Public Health England

Protecting and improving the nation's health

SARS-CoV-2 variant data update, England

Version 10

6 August 2021

This briefing provides an update on previous data located in technical and variant data update briefings and updates up to 23 July 2021.

Contents

Surveillance data overview

This document includes routine data on variants of concern and under investigation. Delta (VOC-21APR-02, B.1.617.2) and VUI-21JUL-01 (B.1.621) are detailed in technical briefing 20.

There are 4 variants of concern and 10 variants under investigation (Table 1).

Table 1. Variant lineage and designation as of 2 August 2021 (provisionally extinct variants removed)

WHO nomenclature as of 19 July 2021	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
Zeta^	P.2	VUI-21JAN-01	VUI	International
Eta	B.1.525	VUI-21FEB-03	VUI	UK
	B.1.1.318	VUI-21FEB-04	VUI	UK
Theta^	P.3	VUI-21MAR-02	VUI	UK
Kappa	B.1.617.1	VUI-21APR-01	VUI	UK
	B.1.617.3	VUI-21APR-03	VUI	UK
	AV.1	VUI-21MAY-01	VUI	UK
	C.36.3	VUI-21MAY-02	VUI	UK
Lambda	C.37	VUI-21JUN-01	VUI	UK
	B.1.621	VUI-21JUL-01	VUI	UK
	B.1.1.7 with E484K	VOC-21FEB-02	*Monitoring	International
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	

WHO nomenclature as of 19 July 2021	Lineage	Designation	Status	UK or International (not currently detected in UK)
	B.1.620		Monitoring	
	B.1.214.2		Monitoring	
	R.1		Monitoring	
	B.1 with 214insQAS		Monitoring	
	AT.1		Monitoring	
	Lineage A with R346K, T478R and E484K		Monitoring	
	Delta like variant with E484A		Monitoring	
	P.1 + N501T and E484Q		Monitoring	
	B.1.629		Monitoring	
	B.1.619		Monitoring	
	C.1.2		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.

VOC-21FEB-02 (B.1.1.7 with E484K) and VUI-21MAR-01 (B.1.324.1 with E484K) 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.

Data on individual variants

Alpha

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 the World Health Organization (WHO) on 31 May 2021.

International epidemiology

GISAID includes data on sequences available internationally. As of 2 August 2021, 755,365 sequences of Alpha are listed from 163 countries or territories on GISAID, excluding the UK.

Epidemiology

Table 2. Number of confirmed and provisional Alpha (B.1.1.7) cases, by region of residence as of 2 August 2021

Region	Confirmed case number	Provisional case number[1]	Total case number	Proportion of total cases
East Midlands	16,205	489	16,694	7.4%
East of England	19,772	178	19,950	8.8%
London	40,207	768	40,975	18.1%
North East	14,811	114	14,925	6.6%
North West	42,006	1,761	43,767	19.3%
South East	24,008	117	24,125	10.7%
South West	8,137	53	8,190	3.6%
West Midlands	18,324	1,303	19,627	8.7%
Yorkshire and Humber	35,951	889	36,840	16.3%
Unknown region	1,333	20	1,353	0.6%
Total	220,754	5,692	226,446	-

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[1] Genotyping is used to identify variants Alpha, Beta, Delta and Gamma. Genotyping targets were updated in mid-May 2021 to prioritise the accurate identification of Delta over Alpha.

Figure 1. Confirmed and provisional Alpha cases by specimen date and region of residence as of 2 August 2021 (Find accessible data used in this graph in underlying data.)
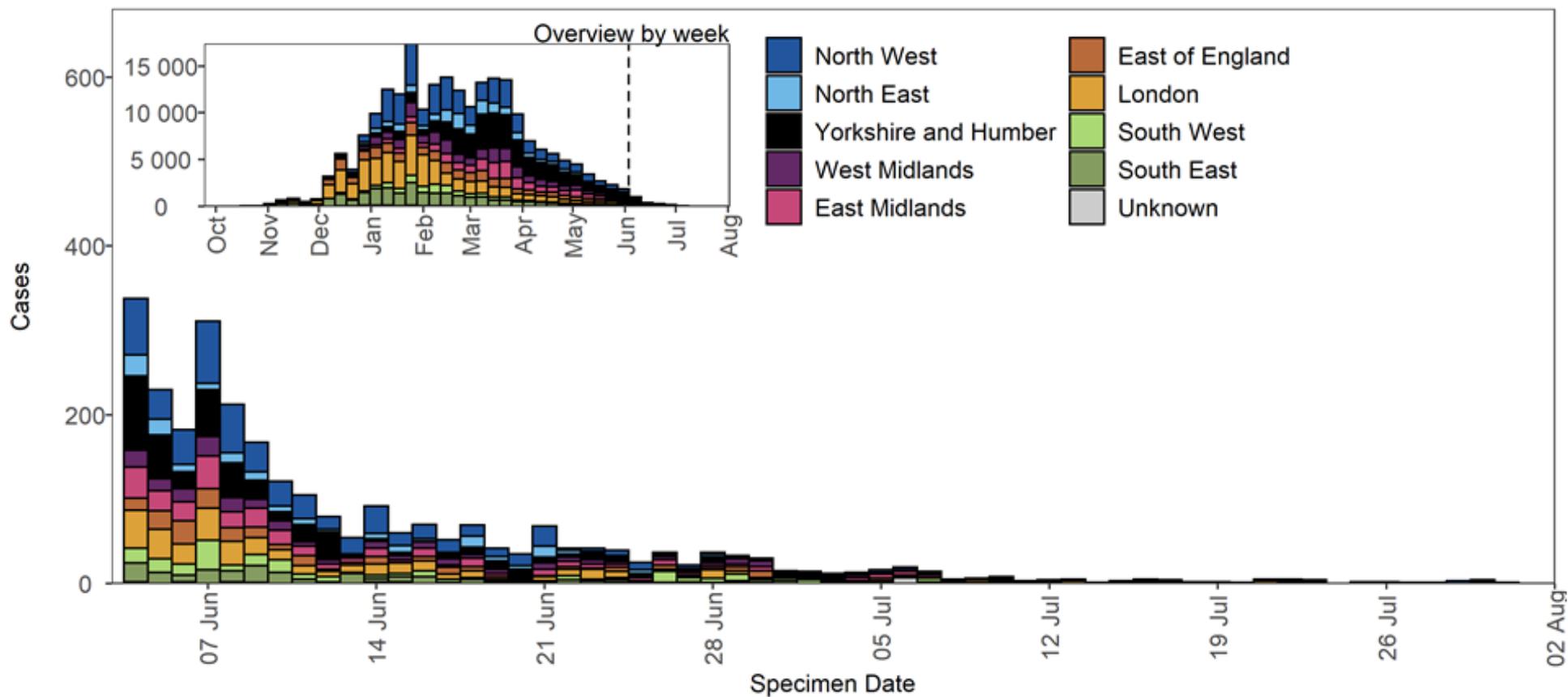
Figure 2. Confirmed and provisional Alpha cases by specimen date and detection method as of 2 August 2021
(Find accessible data used in this graph in underlying data.)

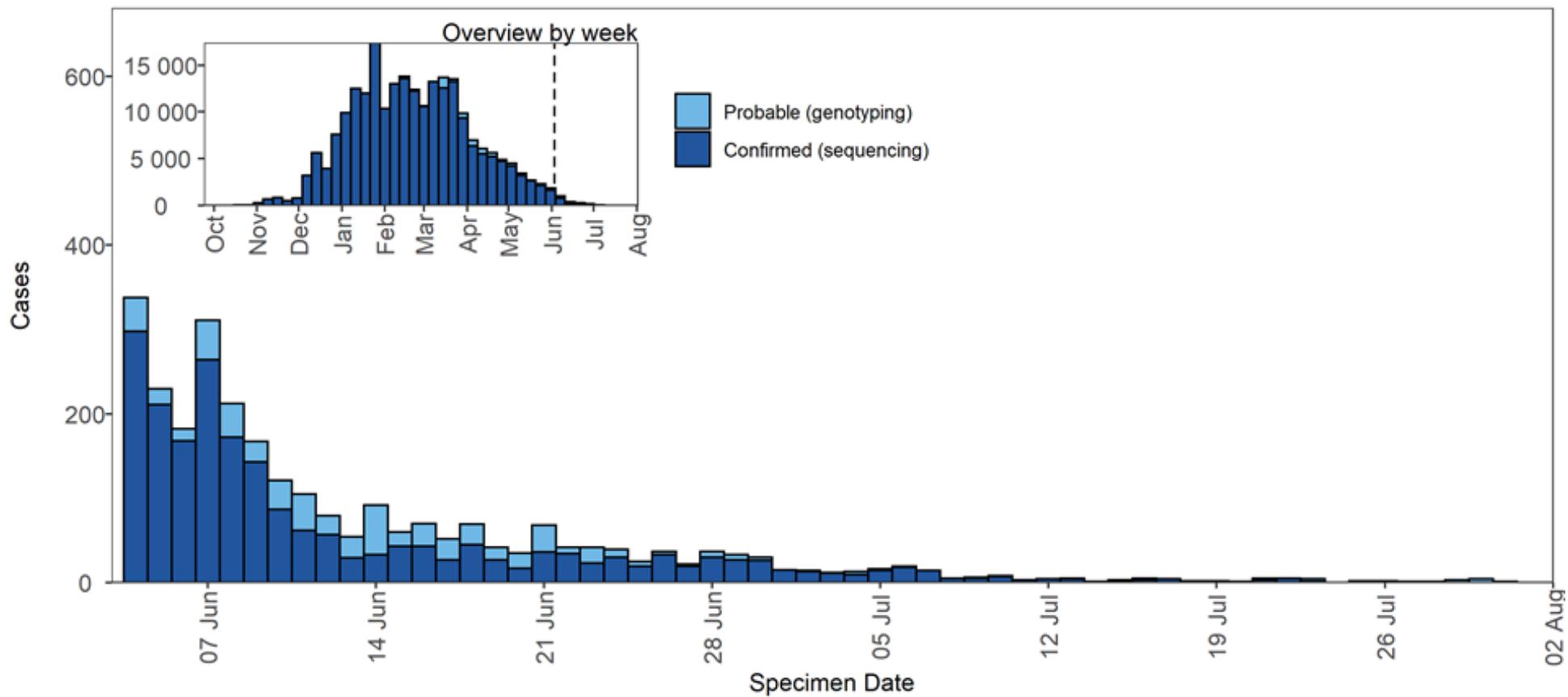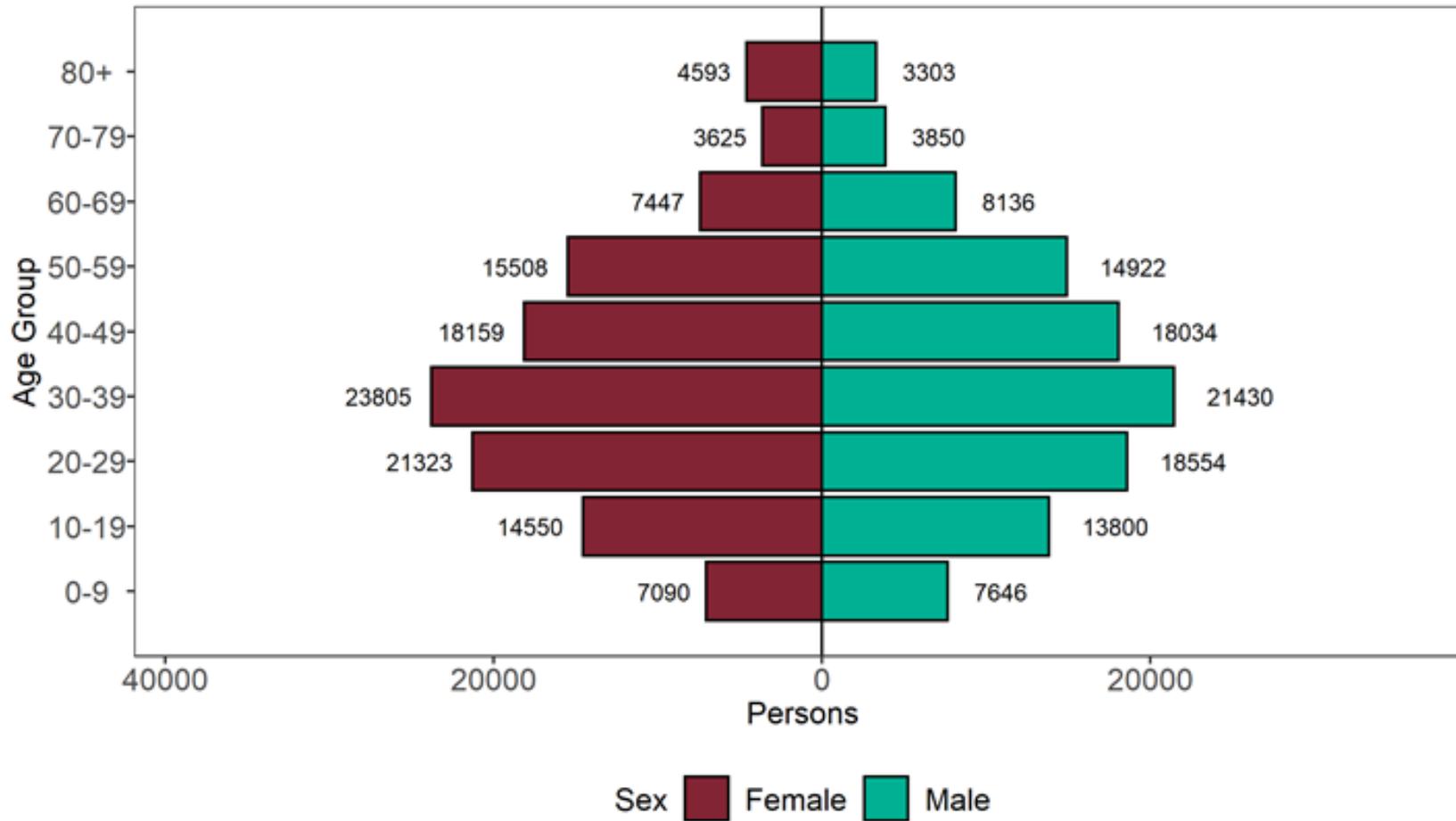**Figure 3. Age and sex pyramid of Alpha cases as of 2 August 2021**
(Find accessible data used in this graph in underlying data.)

671 cases excluded where sex or age not reported

Beta

B.1.351 was initially detected in South Africa. This variant was designated variant under investigation 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 2 August 2021, 28,101 sequences of Beta, are listed from 103 countries or territories, excluding the UK.

Epidemiology

Table 3. Number of confirmed and provisional Beta (B.1.351) cases, by region of residence as of 2 August 2021

Region	Confirmed case number	Provisional case number[2]	Total case number	Proportion of total cases
East Midlands	46	3	49	5.0%
East of England	81	4	85	8.7%
London	416	31	447	46.0%
North East	18	6	24	2.5%
North West	80	9	89	9.2%
South East	113	5	118	12.1%
South West	31	1	32	3.3%
West Midlands	64	1	65	6.7%
Yorkshire and Humber	32	7	39	4.0%
Unknown region	20	4	24	2.5%
Total	901	71	972	-

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[2] Genotyping is used to identify variants Alpha, Beta, Delta and Gamma. Genotyping targets were updated in mid-May 2021 to prioritise the accurate identification of Delta over Alpha.

Figure 4. Confirmed and provisional Beta cases by specimen date and region of residence as of 2 August 2021
Larger plot includes last 60 days only. (Find accessible data used in this graph in underlying data.)
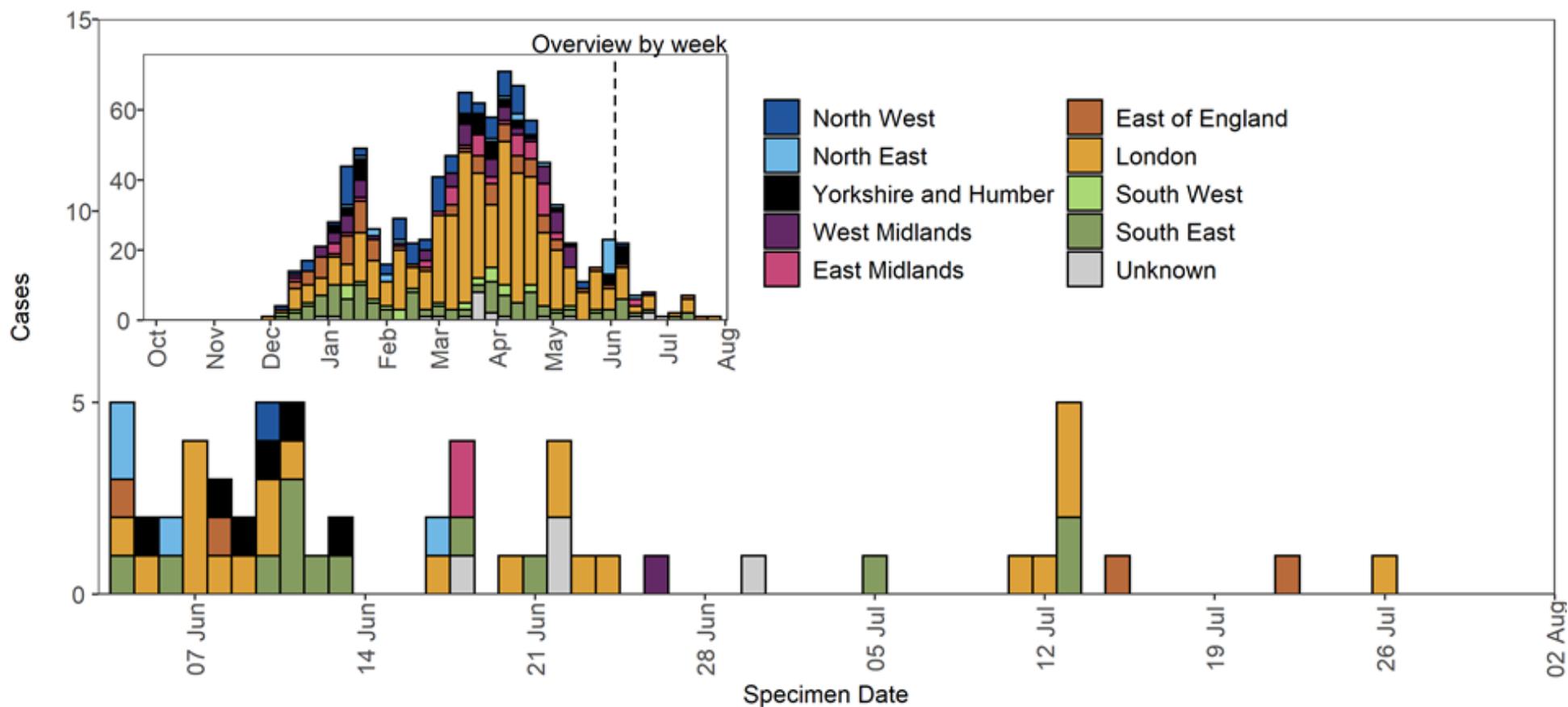
Figure 5. Confirmed and provisional Beta cases by specimen date and detection method as of 2 August 2021
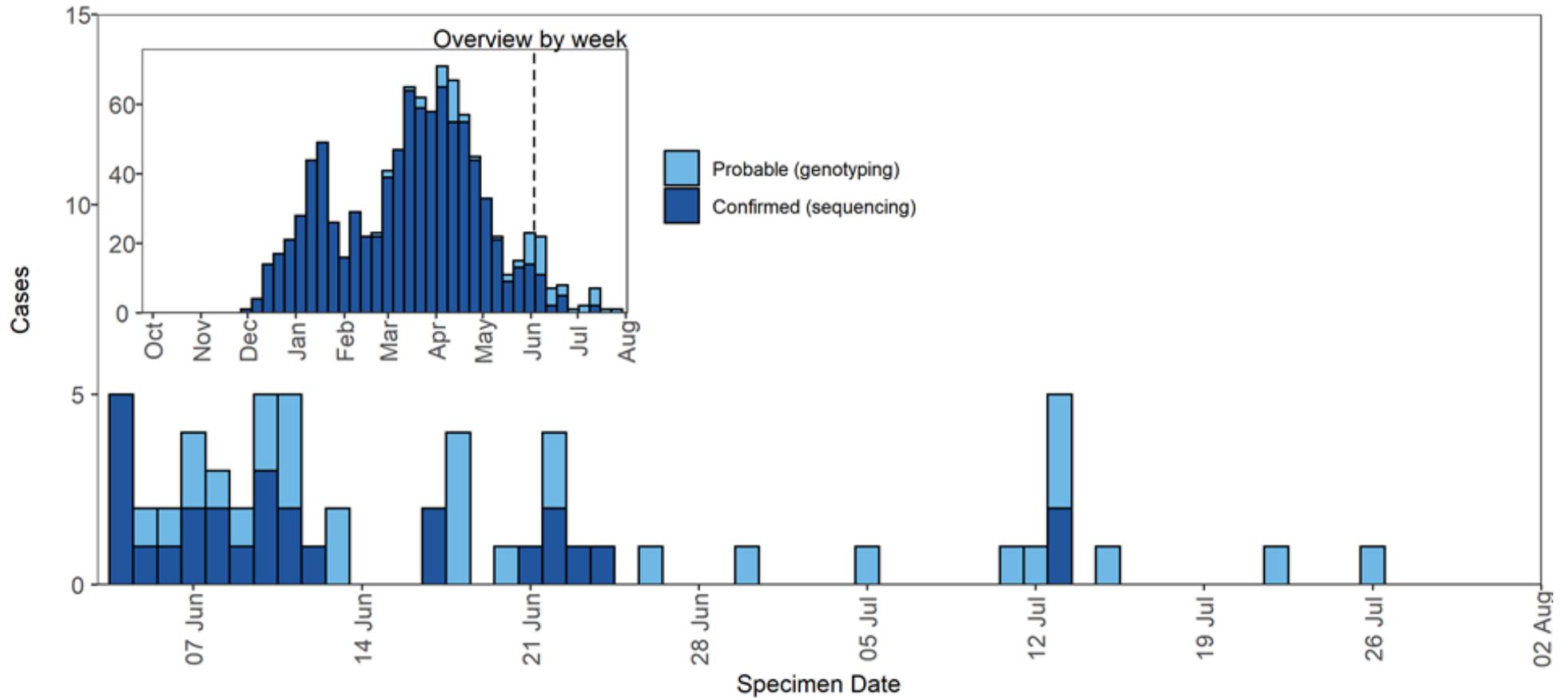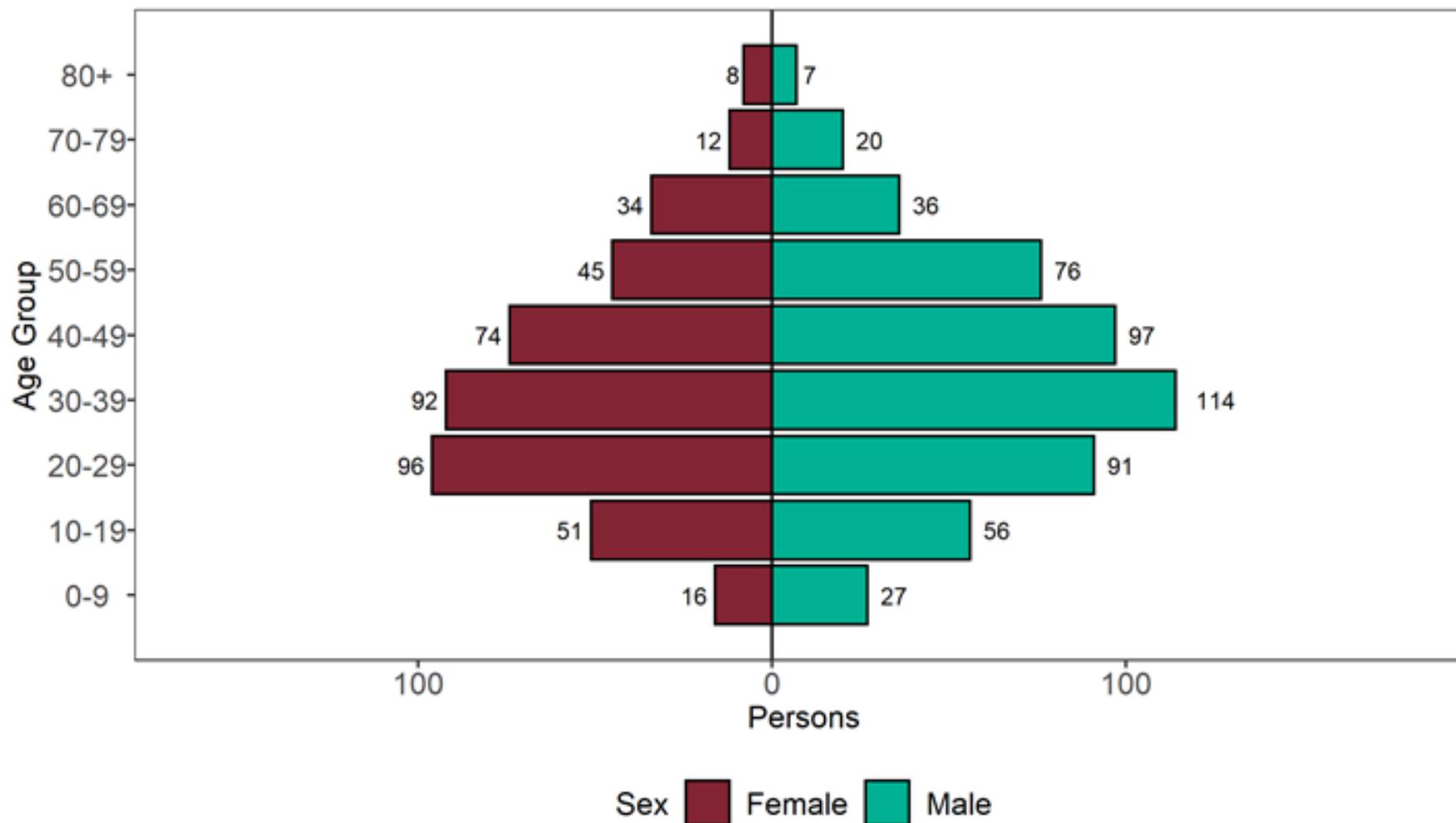Larger plot includes last 60 days only. (Find accessible data used in this graph in underlying data.)

Figure 6. Age and sex pyramid of Beta cases as of 2 August 2021
(Find accessible data used in this graph in underlying data.)

Gamma

First identified in Japan amongst travellers from Brazil. The P.1 lineage is a descendant of B.1.1.28. This variant was designated variant under investigation 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 2 August 2021, 58,931 sequences (excluding the UK) of Gamma from 71 countries.

Epidemiology

Table 4. Number of confirmed and provisional Gamma (P.1) cases, by region of residence as of 2 August 2021

Region	Confirmed case number	Provisional case number[3]	Total case number	Proportion of total cases
East Midlands	4	0	4	1.7%
East of England	13	0	13	5.5%
London	114	22	136	57.9%
North East	0	4	4	1.7%
North West	9	1	10	4.3%
South East	28	4	32	13.6%
South West	10	2	12	5.1%
West Midlands	7	1	8	3.4%
Yorkshire and Humber	2	8	10	4.3%
Unknown region	6	0	6	2.6%
Total	193	42	235	-

[3] Genotyping is used to identify variants Alpha, Beta, Delta and Gamma. Genotyping targets were updated in mid-May 2021 to prioritise the accurate identification of Delta over Alpha.

Figure 7. Confirmed and provisional Gamma cases by specimen date and region of residence as of 2 August 2021
Larger plot includes last 60 days only. (Find accessible data used in this graph in underlying data.)
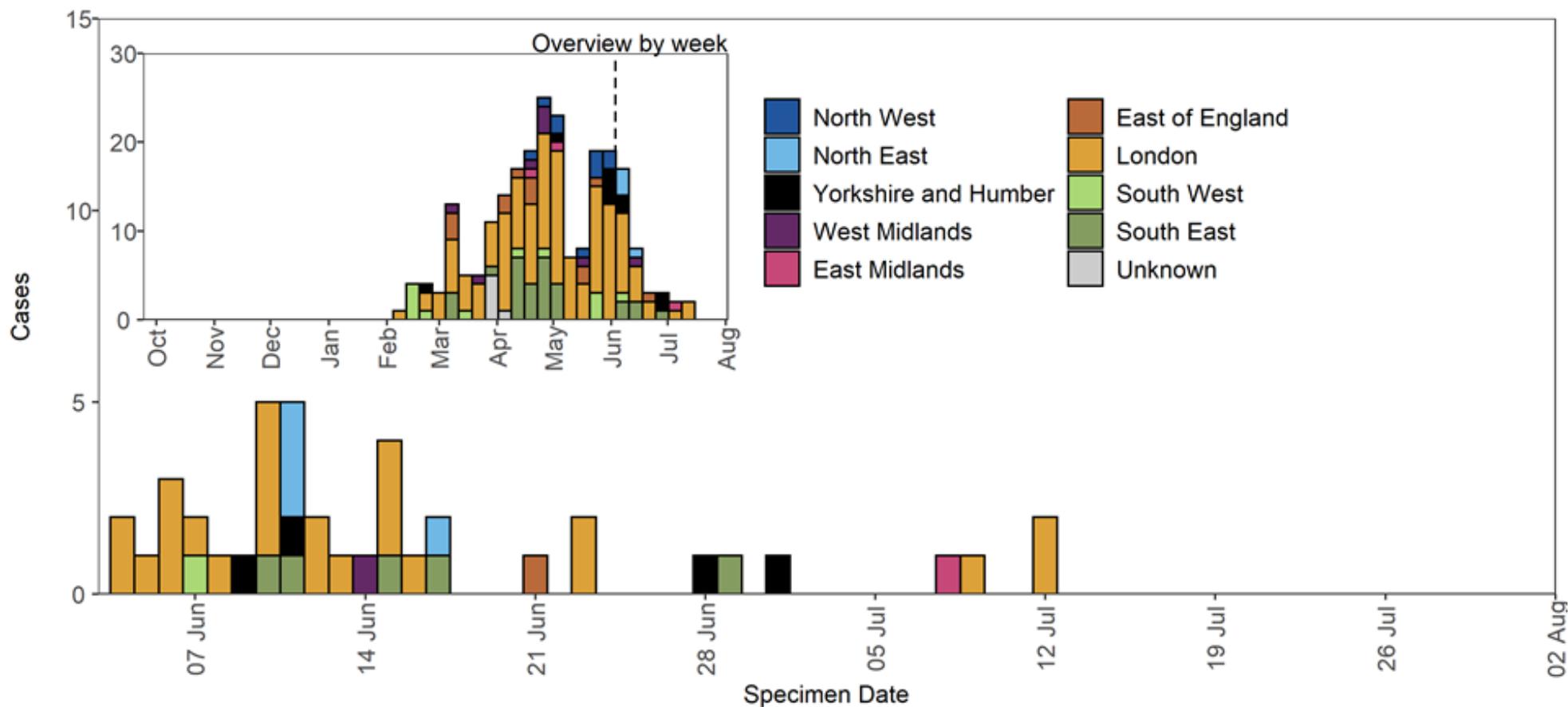

14

Figure 8. Confirmed and provisional Gamma cases by specimen date and detection method as of 2 August 2021 (Find accessible data used in this graph in underlying data.)
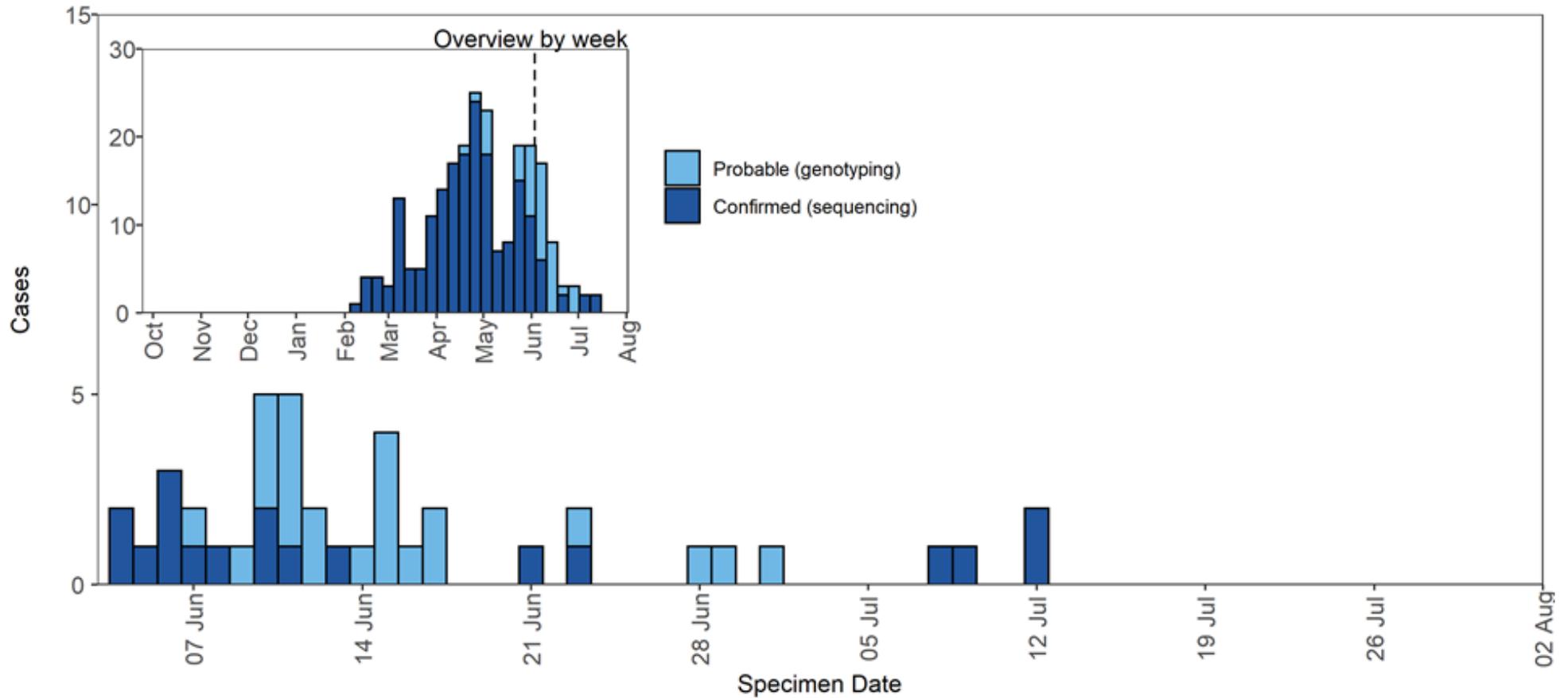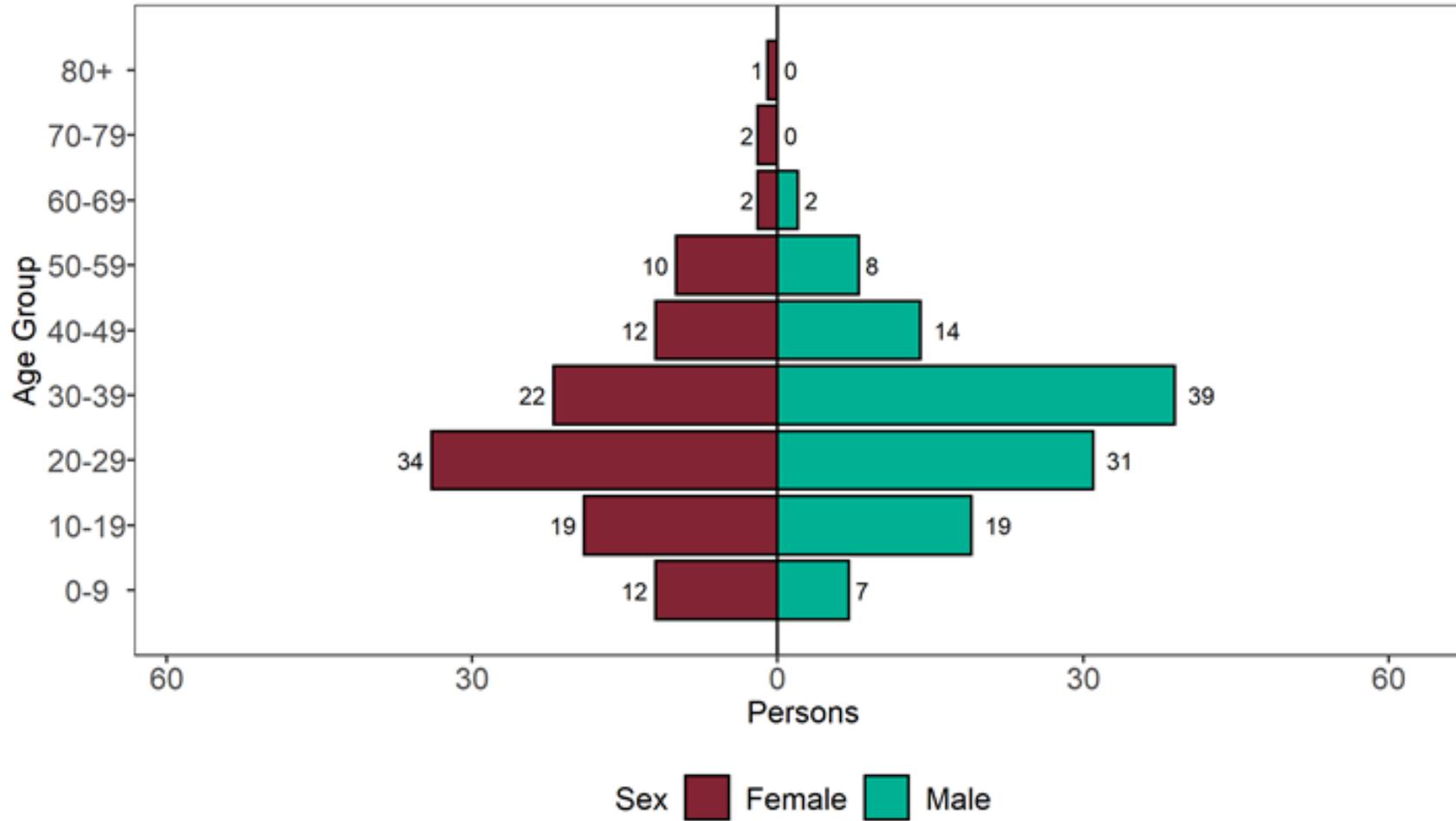
Figure 9. Age and sex pyramid of Gamma cases as of 2 August 2021
(Find accessible data used in this graph in underlying data.)

1 cases excluded where sex or age not reported

Zeta

First identified in Brazil, the P.2 lineage is a descendant of B.1.1.28. This variant was designated VUI-21JAN-01 (P.2) on 13 January 2021. It was first sequenced in the UK in November 2020. This was named Zeta by WHO on 31 May 2021.

International epidemiology

GISAID includes data on sequences available internationally. As of 2 August 2021, 4,552 sequences (excluding the UK) of Zeta from 40 countries.

Epidemiology

Table 5. Number of confirmed and provisional Zeta (P.2) cases, by region of residence as of 2 August 2021

Region	Total case number	Proportion of total cases
East Midlands	1	1.9%
East of England	2	3.7%
London	14	25.9%
North East	0	0.0%
North West	12	22.2%
South East	6	11.1%
South West	7	13.0%
West Midlands	1	1.9%
Yorkshire and Humber	11	20.4%
Total	54	-

Figure 10. Confirmed and provisional Zeta cases by specimen date and region of residence as of 2 August 2021
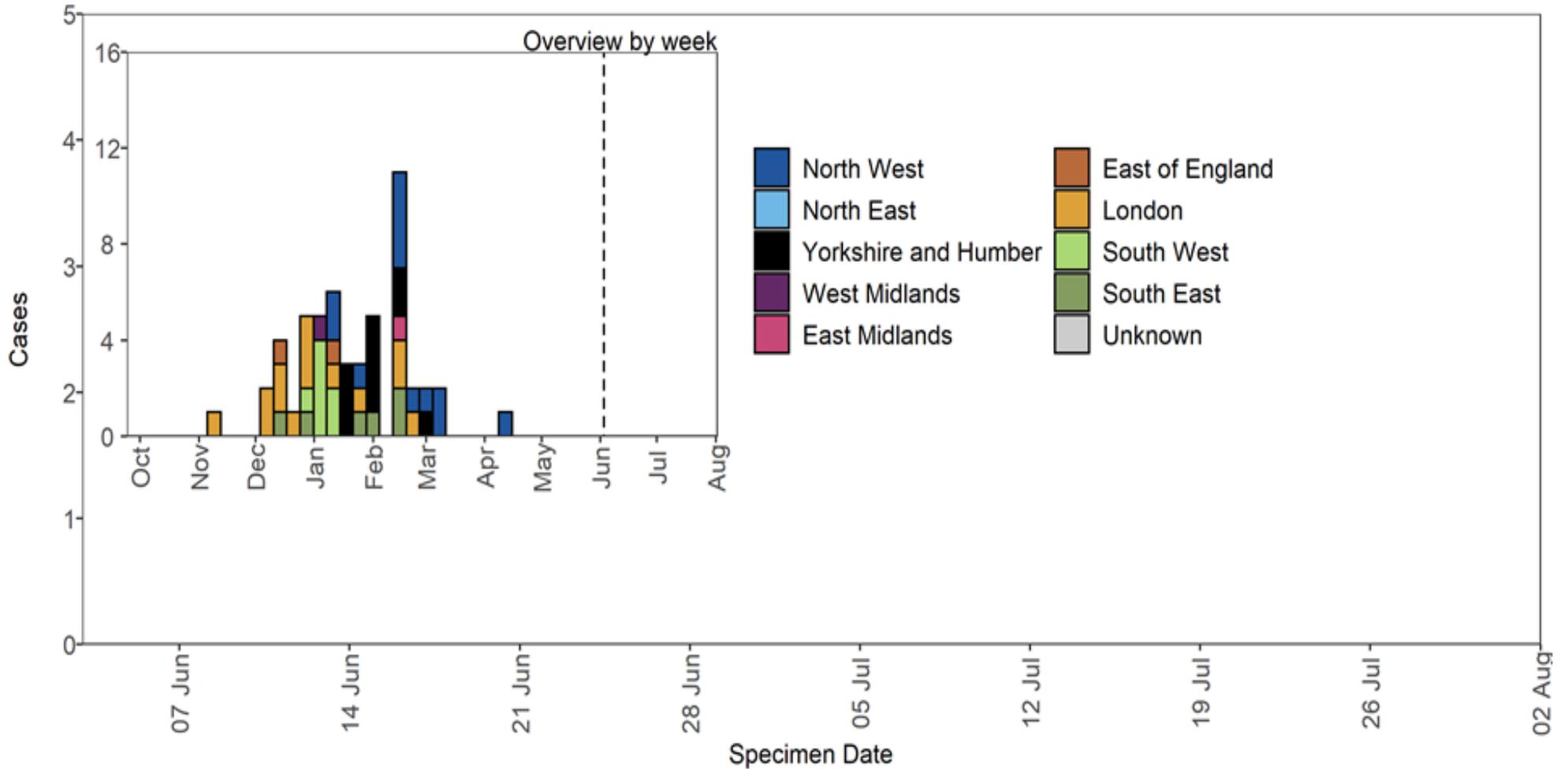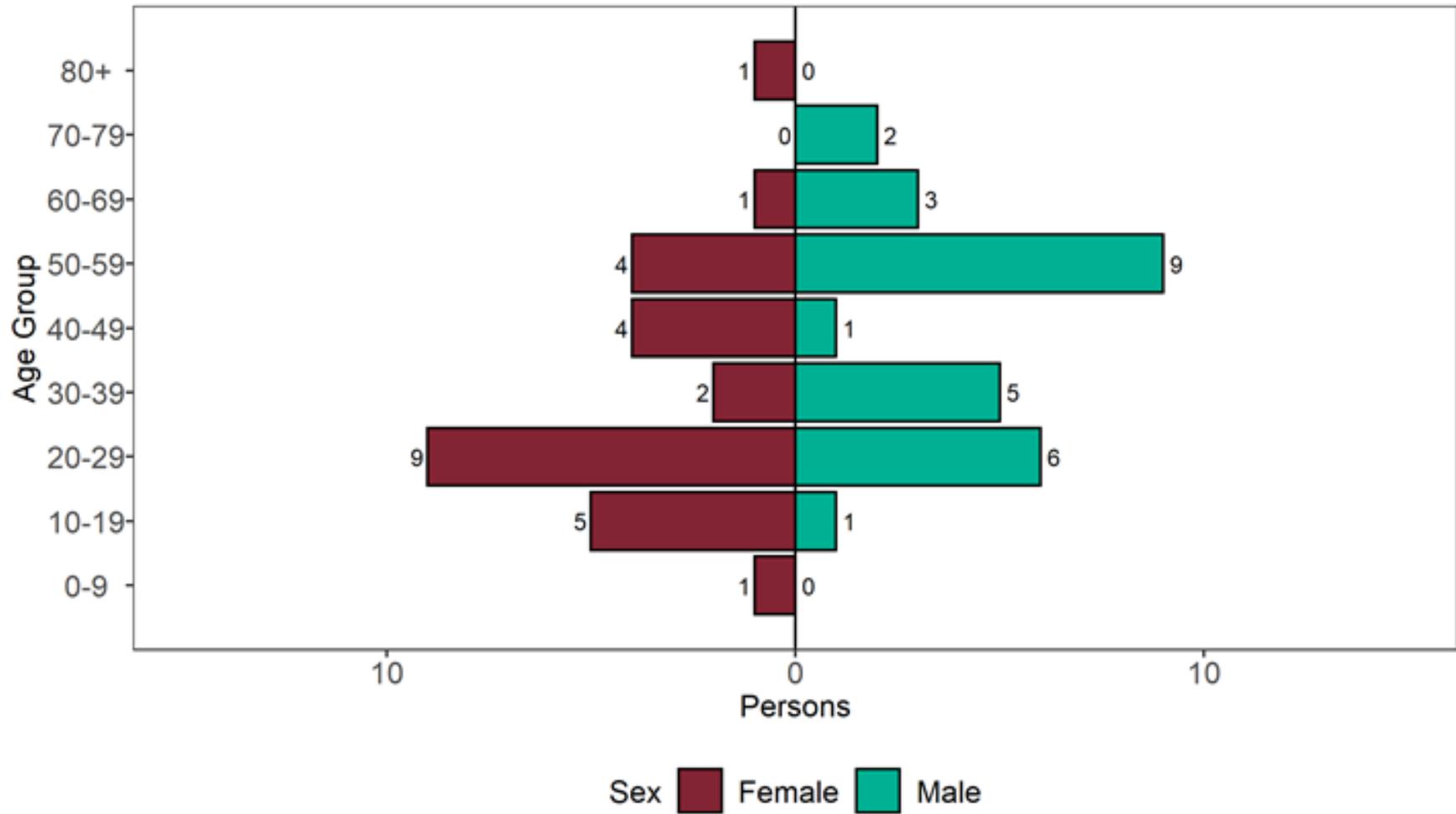Larger plot includes last 60 days only. (Find accessible data used in this graph in underlying data.)

Figure 11. Age and sex pyramid of Zeta cases as of 2 August 2021
(Find accessible data used in this graph in underlying data.)

Eta

B.1.525 was identified as a geographically dispersed cluster in 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 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 2 August 2021, 6,551 sequences of Eta are listed, from 71 countries or territories, excluding the UK.

Epidemiology

Table 6. Number of confirmed and provisional Eta (B.1.525) cases, by region of residence as of 2 August 2021

Region	Total case number	Proportion of total cases
East Midlands	10	2.3%
East of England	30	6.8%
London	157	35.4%
North East	5	1.1%
North West	77	17.4%
South East	80	18.1%
South West	18	4.1%
West Midlands	35	7.9%
Yorkshire and Humber	20	4.5%
Unknown region	11	2.5%
Total	443	-

Figure 12. Confirmed and provisional Eta cases by specimen date and region of residence as of 2 August 2021
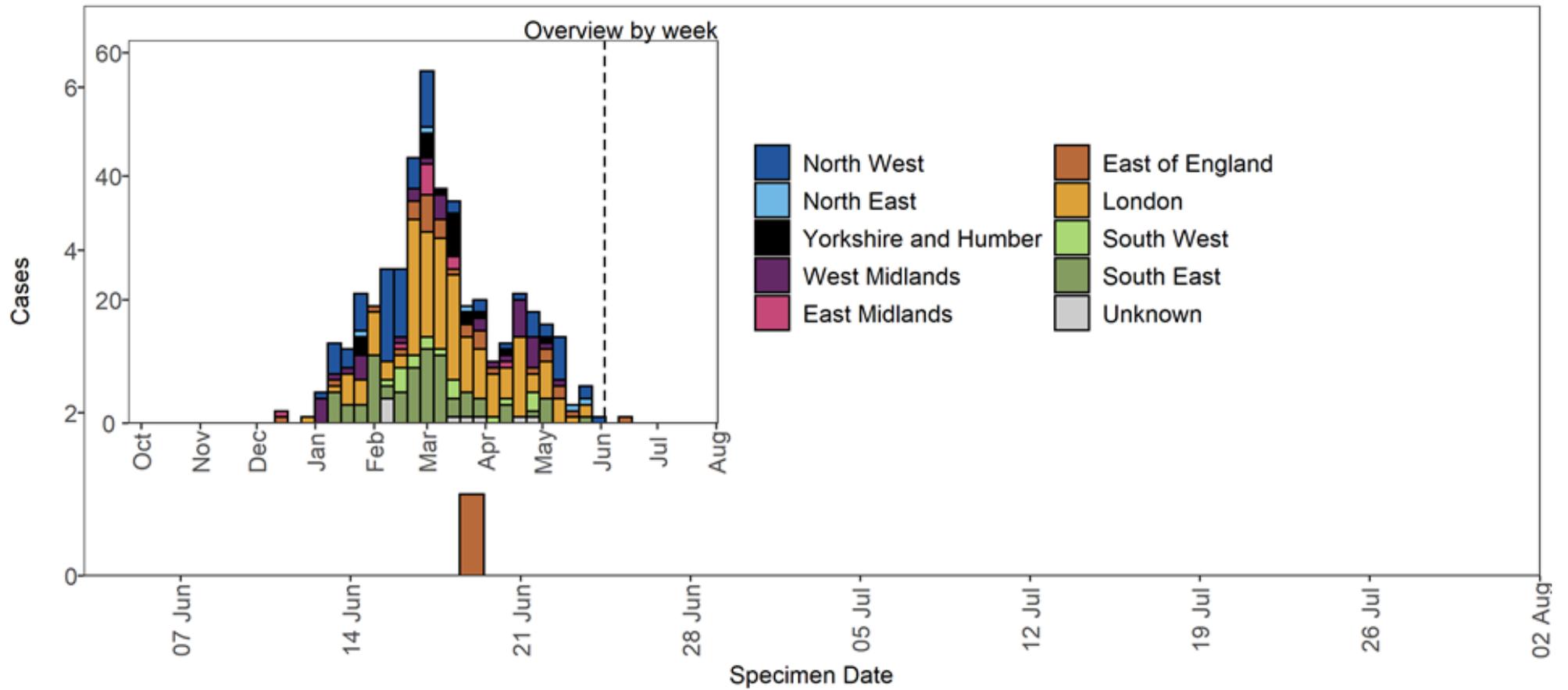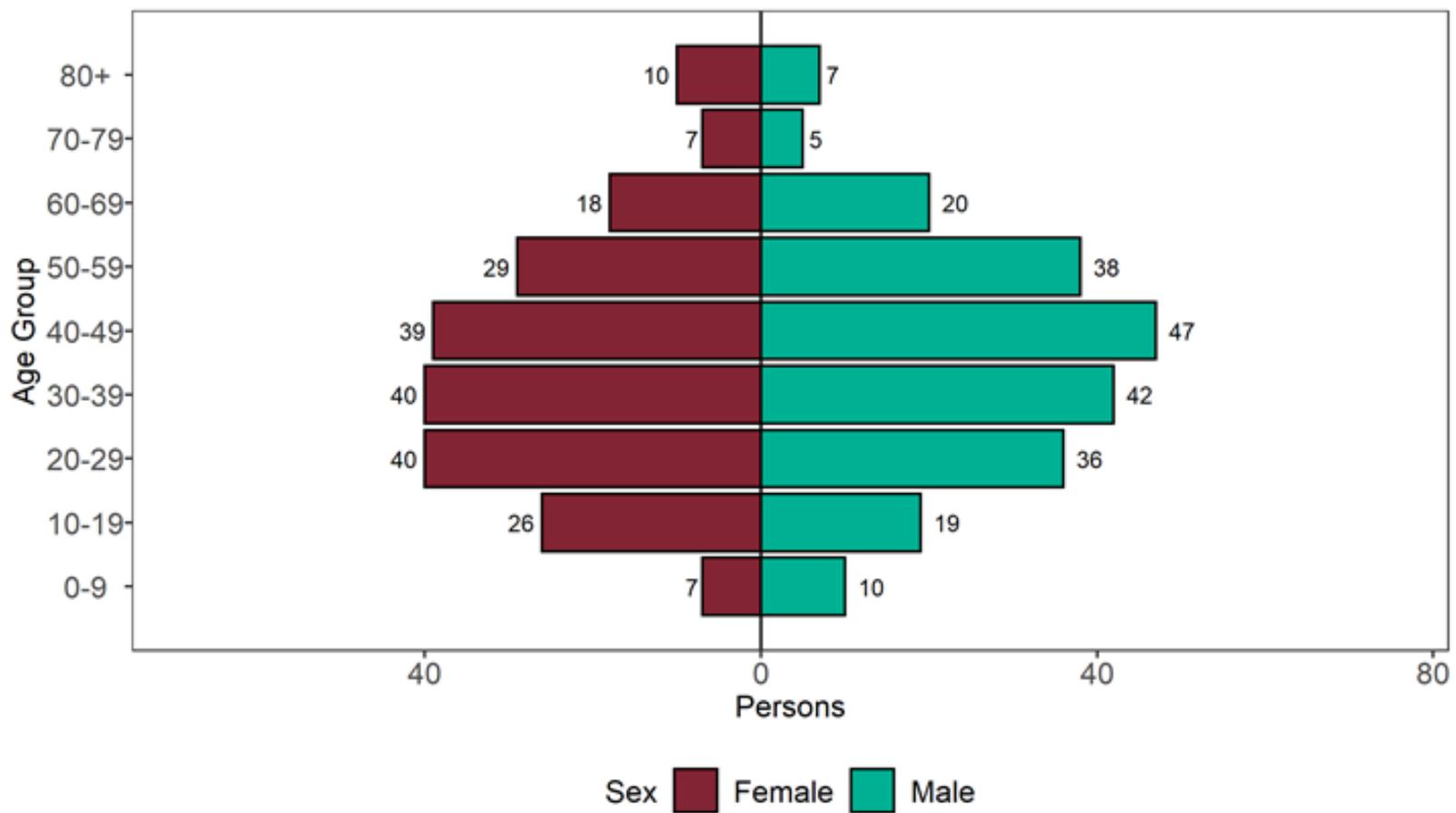Larger plot includes last 60 days only. (Find accessible data used in this graph in underlying data.)

Figure 13. Age and sex pyramid of Eta cases as of 2 August 2021
(Find accessible data used in this graph in underlying data.)

VUI-21FEB-04 (B.1.1.318)

B.1.1.318 was identified in England in mid-February 2021 through routine horizon scanning for the development of new clusters of genomes containing E484K. This analysis identified an initial cluster of 6 cases containing E484K and other spike mutations, designated VUI-21FEB-04 (B.1.1.318) on 23 February 2021.

International epidemiology

GISAID includes data on sequences available internationally. As of 2 August 2021, 274 international VUI-21FEB-04 sequences from 26 countries, excluding the UK have been identified on GISAID.

Epidemiology

Table 7. Number of confirmed and provisional VUI-21FEB-04 (B.1.1.318) cases, by region of residence as of 2 August 2021

Region	Total case number	Proportion of total cases
East Midlands	11	3.7%
East of England	37	12.5%
London	112	38.0%
North East	2	0.7%
North West	50	16.9%
South East	51	17.3%
South West	1	0.3%
West Midlands	13	4.4%
Yorkshire and Humber	11	3.7%
Unknown region	7	2.4%
Total	295	-

Figure 14. Confirmed and provisional VUI-21FEB-04 cases by specimen date and region of residence as of 2 August 2021
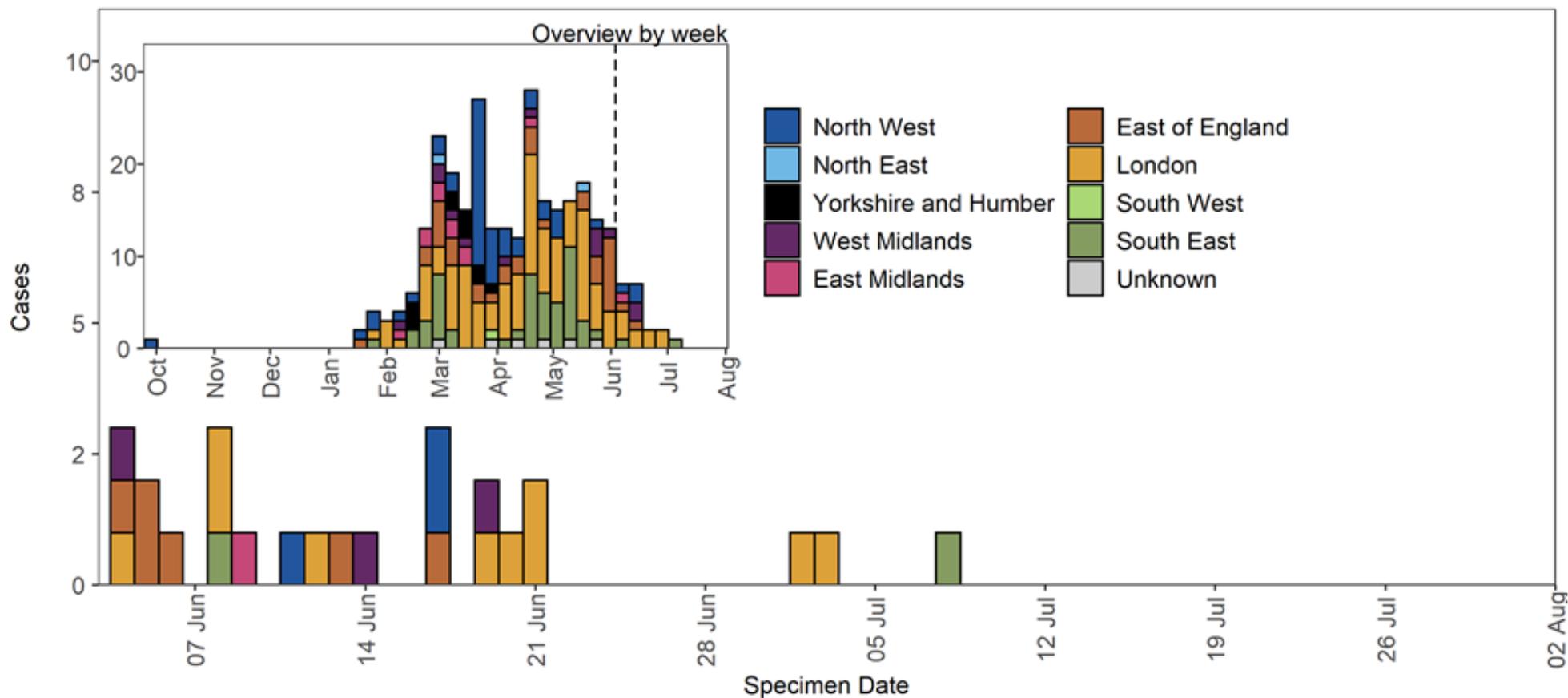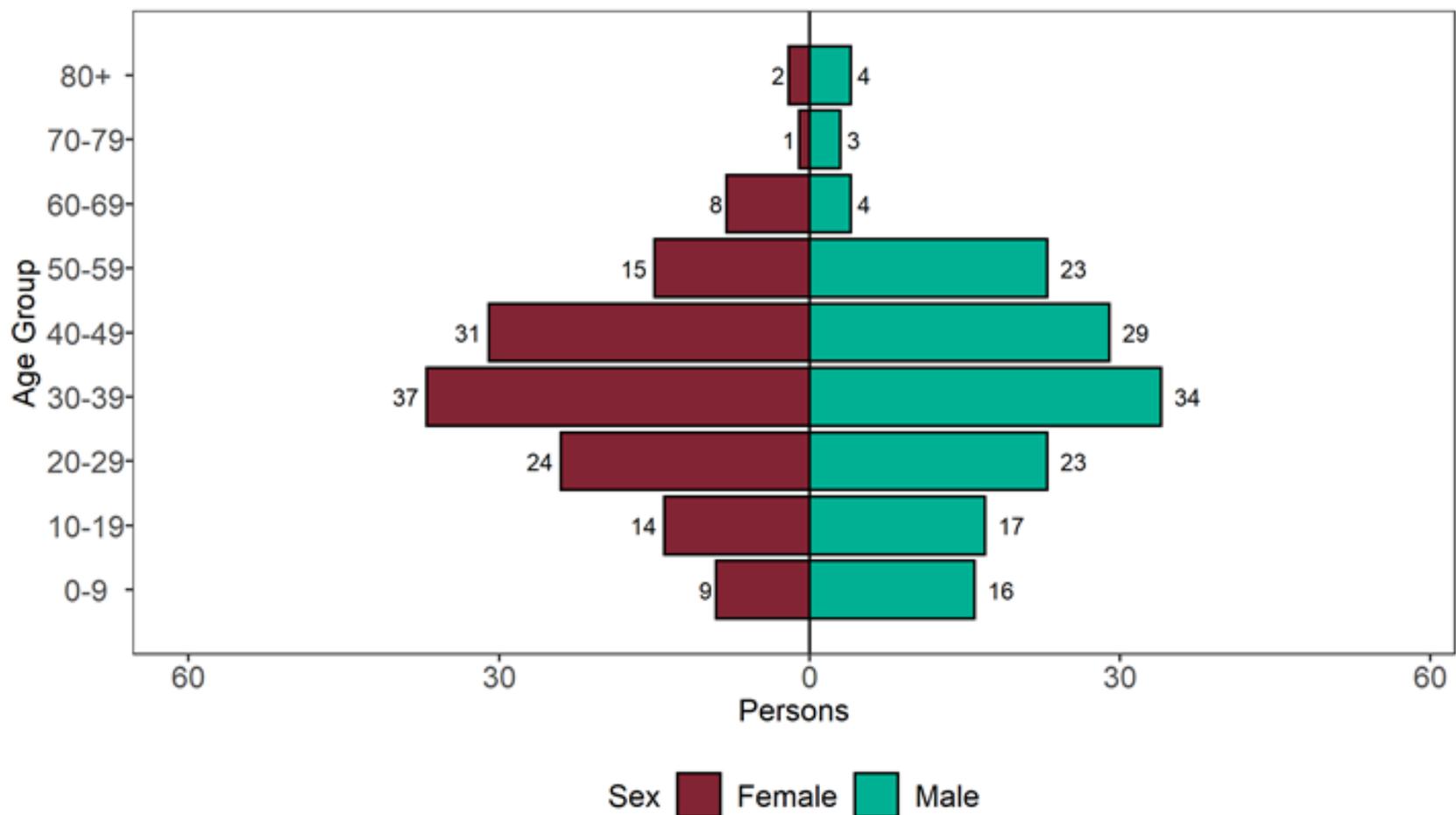Larger plot includes last 60 days only. (Find accessible data used in this graph in underlying data.)

Figure 15. Age and sex pyramid of VUI-21FEB-04 cases as of 2 August 2021
(Find accessible data used in this graph in underlying data.)

1 cases excluded where sex or age not reported

Theta

P.3 was identified on 9 March 2021 in a report of 33 genomes from the Philippines with 13 lineage defining mutations. This variant shares important mutations with other variants of concern, including E484K, N501Y, and P681H. Based on its genomic profile, Public Health England designated P.3 as VUI-21MAR-02 on 11 March 2021. This variant arises from B.1.1.28, which is the same parent lineage of P.1 and P.2 in Brazil. Phylogenetic analysis of P.3 shows diversity indicating circulation prior to detection. This variant was named Theta by WHO on 31 May 2021.

International epidemiology

GISAID includes data on sequences available internationally. As of 2 August 2021, 276 sequences of Theta have been identified in GISAID, excluding the UK: Angola (1), Australia (4), Canada (2), China (2), Germany (10), Hong Kong (11), Japan (6), Malaysia (9), Netherlands (7), New Zealand (3), Norway (3), Philippines (195), Singapore (3), South Korea (2), Sweden (2), USA (16).

Epidemiology

Table 8. Number of confirmed and provisional Theta (P.3) cases, by region of residence as of 2 August 2021

Region	Total case number	Proportion of total cases
East Midlands	0	0.0%
East of England	1	14.3%
London	2	28.6%
North East	0	0.0%
North West	1	14.3%
South East	0	0.0%
South West	2	28.6%
West Midlands	0	0.0%
Yorkshire and Humber	1	14.3%
Total	7	-

Figure 16. Confirmed and provisional Theta cases by specimen date and region of residence as of 2 August 2021
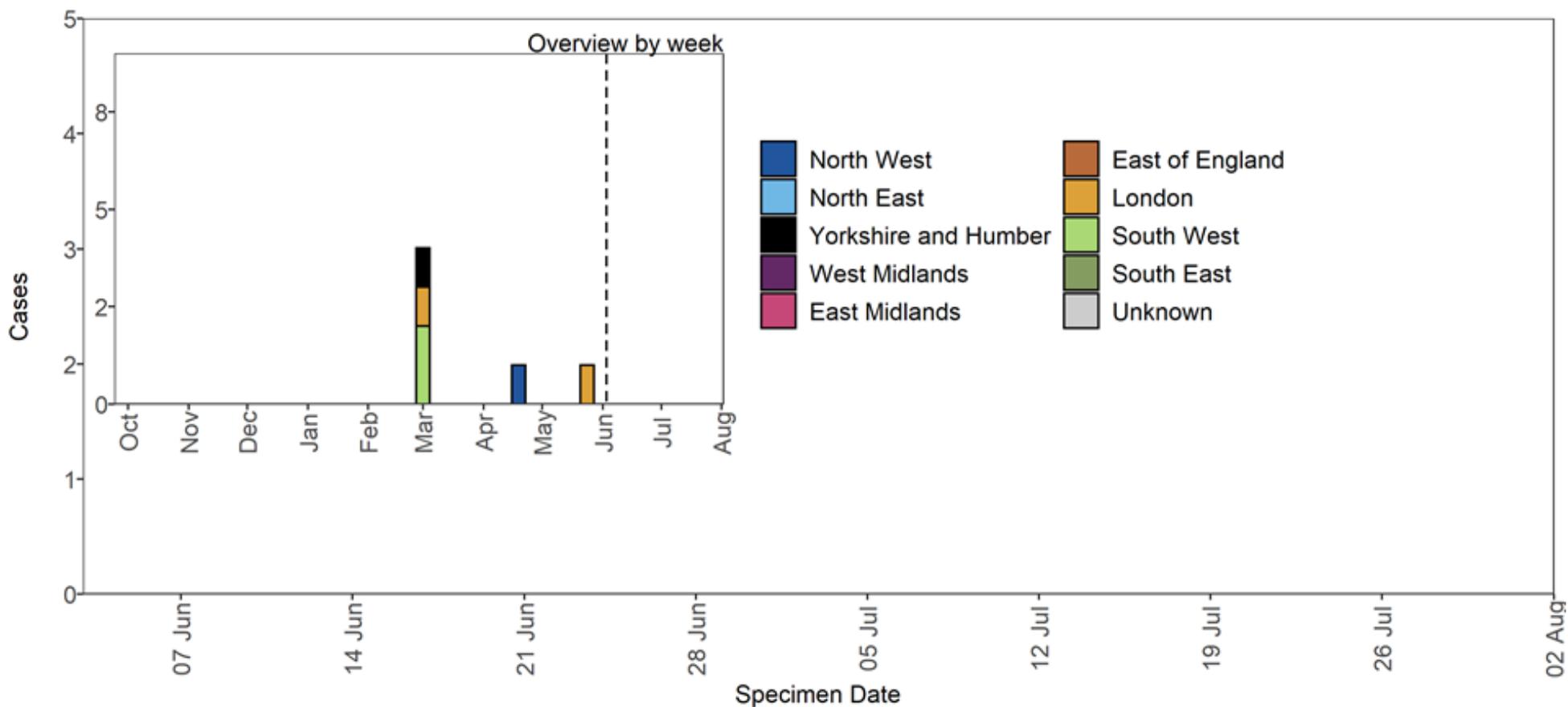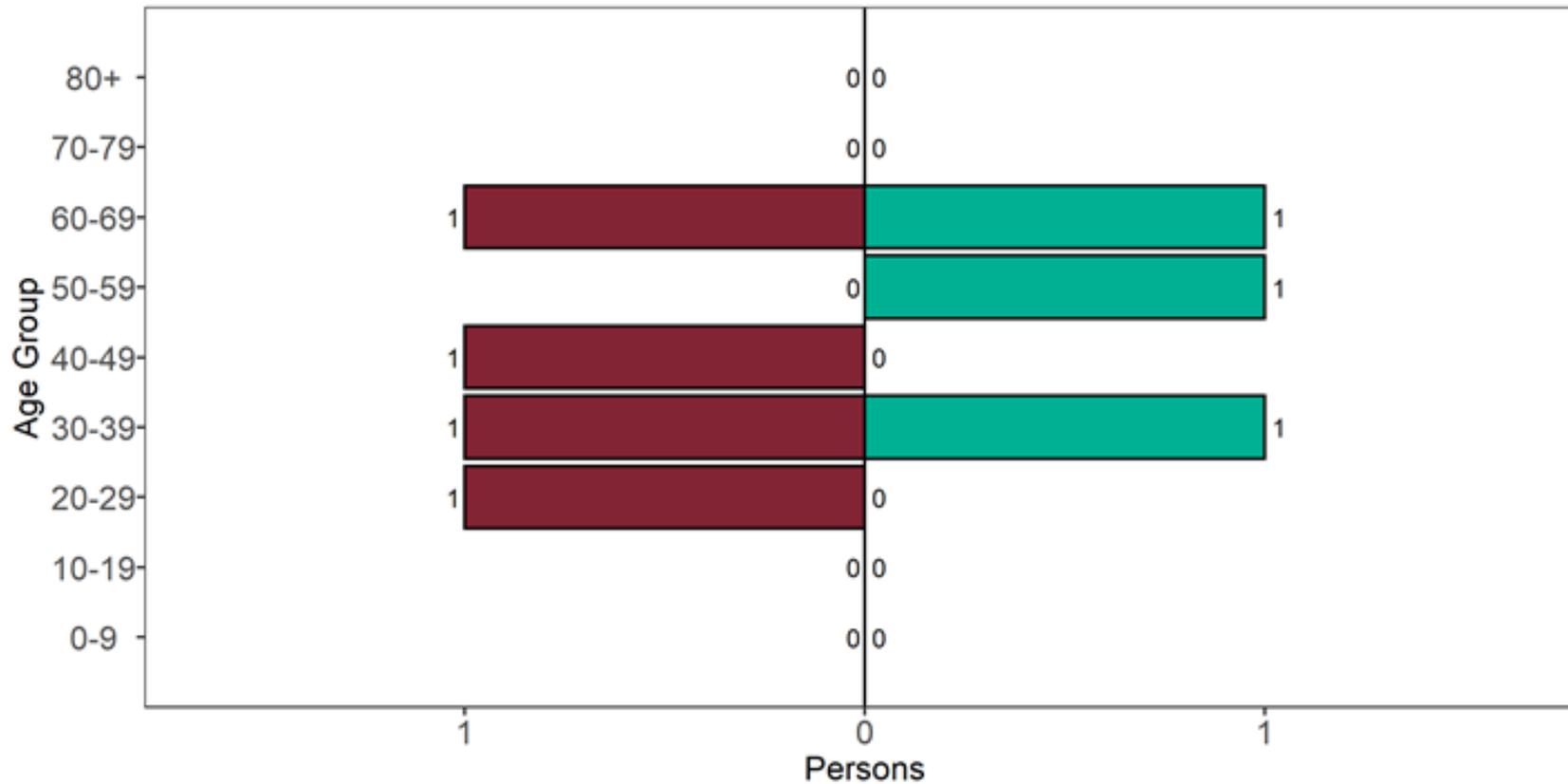Larger plot includes last 60 days only. (Find accessible data used in this graph in underlying data.)

Figure 17. Age and sex pyramid of Theta cases as of 2 August 2021
(Find accessible data used in this graph in underlying data.)

Kappa

B.1.617 lineage was escalated to a variant under investigation on 1 April 2021. B.1.617.1 was escalated to a separate variant under investigation on 27 April 2021 (VUI-21APR-01). This variant was named Kappa by WHO on 31 May 2021.

International epidemiology

GISAID includes data on sequences available internationally. As of 2 August 2021, 5,219 Kappa sequences from 49 countries (excluding the UK) have been identified in GISAID.

Epidemiology

Table 9. Number of confirmed and provisional Kappa (B.1.617.1) cases, by region of residence as of 2 August 2021

Region	Total case number	Proportion of total cases
East Midlands	50	11.2%
East of England	31	6.9%
London	197	44.1%
North East	5	1.1%
North West	32	7.2%
South East	42	9.4%
South West	14	3.1%
West Midlands	48	10.7%
Yorkshire and Humber	18	4.0%
Unknown region	10	2.2%
Total	447	-

Figure 18. Confirmed and provisional Kappa cases by specimen date and region of residence as of 2 August 2021
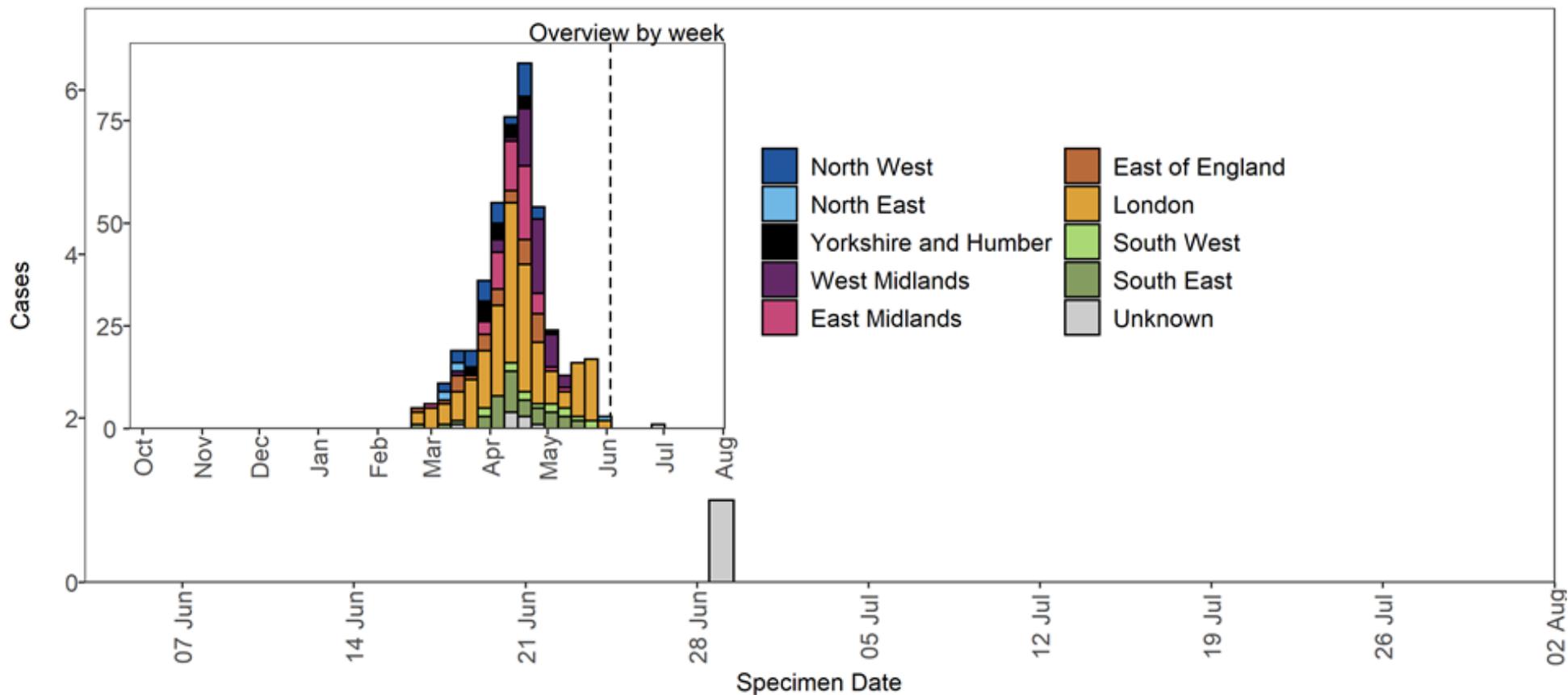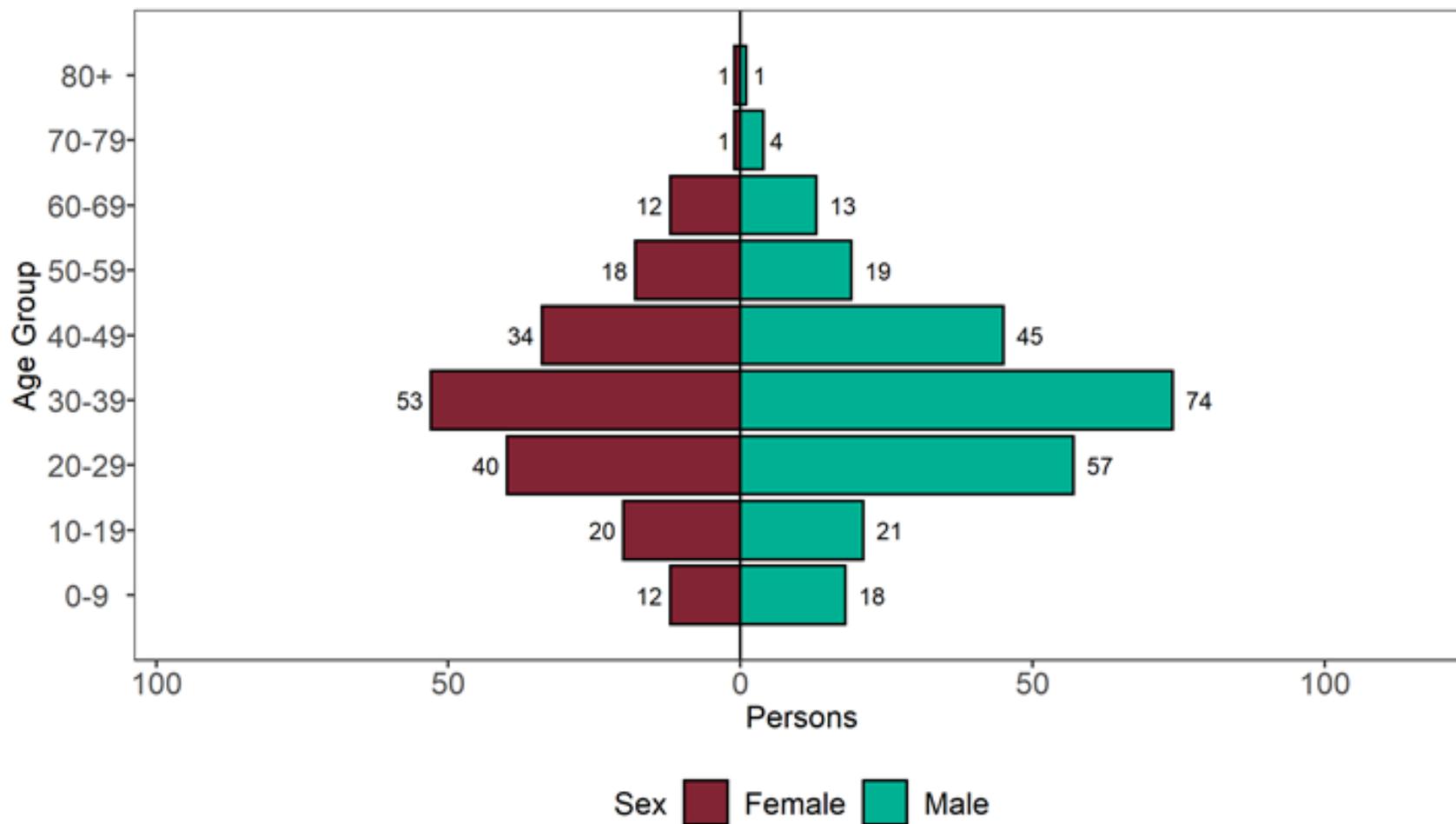Larger plot includes last 60 days only. (Find accessible data used in this graph in underlying data.)

Figure 19. Age and sex pyramid of Kappa cases as of 2 August 2021
(Find accessible data used in this graph in underlying data.)

4 cases excluded where sex or age not reported

VUI-21APR-03 (B.1.617.3)

B.1.617 lineage was escalated to a variant under investigation on 1 April 2021. VUI-21APR-03 (B.1.617.3) was escalated to a variant under investigation on 28 April 2021.

International epidemiology

GISAID includes data on sequences available internationally. As of 2 August 2021, 201 sequences of VUI-21APR-03 from the following countries (excluding the UK) have been identified in GISAID: India (186), Japan (1), Malawi (7), Russia (2), Singapore (1), USA (4).

Epidemiology

Table 10. Number of confirmed and provisional VUI-21APR-03 (B.1.617.3) cases, by region of residence as of 2 August 2021

Region	Total case number	Proportion of total cases
East Midlands	0	0.0%
East of England	0	0.0%
London	5	38.5%
North East	0	0.0%
North West	6	46.2%
South East	2	15.4%
South West	0	0.0%
West Midlands	0	0.0%
Yorkshire and Humber	0	0.0%
Total	13	-

Figure 20. Confirmed and provisional VUI-21APR-03 cases by specimen date and region of residence as of 2 August 2021
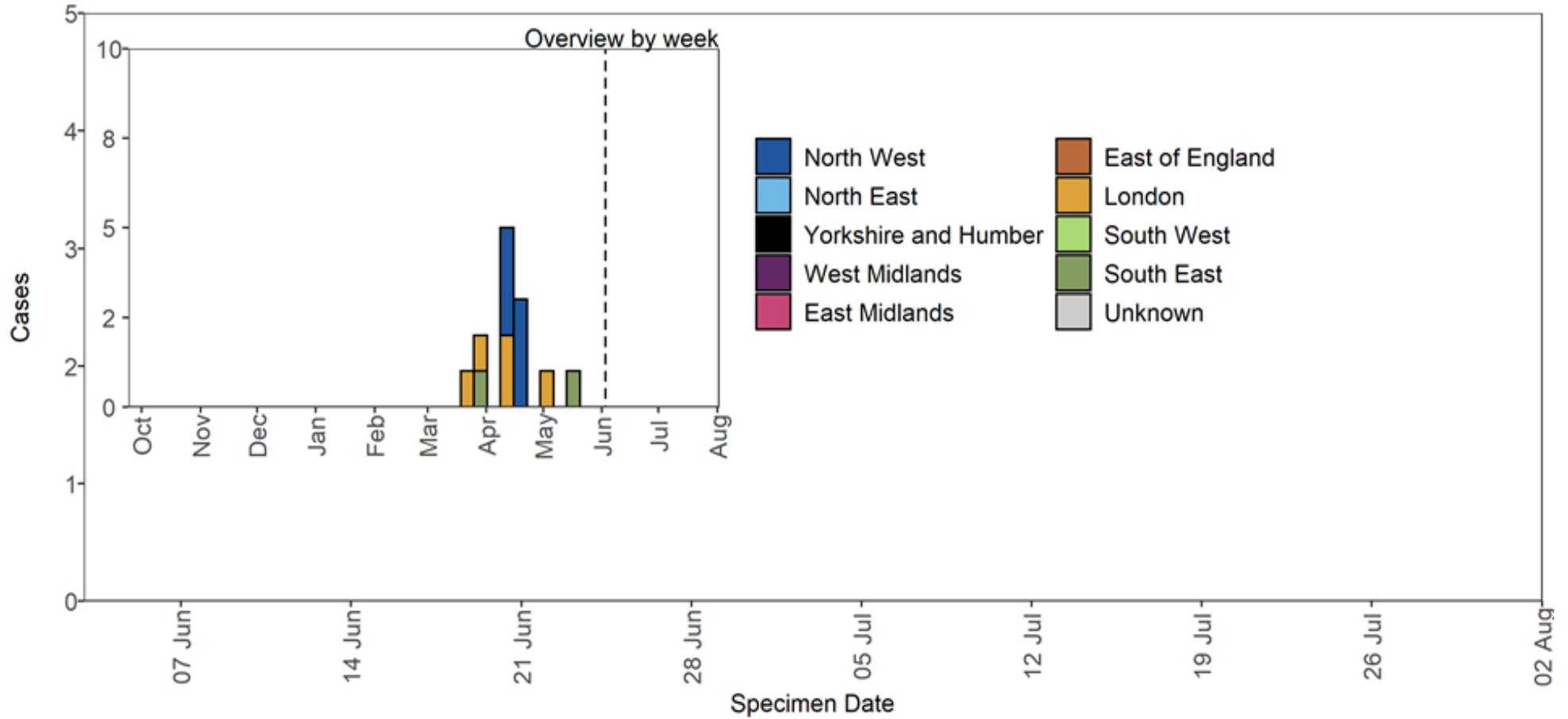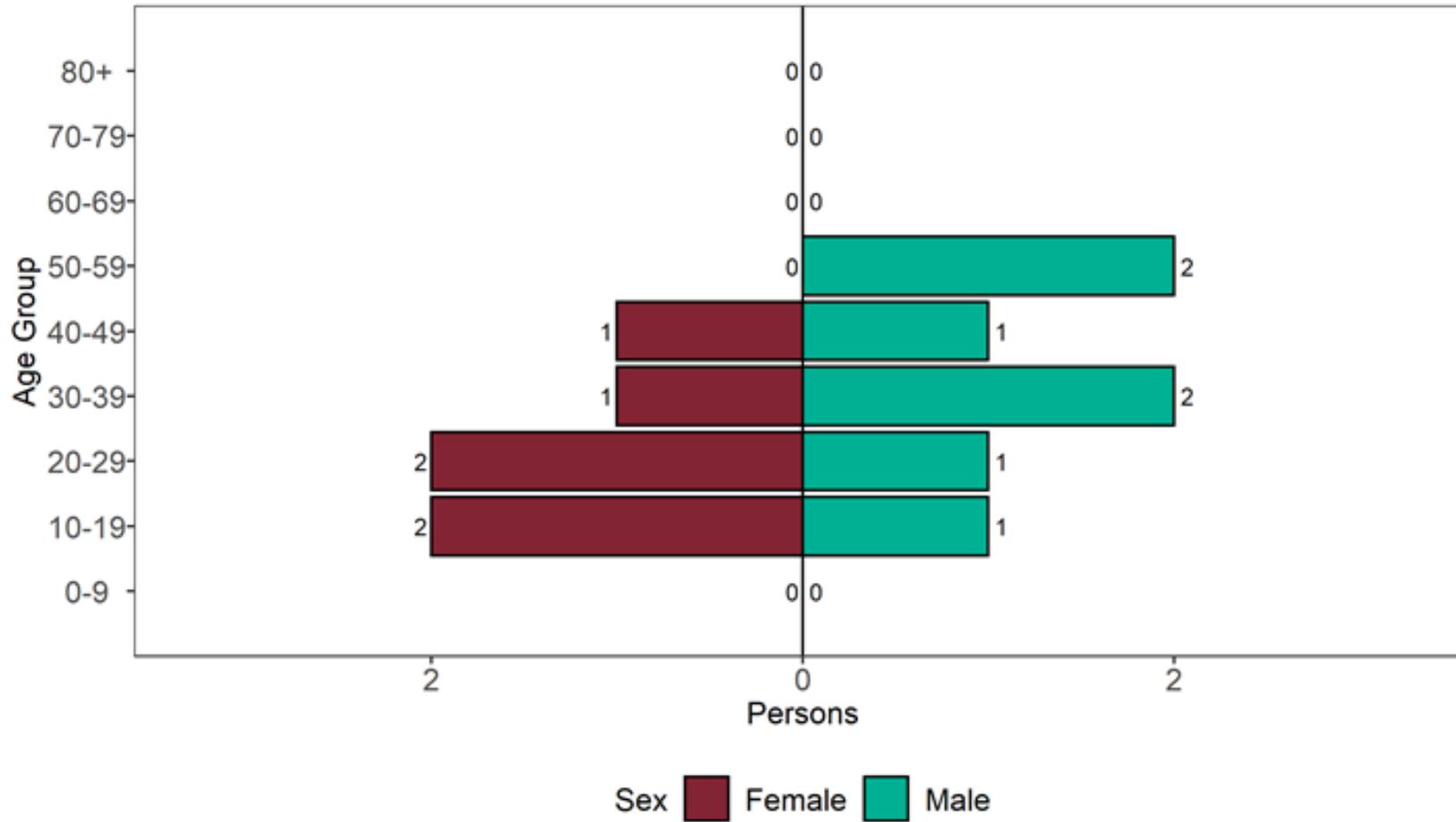Larger plot includes last 60 days only. (Find accessible data used in this graph in underlying data.)

Figure 21. Age and sex pyramid of VUI-21APR-03 cases as of 2 August 2021
(Find accessible data used in this graph in underlying data.)

0 cases excluded where sex or age not reported

VUI-21MAY-01 (AV.1)

AV.1 was first detected in UK sequences and designated under investigation on 14 May 2021 as VUI-21MAY-01 based on its mutation profile and apparent localised cluster in Yorkshire and Humber.

International epidemiology

GISAID includes data on sequences available internationally. Excluding the UK, as of 16 July 2021, 5 sequences of VUI-21MAY-01 from France have been identified in GISAID.

Epidemiology

Table 11. Number of confirmed and provisional VUI-21MAY-01 (AV.1) cases, by region of residence as of 2 August 2021

Region	Total case number	Proportion of total cases
East Midlands	7	3.8%
East of England	11	6.0%
London	1	0.5%
North East	1	0.5%
North West	7	3.8%
South East	0	0.0%
South West	0	0.0%
West Midlands	4	2.2%
Yorkshire and Humber	152	82.6%
Unknown region	1	0.5%
Total	184	-

Figure 22. Confirmed and provisional VUI-21MAY-01 cases by specimen date and region of residence as of 2 August 2021 Larger plot includes last 60 days only. (Find accessible data used in this graph in underlying data.)
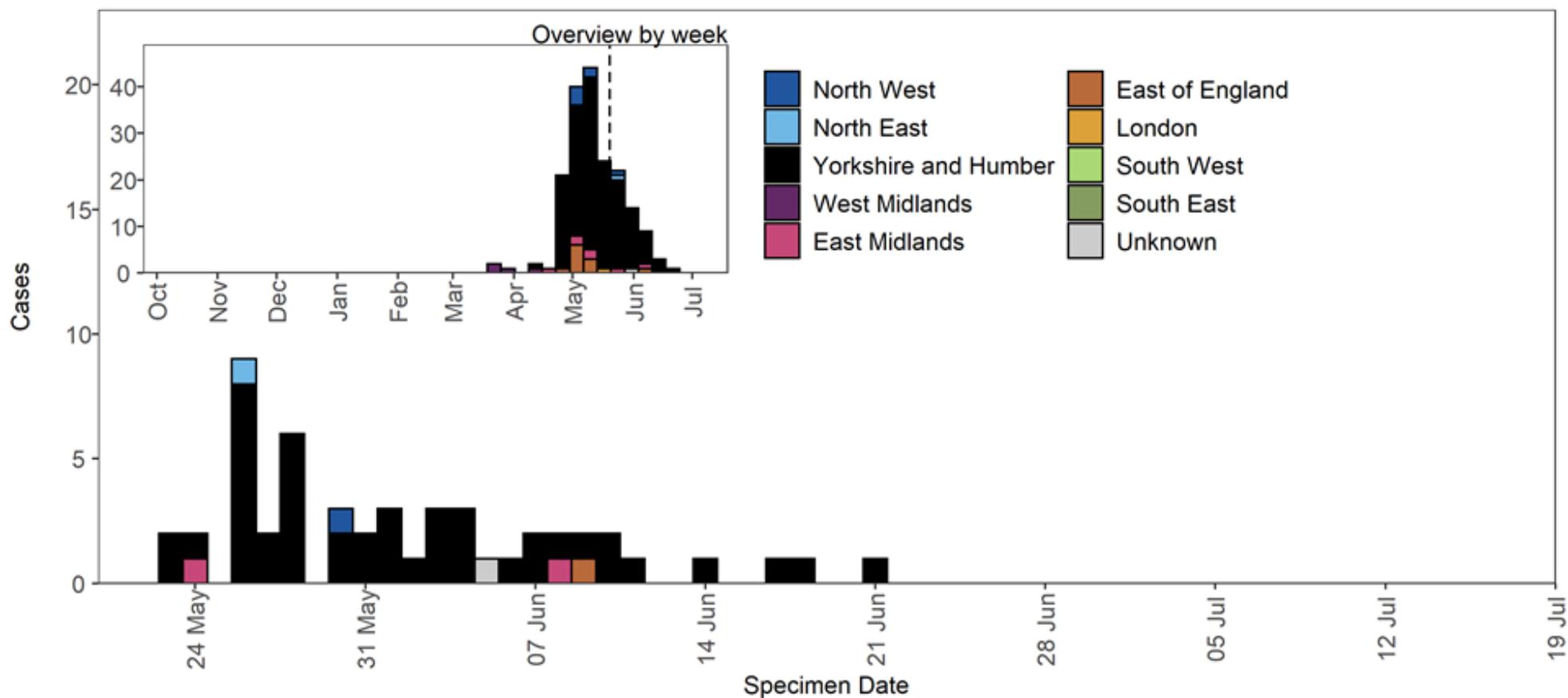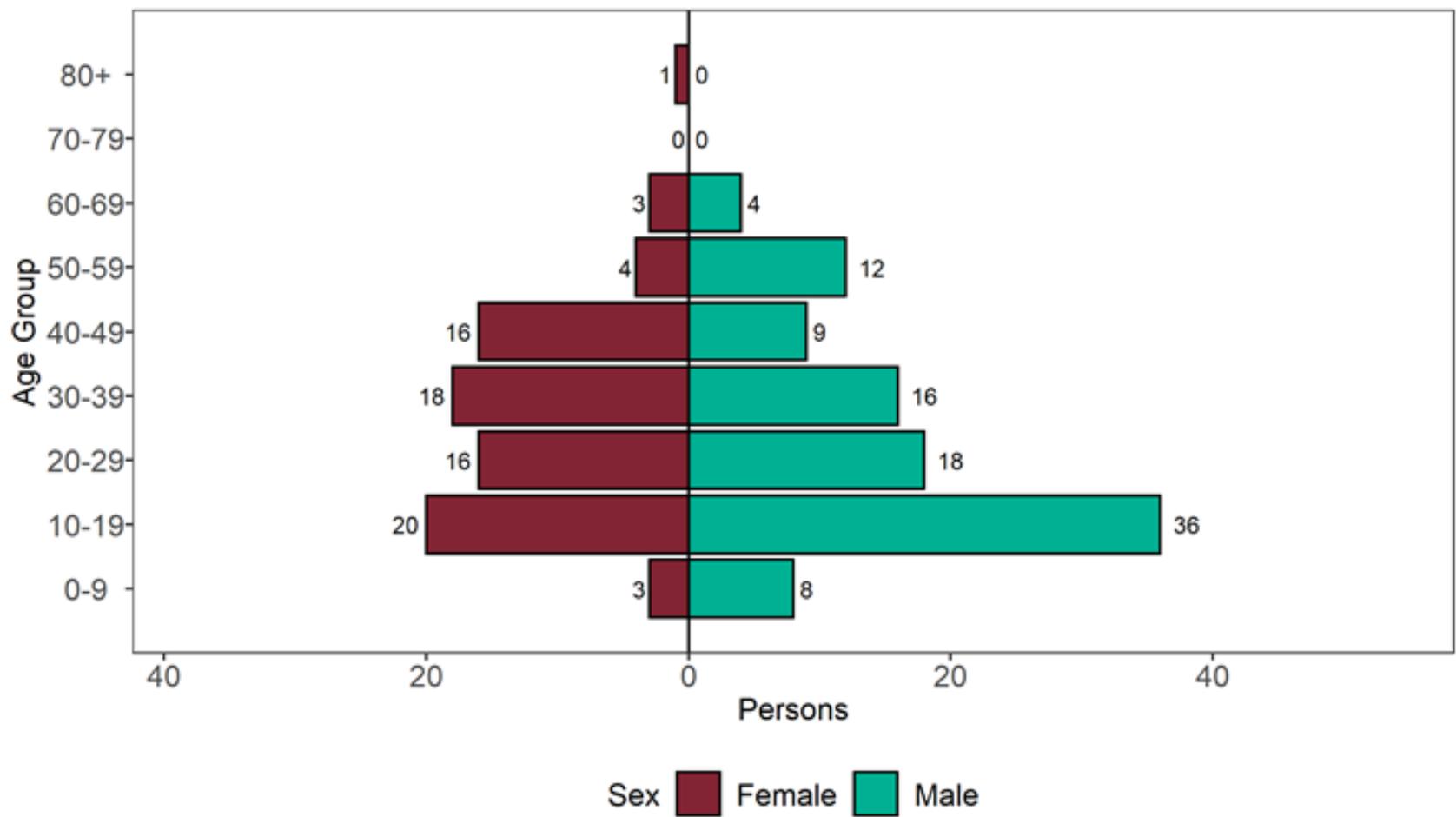
Figure 23. Age and sex pyramid of VUI-21MAY-01 cases as of 2 August 2021
(Find accessible data used in this graph in underlying data.)

VUI-21MAY-02 (C.36.3)

C.36.3 was designated a variant under investigation on 24 May 2021 (VUI-21MAY-02) based on its mutation profile and increased importation from a widening international area.

International epidemiology

GISAID includes data on sequences available internationally. As of 2 August 2021, 1,660 sequences of VUI-21MAY-02 from 50 countries (excluding the UK) have been identified in GISAID.

Epidemiology

Table 12. Number of confirmed and provisional VUI-21MAY-02 (C.36.3) cases, by region of residence as of 2 August 2021

Region	Total case number	Proportion of total cases
East Midlands	8	5.6%
East of England	23	16.2%
London	41	28.9%
North East	1	0.7%
North West	14	9.9%
South East	13	9.2%
South West	5	3.5%
West Midlands	10	7.0%
Yorkshire and Humber	25	17.6%
Unknown region	2	1.4%
Total	142	-

Figure 24. Confirmed and provisional VUI-21MAY-02 cases by specimen date and region of residence as of 2 August 2021
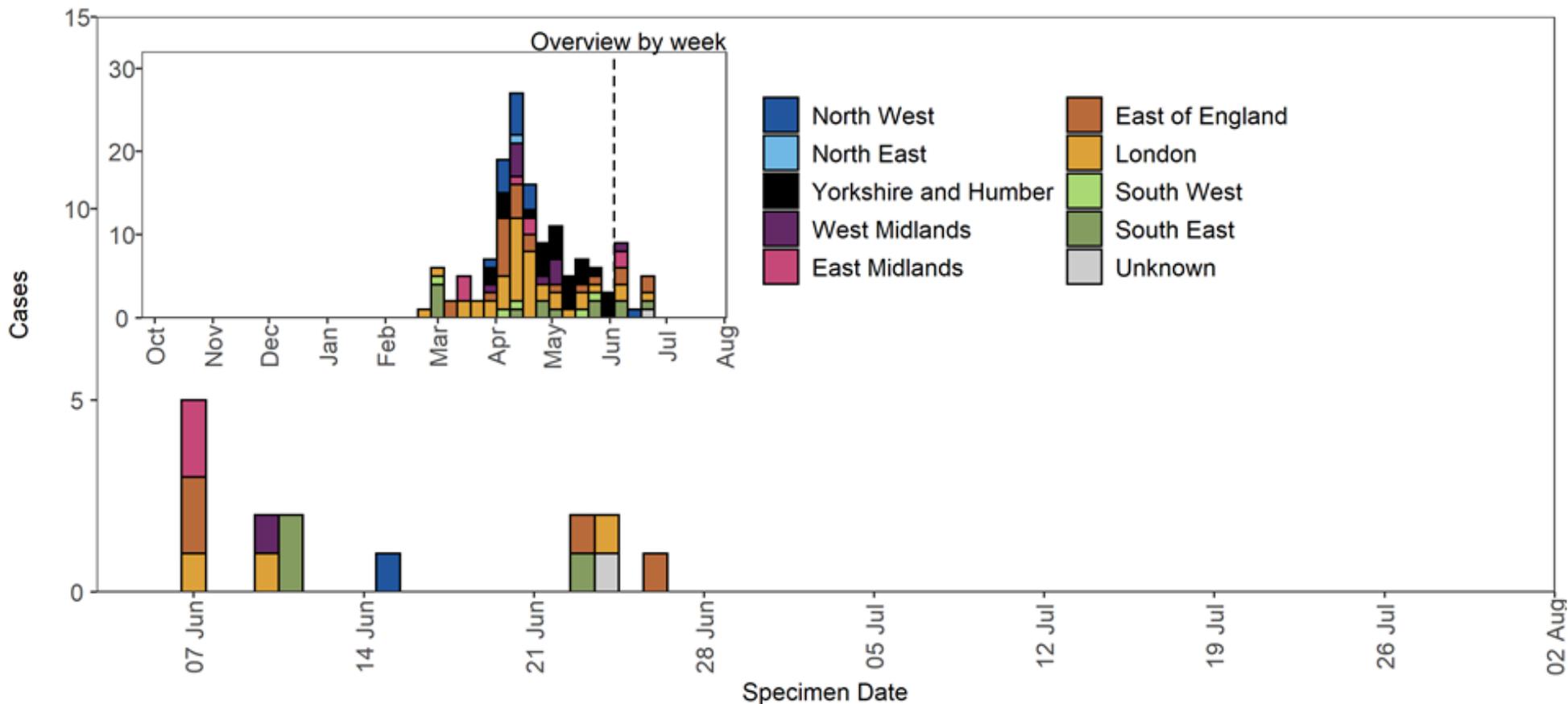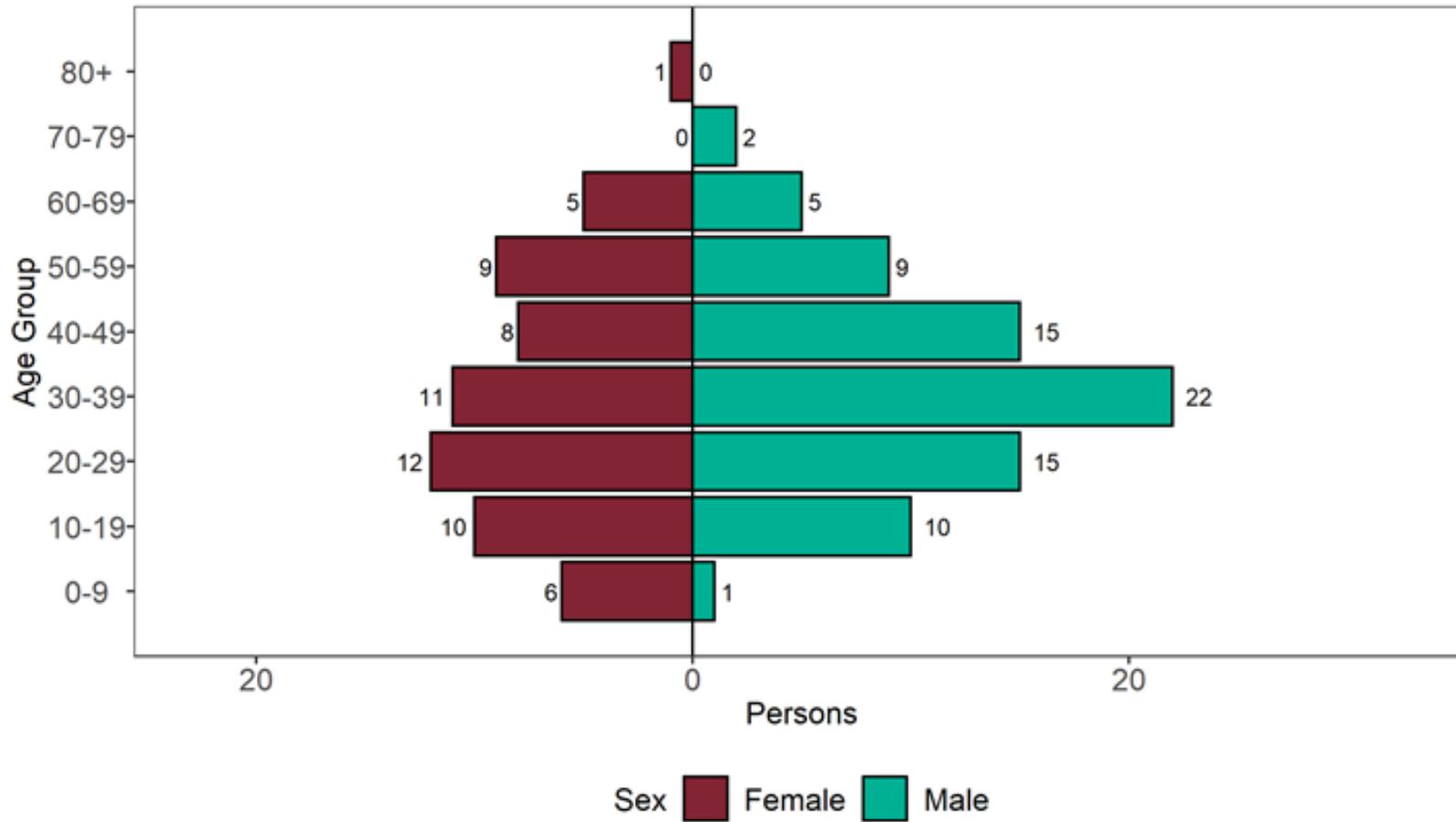Larger plot includes last 60 days only. (Find accessible data used in this graph in underlying data.)

Figure 25. Age and sex pyramid of VUI-21MAY-02 cases as of 2 August 2021
(Find accessible data used in this graph in underlying data.)

1 cases excluded where sex or age not reported

Lambda (C.37, VUI-21JUN-01)

Lambda was identified through international variant horizon scanning and was made a signal in monitoring by Public Health England on 14 April 2021 (lineage B.1.1.1 at the time). On 14 June 2021, WHO designated lineage C.37 as Lambda, a new variant of interest based on evidence of continued emergence and suspected phenotypic implications. Lambda was designated a variant under investigation (VUI-21JUN-01) by Public Health England on 23 June 2021.

Lambda carries a number of mutations with suspected phenotypic implications, such as a potentially increased transmissibility or possible increased resistance to neutralising antibodies[4]. It is characterised by mutations in the spike protein, including G75V, T76I, del247/253, L452Q, F490S, D614G and T859N. However, there is currently limited evidence on how impactful these genomic changes are. Further robust studies into the phenotypic impacts are necessary to better understand its impact on countermeasures and to control the spread. Further studies are also required to validate the continued effectiveness of vaccines.[5] See risk assessment for Lambda.

International epidemiology

As of 2 August 2021, 3,488 Lambda sequences from 29 countries (excluding the UK) have been identified in GISAID.

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[4] Romero PE and others (2021). 'Novel sublineage within B.1.1.1 currently expanding in Peru and Chile, with a convergent deletion in the ORF1a gene (Δ3675-3677) and a novel deletion in the Spike gene (Δ246-252, G75V, T76I, L452Q, F490S, T859N).' Virologica.org, 24 April 2021.
[5] Weekly epidemiological update on COVID-19 to 15 June 2021

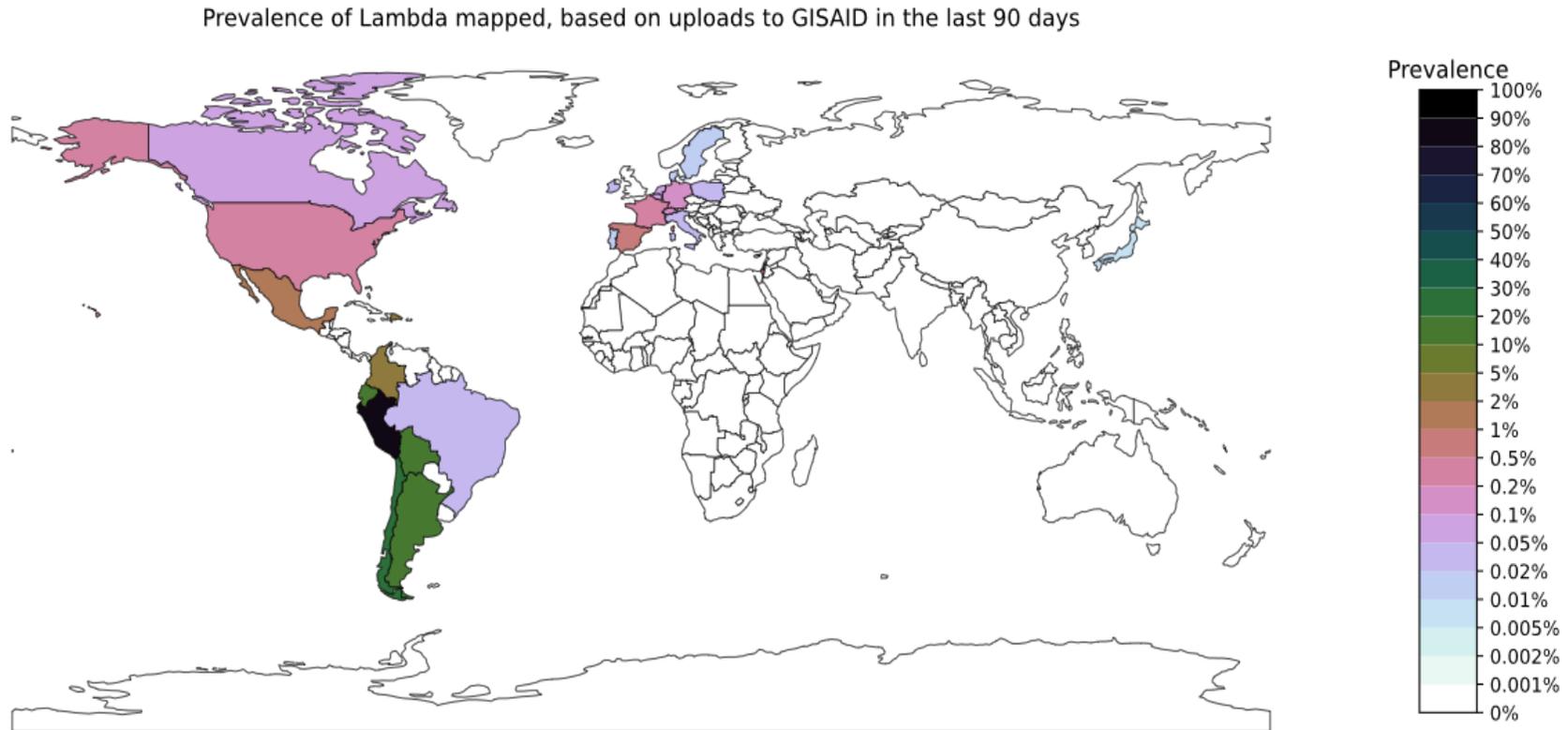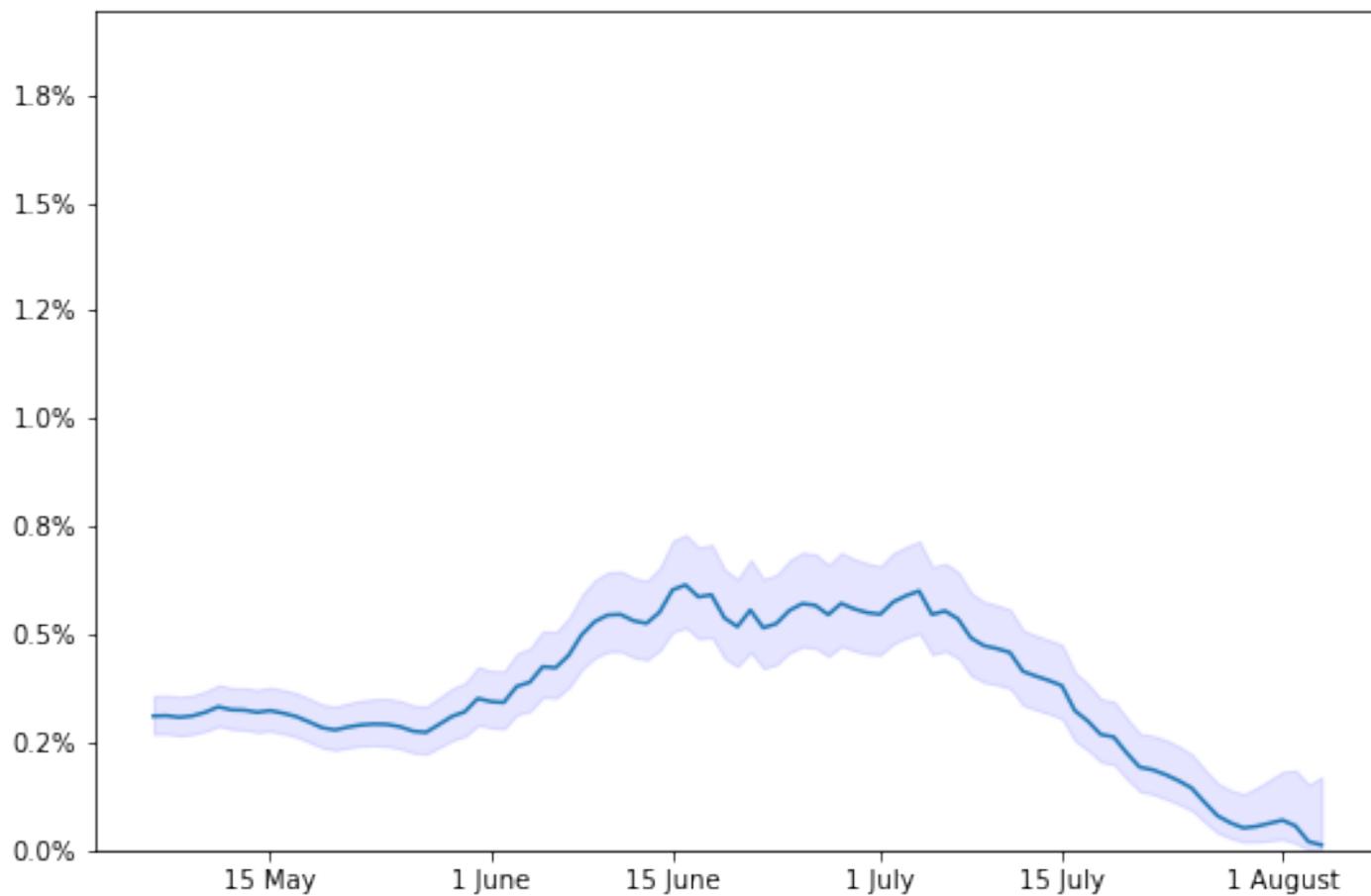**Figure 26. Global Prevalence of Lambda, amongst all sequences on GISAID**

Prevalence of Lambda mapped, based on uploads to GISAID in the last 90 days

Figure 27. Prevalence of Lambda, amongst all sequences on GISAID, obtained using a 2-week rolling window.

Epidemiology

There have been a small number of primarily travel-related Lambda cases (8) in the United Kingdom (UK) between 23 February and 18 June 2021 (as of 2 August 2021). Six cases were in London, one in the South West, and one in the West Midlands. Six cases have a history of travel overseas and 2 cases have not provided information. No deaths have been reported within 28 days. Cases are managed in line with the approach for emerging variants with review of contact tracing, additional data collection, testing of identified contacts, and consideration of targeted case finding as required where there is evidence of community transmission.

Table 13. Number of confirmed and provisional Lambda (C.37) cases, by region of residence as of 2 August 2021

Region	Total case number	Proportion of total cases
East Midlands	0	0.0%
East of England	0	0.0%
London	6	75.0%
North East	0	0.0%
North West	0	0.0%
South East	0	0.0%
South West	1	12.5%
West Midlands	1	12.5%
Yorkshire and Humber	0	0.0%
Total	8	-

Figure 28. Confirmed and provisional Lambda cases by specimen date and region of residence as of 2 August 2021
(Larger plot includes last 60 days only. (Find accessible data used in this graph in underlying data.)
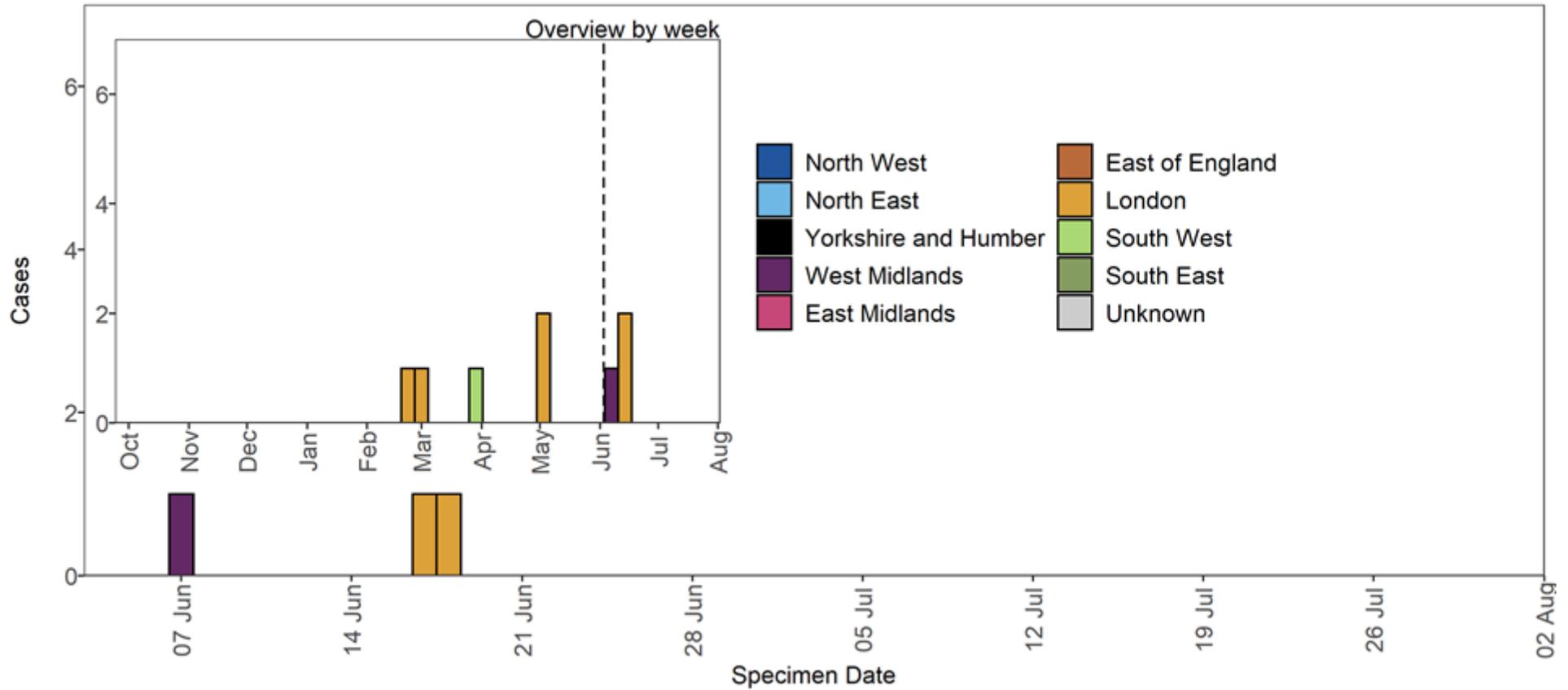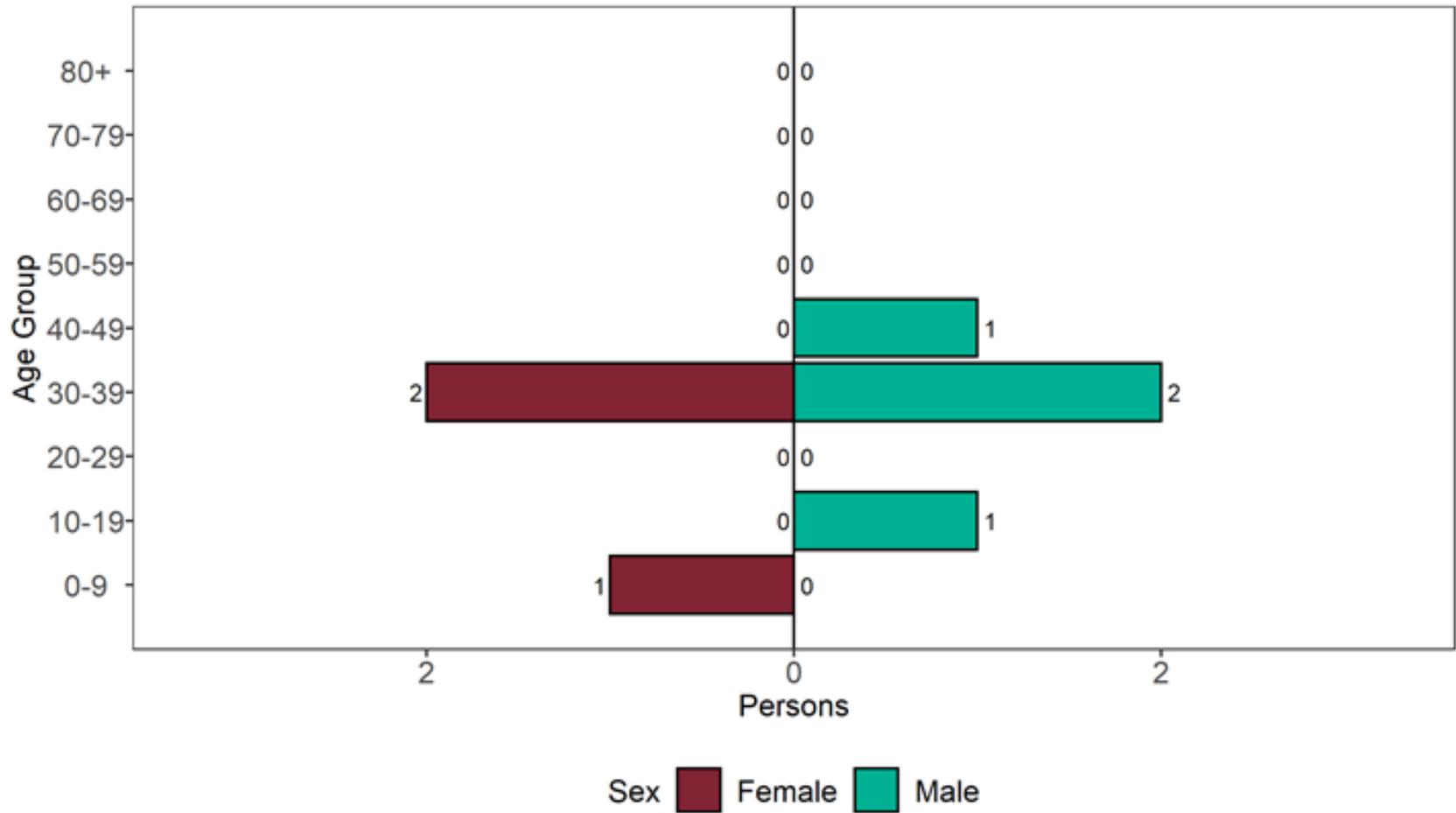
Figure 29. Age and sex pyramid of Lambda cases as of 2 August 2021 (Find accessible data used in this graph in underlying data.)

1 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 PHE 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, 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

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 Public Health England. 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 Cell Data Team
PHE International Cell

Variant Technical Group Membership

The PHE Variant Technical Group includes representation from the following organisations: PHE, 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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