



UK Health
Security
Agency

SARS-CoV-2 variant data update, England

Version 19

10 December 2021

This edition provides an update on previous data noted within the technical [briefings and variant data updates](#) up to 6 December 2021.

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Part 1. Surveillance overview

Table 1 shows the current variants of concern (VOC), variants under investigation (VUI), and variants in monitoring detected and not detected in the United Kingdom (UK) as of 7 December 2021.

Table 1a. Variants detected in the UK in the past 12 weeks

Variants of concern	Variants under investigation	Variants in monitoring
Alpha (B.1.1.7) VOC-20DEC-01	VUI-21OCT-01 (AY.4.2)†	B.1.640
Beta (B.1.351) VOC-20DEC-02	VUI-21JUL-01 (B.1.621)	B.1.617.2 + E484K
Gamma (P.1) VOC-21JAN-02	VUI-21APR-01 (B.1.617.1)	
Delta (B.1.617.2 and sub-lineages) VOC-21APR-02		
Omicron (B.1.1.529) VOC-21NOV-01		

† AY.4.2 is a sub-lineage within Delta that has been assigned as a distinct VUI.

Table 1b. Variants detected in GISAID, but not in the UK, in the past 12 weeks

Variants of concern	Variants under investigation	Variants in monitoring
	VUI-21APR-03 (B.1.617.3)	C.37*
	VUI-21JAN-01 (P.2)	B.1.526
	VUI-21FEB-04 (B.1.1.318)	B.1 with 214insQAS
	VUI-21FEB-03 (B.1.525)	B.1.629
		B.1.630, B.1.631/B.1.628
		P.1.8
		C.1.2
		B.1.1.7 + B.1.617.2 possible recombinant
		C.37 descendant (S:L5F, G75V, D614G, L452Q, E484K, P499R, N501T, H655Y, P681R)
		C.36.3††
		B.1.427/B.1.429

Variants of concern	Variants under investigation	Variants in monitoring
		B.1.620
		R.1
		BA.2

* Previously VUI-21JUN-01, de-escalated on 20 October 2021.

†† Previously VUI-21MAY-02, de-escalated on 20 October 2021.

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.

Zeta and Theta were de-escalated by the World Health Organization (WHO) and are no longer WHO variants under monitoring. Kappa, Iota, Eta and Epsilon were de-escalated by WHO and are now WHO variants under monitoring.

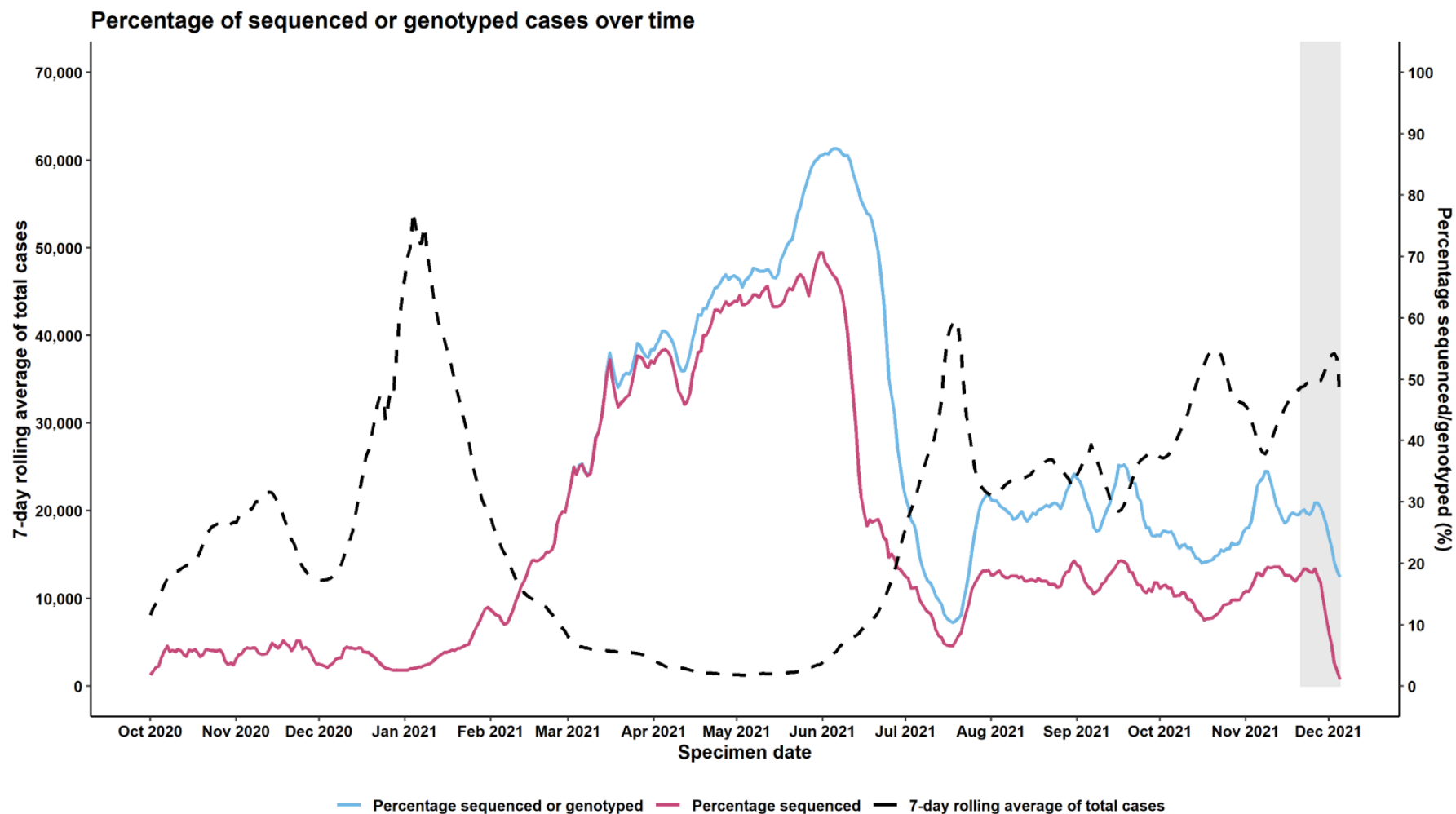
Sequencing coverage

[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.

Sequencing coverage is stable ([Figure 1](#)) and similar proportions are sequenced and genotyped across each region. Currently, 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

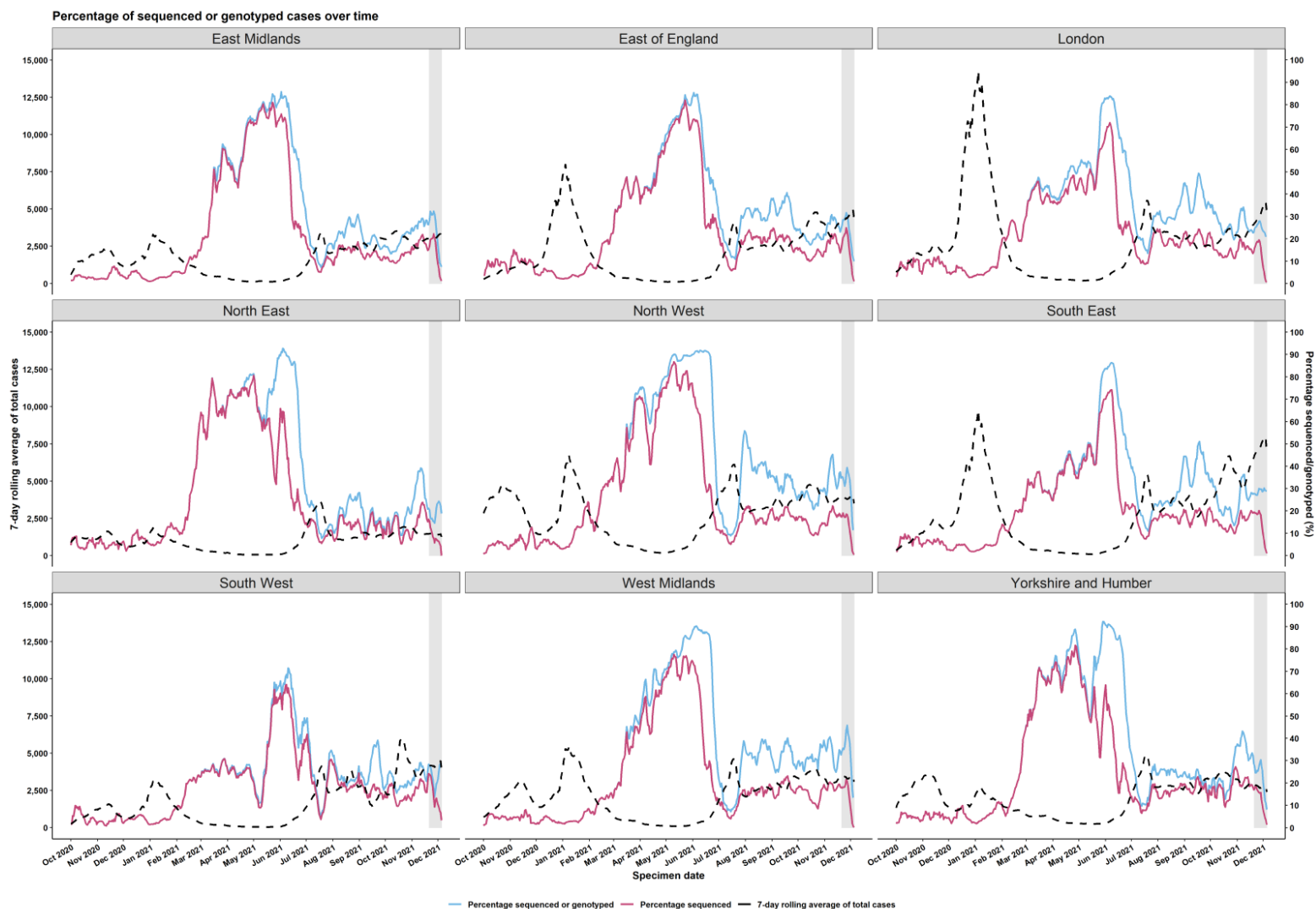
Figure 1. Coverage of sequencing with a valid result and genotyping over time (1 October 2020 to 5 December 2021)



Data extract from 06 December 2021; data from 01 October 2020 to 05 December 2021.
Grey shading was applied to the previous 14 days to account for reporting delays in sequencing data.

Grey shading was applied to the previous 14 days to account for reporting delays in sequencing data. (The data used in this graph can be found in the [accompanying spreadsheet.](#))

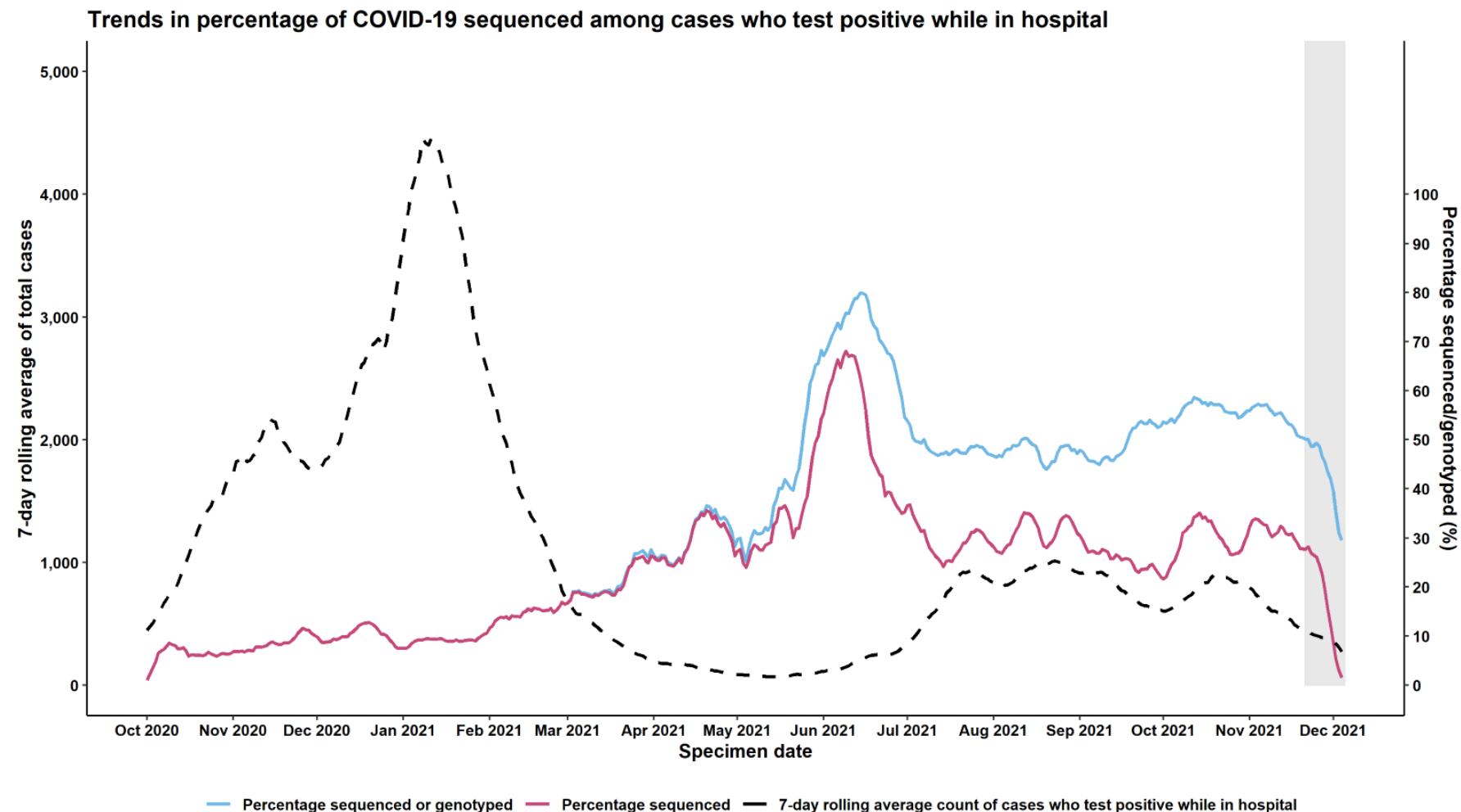
Figure 2. Coverage of sequencing with a valid result and genotyping over time by region (1 October 2020 to 5 December 2021)



Data extract from 06 December 2021; data from 01 October 2020 to 05 December 2021. Grey shading was applied to the previous 14 days to account for reporting delays in sequencing data. There were 8920 cases missing PHEC that were excluded.

Grey shading was applied to the previous 14 days to account for reporting delays in sequencing data. (The data used in this graph can be found in the [accompanying spreadsheet.](#))

Figure 3. Coverage of sequencing with valid result and genotyping for cases who test positive in hospital (1 October 2020 to 5 December 2021)



Data extract from 06 December 2021; data from 01 October 2020 to 05 December 2021.
Grey shading was applied to the previous 14 days to account for reporting delays in sequencing data.

Grey shading was applied to the previous 14 days to account for reporting delays in sequencing data. (The data used in this graph can be found in the [accompanying spreadsheet](#).)

Part 2. Data on individual variants

Alpha – VOC-20DEC-01 (B.1.1.7)

This variant was designated VUI 202012/01 (B.1.1.7) on detection and on review re-designated as VOC-20DEC-01 (202012/01, B.1.1.7) on 18 December 2020. This was named Alpha by WHO on 31 May 2021.

International epidemiology

GISAID includes data on sequences available internationally. As of 7 December 2021, 867,565 sequences of VOC-20DEC-01 are listed from 182 countries or territories on GISAID, excluding the UK.

Epidemiology

Table 2. Number of confirmed and provisional Alpha - VOC-20DEC-01 (B.1.1.7) cases, by region of residence as of 6 December 2021

Region	Confirmed case number	Provisional case number	Total case number	Case proportion
East Midlands	16,221	487	16,708	7.4%
East of England	19,747	181	19,928	8.8%
London	40,512	777	41,289	18.2%
North East	14,753	114	14,867	6.6%
North West	42,023	1,748	43,771	19.3%
South East	24,050	123	24,173	10.7%
South West	8,200	53	8,253	3.6%
West Midlands	18,350	1,301	19,651	8.7%
Yorkshire and Humber	35,968	886	36,854	16.3%
Unknown region	1,249	20	1,269	0.6%
Total	221,073	5,690	226,763	-

Figure 4. Confirmed and provisional Alpha - VOC-20DEC-01 (B.1.1.7) cases by specimen date and region of residence as of 6 December 2021

(The data used in this graph can be found in the [accompanying spreadsheet](#).)

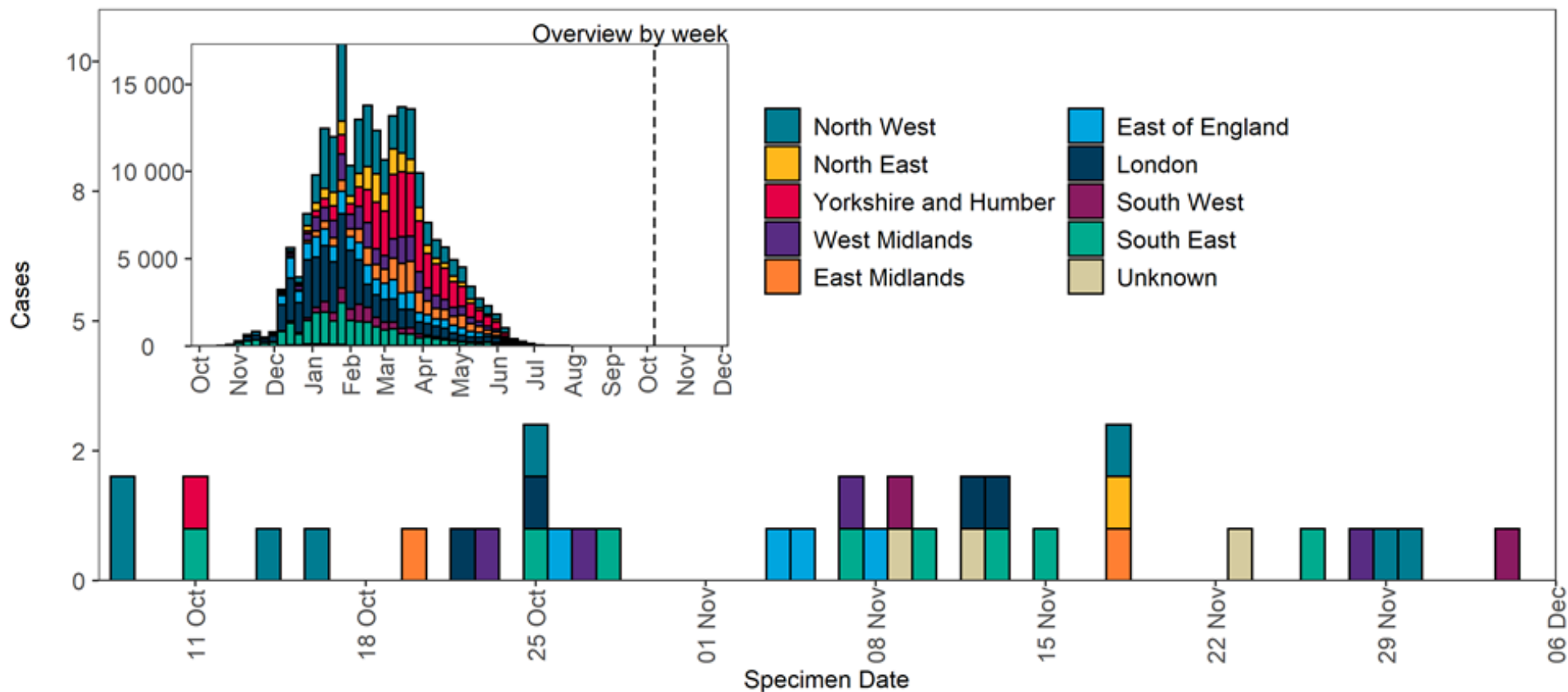


Figure 5. Confirmed and provisional Alpha - VOC-20DEC-01 (B.1.1.7) cases by specimen date and detection method as of 6 December 2021

(The data used in this graph can be found in the [accompanying spreadsheet](#).)

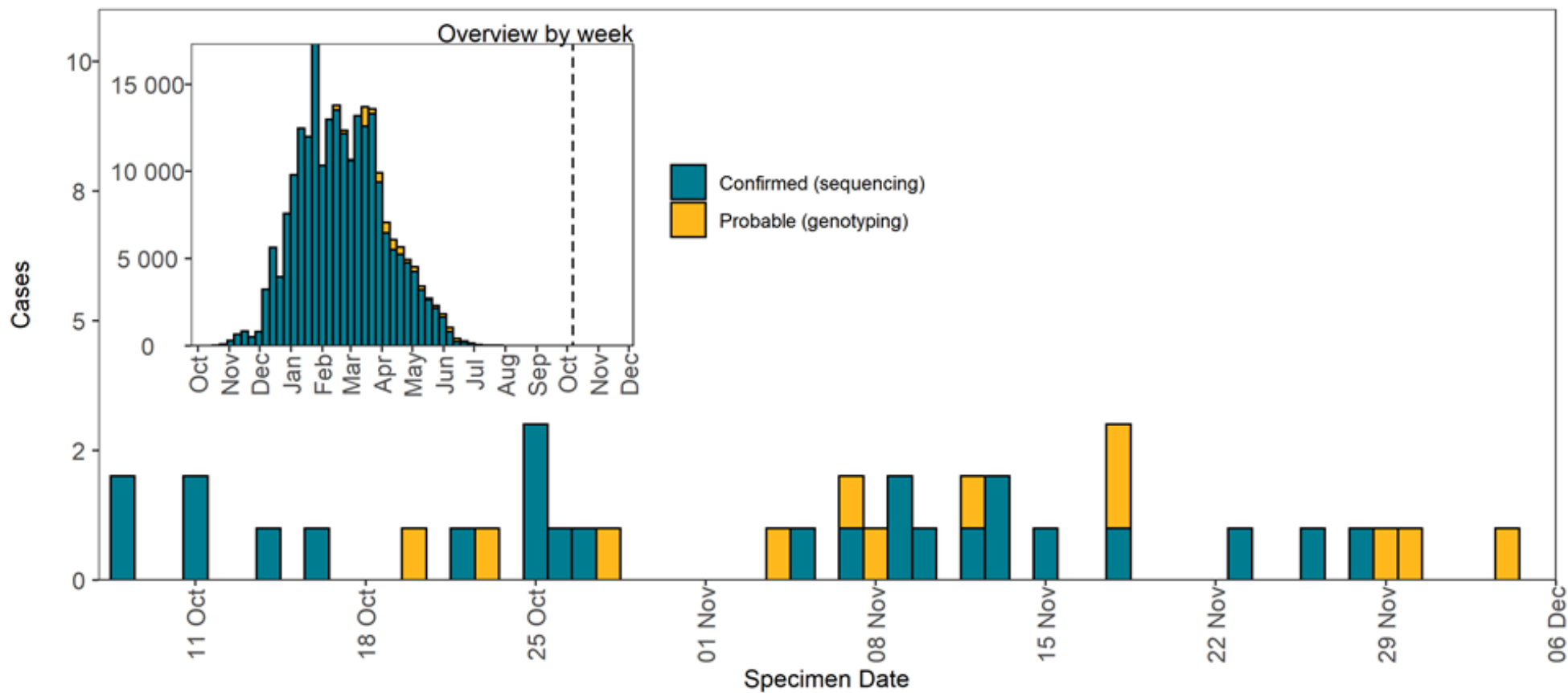
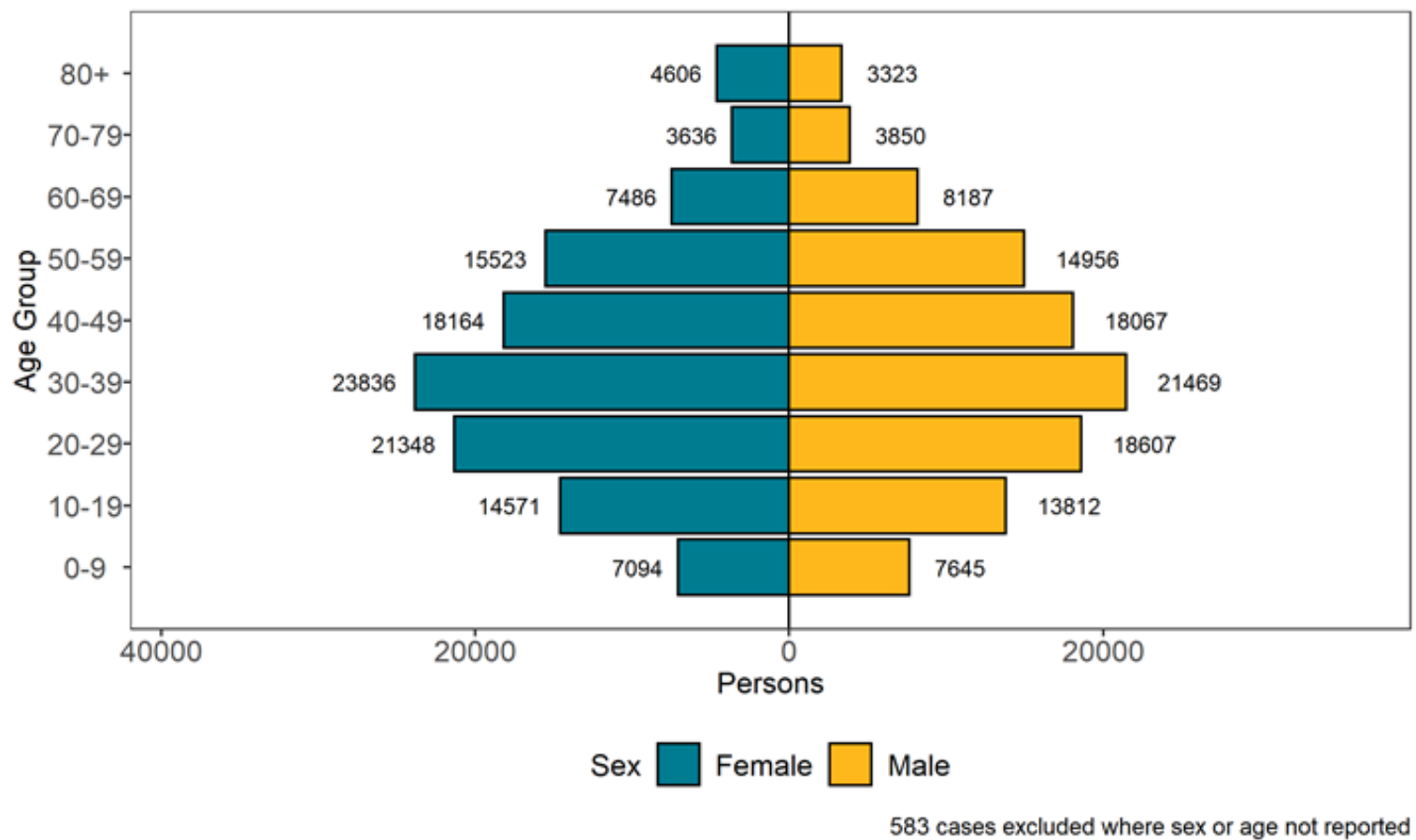


Figure 6. Age-sex pyramid of Alpha - VOC-20DEC-01 (B.1.1.7) cases as of 6 December 2021

(The data used in this graph can be found in the [accompanying spreadsheet](#).)



Beta - VOC-20DEC-02 (B.1.351)

B.1.351 was initially detected in South Africa. This variant was designated VUI on detection and on review re-designated as VOC-20DEC-02 (B.1.351) on 24 December 2020. It was named Beta by WHO on 31 May 2021.

International epidemiology

GISAID includes data on sequences available internationally. As of 7 December 2021, 34,677 sequences of VOC-20DEC-02 are listed from 114 countries or territories on GISAID, excluding the UK.

Epidemiology

Currently there are no Beta genomes in the last 12 weeks in the UK that have been linked to individuals, however there are cases that have been confirmed as Beta through sequencing in the last 12 weeks that are in the process of being linked.

Table 3. Number of confirmed and provisional Beta - VOC-20DEC-02 (B.1.351) cases, by region of residence as of 6 December 2021

Region	Confirmed case number	Provisional case number	Total case number	Case proportion
East Midlands	49	3	52	5.2%
East of England	82	2	84	8.5%
London	430	25	455	45.8%
North East	19	6	25	2.5%
North West	80	9	89	9.0%
South East	118	4	122	12.3%
South West	31	1	32	3.2%
West Midlands	66	2	68	6.8%
Yorkshire and Humber	32	6	38	3.8%
Unknown region	23	5	28	2.8%
Total	930	63	993	-

Figure 7. Confirmed and provisional Beta - VOC-20DEC-02 (B.1.351) cases by specimen date and region of residence as of 6 December 2021

(The data used in this graph can be found in the [accompanying spreadsheet.](#))

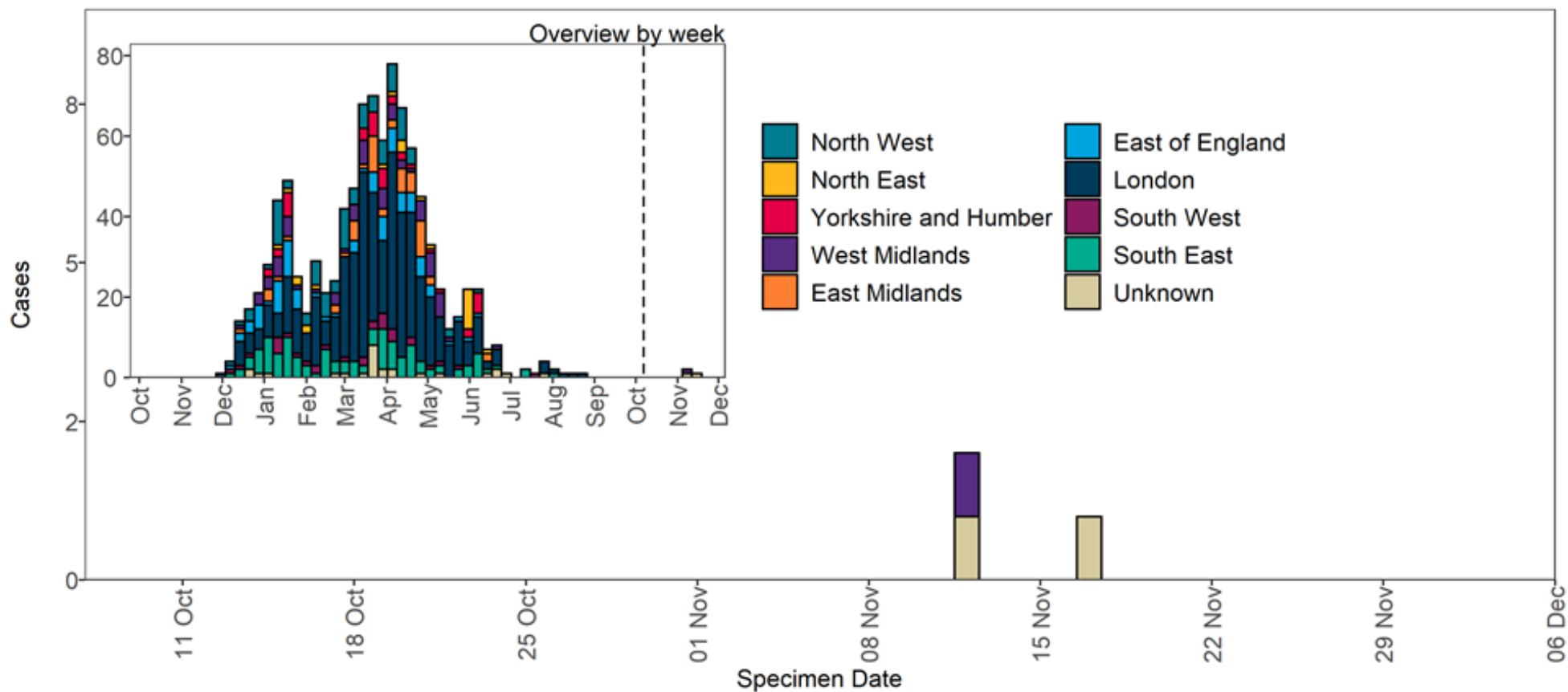


Figure 8. Confirmed and provisional Beta - VOC-20DEC-02 (B.1.351) cases by specimen date and detection method as of 6 December 2021

(The data used in this graph can be found in the [accompanying spreadsheet.](#))

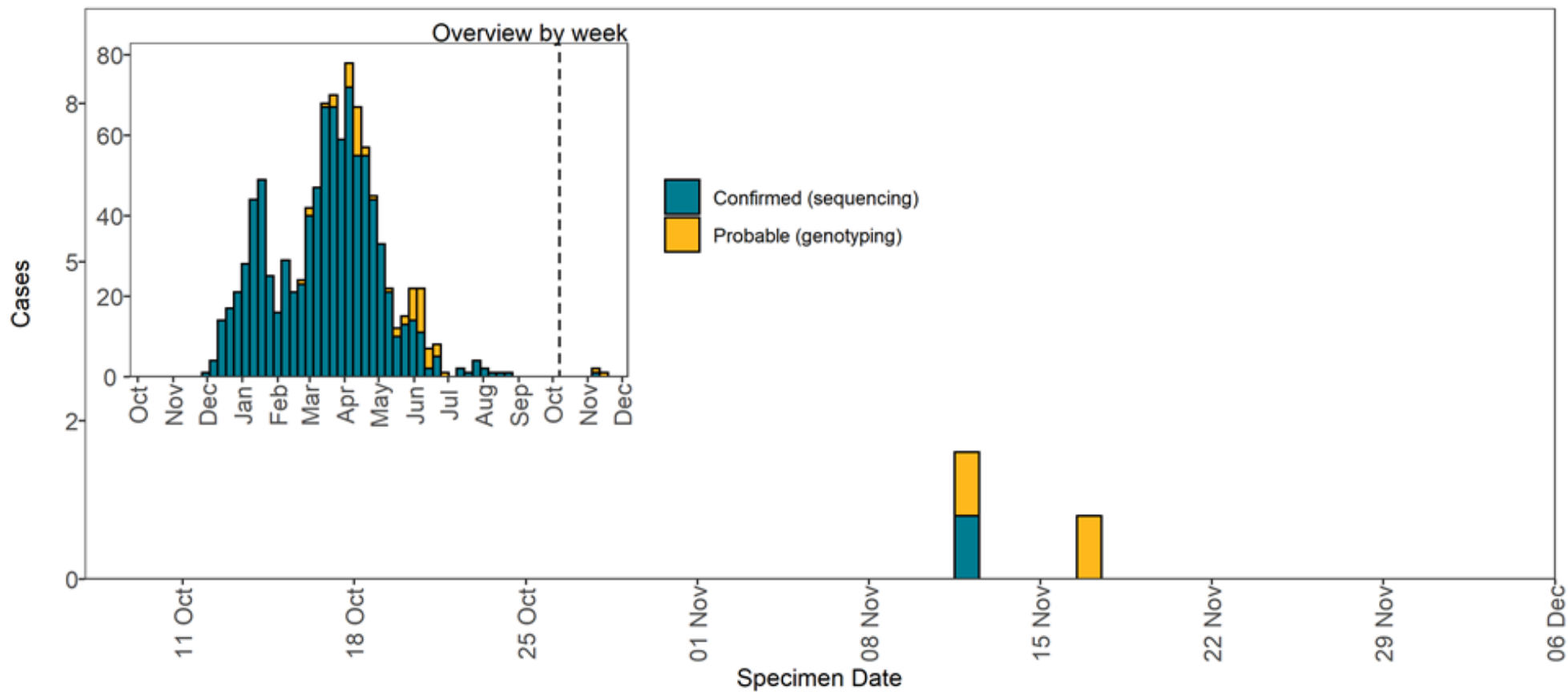
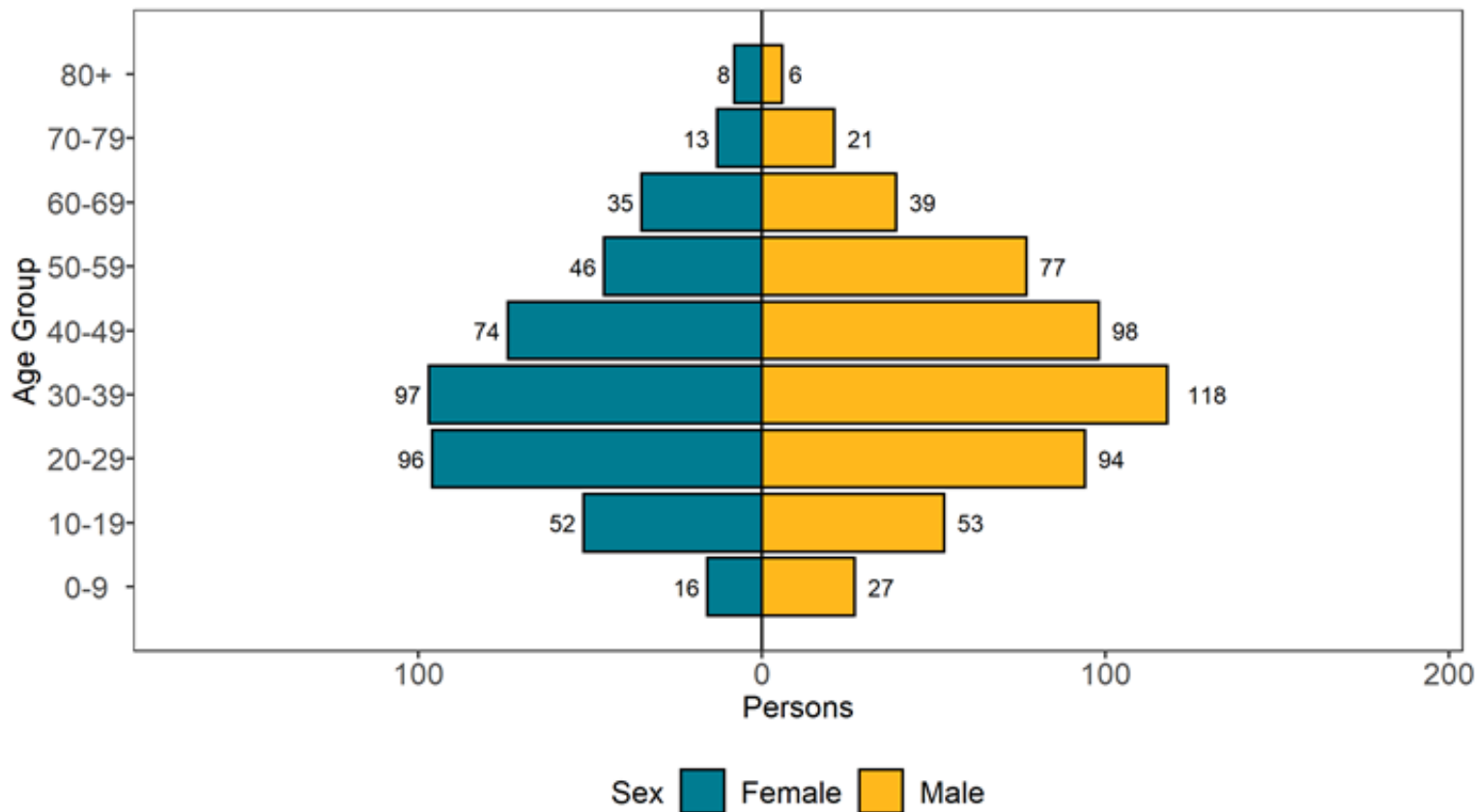


Figure 9. Age-sex pyramid of Beta - VOC-20DEC-02 (B.1.351) cases as of 6 December 2021

(The data used in this graph can be found in the [accompanying spreadsheet.](#))



23 cases excluded where sex or age not reported

Gamma - VOC-21JAN-02 (P.1)

The variant was first identified in Japan amongst travellers from Brazil. The P.1 lineage is a descendant of B.1.1.28. This variant was designated VUI on detection and on review re-designated as VOC-21JAN-02 (P.1) on 13 January 2021. This was named Gamma by WHO on 31 May 2021.

International epidemiology

GISAID includes data on sequences available internationally. As of 7 December 2021, 107620 sequences of VOC-21JAN-02 are listed from 84 countries or territories on GISAID, excluding the UK.

Epidemiology

Table 4. Number of confirmed and provisional Gamma - VOC-21JAN-02 (P.1) cases, by region of residence as of 6 December 2021

Region	Confirmed case number	Provisional case number	Total case number	Case proportion
East Midlands	7	2	9	3.2%
East of England	13	4	17	6.0%
London	122	29	151	53.7%
North East	1	4	5	1.8%
North West	9	2	11	3.9%
South East	29	8	37	13.2%
South West	11	8	19	6.8%
West Midlands	8	5	13	4.6%
Yorkshire and Humber	2	8	10	3.6%
Unknown region	9	0	9	3.2%
Total	211	70	281	-

Figure 10. Confirmed and provisional Gamma - VOC-21JAN-02 (P.1) cases by specimen date and region of residence as of 6 December 2021

(The data used in this graph can be found in the [accompanying spreadsheet.](#))

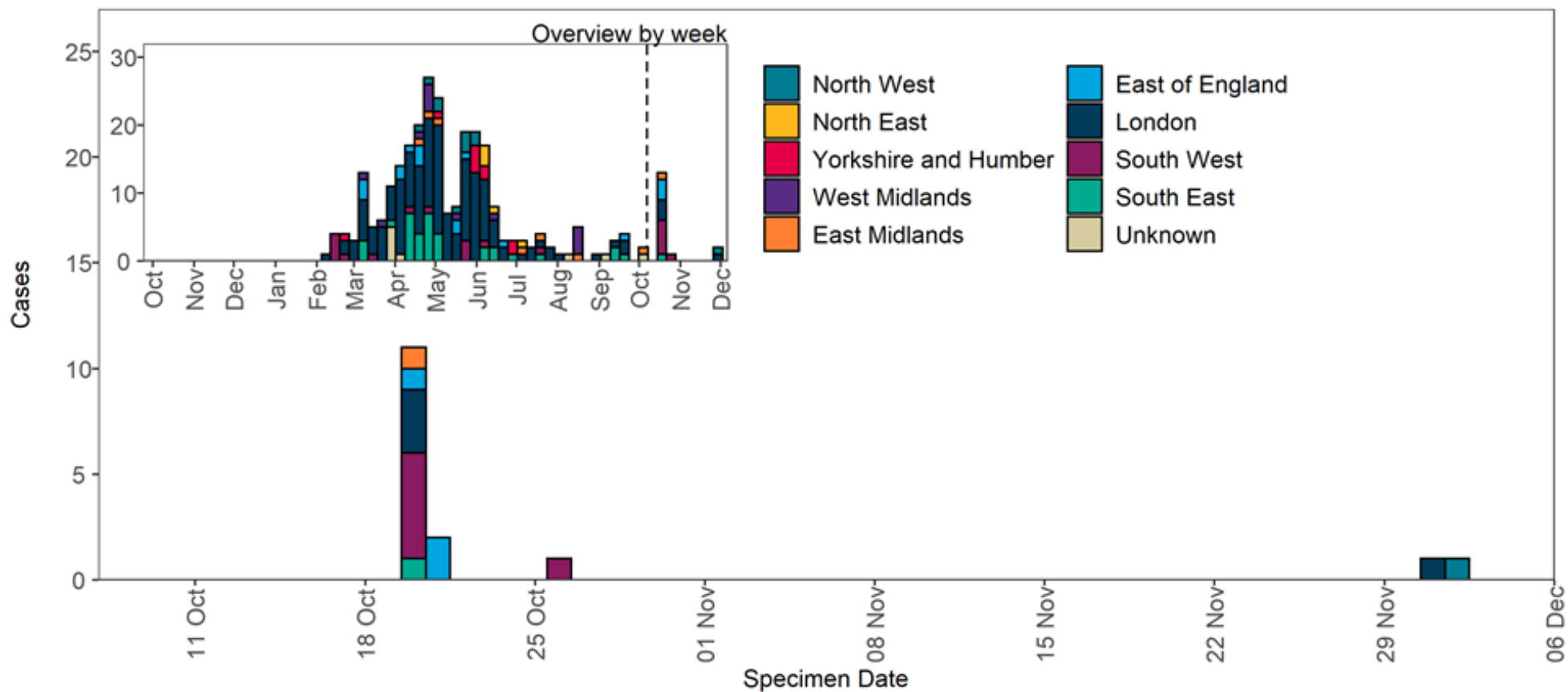


Figure 11. Confirmed and provisional Gamma - VOC-21JAN-02 (P.1) cases by specimen date and detection method as of 6 December 2021

(The data used in this graph can be found in the [accompanying spreadsheet.](#))

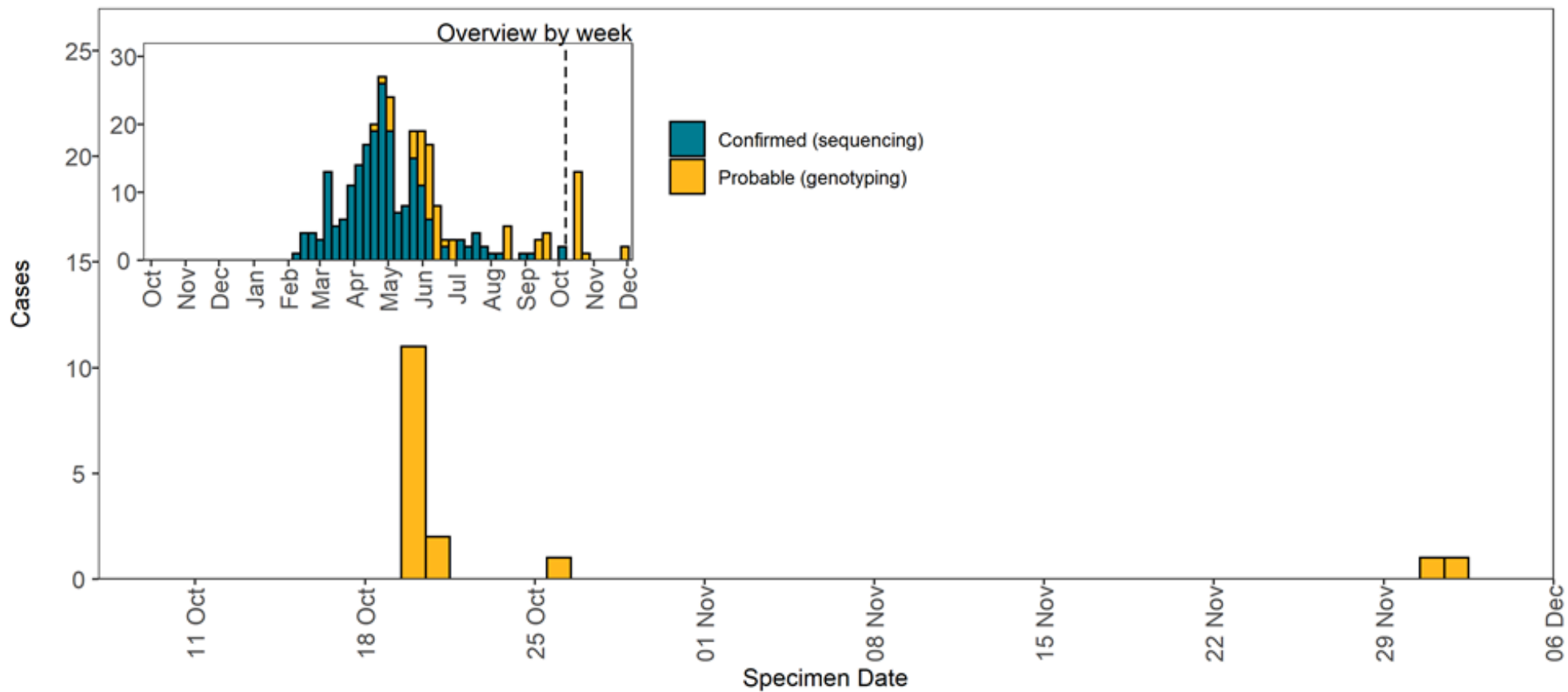
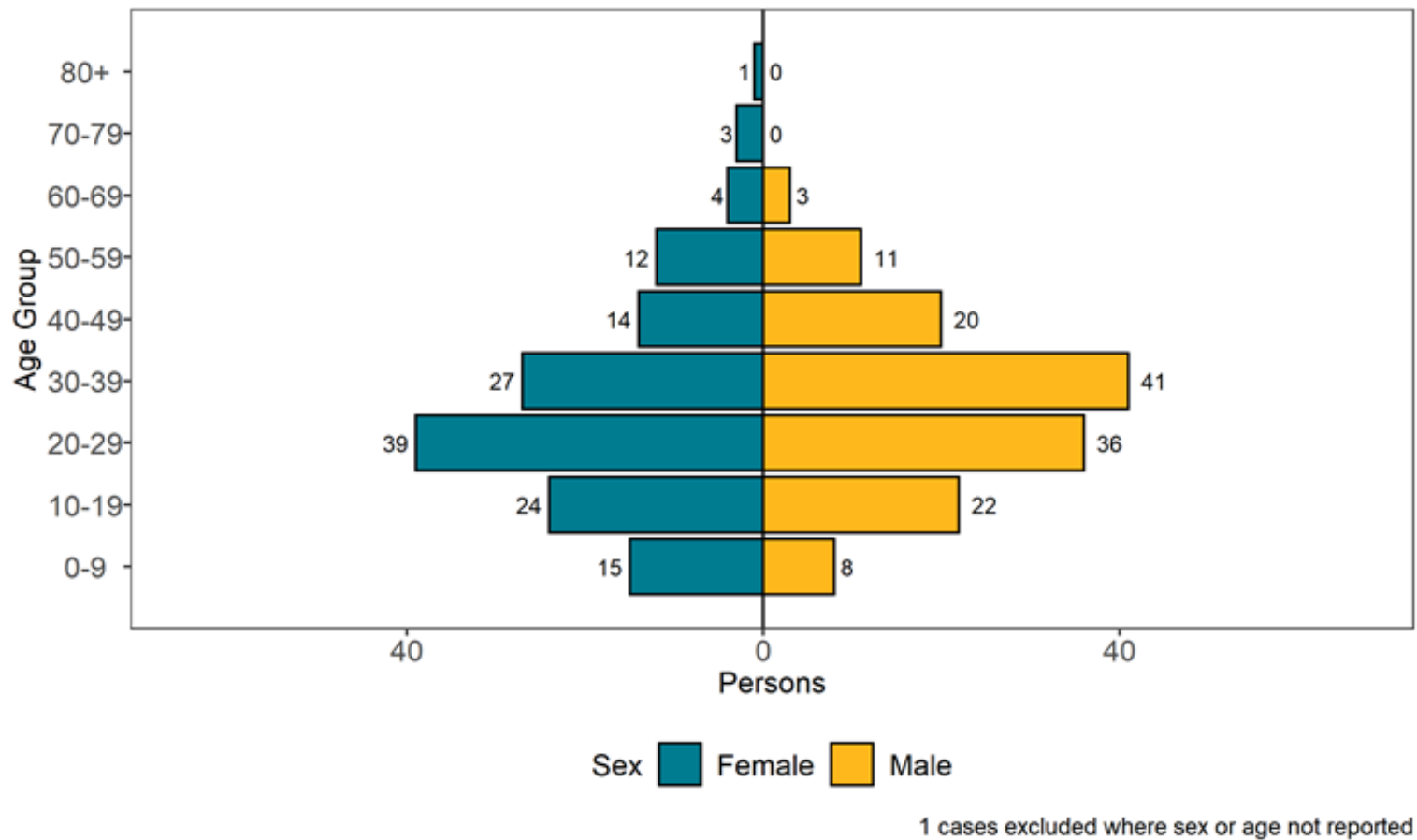


Figure 12. Age-sex pyramid of Gamma - VOC-21JAN-02 (P.1) cases as of 6 December 2021

(The data used in this graph can be found in the [accompanying spreadsheet.](#))



Delta - VOC-21APR-02 (B.1.617.2) – Delta with mutations at Spike:484

The lineage B.1.617.2 was escalated to a VOC in the UK on 6 May 2021 (VOC-21APR-02). This variant was named Delta by WHO on 31 May 2021. Changes at position 484 in spike are potentially antigenically significant and so are monitored in the UK genomes. Delta with E484Q was first identified through horizon scanning on the 3 August 2021 after being detected in 6 Scottish samples between 22 and 28 July 2021.

International epidemiology

GISAID includes data on sequences available internationally. As of 5 December 2021, 5,248 sequences of Delta (VOC-21APR-02 or VUI-21OCT-01) with E484Q are listed from over 70 countries or territories on GISAID, excluding the UK.

Epidemiology

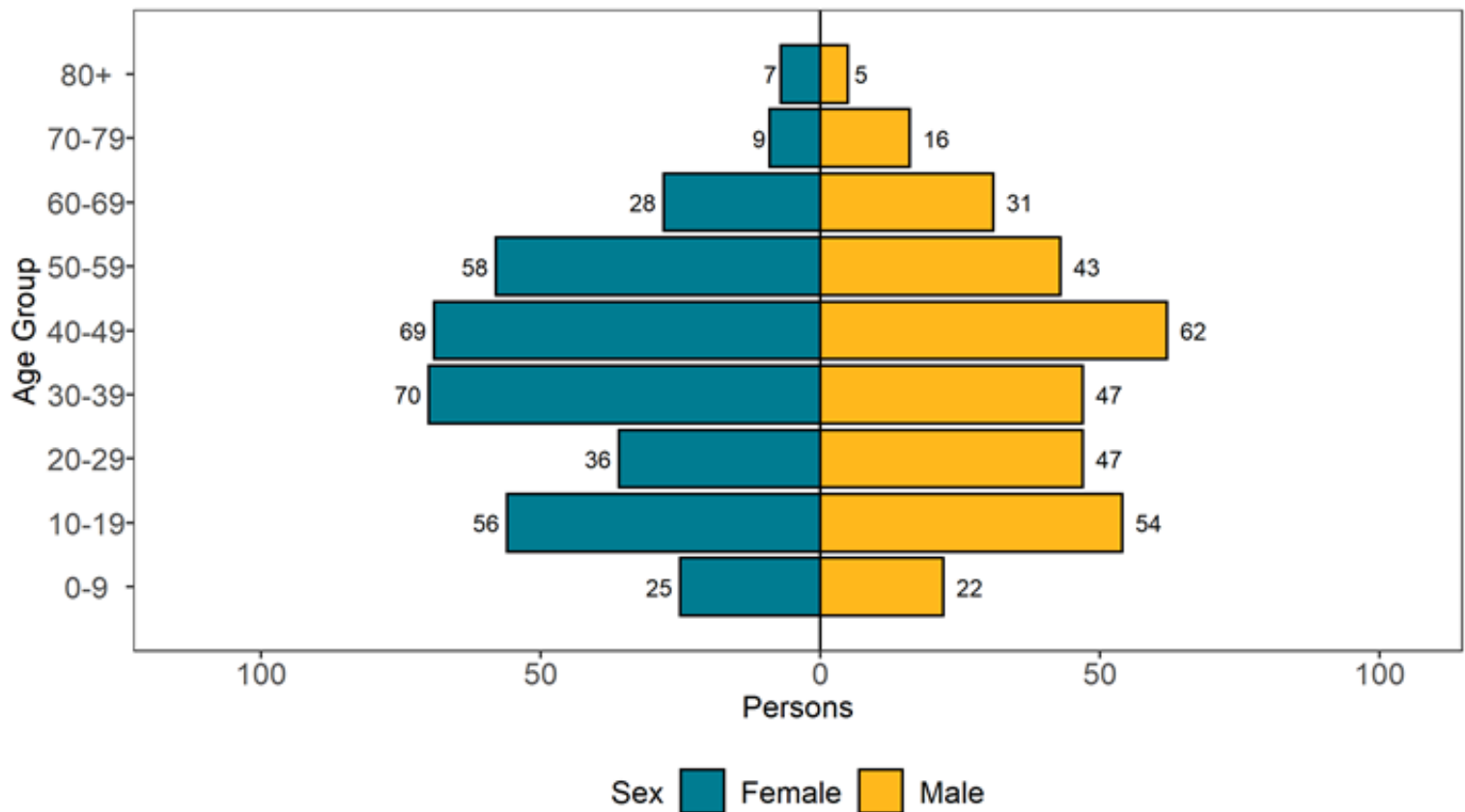
Table 5. Number of confirmed (sequencing) Delta cases with E484Q mutation, by region of residence as of 6 December 2021

Region	Confirmed (sequencing) case number	Total case number	Case proportion
East Midlands	36	36	5.2%
East of England	63	63	9.1%
London	214	214	30.9%
North East	75	75	10.8%
North West	69	69	10.0%
South East	102	102	14.7%
South West	23	23	3.3%
West Midlands	40	40	5.8%
Yorkshire and Humber	46	46	6.6%
Unknown region	25	25	3.6%
Total	693	693	-

693 of the 841 Delta + E484Q sequences linked to a case.

Figure 13. Age-sex pyramid of confirmed (sequencing) Delta with E484Q mutation cases as of 6 December 2021

(The data used in this graph can be found in the [accompanying spreadsheet.](#))



8 cases excluded where sex or age not reported

Delta with E484K was first detected on 8 July 2021 in a UK sequence with a collection date of 28 June 2021.

International epidemiology

GISAID includes data on sequences available internationally. As of 5 December 2021, 766 sequences of Delta (VOC-21APR-02 or VUI-21OCT-01) with E484K are listed from over 50 countries or territories on GISAID, excluding the UK.

Epidemiology in England

Table 6. Number of confirmed (sequencing) Delta cases with E484K mutation, by region of residence as of 6 December 2021

Region	Confirmed (sequencing) case number	Total case number	Case proportion
East Midlands	13	13	5.9%
East of England	11	11	5.0%
London	9	9	4.1%
North East	42	42	19.1%
North West	105	105	47.7%
South East	10	10	4.5%
South West	15	15	6.8%
West Midlands	1	1	0.5%
Yorkshire and Humber	10	10	4.5%
Unknown region	4	4	1.8%
Total	220	220	-

220 of the 281 Delta + E484K sequences linked to a case.

Figure 14. Confirmed (sequencing) Delta with E484K mutation cases by specimen date and region of residence as of 6 December 2021

(The data used in this graph can be found in the [accompanying spreadsheet.](#))

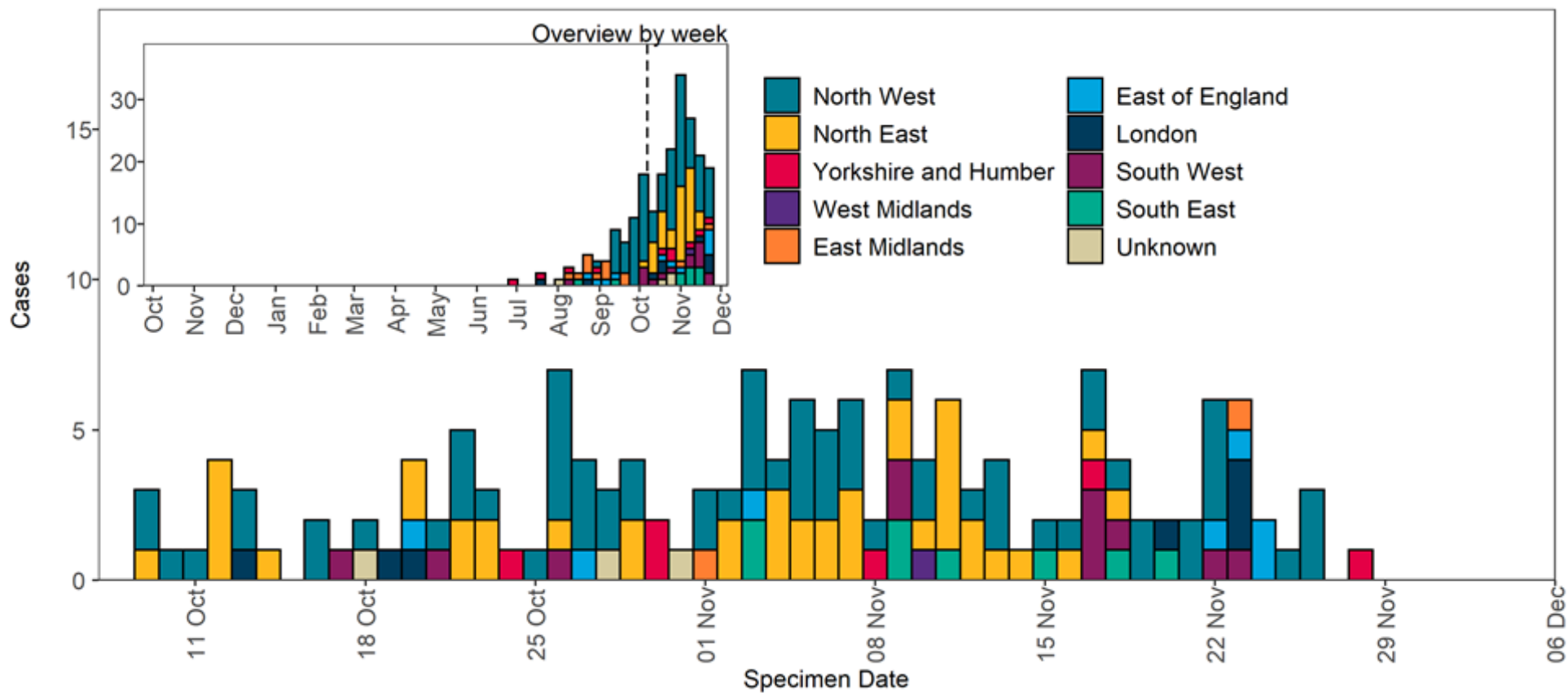
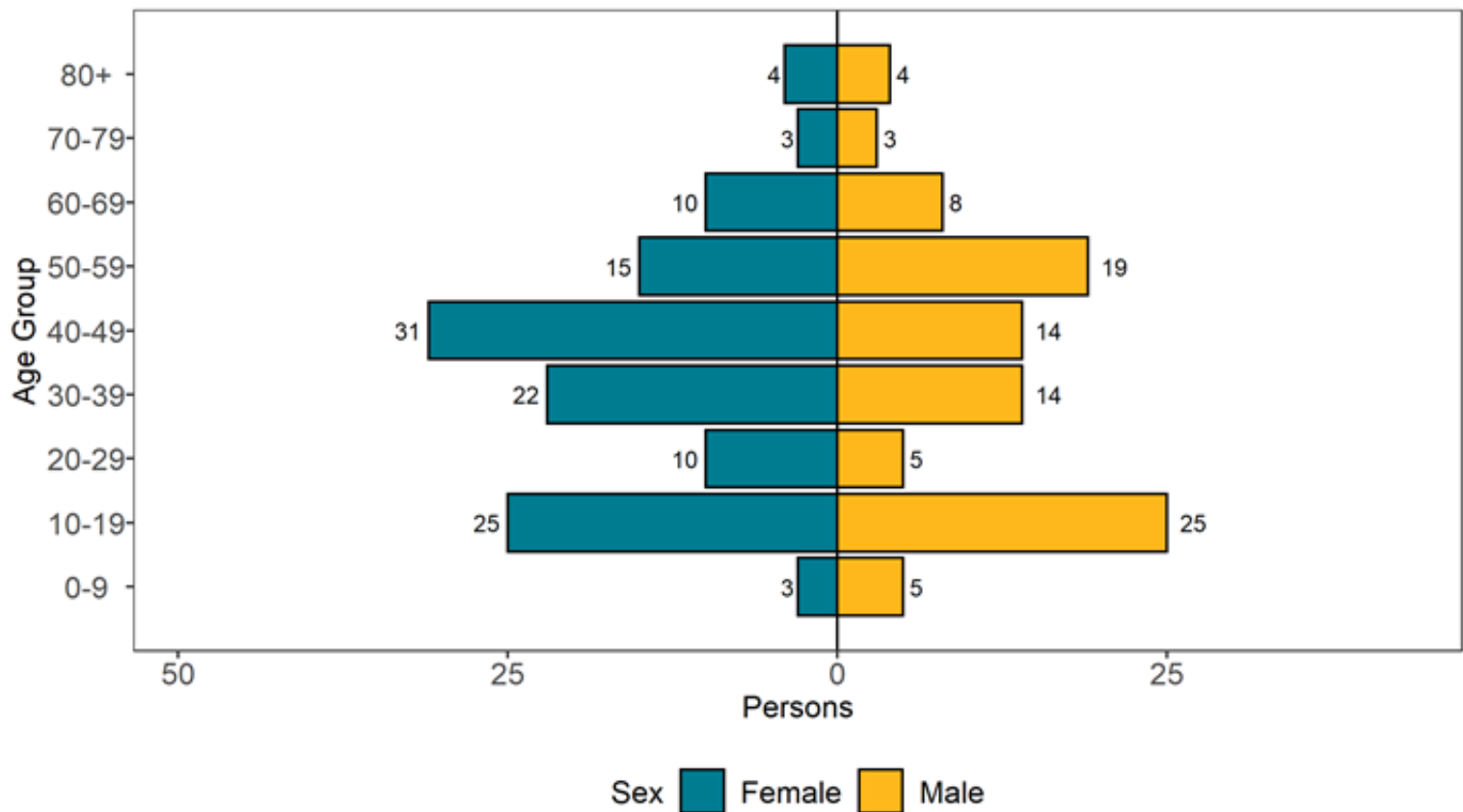


Figure 15. Age-sex pyramid of confirmed (sequencing) Delta with E484K mutation cases as of 6 December 2021

(The data used in this graph can be found in the [accompanying spreadsheet.](#))



0 cases excluded where sex or age not reported

VUI-21OCT-01 (AY 4.2)

The lineage B.1.617.2 was escalated to a VOC in the UK on 6 May 2021 (VOC-21APR-02). This variant was named Delta by WHO on 31 May 2021. New sub-lineages of Delta are regularly identified and designated. The Delta sublineage AY.4.2 was designated VUI-21OCT01 on 20 October 2021.

International epidemiology

GISAID includes data on sequences available internationally. As of 7 December 2021, 5,720 sequences of VUI-21OCT-01 are listed from 44 countries or territories on GISAID, excluding the UK.

Epidemiology

Table 7. Number of confirmed (sequencing) VUI-21OCT-01 cases, by region of residence as of 6 December 2021

Region	Total case number	Case proportion
East Midlands	4,124	7.2%
East of England	6,792	11.9%
London	6,339	11.1%
North East	1,450	2.5%
North West	5,911	10.4%
South East	11,697	20.6%
South West	8,414	14.8%
West Midlands	6,913	12.2%
Yorkshire and Humber	5,043	8.9%
Unknown region	210	0.4%
Total	56,893	-

Figure 16. Confirmed and provisional VUI-210CT-01 (AY 4.2) cases by specimen date and region of residence as of 6 December 2021

(The data used in this graph can be found in the [accompanying spreadsheet.](#))

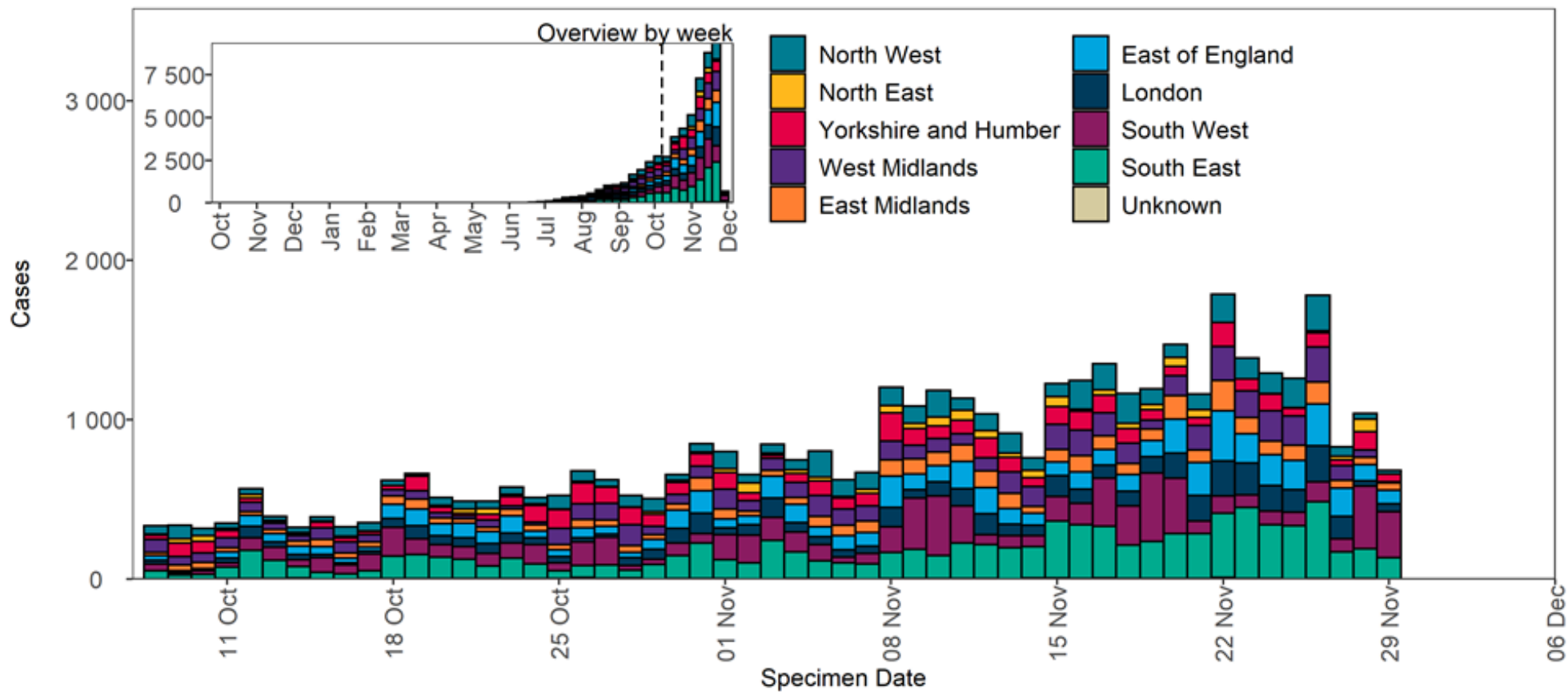
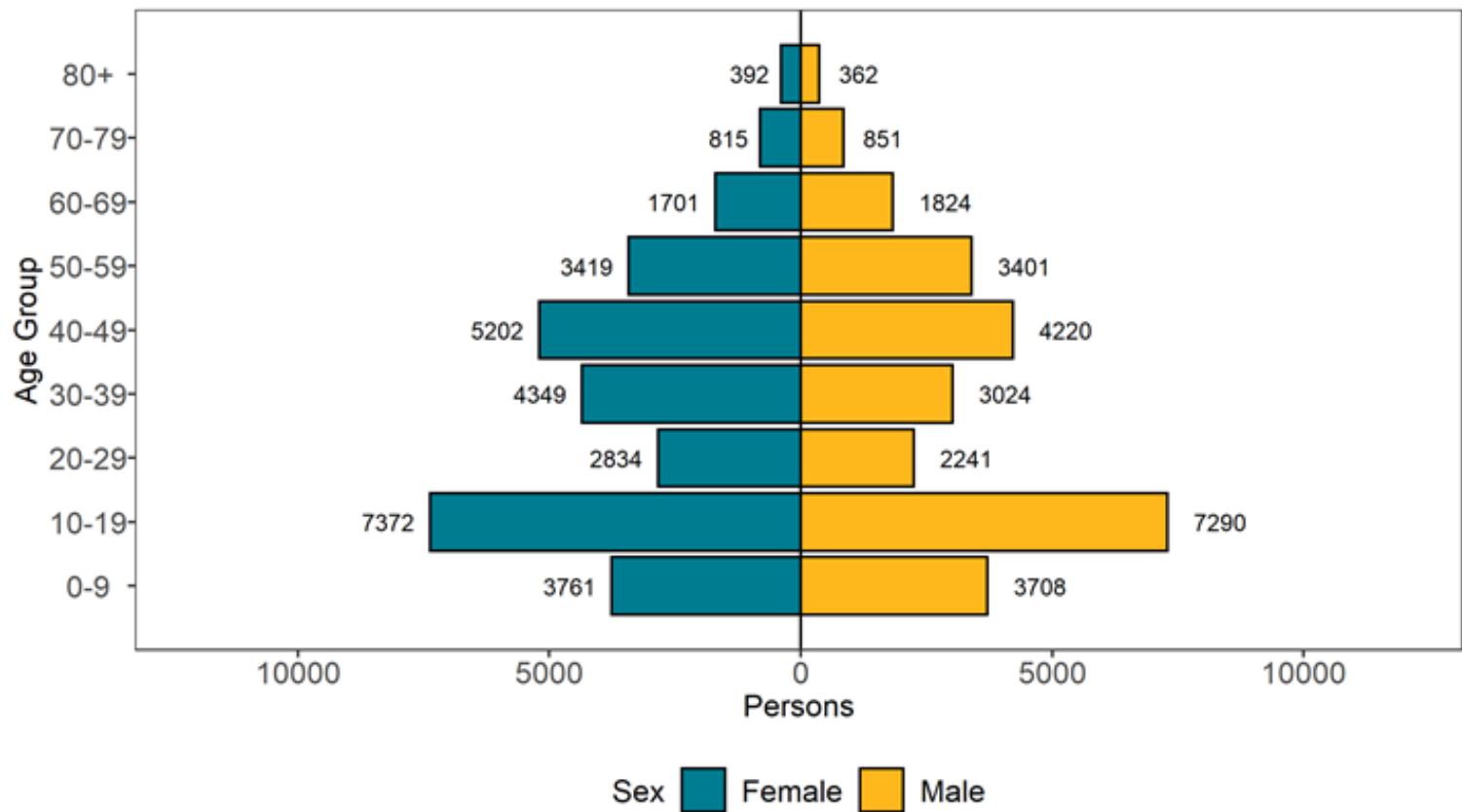


Figure 17. Age-sex pyramid of VUI-21OCT-01 (AY 4.2) cases as of 6 December 2021

(The data used in this graph can be found in the [accompanying spreadsheet](#).)



127 cases excluded where sex or age not reported

VUI-21FEB-03 (B.1.525)

B.1.525 was identified as a geographically dispersed cluster in the UK on 2 February 2021. This variant was designated VUI-21FEB-03 (B.1.525) on 12 February 2021. The earliest sample date for VUI-21FEB-03 (B.1.525) in England was 15 December 2020. This was named Eta VUI-21FEB-03 (B.1.525) by WHO on 31 May 2021. Genotyping data is not collected for this variant.

International epidemiology

GISAID includes data on sequences available internationally. As of 7 December 2021, 7,872 sequences of VUI-21FEB-03 are listed from 84 countries or territories on GISAID, excluding the UK.

Epidemiology

Table 8. Number of confirmed and provisional VUI-21FEB-03 (B.1.525) cases, by region of residence as of 6 December 2021

Region	Total case number	Case proportion
East Midlands	12	2.6%
East of England	30	6.5%
London	166	35.9%
North East	5	1.1%
North West	80	17.3%
South East	82	17.7%
South West	18	3.9%
West Midlands	36	7.8%
Yorkshire and Humber	20	4.3%
Unknown region	13	2.8%
Total	462	-

Figure 18. Confirmed and provisional VUI-21FEB-03 (B.1.525) cases by specimen date and region of residence as of 6 December 2021

Larger plot includes last 60 days only. (The data used in this graph can be found in the [accompanying spreadsheet.](#))

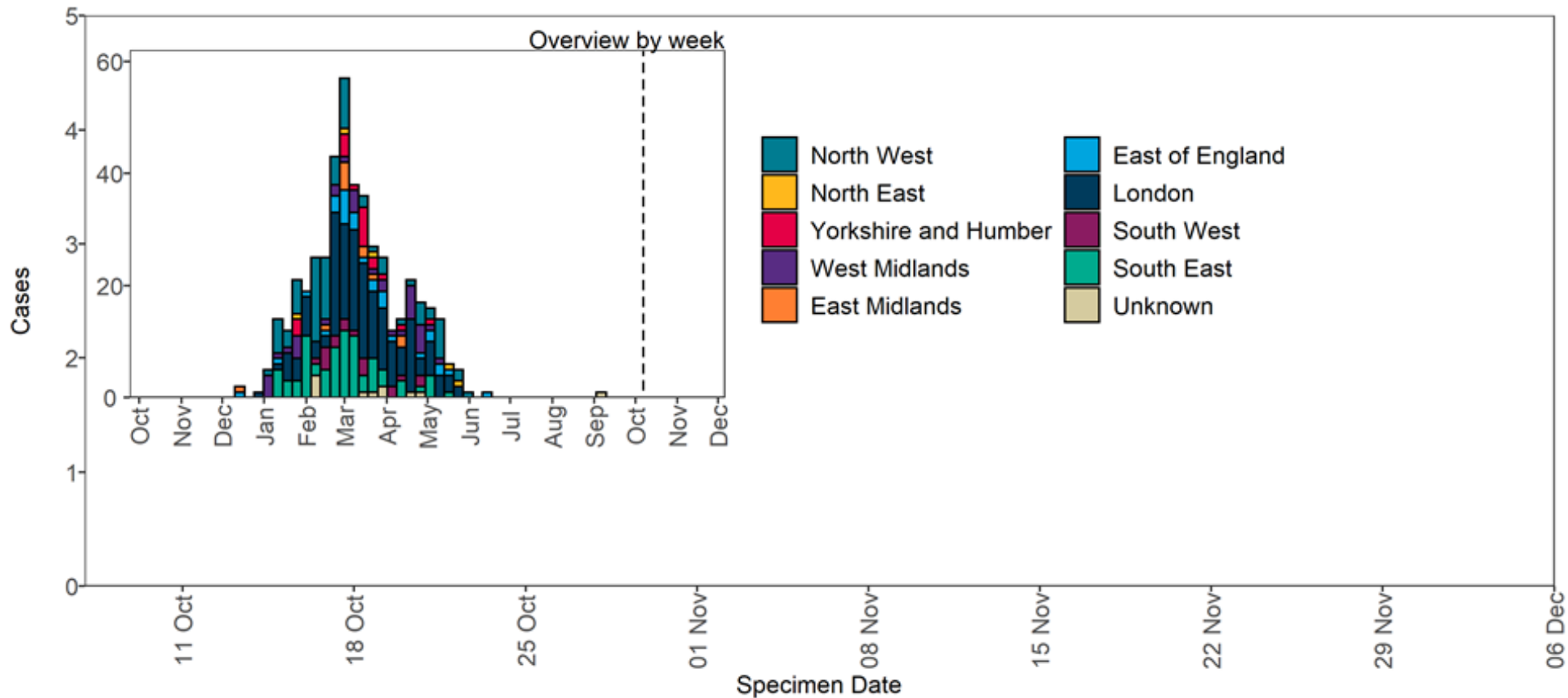
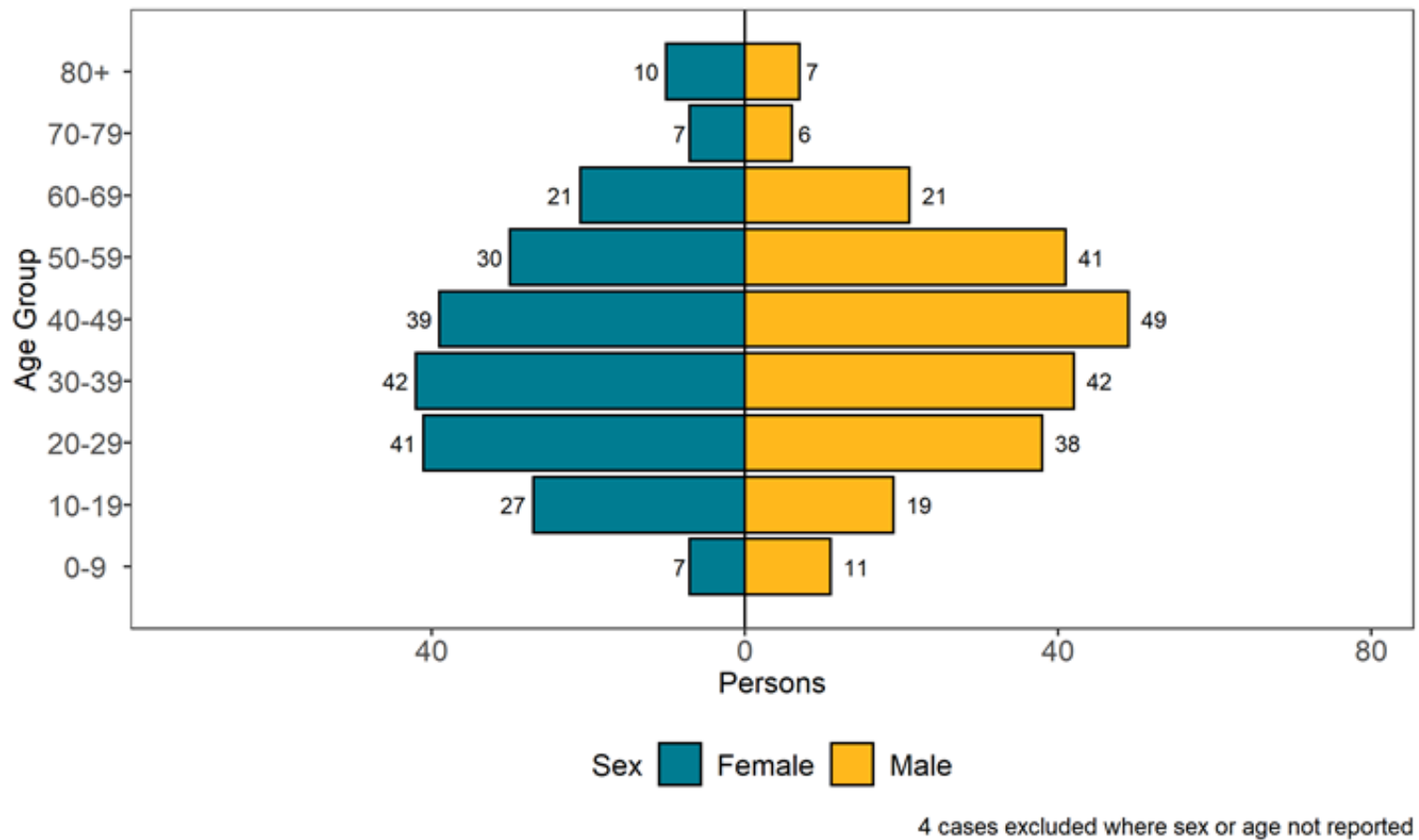


Figure 19. Age-sex pyramid of VUI-21FEB-03 (B.1.525) cases as of 6 December 2021

(The data used in this graph can be found in the [accompanying spreadsheet.](#))



Mu - VUI-21JUL-01 (B.1.621)

VUI-21JUL-01 was identified through international variant horizon scanning and was made a signal in monitoring by Public Health England (PHE) on 7 June 2021 (lineage B.1.621 at the time). On 21 July 2021, PHE designated lineage B.1.621 as a new VUI, VUI-21JUL-01, based on apparent spread into multiple countries, importation to the UK and mutations of concern. B.1.621 was designated as Mu by WHO on the 30 August 2021.

International epidemiology

GISAID includes data on sequences available internationally. As of 7 December 2021, 13,403 sequences of VUI-21JUL-01 are listed from 54 countries or territories on GISAID, excluding the UK.

Epidemiology

Table 9. Number of confirmed and provisional Mu-VUI-21JUL-01 (B.1.621) cases, by region of residence as of 6 December 2021

Region	Total case number	Case proportion
East Midlands	3	5.8%
East of England	7	13.5%
London	25	48.1%
North East	0	0.0%
North West	4	7.7%
South East	6	11.5%
South West	1	1.9%
West Midlands	1	1.9%
Yorkshire and Humber	1	1.9%
Unknown region	4	7.7%
Total	52	-

Figure 20. Confirmed and provisional Mu-VUI-21JUL-01 (B.1.621) cases by specimen date and region of residence as of 6 December 2021

(The data used in this graph can be found in the [accompanying spreadsheet](#).)

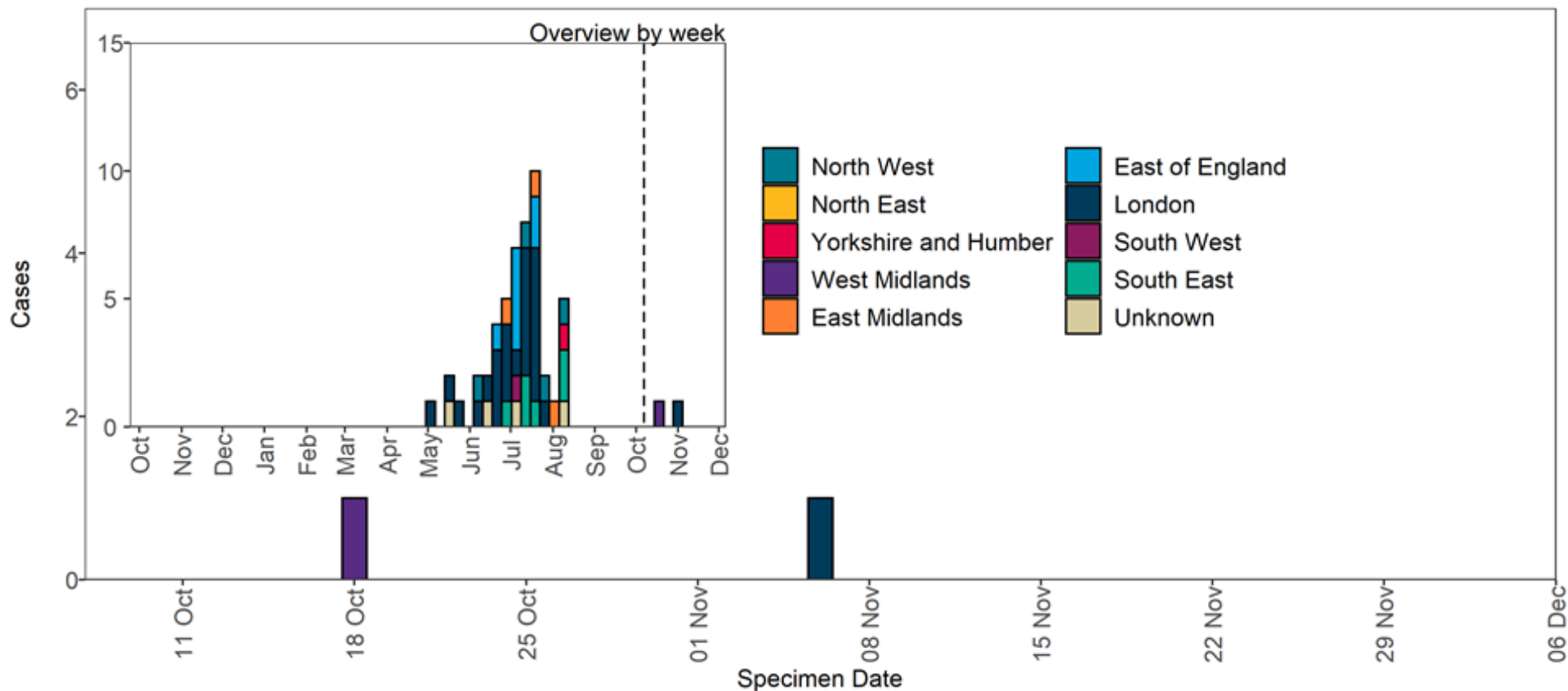
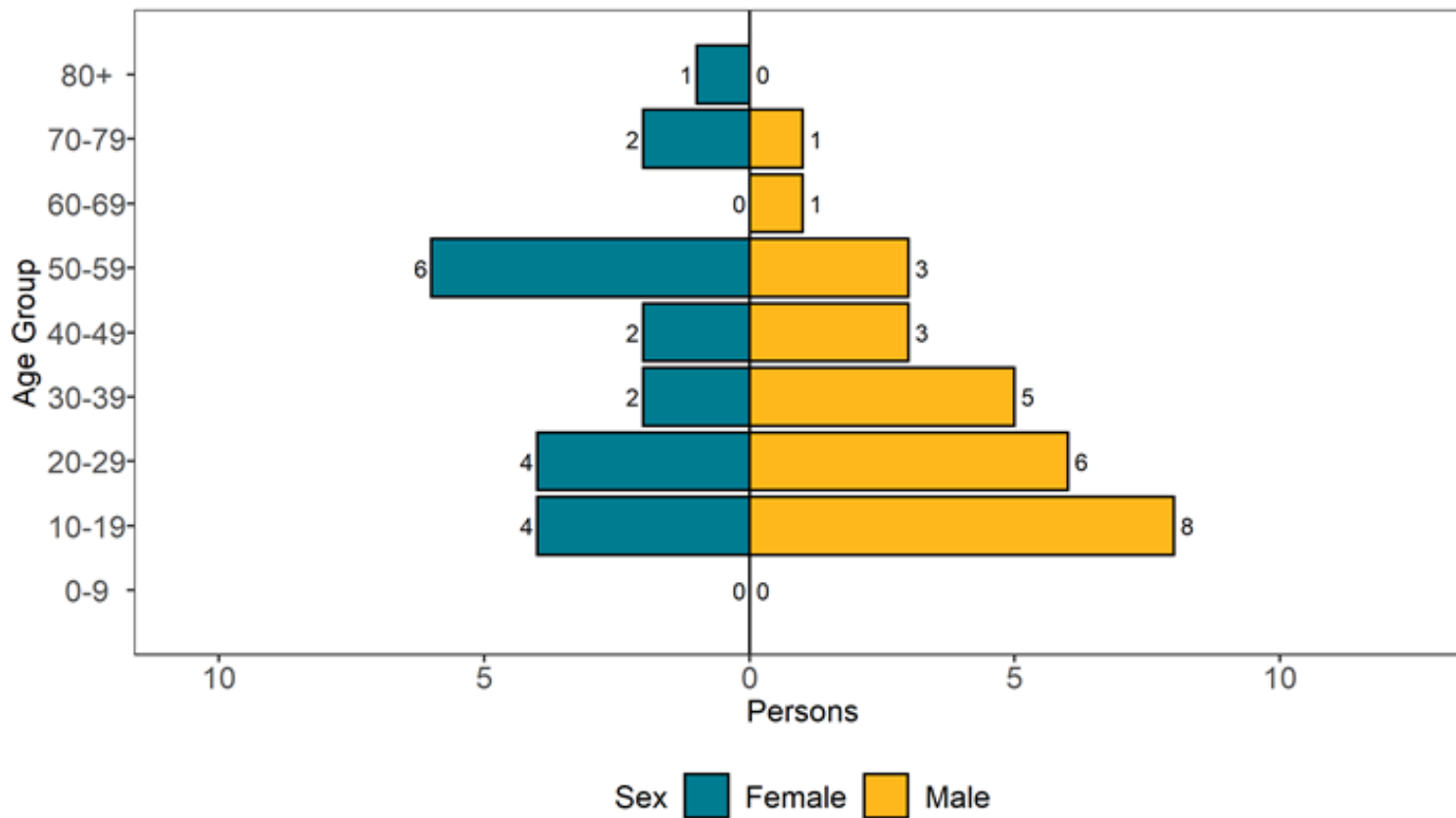


Figure 21. Age-sex pyramid of Mu-VUI-21JUL-01 (B.1.621) cases as of 6 December 2021

(The data used in this graph can be found in the [accompanying spreadsheet](#).)



4 cases excluded where sex or age not reported

Sources and acknowledgments

Data sources

Data used in this investigation is derived from the COG-UK data set, the UKHSA Second Generation Surveillance System (SGSS), NHS Test and Trace, the Secondary Uses Service (SUS) data set and Emergency Care Data Set (ECDS). Data on international cases are derived from reports in GISAID.

Repository of human and machine-readable genomic case definitions

A repository containing the up-to-date genomic definitions for all VOC and VUI as curated by Public Health England was created 5 March 2021. The repository can be accessed on GitHub. They are provided to facilitate standardised VOC and VUI calling across sequencing sites and bioinformatics pipelines and are the same definitions used internally at UKHSA. 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

UKHSA Genomics Cell
UKHSA Outbreak Surveillance Team
UKHSA Epidemiology Cell
UKHSA Contact Tracing Cell Data Team
UKHSA International Cell

Variant Technical Group membership

The UKHSA Variant Technical Group includes representation from the following organisations: UKHSA, DHSC, BEIS, Public Health Wales, Public Health Scotland, Public Health Agency Northern Ireland, Imperial College London, London School of Hygiene and Tropical Medicine, University of Birmingham, University of Cambridge, University of Edinburgh, University of Liverpool, the Wellcome Sanger Institute.

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About the UK Health Security Agency

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