

# GECHO Philippines SARS-CoV-2 Situation Report - 2022 September

## Highlights

- BA.5.2 remains the dominant of the recent isolates
- No BQ.1.\* or BA.2.75.\* has been isolated
- A recombinant lineage, XBC, was detected in the Philippines and under monitor ([source](#))

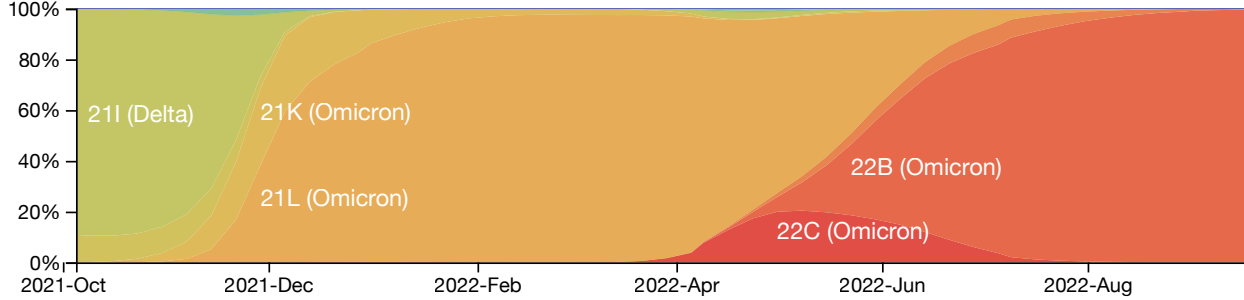
## SARS-CoV-2 variants detected in the Philippines

WHO label	Pango lineage	Classification	New submission	Isolated in 3 months	Total
Alpha	B.1.1.7/Q.x	VOC	0	0	2801
Beta	B.1.351	VOC	0	0	3280
Delta	B.1.617.2/AY.x	VOC	1 (0.2)	1 (0.1)	3491
Gamma	P.1	VOC	0	0	5
Omicron	B.1.1.529/BA.x	VOC	535 (86.7)	853 (91)	8601
Eta	B.1.525	VUM	0	0	8
Theta	P.3	VUM	0	0	523

**Table 1. Number of available sequences by variant in the Philippines as of 27 September 2022.** The variants (VOC/VUM) here only include sequences that present in the GISAID or GECHO data base and fulfill the definitions of WHO at the time the report is prepared. *New submission*, new sequences submitted from the last report. *Isolated in 3 months*, sequences isolated from 1 July 2022 to 27 September 2022. Numbers in the parentheses are percentage of the category (%).

- **VOC (Variant of Concern):** A SARS-CoV-2 variant that meets the definition of a VOI (see below) and, through a comparative assessment, has been demonstrated to be associated with (a) increase in transmissibility, (b) increase in clinical disease presentation or (c) decrease in effectiveness of public health measures including diagnostics, vaccines, therapeutics.
- **VOI (Variant of Interest):** A SARS-CoV-2 variant: (a) with genetic changes that are predicted or known to affect virus characteristics such as transmissibility, disease severity, immune escape, diagnostic or therapeutic escape; AND (b) identified to cause significant community transmission or multiple COVID-19 clusters, in multiple countries with increasing relative prevalence alongside increasing number of cases over time.
- **VUM (Variant Under monitoring):** A SARS-CoV-2 variant with genetic changes that are suspected to affect virus characteristics with some indication that it may pose a future risk, but evidence of phenotypic or epidemiological impact is currently unclear, requiring enhanced monitoring and repeat assessment pending new evidence.

- **Pango lineage:** A dynamic SARS-CoV-2 naming system that uses a phylogenetic framework (methods that involve a tree-like structure inferred based on genetic information of viruses) to identify actively spreading lineages. The Pango system is designed to track the transmission and spread of SARS-CoV-2, but does not attempt to identify or define VOCs or VOIs.



**Figure 1. Temporal frequencies of SARS-CoV-2 variants in the Philippines.** The figure is constructed with a subsampled genomic data set from all available sequences ([methods](#)). A more detailed illustration of SARS-CoV-2 lineages isolated in the country can be visualised by selecting Pango Lineage as the option for coloring in the control panel (icon on top left/right). **Note** that the latest available Philippine sequences were isolated on 17 August, 2022, thus the frequencies after the time point could harbor great uncertainty.

- **Nextstrain clade** and the corresponding Pango lineage name: 22B = BA.5, 22C = BA.2.12.1, 22A = BA.4, 21L = BA.2, 21K = BA.1.

#### Diversity within the Omicron variant

Pango lineage	New submission	Isolated in 3 months	Total
BA.1.*	0	0	597
BA.2	3 (0.5)	5 (0.5)	732
BA.2.3	4 (0.6)	7 (0.7)	5685
BA.2.12.1	2 (0.3)	4 (0.4)	117
BA.2.75.*	0	0	0
Other BA.2.*	4 (0.6)	5 (0.5)	197
BA.4.*	38 (6.2)	50 (5.3)	92
BA.5	57 (9.2)	100 (10.7)	129
BA.5.2	364 (59)	574 (61.3)	838
BE.1.*	5 (0.8)	9 (1)	12
BQ.1.*	0	0	0

**Table 1b. Number of available Omicron sequences in the Philippines as of 27 September 2022.** *New submission*, new sequences submitted from the last report. *Isolated in 3 months*, sequences isolated from 1 July 2022 to 27 September 2022. Numbers in the parentheses are percentage of the category (%). Phylogenetic relationship of the sublineages of Omicron variant is available [here](#).

- **BE.1** = BA.5.3.1.1, a sublineage of BA.5.3; **BQ.1** = BE.1.1.1.1, a sublineage of BE.1 (and also a sublineage of BA.5.3).

## Diversity within the Delta variants

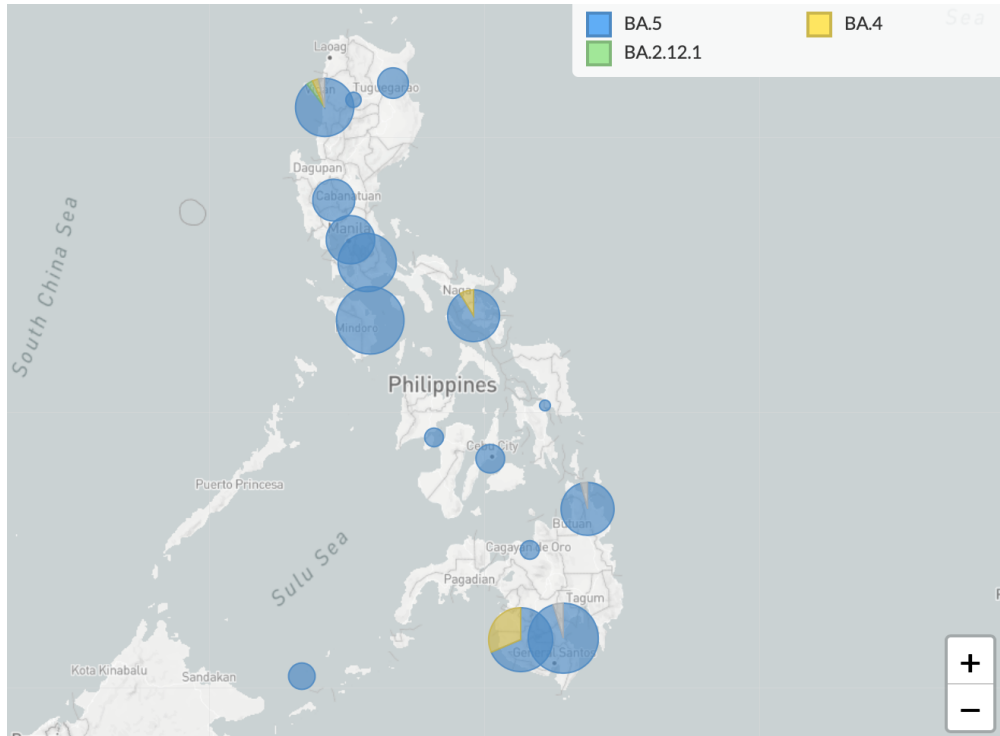
More than 70 Pango lineages have been found among Delta variants isolated in the Philippines, with >40 sublineages that have more than 2 isolated sequences as of March 2022. Phylogenetic relationship of the sublineages of Delta variant is available [here](#).

## SARS-CoV-2 variants detected by administrative region

Region	New submission	Dominant variant in 3 months	Isolated in 3 months	Total
NCR	12 (1.9)	Omicron (91.3)	23 (2.5)	5755
Ilocos	18 (2.9)	Omicron (85.3)	34 (3.6)	687
CAR	1 (0.2)	Omicron (50)	2 (0.2)	1317
Cagayan Valley	0	Omicron (100)	8 (0.9)	1559
Central Luzon	20 (3.2)	Omicron (70.8)	24 (2.6)	1629
Calabarzon	113 (18.3)	Omicron (81.5)	184 (19.6)	3229
Mimaropa	50 (8.1)	Omicron (93.8)	65 (6.9)	536
Bicol	13 (2.1)	Omicron (70.2)	47 (5)	626
Western Visayas	3 (0.5)	Omicron (100)	6 (0.6)	1245
Central Visayas	7 (1.1)	Omicron (81.8)	11 (1.2)	1181
Eastern Visayas	1 (0.2)	Omicron (50)	2 (0.2)	234
Zamboanga Peninsula	0	-	0	778
Northern Mindanao	1 (0.2)	Omicron (100)	3 (0.3)	520
Davao	267 (43.3)	Omicron (99.2)	381 (40.7)	1934
Soccsksargen	79 (12.8)	Omicron (90.3)	113 (12.1)	541
Caraga	26 (4.2)	Omicron (100)	28 (3)	536
BARMM	6 (1)	Omicron (100)	6 (0.6)	127

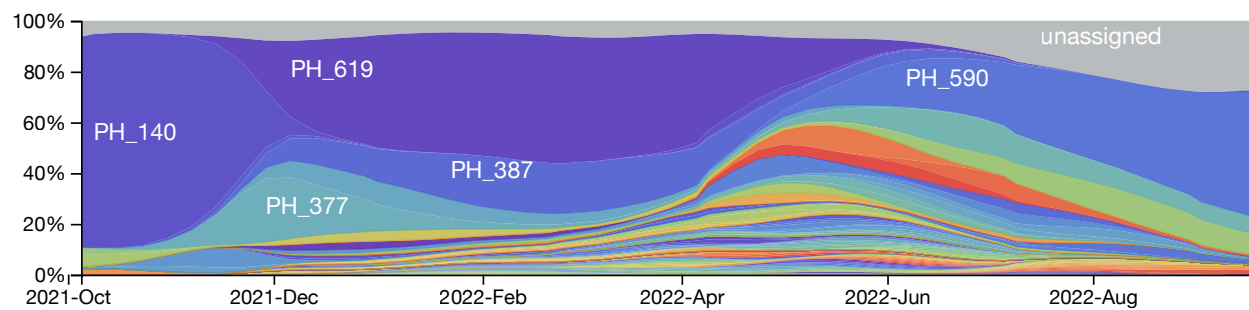
**Table 2. Number of available sequences by administrative region in the Philippines as of 27 September 2022.** The variant definition is identical to Table 1 based on the WHO website. *New submission*, new sequences submitted from the last report. *Dominant variant in 3 months*, the major variant isolated from 1 July 2022 to 27 September 2022. A dash indicates no sequence isolated. *Isolated in 3 months*, sequences isolated from 1 July 2022 to 27 September 2022. Numbers next to the dominant variant indicate percentage of the variant in the region, whereas other numbers in the parentheses are percentage of the category.

NCR, National Capital Region; CAR, Cordillera Administrative Region; BARMM, Bangsamoro Autonomous Region in Muslim Mindanao.



**Figure 2. Frequencies of SARS-CoV-2 variants by administrative region in the Philippines since July 2022.** The figure is constructed with a subsampled genomic data set from all available sequences as Figure 1. Frequencies of isolates in a particular time frame and frequencies classified with the Pango lineage can be adjusted with the control panel (icon on top left/right).

### Philippines specific SARS-CoV-2 lineages



**Figure 3. Temporal frequencies of Philippine lineages (clusters) identified by Grapevine-anywhere.** Each sequence submitted to GECO database would undergo *Grapevine-anywhere* pipeline to detect sustain local transmission. A cluster is defined based on multiple sequences isolated in the Philippines that appeared to descend from the same introductory event on a phylogenetic tree. Phylogenetic relationships of these lineages can be found [here](#).

Cluster name	Date first identified	Pango lineage	Distribution	New sub-mission	Isolated in 3 months	Total
PH_590	2022-05-19	BA.5.2	>3 regions	203	288	389
PH_588	2022-06-20	BA.5.2	>3 regions	50	106	141
PH_614	2022-06-08	BA.5	>3 regions	48	71	92
PH_579	2022-05-15	BA.5.2	>3 regions	35	55	109
PH_587	2022-05-12	BA.5.2	>3 regions	22	32	48
PH_548	2022-05-28	BA.4	Soccsksargen; Davao	24	30	47
PH_606	2022-06-20	BA.5.2.1	Bicol; Calabarzon; Davao	5	13	20
PH_603	2022-05-31	BA.5.2.1	>3 regions	8	9	17
PH_577	2022-06-15	BA.5.2	Davao; Soccsksargen	5	7	8
PH_604	2022-05-25	BA.5.2.1	>3 regions	2	7	9
PH_556	2022-07-24	BA.5	Mimaropa	6	6	6
PH_589	2022-05-22	BA.5.2	>3 regions	5	6	11
PH_613	2022-01-07	BA.5.2.1	>3 regions	5	6	11
PH_575	2022-07-05	BA.5.1	Soccsksargen; Davao	1	5	5
PH_475	2022-06-17	BA.2.74	Davao; Calabarzon; Soccsksargen	4	5	7
PH_559	2022-06-27	BE.1	Bicol; Calabarzon	2	4	5
PH_569	2022-05-26	BA.5.1	>3 regions	3	4	6
PH_547	2022-05-25	BA.4	>3 regions	1	4	13
PH_619	2021-05-15	BA.2.3	>3 regions	2	3	3034
PH_566	2022-06-09	BA.5.5	Davao; Northern Mindanao; Soccsksargen	1	2	10
PH_495	2022-06-03	BA.2.12.1	>3 regions	2	2	5
PH_655	2021-05-25	BA.2.3	>3 regions	2	2	578
PH_543	2022-06-19	BA.4	Soccsksargen; BARMM; Davao	1	1	5
PH_486	2022-05-31	BA.2	NCR; Calabarzon; Western Visayas	1	1	6
PH_502	2022-04-22	BA.2.12.1	>3 regions	0	1	27
PH_468	2022-05-30	BA.2.40.1	Bicol; Davao; Eastern Visayas	0	0	5
PH_509	2022-04-29	BA.2.12.1	Mimaropa; Calabarzon	0	0	13
PH_525	2022-04-26	BA.2	NCR; Calabarzon	0	0	10
PH_489	2022-04-21	BA.2	Cagayan Valley; NCR; CAR	0	0	10
PH_493	2022-04-15	BA.2.12.1	>3 regions	0	0	23
PH_471	2022-03-17	BA.2.10	NCR; Central Visayas; CAR	0	0	5
PH_381	2022-03-02	BA.2.9	Calabarzon; CAR; Ilocos	0	0	6
PH_447	2022-02-13	BA.2	NCR; Calabarzon; Western Visayas	0	0	5
PH_484	2022-01-31	BA.2	NCR; Zamboanga Peninsula	0	0	8
PH_460	2022-01-29	BA.2	NCR	0	0	5
PH_349	2022-01-27	BA.1.1	NCR; Davao	0	0	5
PH_421	2022-01-21	BA.2.3	>3 regions	0	0	5
PH_542	2022-01-19	BA.2	Cagayan Valley; Central Visayas; NCR	0	0	6
PH_400	2022-01-18	BA.2.3	>3 regions	0	0	9
PH_476	2022-01-16	BA.2	>3 regions	0	0	11
PH_401	2022-01-13	BA.2.3	Zamboanga Peninsula; Western Visayas; Davao	0	0	7
PH_634	2022-01-13	BA.2.3	>3 regions	0	0	6
PH_660	2022-01-10	BA.2.3	>3 regions	0	0	9

Cluster name	Date first identified	Pango lineage	Distribution	New sub-mission	Isolated in 3 months	Total
PH_644	2022-01-08	BA.2.3	>3 regions	0	0	7
PH_420	2022-01-05	BA.2.3	>3 regions	0	0	7
PH_617	2022-01-05	BA.2.3	>3 regions	0	0	10
PH_615	2022-01-04	BA.2.3	>3 regions	0	0	15
PH_621	2022-01-04	BA.2.3	>3 regions	0	0	12
PH_664	2022-01-04	BA.2.3	>3 regions	0	0	11
PH_653	2022-01-03	BA.2.3	>3 regions	0	0	8
PH_661	2022-01-03	BA.2.3	>3 regions	0	0	19
PH_453	2021-12-31	BA.2	>3 regions	0	0	6
PH_636	2021-12-31	BA.2.3	>3 regions	0	0	6
PH_651	2021-12-31	BA.2.3	>3 regions	0	0	7
PH_442	2021-12-29	BA.2	>3 regions	0	0	18
PH_449	2021-12-29	BA.2	Central Luzon; NCR	0	0	6
PH_458	2021-12-29	BA.2	>3 regions	0	0	39
PH_622	2021-12-29	BA.2.3	>3 regions	0	0	6
PH_659	2021-12-29	BA.2.3	>3 regions	0	0	10
PH_426	2021-12-28	BA.2.3	>3 regions	0	0	28
PH_461	2021-12-28	BA.2	>3 regions	0	0	57
PH_631	2021-12-27	BA.2.3	>3 regions	0	0	45
PH_648	2021-12-27	BA.2.3	>3 regions	0	0	24
PH_649	2021-12-27	BA.2.3	>3 regions	0	0	8
PH_666	2021-12-27	BA.2.3	>3 regions	0	0	204
PH_670	2021-12-27	BA.2.3	>3 regions	0	0	149
PH_671	2021-12-26	BA.2.3	>3 regions	0	0	34
PH_373	2021-12-25	BA.1	Central Visayas; NCR; Davao	0	0	6
PH_405	2021-12-23	BA.2.3	>3 regions	0	0	15
PH_632	2021-12-23	BA.2.3	>3 regions	0	0	15
PH_363	2021-12-22	BA.1.1	NCR; Central Visayas	0	0	6
PH_370	2021-12-22	BA.1.1	>3 regions	0	0	75
PH_437	2021-12-22	BA.2.3	>3 regions	0	0	62
PH_387	2021-12-19	BA.2.3	>3 regions	0	0	1016
PH_377	2021-11-20	BA.1.1	>3 regions	0	0	323
PH_98	2021-08-15	AY.122	Mimaropa; Calabarzon; Bicol	0	0	6
PH_76	2021-07-25	B.1.617.2	>3 regions	0	0	6
PH_86	2021-07-24	AY.98.1	NCR	0	0	6
PH_130	2021-07-18	B.1.617.2	NCR	0	0	5
PH_108	2021-07-16	AY.107	>3 regions	0	0	29
PH_113	2021-07-13	AY.107	Central Luzon; NCR	0	0	6
PH_147	2021-07-12	AY.87	NCR; Calabarzon	0	0	12
PH_81	2021-07-10	AY.23	>3 regions	0	0	8
PH_115	2021-07-08	AY.112	Northern Mindanao; Cagayan Valley; BARMM	0	0	8
PH_131	2021-07-07	AY.112	>3 regions	0	0	21
PH_79	2021-07-05	B.1.617.2	>3 regions	0	0	6
PH_80	2021-07-05	AY.23	>3 regions	0	0	23
PH_138	2021-07-02	AY.116	NCR; Calabarzon	0	0	6
PH_96	2021-06-28	AY.122	>3 regions	0	0	47
PH_117	2021-06-27	AY.112	>3 regions	0	0	28
PH_123	2021-06-27	AY.106	>3 regions	0	0	92
PH_116	2021-06-23	AY.1	>3 regions	0	0	278
PH_196	2021-05-06	B.1.1.7	>3 regions	0	0	7

Cluster name	Date first identified	Pango lineage	Distribution	New sub-mission	Isolated in 3 months	Total
PH_192	2021-04-30	B.1.1.7	Davao; Caraga; NCR	0	0	19
PH_140	2021-04-24	B.1.617.2	>3 regions	0	0	2404
PH_184	2021-04-14	B.1.1.7	>3 regions	0	0	21
PH_191	2021-04-13	B.1.1.7	Davao; Caraga; Central Luzon	0	0	13
PH_149	2021-04-09	B.1.351	>3 regions	0	0	8
PH_343	2021-04-02	B.1.1.519	NCR	0	0	5
PH_193	2021-03-25	B.1.1.7	>3 regions	0	0	29
PH_188	2021-03-22	B.1.1.7	>3 regions	0	0	31
PH_203	2021-03-19	B.1.1.7	>3 regions	0	0	12
PH_206	2021-03-15	B.1.1.7	Bicol; NCR; Calabarzon	0	0	13
PH_205	2021-03-10	B.1.1.7	>3 regions	0	0	10
PH_201	2021-03-08	B.1.1.7	>3 regions	0	0	27
PH_182	2021-03-06	AY.122	>3 regions	0	0	210
PH_183	2021-03-05	B.1.1.7	>3 regions	0	0	24
PH_189	2021-03-05	B.1.1.7	>3 regions	0	0	32
PH_228	2021-03-05	B.1.1.7	>3 regions	0	0	32
PH_200	2021-03-04	B.1.1.7	>3 regions	0	0	18
PH_198	2021-02-22	B.1.1.7	NCR; Calabarzon; Central Luzon	0	0	13
PH_164	2021-02-15	B.1.1.7	>3 regions	0	0	55
PH_233	2021-02-12	B.1.1.7	>3 regions	0	0	72
PH_227	2021-02-11	B.1.1.7	>3 regions	0	0	15
PH_284	2021-02-05	B.1.1.63	NCR; Calabarzon	0	0	6
PH_190	2021-01-31	B.1.351	>3 regions	0	0	3030
PH_297	2021-01-27	B.1.1.63	NCR; Calabarzon	0	0	7
PH_229	2021-01-26	B.1.1.7	>3 regions	0	0	48
PH_277	2021-01-25	B.1.1.63	Calabarzon	0	0	5
PH_44	2021-01-21	B.1.466.1	Calabarzon; NCR	0	0	21
PH_254	2021-01-19	B.1.1	>3 regions	0	0	29
PH_269	2021-01-15	B.1.1.28	Davao; NCR; Soccsksargen	0	0	9
PH_170	2021-01-14	B.1.1.7	NCR; Central Visayas; CAR	0	0	5
PH_45	2021-01-12	B.1.441	NCR; Central Visayas	0	0	5
PH_267	2021-01-11	B.1.1.28	Davao	0	0	14
PH_274	2021-01-09	B.1.1.28	Davao; Soccsksargen; Calabarzon	0	0	16
PH_329	2021-01-08	B.1.1	Calabarzon; Central Visayas; NCR	0	0	6
PH_340	2021-01-08	P.3	>3 regions	0	0	456
PH_173	2021-01-07	B.1.1.7	NCR; Calabarzon; Central Visayas	0	0	12
PH_176	2021-01-07	B.1.1.7	NCR; Central Luzon; Central Visayas	0	0	6
PH_211	2021-01-07	B.1.1.7	>3 regions	0	0	342
PH_272	2021-01-06	B.1.1.28	>3 regions	0	0	45
PH_163	2021-01-05	B.1.1.7	>3 regions	0	0	133
PH_273	2021-01-03	B.1.1.28	Davao; Soccsksargen	0	0	17
PH_181	2020-12-29	B.1.1.7	>3 regions	0	0	8
PH_60	2020-12-28	B.1.524	>3 regions	0	0	10
PH_316	2020-12-18	B.1.1.63	Cagayan Valley; NCR	0	0	7
PH_312	2020-12-17	B.1.1.263	CAR; Cagayan Valley; Central Luzon	0	0	65

Cluster name	Date first identified	Pango lineage	Distribution	New sub-mission	Isolated in 3 months	Total
PH_325	2020-12-15	B.1.1.63	NCR; Calabarzon; CAR	0	0	11
PH_220	2020-12-10	B.1.1.7	NCR; Calabarzon; Central Visayas	0	0	5
PH_322	2020-12-10	B.1.1.63	Calabarzon; NCR	0	0	5
PH_27	2020-12-08	B.1.1.7	Calabarzon; Cagayan Valley; Mimaropa	0	0	7
PH_293	2020-12-04	B.1.1.63	NCR; Central Luzon	0	0	10
PH_261	2020-12-02	B.1.1.28	>3 regions	0	0	36
PH_262	2020-12-02	B.1.1.28	NCR; Calabarzon; Caraga	0	0	21
PH_257	2020-11-25	B.1.1	Calabarzon; NCR	0	0	11
PH_304	2020-11-15	B.1.1.263	CAR; Cagayan Valley; Calabarzon	0	0	9
PH_14	2020-11-10	B.6	NCR; Calabarzon	0	0	5
PH_36	2020-11-09	B.1.1.7	>3 regions	0	0	1422
PH_265	2020-11-07	B.1.1.28	Calabarzon; NCR; Central Luzon	0	0	6
PH_47	2020-11-06	B.1.36	Calabarzon; NCR	0	0	9
PH_298	2020-11-02	B.1.1.63	>3 regions	0	0	34
PH_283	2020-11-01	B.1.1.63	>3 regions	0	0	14
PH_309	2020-10-11	B.1.1.263	>3 regions	0	0	67
PH_266	2020-08-24	B.1.1.28	>3 regions	0	0	15
PH_61	2020-08-22	B.1	NCR; Calabarzon; Davao	0	0	12
PH_256	2020-08-07	B.1.1	NCR	0	0	5
PH_292	2020-08-07	B.1.1.63	>3 regions	0	0	20
PH_12	2020-08-06	B.6	>3 regions	0	0	40
PH_258	2020-08-05	B.1.1	Calabarzon; NCR	0	0	5
PH_326	2020-08-04	B.1.1	>3 regions	0	0	102
PH_24	2020-07-20	B.1	>3 regions	0	0	12
PH_92	2020-07-19	B.1.1.63	>3 regions	0	0	371
PH_28	2020-07-15	B.1	>3 regions	0	0	25
PH_251	2020-07-12	B.1.1	NCR; Calabarzon; Mimaropa	0	0	9
PH_315	2020-07-09	B.1.1.63	>3 regions	0	0	121
PH_238	2020-07-08	B.1.1	>3 regions	0	0	154
PH_280	2020-07-08	B.1.1.63	>3 regions	0	0	78
PH_62	2020-07-08	B.1	Mimaropa; NCR; Central Visayas	0	0	9
PH_287	2020-07-07	B.1.1.63	NCR; Calabarzon; Cagayan Valley	0	0	12
PH_314	2020-07-07	B.1.1.63	>3 regions	0	0	30
PH_260	2020-07-05	B.1.1.28	>3 regions	0	0	229
PH_276	2020-07-01	B.1.1.63	>3 regions	0	0	233
PH_295	2020-07-01	B.1.1.63	Calabarzon; NCR; CAR	0	0	9
PH_320	2020-06-29	B.1.1.63	>3 regions	0	0	133
PH_290	2020-06-23	B.1.1.63	NCR	0	0	5
PH_303	2020-06-16	B.1.1.263	>3 regions	0	0	145
PH_65	2020-06-11	B.1	NCR; Western Visayas	0	0	9
PH_11	2020-03-11	B.6	NCR; Cagayan Valley	0	0	6
PH_2	2020-03-10	B.6	>3 regions	0	0	22

**Table 3. Number of sequences by cluster identified with the Grapevine-anywhere as of 27 September 2022.** A cluster is defined based on multiple sequences isolated in the Philippines that appeared

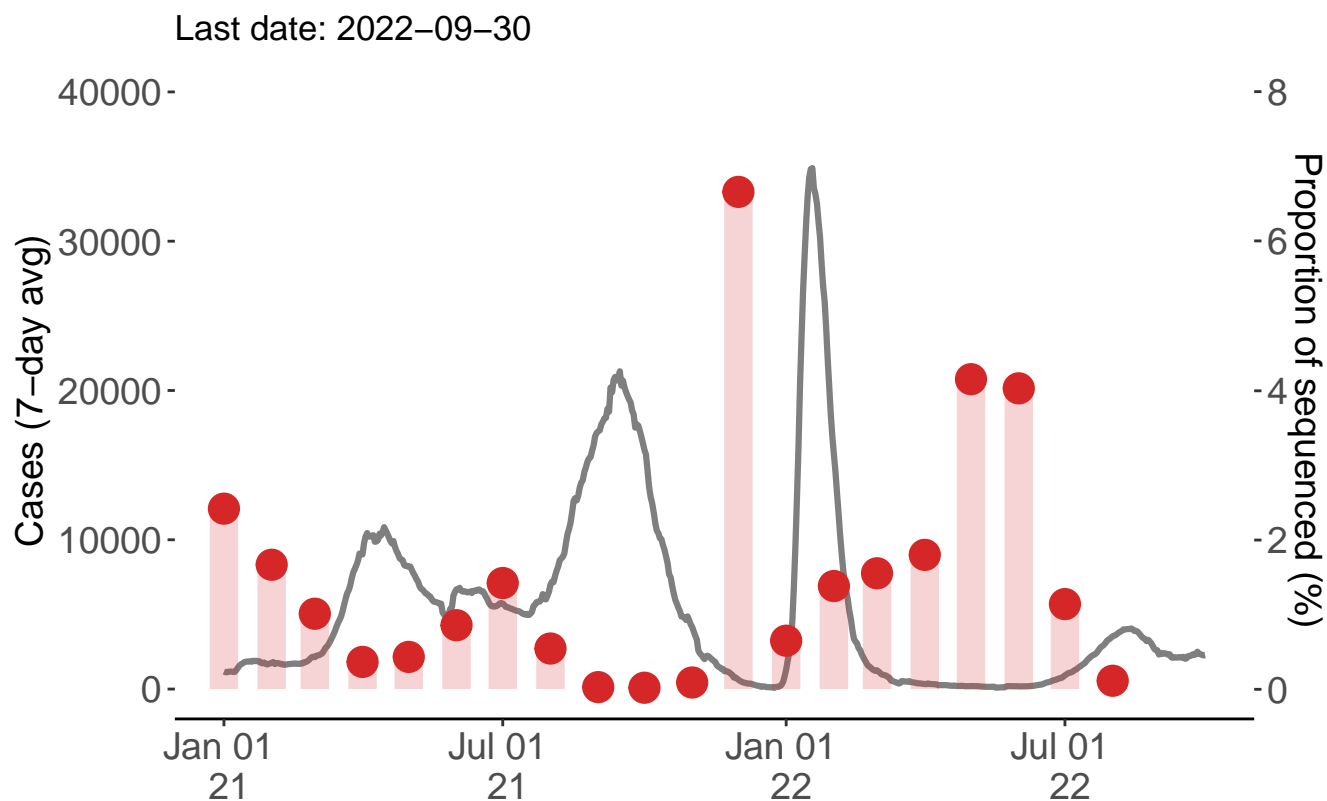


to descend from the same introductory event on a phylogenetic tree. *Date first identified*, the isolation date of the first identified sequence. *Pango lineage*, the major Pango lineage of the sequences that belong to the same cluster. *New submission*, new sequences submitted from the last report. *Isolated in 3 months*, sequences isolated from 1 July 2022 to 27 September 2022.

## SARS-CoV-2 sequencing in the Philippines

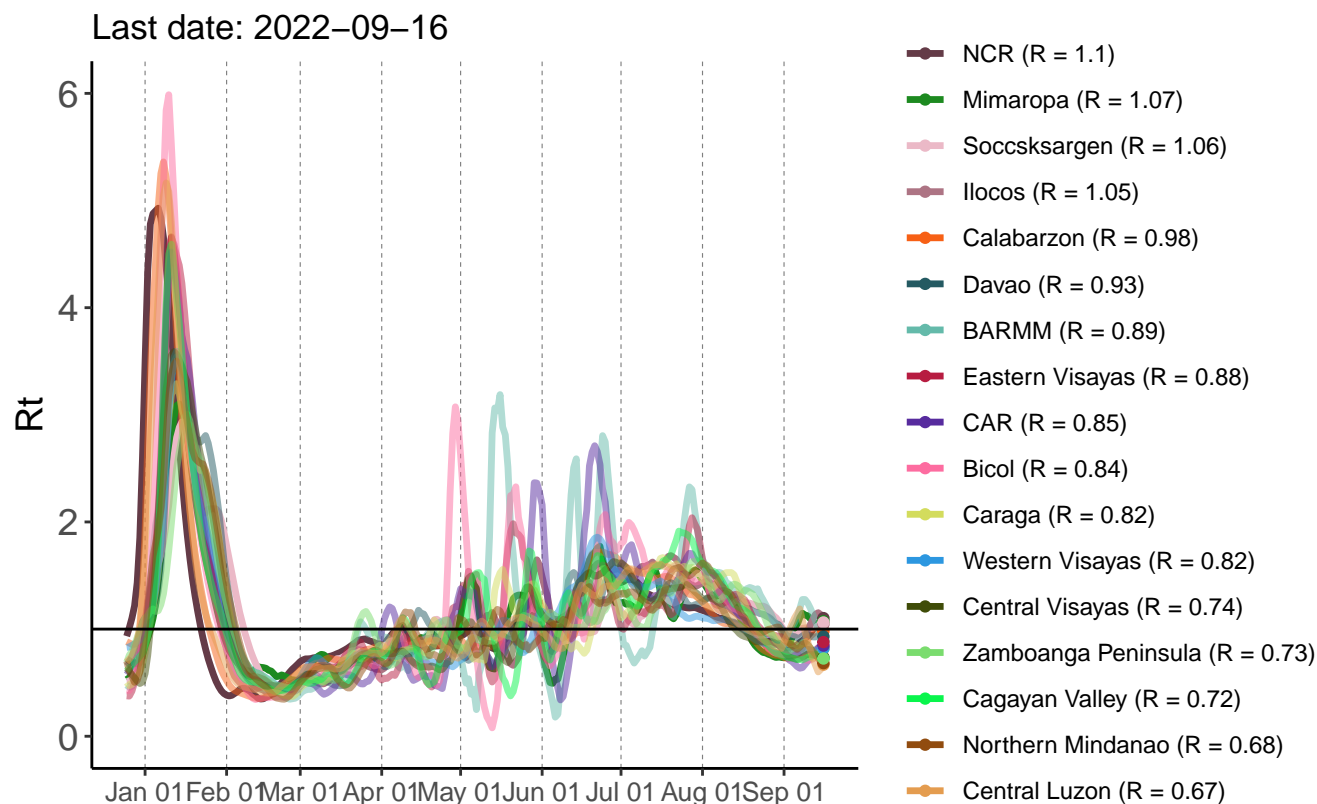
Total available SARS-CoV-2 sequences in the Philippines: 22452

SARS-CoV-2 sequences from GECO project: 2587



**Figure 4. Number of COVID-19 cases and the proportion of sequenced samples in the Philippines from January 2021.** The gray line indicates the mean cases in a 7 days window based on the JHU data base, whereas the red bars indicate the estimated percentage of sequenced samples among cases in a month.

## Epidemiology of COVID-19 in the Philippines



**Figure 5. Mean effective reproductive number ( $R_t$ ) of COVID-19 in the Philippines by region from December 2021 to August 2022.** The reproductive number ( $R$ ) is defined as the number of new infections that one infected patient can cause in a susceptible population. Here, the *mean effective reproductive number* ( $R_t$ ) was inferred by daily number of cases reported in MOH, Philippines in a window of seven days. The horizontal line indicates one. If  $R_t$  is greater than 1, the case number in the region will likely continue to grow. If the  $R_t$  is below 1, the new cases may continue to appear at a slower rate. The  $R$  values denoted with the region name represent the most recent estimates. More regional epidemiological statistics can be found [here](#).

## SARS-CoV-2 mutations of interest

### Omicron sublineage convergent sites

- **R346X** (K:BA.1.1; T: BA.5.2, BA.2.75.2): [Distribution on the Philippine isolates](#)
- **K444X** (R: BA.2.3.20; M: BR.1 [a BA.2.75.4.\*]; T:BQ.1): [Distribution on the Philippine isolates](#)
- **L452X** (R:BA.4/BA.5, BA.2.35; M:BA.2.3.20): [Distribution on the Philippine isolates](#)
- **N460X** (K:BA.2.75, BQ.1 [a BA.5.3.\*]): [Distribution on the Philippine isolates](#)
- **F486X** (V:BA.4/BA.5, S: BA.2.75.2): [Distribution on the Philippine isolates](#)

- **R493X** (Q:BA.4/BA.5, BA.2.75): [Distribution on the Philippine isolates](#)

Other Spike protein

- **69-70Del** (Alpha, Omicron): [Distribution on the Philippine isolates](#)
- **T95I** (Mu, Omicron): [Distribution on the Philippine isolates](#)
- **144-** (Alpha, Eta, Omicron): [Distribution on the Philippine isolates](#)
- **K417N** (Beta, Omicron): [Distribution on the Philippine isolates](#)
- **T478K** (Delta, Omicron): [Distribution on the Philippine isolates](#)
- **E484K** (Beta, Gamma, Eta, Mu): [Distribution on the Philippine isolates](#)
- **N501Y** (Alpha, Beta, Gamma, Mu, Omicron): [Distribution on the Philippine isolates](#)
- **H655Y** (Gamma, Omicron): [Distribution on the Philippine isolates](#)

Relevant functions including antibody escape (S 69-70Del, S 144, S 346, S 417, S 484) and receptor binding (S 417, S 484, S 501). 69-70Del, deletions at positions 69-70.

## Data sources and references

Data

- [GECO website](#)
- [DOH Data drop](#)
- [GISAID](#) (EPI-SET: EPI\_SET\_220930td)
- [JHU COVID data](#)

Methods

- [Analyses in this report](#)
- [Nextstrain](#) (build for GECO project)
- [Grapevine-anywhere](#)

References

- [WHO](#)
- [Pango lineage list](#)

**Online version and previous reports**

[GECO Monthly Report](#)

2022-08 [pdf](#)



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