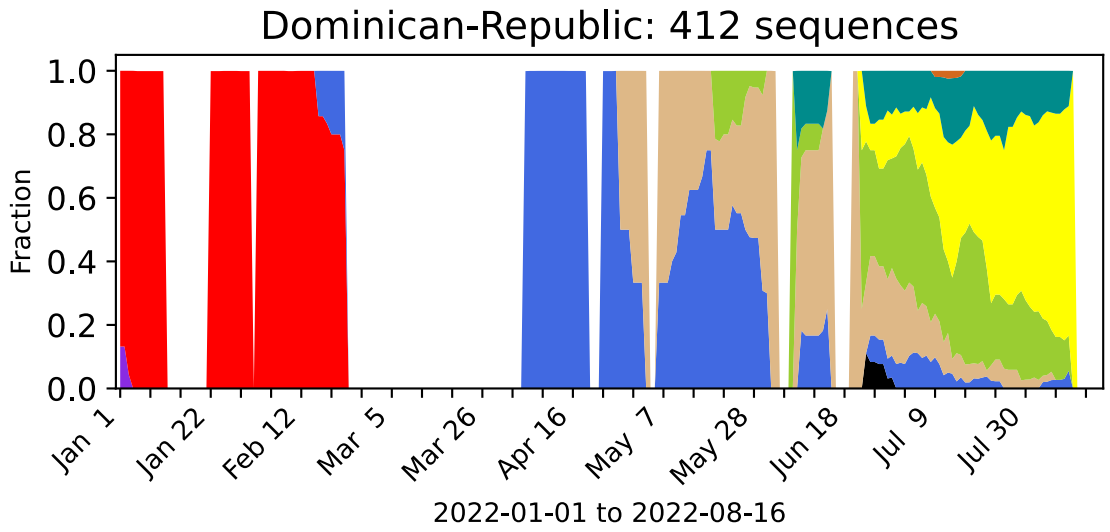
BA.4.6

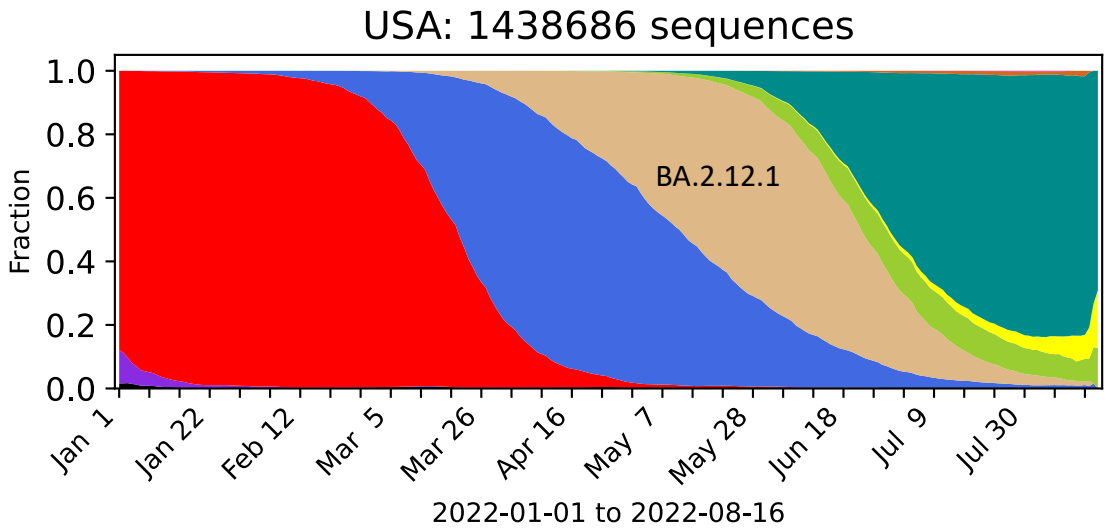
BA.4.6 is a very common BA.4 sublineage that adds R346T,N658S to BA.4

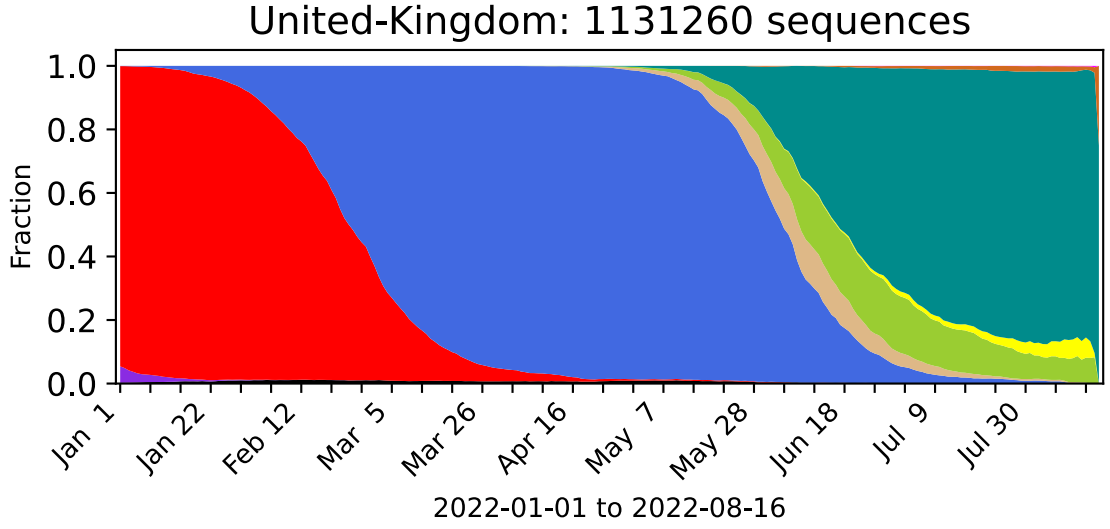
It is common globally, sampled 10,068 times in GISAID.

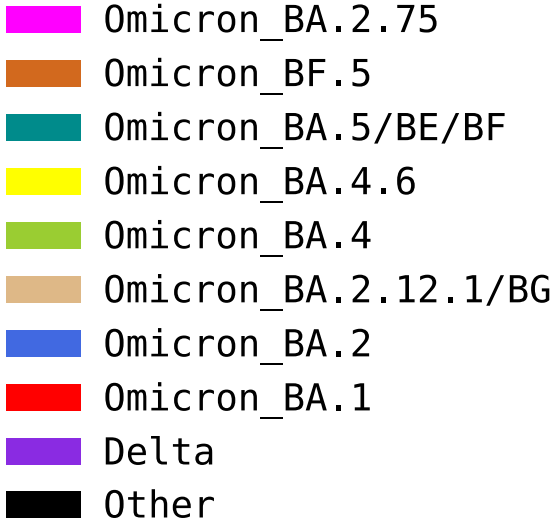
It is increasingly sampled relative to other BA.4's but it is not consistently increasing faster than BA.5s.

3 examples of nations where BA.4.6 is increasing:









BA.4.6 is increasing globally
In 28/30 countries, and is increasing relative to other BA.4 variants, but not consistently relative to BA.5

BA.4.6 has increased in sampling frequency overall in 28/30 countries in the last 3 months, but it is *not* consistently increasing relative to BA.5. Most data is available in the US and UK, and in both countries there is a slow steady relative increase.

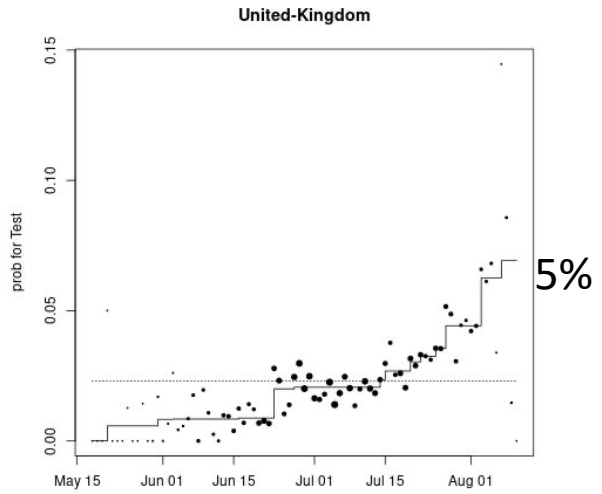
Significantly increasing over time

BA.4.6 BA.5

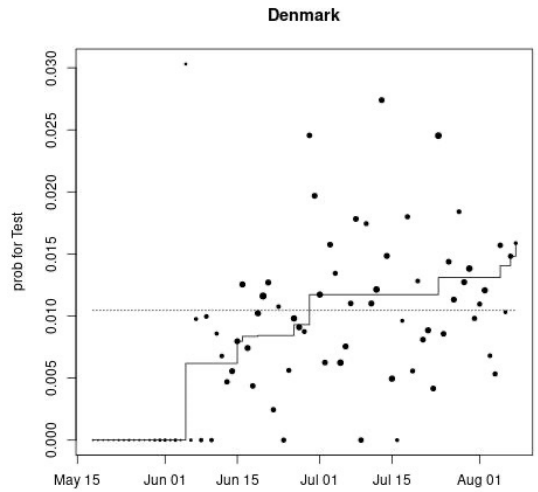
	# Test	# Others	Total	Test/Total (%)	# days	Time window	p-val
Australia	157	10231	10388	1.51	86	85	0.04975
Austria	11	3030	3041	0.36	74	79	0.03483
Belgium	47	9568	9615	0.49	84	83	0.00249
Botswana	17	124	141	12.06	38	79	0.99502
Brazil	58	6055	6113	0.95	71	72	0.00249
Canada	593	13463	14056	4.22	79	78	0.00249
Chile	117	1285	1402	8.35	79	78	0.36567
Colombia	18	206	224	8.04	50	73	0.03731
Czech-Republic	16	2364	2380	0.67	73	79	0.30846
Denmark	306	28980	29286	1.04	83	82	0.00249
Dominican-Republic	107	44	151	70.86	35	58	0.00995
Ecuador	12	313	325	3.69	42	56	0.16667
France	221	33983	34204	0.65	83	82	0.00249
Germany	151	58612	58763	0.26	83	82	0.00249
Ireland	38	5198	5236	0.73	68	68	0.00249
Israel	72	27733	27805	0.26	85	84	0.00249
Italy	46	6538	6584	0.70	84	83	0.00249
Japan	25	17208	17233	0.15	84	84	0.9602
Luxembourg	75	4239	4314	1.74	66	67	0.18657
Mexico	23	5100	5123	0.45	74	73	0.81343
Netherlands	27	6573	6600	0.41	81	81	0.08955
Peru	65	1689	1754	3.71	58	61	0.00249
Puerto-Rico	18	305	323	5.57	45	72	0.07214
South-Africa	35	903	938	3.73	76	78	0.0796
South-Korea	11	2194	2205	0.50	63	64	0.25373
Spain	34	8237	8271	0.41	79	78	0.00249
Sweden	32	6713	6745	0.47	82	81	0.00249
Switzerland	15	3014	3029	0.50	75	75	0.51493
Trinidad-and-Tobago	12	270	282	4.26	42	44	0.29602
USA	5165	151007	156172	3.31	86	85	0.00249
United-Kingdom	1476	62666	64142	2.30	85	84	0.00249

Above: summary of all countries where BA.4.6 and BA.5 were co-circulating and each was found ≥10 times. A p-value < 0.05 indicates that BA.2.75 is gaining in sampling frequency relative to BA.5. Sampling between 2022-05-16 and 2022-08-16.

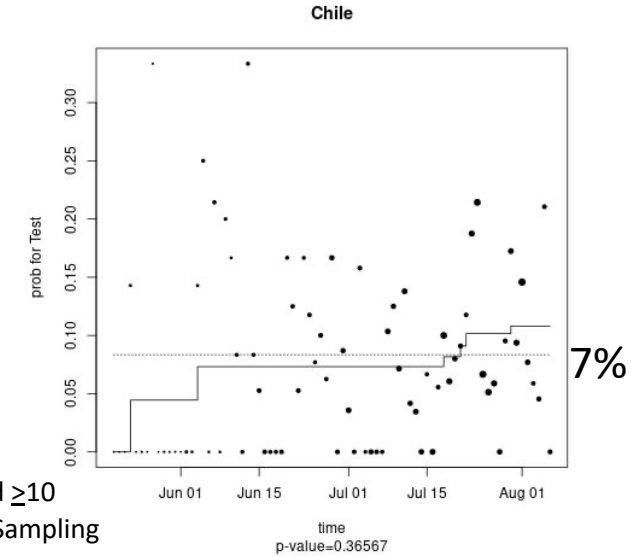
In the graphs on the right, size of the dot reflects the sample size on given day and the y axis represents the sampling frequency of B4.6/[BA.5+BA.4.6]



5%



1.5%



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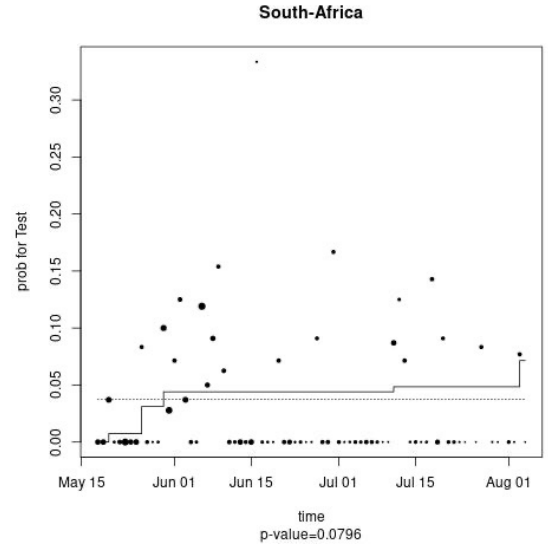

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