Public Health England

Protecting and improving the nation's health

Serological Surveillance: Summary report 6
PHE Surveillance Cell

27 May 2020

Key messages:

- **Results from testing an additional 1936 adult blood donor samples (collected in mid-May (weeks 19 and 20)) from the North-East, Midlands and East of England regions, and an additional 94 paediatric samples from GOSH (collected in weeks 12 - 17) are included in this week's report.**
- **Adjusted prevalence rates in blood donors in the North East have increased from 3.5% [1.5% - 5.8%] in week 16 to 6.3% [4% - 8.9%] in week 20.**
- **Adjusted prevalence rates in blood donors in the Midlands have decreased from 6.4% [4.1% - 9%] in week 16 to 5% [2.8% - 7.6%] in week 20.**
- **Differences in prevalence seen between age groups (with highest prevalence in young adults) in earlier sampling are no longer apparent by week 20 in the North East and the Midlands.**
- **The adjusted prevalence in paediatric samples collected from GOSH show a minimal increase between weeks 14 (15.1% [9.7% - 21.6%]) and 16 (15.6% [10.4% - 22%]).**

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 at regular intervals. This week's report presents the results from testing a second set of blood donor samples from the North East of England, an addional set of samples from the East of England (within the same time period as previously presented) and the third set of samples from the Midlands (comprising 1936 samples in total). In addition, results from the testing of 94 paediatric samples collected from Great Ormond Street Hospital (GOSH) are summarised.

Results

Seroprevalence estimates presented here are based on a total of 12,470 adult samples from NHSBT and Welsh Blood Service (WBS) and includes the results of 1014 new samples from the North East

(collected in week 20), 870 new samples from the Midlands (collected in week 20) and 52 new samples from the East of England (collected in week 19).

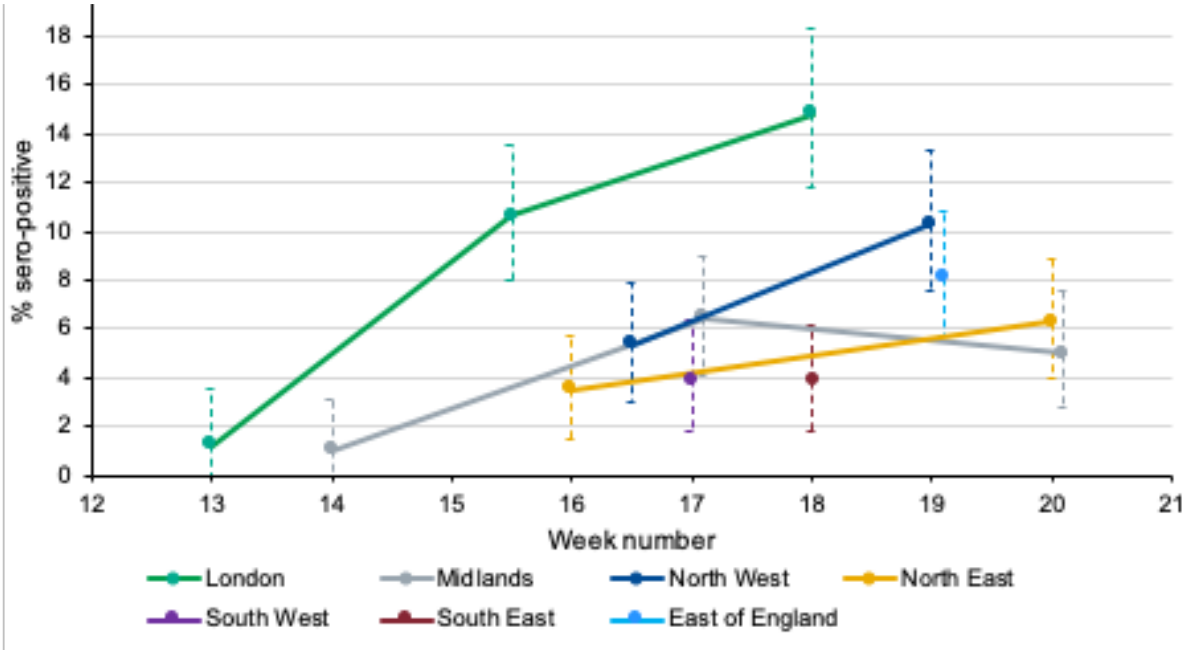
Seroprevalence estimates amongst blood donors were adjusted for the sensitivity and sensitivity of the EuroImmun assay, based on sensitivity of 137/173 (79.2%) and specificity of 699/707 (98.9%) and uncertainty using a Bayesian approach. Further details have been provided in previous reports.

The NHSBT analysis includes adjusted prevalence weighted to match the 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 age group categories as given in Figure 1.

Blood donor data

The additional results from week 20 (**Figure 1**) show that adjusted prevalence in the North East has increased from 3.5% (week 16) to 6.3% (week 20). In contrast, the week 20 data for the Midlands (the third sample set from this region) indicates a slightly lower adjusted prevalence, falling from 6.4% [4.1% - 9%] in week 17 to 5% [2.8% - 7.6%]in week 20. (**Table 1, Appendix 1**).

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



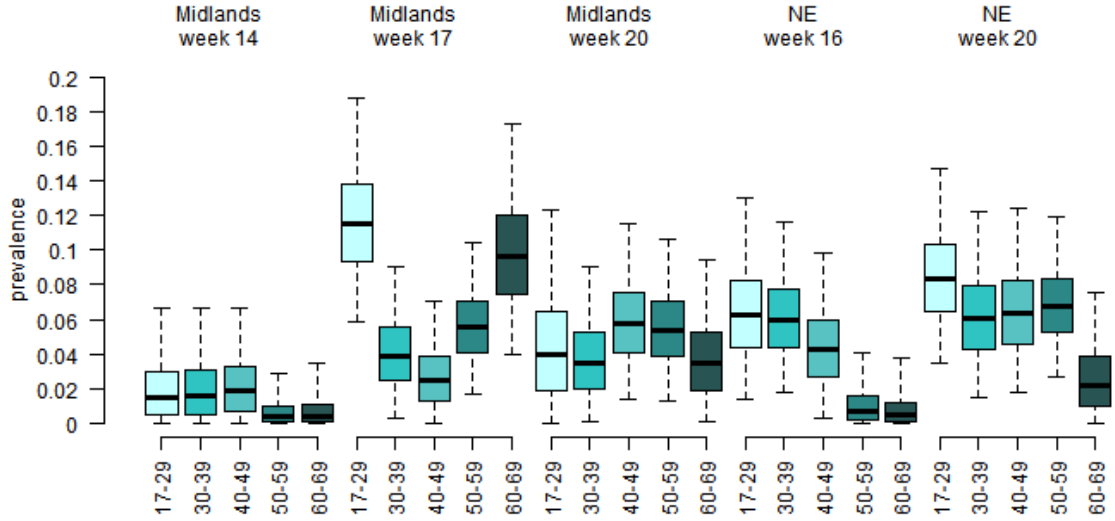
*using Euroimmun assay adjusted for sensitivity (79%) and specificity (99%)

**error bars show 95% confidence intervals

The adjusted prevalence estimates by ~10 year age bands are shown in **Figure 2**. As seen previously in other regions, the gap between the age groups in both the North East and the Midlands has narrowed considerably. Whilst in week 17, young adults aged 17-29 years showed the highest prevalence, by week 20 in the Midlands there is little difference in prevalence across all age groups. The only age band that displays a significantly lower prevalence in the North East (during the same time period) is the 60-69 year age group.

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.

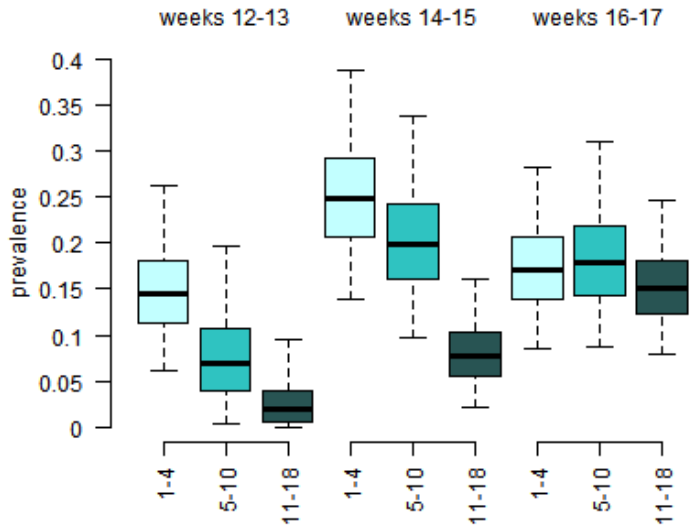
Figure 2: *NHSBT Adjusted Prevalence Estimates by age, region and period of sampling, using the Euroimmun assay*



GOSH

The results from testing an additional 94 samples from GOSH have been added to the previous analyses in order to provide more up to date estimates of prevalence among this population from weeks 12 – 17. These new samples indicate that observed prevalence has remained largely stable between weeks 14 (15.1% [9.7% - 21.6%]) and 17 (15.6% [10.4% - 22%]) (**Table 2, Appendix 1)**.

Figure 3: *GOSH adjusted prevalence estimates by age and period of sampling, using the Euroimmun assay*



When stratified by age for weeks 16 – 17, the disparity in prevalence seen in earlier weeks (in which younger children had a significantly higher prevalence than older ones) has narrowed, due to both a higher prevalence among older children, and a lower prevalence among younger children (**Figure 3**). This change may be due to relatively small numbers in these data sets.

When stratified by gender, the paediatric samples from GOSH continue to display a markedly increased prevalence among boys, during all time periods (**Figure 4**).

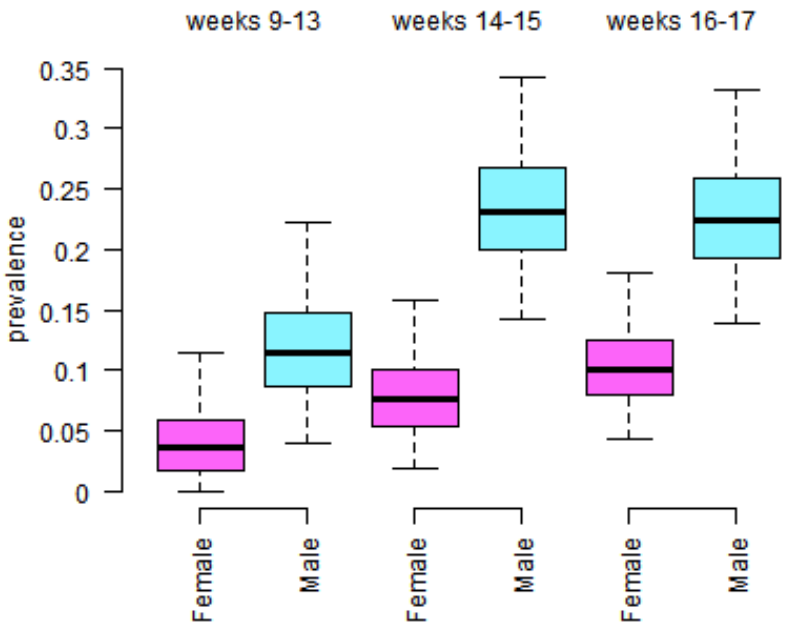


Figure 4: *GOSH prevalence estimates by gender and period of sampling, using the Euroimmun assay*

Comments

This week's report provides more detailed analyses on the results of serial sampling in North East and the Midlands; results that supplement existing data presented in previous reports from serial sampling in London and the North West. Adjusted figures for previous weeks have changed slightly based on updated evidence about assay sensitivity, which appears to be better after more convalescent samples have been tested.

The estimates among adults show a modest increase in prevalence within the North East, however the increase seen between weeks 16 and 20 is relatively smaller than that seen in other regions over a similar time period. Data from the Midlands shows a small decline in prevalence between weeks 16 and 20. This is likely driven by precise locations of sampling; the most recent set of samples contains significantly fewer samples from Birmingham (99 samples, compared to 373 within the previous set), an area that we have previously shown to have a higher prevalence than the rest of the region. 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 the North East and the Midlands display a similar pattern, with an early high prevalence in young adults, followed by a later increase in older age groups, leading to a more even pattern of prevalence across age bands.

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. Data from different regions should be easier to interpret when incidence has fallen and antibody levels stabilise.

Additional data from children at Great Ormond Street is available this week, and shows a small 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; the paediatric prevalence results from weeks 16-17 are similar to the analyses of SEU samples using the RBD assay

that were presented last week. Samples from What's the Story study, with healthy children and adolescents up to the age of 25, should provide more insights.

Appendix 1: Additional data

***Table 1**: Summary of NHSBT Prevalence Estimates by region and period of sampling, using the Euroimmun assay*

Region	date range	Week of collect-ion	pos	total	% pos (95% CI)	adjusted prevalence (95% CrI)
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%)
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%)
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%)

***Table 2**: 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	16-17	36	265	13.6% (9.7% - 18.3%)	15.6% (10.4% - 22%)