



## COVID-19 Literature Digest – 02/10/2020

PHE's COVID-19 Literature Digest has been produced since February 2020. A selection of our previous Digests [can be found here](#). This resource aims to highlight a small selection of recent COVID-19 papers that are relevant to UK settings, contains new data / insights or emerging trends. The Digest team generate a report three times per week (Mon, Wed, Fri), which includes both preliminary reports of work (preprints) that have NOT been peer-reviewed and research that has been subject to peer review and wider scrutiny. The Digest is very rapidly produced and does not claim to be a perfect product; the inclusion or omission of a publication should not be viewed as an endorsement or rejection by PHE. We do not accept responsibility for the availability, reliability or content of the items included in this resource.

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Best wishes,

Bláthnaid Mahon, Emma Farrow, James Robinson  
*On behalf of the PHE COVID-19 Literature Digest Team*

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**Report for 02.10.2020** (please note that papers that have **NOT been peer-reviewed** are **highlighted in red**).

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## Serology and immunology

Publication Date	Title / URL	Journal / Article type	Digest
01.10.2020	<a href="#">Seroprevalence of SARS-CoV-2 antibodies in people with an acute loss in their sense of smell and/or taste in a community-based population in London, UK: An observational cohort study</a>	PLoS Med / Article	<ul style="list-style-type: none"> <li>The study aimed to determine the seroprevalence of SARS-CoV-2 antibodies in a community-based population (n=590; Mean age 39.4 years; 69.1% female) with acute loss of smell and/or taste, compare the frequency of COVID-19 associated symptoms, and evaluate whether smell or taste loss are indicative of COVID-19 infection.</li> <li>A total of 77.6% of 567 participants with acute smell and/or taste loss had SARS-CoV-2 antibodies; of these, 39.8% (n = 175) had neither cough nor fever.</li> <li>New loss of smell was more prevalent in participants with SARS-CoV-2 antibodies, compared with those without antibodies (93.4% versus 78.7%, p &lt; 0.001), whereas taste loss was equally prevalent (90.2% versus 89.0%, p = 0.738).</li> <li>Seropositivity was 3 times more likely in participants with smell loss (OR 2.86; 95% CI 1.27-6.36; p &lt; 0.001) compared with those with taste loss.</li> </ul>
30.09.2020	<a href="#">SARS-CoV-2-derived peptides define heterologous and COVID-19-induced T cell recognition</a>	Nat Immunol / Article	<ul style="list-style-type: none"> <li>Identified and characterized multiple dominant and subdominant SARS-CoV-2 HLA class I and HLA-DR peptides as potential T cell epitopes in COVID-19 convalescent and unexposed individuals.</li> <li>SARS-CoV-2-specific peptides enabled detection of post-infectious T cell immunity, even in seronegative convalescent individuals. Cross-reactive SARS-CoV-2 peptides revealed pre-existing T cell responses in 81% of unexposed individuals and validated similarity with common cold coronaviruses, providing a functional basis for heterologous immunity in SARS-CoV-2 infection.</li> <li>Together, the proposed SARS-CoV-2 T cell epitopes enable identification of heterologous and post-infectious T cell immunity and facilitate development of diagnostic, preventive and therapeutic measures for COVID-19.</li> </ul>
29.09.2020	<a href="#">SARS-CoV-2 antibody testing in a UK population: detectable IgG for up to 20 weeks post infection</a>	medRxiv (non-peer reviewed) / Article	<ul style="list-style-type: none"> <li>Analysis of a cohort of pre-pandemic and pandemic individuals (n=348 positive, n=510 negative) suggests SARS-CoV-2 IgG persists up to 140 days (20 weeks) post infection.</li> <li>The authors determine the sensitivity and specificity of the three commercial immunoassays used (EuroImmun; Sens. 98.9% [97.7-99.7%]; Spec. 99.2% [98.4-99.8%]; Roche; Sens. 99.4% [98.6-100%]; Spec. (96.7% [95.1-98.2%]; Abbott; Sens. 86.8% [83.1-90.2%]; Spec. (99.2% [98.4-99.8%])).</li> </ul>
29.09.2020	<a href="#">SARS-CoV-2 antibody responses in patients with aggressive haematological malignancies</a>	medRxiv (non-peer reviewed) / Article	<ul style="list-style-type: none"> <li>A study analysed longitudinal serum samples from ten hospitalised patients with aggressive haematological malignancy who were also on systemic anti-cancer treatment, collected up to 103 days post-onset of COVID-19 symptoms.</li> <li>The majority (8/9) of patients with confirmed SARS-CoV-2 infection seroconverted and developed antibodies to the major SARS-CoV-2 antigens (S1 and</li> </ul>

			N), with most (6/8) producing neutralising antibody responses. <ul style="list-style-type: none"> <li>• The dynamics of antibody responses were broadly similar to that reported for the general population, except for a possible delay to seroconversion.</li> </ul>
30.09.2020	<a href="#">COVID-19 vaccine BNT162b1 elicits human antibody and T(H)1 T-cell responses</a>	Nature / Article	<ul style="list-style-type: none"> <li>• Present antibody and T-cell responses after BNT162b1 vaccination from a second, non-randomized open-label phase 1/2 trial in healthy adults, 18-55 years of age.</li> <li>• Two doses of 1 to 50 µg of BNT162b1 elicited robust CD4+ and CD8+ T-cell responses and strong antibody responses, with RBD-binding IgG concentrations clearly above those in a COVID-19 human convalescent sample (HCS) panel.</li> <li>• Day 43 SARS-CoV-2 serum neutralising geometric mean titres were 0.7-fold (1 µg) to 3.5-fold (50 µg) those of the HCS panel.</li> <li>• The robust RBD-specific antibody, T-cell and favourable cytokine responses induced by the BNT162b1 mRNA vaccine suggest multiple beneficial mechanisms with potential to protect against COVID-19.</li> </ul>
30.09.2020	<a href="#">LY-CoV555, a rapidly isolated potent neutralizing antibody, provides protection in a non-human primate model of SARS-CoV-2 infection</a>	bioRxiv (non-peer reviewed) / Article	<ul style="list-style-type: none"> <li>• The authors report that high-throughput microfluidic screening of antigen-specific B-cells led to the identification of LY-CoV555, a potent anti-spike neutralizing antibody from a convalescent COVID-19 patient.</li> <li>• Biochemical, structural, and functional characterization revealed high-affinity binding to the receptor-binding domain, ACE2 binding inhibition, and potent neutralizing activity.</li> <li>• In a rhesus macaque challenge model, prophylaxis doses as low as 2.5 mg/kg reduced viral replication in the upper and lower respiratory tract.</li> </ul>

## Diagnostics

Publication Date	Title / URL	Journal / Article type	Digest
01.10.2020	<a href="#">SARS-CoV-2 samples may escape detection because of a single point mutation in the N gene</a>	Eurosurveillance / Rapid communication	<ul style="list-style-type: none"> <li>• The authors found that a single nucleotide polymorphism (SNP) in the nucleoprotein gene of SARS-CoV-2 from a patient interfered with detection in a widely used commercial assay.</li> <li>• Some 0.2% of the isolates in the EpiCoV database contain this SNP. Although SARS-CoV-2 was still detected by the other probe in the assay, this underlines the necessity of targeting two independent essential regions of a pathogen for reliable detection.</li> </ul>
30.09.2020	<a href="#">Real-time Screening of Specimen Pools for Coronavirus Disease 2019 (COVID-19) Infection at Sanya Airport, Hainan Island, China</a>	Clin Infect Dis / Article	<ul style="list-style-type: none"> <li>• A 10:1 pooled test strategy on-site at an airport of China was pursued, resulting in increased test throughput, limited use of reagents, and increased testing efficiency without loss of sensitivity.</li> <li>• This testing approach has the potential to reduce the need for contact tracing when the results are delivered first time.</li> </ul>

30.09.2020	<a href="#">Thoracic imaging tests for the diagnosis of COVID-19</a>	Cochrane Database Syst Rev / Review	<ul style="list-style-type: none"> <li>• A systematic review and meta-analysis (84 studies) sought to determine the diagnostic accuracy of chest imaging (computed tomography (CT), X-ray and ultrasound) in people with suspected or confirmed COVID-19.</li> <li>• Poor study quality and heterogeneity of included studies limit the ability to draw conclusions.</li> <li>• Data indicates chest CT is sensitive but not specific for diagnosis in suspected patients.</li> <li>• Accuracy estimates of chest X-ray and ultrasound of the lungs for the diagnosis of COVID-19 should be carefully interpreted due to limited data.</li> </ul>
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## Genomics

Publication Date	Title / URL	Journal / Article type	Digest
28.09.2020	<a href="#">Large scale sequencing of SARS-CoV-2 genomes from one region allows detailed epidemiology and enables local outbreak management</a>	medRxiv (non-peer reviewed) / Article	<ul style="list-style-type: none"> <li>• The authors undertook whole genome sequencing of the SARS-CoV-2 genomes present in positive clinical samples from the UK county of Norfolk and surrounding areas, which have a stable, low-density population.</li> <li>• Genomes belonged to 26 distinct global lineages, indicating that there multiple separate introductions into the region.</li> <li>• One hundred genetically-distinct UK lineages were detected demonstrating local evolution, at a rate of ~2 SNPs per month, and multiple co-occurring lineages as the pandemic progressed.</li> <li>• Sixteen lineages in key workers which were not in patients were identified, indicating infection control measures were effective.</li> <li>• The D614G spike protein mutation which is linked to increased transmissibility dominates the samples, and rapidly confirmed relatedness of cases in an outbreak at a food processing facility.</li> </ul>
28.09.2020	<a href="#">SARS-CoV-2 D614G Variant Exhibits Enhanced Replication ex vivo and Earlier Transmission in vivo</a>	bioRxiv (non-peer reviewed) / Article	<ul style="list-style-type: none"> <li>• The authors engineered SARS-CoV-2 variants harboring the D614G substitution in the S protein, with or without nanoluciferase.</li> <li>• The D614G variant replicates more efficiency in primary human proximal airway epithelial cells and is more fit than wildtype (WT) virus in competition studies.</li> <li>• With similar morphology to the WT virion, the D614G virus is also more sensitive to SARS-CoV-2 neutralizing antibodies.</li> <li>• Infection of human ACE2 transgenic mice and Syrian hamsters with the WT or D614G viruses produced similar titres in respiratory tissue and pulmonary disease.</li> <li>• However, the D614G variant exhibited significantly faster droplet transmission between hamsters than the WT virus, early after infection.</li> </ul>

30.09.2020	<a href="#">The major genetic risk factor for severe COVID-19 is inherited from Neanderthals</a>	Nature / Article	<ul style="list-style-type: none"> <li>• Authors investigated if the genetic risk factor for severe COVID-19 is inherited from Neanderthals.</li> <li>• They state that the risk is conferred by a genomic segment of ~50 kb that is inherited from Neanderthals and is carried by ~50% of people in South Asia and ~16% of people in Europe today.</li> </ul>
30.09.2020	<a href="#">The furin cleavage site of SARS-CoV-2 spike protein is a key determinant for transmission due to enhanced replication in airway cells</a>	bioRxiv (non-peer reviewed) / Article	<ul style="list-style-type: none"> <li>• SARS-CoV-2 has a unique polybasic insertion at the S1/S2 cleavage sites (CS), which the authors demonstrate can be cleaved by furin.</li> <li>• SARS-CoV-2 virus lacking the S1/S2 furin CS was shed to lower titres from infected ferrets and was not transmitted to cohoused sentinel animals, suggesting the polybasic CS is a key determinant for efficient SARS-CoV-2 transmission.</li> </ul>

### Epidemiology and clinical – children / pregnancy

Publication Date	Title / URL	Journal / Article type	Digest
28.09.2020	<a href="#">COVID-19 Trends Among School-Aged Children - United States, March 1-September 19, 2020</a>	MMWR Morb Mortal Wkly Rep / Report	<ul style="list-style-type: none"> <li>• Since March, 277,285 COVID-19 cases in US children have been reported.</li> <li>• COVID-19 incidence among adolescents aged 12–17 years (37.4 cases per 100,000 children) was approximately twice that in children aged 5–11 years (19.0).</li> <li>• Underlying conditions were more common among school-aged children with severe outcomes related to COVID-19.</li> <li>• Weekly incidence, SARS-CoV-2 test volume, and percentage of tests positive among school-aged children varied over time and by region of the United States.</li> </ul>

### Epidemiology and clinical – risk factors

Publication Date	Title / URL	Journal / Article type	Digest
30.09.2020	<a href="#">In-hospital cardiac arrest in critically ill patients with covid-19: multicenter cohort study</a>	BMJ / Research	<ul style="list-style-type: none"> <li>• A cohort study drawn from intensive care units at 68 hospitals across the United States investigated the incidence, risk factors, and outcomes associated with in-hospital cardiac arrest (IHCA) and cardiopulmonary resuscitation (CR) in critically ill adults with COVID-19 (n=5019).</li> <li>• 14.0% (701/5019) had IHCA, 57.1% (400/701) of whom received CR.</li> <li>• Patients who had IHCA were older (mean age 63 (standard deviation 14) v 60 (15) years), had more comorbidities, and were more likely to be admitted to a hospital with a smaller number of intensive care unit beds compared with those who did not have IHCA.</li> <li>• Patients who received CR were younger than those who did not (mean age 61 (standard deviation 14) v 67 (14) years).</li> </ul>

			<ul style="list-style-type: none"> <li>Survival to hospital discharge differed by age: 21.2% (11/52) of patients &lt;45 years survived compared with 2.9% (1/34) of those aged 80 or older.</li> </ul>
30.09.2020	<a href="#">Association of a Prior Psychiatric Diagnosis With Mortality Among Hospitalized Patients With Coronavirus Disease 2019 (COVID-19) Infection</a>	JAMA Netw Open / Research letter	<ul style="list-style-type: none"> <li>A cohort study of 1685 patients (mean age 65.2 years; 52.6% male) hospitalized with COVID-19 in at 5 hospitals in Connecticut, USA, evaluated the association between prior psychiatric diagnosis and COVID-19–related mortality of hospitalised patients.</li> <li>Patients with a psychiatric diagnosis (n=473; 28% of the cohort) had a higher mortality rate compared with those with no psychiatric diagnosis, with 35.7% vs 14.7% of 2-week mortality and 40.9% vs 22.2% of 3-week mortality rate (P &lt; .001) (and with 44.8% vs 31. 5% of 4-week mortality rate).</li> <li>After controlling for demographic characteristics, other medical comorbidities, and hospital location, the risk of death remained significantly greater among patients with a psychiatric disorder (hazard ratio, 1.5; 95% CI, 1.1-1.9; P = .003).</li> </ul>

#### Epidemiology and clinical – other

Publication Date	Title / URL	Journal / Article type	Digest
01.10.2020	<a href="#">REACT-1 study of coronavirus transmission: September 2020 results</a>	Gov.uk / Official statistics	<ul style="list-style-type: none"> <li>A representative cross-section of volunteers in England tested themselves with swabs between 18 and 26 Sep 2020. Swabs were analysed using PCR.</li> <li>Out of 84,610 swab results, 363 were positive. This was significantly higher than the prevalence of 0.125% (0.096%, 0.154%) measured during Aug 2020 and the highest observed prevalence of any round since this study started reporting in May.</li> <li>Subsequent rounds of REACT-1 will allow further accurate assessment of trends in prevalence and transmission.</li> </ul>
02.10.2020	<a href="#">Changing Age Distribution of the COVID-19 Pandemic - United States, May-August 2020</a>	MMWR Morb Mortal Wkly Rep / Article	<ul style="list-style-type: none"> <li>Early in the pandemic, COVID-19 incidence highest among older adults. June–August, incidence highest in persons 20–29 years, accounting for &gt;20% of all confirmed cases.</li> <li>Across southern U.S in June 2020, increases in percentage of positive SARS-CoV-2 test results among adults aged 20–39 years preceded increases among those aged ≥60 years by 4–15 days.</li> <li>Preliminary evidence that younger adults contributed to community transmission of COVID-19 to older adults.</li> </ul>
29.09.2020	<a href="#">Flight-Associated Transmission of Severe Acute Respiratory Syndrome Coronavirus 2 Corroborated by Whole-Genome Sequencing</a>	Emerg Infect Dis / Research	<ul style="list-style-type: none"> <li>Whole-genome sequencing was used to investigate potential transmission of SARS-CoV-2 during a domestic flight within Australia.</li> <li>Eleven passengers with SARS-CoV-2 infection and symptom onset within 48 hours of the flight were considered infectious during travel; 9 had recently disembarked from a cruise ship with a retrospectively identified SARS-CoV-2 outbreak.</li> </ul>

			<ul style="list-style-type: none"> <li>• Eight cases were considered flight associated with the distinct SARS-CoV-2 A2-RP strain; the remaining 3 cases (1 with A2-RP) were possibly flight associated.</li> <li>• All 11 passengers had been in the same cabin with symptomatic persons who had primary, culture-positive, A2-RP cases.</li> <li>• This investigation provides evidence of flight-associated SARS-CoV-2 transmission.</li> </ul>
30.09.2020	<a href="#">Epidemiology and transmission dynamics of COVID-19 in two Indian states</a>	Science / Article	<ul style="list-style-type: none"> <li>• Data from the Indian states of Tamil Nadu and Andhra Pradesh provide a detailed view into SARS-CoV-2 transmission pathways and mortality in a high-incidence setting.</li> <li>• Reported cases and deaths have been concentrated in younger cohorts than expected from observations in higher-income countries, even after accounting for demographic differences across settings.</li> <li>• Among 575,071 individuals exposed to 84,965 confirmed cases, infection probabilities ranged from 4.7-10.7% for low-risk and high-risk contact types.</li> <li>• Same-age contacts were associated with the greatest infection risk.</li> <li>• Case-fatality ratios spanned 0.05% at ages 5-17 years to 16.6% at ages ≥85 years.</li> </ul>
01.10.2020	<a href="#">Symptom Characterization and Outcomes of Sailors in Isolation After a COVID-19 Outbreak on a US Aircraft Carrier</a>	JAMA Netw Open / Research letter	<ul style="list-style-type: none"> <li>• In this study, the US Army Public Health COVID-19 Task Force describes the results of an independent investigation of the shore-based USS Theodore Roosevelt (USS TR) outbreak response.</li> <li>• Of 4085 USS TR sailors who disembarked, 736 had a diagnosis of SARS-CoV-2 (median age, 25 years; interquartile range, 22-31 years; 572 males [77.7%]).</li> <li>• 590 sailors (80.2%) were characterized as symptomatic, with a median symptom duration of 7 days (interquartile range, 5-11 days).</li> <li>• 146 sailors (19.8%) remained asymptomatic for the duration of the study period.</li> <li>• Cough was observed for 677 person-days (13.6%), cold like symptoms for 483 person-days (9.7%), anosmia for 463 person-days (9.3%), headache for 438 person-days (8.8%), ageusia for 393 person-days (7.9%), and fever for 65 person-days (1.3%).</li> </ul>

#### Overviews, comments and editorials

Publication Date	Title / URL	Journal / Article type
30.09.2020	<a href="#">Rethinking Covid-19 Test Sensitivity - A Strategy for Containment</a>	N Engl J Med / Perspective
03.10.2020	<a href="#">Building a resilient NHS, for COVID-19 and beyond</a>	Lancet / Editorial
29.09.2020	<a href="#">Using critical information to strengthen pandemic preparedness: the role of national public health agencies</a>	BMJ Glob Health / Analysis

29.09.2020	<a href="#">Covid-19: Universities roll out pooled testing of students in bid to keep campuses open</a>	BMJ / News
29.09.2020	<a href="#">Preventing and Responding to COVID-19 on College Campuses</a>	JAMA / Viewpoint
01.10.2020	<a href="#">USS Theodore Roosevelt, COVID-19, and Ships: Lessons Learned</a>	JAMA Netw Open / Commentary
30.09.2020	<a href="#">The use of mobile phone data to inform analysis of COVID-19 pandemic epidemiology</a>	Nat Commun / Perspective
30.09.2020	<a href="#">COVID-19 and Heart Failure With Preserved Ejection Fraction</a>	Jama / Viewpoint
30.09.2020	<a href="#">ABO Blood Group Correlations With COVID-19: Cohort Choice Makes A Difference</a>	Clin Infect Dis / Letter

**Produced by the PHE COVID-19 Literature Digest Team**

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