



Summary of COVID-19 virus variants in Ireland

Report prepared by HPSC and NVRL on 14/09/2021

Background

All medical practitioners, including the clinical directors of diagnostic laboratories, are required to notify the Medical Officer of Health (MOH)/Director of Public Health (DPH) of any confirmed, probable or possible cases of COVID-19 that they identify. Laboratory, clinical and epidemiological data, on notified COVID-19 cases, are recorded on the Health Protection Surveillance Centre's (HPSC) Computerised Infectious Disease Reporting System (CIDR).

This report summarises COVID-19 whole genome sequencing (WGS) carried out by the National Virus Reference Laboratory (NVRL) and partners. Current WGS capacity is approximately 1,000 – 1,200 specimens per week. WGS data included in this report are data received from the NVRL as of September 14th 2021 and reflect sequencing results since week 51 2020 (specimen dates between 13th December 2020 and August 30th 2021).

The epidemiological data on the sequenced cases were extracted from CIDR on 13/09/2021 and supplemented by information from the COVID care tracker (CCT) database. CIDR is a dynamic system and case details may be updated at any time. Therefore, the data described here may differ from previously reported data and data reported for the same time period in the future.

The interim case definition for variants of concern for public health response and an overview of the procedures for the laboratory detection of mutations or variants of concern at the NVRL are available [here](#).

The World Health Organization (WHO) working definitions for 'SARS-CoV-2 variants of concern' (VOCs) and 'SARS-CoV-2 variants of interest' (VOIs) are available [here](#).

On May 31st 2021, the following announcement was made by the WHO:

Following extensive consultation and deliberations, WHO proposes the following; for existing and newly designated VOCs and VOIs, according to WHO's working definitions, which include an assessment of the risks posed to global public health, WHO will assign labels based upon the Greek alphabet (i.e. Alpha, Beta, Gamma, etc.). If all 24 letters become assigned, other lists of labels will be considered and announced by WHO. Further information on the new labels of already defined VOCs and VOIs can be found at <https://www.who.int/activities/tracking-SARS-CoV-2-variants>.

Overview of virus variants identified in Ireland to date

The first VOC case was detected in Ireland in week 51 2020. Ten percent of all confirmed COVID-19 cases since week 51 have been sequenced. The proportion of COVID-19 cases with sequencing results has increased significantly in recent months and 20% of confirmed cases between weeks 18 and 33 have been sequenced.

Cases of four variants of concern (VOC) have been identified in Ireland to date; B.1.1.7 (Alpha), B.1.351 (Beta), P.1 (Gamma) and B.1.617.2 (Delta). Several sublineages of the Delta variant (AY.3, AY.4, AY.5, AY.6, AY.7, AY.8, AY.9, AY.12, AY.17 and AY.25) have also been identified in Ireland. Nine variants of interest (VOI)/variants of note have been identified to date; B.1.617.1 (Kappa), P.2 (Zeta), B.1.525 (Eta), B.1.526 (Iota), B.1.1.318, B.1.429 (Epsilon), C.37 (Lambda), B.1.621 (Mu) and A.27.

The first VOC case detected in Ireland, a B.1.1.7 (Alpha) case, had a specimen date in week 51 2020. However, two earlier cases of B.1.1.7 (Alpha) have since been identified through retrospective testing. The specimen dates for these two cases were in week 37 2020 (September) and week 43 2020 (October), indicating that B.1.1.7 (Alpha) was circulating prior to December 2020 in Ireland. The transmission of this variant was widespread in Ireland, with 16,006 cases of COVID-19 confirmed to have been infected with this variant since week 51 2020. Ninety two percent of sequenced COVID-19 cases with specimen dates between weeks 6 and 23 2021 were infected with the B.1.1.7 (Alpha) variant. This has since decreased with the emergence of the B.1.617.2 (Delta) variant. Two percent of sequenced cases with specimen dates between weeks 28 and 35 were identified as B.1.1.7 (Alpha) and 98% were B.1.617.2 (Delta). Two cases of the B.1.1.7 (Alpha) variant identified in Ireland were found to have the additional E484K mutation.

The first case of the B.1.351 (Beta) VOC identified in Ireland had a specimen date in week 52 2020 (week starting December 20th). A total of 77 COVID-19 cases have been confirmed to have been infected with this variant in Ireland to date. The first case of the P.1 (Gamma) VOC was sampled in week 5 2021 (week starting January 31st). To date, this variant has been confirmed in 32 cases of COVID-19.

The World Health Organization classified the B.1.617, first identified in India, as a variant of concern on May 10th 2021. This variant has three sublineages with different mutations; B.1.617.1 (Kappa), B.1.617.2 (Delta) and B.1.617.3. All three sub-lineages were initially classified as VOCs. However, on monitoring the evolving epidemiological situation, the WHO decided to re-categorise the B.1.617.1 (Kappa) sub-lineage as a VOI rather than a VOC as its global prevalence was declining. Significantly increased transmissibility has been observed in association with the B.1.617.2 (Delta) sub-lineage and this remains a VOC. There have been relatively few reports of the B.1.617.3 sub-lineage to date and this is no longer classified as a VOC or VOI. To date in Ireland, 10,590 cases of COVID-19 have been identified as infected with the B.1.617.2 (Delta) variant or a Delta sublineage (specimen dates: April 7th to August 30th 2021) and 210 cases have been found to be infected with the B.1.617.1 (Kappa) variant (specimen dates: March 26th to July 4th).

Table 1 summarises virus variants identified in Ireland since week 51 2020. Figures 1a, 1b and 1c illustrate sequencing results since week 51 2020. Figure 2 shows the number and percentage of confirmed cases of COVID-19 sequenced by week.

Table 1. Sequencing results for COVID-19 cases sampled from week 51 (December 13th 2020) to week 35* (Sept 4th 2021)

Virus variant	Number of cases	% sequenced cases
Variants of concern		
B.1.617.2 (Delta)	6783	24.1
B.1.617.2.3 (AY.3)	558	2.0
B.1.617.2.4 (AY.4)	2391	8.5
B.1.617.2.5 (AY.5)	393	1.4
B.1.617.2.6 (AY.6)	172	0.6
B.1.617.2.7 (AY.7)	27	0.1
B.1.617.2.8 (AY.8)	4	0.0
B.1.617.2.9 (AY.9)	227	0.8
B.1.617.2.12 (AY.12)	30	0.1
B.1.617.2.12 (AY.17)	1	0.0
B.1.617.2.12 (AY.25)	4	0.0
B.1.351 (Beta)	77	0.3
P.1 (Gamma)	32	0.1
B.1.1.7 (Alpha)†	16006	56.9
Variants of interest		0.0
B.1.1.318	241	0.9
B.1.1.318.4 (AZ.4)	5	0.0
B.1.617.1 (Kappa)	210	0.7
B.1.525 (Eta)	73	0.3
P.2 (Zeta)	15	0.1
B.1.526 (Iota)	11	0.0
B.1.429 (Epsilon)	7	0.0
C.37 (Lambda)	4	0.0
B.1.621 & B.1.621.1 (Mu) ‡	4	0.0
A.27	2	0.0
Other (not a variant of concern or variant of interest)	873	3.1
Total	28,150	

* WGS result for specimens with sampling dates in recent weeks may not yet be available.

† Two cases infected with the B.1.1.7 variant were found to have the additional E484K mutation

‡ Includes B.1.621 (n=2) and the sublineage B.1.621.1 (n=2)

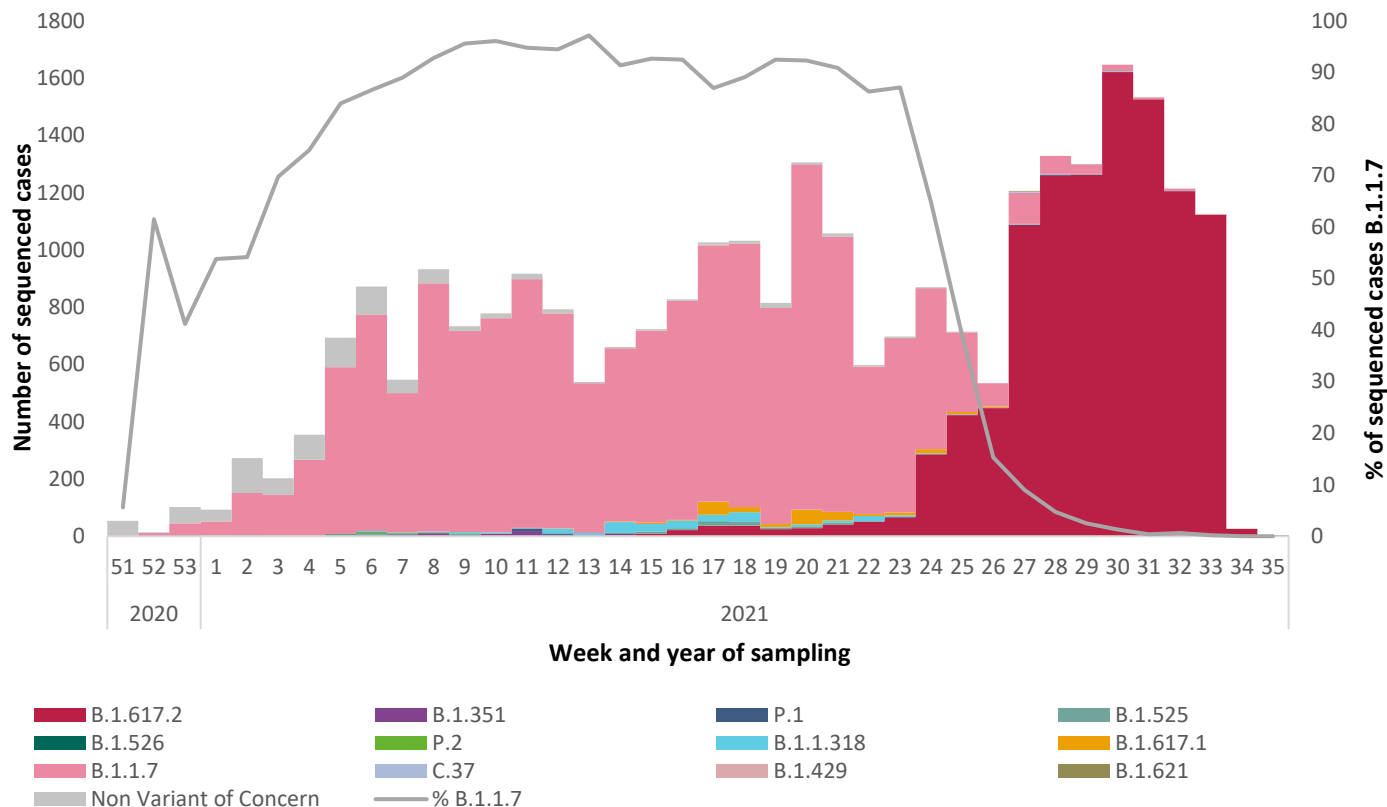


Figure 1a. Whole genome sequencing results and percentage of sequenced specimens* that were found to be the B.1.1.7 (Alpha) variant of concern, specimen collection dates from week 51 (December 13th 2020) to week 35 (Sept 4th 2021)**

*The proportion of cases attributed to lineage B.1.1.7 is based on S gene target failure (SGTF) data from the Thermo Fisher TaqPath assay. To date, all those SGTF samples that have undergone WGS have been identified as lineage B.1.1.7

**WGS result for specimens with sampling dates in recent weeks may not yet be available

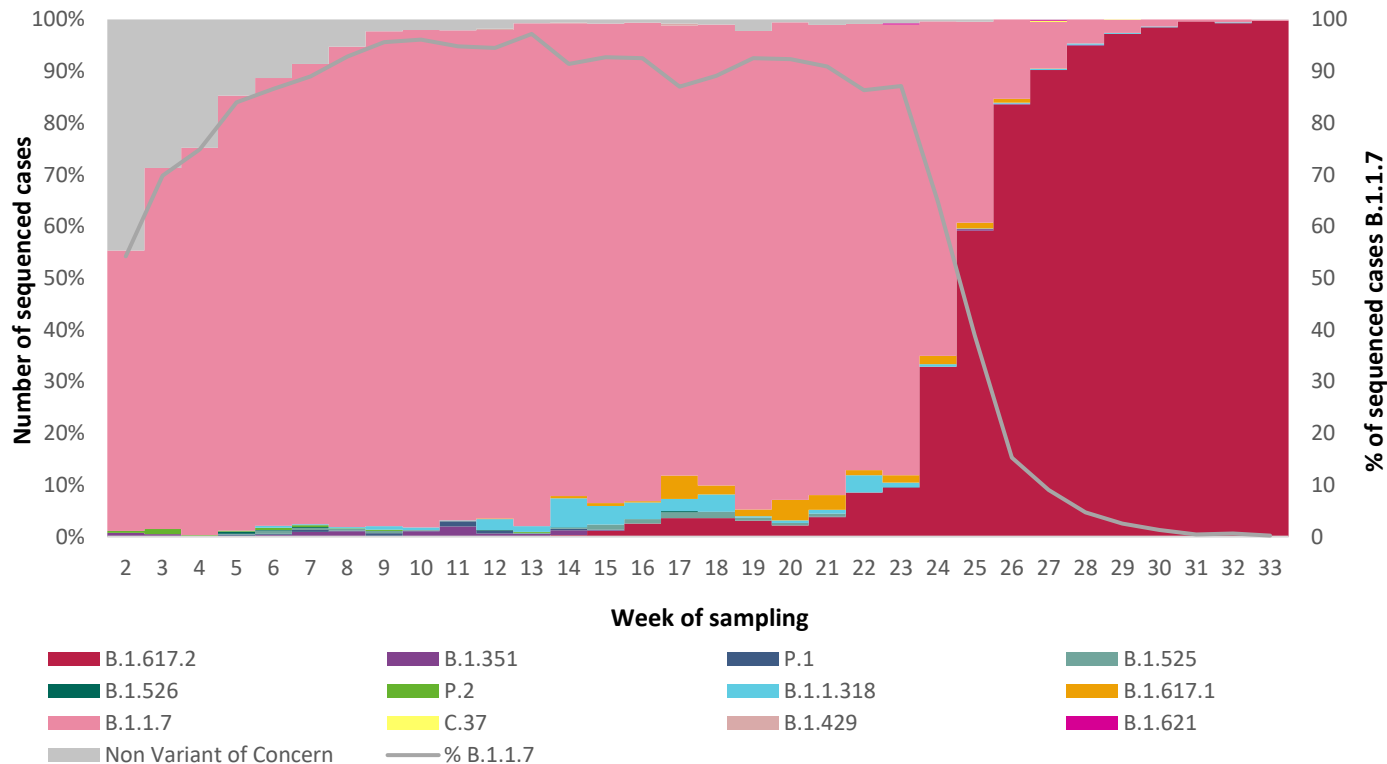


Figure 1b. Percentage of sequenced specimens, by variant of concern or interest, specimen collection dates from week 2 (January 10th 2021) to week 33* (Aug 21st 2021)

*WGS result for specimens with sampling dates in recent weeks may not yet be available. Weeks 34 and 35 omitted from graph due to the small number of sequenced cases (n=26 & 3).

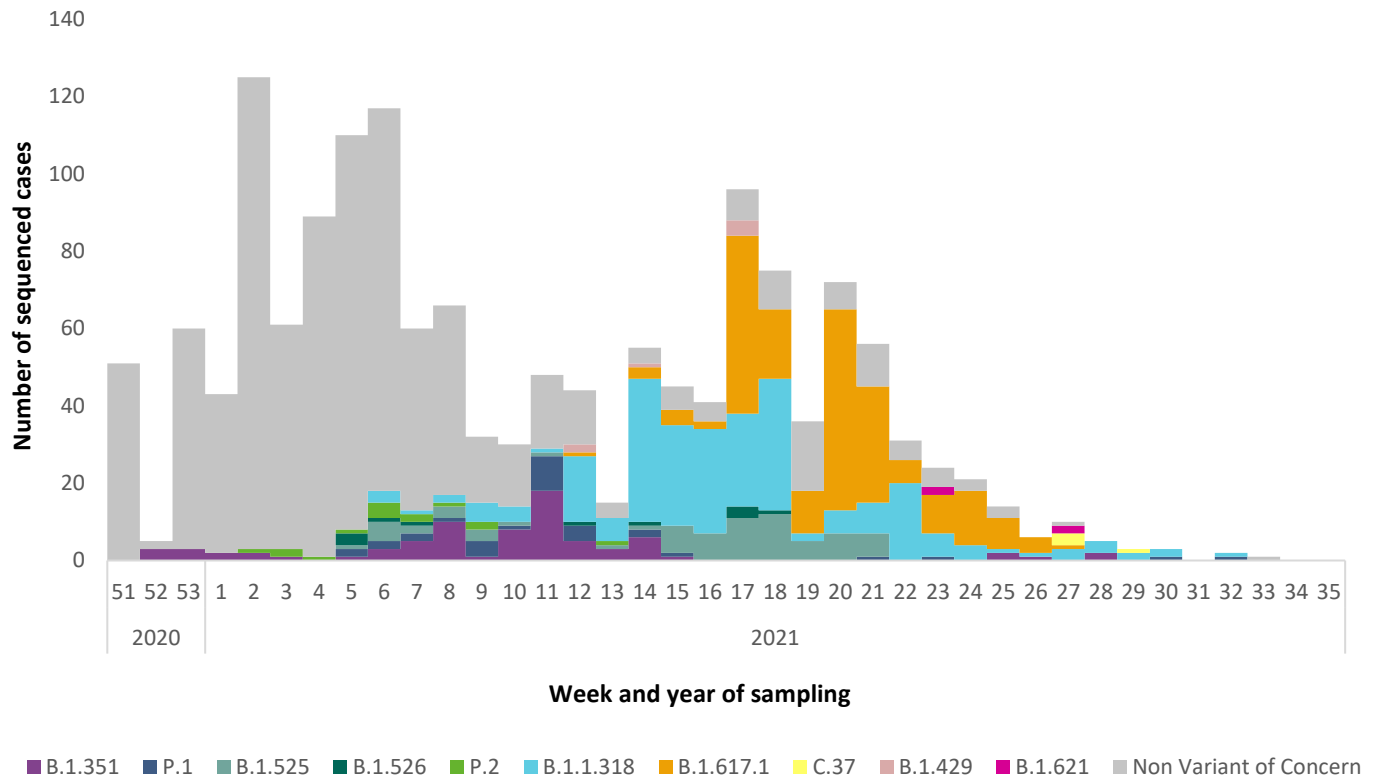


Figure 1c. Whole genome sequencing results excluding B.1.17 (Alpha) and B.1.617.2 (Delta), specimen collection dates from week 51 (December 13th 2020) to week 35* (Sept 4th 2021)

*WGS result for specimens with sampling dates in recent weeks may not yet be available

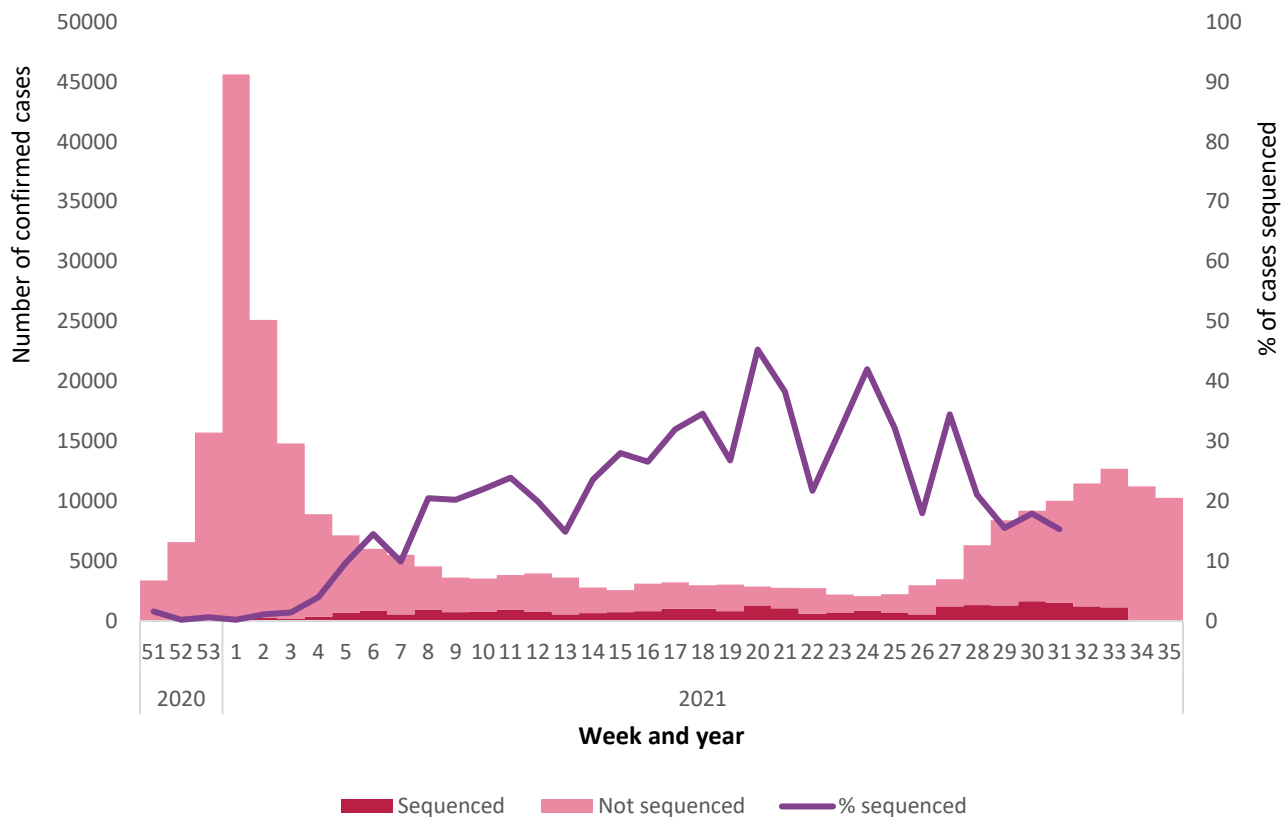


Figure 2. Number of confirmed cases of COVID-19 notified, by number sequenced/not sequenced, and percentage sequenced, week 51 (December 13th 2020) to week 35* (Sept 4th 2021)

*WGS result for specimens with sampling dates in recent weeks may not yet be available

Variants of concern

B.1.351 (Beta) VOC

A total of 77 COVID-19 cases have been confirmed to have been infected with the B.1.351 (Beta) VOC in Ireland to date. These are summarised in table 1, figure 3 and table 2.

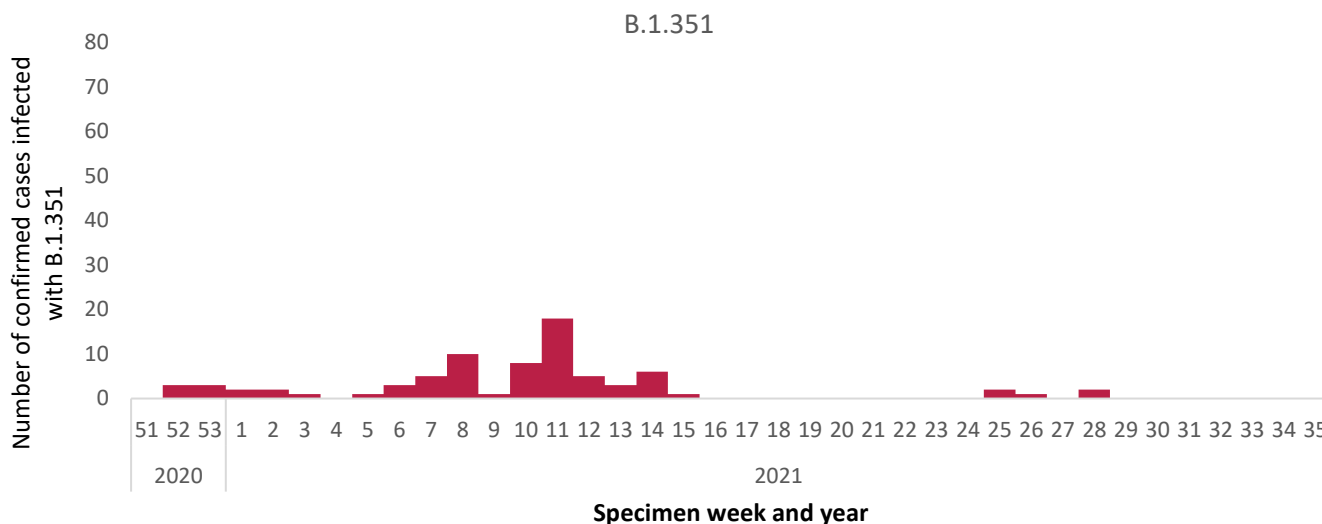


Figure 3. Number of cases of COVID-19 identified as infected with the B.1.351 (Beta) VOC by specimen week* and year

*WGS results for specimens with sampling dates in recent weeks may not yet be available

P.1 (Gamma) VOC

To date the P.1 (Gamma) VOC has been confirmed in 32 cases of COVID-19 (table 1, figure 4 and table 2).

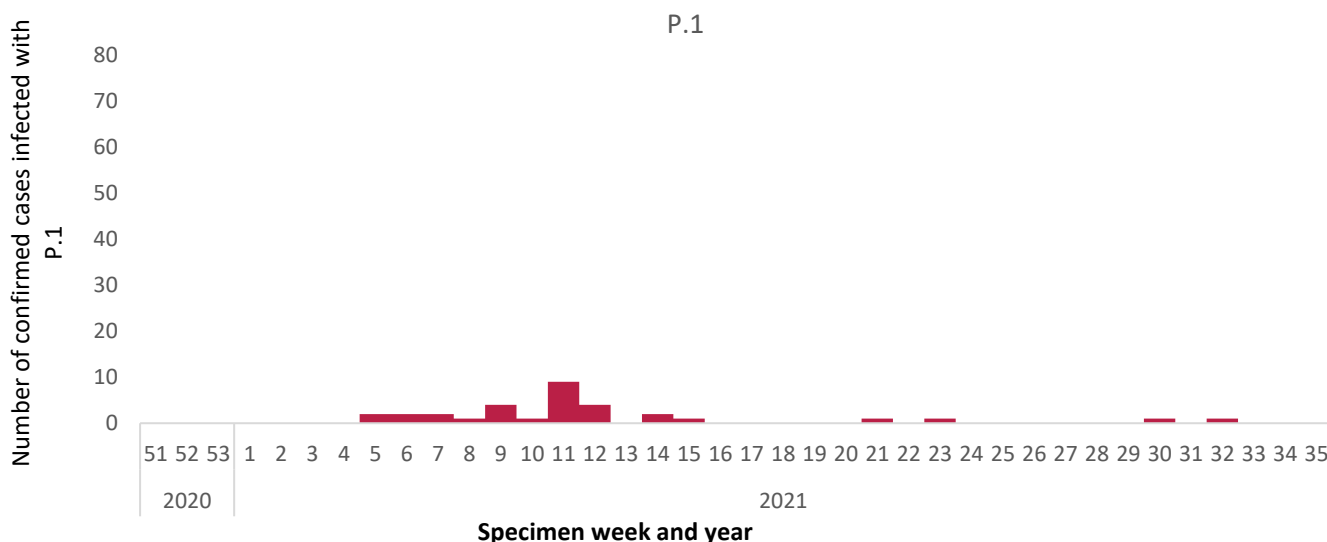


Figure 4. Number of cases of COVID-19 identified as infected with the P.1 (Gamma) VOC by specimen week* and year

*WGS results for specimens with sampling dates in recent weeks may not yet be available

B.1.617.2 (Delta) VOC

The B.1.617.2 (Delta) VOC or a Delta sublineage have been confirmed in 10,590 cases of COVID-19 to date. Several sublineages of the Delta variant have been identified in Ireland, the most common of which are AY.3 (n=558) and AY.4 (n=2,391) (table 1, figure 5 and table 2).

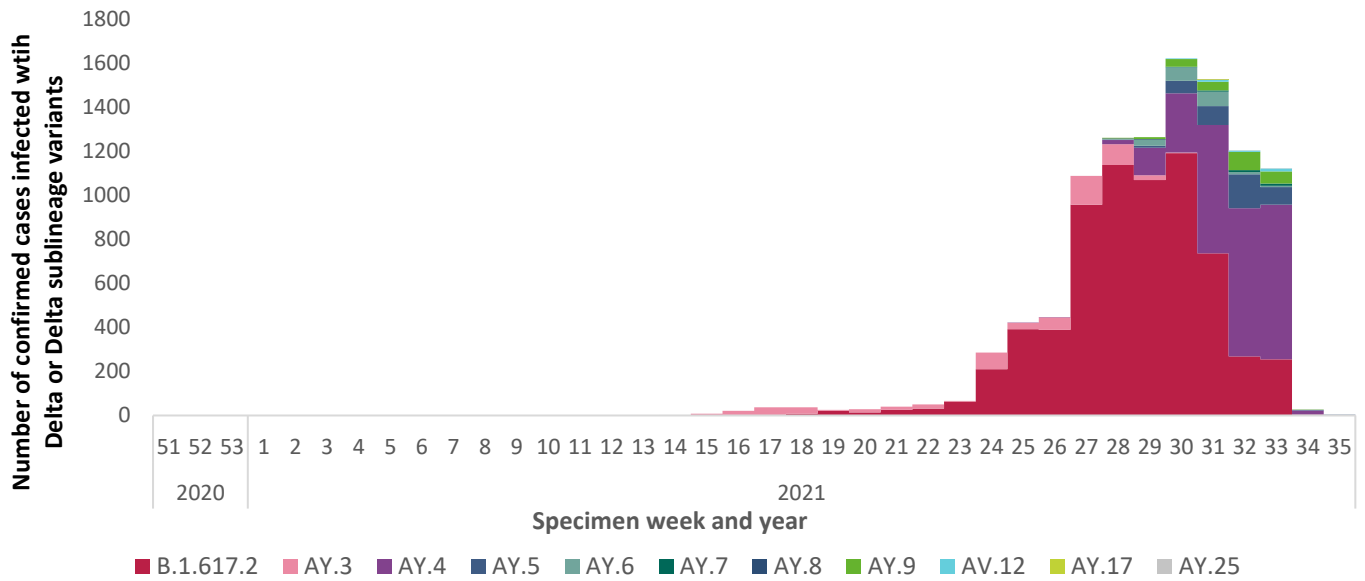


Figure 5. Number of cases of COVID-19 identified as infected with B.1.617.2 (Delta) VOC by specimen week and year*

*WGS result for specimens with sampling dates in recent weeks may not yet be available

Table 2. Summary of sequenced cases infected with the B.1.351 (Beta), P.1 (Gamma) and B.1.617.2 (Delta) variants of concern, specimen dates from week 51 (December 13th 2020) to week 35* (Sept 4th 2021)

Characteristics	B.1.351 (Beta)		P.1 (Gamma)		B.1.617.2 (Delta)	
	Number	%	Number	%	Number	%
Age group						
≤18 yrs	15	19.5	2	6.3	2899	27.4
19-34 yrs	20	26.0	14	43.8	4687	44.3
35-44 yrs	20	26.0	9	28.1	1297	12.2
45-64 yrs	18	23.4	7	21.9	1345	12.7
65+ yrs	4	5.2	0	0.0	341	3.2
Unknown	0	0.0	0	0.0	21	0.2
Sex						
Male	37	48.1	18	56.3	5387	50.9
Female	40	51.9	14	43.8	5179	48.9
Unknown	0	0.0	0	0.0	24	0.2
Total	77		32		10,590	

*WGS results for specimens with sampling dates in recent weeks may not yet be available

B.1.617.2 (Delta) and Delta sublineage cases and % population fully vaccinated, by age group and week

Figure 6 shows the number of cases of COVID-19 identified as infected with the B.1.617.2 (Delta) VOC (including Delta sublineages) by age group and week and the % of the Irish population who were fully vaccinated against COVID-19 in the same age group and weeks.

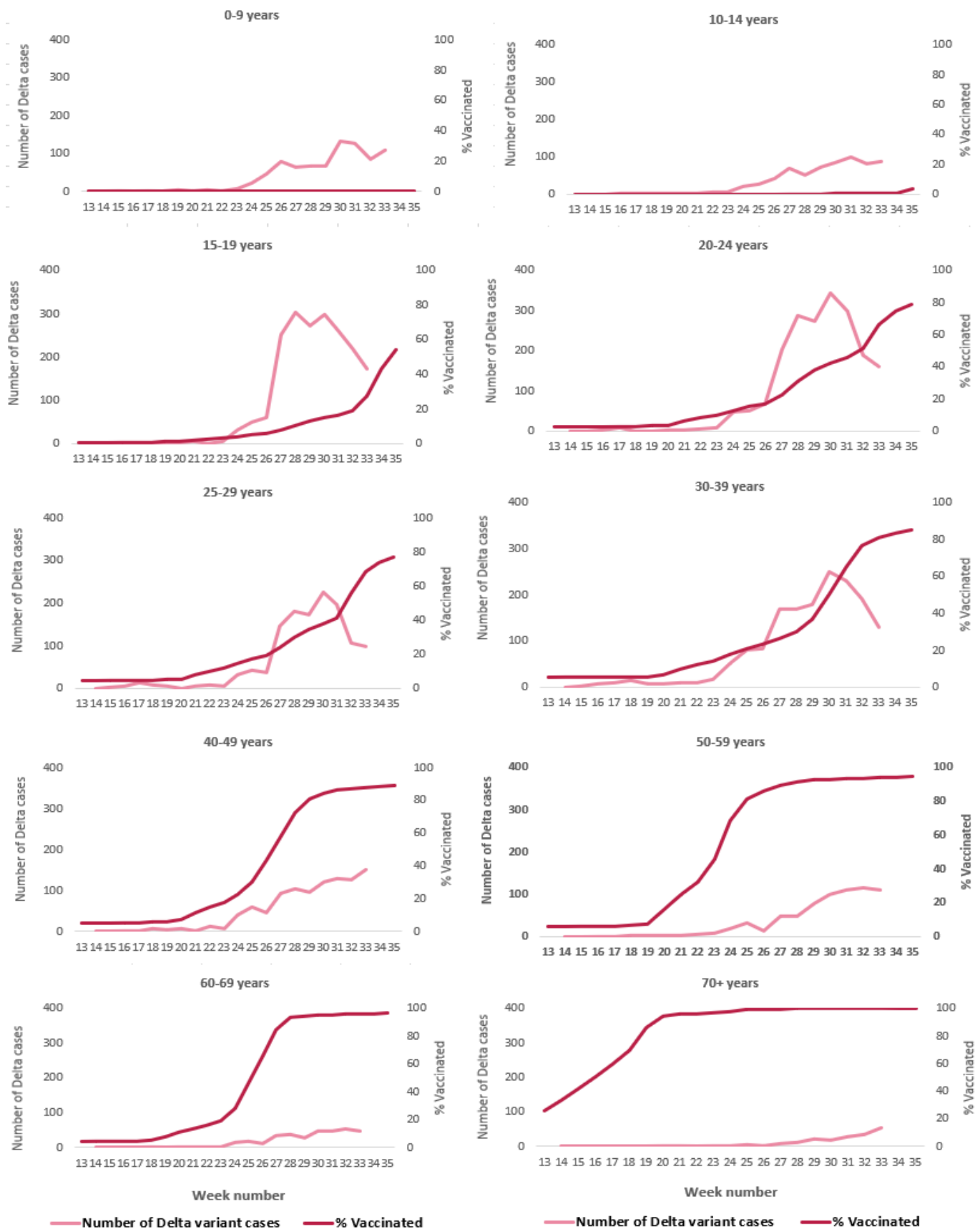


Figure 6. Number of B.1.617.2 (Delta) and Delta sublineage cases by age group and % population fully vaccinated by age group and week

Table 3. Summary of sequenced cases infected with variants of interest/note, specimen dates from week 51 (December 13th 2020) to week 35* (Sept 4th 2021)

Characteristics	P.2 (Zeta)		B.1.525 (Eta)		B.1.526 (Iota)		B.1.1.318		B.1.617.1 (Kappa)		B.1.429 (Epsilon)	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Age group												
≤18 yrs	1	6.7	20	27.4	9	81.8	74	30.1	19	9.0	2	28.6
19-34 yrs	7	46.7	23	31.5	0	0.0	55	22.4	153	72.9	2	28.6
35-44 yrs	5	33.3	18	24.7	0	0.0	53	21.5	10	4.8	1	14.3
45-64 yrs	1	6.7	10	13.7	2	18.2	42	17.1	22	10.5	2	28.6
65+ yrs	1	6.7	2	2.7	0	0.0	21	8.5	3	1.4	0	0.0
Unknown	0	0.0	0	0.0	0	0.0	1	0.4	3	1.4	0	0.0
Sex												
Male	7	46.7	36	49.3	7	63.6	105	42.7	106	50.5	3	42.9
Female	8	53.3	37	50.7	4	36.4	140	56.9	101	48.1	4	57.1
Unknown	0	0.0	0	0.0	0	0.0	1	0.4	3	1.4	0	0.0
Total	15		73		11		246		210		7	

*WGS results for specimens with sampling dates in recent weeks may not yet be available

Note: 4 cases of C.37 (Lambda), 2 cases of B.621 (Mu), 2 cases of B.1.621.1 (Mu) and 2 cases of A.27 have also been identified

Acknowledgements

Sincere thanks are extended to all those who participate in the collection and reporting of data used in this report. This includes the National Virus Reference Laboratory staff, National Immunisation Office, Office of the Chief Information Officer, HSE Integrated Information Services (IIS) and COVAX Implementation team of Salesforce, IBM, PWC, HSE procurement/acute hospitals/CHOs/vaccinating teams and administrators/IT staff, HSE Health Intelligence, Strategic Planning & Transformation Unit notifying clinicians, public health doctors, nurses, surveillance scientists, contact tracers, microbiologists, laboratory staff, staff in ICU units and administration staff.

Technical notes and links to further virus variant resources

Table A. Description of possible and confirmed attributes associated with variants of concern and interest

PANGO lineage	Description
B.1.1.7	Increased transmission, no change in antigenicity, potential increased severity
P.1	Increased transmission, reduced neutralisation by antibodies generated in response to vaccination or previous infection with another variant, potential increased disease severity
B.1.351	Increased transmission, reduced neutralisation by antibodies generated in response to vaccination or previous infection with another variant, potential increased severity
P.2	Potential increased transmission, potential reduced neutralisation by antibodies generated in response to vaccination or previous infection with another variant
B.1.525	Potential increased transmission, potential reduced neutralisation by antibodies generated in response to vaccination or previous infection with another variant
B.1.526	Potential increased transmission, reduced neutralisation by antibodies generated in response to vaccination or previous infection with another variant
B.1.1.318	Under investigation
B.1.617.2	Increased transmission, potential increased severity, potential reduced neutralisation by antibodies generated in response to vaccination or previous infection with another variant
B.1.617.1	Potential increased transmission, potential reduced neutralisation by antibodies generated in response to vaccination or previous infection with another variant
B.1.429	Potential increased transmission, reduced neutralisation by antibodies generated in response to vaccination or previous infection with another variant

Further information

Dates of epidemiological weeks are available at: <https://www.hpsc.ie/notifiablediseases/resources/epidemiologicalweeks/>

<https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/variant-surveillance/variant-info.html>

<https://www.cdc.gov/coronavirus/2019-ncov/transmission/variant.html>

<https://www.ecdc.europa.eu/en/publications-data/covid-19-infographic-mutations-current-variants-concern>

<https://www.gov.uk/government/publications/covid-19-variants-genomically-confirmed-case-numbers/variants-distribution-of-cases-data>

<https://www.gov.uk/government/news/confirmed-cases-of-covid-19-variants-identified-in-uk>