Public Health England

Protecting and improving the nation's health

Serological Surveillance: Summary report 7
PHE Surveillance Cell

3 June 2020

Key messages:

- **Overall population weighted prevalence estimates in 17-69 year olds in England for weeks 18-21 was 8.5% [6.9%-10.0%] with evidence of higher prevalence in younger adults and males.**
- **Results from testing an additional 1847 adult blood donor samples (collected in mid-May (week 21)) from London and the South West regions are included in this week's report. An additional 142 paediatric samples collected in weeks 17-18 from Great Ormond Street Hospital (GOSH) are also included.**
- **Adjusted prevalence rates in blood donors in the London have remained fairly stable in recent weeks, increasing from 14.8% [95%CI: 11.8% - 18.3%] in week 18 to 15.6% [12.2% - 19.5%] in week 21.**
- **Adjusted prevalence rates in blood donors in the South West are lower in week 21 (2.6% [0.5%-4.8%]) compared with week 17 (4% [1.8% - 6.4%]).**
- **The adjusted prevalence in paediatric samples collected from GOSH show an increase between weeks 14-15 (15.1% [9.7% - 21.6%]) and weeks 16-18 (18.3% [13.6% - 23.8%]).**

Enhanced Sero-surveillance

Details of the serosurveillance sample sources can be found in previous reports. The data presented in this report has been ascertained using adult samples from blood donors in England (NHS Blood and Transplant (NHSBT)) and Wales (Welsh Blood Service, WBS) with regions sampled at different time periods. This week's report presents for the first time a national adjusted prevalence estimate for England for May (weeks 18-21) using the blood donor data. In addition, the results from testing a fourth set of blood donor samples from London, and a second set of samples from the South West (comprising 1847 new samples in total). In addition, results from adding the 142 paediatric samples collected in weeks 17-18 from Great Ormond Street Hospital (GOSH) to the 690 previous samples from weeks 12-18 are summarised.

Results

Seroprevalence estimates presented here are based on a total of 15,323 adult samples from NHSBT and Welsh Blood Service (WBS) and includes the results of 797 new samples from London and 1050 new samples from the South West (collected in week 21 which is the week ending May 24th 2020).

Seroprevalence estimates amongst blood donors were adjusted for the sensitivity and sensitivity of the EuroImmun assay, based on sensitivity of 137/173 (79.2%) and specificity of 699/707 (98.9%) and uncertainty using a Bayesian approach. Further details have been provided in previous reports. These adjustments are the same as in the previous summary report 6.

The NHSBT analysis includes an adjusted prevalence weighted to match the regional, age and gender distribution of the general population – weightings used ONS population data by NHS region (1). For NHSBT, age standardisation was for ages 17 – 69, using ~10 year age bands as given in Table 1. NHS region of residence, rather than NHS region of sampling, was used in this analysis.

Blood donor data

1) Country-wide prevalence estimate for weeks 18-21 (April 28-May 24)

Since prevalence estimates appear to have stabilised from week 18 onward, with only small increases or decreases observed, we estimated an overall adjusted and population weighted prevalence estimate for all England over the period of week 18-21 by age, sex and for all adults aged 17-69. These results are given in Table 1 below and indicate an overall 8.5% prevalence.

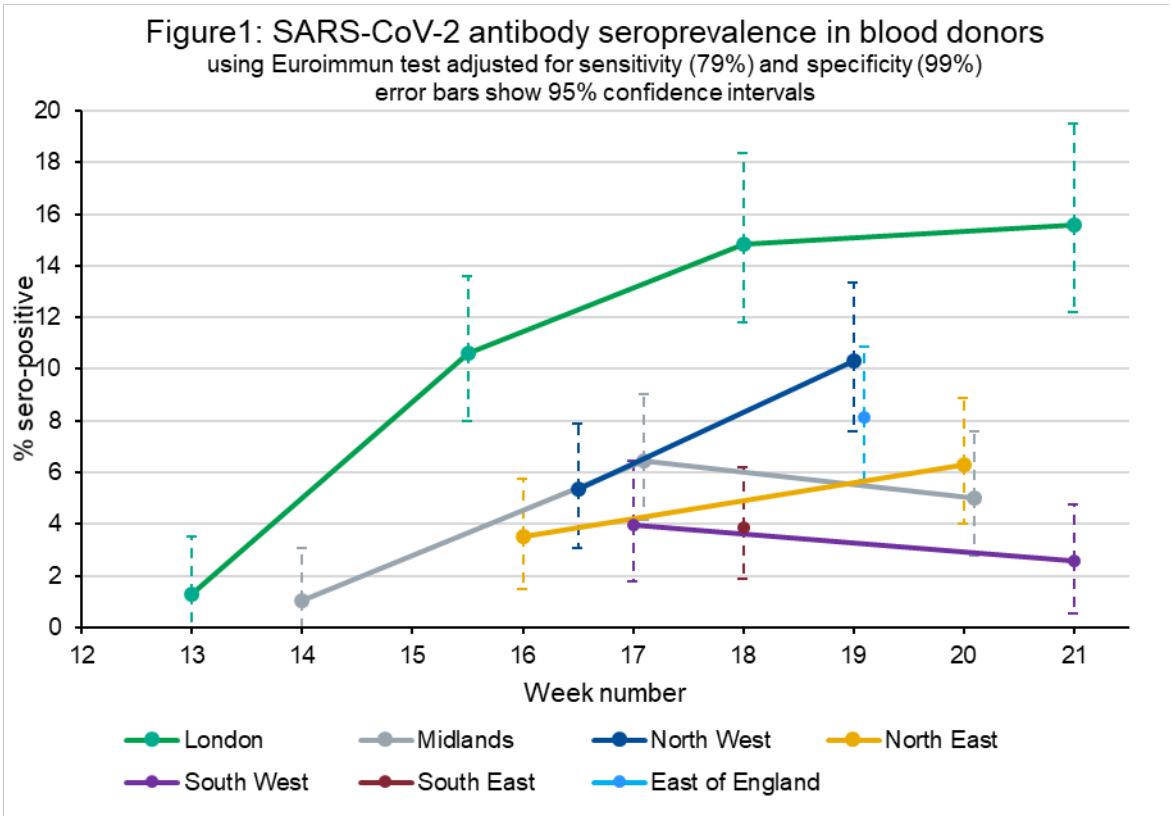
Table 1: Population weighted adjusted prevalence estimates for Weeks 18-21 for all England using the Euroimmun assay

Group	pos	total	adjusted prevalence (95% CrI)
All ages	614	7694	8.5% (6.9% - 10.0%).
Age 17-29	145	1329	10.2% (8.0% - 12.6%)
Age 30-39	152	1673	9.3% (7.2% - 11.3%)
Age 40-49	114	1580	7.9% (5.9% - 9.9%)
Age 50-59	138	1890	7.8% (5.8% - 9.7%)
Age 60-69	65	1222	6.3% (4.3% - 8.2%)
Female	277	3874	7.6% (5.9% - 9.2%)
Male	337	3820	9.4% (7.5% - 11.2%)

2) Regional prevalence estimates over time

The additional results from week 21 (**Figure 1**) show that adjusted prevalence in London has shown a modest increase from 14.8% (11.8% - 18.3%) in week 18 to 15.6% (12.2% - 19.5%) in week 21. In contrast, the week 21 data for the South West (the second sample set from this region) indicates a slightly lower adjusted prevalence at 2.6% [0.5% - 4.8%] compared with 4% [1.8% - 6.4%] in week 17. (**Table 2, Appendix 1**).

Figure1: *Adjusted SARS-CoV-2 antibody seroprevalence in UK blood donors*



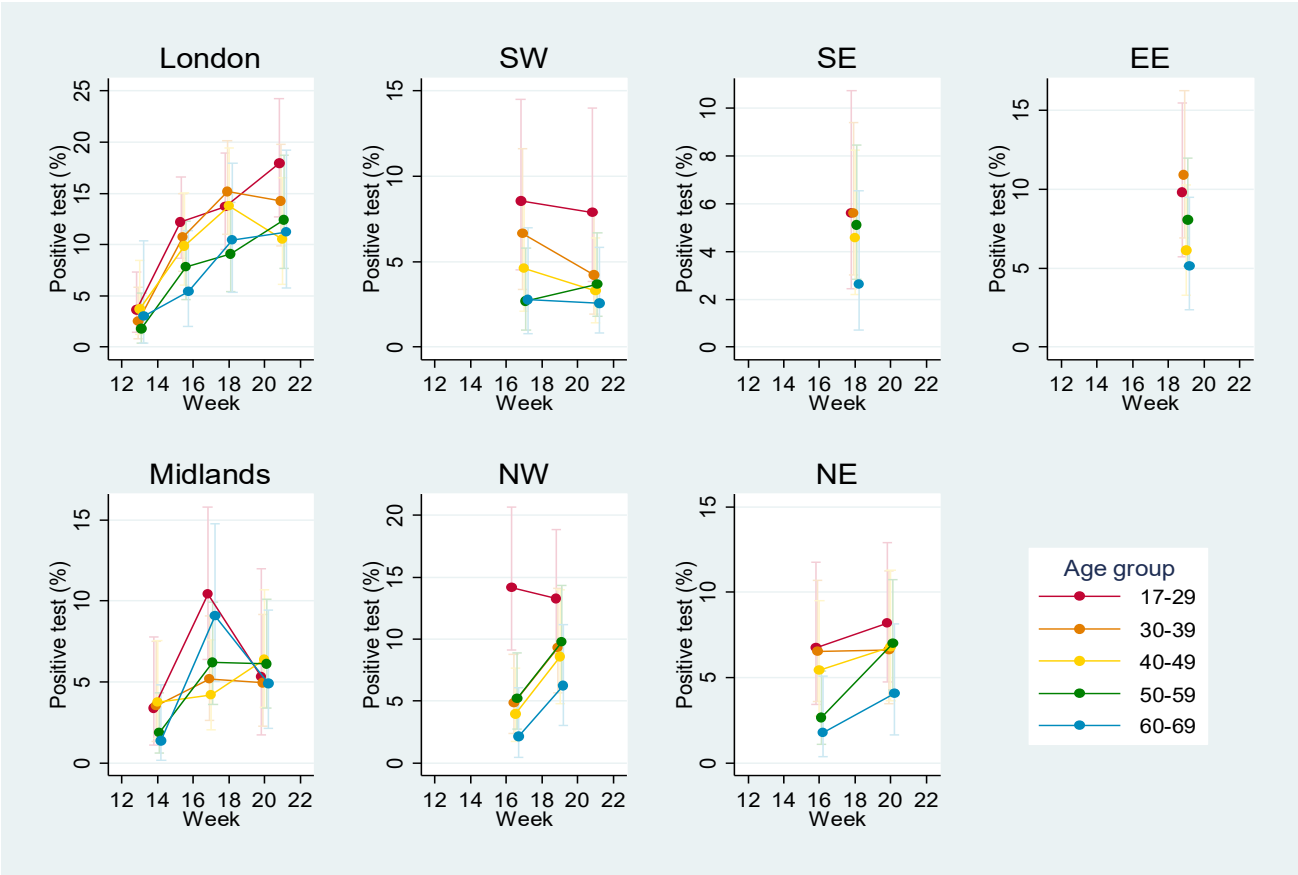
*using Euroimmun assay adjusted for sensitivity (79%) and specificity (99%)

**error bars show 95% confidence intervals

The % positive by ~10 year age bands are shown in **Figure 2**. In week 21, young adults aged 17-29 in London and the South West show the highest % positive test results. In other regions, such as the North East, North West and Midlands the gap between the age groups had narrowed considerably, however this trend of a narrowing gap is not apparent in London and the South West in week 21. The 60-69 year age group typically has lower % positive in all regions.

Please note that about 1-2% of the samples come without demographic data, and hence prevalence estimates in this report are based on the 98-99% sets with available data.

Figure 2: *NHSBT % positive test results by age (error bars show 95% CI), region and period of sampling, using the Euroimmun assay*



Paediatric seroprevaence estimates based on testing samples from GOSH

The results from testing an additional 142 samples from GOSH have been added to the previous analyses in order to provide more up to date estimates of prevalence among this population for weeks 16 – 18. These new samples suggest that adjusted prevalence has increased between weeks 14-15 (15.1% [9.7% - 21.6%]) and weeks 16-18 (18.3% [13.6% - 23.8%]) (**Table 3, Appendix 1)**.

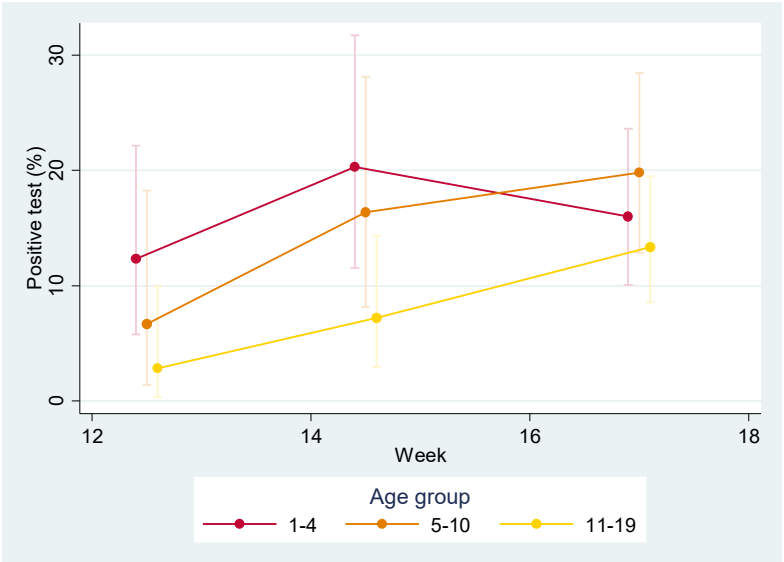


Figure 3: *GOSH % positive test results by age and period of sampling, using the Euroimmun assay*

When stratified by age for weeks 16 – 18, the disparity in % positive test results seen in earlier weeks (in which younger children had a higher % postive than older ones) has narrowed, due to both a higher prevalence among older children, and a lower prevalence among younger children (**Figure 3**).

Comments

This week's report provides for the first time an overall adjusted prevalence for England during May 2020 (weeks 18-21) a period when prevalence had generally stabilised. This is based on testing 7694 adult donor samples aged 17-69 years and indicates an overall prevalence of 8.5%. Prevalence declines with increasing age from 10.2% in 17-29 year olds to 6.3% in 60-69 year olds. Prevalence amongst males was 1.8% higher than females (9.4% and 7.6% respectively).

In addition we provide more detailed analyses on the results of serial sampling in London and the South West; results that supplement existing data presented in previous reports from serial sampling in the Midlands, the North West and North East, and individual collections from the South East and East of England.

The estimates among adults show a very modest increase in prevalence within London, such that the prevalence appears to have reached a plateau. Prevalence estimates from the South West are lower in weeks 21 compared with weeks 17, similar to the pattern observed in the Midlands which has previously been reported. This could be driven by precise locations of sampling; the most recent set of samples from the South West contains greater numbers of samples from Taunton, Torquay and Salisbury, which all appear to be areas with low prevalence. In addition, the sensitivity of the assay over time (for instance, 60 or more days post onset) remains unclear, and this is something that must be taken into account when assessing declines in prevalence over time. With regards to age-stratified analysis, both London and the South West display a similar pattern, with higher prevalence in young adults.

The age and region specific pattern may reflect differences in behaviour and mixing patterns in the different age groups, combined with timing of the epidemic.

Additional data from children tested at Great Ormond Street hospital is available this week, and shows some evidence of an increase in prevalence among this population, along with a flatter prevalence across age groups. Although both of these observations may be effects of lockdown measures, additional results from a range of paediatric samples will be helpful in facilitating a more detailed interpretation. Samples from What's the Story study, with healthy children and adolescents up to the age of 25, should provide more insights in the coming weeks.

Appendix 1: Additional data

***Table 2**: Summary of NHSBT Prevalence Estimates by region and period of sampling, using the Euroimmun assay*

Region	date range	Week of collection	pos	total	% pos (95% CI)	adjusted prevalence (95% CrI)
NHS blood & transplant						
London	26-27 Mar	13	22	757	2.9% (1.8% - 4.4%)	1.3% (0% - 3.5%)
	9-13 Apr	15-16	107	1085	9.9% (8.2% - 11.8%)	10.6% (8% - 13.6%)
	1-3 May	18	127	974	13.0% (11.0% - 15.3%)	14.8% (11.8% - 18.3%)
	21 - 22 May	21	109	797	13.7% (11.4% - 16.3%)	15.6% (12.2% - 19.5%)
Midlands	2-3 Apr	14	25	916	2.7% (1.8% - 4.0%)	1% (0% - 3.1%)
	23-24 Apr	17	70	1043	6.7% (5.3% - 8.4%)	6.4% (4.1% - 9%)
	14-15 May	20	49	870	5.6% (4.2% - 7.4%)	5% (2.8% - 7.6%)
NE	14-16 Apr	16	46	1016	4.5% (3.3% - 6.0%)	3.5% (1.5% - 5.8%)
	13-14 May	20	67	1014	6.6% (5.2% - 8.3%)	6.3% (4% - 8.9%)
NW	15-20 Apr	16-17	55	936	5.9% (4.5% - 7.6%)	5.3% (3.1% - 7.9%)
	6-8 May	19	92	959	9.6% (7.8% - 11.6%)	10.3% (7.6% - 13.3%)
SW	24-26 Apr	17	42	865	4.9% (3.5% - 6.5%)	4% (1.8% - 6.4%)
	21 - 22 May	21	42	1050	4.0% (2.9% - 5.4%)	2.6% (0.5% - 4.8%)
SE	30 Apr - 1 May	18	49	1020	4.8% (3.6% - 6.3%)	3.9% (1.9% - 6.2%)
EE	7-10 May	19	81	1015	8.0% (6.4% - 9.8%)	8.1% (5.7% - 10.9%)
Welsh blood service						
Wales		17	34	1006	3.4% (2.4% - 4.7%)	1.7% (0.1% - 3.8%)

***Table 3**: Summary of GOSH Prevalence Estimates by period of sampling, using the Euroimmun assay*

date range	Week of collection	pos	total	% pos (95% CI)	adjusted prevalence (95% CrI)
20-28 Mar	12-13	14	190	7.4% (4.1% - 12.1%)	7.3% (2.8% - 13.2%)
1-12 Apr	14-15	31	235	13.2% (9.1% - 18.2%)	15.1% (9.7% - 21.6%)
13-22 Apr	16-18	64	407	15.7% (12.3% - 19.6%)	18.3% (13.6% - 23.8%)