COVID-19 Literature Digest – 28/09/2020

Please find today's report below.

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a report three times per week (Mon, Wed, Fri), which includes both preliminary reports of work (preprints) that have NOT been peer-reviewed and research that has been subject to peer review and wider scrutiny.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.

To join our email distribution list please send a request to COVID.LitDigest@phe.gov.uk. If you are interested in papers relating to behaviour and social science please contact wncov.behaviour@phe.gov.uk to sign up to receive the PHE Behavioural Sciences Weekly Report.

Best wishes,

Bláthnaid Mahon, Emma Farrow, James Robinson
On behalf of the PHE COVID-19 Literature Digest Team
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Report for 28.09.2020 (please note that papers that have **NOT been peer-reviewed** are highlighted in red).

Sections:
Serology and immunology
Diagnostics
Genomics
Epidemiology and clinical – children / pregnancy
Epidemiology and clinical – risk factors
Epidemiology and clinical – long term complications / sequelae
Epidemiology and clinical – other
Infection control
Treatment
Modelling

Serology and immunology

Publication Date	Title / URL	Journal / Article type	Digest
25.09.2020	Update on immunity to SARS-CoV-2, 2 September 2020	Gov.uk / Research and analysis	• Discusses the following questions: 1. What type and what levels of antibody response confer protection from infection or disease? 2. Can people get reinfected with SARS CoV2 and if so, do they have disease and can they transfer virus onto others? 3. Is the virus evolving in any way that might impact the efficacy of current vaccines that are designed on early strains? 4. If antibodies are protective, how long will protection last?
25.09.2020	Prevalence of SARS-CoV-2 antibodies in a large nationwide sample of patients on dialysis in the USA: a cross-sectional study	Lancet / Article	• For this cross-sectional study, in partnership with a central laboratory that receives samples from approximately 1300 dialysis facilities across the USA, the authors tested the remainder plasma of 28,503 randomly selected adult patients receiving dialysis in July, 2020, using a spike protein receptor binding domain total antibody chemiluminescence assay. • Concluded that during the first wave of the COVID-19 pandemic, fewer than 10% of the US adult population formed antibodies against SARS-CoV-2, and fewer than 10% of those with antibodies were diagnosed.
25.09.2020	Humoral response and PCR positivity in patients with COVID-19 in the New York City region, USA: an observational study	Lancet Microbe / Article	• Investigated both seroconversion and PCR positivity in a large cohort of convalescent serum donors in the New York City region. • Measured SARS-CoV-2 antibody titres in 1343 people. Of the 624 participants with confirmed SARS-CoV-2 infection who had serologies done after 4 weeks, all but three seroconverted to the SARS-CoV-2 spike protein, whereas 269 (37%) of 719 participants with suspected SARS-CoV-2 infection seroconverted. • PCR positivity was detected up to 28 days from symptom resolution.
25.09.2020	Viral presence and immunopathology in patients with lethal COVID-19: a prospective autopsy cohort study	Lancet Microbe / Article	• This study assessed the duration of viral presence, identified the extent of inflammatory response, and investigated the underlying cause of coagulopathy. • This prospective autopsy cohort study (on 21 patients with COVID-19)

			was done at Amsterdam University Medical Centres (UMC), the Netherlands. • Concluded that in patients with lethal COVID-19, an extensive systemic inflammatory response was present, with a continued presence of neutrophils and NETs. However, SARS-CoV-2-infected cells were only sporadically present at late stages of COVID-19. • This suggests a maladaptive immune response and substantiates the evidence for immunomodulation as a target in the treatment of severe COVID-19.
24.09.2020	[Auto-antibodies against type I IFNs in patients with life-threatening COVID-19](#)	Science / Article	• Report that at least 101 of 987 patients with life-threatening COVID-19 pneumonia had neutralizing IgG auto-Abs against IFN-ω (13 patients), the 13 types of IFN-α (36), or both (52), at the onset of critical disease; a few also had auto-Abs against the other three type I IFNs. • The auto-Abs neutralize the ability of the corresponding type I IFNs to block SARS-CoV-2 infection in vitro. • These auto-Abs were not found in 663 individuals with asymptomatic or mild SARS-CoV-2 infection and were present in only 4 of 1,227 healthy individuals. • A B cell auto-immune phenocopy of inborn errors of type I IFN immunity underlies life-threatening COVID-19 pneumonia in at least 2.6% of women and 12.5% of men.
24.09.2020	[Inborn errors of type I IFN immunity in patients with life-threatening COVID-19](#)	Science / Article	• Found an enrichment in rare variants predicted to be loss-of-function (LOF) at the 13 human loci known to govern TLR3- and IRF7-dependent type I interferon (IFN) immunity to influenza virus, in 659 patients with life-threatening COVID-19 pneumonia, relative to 534 subjects with asymptomatic or benign infection. • By testing these and other rare variants at these 13 loci, the authors experimentally define LOF variants in 23 patients (3.5%), aged 17 to 77 years, underlying autosomal recessive or dominant deficiencies. • Show that human fibroblasts with mutations affecting this pathway are vulnerable to SARS-CoV-2. Inborn errors of TLR3- and IRF7-dependent type I IFN immunity can underlie life-threatening COVID-19 pneumonia in patients with no prior severe infection.
24.09.2020	[Ultrapotent human antibodies protect against SARS-CoV-2 challenge via multiple mechanisms](#)	Science / Article	• Report the isolation and characterization of two ultrapotent SARS-CoV-2 human neutralizing antibodies (S2E12 and S2M11) that protect hamsters against SARS-CoV-2 challenge. • Cryo-electron microscopy structures show that S2E12 and S2M11 competitively block ACE2 attachment and that S2M11 also locks the

			spike in a closed conformation by recognition of a quaternary epitope spanning two adjacent receptor-binding domains. • Cocktails including S2M11, S2E12 or the previously identified S309 antibody broadly neutralize a panel of circulating SARS-CoV-2 isolates and activate effector functions.
25.09.2020	Self-sampling of capillary blood for serological testing of SARS-CoV-2 by COVID-19 IgG ELISA	medRxiv (non-peer reviewed) / Article	• The authors analysed 209 matched venous and capillary blood samples obtained from 39 participants using a COVID-19 IgG ELISA to detect COVID-19 antibodies. • 37/38 participants were able to self-collect an adequate sample of capillary blood (≥50 µl). • Suggests capillary blood self-sampling is a reliable and feasible alternative to venepuncture for serological assessment in COVID-19.

Diagnostics

Publication Date	Title / URL	Journal / Article type	Digest
25.09.2020	Mass screening of asymptomatic persons for SARS-CoV-2 using saliva	Clin Infect Dis / Article	• In this mass-screening study including 1,924 individuals, the sensitivity of nucleic acid amplification testing with nasopharyngeal and saliva specimens were 86% (90%CI:77-93%) and 92% (90%CI:83-97%), respectively, with specificities greater than 99.9%. • The true concordance probability between the nasopharyngeal and saliva tests was estimated at 0.998 (90%CI:0.996-0.999) on the estimated airport prevalence at 0.3%. In positive individuals, viral load was highly correlated between NPS and saliva. • Both nasopharyngeal and saliva specimens had high sensitivity and specificity. Self-collected saliva is a valuable specimen to detect SARS-CoV-2 in mass screening of asymptomatic persons.
18.09.2020	Diagnosis of SARS-CoV-2 infection with LamPORE, a high-throughput platform combining loop-mediated isothermal amplification and nanopore sequencing	medRxiv (non-peer reviewed) / Article	• Study evaluating the performance of LamPORE against RT-PCR using RNA extracted from spiked respiratory samples and stored nose and throat swabs collected at two UK hospitals. • The limit of detection of LamPORE was 7-10 genome copies/microlitre of extracted RNA - above the limit achievable by RT-PCR, but was not associated with a significant reduction of sensitivity in samples. • Overall, 1.4% (7/514 [0.5-2.9]) of samples produced an indeterminate result on first testing, and repeat LamPORE testing on the same RNA extract had a reproducibility of 96.8% (478/494 [94.8-98.1]).

Genomics

Publication Date	Title / URL	Journal / Article type	Digest
24.09.2020	Genetic mechanisms of critical illness in Covid-19	medRxiv (non-peer reviewed) / Article	• Reports the results of a genome-wide association study (GWAS) in 2244 critically-ill Covid-19 patients from 208 UK intensive care units (ICUs), representing >95% of all ICU beds. • Three novel genome-wide significant associations were identified and replicated: chr19p13.3 (rs2109069, p = 3.98 x 10-12), within the gene encoding dipeptidyl peptidase 9 (DPP9), at chr12q24.13 (rs10735079, p = 1.65 x 10-8) in a gene cluster encoding antiviral restriction enzyme activators (OAS1, OAS2, OAS3), and at chr21q22.1 (rs2236757, p = 4.99 x 10-8) in the interferon receptor gene IFNAR2.

Epidemiology and clinical – children / pregnancy

Publication Date	Title / URL	Journal / Article type	Digest
25.09.2020	Susceptibility to SARS-CoV-2 Infection Among Children and Adolescents Compared With Adults: A Systematic Review and Meta-analysis	JAMA Pediatr / Systematic review	• In this systematic review and meta-analysis including 32 studies, children and adolescents younger than 20 years had 44% lower odds of secondary infection with SARS-CoV-2 compared with adults 20 years and older; this finding was most marked in those younger than 10 to 14 years. • Data were insufficient to conclude whether transmission of SARS-CoV-2 by children is lower than by adults.

Epidemiology and clinical – risk factors

Publication Date	Title / URL	Journal / Article type	Digest
25.09.2020	CO-CIN: Influenza infection in patients hospitalised with COVID-19 - rapid report from CO-CIN data, 23 September 2020	Gov.uk / Research and analysis	• Investigated the impact of Influenza virus infection in patients with severe concurrent SARS-CoV-2 infection by collating clinical details and outcomes on approx two thirds of all hospital admissions for COVID-19 in England, Scotland and Wales. • After adjustment for age, sex and selected comorbidities, dual

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			infection remained strongly associated with a greatly increased length of stay.
25.09.2020	Racial Disparities in Incidence and Outcomes Among Patients With COVID-19	JAMA Netw Open / Original investigation	• In this cross-sectional study of 2595 patients, positive COVID-19 tests were associated with Black race, male sex, and age 60 years or older. • Black race and poverty were associated with hospitalization, but only poverty was associated with intensive care unit admission.
24.09.2020	Risk factors for severe disease in patients admitted with COVID-19 to a hospital in London, England: a retrospective cohort study	medRxiv (non-peer reviewed) / Article	• An observational cohort study of COVID-19 patients (n=981) admitted to a London hospital between 12 Mar and 15 Apr 2020 aimed to characterise independent associations between the clinical outcomes of hospitalised patients and their demographics, comorbidities, blood tests and bedside observations. • The mortality rate was 36.0%. • Age (adjusted hazard ratio (aHR) 1.53), respiratory disease (aHR 1.37), immunosuppression (aHR 2.23), respiratory rate (aHR 1.28), hypoxia (aHR 1.36), Glasgow Coma Score <15 (aHR 1.92), urea (aHR 2.67), alkaline phosphatase (aHR 2.53), C-reactive protein (aHR 1.15), lactate (aHR 2.67), platelet count (aHR 0.77) and infiltrates on chest radiograph (aHR 1.89) were all associated with mortality.
25.09.2020	Impact of solid cancer on in-hospital mortality overall and among different subgroups of patients with COVID-19: a nationwide, population-based analysis	ESMO Open / Article	• Report a population-based analysis of patients hospitalised with COVID-19 with prior or current solid cancer versus those without cancer. • A total of 13 594 patients (of whom 1187 with solid cancer (8.7%)) were evaluable for the baseline analysis and 10 486 (892 with solid cancer (8.5%)) for the in-hospital analysis. • This population-based analysis demonstrates that solid cancer is an independent adverse prognostic factor for in-hospital mortality among patients with COVID-19. • This adverse effect was more pronounced among younger patients and those without other comorbidities.

Epidemiology and clinical – long term complications / sequelae

Publication Date	Title / URL	Journal / Article type	Digest
23.09.2020	Medium-term and Long-term Health Impacts of COVID-19 on Infection Survivors	NLCAHR COVID-19 Quick Response Reports / Rapid review	• The available evidence indicates that COVID-19 is likely to have medium/long-term health impacts through prolonged disease progression as well as complications and sequelae. • Medium/long-term health impacts are multi-system and may involve

			the lungs, cardiovascular system, central and peripheral neurological systems, kidneys, eyes, and immune system.
			• Survivors are also predicted to be at increased risk for anxiety, depression, and other mental health comorbidities.
			• The pandemic is still relatively new and definitive research-based evidence is scant. A large CIHR-funded research project in Canada is tracking the physical, mental and psychosocial outcomes of COVID-19 Survivors.

Epidemiology and clinical – other

Publication Date	Title / URL	Journal / Article type	Digest
25.09.2020	Antihypertensive Medications and COVID-19 Diagnosis and Mortality: Population-based Case-Control Analysis in the United Kingdom	medRxiv (non-peer reviewed) / Article	• A population-based case control study (16,866 patients, 70,137 matched controls) evaluated antihypertensive medications and COVID-19 diagnosis and mortality. • In adjusted analyses, patients treated with ACEIs or ARBs had similar mortality to patients treated with classes B, C, D or other antihypertensive drugs (O) (1.00) or patients receiving no antihypertensive therapy (0.99).

Infection control

Publication Date	Title / URL	Journal / Article type	Digest
24.09.2020	Detection of SARS-CoV-2 within the healthcare environment: a multicentre study conducted during the first wave of the COVID-19 outbreak in England	medRxiv (non-peer reviewed) / Article	• The presence of SARS-CoV-2 in the air and on environmental surfaces around hospitalised patients, with and without respiratory symptoms, was investigated in eight hospitals in England. • SARS-CoV-2 RNA was detected on 30 (8.9%) of 336 surfaces, with Ct values from 28.8 to 39.1. • Concomitant bacterial counts were low, suggesting the cleaning routine across all eight hospitals was effective. • SARS-CoV-2 RNA was detected in four of 55 air samples taken <1m from four different patients. In all cases, concentration of viral RNA was low and ranged from <10 to 460 genomic copies per m3 of air.

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			• Findings support current guidance on the use of specific PPE ensembles for aerosol and non-aerosol generating procedures.
22.09.2020	[Public health information on COVID-19 for international travellers: Lessons learned from a rapid mixed-method evaluation in the UK containment phase](#)	medRxiv (non-peer reviewed) / Article	• Evaluated the impact and effectiveness of communication materials provided to passengers arriving at UK airports in the early stages of the pandemic using cross-sectional survey and follow-up interviews. • Data suggests PHE COVID-19 public health information was perceived as clear and acceptable, although passengers acquired knowledge from various sources and saw the provision of information alone on arrival as an insufficient official response. • Suggests the importance of taking diverse information sources into account, and of the need for public assurance in creating public health information materials.
16.09.2020	[Travel-related control measures to contain the COVID-19 pandemic: a rapid review](#)	Cochrane Database of Systematic Reviews / Rapid review	• Updated review assessing the effectiveness of travel-related control measures during the COVID-19 pandemic on infectious disease and screening-related outcomes. • Included 40 records reporting on 36 unique studies. • Insufficient evidence to draw firm conclusions about the effectiveness of travel-related quarantine on its own. Some of the included studies suggest that effects are likely to depend on factors such as the stage of the epidemic, the interconnectedness of countries, local measures undertaken to contain community transmission, and the extent of implementation and adherence.

Treatment

Publication Date	Title / URL	Journal / Article type	Digest
25.09.2020	[Extracorporeal membrane oxygenation support in COVID-19: an international cohort study of the Extracorporeal Life Support Organization registry](#)	The Lancet / Article	• Used data from the Extracorporeal Life Support Organization (ELSO) Registry to characterise the epidemiology, hospital course, and outcomes of patients aged 16 years or older with confirmed COVID-19 who had ECMO support initiated between Jan 16 and May 1, 2020, at 213 hospitals in 36 countries. • Data for 1035 patients with COVID-19 who received ECMO support were included in this study. • In patients with COVID-19 who received ECMO, both estimated mortality 90 days after ECMO and mortality in those with a final

			disposition of death or discharge were less than 40%. These data provide a generalisable estimate of ECMO mortality in the setting of COVID-19.
25.09.2020	Prophylactic intranasal administration of a TLR2 agonist reduces upper respiratory tract viral shedding in a SARS-CoV-2 challenge ferret model	bioRxiv (non-peer reviewed) / Article	• The authors demonstrate that prophylactic intra-nasal administration of the TLR2/6 agonist INNA-051 in a SARS-CoV-2 ferret infection model effectively reduces levels of viral RNA in the nose and throat.

Modelling

Publication Date	Title / URL	Journal / Article type	Digest
23.09.2020	COVID-19 among people experiencing homelessness in England: a modelling study	Lancet Respiratory Medicine / Article	• Estimated the avoided deaths and health-care use among people experiencing homelessness during the so-called first wave of COVID-19 in England—ie, the peak of infections occurring between Feb and May, 2020—and the potential impact of COVID-19 on this population in the future. • Up to May 31, 2020, the authors calibrated the model to 4% of the homeless population acquiring SARS-CoV-2, and estimated that 24 deaths (95% prediction interval 16–34) occurred. • They estimated that the preventive measures imposed might have avoided 21,092 infections (19 777–22 147), 266 deaths (226–301), 1164 hospital admissions (1079–1254), and 338 ICU admissions (305–374) among the homeless population.
24.09.2020	The potential health and economic value of SARS-CoV-2 vaccination alongside physical distancing in the UK: transmission model-based future scenario analysis and economic evaluation	medRxiv (non-peer reviewed) / Article	• The authors use an age-structured dynamic-transmission and economic model to explore the value of introducing SARS-CoV-2 immunisation alongside physical distancing scenarios in the UK. • Without vaccination and physical distancing, the model estimates 147.9 million COVID-19 cases (95% uncertainty interval: 48.5 million, 198.7 million) and 2.8 million (770,000, 4.2 million) deaths in the UK over ten years. • Vaccination with 75% vaccine effectiveness and 10-year protection may stop community transmission entirely for several years, whereas SARS-CoV-2 becomes endemic without highly effective vaccines. • Introducing vaccination leads to economic gains (positive net monetary value) of 0.37 billion to +1.33 billion across all scenarios from the healthcare perspective, but net monetary values of physical

			distancing scenarios may be negative from societal perspective if the daily national economy losses are persistent and large.

Guidance and consensus statements

Publication Date	Title / URL	Journal / Article type
25.09.2020	Guidance to parents and guardians: when you should book a coronavirus test for your child	Gov.uk / Correspondence
25.09.2020	Priority groups for coronavirus (COVID-19) vaccination: advice from the JCVI, 25 September 2020	Gov.uk / Independent report

Overviews, comments and editorials

Publication Date	Title / URL	Journal / Article type
25.09.2020	Strengthening the UK primary care response to covid-19	Bmj / Analysis
25.09.2020	Work a key determinant in COVID-19 risk	Lancet Global Health / Correspondence
25.09.2020	In-flight Transmission of SARS-CoV-2: a review of the attack rates and available data on the efficacy of face masks	J Travel Med / Article
16.09.2020	Fast coronavirus tests: what they can and can't do	Nature / News feature
23.09.2020	Hard to reach: COVID-19 responses and the complexities of homelessness	Lancet Respiratory Medicine / Comment
24.09.2020	Convalescent Plasma for the Treatment of COVID-19: Perspectives of the National Institutes of Health COVID-19 Treatment Guidelines Panel	Ann Intern Med / Article
25.09.2020	SARS-CoV-2 antibody seroprevalence in patients receiving dialysis in the USA	Lancet / Comment
25.09.2020	Genetic variants mimicking therapeutic inhibition of IL-6 receptor signaling and risk of COVID-19	Lancet Rheumatology / Correspondence

Produced by the PHE COVID-19 Literature Digest Team

Protecting and improving the nation's health