



COVID-19 Literature Digest – 19/08/2020

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- Serology and immunology
- Diagnostics
- Genomics
- Epidemiology and clinical - children and pregnancy
- Epidemiology and clinical - risk factors
- Epidemiology and clinical - other
- Modelling
- Overviews, comments and editorials (no digest)

Please note that we are including preprints (**highlighted in red**), which are preliminary reports of work that have NOT been peer-reviewed. They should not be relied on to guide clinical practice or health-related behaviour and should NOT be reported in news media as established information.

Serology and immunology

Publication Date	Title / URL	Journal / Article type	Digest
06.08.2020	Immune response to SARS-CoV-2 in health care workers following a COVID-19 outbreak: A prospective longitudinal study	J Clin Virol / Article	<ul style="list-style-type: none">• A single-centre study of 166 health care workers in which the authors examined serologic response up to 12 weeks after a well-documented and contained outbreak of COVID-19 and compared results with findings from earlier serologic testing in the same population.• 77.8 % of study subjects developed a specific IgG-response, while none of the COVID-19 contact groups had a detectable IgG response.• Amongst most COVID-19 patients the values of detectable IgG-responses significantly increased over time, while that of positive IgA responses decreased.

			<ul style="list-style-type: none"> • No correlation was found between the number of reported symptoms and antibody responses in COVID-19 patients
17.08.2020	A dynamic COVID-19 immune signature includes associations with poor prognosis	Nat Med / Article	<ul style="list-style-type: none"> • The authors identify a core peripheral blood immune signature across 63 hospital-treated patients with COVID-19 who were otherwise highly heterogeneous. • The signature includes discrete changes in B and myelomonocytic cell composition, profoundly altered T cell phenotypes, selective cytokine/chemokine upregulation, and COVID-19-specific antibodies. • Some signature traits identify links with other settings of immune protection and immunopathology; others, including basophil and plasmacytoid dendritic cell depletion, correlate strongly with disease severity; while a third set of traits, including a triad of IP-10, interleukin-10 and interleukin-6, anticipate subsequent clinical progression. • Suggests, contingent upon independent validation in other COVID-19 cohorts, individual traits within this signature may collectively and individually guide treatment options.
17.08.2020	ORF8 and ORF3b antibodies are accurate serological markers of early and late SARS-CoV-2 infection	Nat Immunol / Technical report	<ul style="list-style-type: none"> • The authors utilize the luciferase immunoprecipitation system to assess antibody responses to 15 different COVID-19 antigens in affected patients. • The study identifies new targets of the immune response to COVID-19 and shows that nucleocapsid, open reading frame (ORF)8 and ORF3b elicit the strongest specific antibody responses. • ORF8 and ORF3b antibodies, taken together as a cluster of points, identified 96.5% of COVID-19 samples at early and late time points of disease with 99.5% specificity.
15.08.2020	SARS-CoV-2 Antibody Responses Correlate with Resolution of RNAemia But Are Short-Lived in Patients with Mild Illness	medRxiv (non-peer reviewed) / Article	<ul style="list-style-type: none"> • An analysis of 625 serial plasma samples from 40 hospitalized COVID-19 patients and 170 COVID-19-infected outpatients and asymptomatic individuals. • Severely ill patients developed significantly higher COVID-19-specific antibody responses than outpatients and asymptomatic individuals. • The development of plasma antibodies was correlated with decreases in viral RNAemia, consistent with potential humoral immune clearance of virus. • Using a novel competition ELISA, the authors detected antibodies blocking RBD-ACE2 interactions in 68% of inpatients and 40% of outpatients tested. • Cross-reactive antibodies recognizing COVID-19 RBD were found almost exclusively in hospitalized patients. • Outpatient and asymptomatic individuals' serological responses to

			COVID-19 decreased within 2 months, suggesting that humoral protection may be short-lived.
14.08.2020	A single dose of an adenovirus-vectored vaccine provides protection against SARS-CoV-2 challenge	Nat Commun / Article	<ul style="list-style-type: none"> • A single vaccination with a replication-defective human type 5 adenovirus encoding the COVID-19 spike protein (Ad5-nCoV) protected mice completely against mouse-adapted COVID-19 infection in the upper and lower respiratory tracts. • Additionally, a single vaccination with Ad5-nCoV protects ferrets from wild-type COVID-19 infection in the upper respiratory tract. • This suggests that the mucosal vaccination may provide a desirable protective efficacy and this delivery mode is worth further investigation in human clinical trials.

Diagnostics

Publication Date	Title / URL	Journal / Article type	Digest
19.08.2020	Population-wide testing of SARS-CoV-2: country experiences and potential approaches in the EU/EEA and the United Kingdom	European Centre for Disease Prevention and Control / Technical report	<ul style="list-style-type: none"> • This document summarises country experiences and perspectives relating to the objective and application of different population-wide testing approaches and discusses the options in the context of the EU/EEA and the UK. • The testing of all individuals in a specific setting as part of an outbreak investigation (e.g. related to an occupational setting) or a research study are not considered to be population-wide testing in the context of this document. • Details on the screening of particular targeted populations (e.g. testing of pregnant women on labour and delivery wards, testing of residents and staff in long-term care facilities, testing of all patients prior to surgery, etc.) are also not included in this document.
16.08.2020	Impact of a novel community testing pathway for people with suspected COVID-19 in Wales: a cost-minimisation analysis	BMJ Open / Article	<ul style="list-style-type: none"> • During the containment phase of the COVID-19 pandemic the authors developed a community model pathway for COVID-19 testing in Wales, with testing teams undertaking swabbing in individuals' usual place of residence. • A cost-minimisation analysis was undertaken to compare the costs to NHS Wales of community testing versus standard hospital testing practices and ambulance conveyancing. • 177 patients with suspected COVID-19 underwent community testing via local NHS organisations between Jan and Feb 2020 with a mean age of

46.1 (IQR 27.5-56.3). This was 92% of total patients who were tested for COVID-19 during this period.

- The authors estimate cash savings in improved productivity for the NHS of £24,539 during this time period, in addition to further non-monetised benefits for hospital and ambulance flow.

Genomics

Publication Date	Title / URL	Journal / Article type	Digest
18.08.2020	Effects of a major deletion in the SARS-CoV-2 genome on the severity of infection and the inflammatory response: an observational cohort study	The Lancet / Comment	<ul style="list-style-type: none"> • Investigated the effect of the 382-nucleotide deletion (Δ382) in the ORF8 region of the SARS-CoV-2 genome on the clinical features of infection. • Between Jan 22 and Mar 21, 2020, 278 patients with PCR-confirmed SARS-CoV-2 infection were screened for the Δ382 deletion and 131 were enrolled onto the study, of whom 92 (70%) were infected with the wild-type virus, ten (8%) had a mix of wild-type and Δ382-variant viruses, and 29 (22%) had only the Δ382 variant. • The Δ382 variant of SARS-CoV-2 seems to be associated with a milder infection. The observed clinical effects of deletions in ORF8 could have implications for the development of treatments and vaccines.
17.08.2020	Structures and distributions of SARS-CoV-2 spike proteins on intact virions	Nature / Article	<ul style="list-style-type: none"> • The authors applied cryo-electron microscopy and tomography to image intact COVID-19 virions, determining the high-resolution structure, conformational flexibility and distribution of S trimers in situ on the virion surface. • Results suggest the conformations of S present on the virion, and provide a basis from which to understand interactions between S and neutralizing antibodies during infection or vaccination.
17.08.2020	Bacterial modification of the host glycosaminoglycan heparan sulfate modulates SARS-CoV-2 infectivity	bioRxiv (non-peer reviewed) / Article	<ul style="list-style-type: none"> • The authors demonstrate that commensal host bacterial communities can modify heparan sulfate (HS) and thereby modulate COVID-19 spike protein binding. • Prevalence of such bacteria and expression of key microbial glycosidases in bronchoalveolar lavage fluid (BALF) was lower in adult COVID-19 patients than in healthy controls. • Presence of HS-modifying bacteria decreased with age in two large survey datasets, FINRISK 2002 and American Gut, revealing one possible

mechanism for the observed increase in COVID-19 susceptibility with age.

- HS-modifying bacteria in human microbial communities may regulate viral adhesion, and loss of these commensals could predispose individuals to infection.

Epidemiology and clinical - children and pregnancy

Publication Date	Title / URL	Journal / Article type	Digest
17.08.2020	COVID-19 and multisystem inflammatory syndrome in children and adolescents	The Lancet Infectious Diseases / Review	<ul style="list-style-type: none"> • Review the epidemiology, causes, clinical features, and current treatment protocols for multisystem inflammatory syndrome in children and adolescents associated with COVID-19. • Also discuss the possible underlying pathophysiological mechanisms for COVID-19-induced inflammatory processes, which can lead to organ damage in paediatric patients who are severely ill. • These insights provide evidence for the need to develop a clear case definition and treatment protocol for this new condition and also shed light on future therapeutic interventions and the potential for vaccine development.

Epidemiology and clinical - risk factors

Publication Date	Title / URL	Journal / Article type	Digest
17.08.2020	Assessment of COVID-19 Hospitalizations by Race/Ethnicity in 12 States	JAMA Intern Med / Letter	<ul style="list-style-type: none"> • An analysis of the racial/ethnic prevalence of cumulative COVID-19 hospitalizations (n=48,788) in 12 US states that report such data during a nearly 2 month period, comparing how prevalence differs from racial/ethnic composition of each state's population. • The share of the hospitalizations of White patients (all 12 states) and Asian patients (6 of 10 states that reported data) was smaller than respective share of state population. • Hospitalizations among Black patients (all 12 states) and Hispanic patients (10 of 11 states) was higher than their share of state population. • Data for American Indian and Alaskan Native populations were only reported by 8 states. However, disparity was substantial in select states.

			<ul style="list-style-type: none"> • The present study does not adjust for age, sex, comorbidities, or socioeconomic factors.
18.08.2020	Association of Race With Mortality Among Patients Hospitalized With Coronavirus Disease 2019 (COVID-19) at 92 US Hospitals	JAMA Netw Open / Article	<ul style="list-style-type: none"> • A cohort study of 11,210 adult patients (age ≥18 years) hospitalized with confirmed COVID-19 in 12 US states examined the association of race on all-cause, in-hospital mortality. • All-cause in-hospital mortality among hospitalized White and Black patients was 23.1% (724 of 3218) and 19.2% (540 of 2812), respectively. • After adjustment for age, sex, insurance, comorbidities, neighbourhood deprivation, and site of care, there was no statistically significant difference in risk of mortality between Black and White patients (hazard ratio, 0.93; 95% CI, 0.80 to 1.09).
17.08.2020	Coronavirus 2019 (COVID-19) Infections Among Healthcare Workers, Los Angeles County, February - May 2020	Clin Infect Dis / Article	<ul style="list-style-type: none"> • As of May 31st, over three months into the pandemic, nearly 5,500 positive HCWs were reported to Los Angeles County Department of Public Health (LAC DPH), representing 9.6% of all cases. • Cases reported working in 27 different setting types, including outpatient medical offices, correctional facilities, emergency medical services, etc., with the highest proportion from long-term care facilities (46.6%) and hospitals (27.7%). • Case-patients included both clinical and non-clinical roles, with nearly half (49.4%) of positive HCWs being nurses. • Overall, compared to all LAC cases, HCWs reported lower rates of hospitalization (5.3% vs. 12.2%) and death (0.7% vs. 4.3%) from COVID-19. • Many factors increased HCWs risk of infection, including high risk work environment, limited supply of personal protective equipment, and even pressure to help and work during a pandemic.
11.08.2020	What are the sources of exposure in healthcare personnel with coronavirus disease 2019 infection?	Am J Infect Control / Report	<ul style="list-style-type: none"> • In a single facility study in Cleveland, Ohio, 25% of personnel with COVID-19 had a higher-risk exposure to an infected patient or co-worker and 14% reported a higher-risk exposure in the community. • All higher-risk exposures to infected patients occurred on non-COVID-19 units, often when there was a delay in diagnosis because COVID-19 was not initially suspected. • Higher-risk exposures to co-workers with COVID-19 often involved lapses in compliance with masking in non-patient care areas such as nursing stations and staff work or break rooms.

Epidemiology and clinical – other

Publication Date	Title / URL	Journal / Article type	Digest
18.08.2020	Coronavirus (COVID-19) Infection Survey: characteristics of people testing positive for COVID-19 in England, August 2020	Office for National Statistics / COVID-19 Infection Survey	<ul style="list-style-type: none">• Refer to the number of COVID-19 infections within the community population; community in this instance refers to private residential households, and it excludes those in hospitals, care homes or other institutional settings in England.• Evidence that Asian or Asian British individuals were more likely to test positive for COVID-19 than White individuals over the most recent eight weeks of the study, and there is also some evidence to suggest a higher percentage of individuals from ethnic minorities have had COVID-19 in the past.• No evidence to suggest differences in the likelihood of people of different ages testing positive for COVID-19 via swabs, but limited evidence to suggest a smaller proportion of older people within community settings test positive for COVID-19 antibodies.• No evidence to suggest differences in the likelihood of males and females testing positive for COVID-19 via swabs or for COVID-19 antibodies.

Modelling

Publication Date	Title / URL	Journal / Article type	Digest
18.08.2020	Comparison of molecular testing strategies for COVID-19 control: a mathematical modelling study	The Lancet Infectious Diseases / Article	<ul style="list-style-type: none">• Developed a mathematical model of SARS-CoV-2 transmission based on infectiousness and PCR test sensitivity over time since infection.• Concluded that molecular testing can play an important role in prevention of SARS-CoV-2 transmission, especially among health-care workers and other high-risk groups, but no single strategy will reduce R below 1 at current levels of population immunity. Immunity passports based on antibody tests or tests for infection face substantial technical, legal, and ethical challenges.

Overviews, comments and editorials

Publication Date	Title / URL	Journal / Article type
18.08.2020	Government creates new National Institute for Health Protection	Department of Health and Social Care / Press release
17.08.2020	SARS-CoV-2 renal tropism associates with acute kidney injury	The Lancet / Correspondence
01.09.2020	COVID-19 related stroke in young individuals	The Lancet Neurology / Correspondence
01.09.2020	COVID-19 and selective vulnerability to Parkinson's disease	The Lancet Neurology / Correspondence
12.08.2020	Previous cardiovascular surgery significantly increases the risk of developing critical illness in patients with COVID-19	J Infect / Correspondence
12.08.2020	Setting the criteria for SARS-CoV-2 reinfection - six possible cases	J Infect / Letter
17.08.2020	Is presymptomatic spread a major contributor to COVID-19 transmission?	Nat Med / Comment
13.08.2020	Open Science Saves Lives: Lessons from the COVID-19 Pandemic	bioRxiv (non-peer reviewed) / Article

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