



Weekly Influenza and COVID-19 Surveillance graphs

PHE publishes a weekly national influenza and COVID-19 surveillance report which summarises the information from the surveillance systems which are used to monitor influenza, COVID-19 and other seasonal respiratory viruses in England.

Additional figures based on these surveillance systems are included in this slide set.

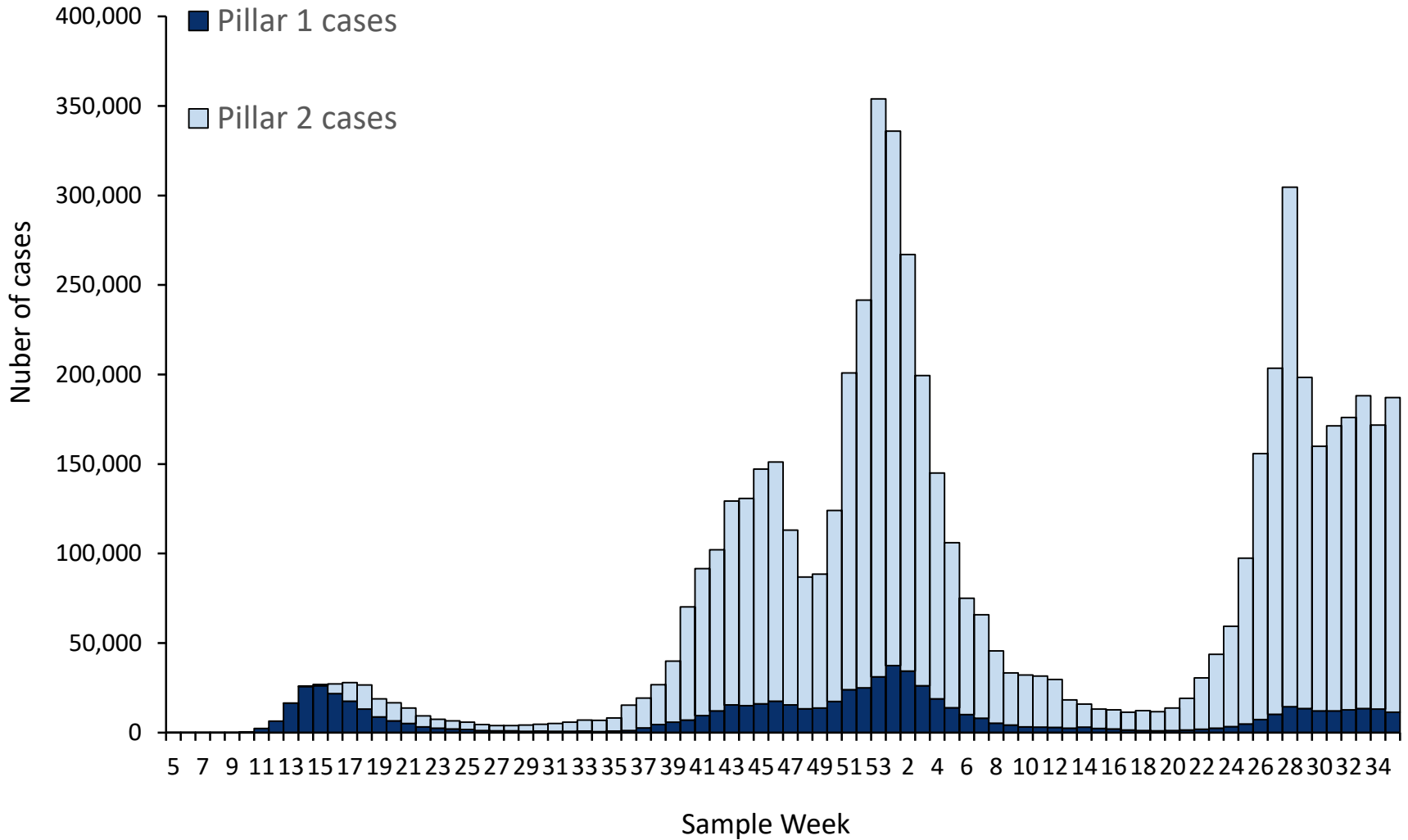
The figures presented in this slide set are based on data from week 35 (between 30 August and 5 September 2021).



COVID-19 Pandemic Overview

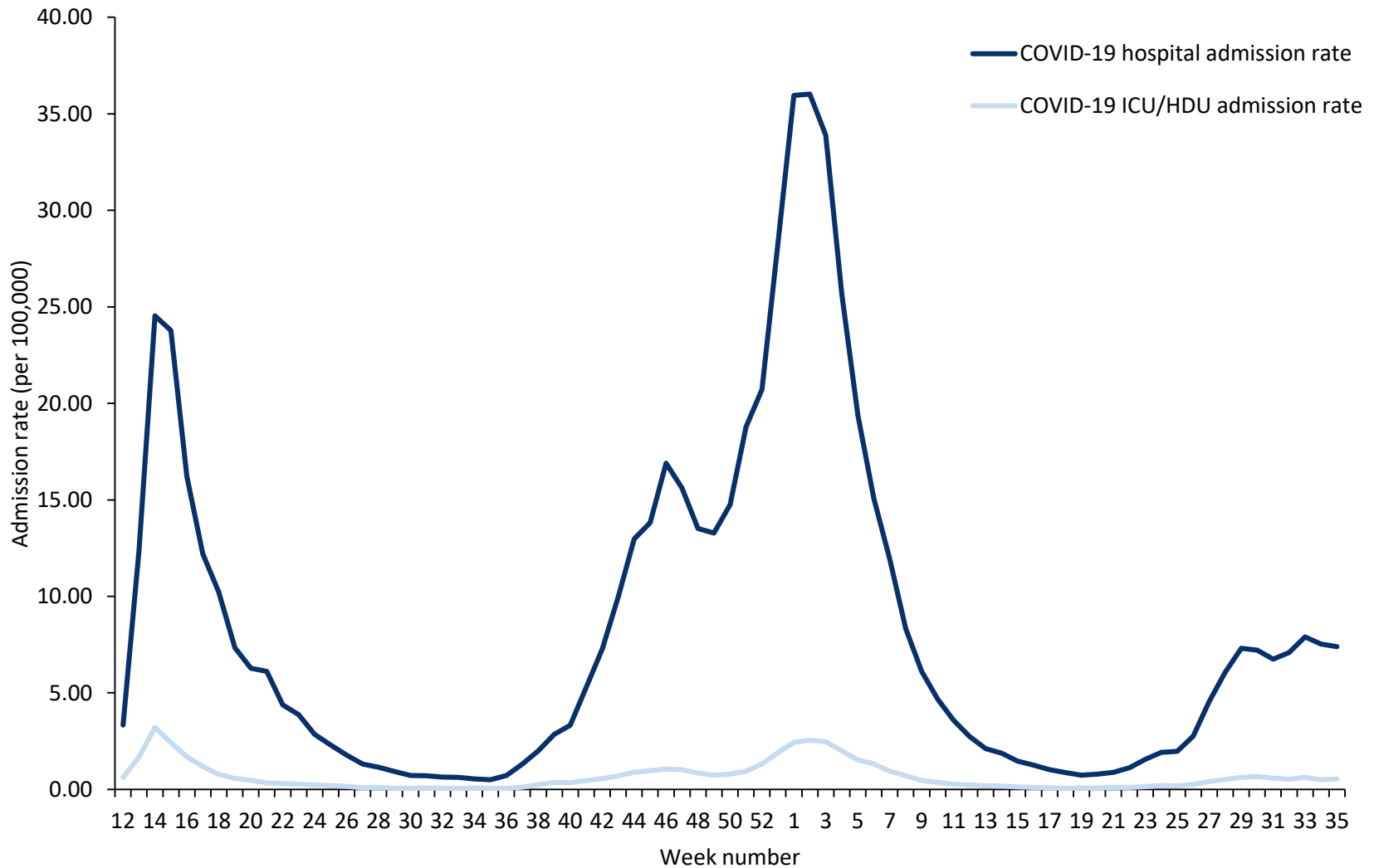


Confirmed COVID-19 cases tested under Pillar 1 and Pillar 2, by sample week, since week 5 2020



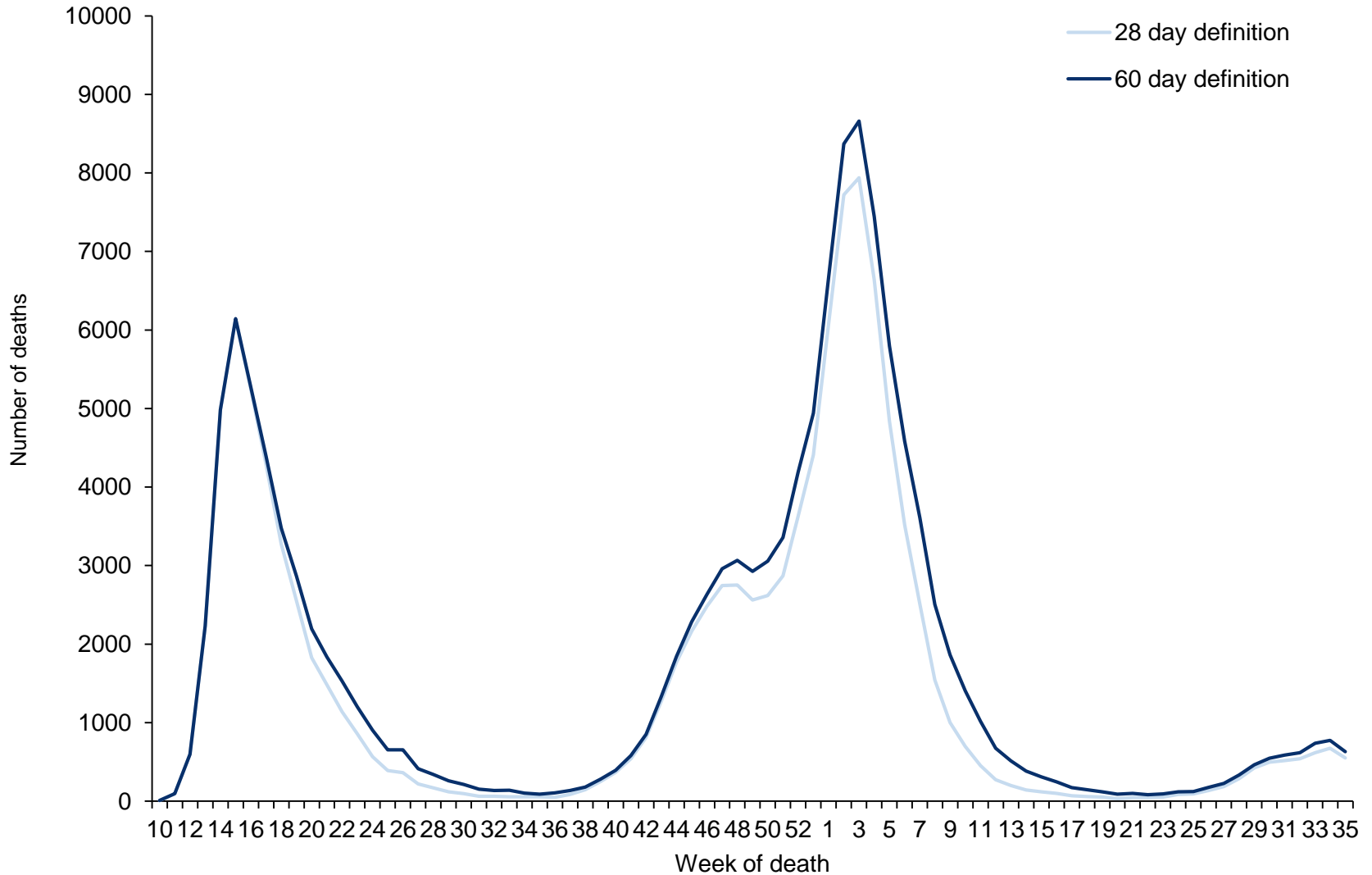


Weekly overall hospital and ICU/HDU admission rates per 100,000 of new COVID-19 positive cases reported through SARI Watch, England since week 12 2020





Number of deaths since week 10 2020 by week of death and time since laboratory confirmation of COVID-19, England





Confirmed COVID-19 cases in England

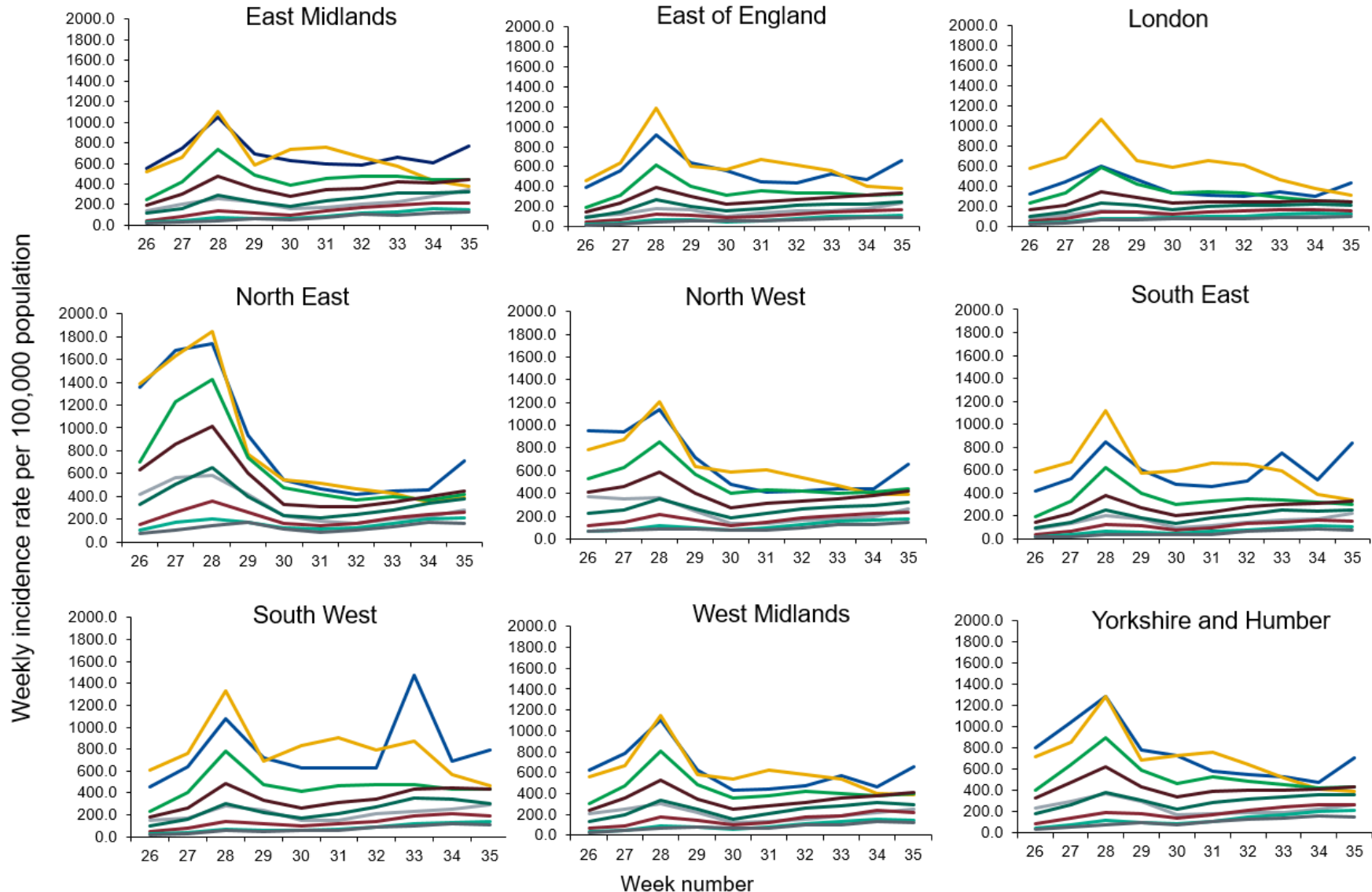


Data Information

- From the week 32 report onwards, case rates have been updated to use the latest ONS population estimates for mid-2020. Previously case rates were calculated using the mid-2019 population estimates
- Rates by ethnicity and IMD quantile will continue to be presented using the mid-2019 estimates, until the mid-2020 estimates become available.



Weekly COVID-19 incidence per 100,000 population by age group and region, weeks 26 to 35

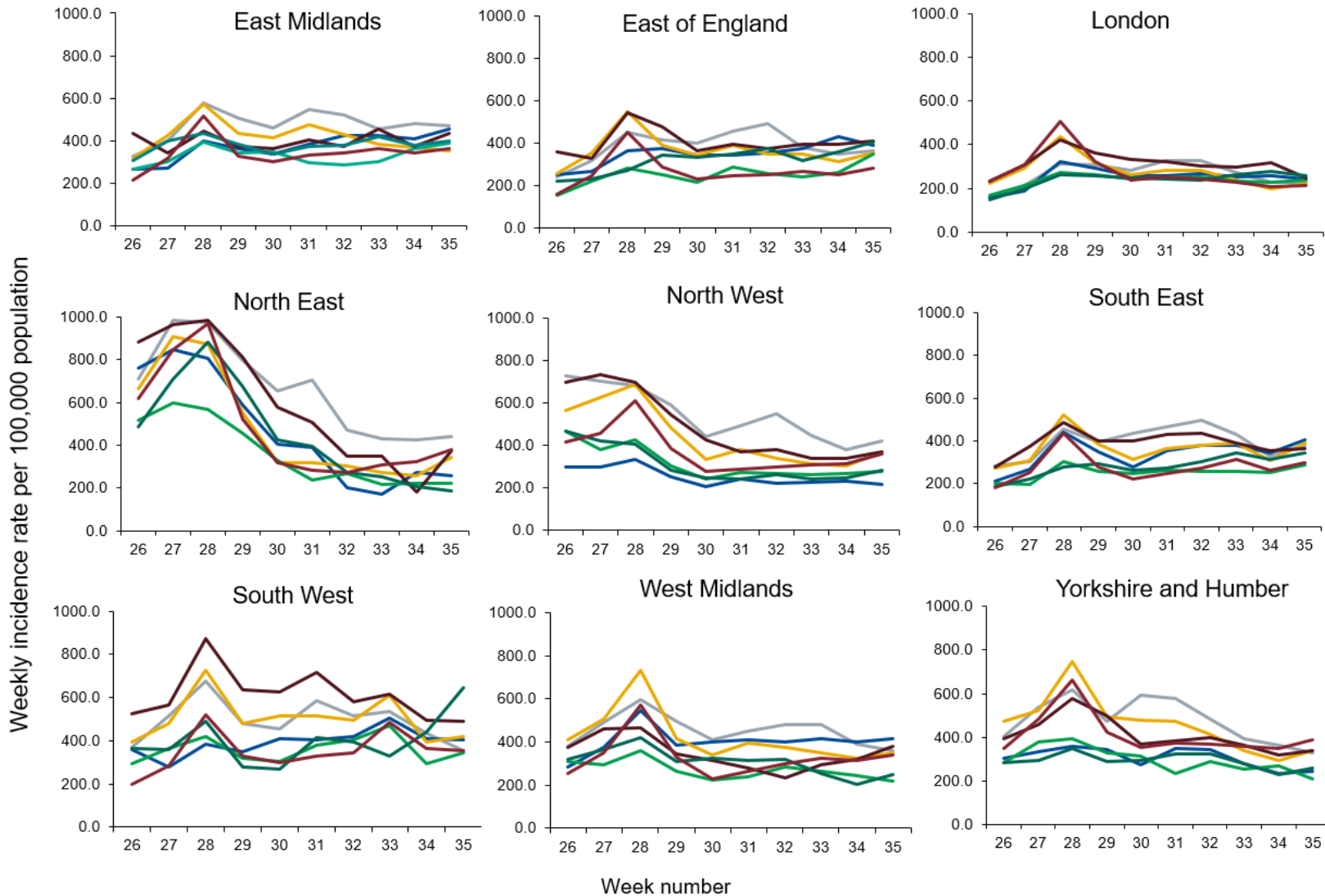


— 0-9 — 10-19 — 20-29
 — 30-39 — 40-49 — 50-59
 — 60-69 — 70-79 — 80+

Week number



Weekly COVID-19 incidence per 100,000 population by ethnicity and region, weeks 26 to 35



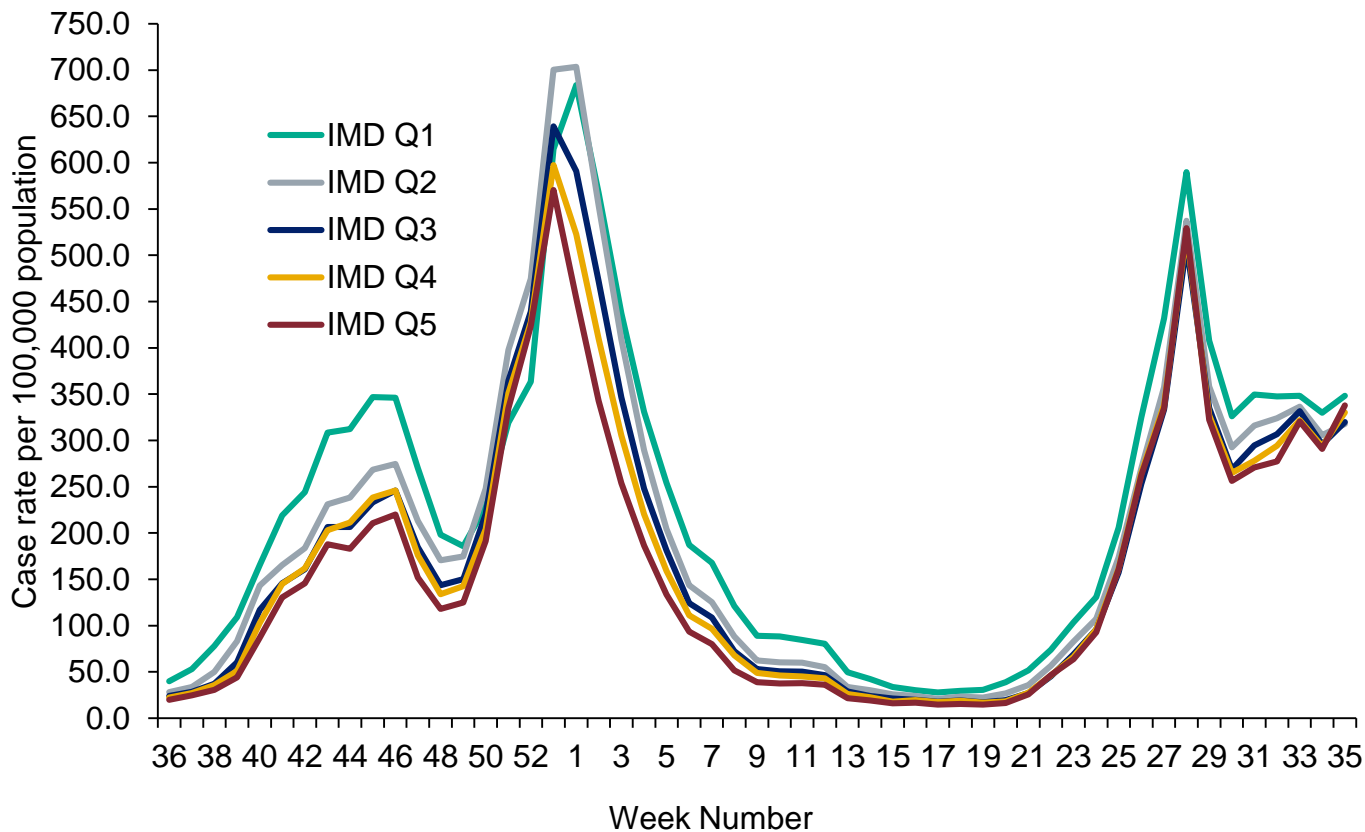
- Black/African/Caribbean/Black British
- Indian (Asian or British)
- Mixed/Multiple Ethnic Groups
- Other Asian/Asian British
- Other ethnic group
- Pakistani (Asian or British)
- White

*these incidence rates have been calculated using the mid-2019 ONS population estimates

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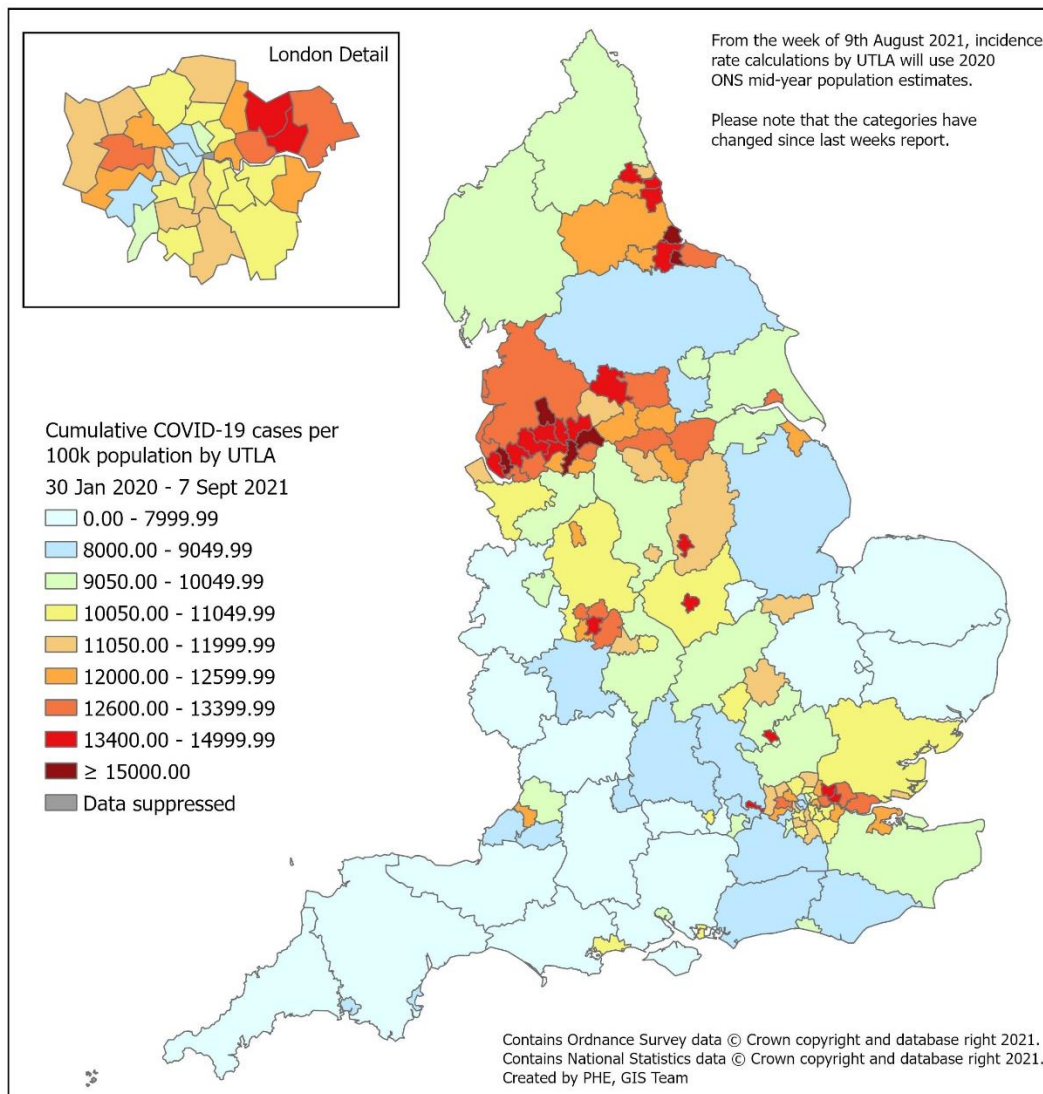
Weekly COVID-19 rate per 100,000 population by IMD quintile (1 being the most deprived and 5 being the least deprived)



*these incidence rates have been calculated using the mid-2019 ONS population estimates

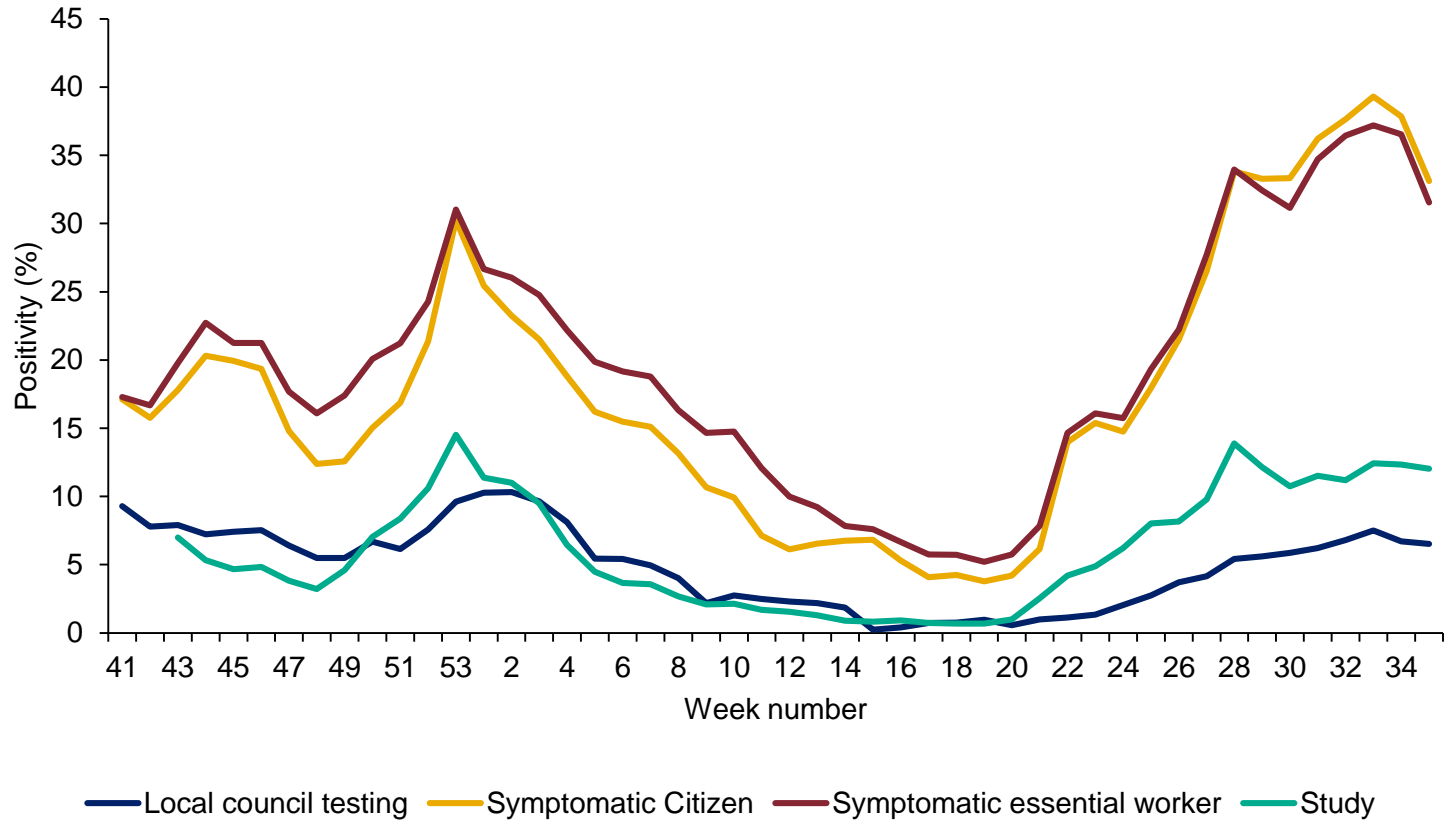


Cumulative rate of COVID-19 cases per 100,000 population tested under Pillar 1 and 2, by upper-tier local authority, England (box shows enlarged map of London area)





Weekly PCR positivity of COVID-19 cases by reason for test, weeks 41 to 35

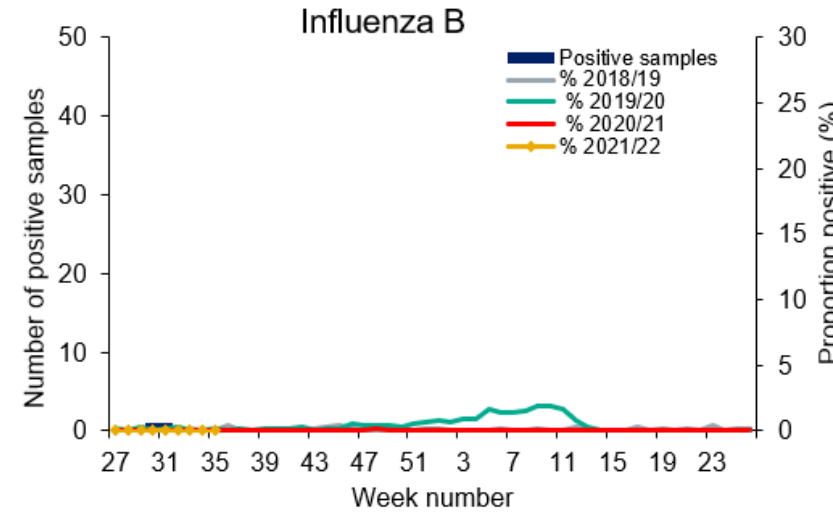
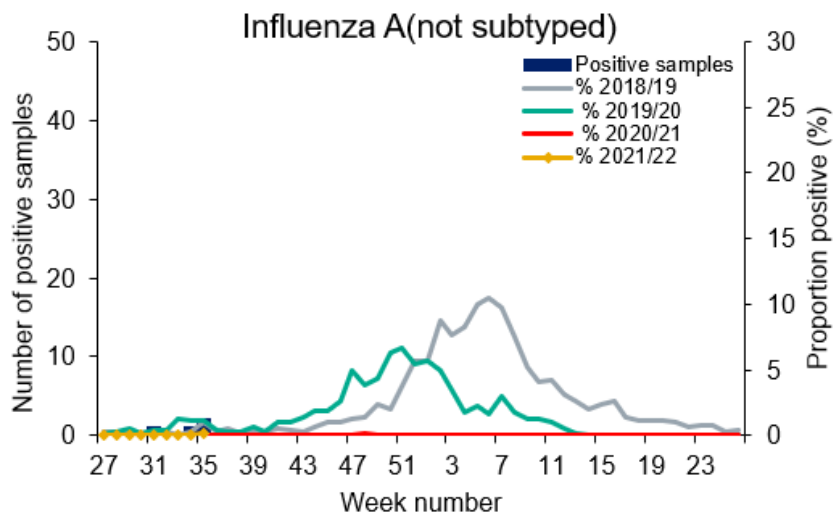
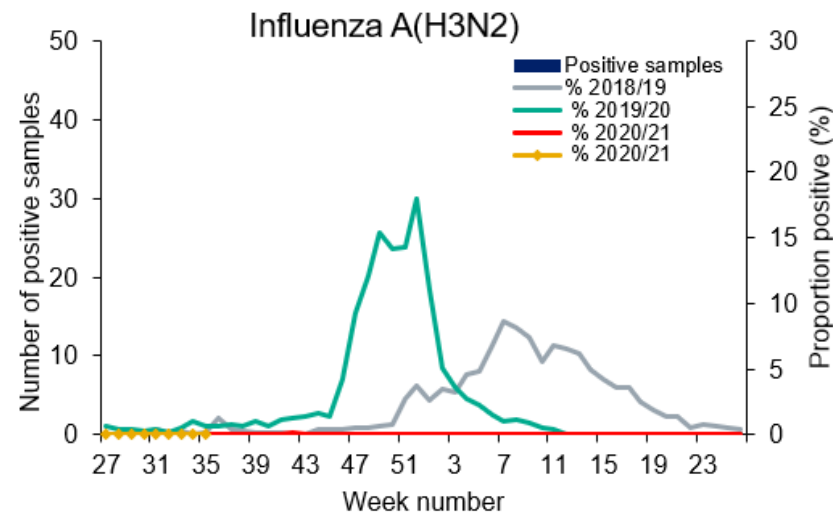
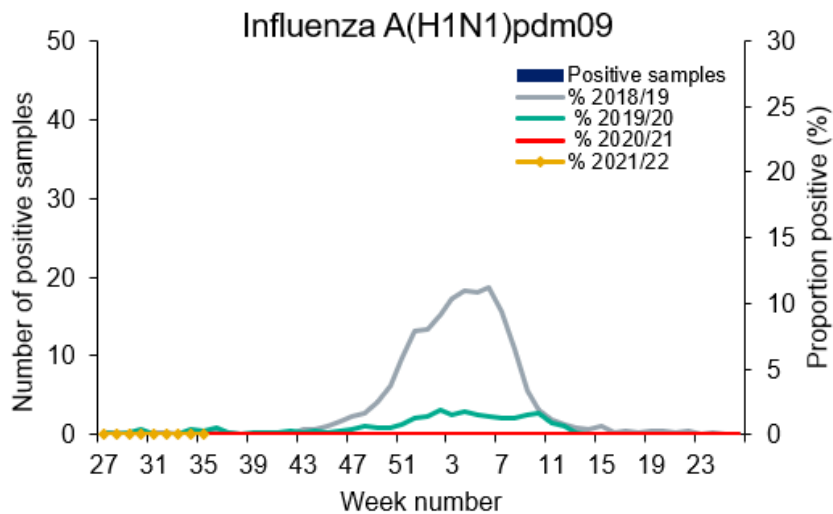




Respiratory Datamart system (England)

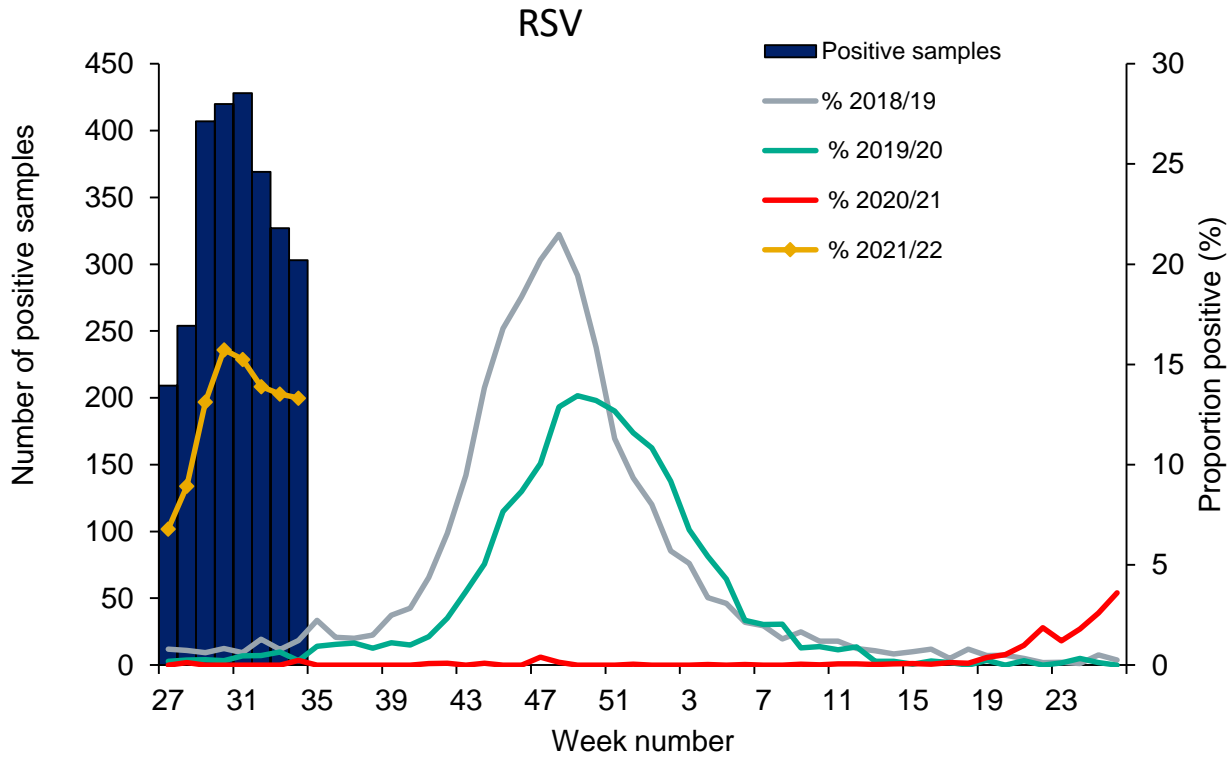


Respiratory DataMart – Influenza subtypes



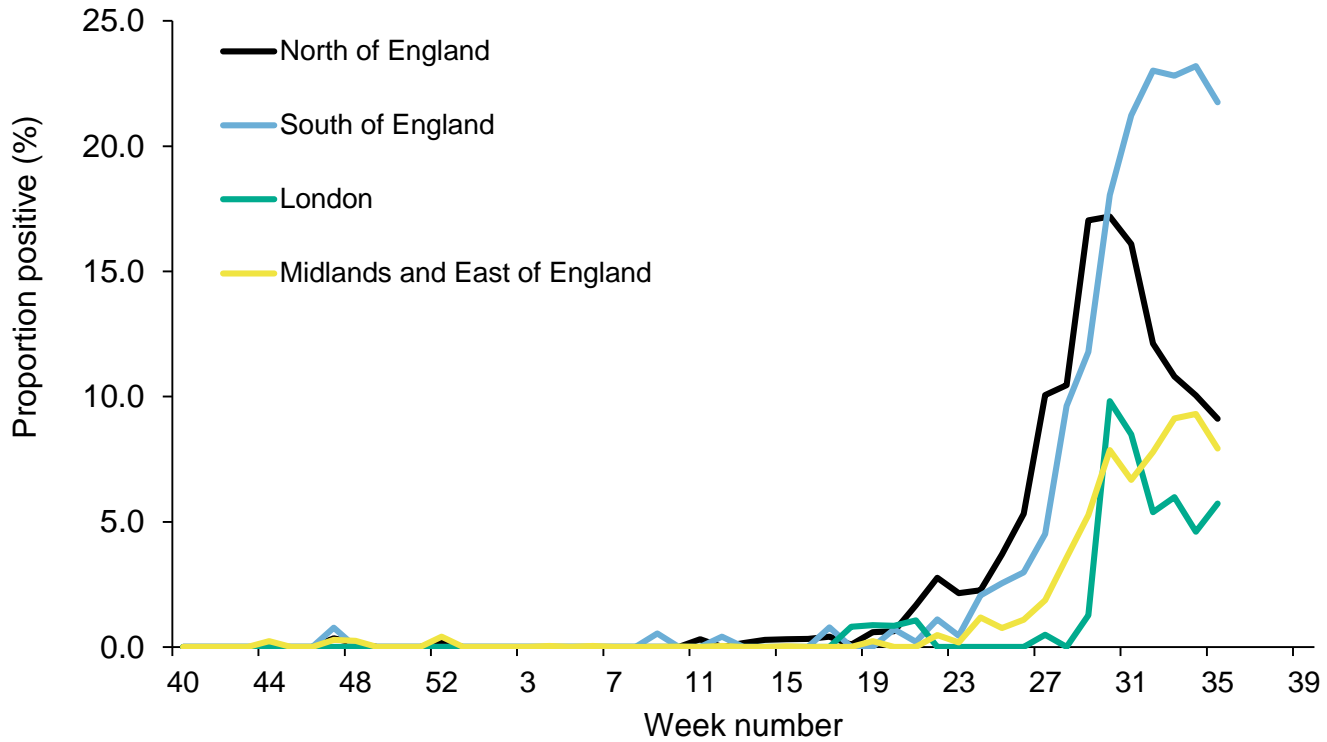


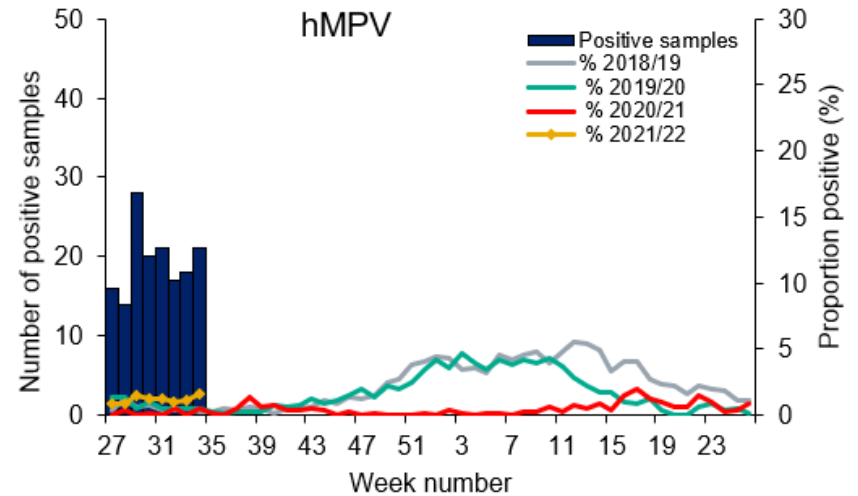
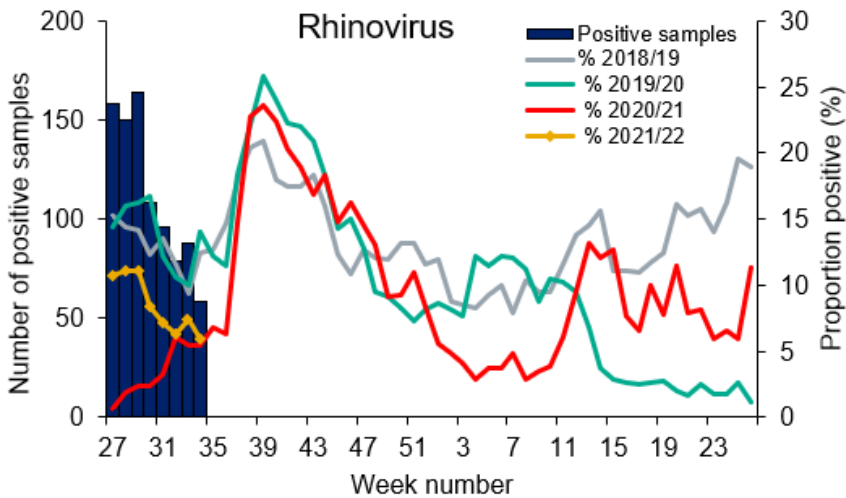
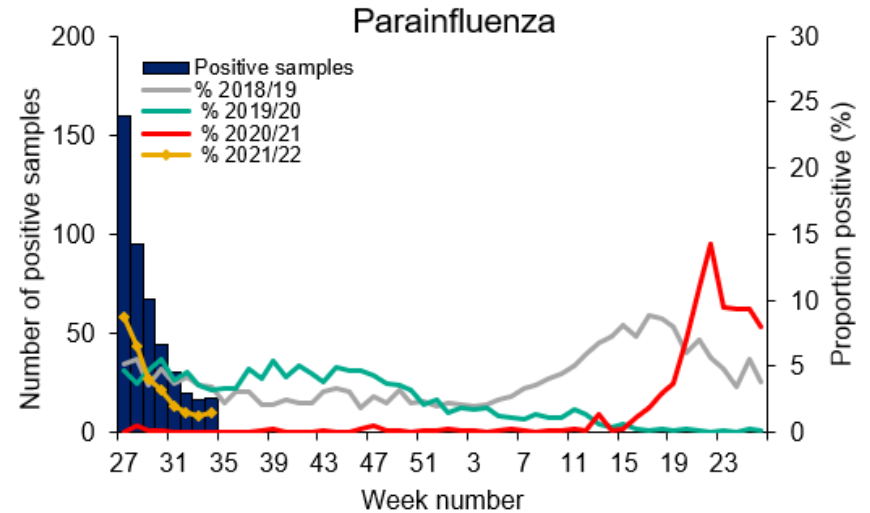
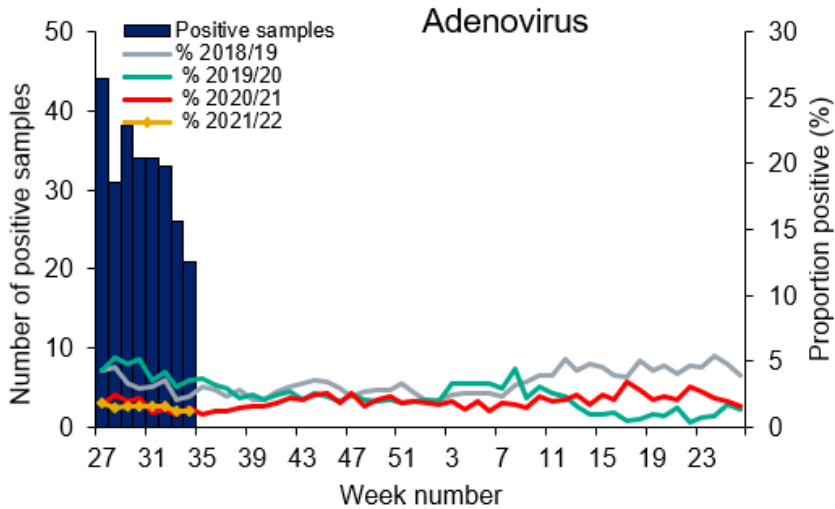
Respiratory DataMart – Respiratory syncytial virus (RSV)





Respiratory DataMart – Respiratory syncytial virus (RSV) weekly positivity by PHE region





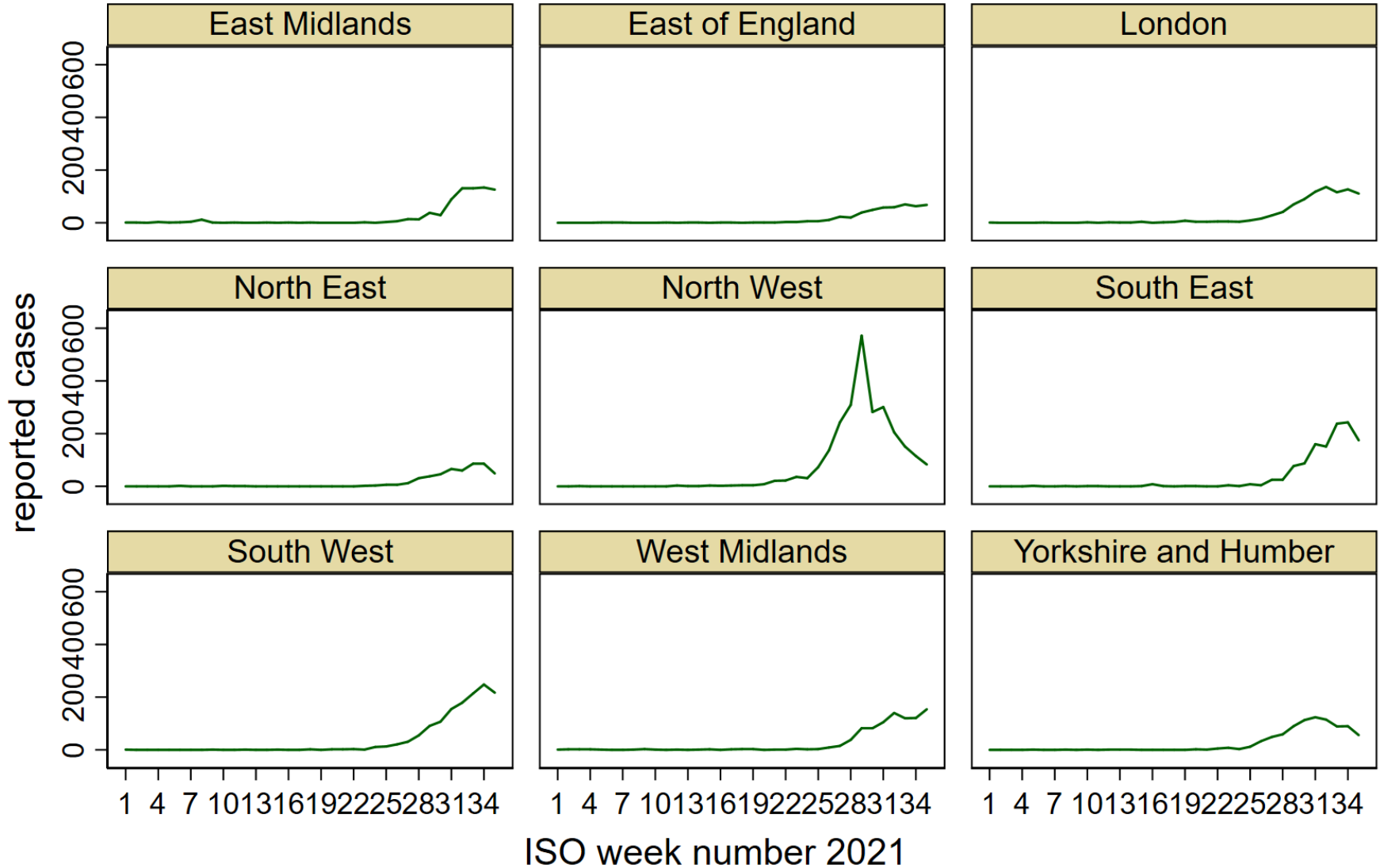
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Second generation surveillance system (SGSS)



SGSS reported RSV cases by region (all ages)



The presented figures are based on laboratory reports through SGSS. Testing and reporting procedures vary by virus, PHEC and over time, including short-term trends in testing. Therefore comparisons should be done with caution.



Community surveillance



Data Information

- we report on new acute respiratory infection (ARI) incidents reported to Health Protection Teams (HPTs) and entered on HPZone in the previous reporting week in educational settings by locality
- individual case notes are reviewed by an epidemiologist and an assessment made about whether the criteria for a confirmed COVID-19 cluster or outbreak are met. See definitions below
- the incidents captured on HPZone represent a subset of all ongoing clusters and outbreaks in England. A variety of arrangements are in place with local authorities and other stakeholders supporting HPTs, however data may not routinely be documented on HPZone. As a result, the number of outbreaks reported for some of the regions are underestimates
- For the 2021-2022 academic year the thresholds for reporting an outbreak in an educational setting to HPTs and HPZone have been revised, therefore comparisons with the 2020 to 2021 season should be interpreted with caution. Please see the next slide for the updated thresholds.

Caveats

- National Schools and Universities helplines remain in place to support educational settings to manage cases and outbreaks that may not require HPT input
- From Monday 19 July 2021, schools, colleges and nurseries no longer carry out routine contact tracing. Close contacts are now identified and contacted by NHS Test and Trace.



Thresholds for reporting

For the 2021-2022 academic year the thresholds for reporting an outbreak in an educational setting to HPZone have been revised, therefore when comparing with the 2020-2021 season, please interpret with caution.

Clusters and outbreaks are now reported to HPZone if either of the two following criteria are met:

- 5 cases or 10% (whichever is reached first) test-confirmed cases of COVID-19 (either PCR testing or LFD Ag testing with follow-up PCR) within 10 days, among students or staff clustered in a consistent group or cohort. Dates should be calculated based on illness onset, or test date if asymptomatic

Or

- Evidence of severe illness e.g. students or staff members admitted to hospital or a death as a result of a COVID-19 infection (PCR or LFD Ag with follow up PCR) as the setting may require advice on risk assessment and communication.

Definitions

Cluster: two or more test-confirmed cases of COVID-19 among individuals associated with a specific non-residential setting with illness onset dates within a 14-day period (in the absence of detailed information about the type of contact between the cases).

Outbreak: two or more test-confirmed cases of COVID-19 among individuals associated with a specific non-residential setting with illness onset dates within 14 days, and one of:

- identified direct exposure between at least 2 of the test-confirmed cases in that setting (for example under one metre face to face, or spending more than 15 minutes within 2 metres) during the infectious period of one of the cases
- When there is no sustained local community transmission - absence of an alternative source of infection outside the setting for the initially identified cases



Number of COVID-19 confirmed clusters or outbreaks by type of educational setting, England

End of academic year total

Week 36 2020- 34 2021

PHE Centres	Cumulative number of confirmed COVID-19 clusters or outbreaks by type of educational setting for the 2020/21 academic year Week 36 2020- 34 2021						
	Nursery	Primary School	Secondary School	Combined	Special Educational Needs (SEN) schools	College University	Total
Total	846	2125	2122	40	666	268	6067

Week 35 2021

Main table

PHE Centres	Cumulative number of confirmed COVID-19 clusters or outbreaks by type of educational setting for the 2021/22 academic year - Week 35 2021						
	Nursery	Primary School	Secondary School	Combined	Special Educational Needs (SEN) schools	College University	Total
East Midlands Centre	0 (0)	0 (0)	1 (1)	0 (0)	5 (5)	0 (0)	6 (6)
East of England Centre	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
London Centre	2 (2)	1 (1)	1 (1)	0 (0)	1 (1)	0 (0)	5 (5)
North East Centre	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
North West Center	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
South East Centre	1 (1)	0 (0)	1 (1)	0 (0)	0 (0)	0 (0)	2 (2)
South West Centre	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
West Midlands Centre	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Yorkshire & the Humber	2 (2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (2)
Total	5 (5)	1 (1)	3 (3)	0 (0)	6 (6)	0 (0)	15 (15)



Weekly number of COVID-19 cases in NHS Test and Trace contact tracing data, who reported attending educational settings

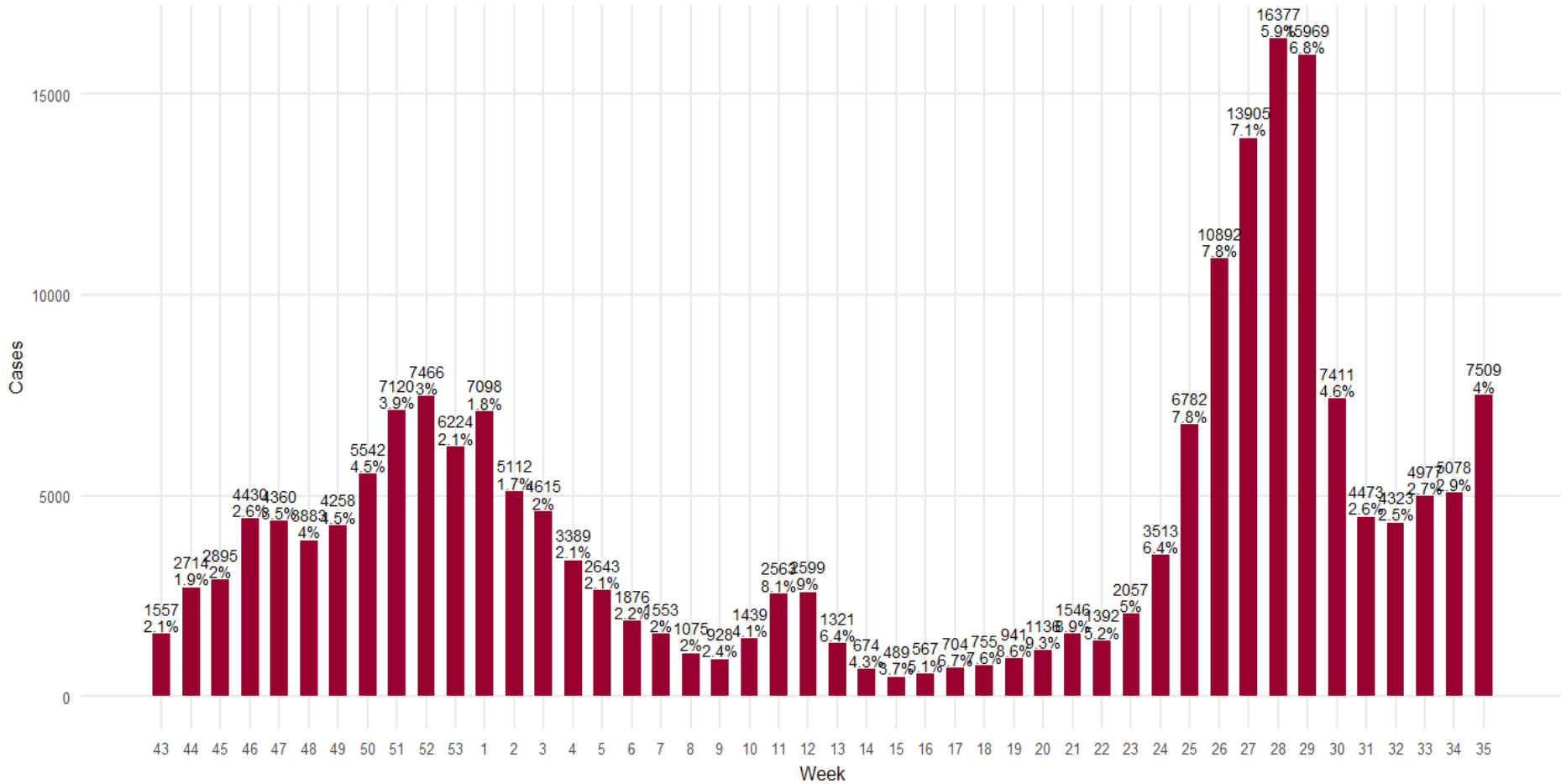
Data sources/definitions

1. The NHS Test & Trace contact tracing form asks individuals about their work or education settings. This report includes those who selected: 'Attending childcare, school, education setting' and selected an education setting of: 'Primary school', 'Secondary school' or 'college' (counted together), 'University'.
2. Age was used to confirm that cases were likely to be students, using the following age ranges as inclusive cut-offs: Primary school: 4 to 12 years old Secondary school college: 11 to 19 years old University: 16 years and above
3. Student cases may not be recorded if 'work and education' was selected rather than 'Attending childcare, school, education setting' Approximately 1% of primary, secondary, and college cases may be underreported because of this, and 4% of university cases.
4. Weeks are defined using ISO-8601, meaning Week 1 starts Monday January 4th and ends Sunday January 10th, 2021.
5. Percentages in charts = percent of all cases (people who tested positive and were referred for contact tracing) for that week, this includes cases which may not have completed the forms and entered work or education settings.
6. The data starts 23 October 2020, when education settings started to be recorded in the present format, and ends with the most recent complete week.
7. Cases are assigned to dates by the date they were transferred to the NHS Test and Trace contact tracing system.
8. If a case reports being in education, this does not specify that they attended the setting in person during the time that they were exposed/infectious (for example they may have been remote learning). In addition, cases that did attend in person may have been exposed in other settings, such as their household or while doing other activities. This data can not be used to directly infer that these cases acquired their infection, or that they exposed others, in an the education setting.



Number of people testing positive that reported attending primary school and proportion among all people testing positive (weeks 43 to 35)

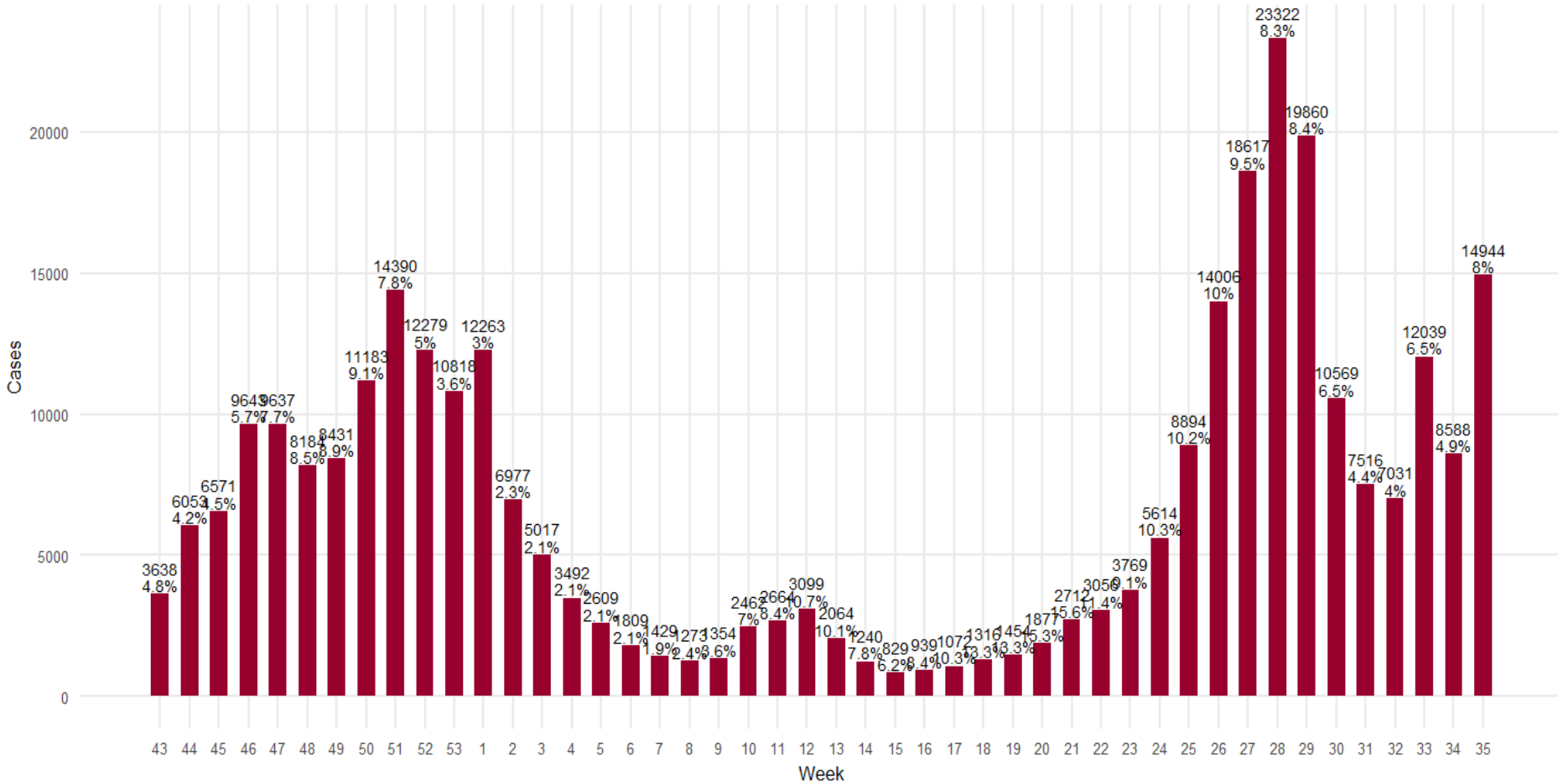
(Data source: NHS Test and Trace)





Number of people testing positive that reported attending secondary school and proportion among all people testing positive (weeks 43 to 35)

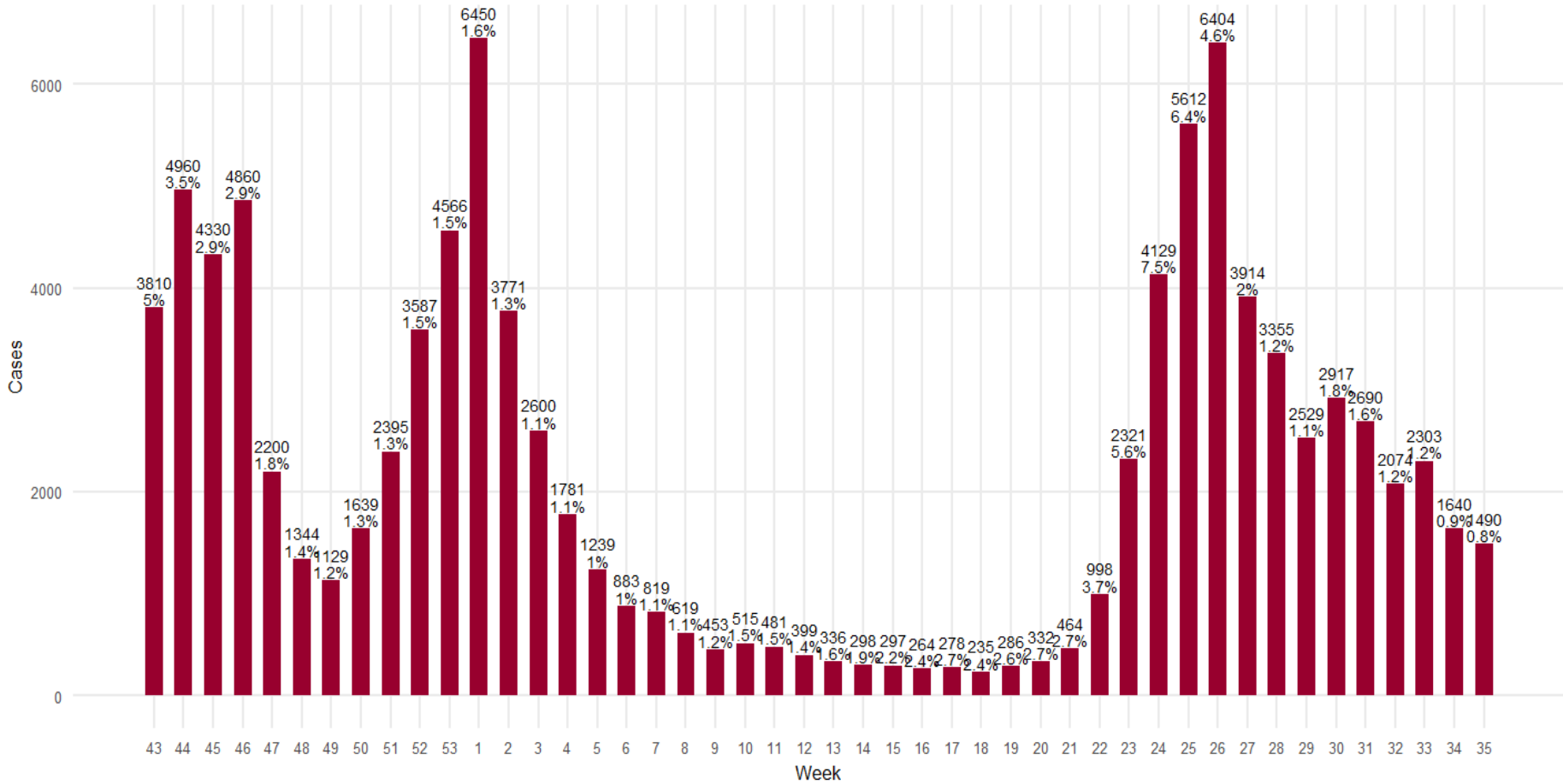
(Data source: NHS Test and Trace)





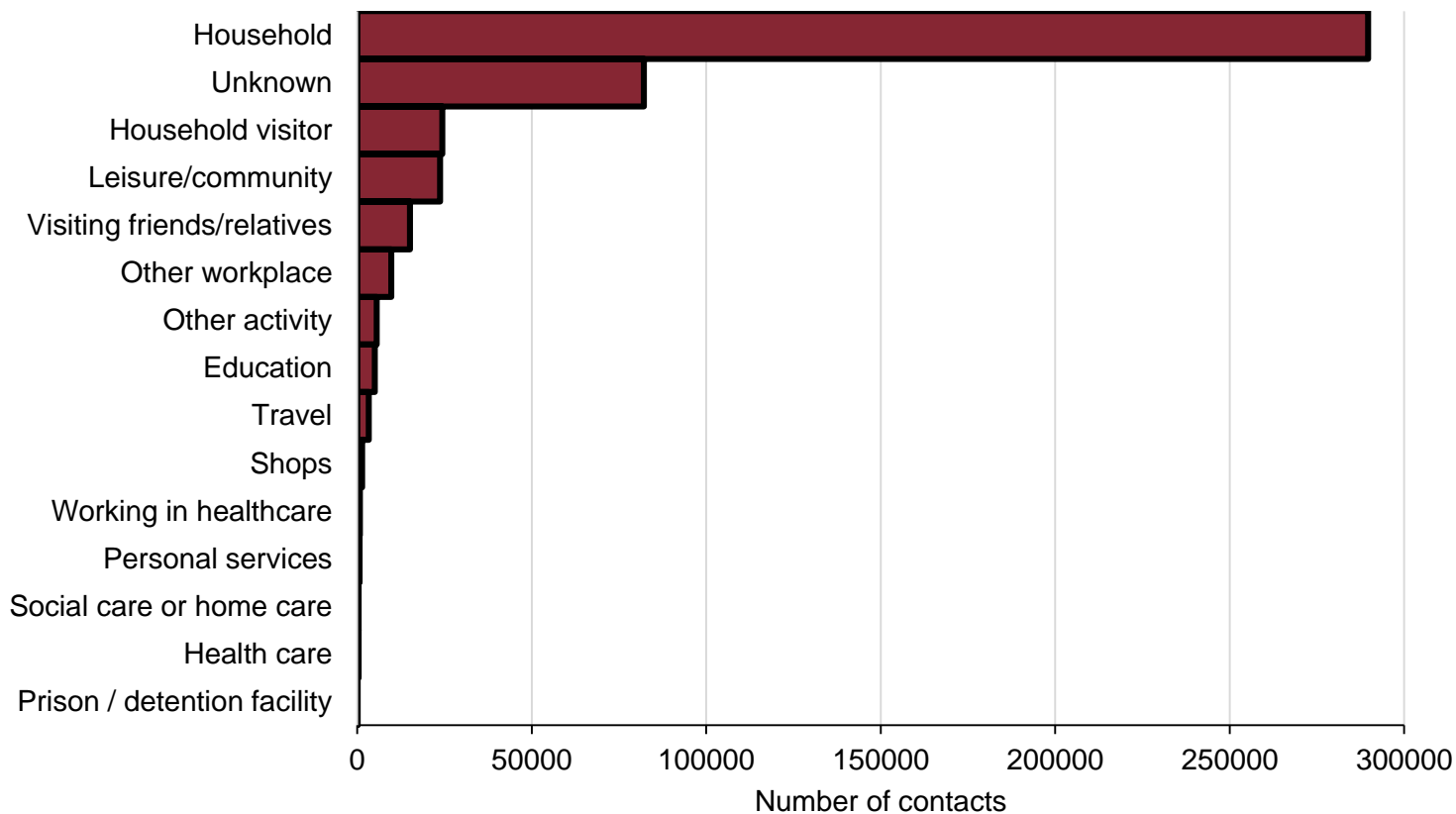
Number of people testing positive that reported attending university and proportion among all people testing positive (weeks 43 to 35)

(Data source: NHS Test and Trace)





Contacts by exposure/activity setting in week 35, England (Data source: NHS Test and Trace)

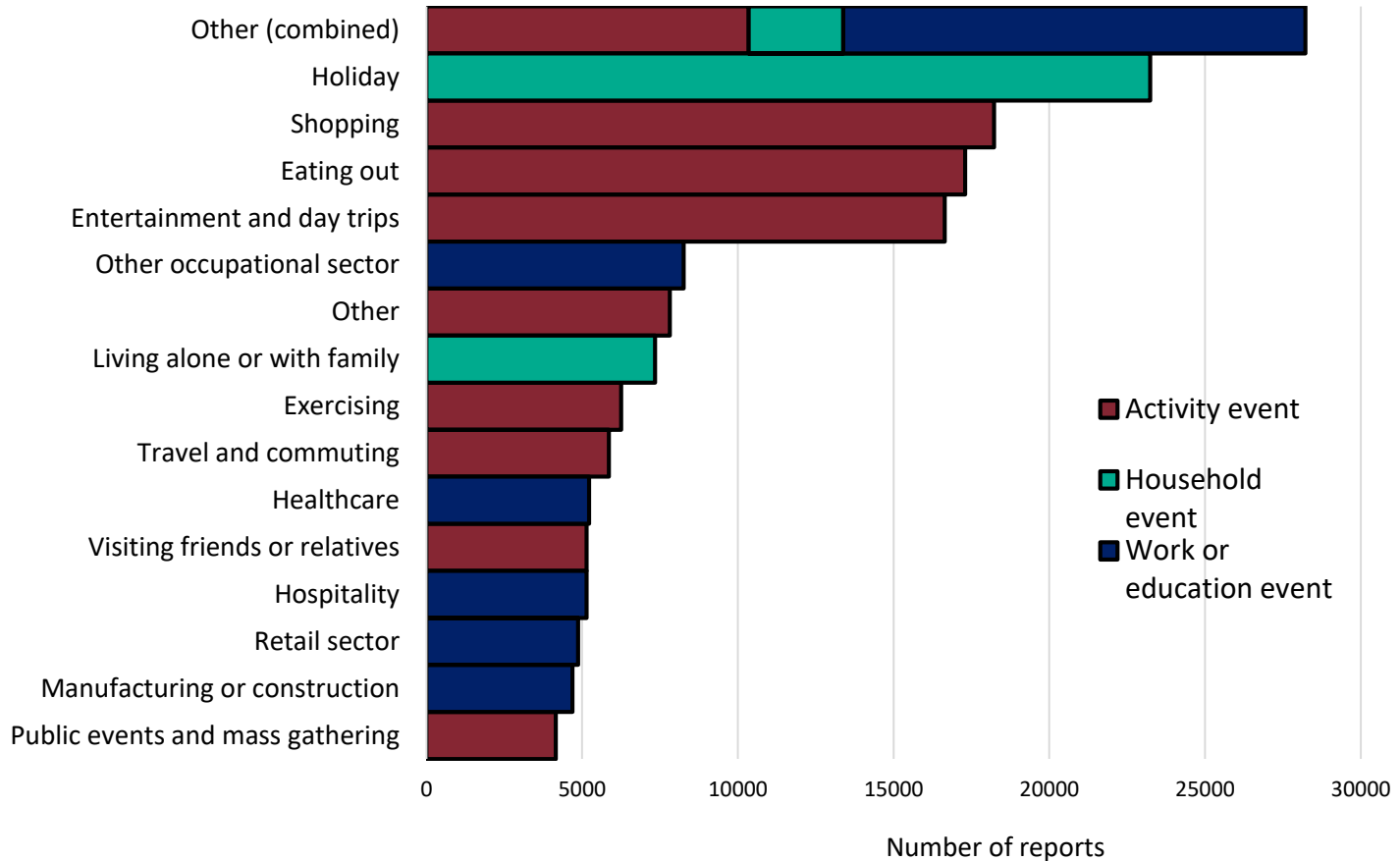


Note: categories have been grouped as follows: leisure / community includes eating out, attending events and celebrations, exercising, worship, arts, entertainment or recreation, community activities and attending play groups or organised trips; other workplace includes: retail, manufacturing or construction, hospitality, transport, emergency services or border force, food production and agriculture, prison, financial services, civil service or local government, information and communication, military, critical national infrastructure.
Personal services include hairdressers, barbers, tattooists and nail bars.



Events and activities reported by people testing positive, prior to symptom onset in week 34, England (Data source: NHS Test and Trace)

Please note that there was no update available for this week.



Note: 'Other' includes a wide range of different activities and settings, each of which has small numbers of individuals, as well as activities which did not fit any specific category and were added as Other by the case. This includes: all within 'activities': Arts, entertainment or recreation; Civil service or government; Close contact services; Community and charity activities; Critical national infrastructure; Emergency services; Financial services; Food production; Hospitality; Immigration border services; Information and communication; Military; Personal care; Prison; Private events and celebrations; Public events and mass gathering; event within a shared household; Sport events; Supported living; Teaching and education; Transport; 'Other (combined)' includes all exposure group types that have small counts such as "went to church", "went to the zoo" within that event type.



Surveillance in 'educational-age' cohorts



- Data source: SGSS Pillar 1 (NHS and PHE testing) and Pillar 2 (community testing) – England
- Educational-age cohorts have been calculated using dates of birth that correspond to a particular year group. School year groups run from 1 September to 31 of August of the following calendar year.
- We include all cases regardless of whether or not they attended an educational setting or whether or not the educational setting was open during the reporting period
- Data for the most recent week are provisional and likely to be an underestimate
- The 2021-2022 school season commenced 1st September 2021. For information regarding the 2020-2021 school season please refer to the Weekly National Flu and COVID-19 reports published between 22nd October 2020 to 2nd September 2021.



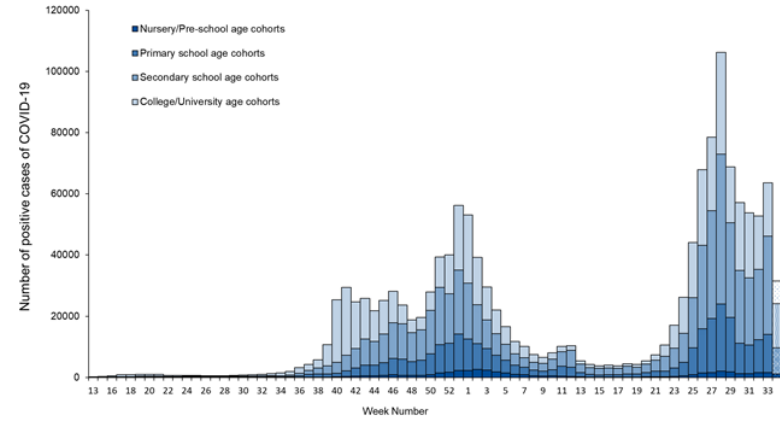
- The table aside represents the birth cohorts for each year group

Birth cohort			Year group
01/09/1998	to	31/08/1999	Uni Year 4
01/09/1999	to	31/08/2000	Uni Year 3
01/09/2000	to	31/08/2001	Uni Year 2
01/09/2001	to	31/08/2002	Uni Year 1
01/09/2002	to	31/08/2003	Year 13
01/09/2003	to	31/08/2004	Year 12
01/09/2004	to	31/08/2005	Year 11
01/09/2005	to	31/08/2006	Year 10
01/09/2006	to	31/08/2007	Year 9
01/09/2007	to	31/08/2008	Year 8
01/09/2008	to	31/08/2009	Year 7
01/09/2009	to	31/08/2010	Year 6
01/09/2010	to	31/08/2011	Year 5
01/09/2011	to	31/08/2012	Year 4
01/09/2012	to	31/08/2013	Year 3
01/09/2013	to	31/08/2014	Year 2
01/09/2014	to	31/08/2015	Year 1
01/09/2015	to	31/08/2016	Reception
01/09/2016	to	31/08/2017	Pre-school
01/09/2017	to	31/08/2018	Nursery

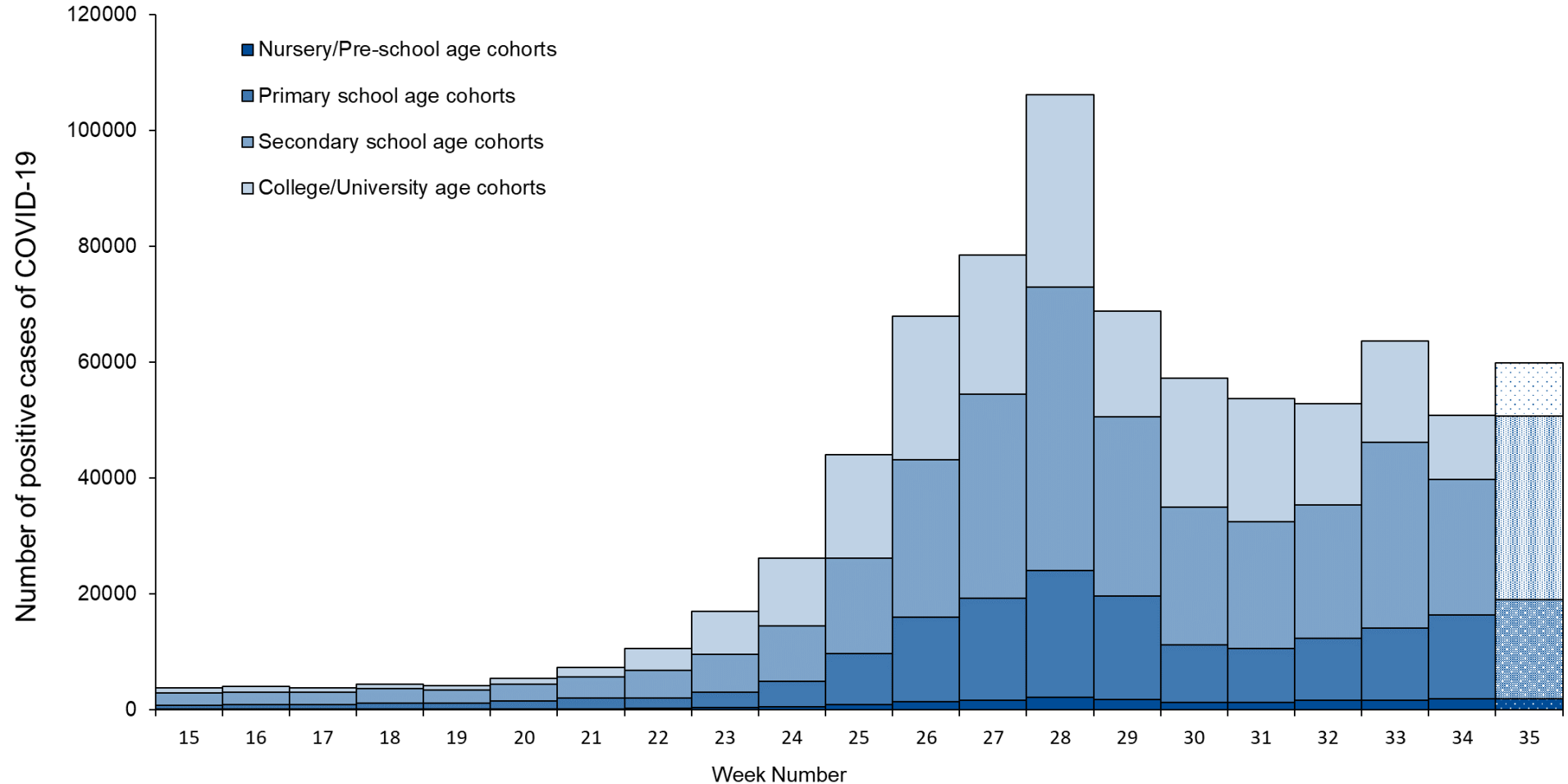


Weekly number of COVID-19 cases, from Week 15 2021 in:

- nursery/preschool age cohorts
- primary school age cohorts
- secondary school age cohorts
- college/University age cohorts



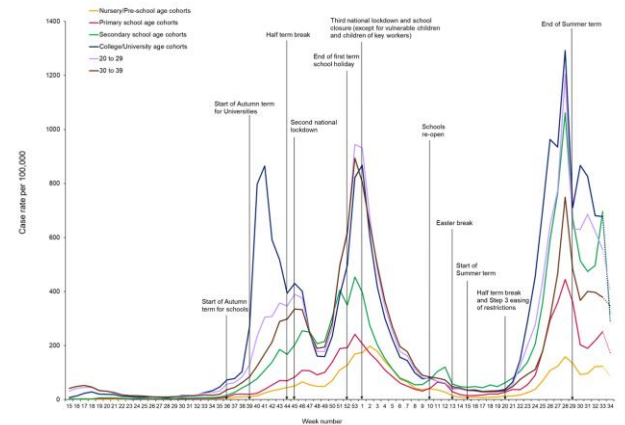
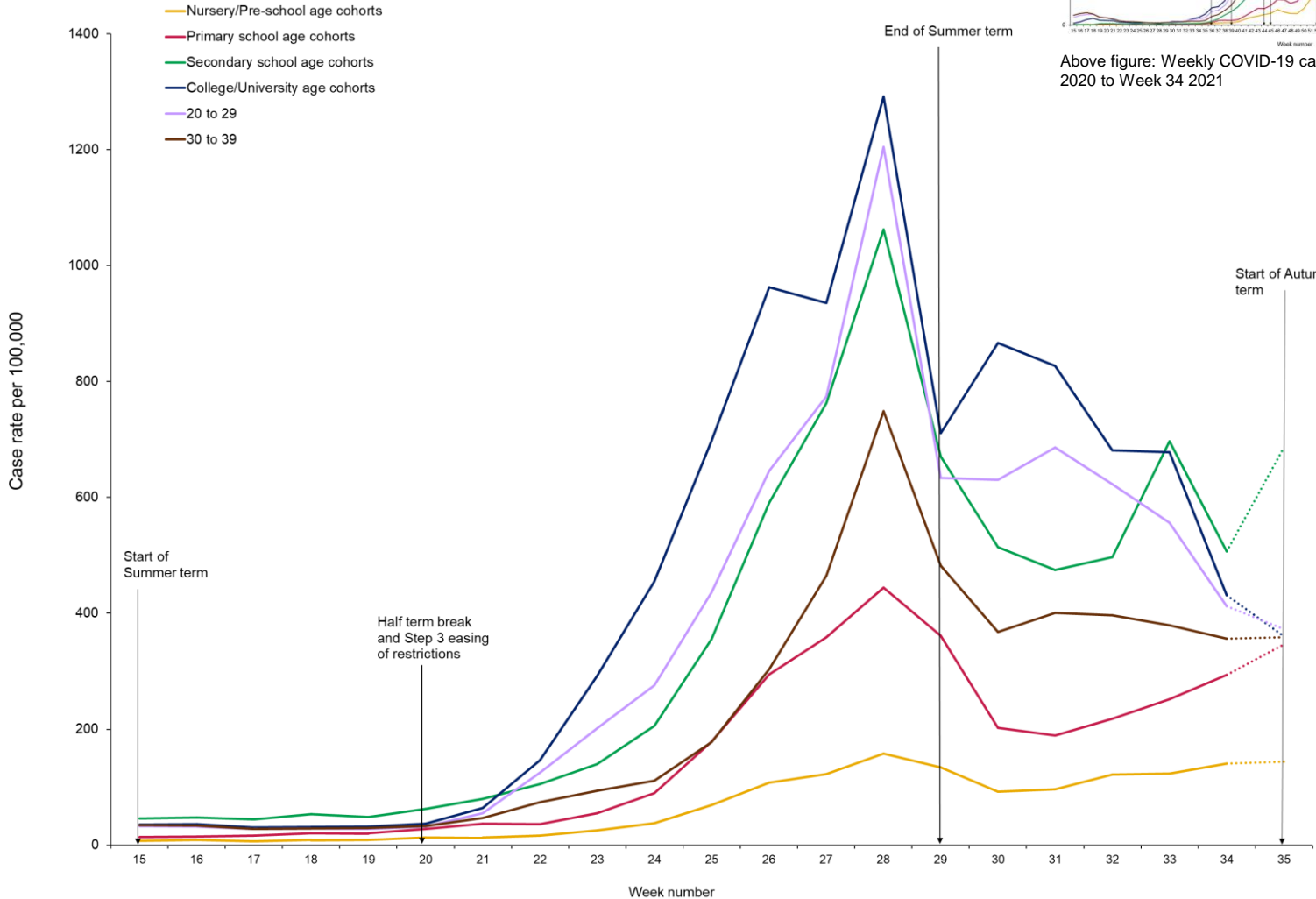
Above figure: Weekly number of COVID-19 cases, from Week 13 2020 to Week 34 2021





Weekly incidence of COVID-19 cases per 100,000 population from Week 15 2021, in:

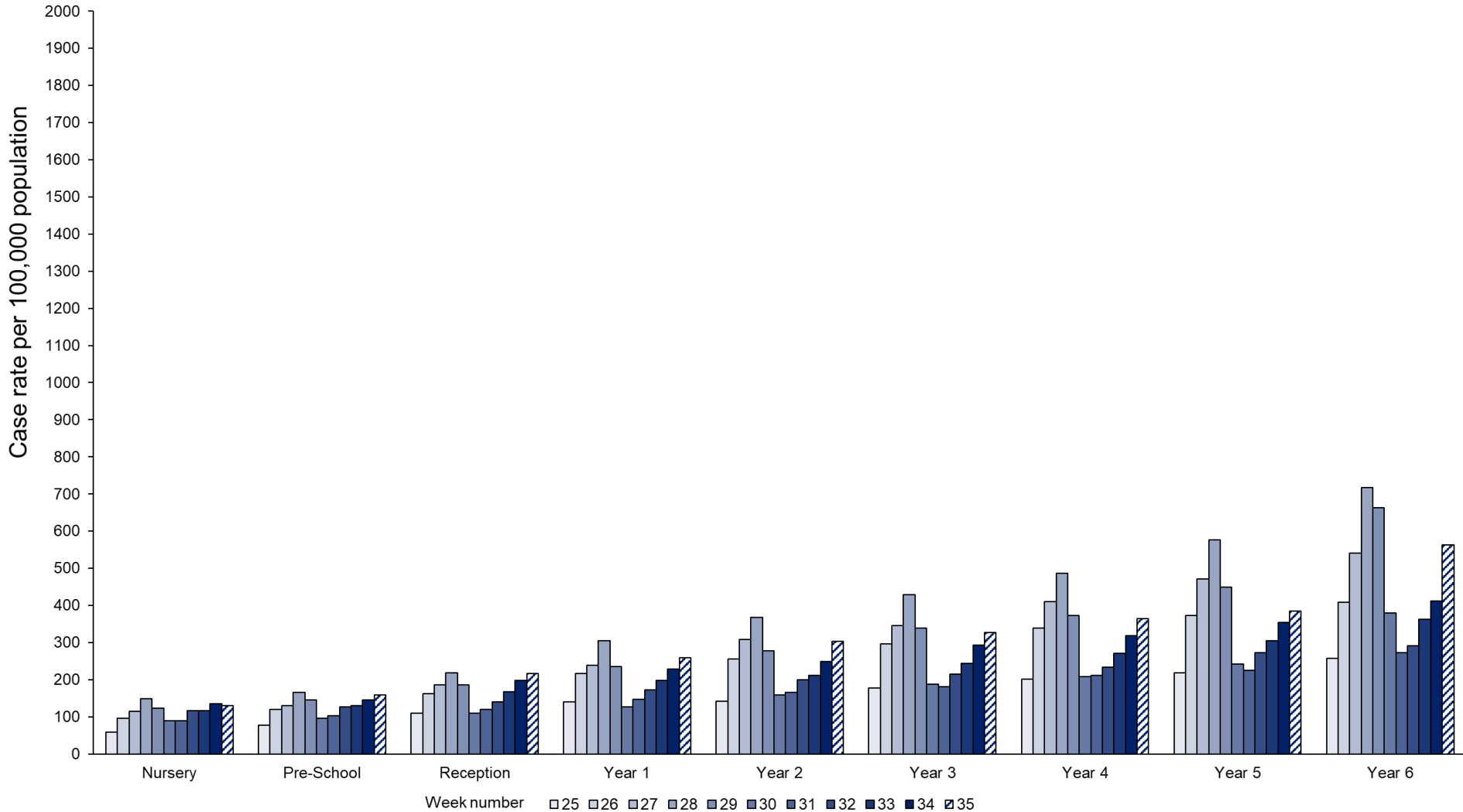
- nursery/preschool age cohorts
- primary school age cohorts
- secondary school age cohorts
- college/University age cohorts



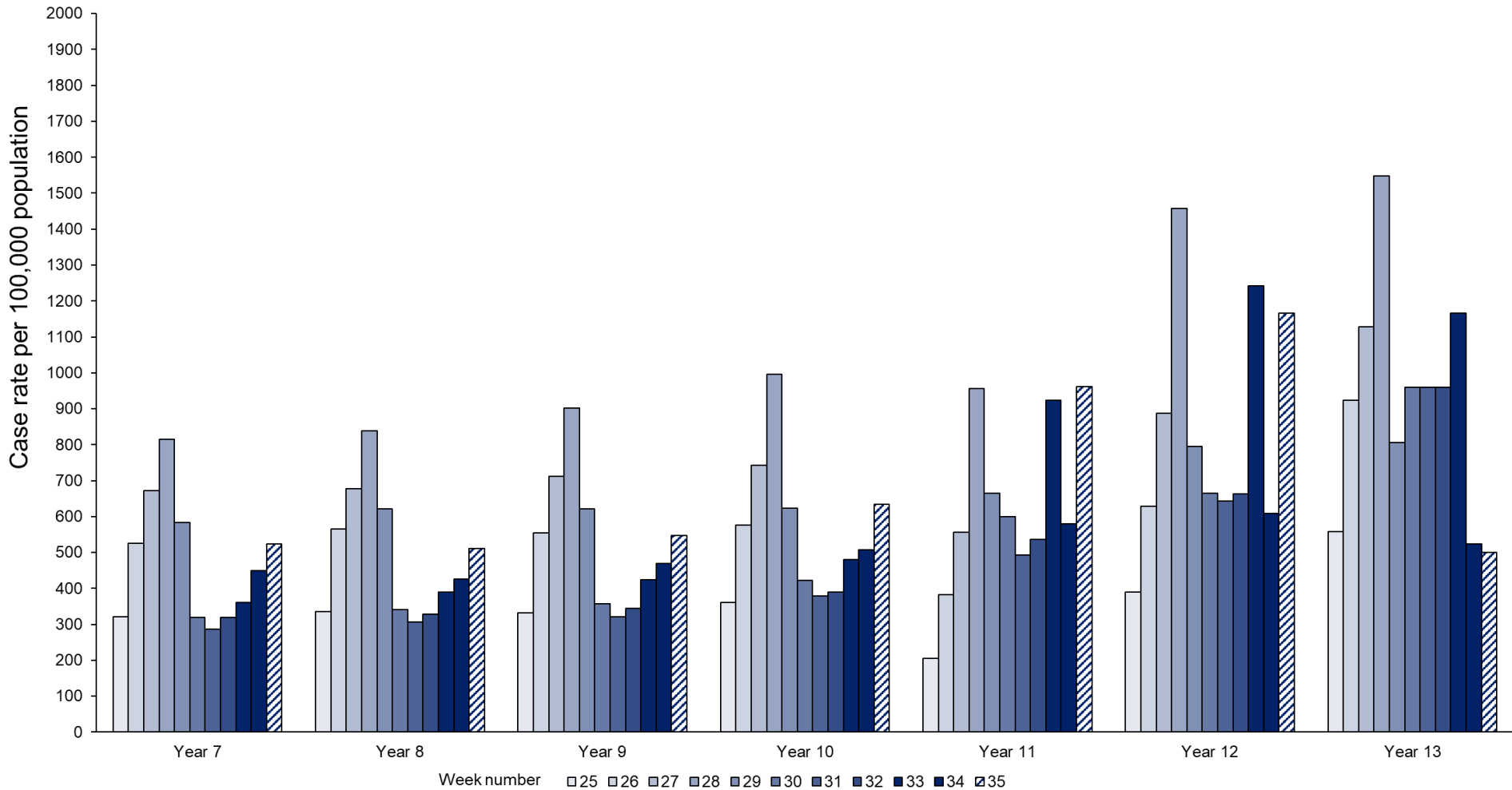
Above figure: Weekly COVID-19 case rate per 100,000, from Week 13 2020 to Week 34 2021



Weekly incidence of COVID-19 cases per 100,000 population in educational age cohorts presented by Year group, from nursery to Year 6, weeks 25 to 35

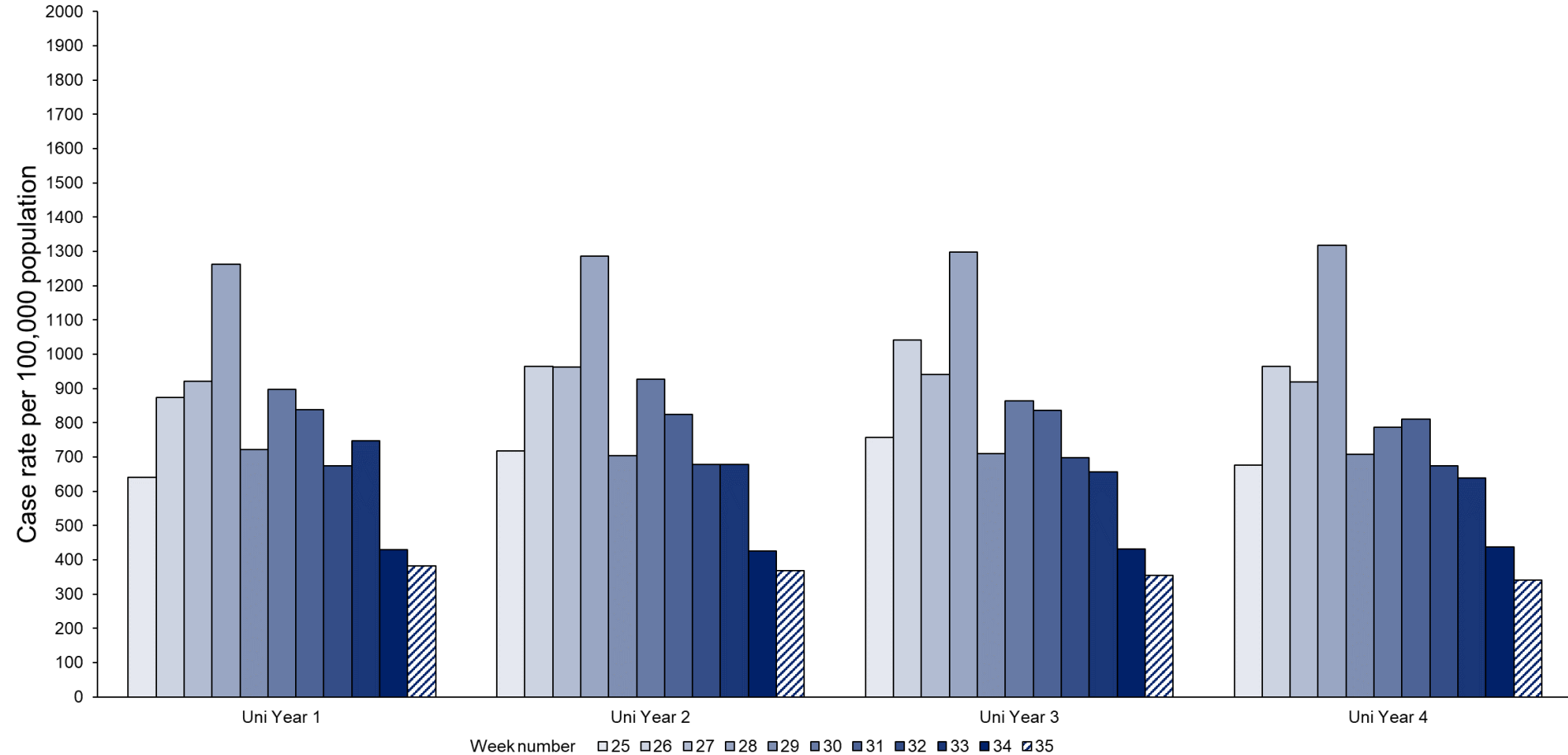


Weekly incidence of COVID-19 cases per 100,000 population in educational age groups presented by secondary school year groups (Year 7 to Year 13), weeks 25 to 35





Weekly incidence of COVID-19 cases per 100,000 population in educational age cohorts corresponding to university/college year groups, weeks 25 to 35

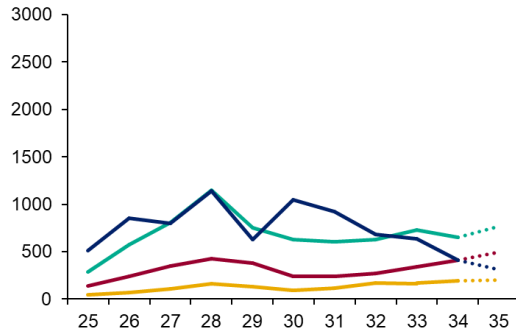




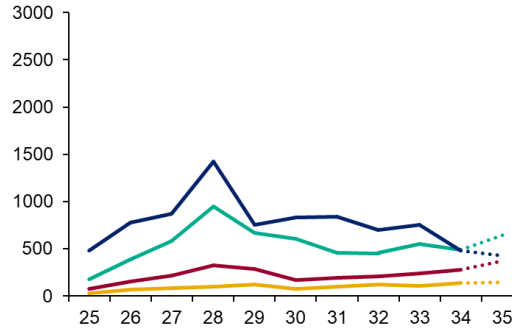
Weekly incidence of COVID-19 cases per 100,000 population by educational age cohorts and PHE region, weeks 25 to 35

Case rate per 100,000 population

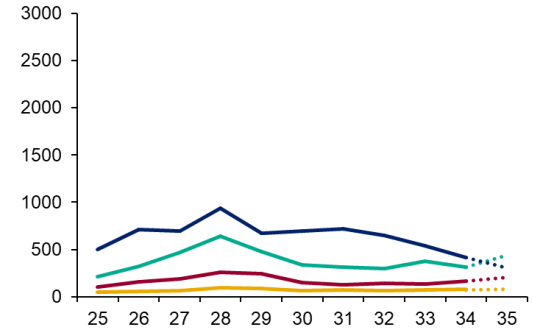
East Midlands



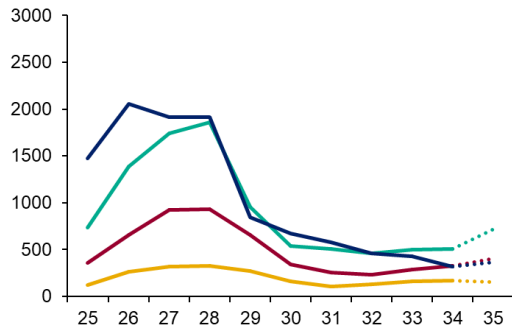
East of England



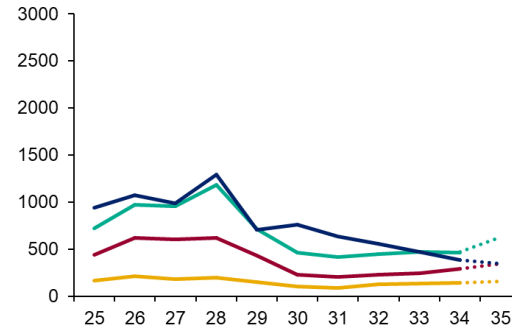
London



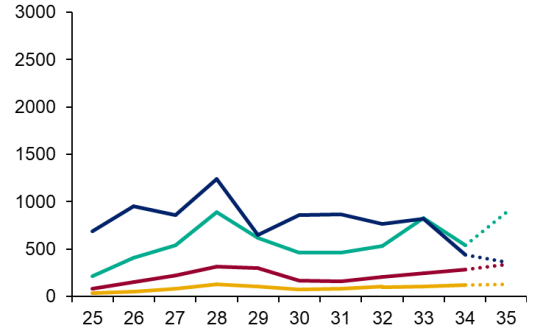
North East



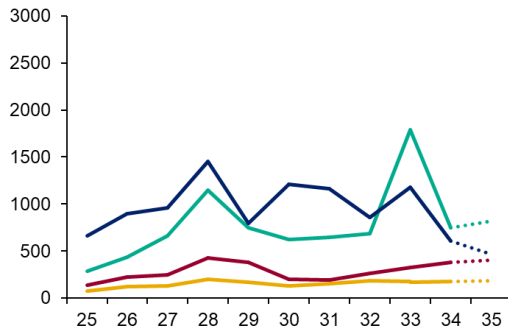
North West



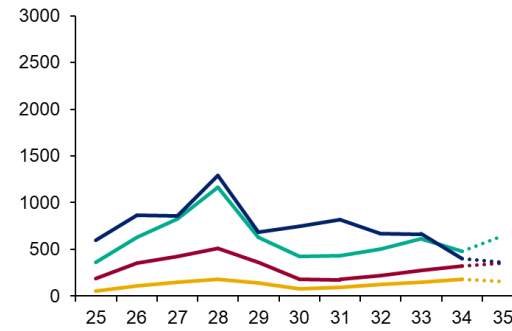
South East



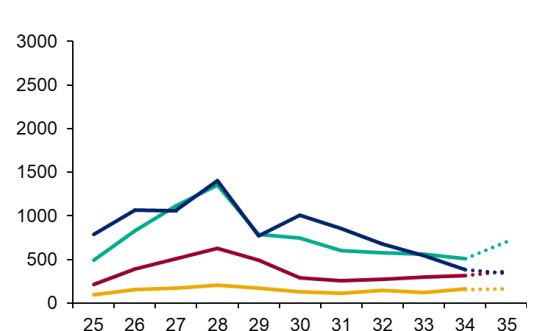
South West



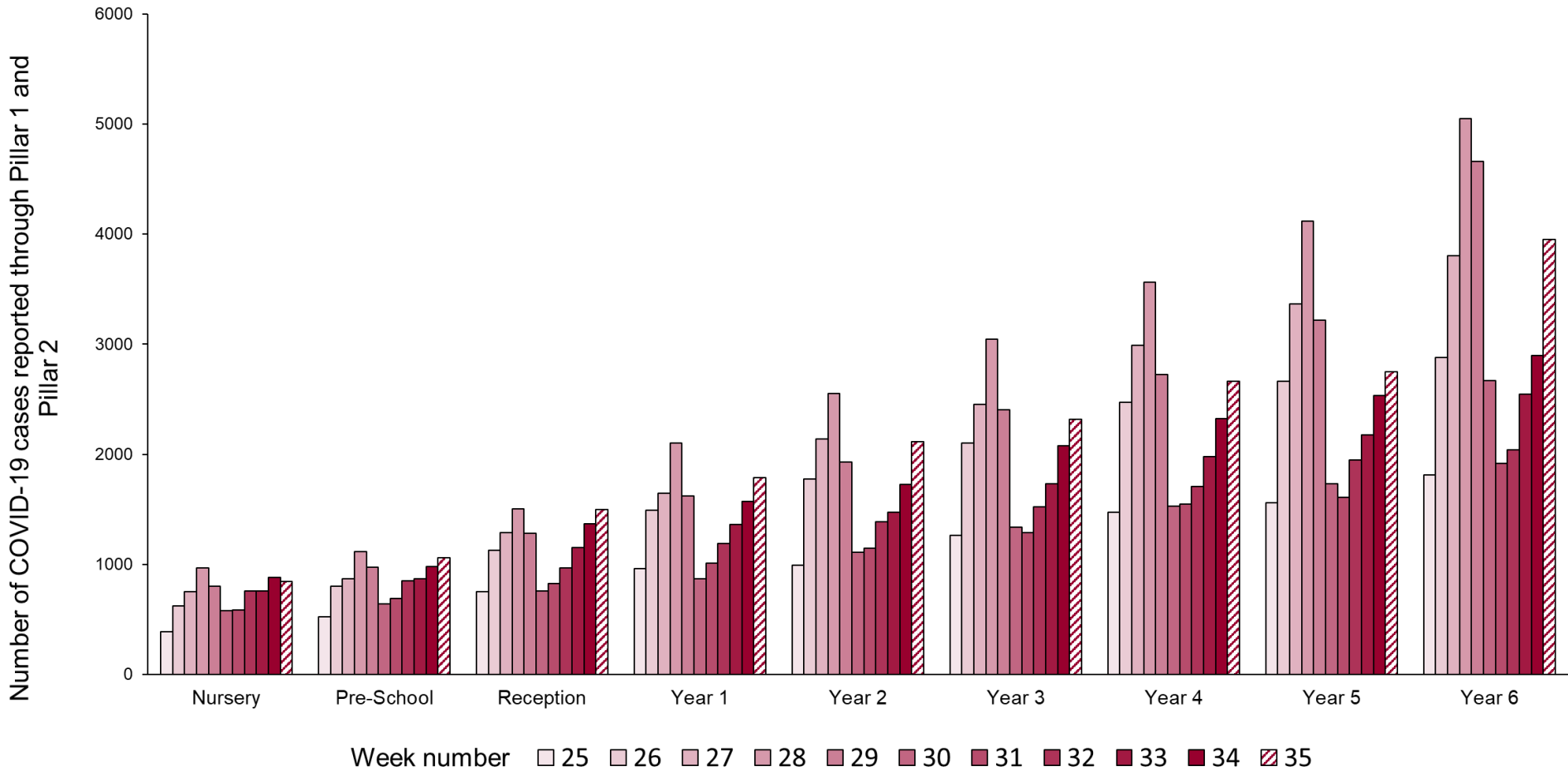
West Midlands



Yorkshire and Humber

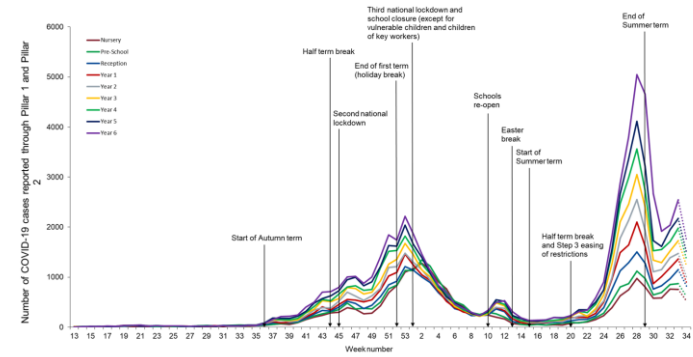


Weekly number of new COVID-19 cases in educational age cohorts presented by Year group, from nursery to Year 6, weeks 25 to 35

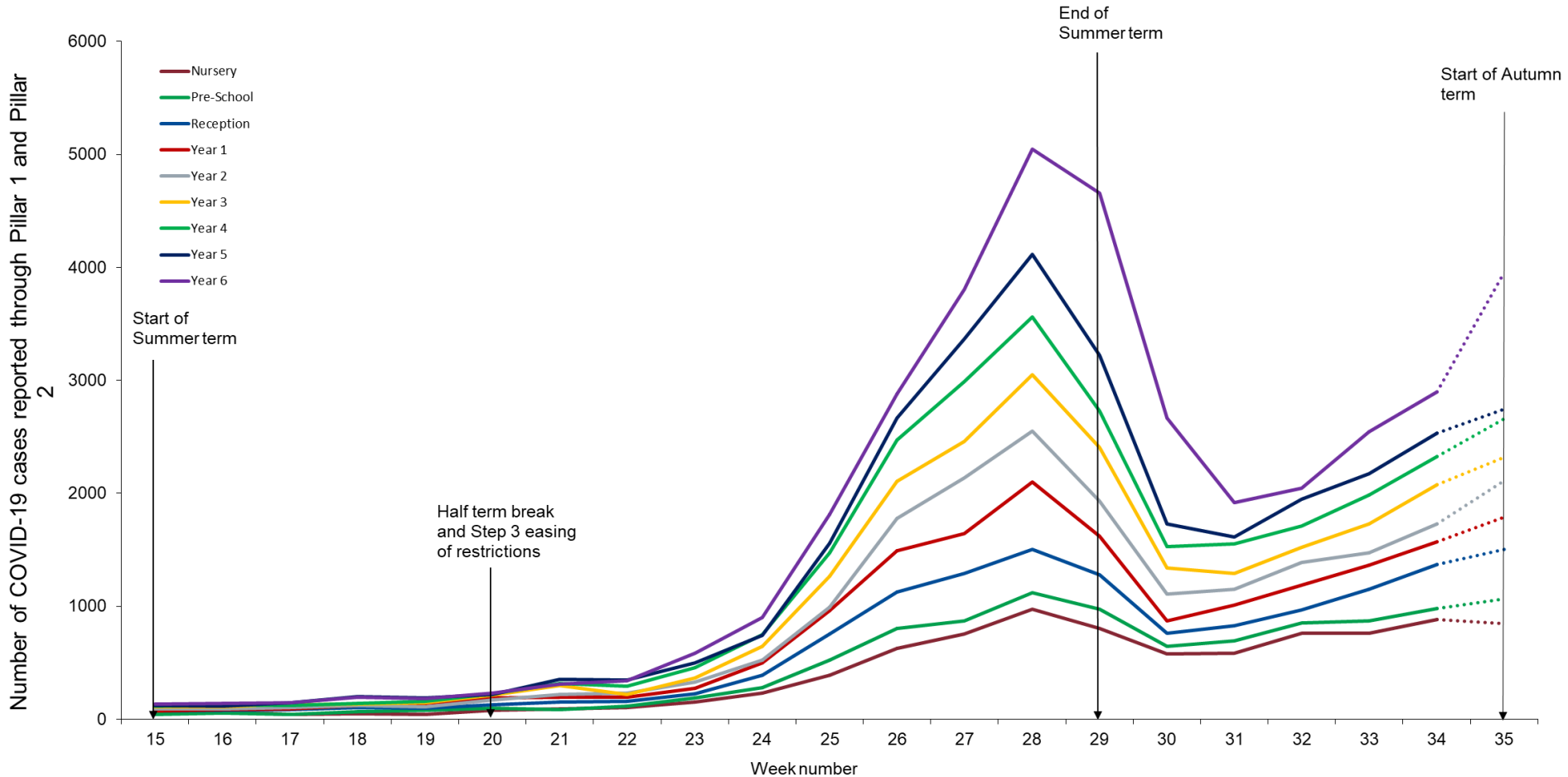




Weekly number of new COVID-19 cases in educational age cohorts presented by Year group, from nursery to Year 6 (from Week 15 2021)

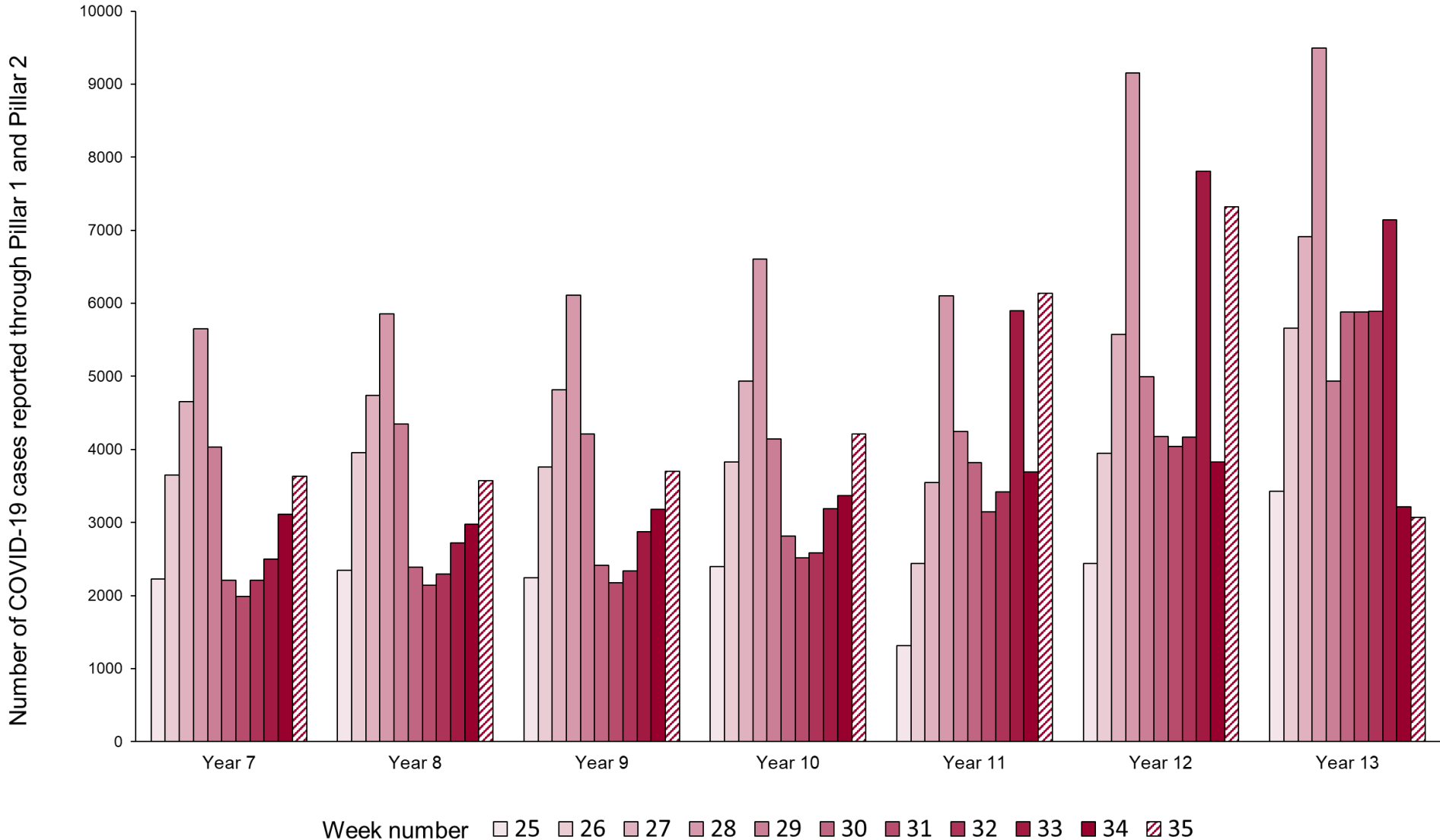


Above figure: Weekly number of COVID-19 cases, from Week 13 2020 to Week 34 2021



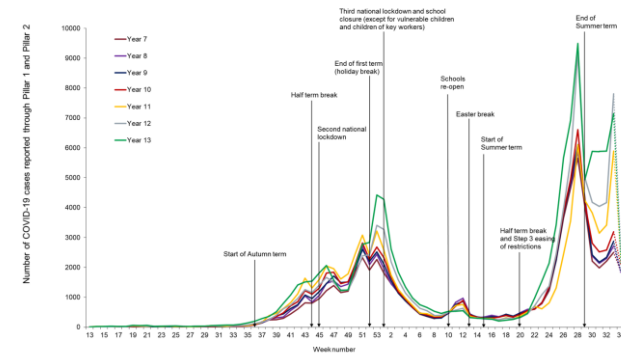


Weekly number of new COVID-19 cases in educational age groups presented by secondary school year groups (Year 7 to Year 13), weeks 25 to 35



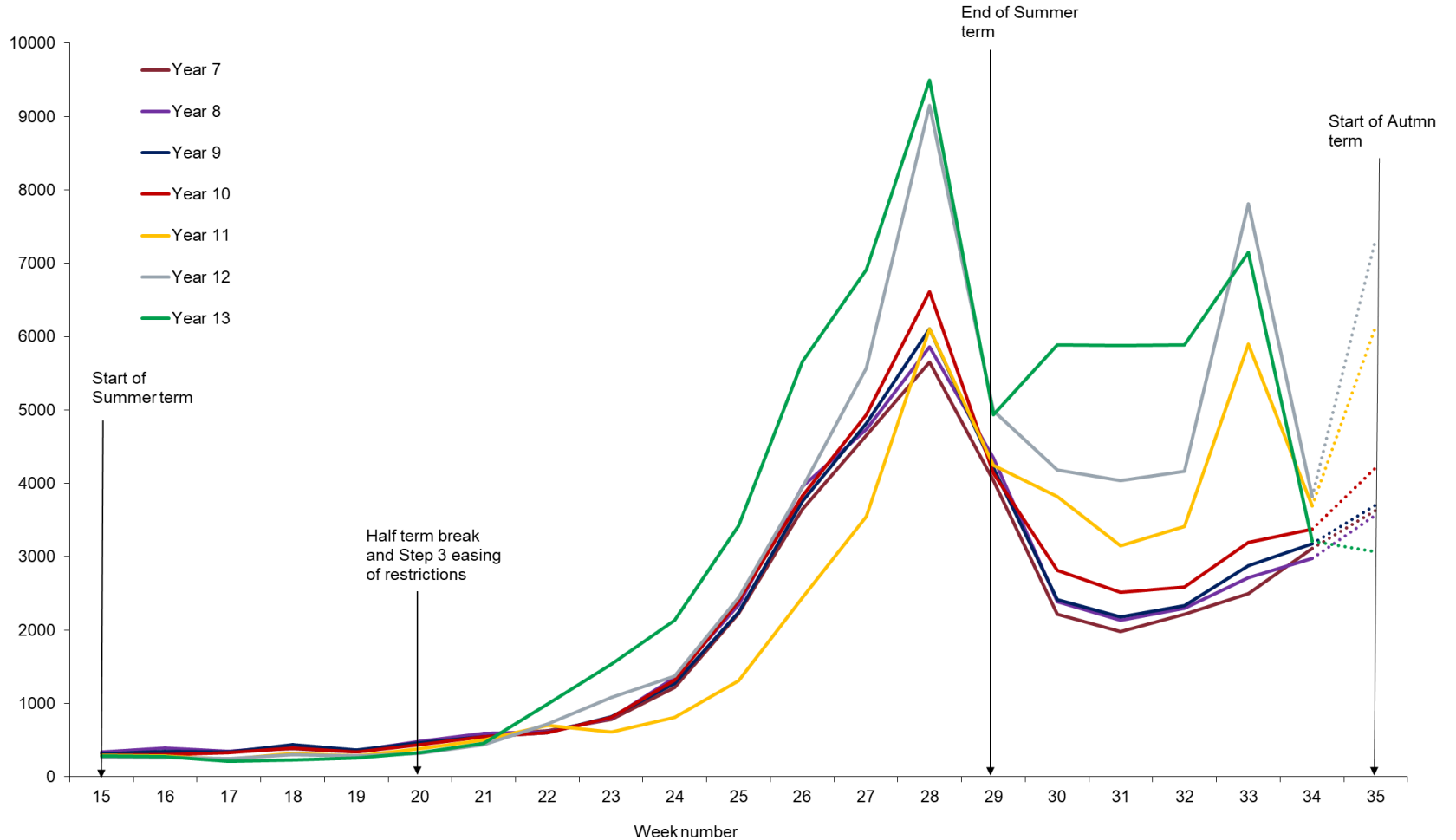


Weekly number of new COVID-19 cases in educational age groups presented by secondary school year groups (Year 7 to Year 13) (from Week 15 2021)



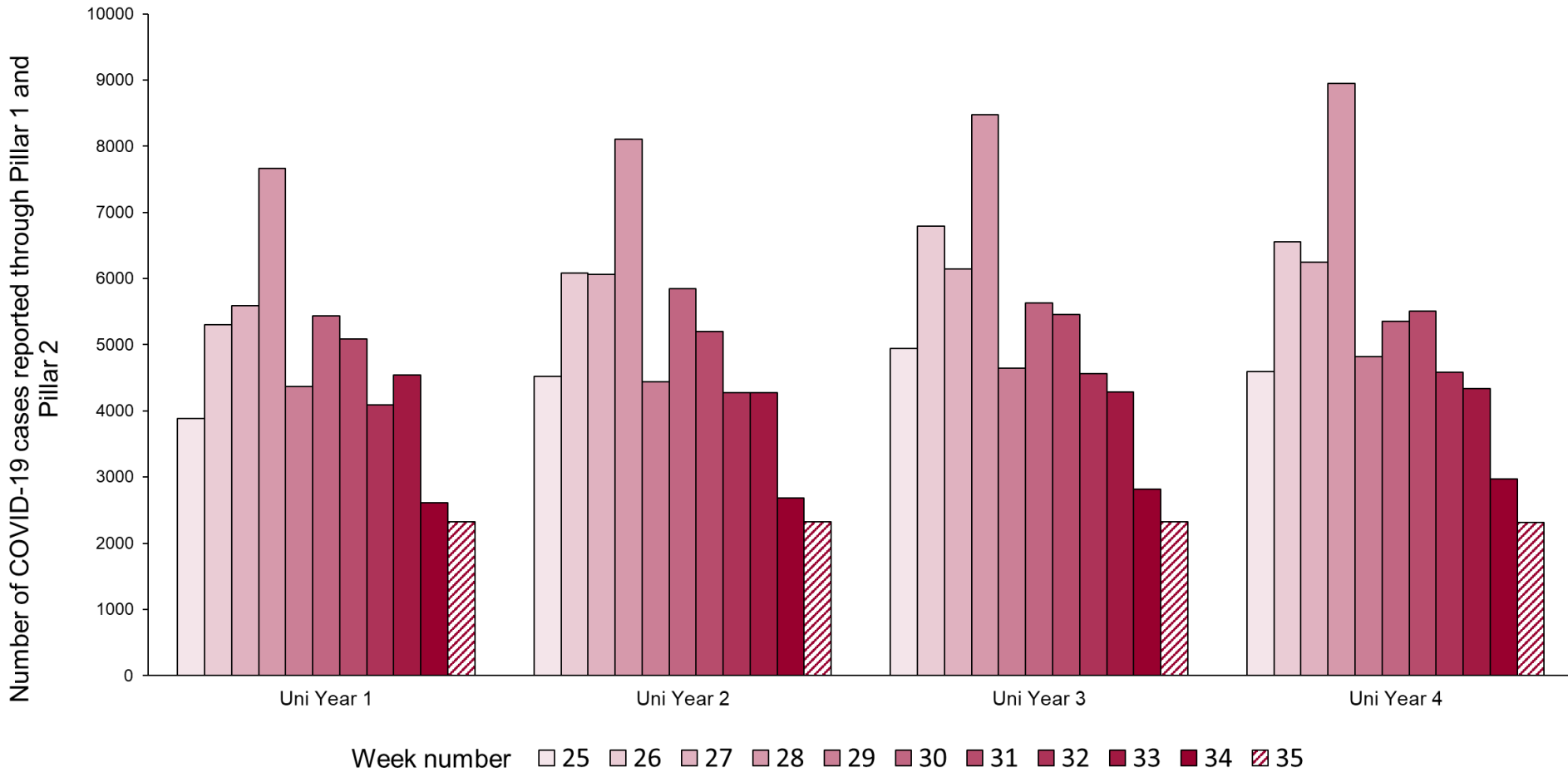
Above figure: Weekly number of COVID-19 cases, from Week 13 2020 to Week 34 2021

Number of COVID-19 cases reported through Pillar 1 and Pillar 2



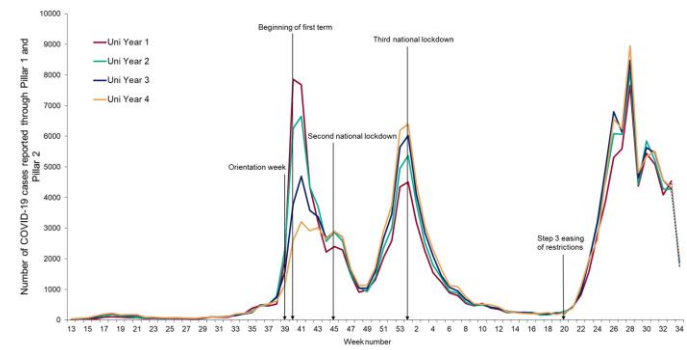


Weekly number of new COVID-19 cases in educational age cohorts corresponding to university/college year groups, weeks 25 to 35

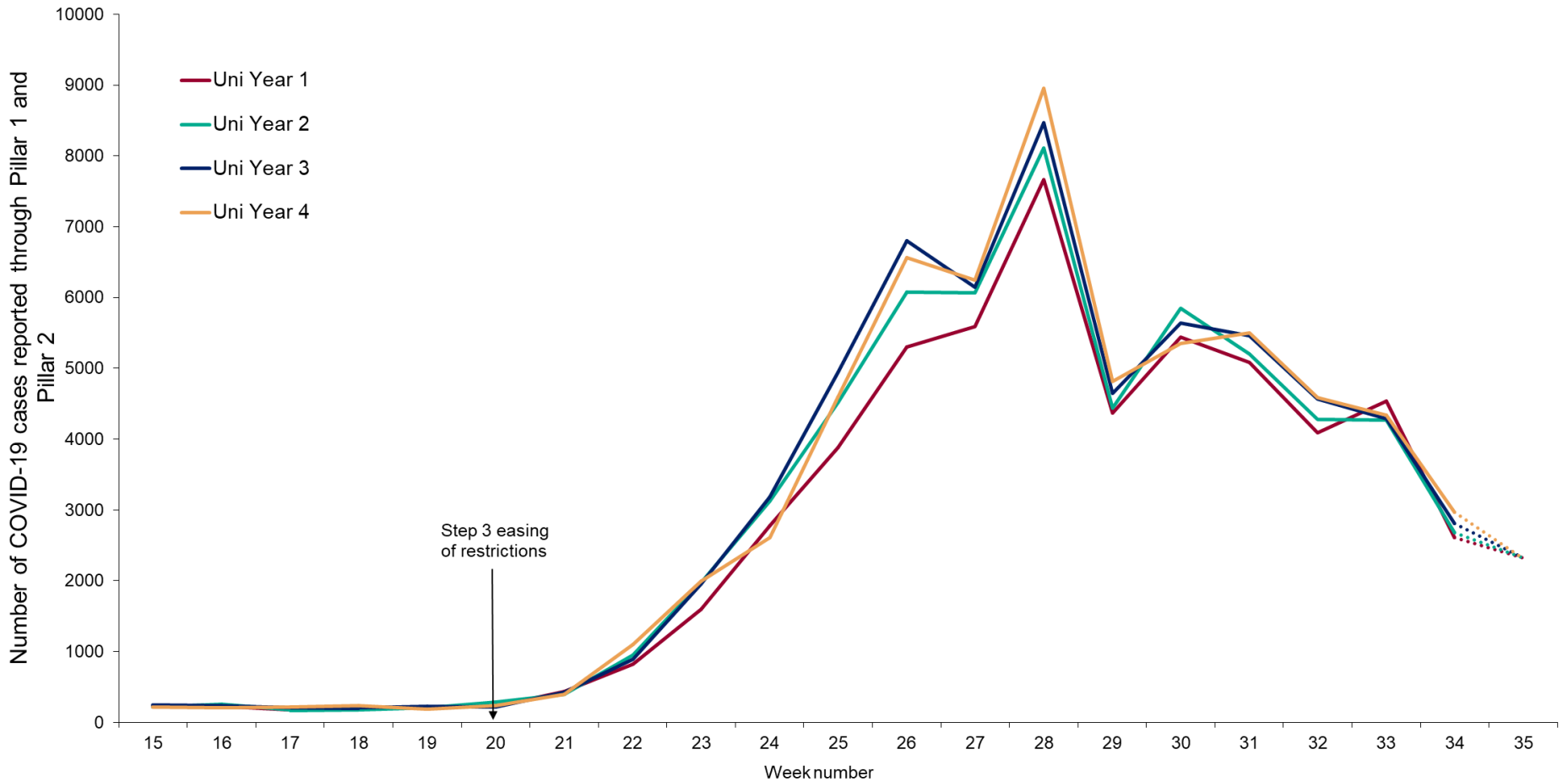




Weekly number of new COVID-19 cases in educational age cohorts corresponding to university/college year groups (from Week 15 2021)



Above figure: Weekly number of COVID-19 cases, from Week 13 2020 to Week 34 2021

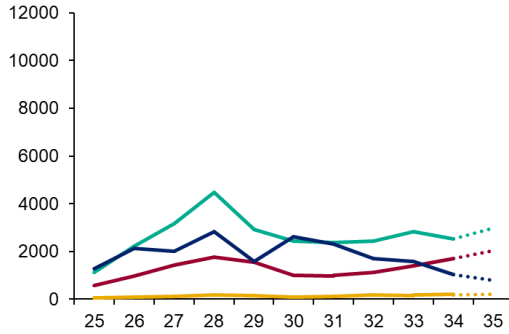




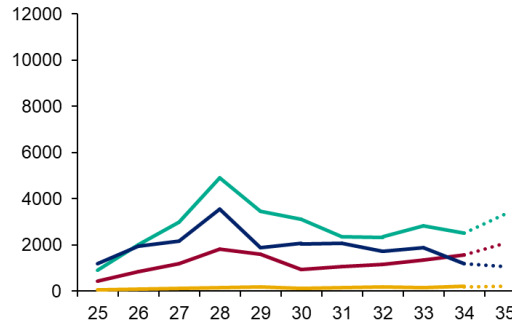
Weekly number of new COVID-19 cases by educational age cohorts and PHE region, weeks 25 to 35

Number of new COVID-19 cases

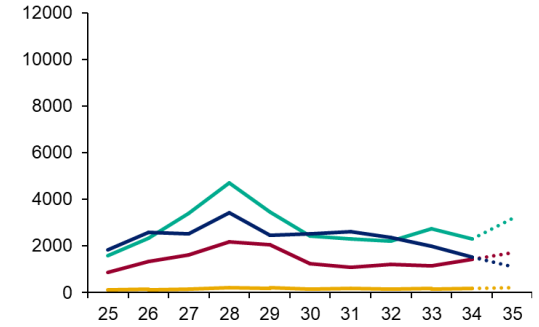
East Midlands



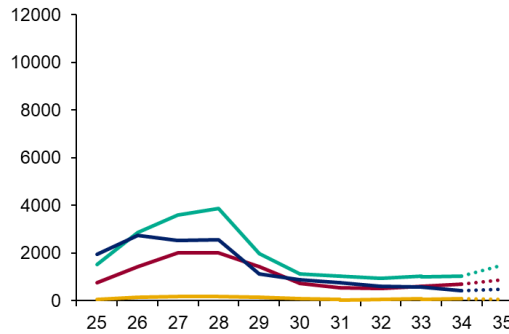
East of England



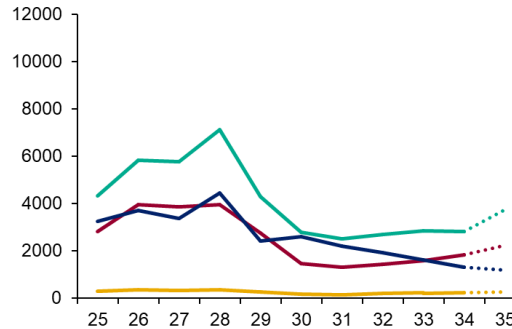
London



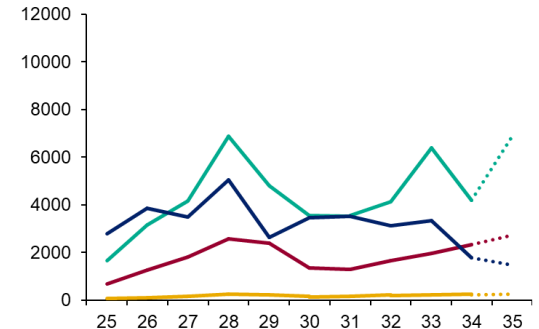
North East



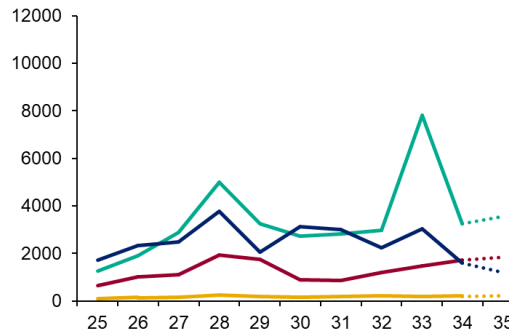
North West



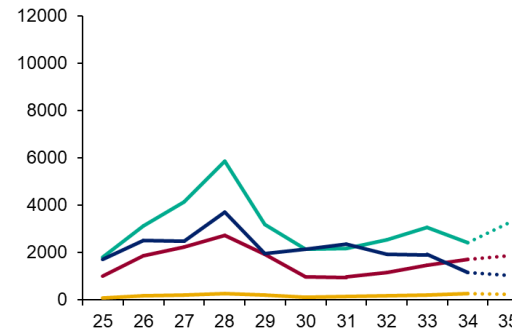
South East



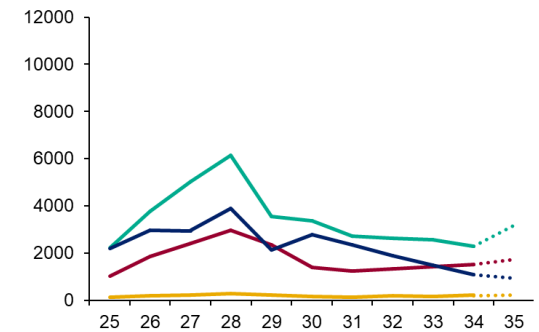
South West



West Midlands



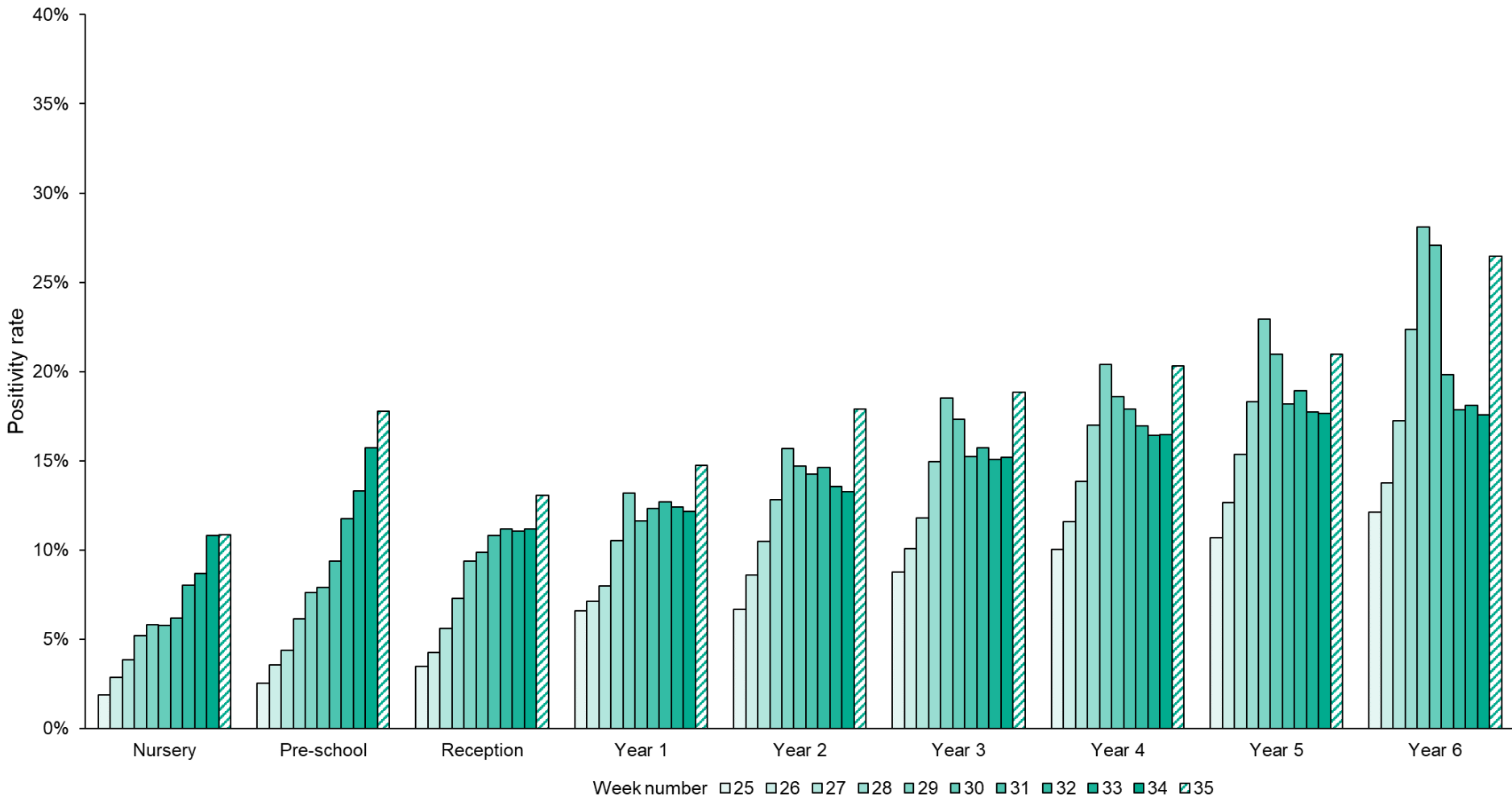
Yorkshire and Humber



— Nursery/Pre-school age cohorts — Primary school age cohorts — Secondary school age cohorts — College/University age cohorts

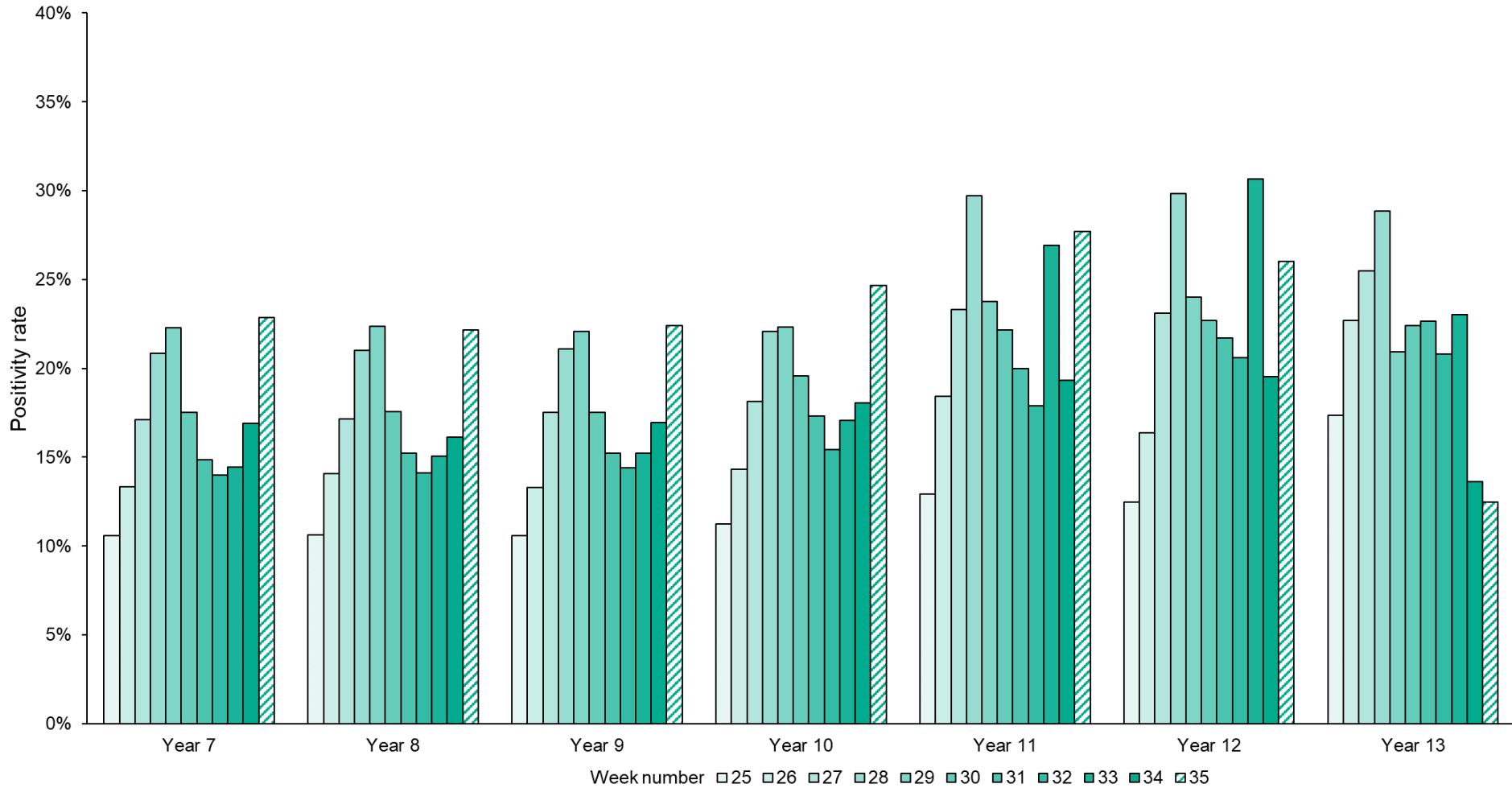


Weekly PCR positivity rates of COVID-19 cases in educational age cohorts presented by Year group, from nursery to Year 6, weeks 25 to 35



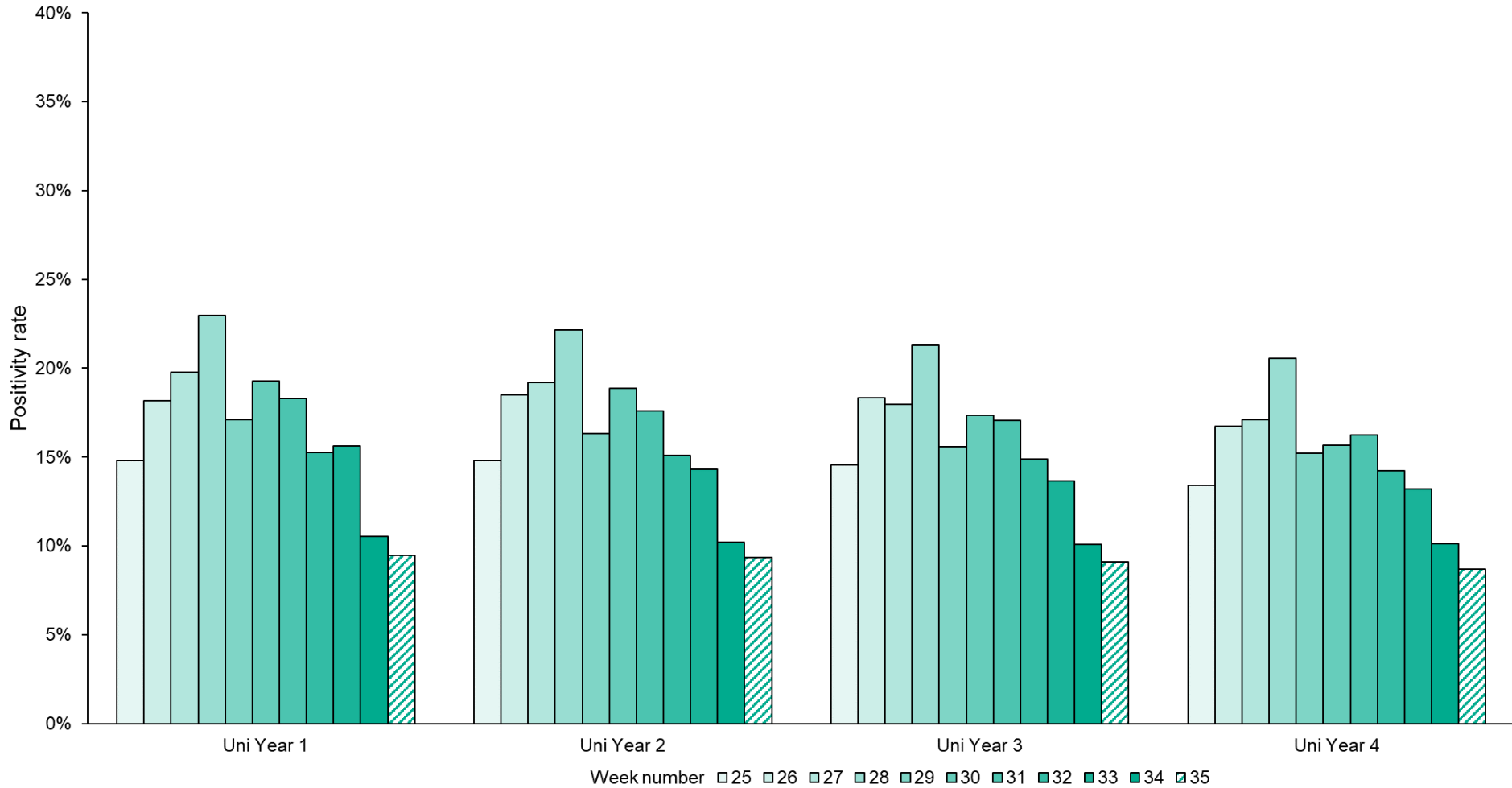


Weekly PCR positivity rates of COVID-19 cases in educational age cohorts presented by secondary school year groups (Year 7 to Year 13), weeks 25 to 35





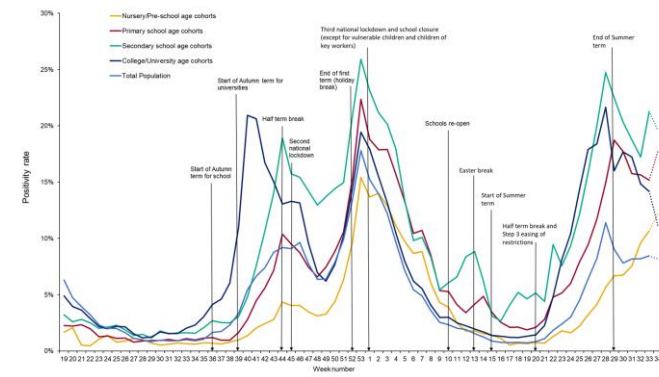
Weekly PCR positivity rates of COVID-19 cases in educational age cohorts corresponding to university/college year groups, weeks 25 to 35



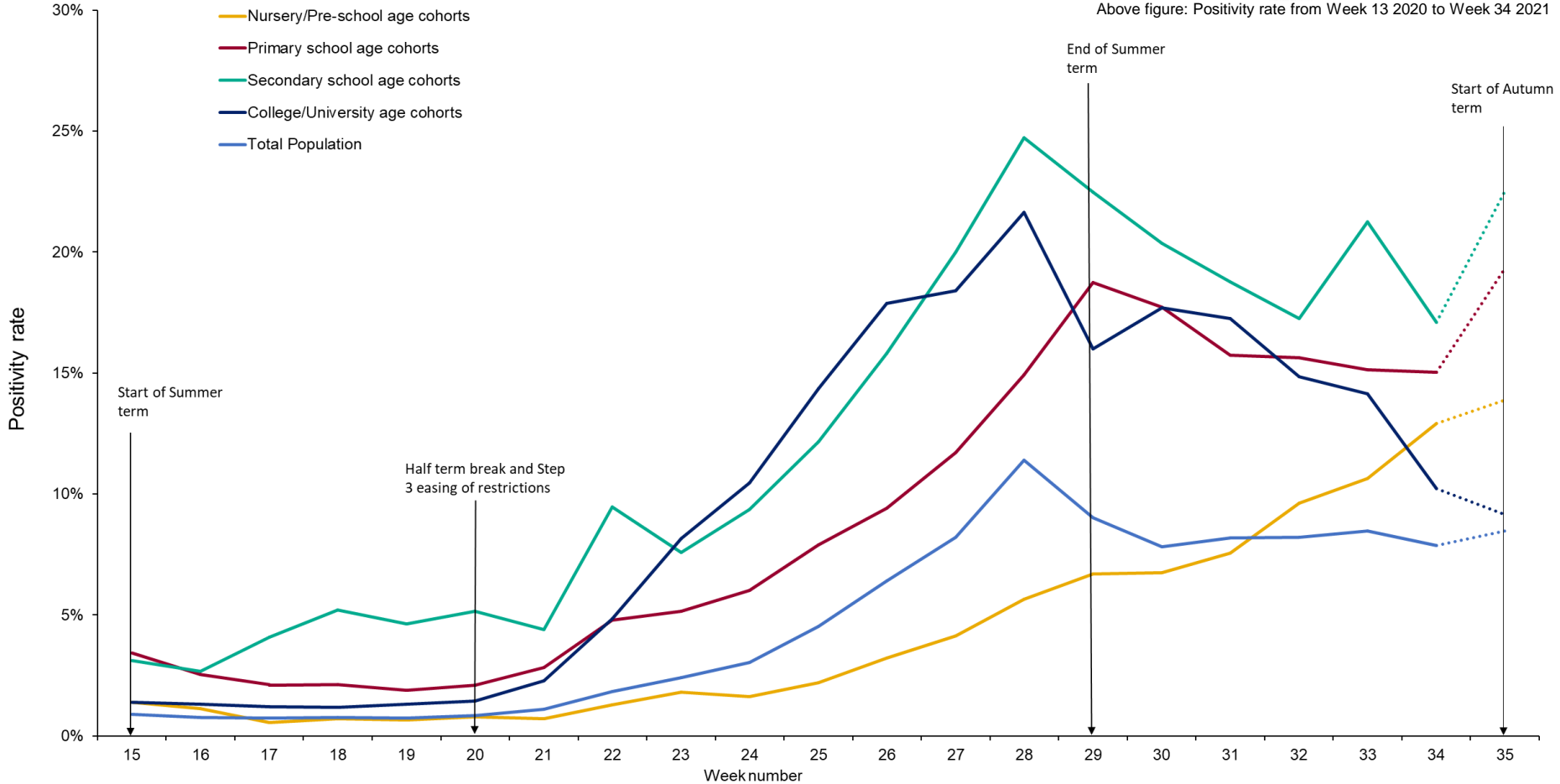


Weekly SARS-CoV-2 PCR positivity rates, Week 15 2021 to week 35 2021:

- nursery/preschool age cohorts
- primary school age cohorts
- secondary school age cohorts
- college/University age cohorts



Above figure: Positivity rate from Week 13 2020 to Week 34 2021

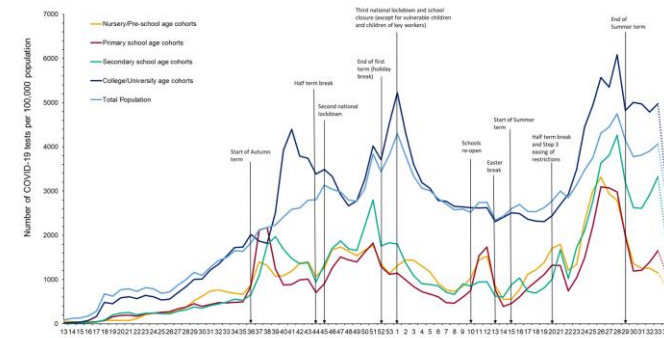


- Positivity data presented in this report has been calculated only using PCR from week 19 2020
- Previous reports have also included lateral flow device tests

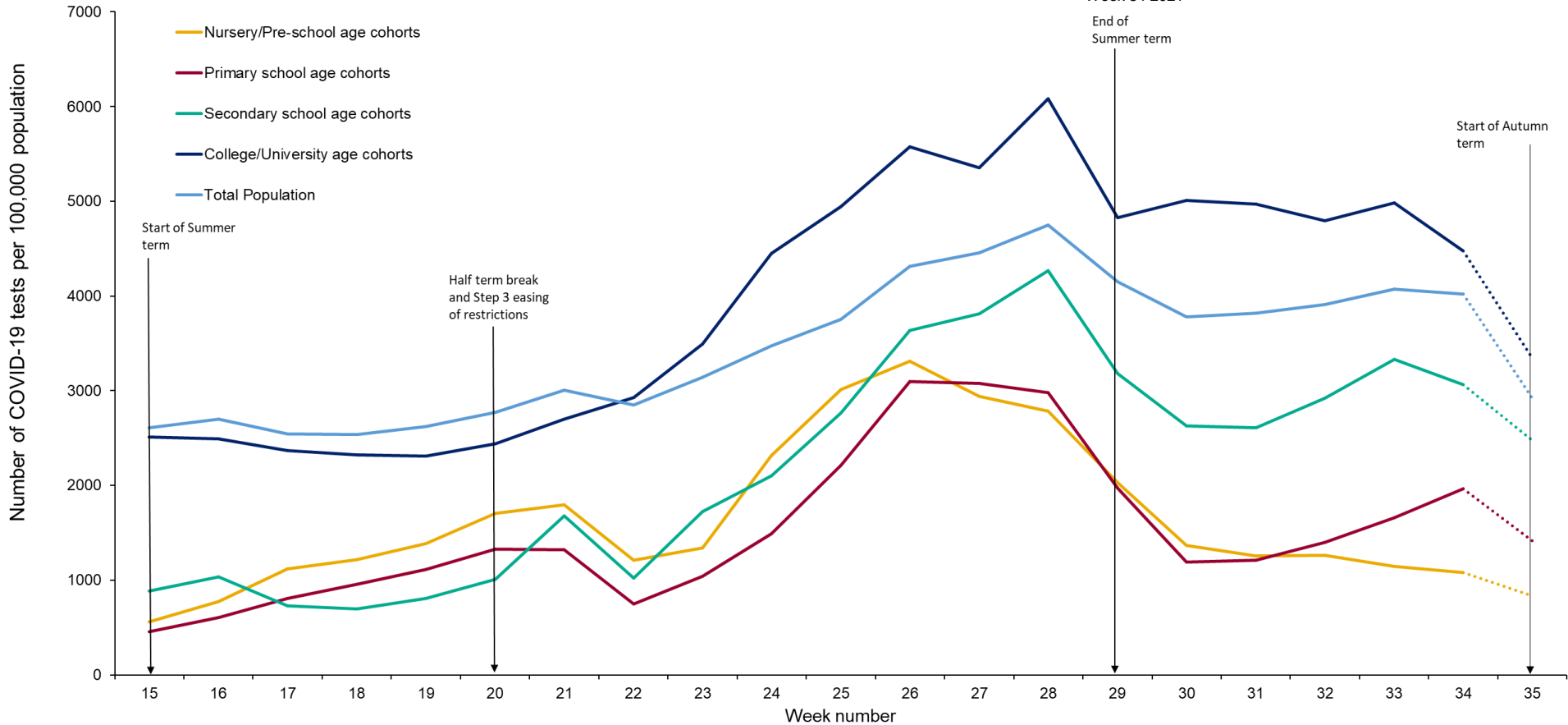


Weekly rate of individuals tested for SARS-CoV-2 by PCR per 100,000 population, from Week 15 2021:

- nursery/preschool age cohorts
- primary school age cohorts
- secondary school age cohorts
- college/University age cohorts



Above figure: Weekly rate of individuals tested from Week 13 2020 to Week 34 2021



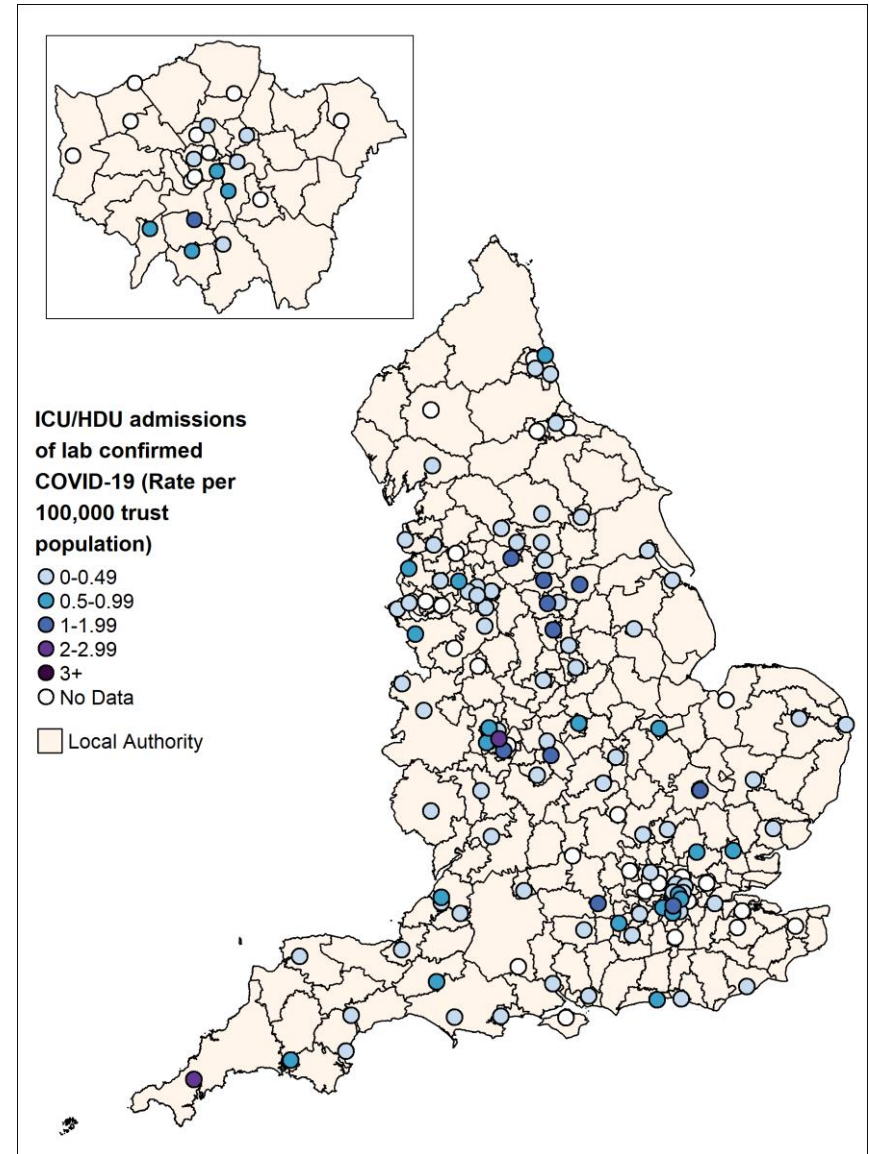
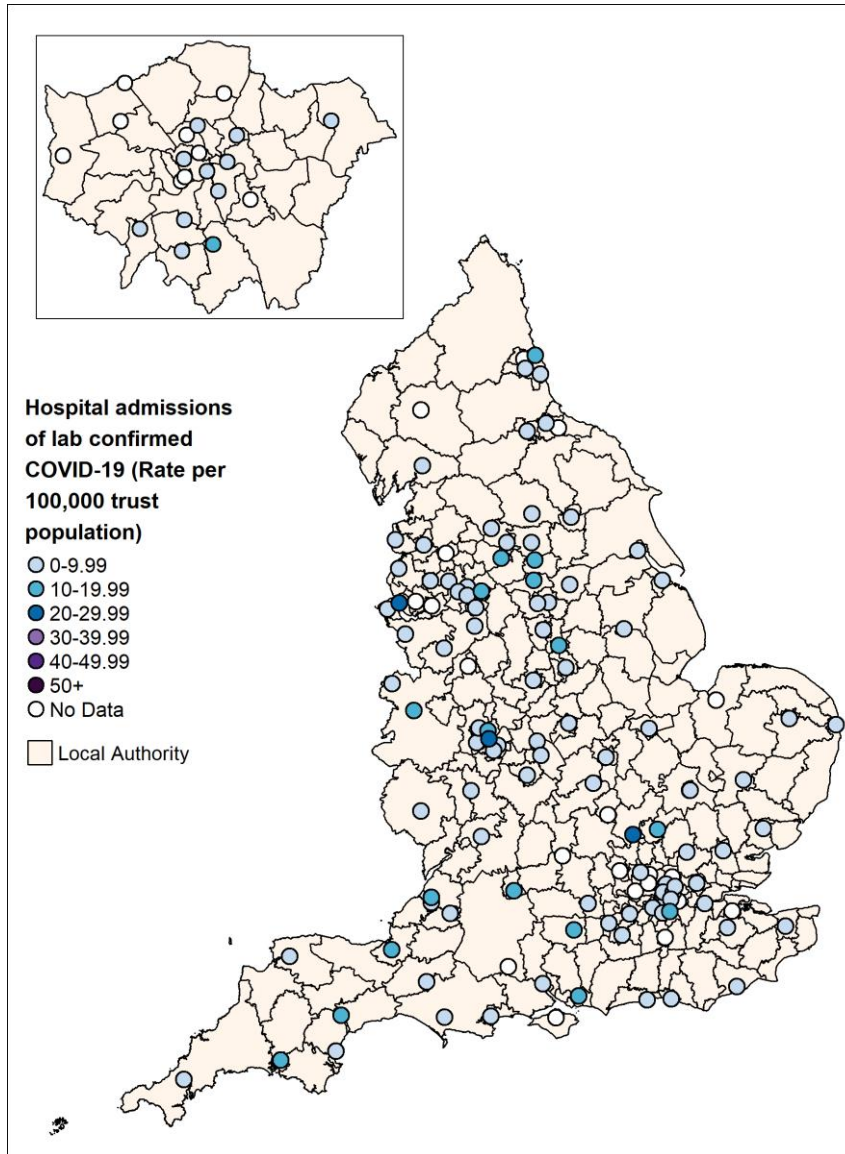
- Positivity data presented in this report has been calculated only using PCR from week 13 2020
- Previous reports have also included lateral flow device tests



Secondary Care surveillance



Weekly admission rates for hospital and ICU/HDU laboratory confirmed COVID-19 cases reported through SARI Watch, week 34



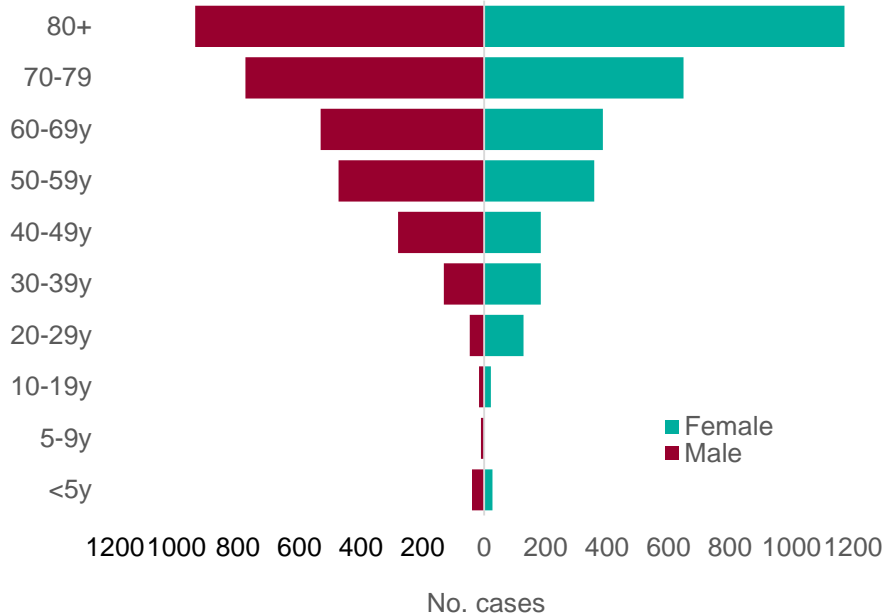
Please note the maps are for week 34 data and has not been updated for week 35

[Return to main menu](#)



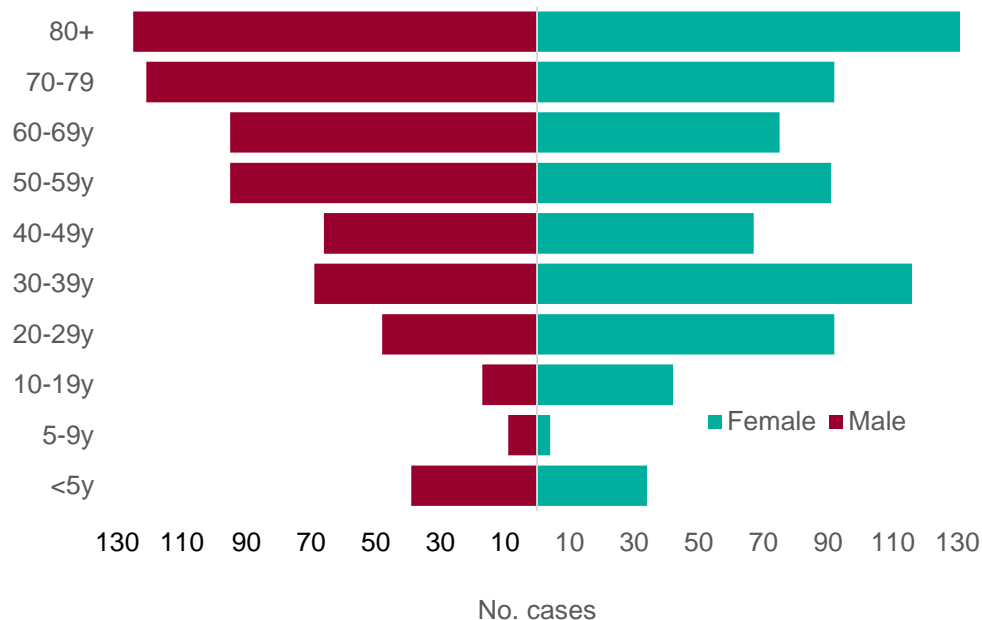
Age/sex pyramid of hospitalisations (all levels of care) for COVID-19, data from sentinel acute NHS trusts, England

(a) Peak of 2nd wave (week 53 2020 to week 3 2021) n= 6,359



Reporting trusts=22

(b) Most recent 4 weeks (week 32 to 35 2021) n=1,428



Reporting trusts=16

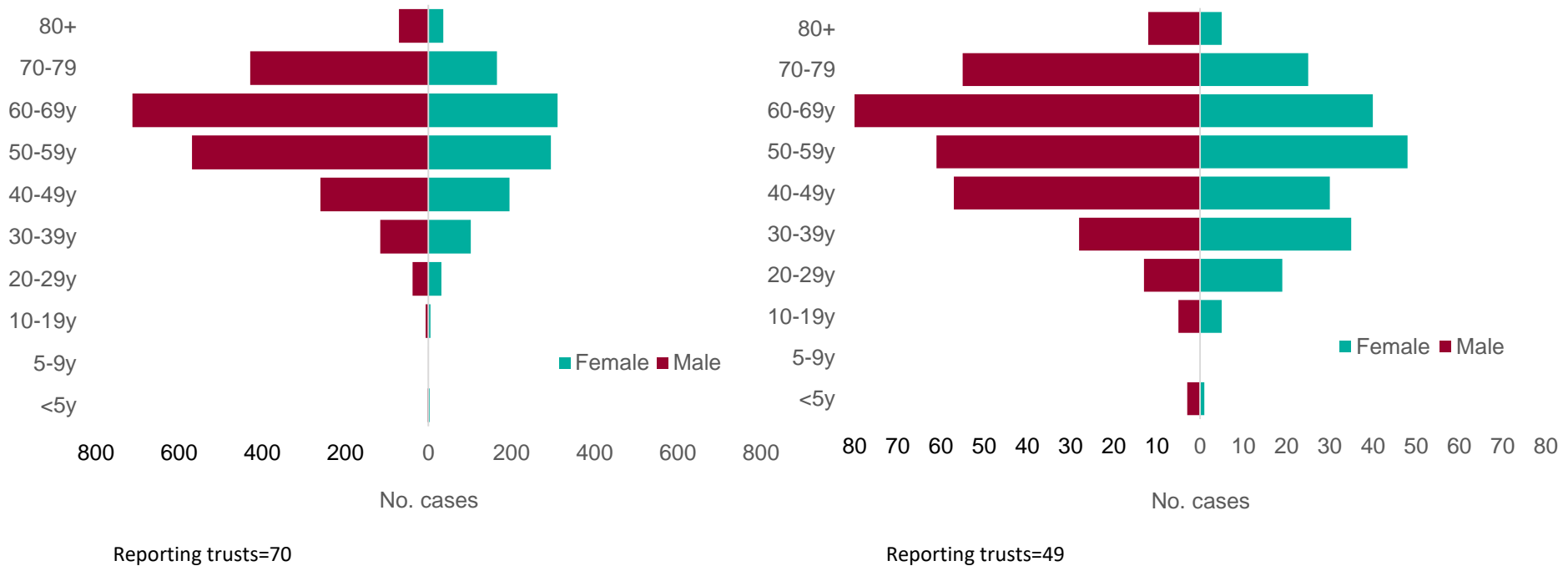
This figure is based on individual patient level data which are provided to SARI Watch from a subset of NHS Acute Trusts, therefore the data should be interpreted with caution as the distribution of age, sex and ethnic group may not be representative of all hospitalised patients.



Age/sex pyramid for admissions to ICU/HDU for COVID-19, mandatory case level data, acute NHS trusts, England

(a) Peak of 2nd wave (week 53 2020 to week 3 2021) n= 3,349

(b) Most recent 4 weeks (week 32 to 35 2021) n=529

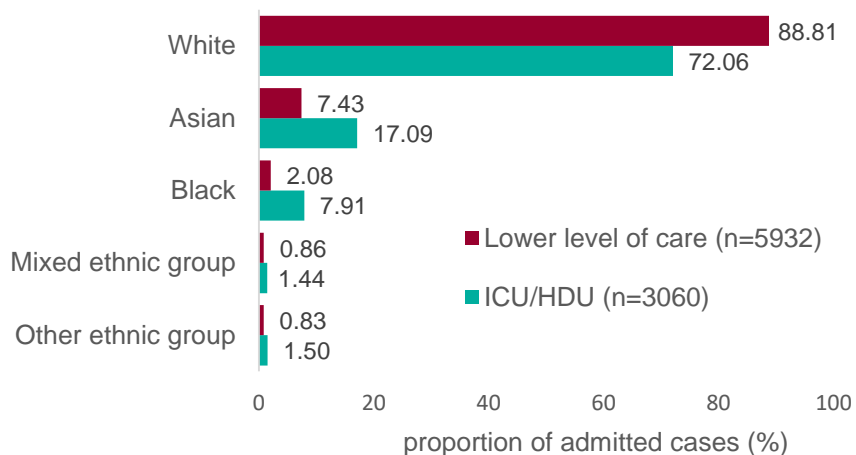


This figure is based on individual patient level data which are provided to SARI Watch from a subset of NHS Acute Trusts, therefore the data should be interpreted with caution as the distribution of age, sex and ethnic group may not be representative of all hospitalised patients.



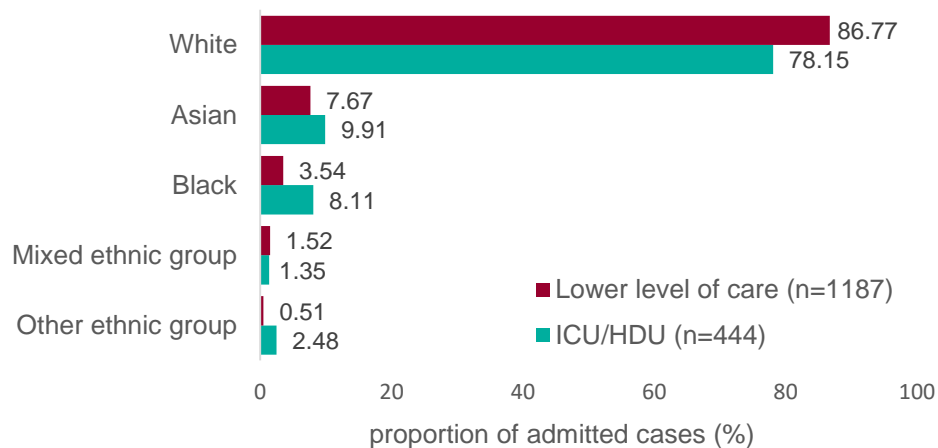
Laboratory confirmed admissions for COVID-19, to acute NHS trusts, by level of care and ethnicity

(a) Peak of 2nd wave (week 53 2020 to week 3 2021)



Reporting trusts
Lower level of care=21
ICU/HDU=68

(b) Most recent 4 weeks (week 32 to 35 2021)



Reporting trusts
Lower level of care=16
ICU/HDU=49

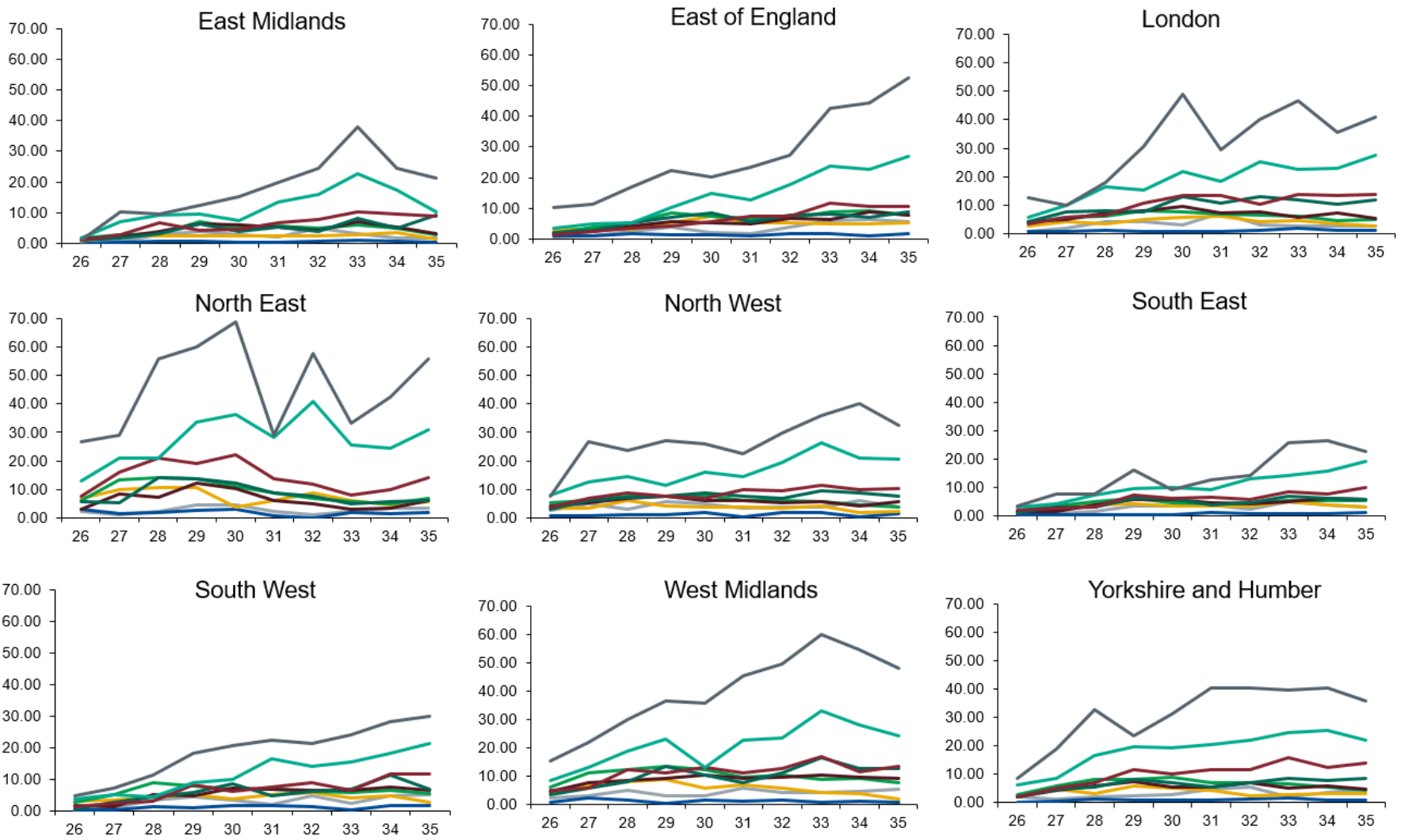
This figure is based on individual patient level data which are provided to SARI Watch from a subset of NHS Acute Trusts, therefore the data should be interpreted with caution as the distribution of age, sex and ethnic group may not be representative of all hospitalised patients.

Caveat: From week 24 the ethnicity analysis is based on a new method for assigning ethnicity, developed by PHE. The previous method used the most recent ethnicity recorded through linkage to Hospital Episode Statistics. However, this method led to unfeasibly high rates in the 'Other' ethnic group when applied to COVID-19 cases, hospitalisation or mortality. The new method uses the most frequent ethnicity recorded through linkage to Hospital Episode Statistics, unless the most frequent was 'Other' when the second most frequent was chosen.



Weekly COVID-19 hospitalisation rate per 100,000 trust catchment population by age group and region, weeks 26 to 35

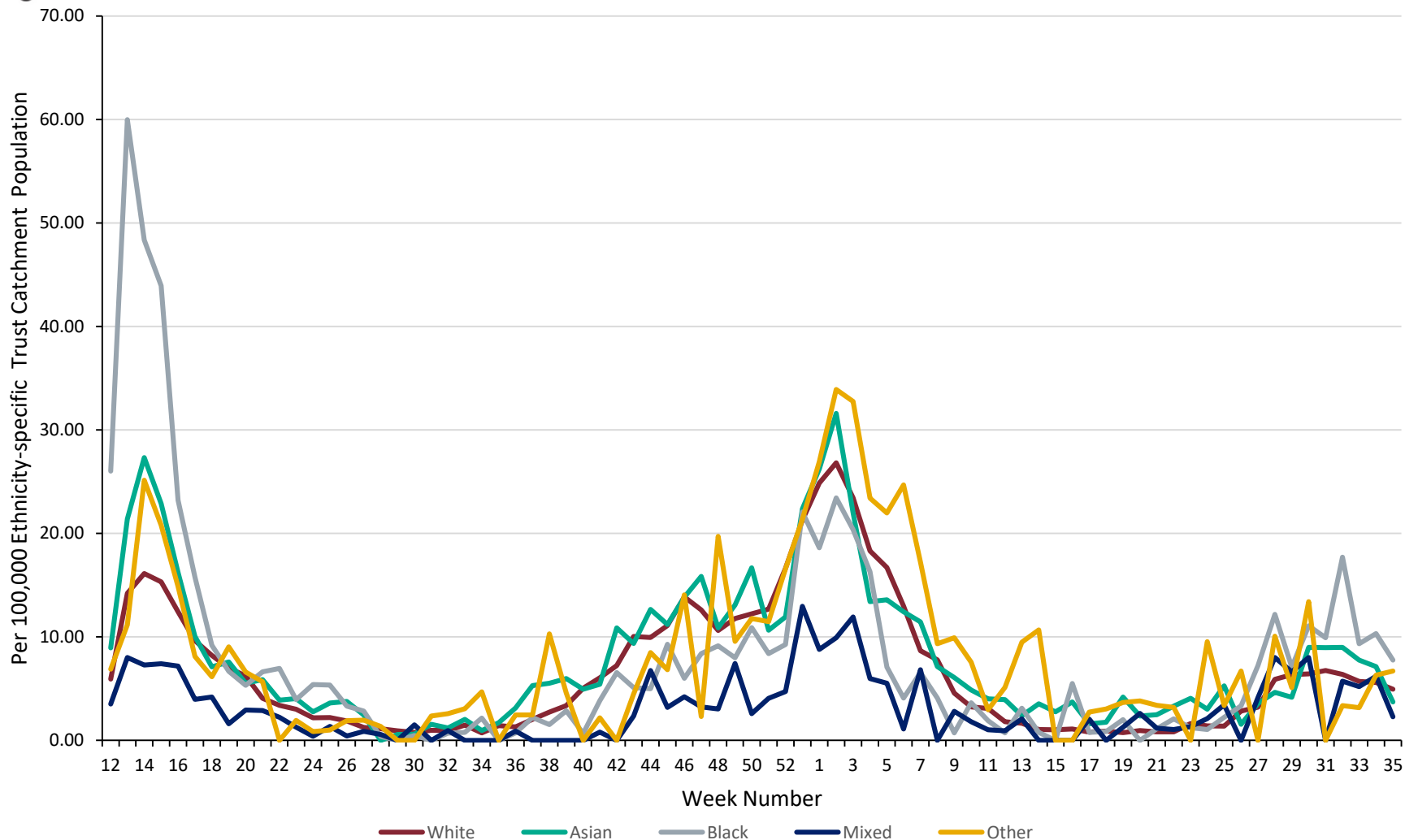
Weekly COVID-19 hospitalisation rate per 100,000 population



- 0 to 4
- 5 to 14
- 15 to 24
- 25 to 44
- 45 to 54
- 55 to 64
- 65 to 74
- 75 to 84
- 85+



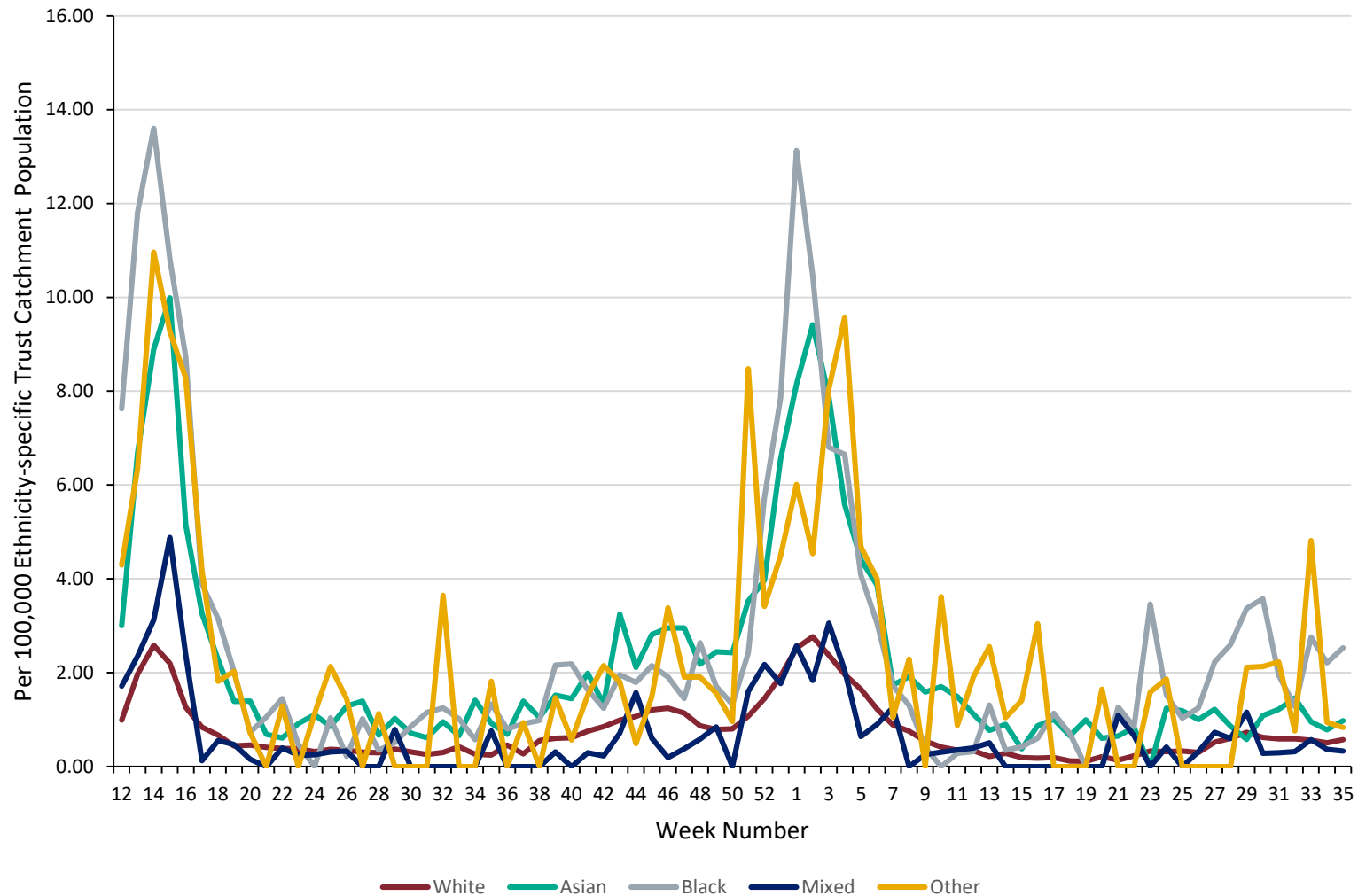
Hospital admission rate (excluding ICU/HDU) by ethnicity per 100,000 trust catchment population



Caveat: From week 24 the ethnicity analysis is based on a new method for assigning ethnicity, developed by PHE. The previous method used the most recent ethnicity recorded through linkage to Hospital Episode Statistics. However, this method led to unfeasibly high rates in the 'Other' ethnic group when applied to COVID-19 cases, hospitalisation or mortality. The new method uses the most frequent ethnicity recorded through linkage to Hospital Episode Statistics, unless the most frequent was 'Other' when the second most frequent was chosen.



Rate of admission to ICU/HDU by ethnicity, per 100,000 trust catchment population



Caveat: From week 24 the ethnicity analysis is based on a new method for assigning ethnicity, developed by PHE. The previous method used the most recent ethnicity recorded through linkage to Hospital Episode Statistics. However, this method led to unfeasibly high rates in the 'Other' ethnic group when applied to COVID-19 cases, hospitalisation or mortality. The new method uses the most frequent ethnicity recorded through linkage to Hospital Episode Statistics, unless the most frequent was 'Other' when the second most frequent was chosen.

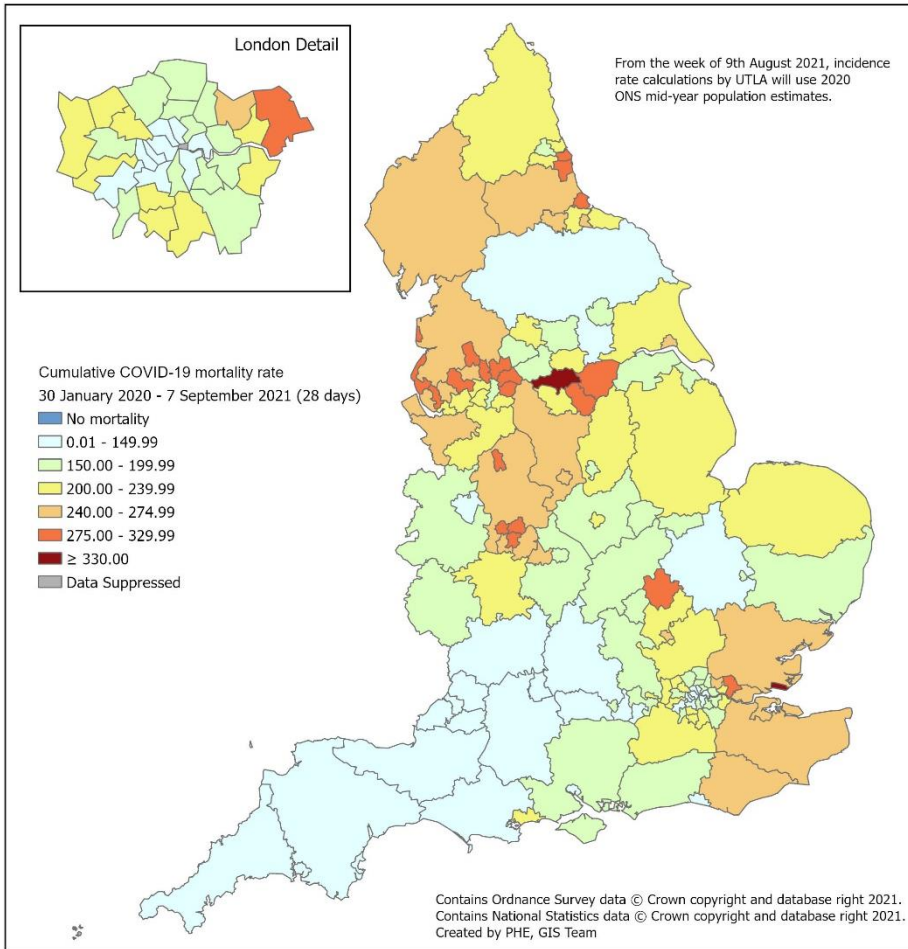


Mortality surveillance

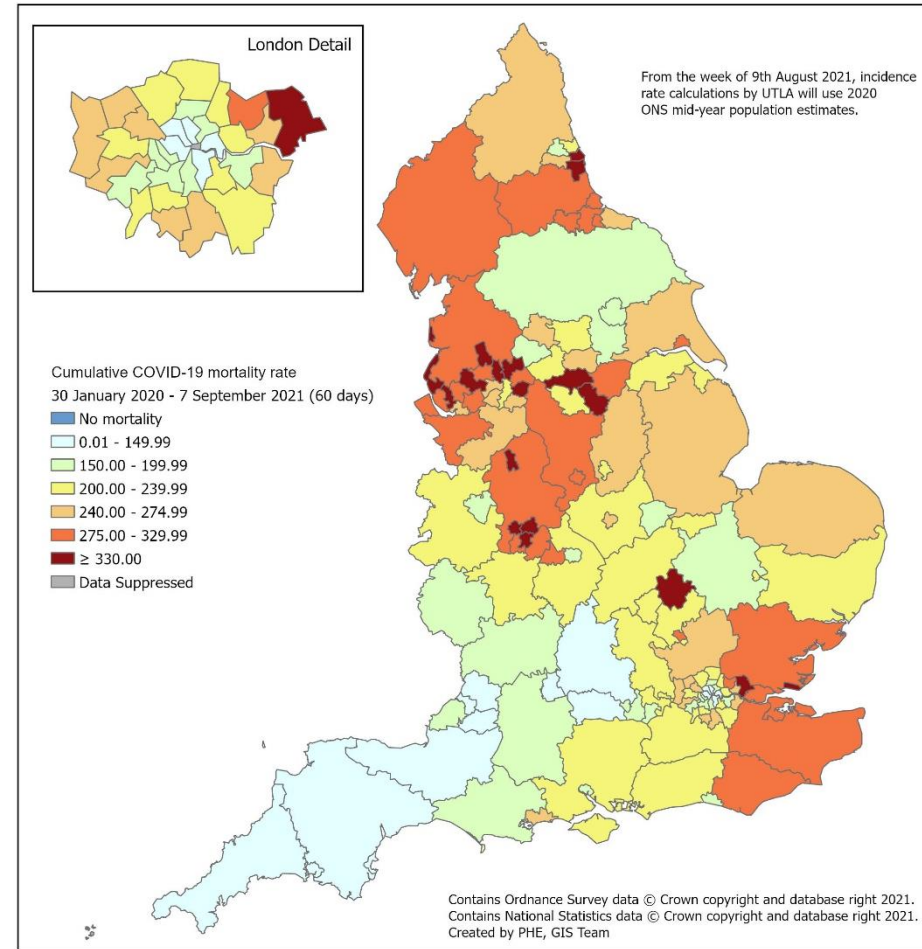


Cumulative mortality rate of COVID-19 cases per 100,000 population tested under Pillar 1 and 2 since the beginning of the pandemic by (a) 28 day definition and (b) 60 day definition

(a)

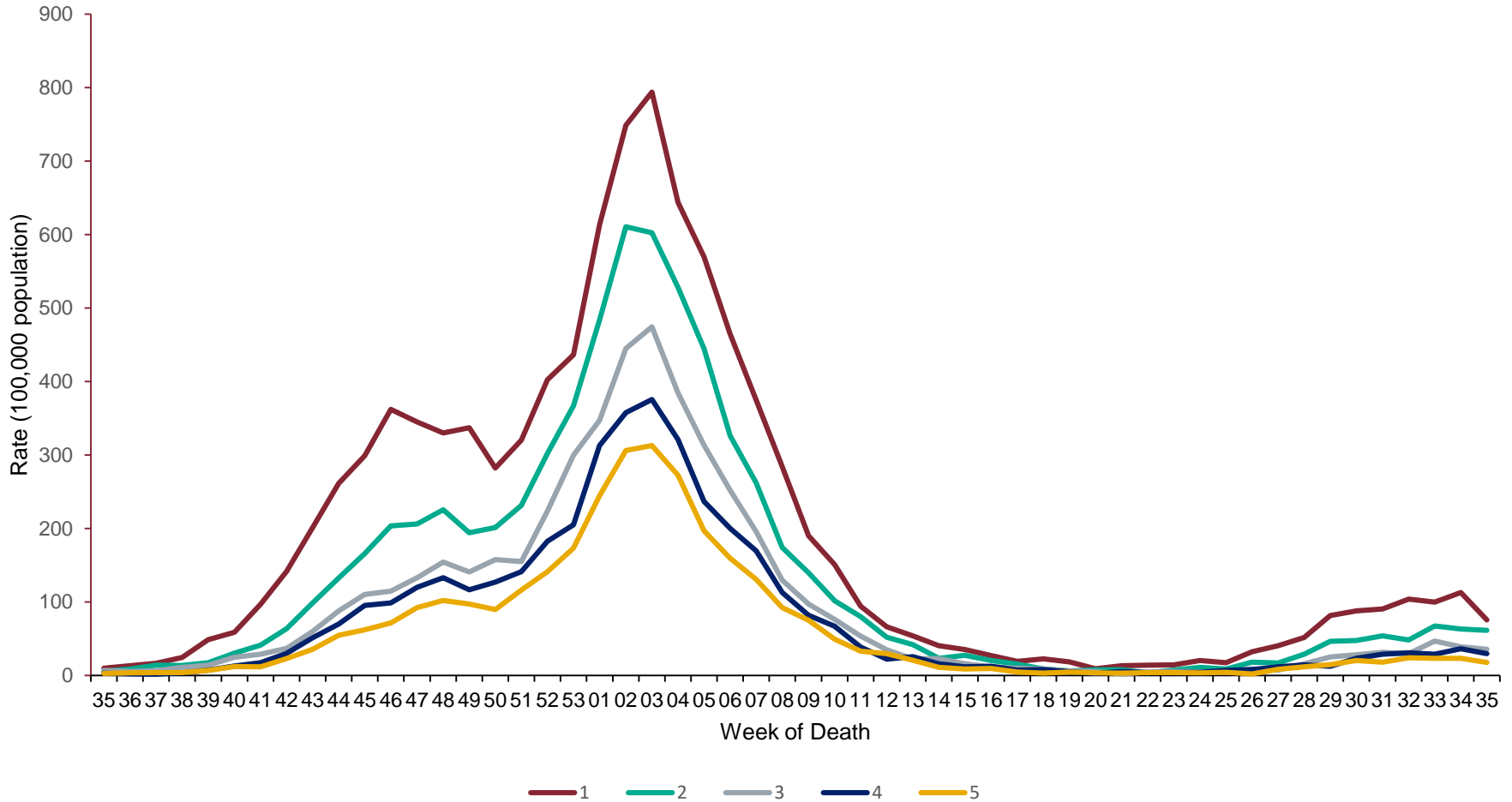


(b)





Age-adjusted mortality rate** (per 100,000 population) in laboratory-confirmed cases of COVID-19 by IMD quintile, by week using the 60 day definition



**Rates are time-adjusted: a weekly population denominator has been used to calculate the mortality rate



Possible reinfections in England

(updated monthly – last update 19 August)



Possible reinfections in England

The following figures present population data based on the first time that individuals tested positive for SARS-CoV-2 through PCR and/ or lateral flow device testing in England together with those who have tested positive for SARS-CoV-2 through PCR and/ or lateral flow testing with an interval of at least 90 days between two consecutive positive tests. This excludes positive LFD test results removed from the main SGSS dataset because the LFD test positive result was followed by a negative PCR result within 3 days and LFD test results where we have had feedback that a positive result was entered in error. The interval of 90 days is in line with the definition currently adopted within Siren, by CDC in [their definition](#) of a person to prioritise for investigation of suspected SARS-CoV-2 reinfection and the draft definition being considered by the World Health Organisation for a suspected reinfection.

These figures present population level data that complements studies that can undertake more detailed investigation at an individual level as exemplified by SIREN the large multicentre prospective cohort study that has followed around 45,000 participants employed by NHS hospitals. In line with [other studies](#), this suggested that those with serological evidence of a previous SARS_CoV-2 infection had an 84% lower risk of infection than those without evidence of prior infection over a median 7-month period.

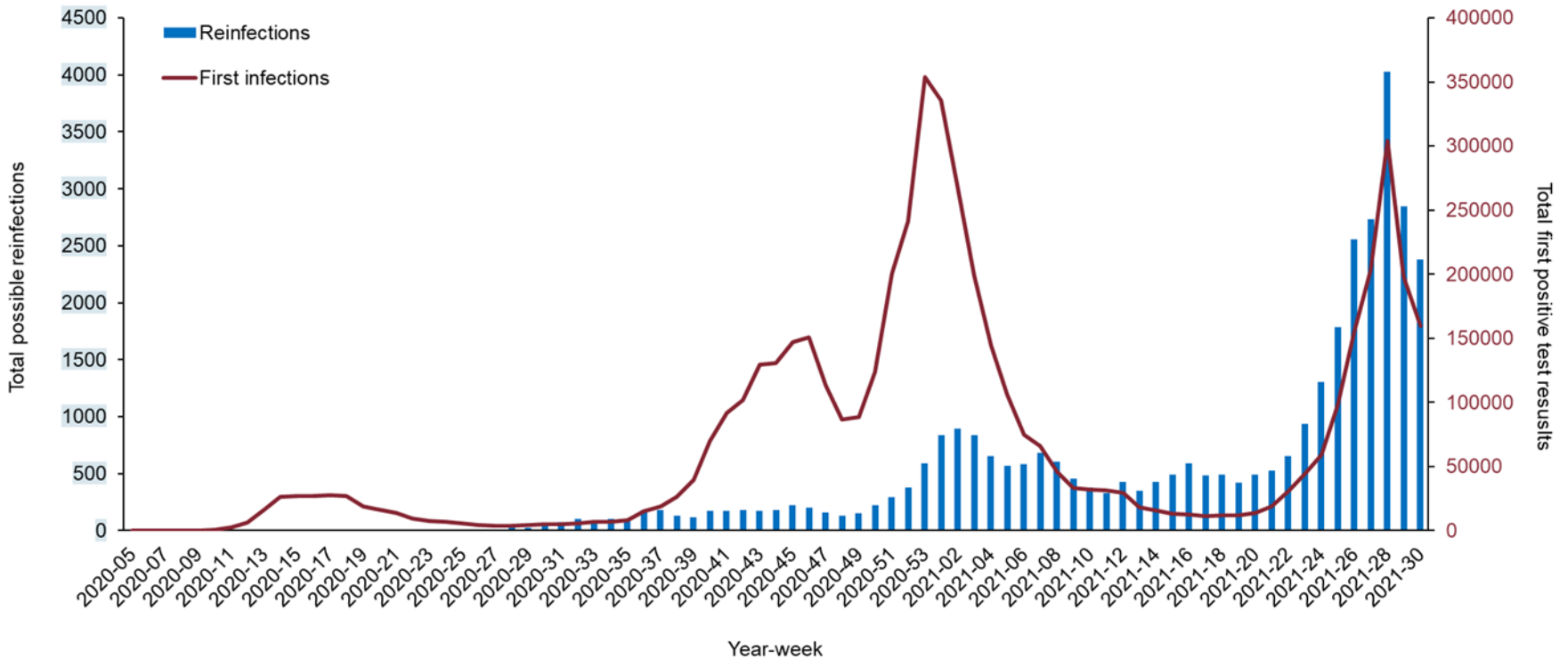
For a possible reinfection to be categorised as confirmed they require sequencing of a specimen at each episode and for the second specimen to be genetically distinct from that sequenced from the first episode. Availability of such dual sequencing is currently very low for several reasons; sequencing was not widely undertaken early in the pandemic; LFD test results do not allow sequencing and some PCR samples have a low viral load where sequencing cannot be undertaken. To meet the definition of a probable reinfection requires sequencing at the second episode that identifies a variant that was not circulating at the time of the first episode.

Further data on reinfections is published in the weekly Influenza and COVID-19 surveillance report.



Possible reinfections in England

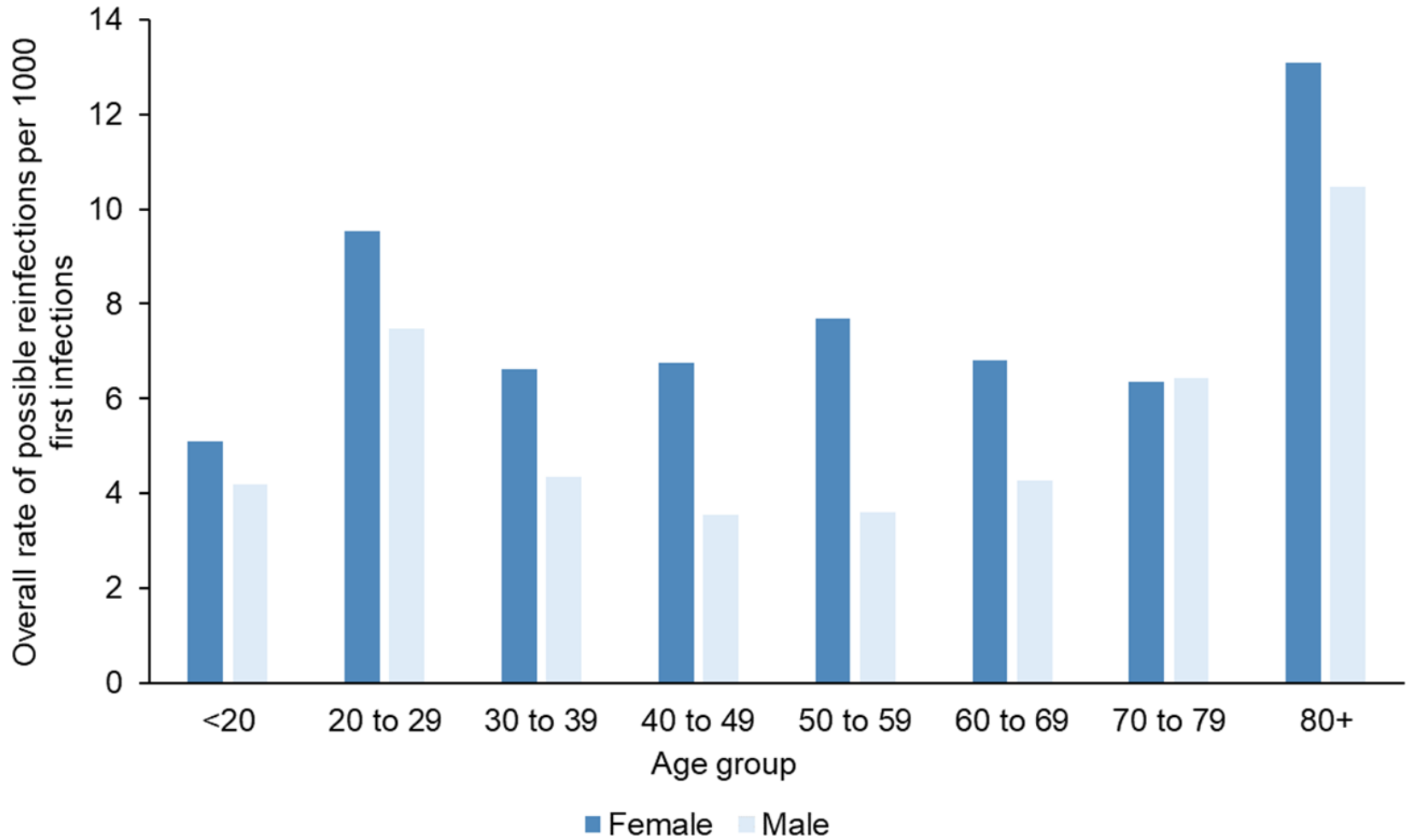
It is important to consider reinfections in the context of first infections and there is a 90-day delay before people with a first infection can become eligible for reinfection. The above graph shows: numbers of possible reinfections and numbers of first infections (secondary Y-axis) by week of onset (based on sample date throughout) through the weeks of the pandemic



*These data have been derived independently based on P1 and P2 datasets and may therefore differ to previously published data.



The age and sex distribution of possible reinfections by overall rate per 1000 first infections (up to week 30) by sex and age group in England





Co/secondary infections with COVID-19

(updated monthly – last update 2 September)



Co/secondary infections with COVID-19 (data updated monthly)

- Caveat - undertesting for other pathogens may result in an underestimate of co/secondary infection cases.
- Co/secondary infections refers to when a patient has an infection with more than one pathogen at the same time (co-infection), or acquires another infection after contracting the first infection (secondary infection).
- Numbers of co/secondary infection remain low across PHE surveillance systems except for patients with severe respiratory failure requiring Extra Corporeal Membrane Oxygenation (ECMO). Analysis of COVID-19 cases with severe respiratory failure requiring ECMO indicates co/secondary infections among these account for just less than a third of all severe respiratory failure cases due to infection.
- Preliminary data analysis from the first pandemic wave indicates that health care associated infections, *Streptococcus pneumoniae*, influenza, *Aspergillus* and *Candidemia* cases and cases with severe respiratory failure requiring ECMO have increased risk of mortality in comparison to patients without co/secondary infection.

Definitions agreed with DAs



Co/secondary infections among Extra Corporeal Membrane Oxygenation (ECMO) patients (patients with most severe clinical respiratory signs)

Analysis is based on cumulative data on ECMO activity from week 40 2019 (30 September 2019) to week 21 2021 (ending 8 August 2021) to cover two complete seasons. This period includes data from the first and second waves of the pandemic. COVID-19 cases are from week 05 2020 (commencing 27 Jan 2020) due to retrospective reporting.

- 31% (199/649) of ECMO patients with a laboratory confirmed respiratory infection (all aetiologies) had a co/secondary infection reported.
- 43% (16/37) of ECMO patients with a laboratory confirmed influenza had co/secondary infections (data from 2019/2020, no flu admissions to ECMO in 2020/21)
- 30% (168/549) of ECMO patients with laboratory confirmed COVID-19 had co/secondary infections. Of these 168 cases, the most frequent co/secondary infections in COVID-19 cases were Gram-negative bacilli (n=61) and fungi (n=33), accounting for 56% (94/168).



Bloodstream & respiratory infections (bacterial & fungal co/secondary infections) & *Clostridioides difficile* infections, in COVID-19 patients diagnosed in England in wave 2 (29 June 2020 to 30 April 2021 incl.) & wave 3 (1 May 2021 to 6 June 2021 incl.)

- In Wave 2 0.2% of COVID-19 patients had a key bacterial/fungal co/secondary infection, while in Wave 3 it was 0.1%, where a coinfection is defined as a positive bacterial/fungal isolate ± 1 day of first SARS-CoV-2 positive specimen date and a secondary infection defined as a positive bacterial/fungal isolate identified between 2 days and <28 days after the SARS-CoV-2 positive specimen date.
- Of all COVID-19 patients in Wave 2, 0.05% had key respiratory infection; 0.1% had a key bloodstream infection, while in Wave 3 0.02% and 0.03% had a key respiratory or bloodstream infection, respectively.
- In Wave 2, 82% of co/secondary infections of any site* were categorised as secondary infections versus 76% in Wave 3.
- Most frequent species identified from co/secondary infection isolates were:
 - **Respiratory:** *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Klebsiella pneumonia* in Wave 2 versus *S. aureus*, *K. pneumonia* and *Escherichia coli* in Wave 3.
 - **Blood:** *E. coli*, *S. aureus*, *Enterococcus faecium* and *K. pneumoniae* in Wave 2 versus *E. coli*, *K. pneumoniae*, and *Enterococcus faecalis* in Wave 3.
- Co-infections occurred more frequently in the elderly; those aged ≥ 60 y accounted for 77% in Wave 2 and 61% in Wave 3. Those aged ≥ 60 y accounted for 65% of secondary infections in Wave 2 but 30% in Wave 3. Furthermore, nearly half of Wave 3 secondary infections were amongst patients aged 40-59y (45%), although numbers are small and caution is advised in interpreting the data.

* Includes respiratory, bloodstream, *Clostridioides difficile* infection (CDI), as well as any combination of respiratory, bloodstream infection and CDI



Co/secondary infection with respiratory viruses, vaccine preventable bacteria and fungi

Bacteria/Fungi/Virus	First Wave (30 Jan 2020 - 28 June 2020)	Second Wave (29 June 2020 – 30 April 2021)	Third Wave (1 May 2021 – 24 August 2021)	Total Cases
Influenza A	33	3	2	38
Influenza B	13	7	3	23
Influenza A & B	1	0	0	1
Flu (not typed)	1	0	0	1
Parainfluenza (any subtype)	14	10	17	41
Seasonal coronavirus	111	52	18	181
Enterovirus	5	7	3	15
Adenovirus	14	14	5	33
Rhinovirus	97	61	15	173
RSV	23	3	83	109
Human metapneumovirus	55	1	6	62
<i>Aspergillus fumigatus</i> ISOLATES (azole resistant)	46 (4)	120 (2)	32 (1)	198 (7)
Probable/Proven cases of CAPA	15	38	8	61
<i>Candida</i> spp.: Candidemia	63	133	4	200
<i>Bordetella pertussis</i>	0	0	0	0
<i>Haemophilus influenzae</i>	3	2	0	5
<i>Neisseria meningitidis</i>	2	0	0	2
<i>Streptococcus pneumoniae</i>	40	45	6	91

Please note fungal data refers to secondary infections only.

The UK moved out of influenza season in early 2020 (for the 2019/20 season) when COVID-19 began to increase in March 2020.

Data contains results from two systems (Respiratory DataMart system and SGSS). Coinfection is defined as their sample dates ≤ 1 day.

Mycology data contains results from Mycology reference laboratory data, Candidaemia is representative of deep infection. One case of osteomyelitis, one case of ventriculitis and one case of endocarditis was documented in wave two.

Legionella, *Mycoplasma* and gastrointestinal infection data not included.