Public Health England

Protecting and improving the nation's health

SARS-CoV-2 variants of concern and variants under investigation in England

Technical briefing 22

3 September 2021

This briefing provides an update on previous briefings up to 20 August 2021

Contents

Summary

This report has been published to continue to share the detailed variant surveillance analyses which contribute to the variant risk assessments and designation of new VOCs and VUIs. The specialist technical briefings contain early data and analysis on emerging variants and findings have a high level of uncertainty.

A separate report is published covering surveillance data on all other VOCs and VUIs.

In summary:

- there are 4 current variants of concern (VOCs) and 8 variants under investigation (VUIs) (Table 1)
- there are no new VOCs or VUIs since the last briefing in the UK classification.
- on 30 August 2021, WHO has designated Mu (B.1.621) as a VOI – this was already defined as VUI in the UK (VUI-21JUL-01) on 21 July 2021

All risk assessments are published separately here, except for Gamma, which was published within Technical Briefing 7 and Alpha within Technical Briefing 9. As Delta is the dominant variant in the UK, epidemiological data in the weekly surveillance report is also relevant.

Published information on variants

The collection page gives content on variants, including prior technical briefings. Definitions for variants of concern, variants under investigation, and signals in monitoring are detailed in Technical Briefing 8. Data on variants not detailed here is published in the Variant Data Update. Variant risk assessments are available in prior technical briefings.

Public Health England (PHE) curated a repository on the 5 March 2021 containing the up-to-date genomic definitions for all VOCs and VUIs. The repository is accessible on GitHub.

World Health Organization (WHO) nomenclature from 31 May 2021 is incorporated. A table incorporating WHO and UK designations with Pango lineages is provided below (Table 1). Following the table, variants are referred to using their WHO designation where this exists and the UK designation where it does not.

Technical briefings are published periodically. From technical briefing 15, briefings include variant diagnoses identified by whole-genome sequencing and a genotyping PCR test, including the categorisation of sequenced and genotyped variant results and a rules-based decision algorithm (RBDA) to identify variant and mutation (VAM) profiles from genotype assay mutation profiles. Genotyping is used to identify variants Alpha, Beta (or B.1.621), Delta, and Gamma. Targets were updated in mid-May 2021 to prioritise accurate identification of Delta over Alpha.

1 Surveillance overview

1.1 Variants under surveillance

Table 1 shows the current VOC, VUI, and variants in monitoring as of 30 August 2021.

Table 1. Variant lineage and designation as of 30 August 2021

WHO nomenclature	Lineage	Designation	Status	UK or International (not currently detected in UK)
Alpha	B.1.1.7	VOC-20DEC-01	VOC	UK
Beta	B.1.351	VOC-20DEC-02	VOC	UK
Gamma	P.1	VOC-21JAN-02	VOC	UK
Delta	B.1.617.2, AY.1, AY.2, and AY.3	VOC-21APR-02	VOC	UK
Eta	B.1.525	VUI-21FEB-03	VUI	International
	B.1.1.318	VUI-21FEB-04	VUI	UK
Theta^	P.3	VUI-21MAR-02	VUI	UK
	B.1.617.3	VUI-21APR-03	VUI	International
	AV.1	VUI-21MAY-01	VUI	UK
	C.36.3	VUI-21MAY-02	VUI	UK
Lambda	C.37	VUI-21JUN-01	VUI	UK
Mu	B.1.621	VUI-21JUL-01	VUI	UK
Epsilon^	B.1.427/B.1.429		Monitoring	
	B.1.1.7 with S494P		Monitoring	
	A.27		Monitoring	
Iota	B.1.526		Monitoring	
	B.1.1.7 with Q677H		Monitoring	
	B.1.620		Monitoring	
	B.1.214.2		Monitoring	
	R.1		Monitoring	
	B.1 with 214insQAS		Monitoring	
	AT.1		Monitoring	
	A.30		Monitoring	
	B.1.630		Monitoring	
	P.1 + N501T and E484Q		Monitoring	
	B.1.629		Monitoring	
	B.1.619		Monitoring	
	C.1.2		Monitoring	
	B.1.630		Monitoring	

	B.1.631/B.1.628		Monitoring	
	P.1.8		Monitoring	

Provisionally extinct variants are excluded from this table.

VOCs and VUIs are monitored weekly for observations within the last 12 weeks. If variants have not been detected in the UK within this period, they are moved to international status with continued monitoring. If a VOC or VUI has not been observed in the UK or international datasets within the preceding 12 weeks, it is designated as provisionally extinct, but monitoring remains in place.

The last documented case of VUI-21APR-03 (B.1.617.3) was on the 17 May 2021 in the UK, this variant was moved to international monitoring on the 16 August 2021.

VUI-21FEB-01 (A.23.1 with E484K), VOC-21FEB-02 (B.1.1.7 with E484K), VUI-21MAR-01 (B.1.324.1 with E484K), Kappa VUI-21APR-01 (B.1.617.1) and Zeta (VUI-21JAN-01) have not been observed in the UK or within the international GISAID dataset within the last 12 weeks. These variants are no longer included in the data update.

^ Epsilon, Zeta and Theta were de-escalated by ECDC and by WHO. Mu was designated on the 30 August 2021.

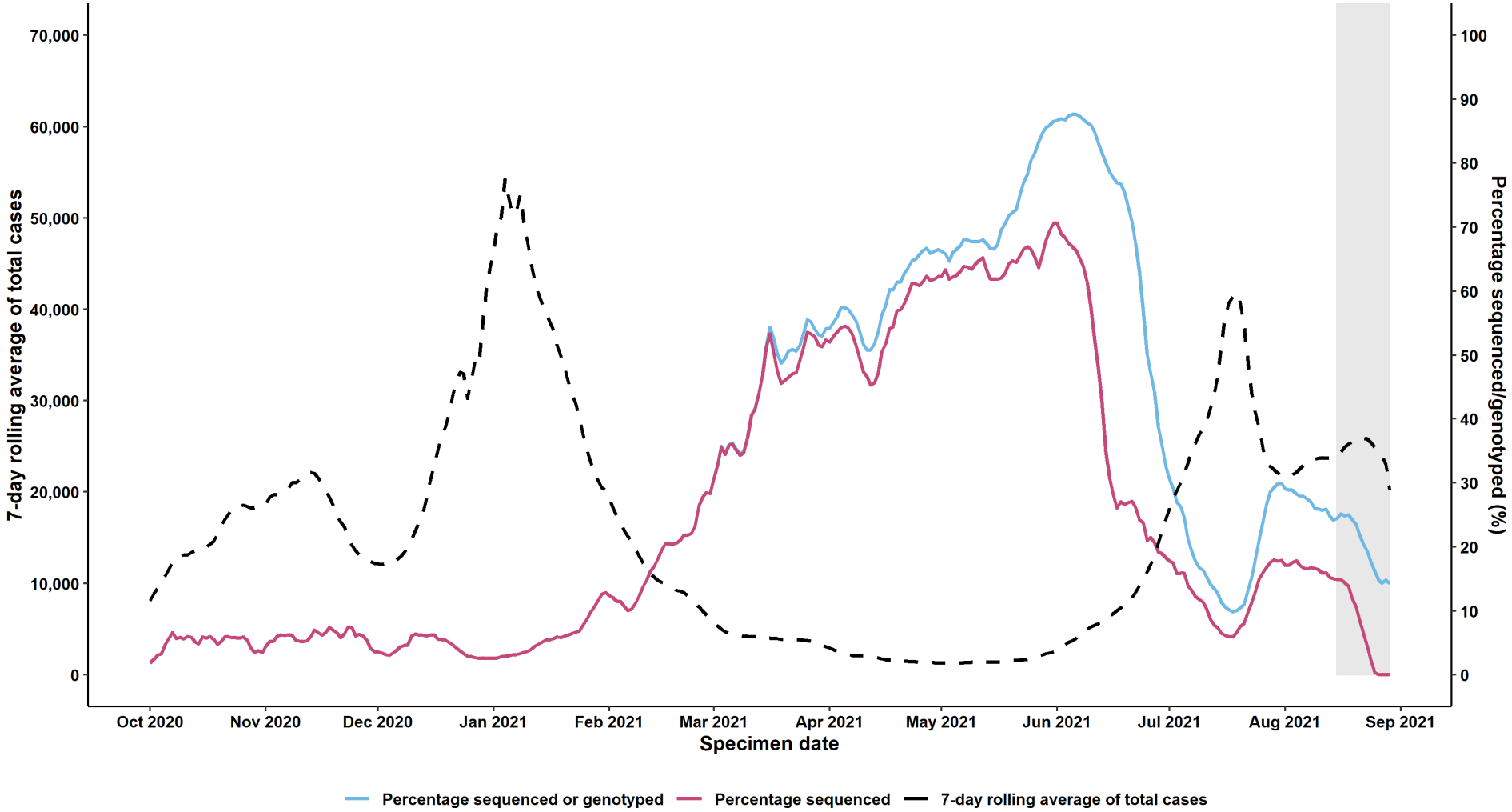
1.2 Sequencing coverage

Figure 1 shows the proportion of cases that have linked to a valid sequencing result (sequences included have 50% of the genome with sufficient read coverage) or genotyping PCR result over time. Figure 2 shows the proportion of cases sequenced and genotyped over time by regions. Figure 3 shows the proportion of cases sequenced and genotyped amongst cases who tested positive while in hospital. Figure 4 shows coverage of sequencing and genotyping for cases by age group.

Sequencing coverage is improving (Figure 1). During the current surge period, the sequencing strategy for both Pillar 1 and 2 is:

- hospitalised cases and hospital staff
- cases among international travellers
- national core priority studies
- as near random a sample as possible from each region, to the maximum coverage allowed by laboratory capacity

Figure 1. Coverage of sequencing with a valid result and genotyping over time (1 October 2020 to 29 August 2021)
(Find accessible data used in this graph in underlying data)



Data extract from 30 August 2021; data from 01 October 2020 to 29 August 2021.
Grey shading was applied to the previous 14 days to account for reporting delays in sequencing data.

Figure 2. Coverage of sequencing with a valid result and genotyping over time by region (1 October 2020 to 29 August 2021)
(Find accessible data used in this graph in underlying data)

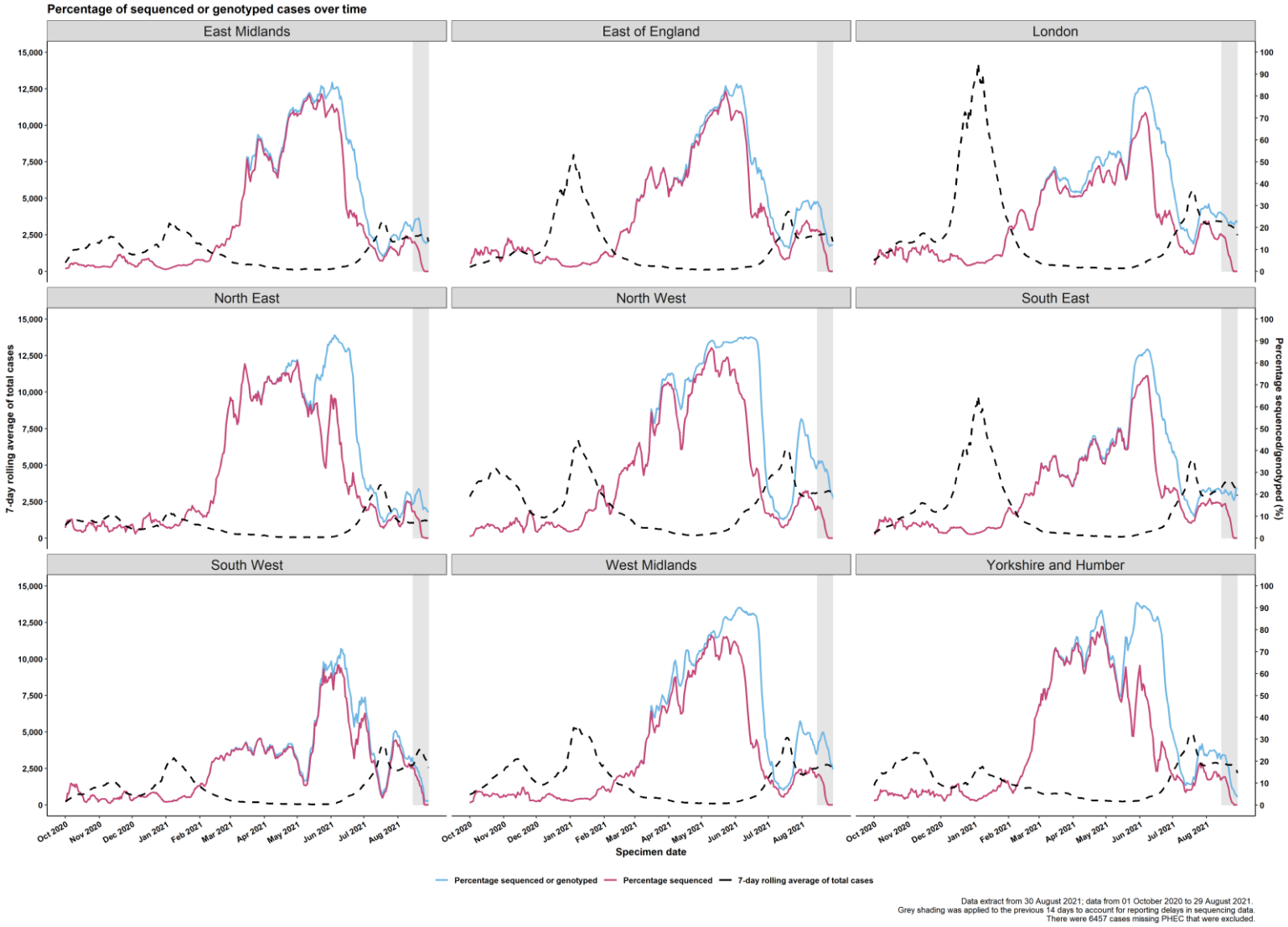
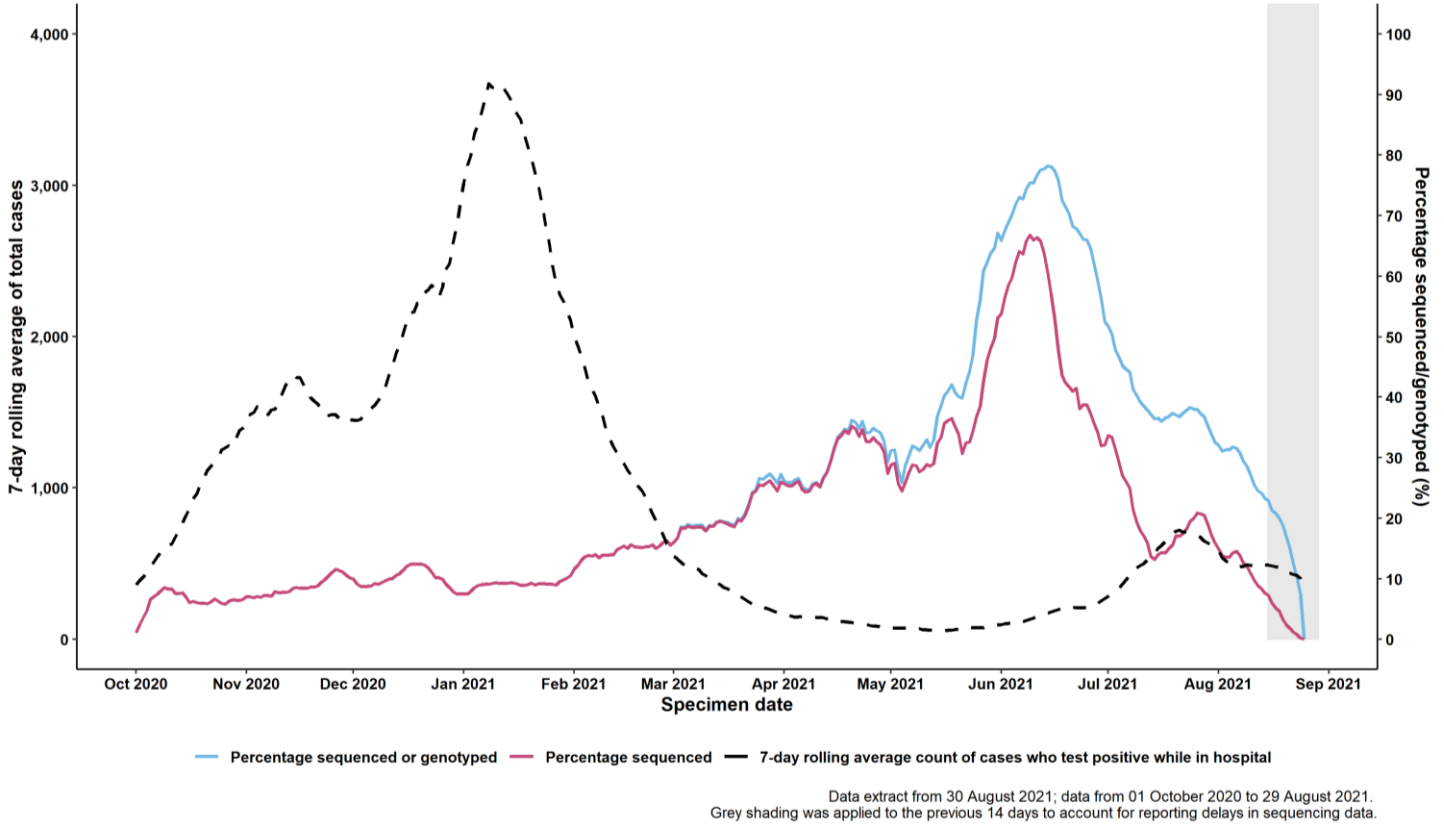


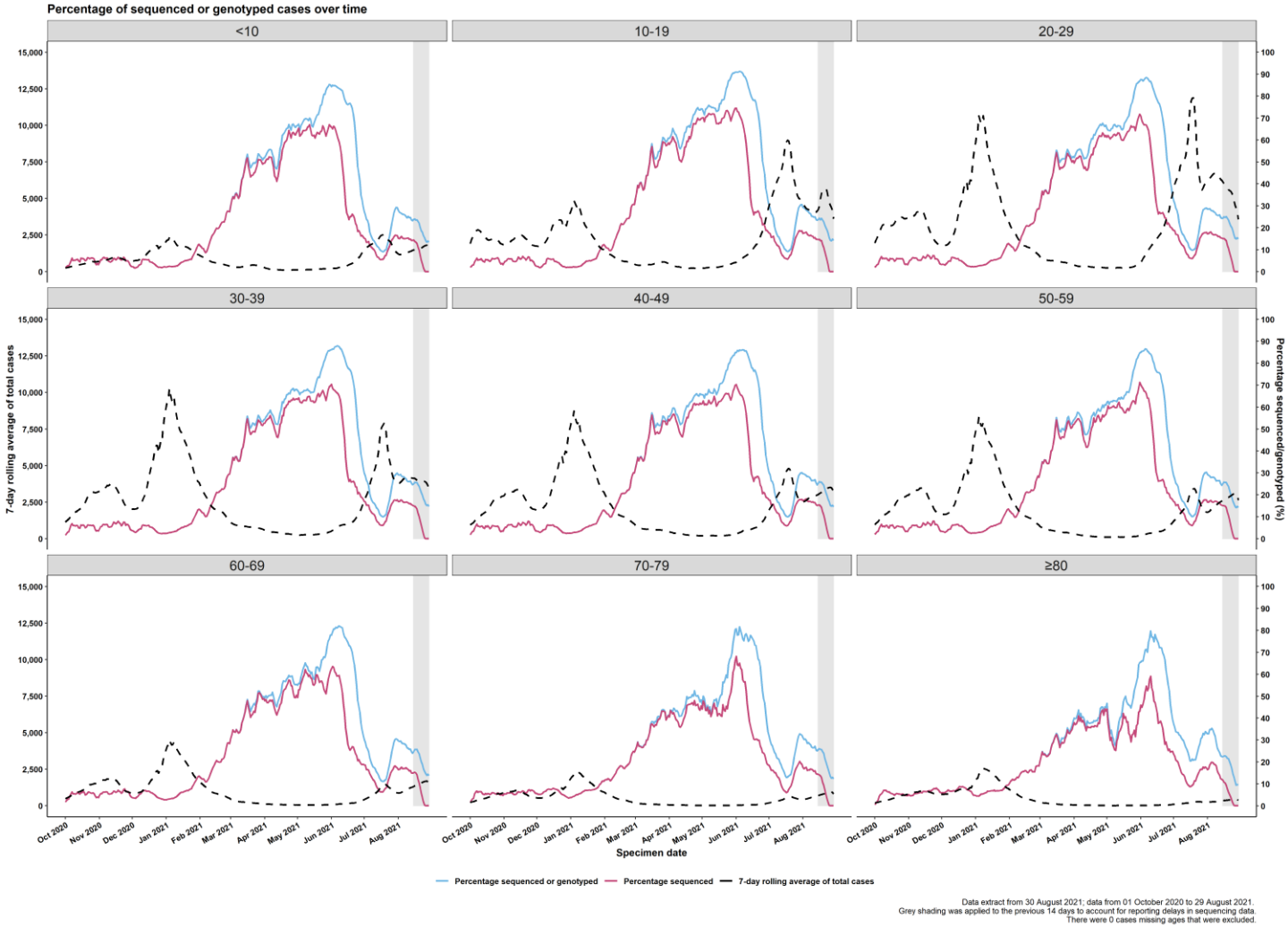
Figure 3. Coverage of sequencing with valid result and genotyping for cases who test positive in hospital (1 October 2020 to 29 August 2021) (Find accessible data used in this graph in **underlying data**)



Grey shading was applied to the previous 14 days to account for reporting delays in sequencing data.

[1]From 14 to 18 June 2021 an operational issue at a sequencing site resulted in a reduction in the number of samples with sequencing data of sufficient quality for variant assignment. There were 19,502 samples reported to PHE as impacted by the incident. PHE has received approximately 10,000 sample identifiers from the list of those affected of which sequencing data has been obtained for approximately 4,300 and genotyping data for 3,300 have a reflex assay result. For approximately 2,400 samples variant assignment is not possible. This issue resulted in a reduction in genome coverage for specimen dates 10 to 15 June 2021 and may impact variant counts in figures and tables for this limited period. The unusable samples were from locations distributed around the UK and the proportions of different variants by region should be correct. In addition, the genotyping results means that this has limited impact in the interpretation of the overall data.

Figure 4. Coverage of sequencing with valid result and genotyping for cases by age group (1 October 2020 to 29 August 2021)
(Find accessible data used in this graph in underlying data)



Grey shading was applied to the previous 14 days to account for reporting delays in sequencing data.

1.3 VOC and VUI case numbers, proportion and deaths

Summary epidemiology on Delta is shown in Table 2 and for each variant is shown in Table 3, case numbers are also updated online. Table 3 shows the number of sequenced, genotyped, and total cases and deaths for each variant. However, case fatality rates are not comparable across variants (see Table 3 footnote). Tables 4 and 5 show the number of cases who visited an NHS Emergency Department, were admitted, and died in any setting. The data is shown from 1 February 2021 onwards to enable comparisons across variants. Figure 5 shows the cumulative number of cases per variant indexed by days since the first report.

Information on attendance to emergency care is derived from the Emergency Care Data Set (ECDS), provided by NHS Digital. These data only show whether a case has attended emergency care at an NHS hospital and was subsequently admitted as an inpatient. The data does not include cases who were directly admitted without first presenting to emergency care.

The crude analysis indicates that the proportion of Delta cases who present to emergency care is greater than that of Alpha, but a more detailed analysis of 43,338 COVID-19 cases indicates that the risk of hospitalisation among Delta cases is 2.26 times greater compared to Alpha (Twohig and others, 2021[1]).

ECDS reporting is lagged as NHS trusts routinely provide monthly data by the 21st of the following month. However, some trusts report daily data, and the linkage between COVID-19 cases and ECDS data is updated twice-weekly.

[1] Hospital admission and emergency care attendance risk for SARS-CoV-2 delta (B.1.617.2) compared with alpha (B.1.1.7) variants of concern: a cohort study

Table 2. Sequenced and genotyped Delta cases by region from 1 October 2020 as of 30 August 2021

Region	Sequenced cases	Genotyped cases[1]	Total Delta case number (1 October 2020 as of 30 August 2021)	Proportion of total Delta cases per region
East Midlands	19,857	12,494	32,351	6.6%
East of England	27,241	14,733	41,974	8.5%
London	43,837	29,410	73,247	14.9%
North East	15,708	12,221	27,929	5.7%
North West	57,306	59,253	116,559	23.7%
South East	36,234	21,375	57,609	11.7%
South West	32,828	6,313	39,141	7.9%
West Midlands	23,445	25,244	48,689	9.9%
Yorkshire and Humber	29,300	23,069	52,369	10.6%
Unknown region	1,439	1,418	2,857	0.6%
Total	287,195	205,530	492,725	-

[1]Genotyping is used to identify variants Alpha, Beta, Delta and Gamma; targets were updated in mid-May 2021 to prioritise accurate identification of Delta over Alpha. If a Genotyped specimen also has a reported sequencing result this case is removed from the Genotyped category and added to Sequenced category once or if the sequence data is reported.

Table 3. Number of sequenced and genotyped cases by variant from 1 October 2020 as of 30 August 2021

Variant	Sequenced cases	Genotyped cases[1]	Total case number	Proportion of total cases	Deaths
Alpha	221,500	5,707	227,207	31.4%	4,351
Beta	923	71	994	0.1%	13
Gamma	205	47	252	0.0%	0
Delta	287,195	205,530	492,725	68.1%	1,802
Eta	460	0	460	0.1%	12
VUI-21FEB-04	312	0	312	0.0%	<5
Theta	7	0	7	0.0%	0
VUI-21APR-03	15	0	15	0.0%	0
VUI-21MAY-01	184	0	184	0.0%	<5
VUI-21MAY-02	147	0	147	0.0%	0
Lambda	8	0	8	0.0%	0
Mu	47	0	47	0.0%	0

[1]Genotyping is used to identify variants Alpha, Beta, Delta and Gamma; targets were updated in mid-May 2021 to prioritise accurate identification of Delta over Alpha. If a Genotyped specimen also has a reported sequencing result this case is removed from the Genotyped category and added to Sequenced category once or if the sequence data is reported.

Table 4. Attendance to emergency care and deaths of sequenced and genotyped cases in England (1 February 2021 to 29 August 2021)

Variant	Age group (years)	Cases since 1 Feb	Cases with specimen date in past 28 days		Cases with an A&E visit§ (exclusion‡)		Cases with an A&E visit§ (inclusion#)		Cases where presentation to A&E resulted in overnight inpatient admission§ (exclusion‡)		Cases where presentation to A&E resulted in overnight inpatient admission§ (inclusion#)		Deaths^	
			n	%	n	%	n	%	n	%	n	%	n	%
Alpha	<50	118,540	26	0.0	5,013	4.2	5,846	4.9	1,241	1.0	1,679	1.4	67	0.1
	≥50	32,363	7	0.0	3,160	9.8	4,594	14.2	1,729	5.3	2,768	8.6	1,550	4.8
	All cases	151,006	35	0.0	8,173	5.4	10,440	6.9	2,970	2.0	4,447	2.9	1,617	1.1
Beta	<50	612	<5	0.5	26	4.2	28	4.6	6	1.0	9	1.5	<5	0.2
	≥50	167	<5	0.6	18	10.8	26	15.6	7	4.2	15	9.0	7	4.2
	All cases	790	<5	0.5	44	5.6	54	6.8	13	1.6	24	3.0	8	1.0
Gamma	<50	227	5	2.2	9	4.0	9	4.0	<5	0.4	<5	0.4	-	0.0
	≥50	24	<5	8.3	<5	8.3	<5	8.3	-	0.0	-	0.0	-	0.0

Variant	Age group (years)	Cases since 1 Feb	Cases with specimen date in past 28 days		Cases with an A&E visit§ (exclusion‡)		Cases with an A&E visit§ (inclusion#)		Cases where presentation to A&E resulted in overnight inpatient admission§ (exclusion‡)		Cases where presentation to A&E resulted in overnight inpatient admission§ (inclusion#)		Deaths^	
			n	%	n	%	n	%	n	%	n	%	n	%
	All cases	251	7	2.8	11	4.4	11	4.4	<5	0.4	<5	0.4	-	0.0
Delta	<50	420,689	115,155	27.4	13,503	3.2	18,337	4.4	2,938	0.7	5,098	1.2	154	0.0
	≥50	71,107	28,873	40.6	3,861	5.4	7,154	10.1	1,985	2.8	4,374	6.2	1,644	2.3
	All cases	492,528	144,067	29.3	17,364	3.5	25,491	5.2	4,923	1.0	9,472	1.9	1,798	0.4
Zeta	<50	16	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0
	≥50	8	-	0.0	<5	12.5	<5	12.5	<5	12.5	<5	12.5	-	0.0
	All cases	24	-	0.0	<5	4.2	<5	4.2	<5	4.2	<5	4.2	-	0.0
Eta	<50	283	-	0.0	10	3.5	12	4.2	5	1.8	6	2.1	-	0.0
	≥50	120	-	0.0	<5	3.3	7	5.8	<5	0.8	<5	2.5	6	5.0

Variant	Age group (years)	Cases since 1 Feb	Cases with specimen date in past 28 days		Cases with an A&E visit§ (exclusion‡)		Cases with an A&E visit§ (inclusion#)		Cases where presentation to A&E resulted in overnight inpatient admission§ (exclusion‡)		Cases where presentation to A&E resulted in overnight inpatient admission§ (inclusion#)		Deaths^	
			n	%	n	%	n	%	n	%	n	%	n	%
	All cases	406	-	0.0	14	3.4	19	4.7	6	1.5	9	2.2	6	1.5
VUI-21FEB-04	<50	245	<5	1.2	6	2.4	9	3.7	<5	0.4	<5	0.8	-	0.0
	≥50	58	-	0.0	<5	1.7	<5	3.4	-	0.0	<5	1.7	<5	1.7
	All cases	305	<5	1.0	7	2.3	11	3.6	<5	0.3	<5	1.0	<5	0.3
Theta	<50	<5	-	0.0	<5	25.0	<5	25.0	-	0.0	-	0.0	-	0.0
	≥50	<5	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0
	All cases	7	-	0.0	<5	14.3	<5	14.3	-	0.0	-	0.0	-	0.0
Kappa	<50	403	<5	0.2	9	2.2	10	2.5	<5	0.2	<5	0.5	-	0.0
	≥50	67	-	0.0	6	9.0	6	9.0	<5	4.5	<5	4.5	<5	3.0

Variant	Age group (years)	Cases since 1 Feb	Cases with specimen date in past 28 days		Cases with an A&E visit§ (exclusion‡)		Cases with an A&E visit§ (inclusion#)		Cases where presentation to A&E resulted in overnight inpatient admission§ (exclusion‡)		Cases where presentation to A&E resulted in overnight inpatient admission§ (inclusion#)		Deaths^	
			n	%	n	%	n	%	n	%	n	%	n	%
	All cases	470	<5	0.2	15	3.2	16	3.4	<5	0.9	5	1.1	<5	0.4
VUI-21APR-03	<50	13	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0
	≥50	<5	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0
	All cases	15	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0
VUI-21MAY-01	<50	161	-	0.0	<5	0.6	<5	1.2	-	0.0	<5	0.6	-	0.0
	≥50	23	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	<5	4.3
	All cases	184	-	0.0	<5	0.5	<5	1.1	-	0.0	<5	0.5	<5	0.5
VUI-21MAY-02	<50	112	-	0.0	9	8.0	10	8.9	<5	2.7	<5	3.6	-	0.0
	≥50	33	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0

Variant	Age group (years)	Cases since 1 Feb	Cases with specimen date in past 28 days		Cases with an A&E visit§ (exclusion‡)		Cases with an A&E visit§ (inclusion#)		Cases where presentation to A&E resulted in overnight inpatient admission§ (exclusion‡)		Cases where presentation to A&E resulted in overnight inpatient admission§ (inclusion#)		Deaths^	
			n	%	n	%	n	%	n	%	n	%	n	%
	All cases	147	-	0.0	9	6.1	10	6.8	<5	2.0	<5	2.7	-	0.0
Lambda	<50	8	-	0.0	<5	12.5	<5	12.5	<5	12.5	<5	12.5	-	0.0
	≥50	14	<5	21	<5	29	5	36	<5	7	<5	7	-	0.0
	All cases	8	-	0.0	<5	12.5	<5	12.5	<5	12.5	<5	12.5	-	0.0
Mu	<50	33	<5	6.1	<5	3.0	<5	3.0	-	0.0	-	0.0	-	0.0
	≥50	14	<5	21.4	<5	28.6	5	35.7	<5	7.1	<5	7.1	-	0.0
	All cases	47	5	10.6	5	10.6	6	12.8	<5	2.1	<5	2.1	-	0.0

Data sources: Emergency care attendance and admissions from ECDS, deaths from PHE daily death data series (deaths within 28 days). NHS trusts are required to submit emergency care attendances by the 21st of each month. As a result, the number of cases with attendances may show substantial increases in technical briefs prepared after the monthly cut-off, compared with other briefs from the same month.
¥ Cases without specimen dates and unlinked sequences (sequenced samples that could not be matched to individuals) are excluded from this table.

* Cases are assessed for any emergency care attendance within 28 days of their positive specimen date. Cases still undergoing within 28-day period may have an emergency care attendance reported at a later date.
§ At least 1 attendance or admission within 28 days of positive specimen date
# Inclusion: Including cases with the same specimen and attendance dates
‡ Exclusion: Excluding cases with the same specimen and attendance dates. Cases where specimen date is the same as date of emergency care visit are excluded to help remove cases picked up via routine testing in healthcare settings whose primary cause of attendance is not COVID-19. This underestimates the number of individuals in hospital with COVID-19 but only includes those who tested positive prior to the day of their emergency care visit. Some of the cases detected on the day of admission may have attended for a diagnosis unrelated to COVID-19.
^ Total deaths in any setting (regardless of hospitalisation status) within 28 days of positive specimen date.

Table 5. Attendance to emergency care and deaths of sequenced and genotyped Delta cases in England by vaccination status (1 February 2021 to 29 August 2021)

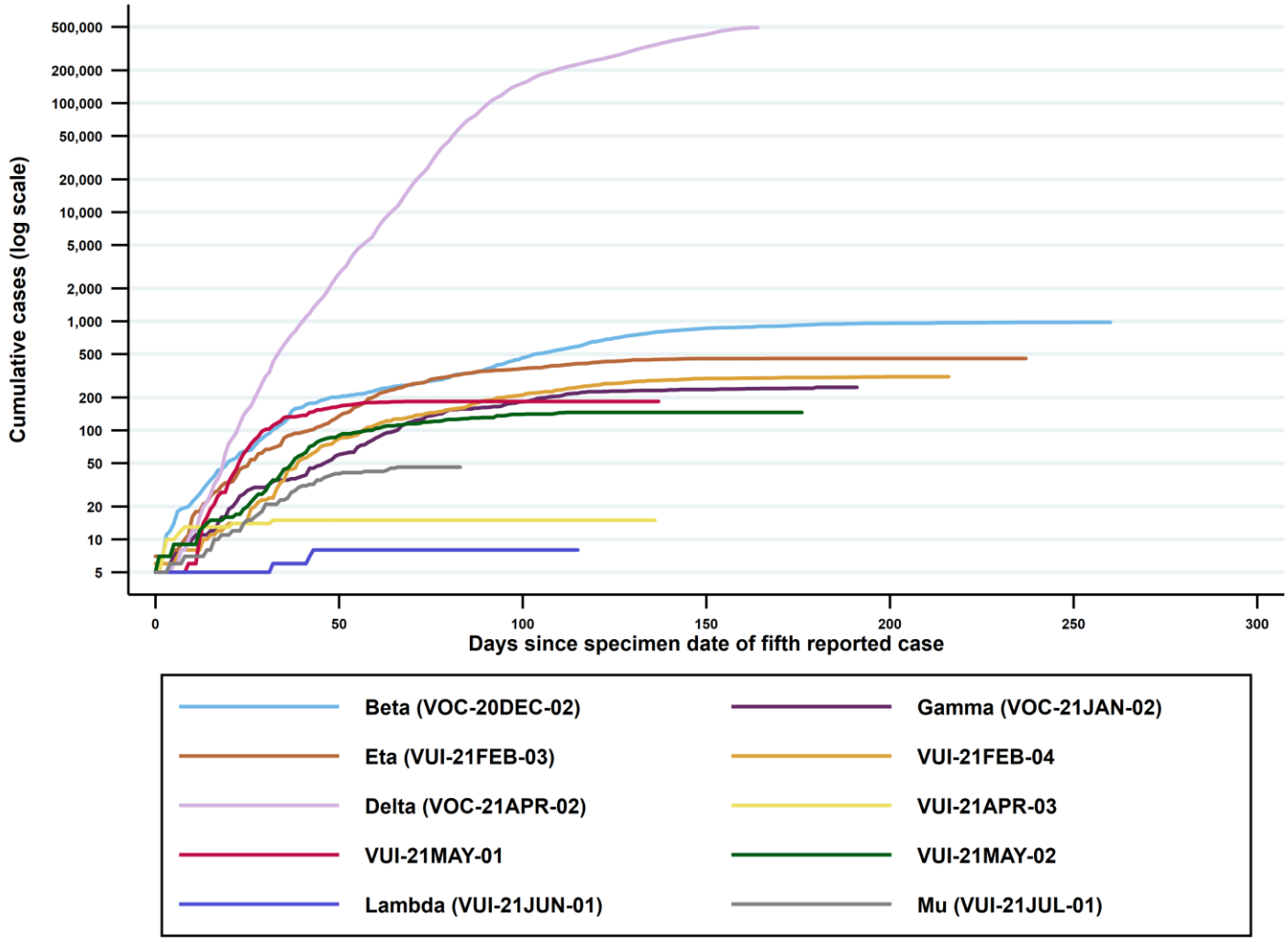
Variant	Age group (years)**	Total	Cases with specimen date in past 28 days	Unlinked	<21 days post dose 1	≥21 days post dose 1	≥14 days post dose 2	Unvaccinated
Delta cases	<50	420,689	115,155	43,327	27,715	74,255	62,403	212,989
	≥50	71,107	28,873	6,064	277	6,622	51,420	6,724
	All cases	492,528	144,067	50,119	27,993	80,877	113,823	219,716
Cases with an emergency care visit§ (exclusion‡)	<50	13,503	N/A	133	954	1,997	1,661	8,758
	≥50	3,861	N/A	16	26	406	2,500	913
	All cases	17,364	N/A	149	980	2,403	4,161	9,671
Cases with an emergency care visit§ (inclusion#)	<50	18,337	N/A	216	1,236	2,467	2,118	12,300
	≥50	7,154	N/A	41	55	665	4,374	2,019

	All cases	25,491	N/A	257	1,291	3,132	6,492	14,319
Cases where presentation to emergency care resulted in overnight inpatient admission§ (exclusion‡)	<50	2,938	N/A	72	156	304	336	2,070
	≥50	1,985	N/A	7	15	161	1,292	510
	All cases	4,923	N/A	79	171	465	1,628	2,580
Cases where presentation to emergency care resulted in overnight inpatient admission§ (inclusion#)	<50	5,098	N/A	111	248	476	521	3,742
	≥50	4,374	N/A	29	36	336	2,651	1,322
	All cases	9,472	N/A	140	284	812	3,172	5,064
Deaths within 28 days of positive specimen date	<50	154	N/A	<5	6	8	37	99
	≥50	1,644	N/A	25	10	118	1,054	437
	All cases	1,798	N/A	29	16	126	1,091	536

Data sources: Emergency care attendance and admissions from ECDS, deaths from PHE daily death data series (deaths within 28 days). NHS trusts are required to submit emergency care attendances by the 21st of each month. As a result, the number of cases with attendances may show substantial increases in technical briefs prepared after the monthly cut-off, compared with other briefs from the same month.
¥ Cases without specimen dates and unlinked sequences (sequenced samples that could not be matched to individuals) are excluded from this table.

* Cases are assessed for any emergency care attendance within 28 days of their positive specimen date. Cases still undergoing within 28-day period may have an emergency care attendance reported at a later date.
§ At least one attendance or admission within 28 days of positive specimen date
# Inclusion: Including cases with the same specimen and attendance dates
‡ Exclusion: Excluding cases with the same specimen and attendance dates. Cases where specimen date is the same as date of emergency care visit are excluded to help remove cases picked up via routine testing in healthcare settings whose primary cause of attendance is not COVID-19. This underestimates the number of individuals in hospital with COVID-19 but only includes those who tested positive prior to the day of their emergency care visit. Some of the cases detected on the day of admission may have attended for a diagnosis unrelated to COVID-19.
^ Total deaths in any setting (regardless of hospitalisation status) within 28 days of positive specimen date.
** Age <50 + >50 do not total ‘all cases’ per category as some cases lack reported age data

Figure 5. Cumulative cases in England of variants indexed by days since the fifth reported case as of 29 August 2021
(Find accessible data used in this graph in underlying data)



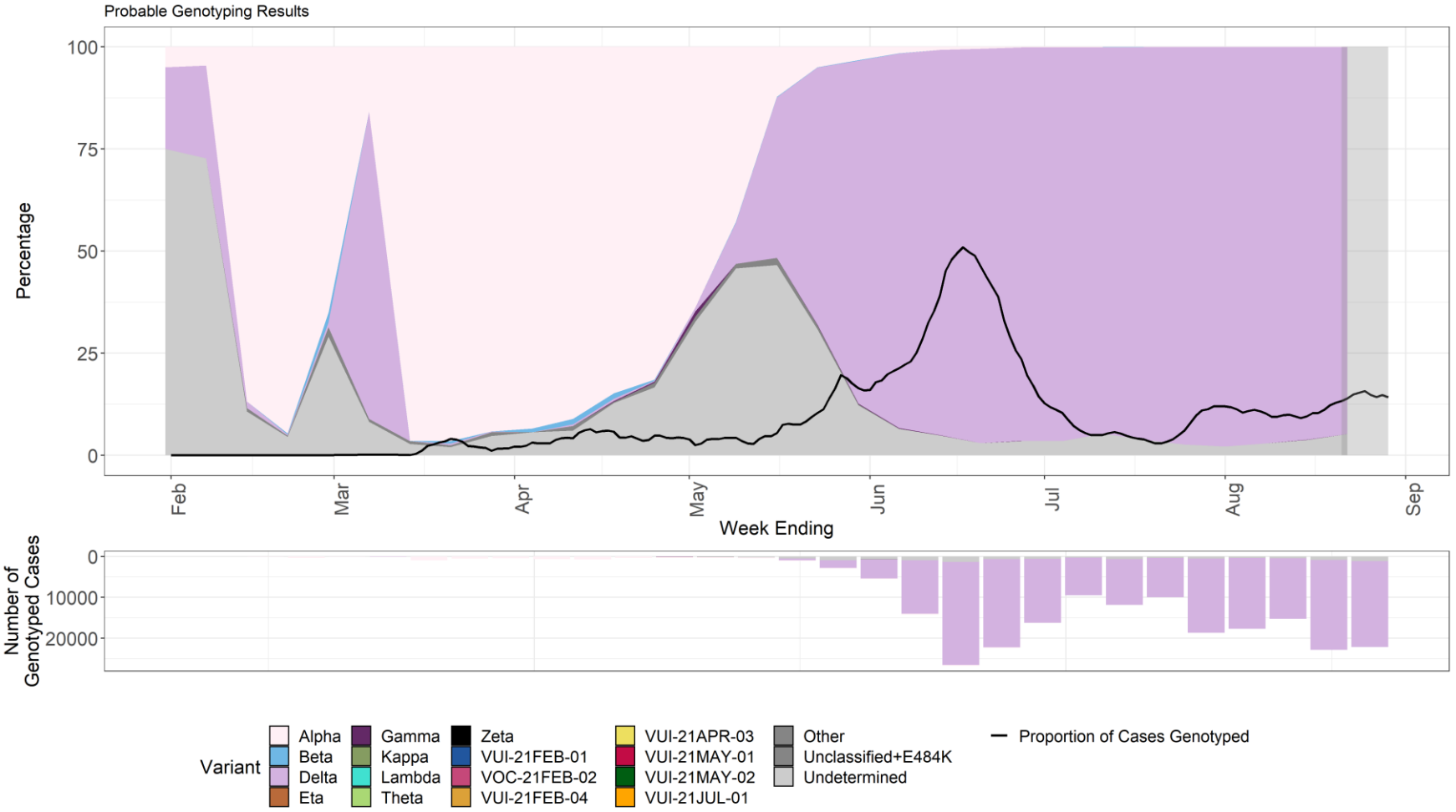
1.4 Variant prevalence

The prevalence of different variants amongst genotyped and sequenced cases is presented in Figures 6 and 7 and split by region in Figures 8 and 9. Genotyping provides probably variant result with a shorter turnaround time of 12 to 24 hours after initial confirmation of COVID-19. The initial panel of targets began trials in March 2021, using single nucleotide polymorphisms that included N501Y, E484K, K417N, and K417T. Results have been reported and used for public health action since 29 March 2021. On 11 May 2021, after rapid validation of targets to allow identification of Delta variant, P681R was introduced in the panel to replace N501Y. Genotyping results have now been fully integrated into the variant data reports and analyses. Changes in the use of genotyping over time should be considered when interpreting prevalence from genotyped data.

The ‘Other’ category in Figures 7 and 9 includes genomes where the quality is insufficient to determine variant status and genomes that do not meet the current definition for a VUI or VOC. The supplementary data for figures are available.

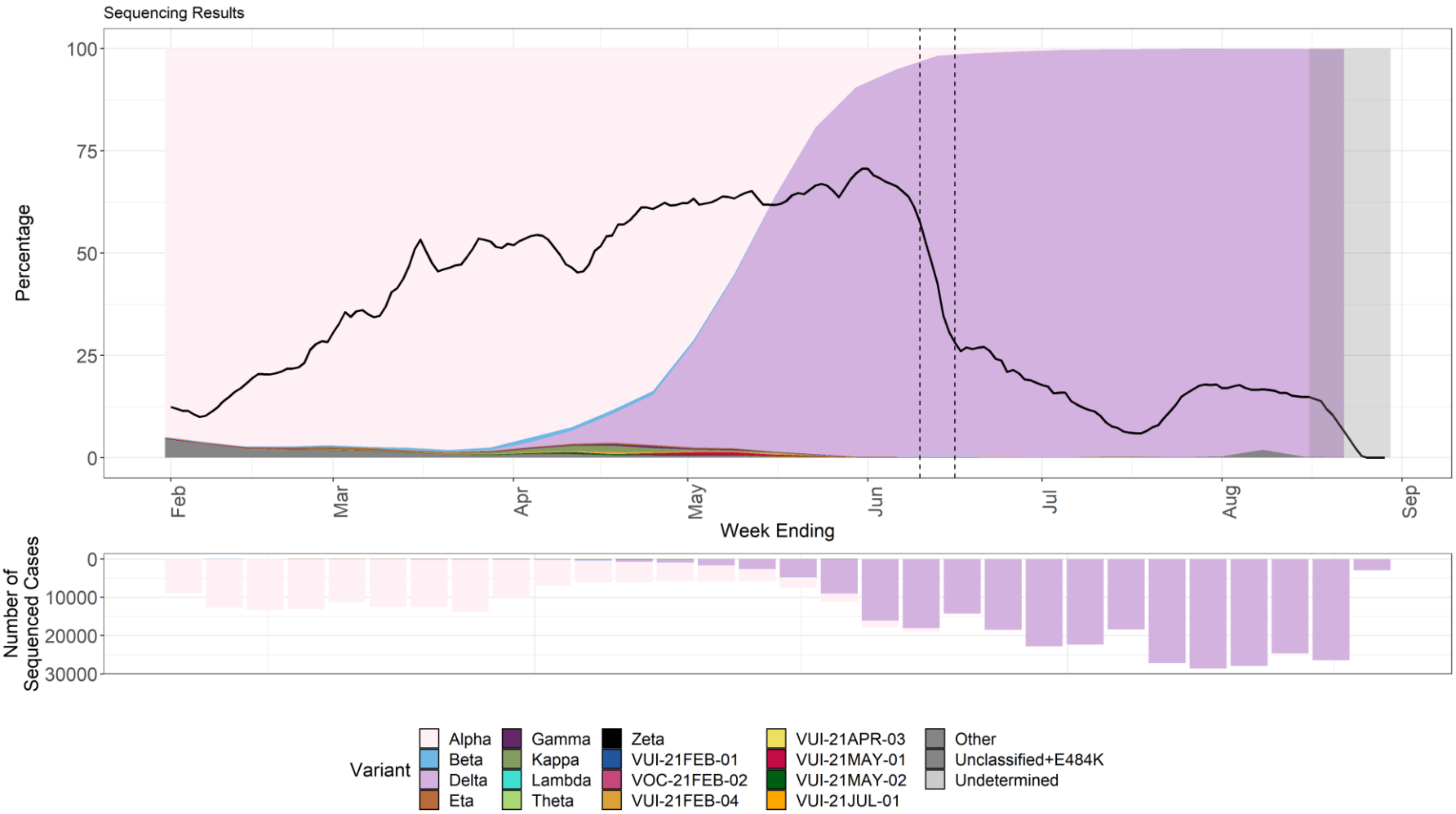
Delta variant accounted for approximately 99% of sequenced and 96% genotyped cases from 1 August to 28 August 2021.

Figure 6. Variant prevalence for all England available genotyped cases from 1 February 2021 as of 30 August 2021 (excluding 0 case where the specimen date was unknown). (Find accessible data used in this graph in underlying data)



A small number of cases identified as Beta (B.1.351) on genotyping since May 2021 without confirmatory sequencing may be VUI-21JUL-01 (B.1.621) with an additional K417N mutation.

Figure 7. Variant prevalence for all England available sequenced cases from 1 February 2021 as of 30 August 2021 (excluding 201 case where the specimen date was unknown). (Find accessible data used in this graph in underlying data).



Dashed lines indicate period incorporating issue at a sequencing site.

Figure 8. Variant prevalence from 1 February 2021 as of 30 August 2021 by region for all genotyped cases in England (excluding 1,812 cases where the region or specimen date were unknown). (Find accessible data used in this graph in underlying data)

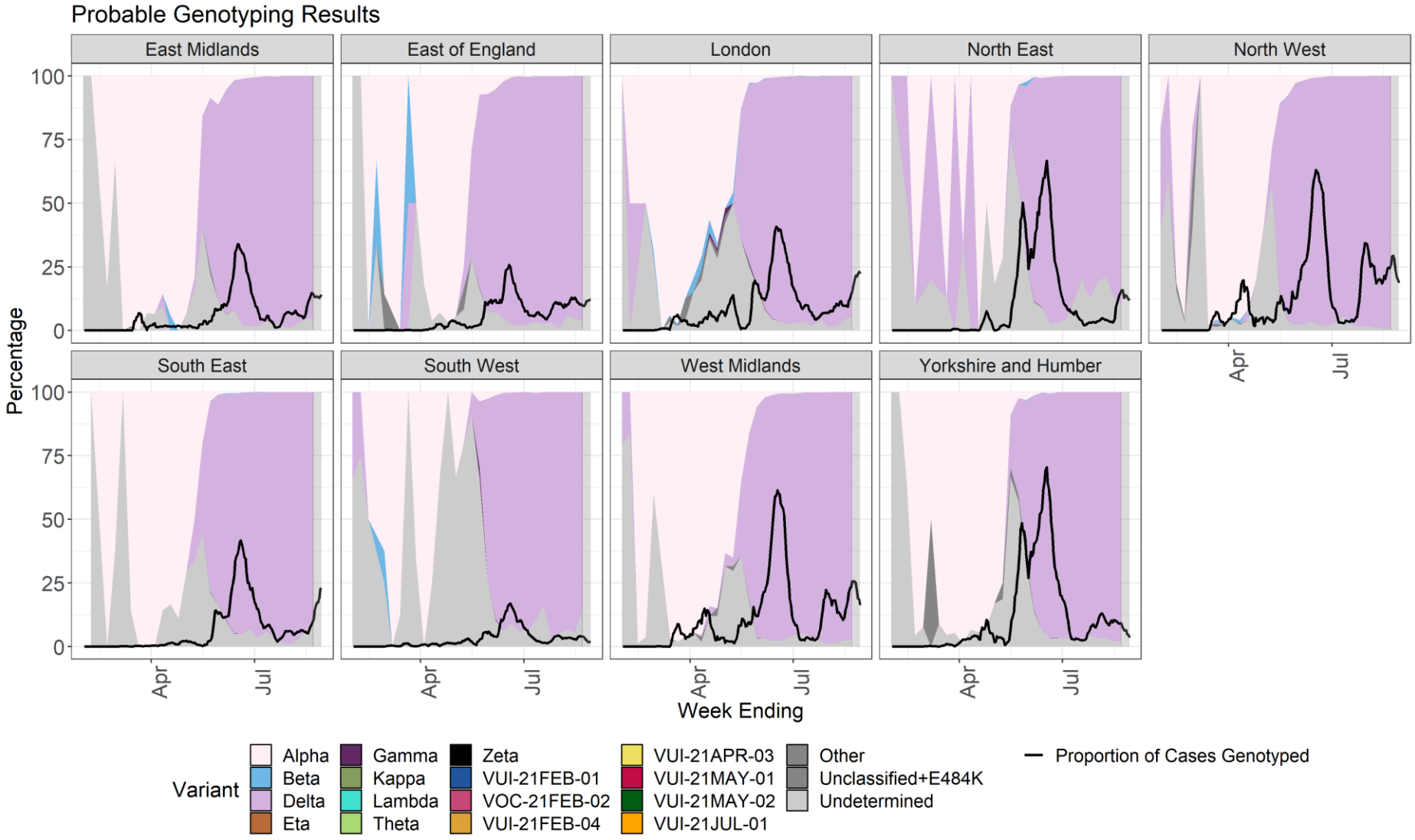
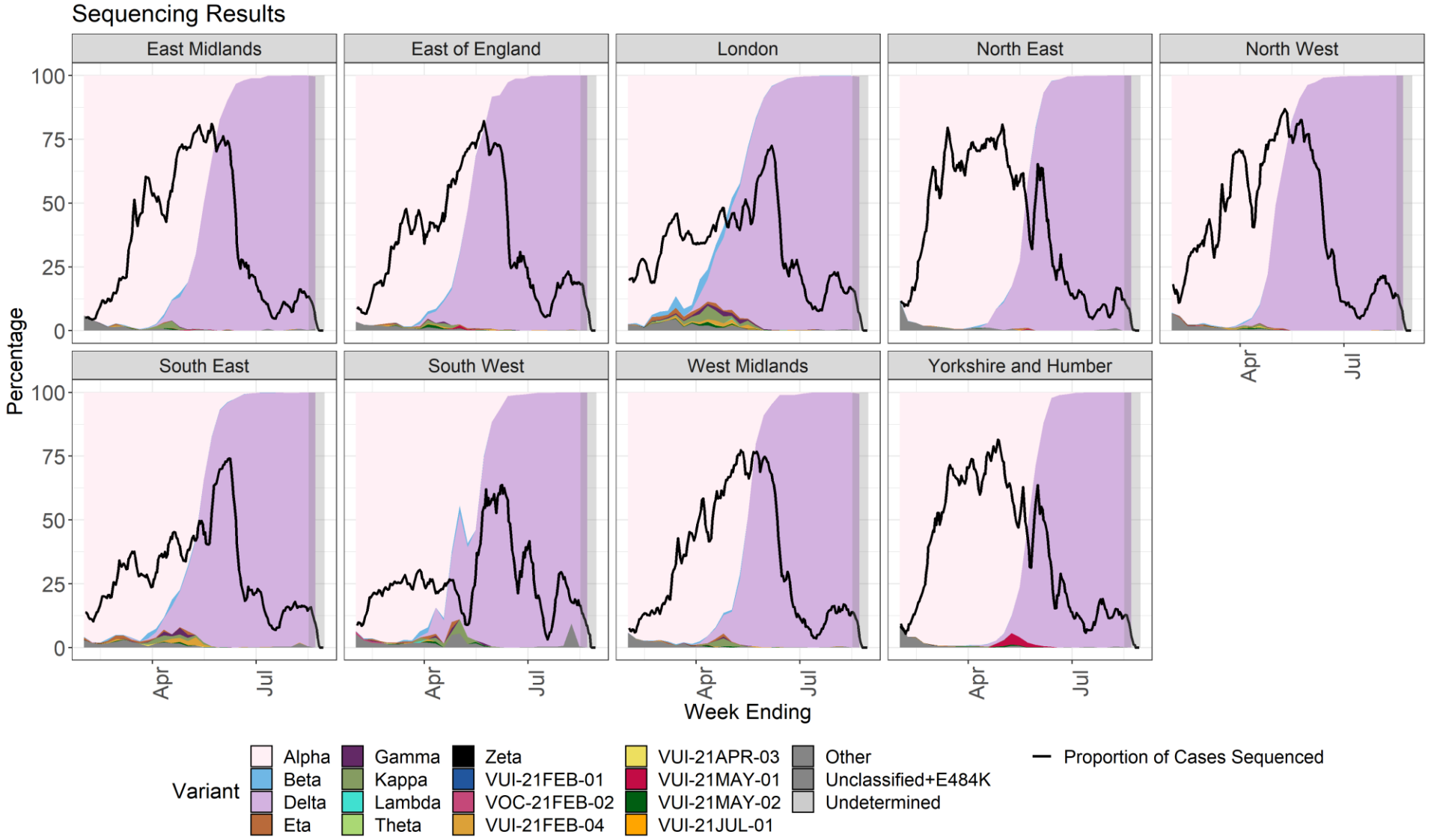


Figure 9. Variant prevalence from 1 February 2021 as of 30 August 2021 by region for all sequenced cases in England (excluding 2292 cases where the region or specimen date were unknown). (Find accessible data used in this graph in underlying data)



Sources and acknowledgments

Data sources

Data used in this investigation is derived from the COG-UK dataset, the PHE Second Generation Surveillance System (SGSS), NHS Test and Trace, the Secondary Uses Service (SUS) dataset, Emergency Care Data Set (ECDS), and the PHE Case and Incident Management System (CIMS). Data on international cases are derived from reports in GISAID, the media and information received via the International Health Regulations National Focal Point (IHRNFP) and Early Warning and Response System (EWRS).

Repository of human and machine-readable genomic case definitions

Genomic definitions for all VOC and VUI are provided in order to facilitate standardised VOC and VUI calling across sequencing sites and bioinformatics pipelines and are the same definitions used internally at PHE. Definition files are provided in YAML format so are compatible with a range of computational platforms. The repository will be regularly updated. The genomic and biological profiles of VOC and VUI are also detailed on first description in prior technical briefings.

Variant Technical Group

Authors of this report

PHE Genomics Cell
PHE Outbreak Surveillance Team
PHE Epidemiology Cell
PHE Contact Tracing Data Team
PHE International Cell
JBC Public Health Science Team
Contributions from the Variant Technical Group Members including the Genotype to Phenotype Consortium

Variant Technical Group members and contributors

The PHE Variant Technical Group includes members and contributors from the following organisations: Public Health England, Public Health Wales, Public Health Scotland, Public Health Agency Northern Ireland, the Department of Health and Social Care, Imperial College London, London School of Hygiene and Tropical Medicine, University of Birmingham, University of Cambridge (including the MRC Biostatistics Unit), University of Edinburgh, University of Liverpool, the Wellcome Sanger Institute, the NHS Test and Trace Joint Biosecurity Centre, Genotype to Phenotype Consortium, SPI-M

Acknowledgements

The authors are grateful to those teams and groups providing data for these analyses including: the Lighthouse Laboratories, NHS, COG-UK, the Wellcome Sanger Institute, Health Protection Data Science teams, the Joint Biosecurity Centre and the Genotype to Phenotype Consortium.

About Public Health England

Public Health England exists to protect and improve the nation's health and wellbeing, and reduce health inequalities. We do this through world-leading science, research, knowledge and intelligence, advocacy, partnerships and the delivery of specialist public health services. We are an executive agency of the Department of Health and Social Care, and a distinct delivery organisation with operational autonomy. We provide government, local government, the NHS, Parliament, industry and the public with evidence-based professional, scientific and delivery expertise and support.

Public Health England
Wellington House
133-155 Waterloo Road
London SE1 8UG
Tel: 020 7654 8000

www.gov.uk/phe
Twitter: @PHE_uk
www.facebook.com/PublicHealthEngland

For queries relating to this document, please contact phe.enquiries@phe.gov.uk

Published September 2021
PHE gateway number: GOV-9572

PHE supports the UN Sustainable Development Goals