



## International EPI Cell Daily Evidence Digest – 08/07/2020

This Daily Evidence Digest is produced by the PHE COVID-19 Literature Digest Team as a resource for professionals working in public health. We do not accept responsibility for the availability, reliability or content of the items included in this resource and do not necessarily endorse the views expressed within them. The papers are organised under the following themes:

- Serology and immunology
- Epidemiology and clinical - risk factors
- Epidemiology and clinical - other
- Infection control
- 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Please note that we are including preprints (**highlighted in red**), which are preliminary reports of work that have NOT been peer-reviewed.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
06.07.2020	<a href="#">Prevalence of SARS-CoV-2 in Spain (ENE-COVID): a nationwide, population-based seroepidemiological study</a>	The Lancet / Article	<ul style="list-style-type: none"><li>• Nationwide population-based study to estimate the seroprevalence of SARS-CoV-2 infection in Spain at national and regional level.</li><li>• From Apr 27 to May 11, 2020, 61,075 participants answered a questionnaire on history of symptoms compatible with COVID-19 and risk factors, and received a point-of-care antibody test.</li><li>• Seroprevalence was 5.0% by the point-of-care test and 4.6% by immunoassay, with a specificity–sensitivity range of 3.7% to 6.2%, with no differences by sex and lower seroprevalence in children younger than 10 years.</li><li>• The majority of the Spanish population is seronegative to SARS-CoV-2 infection, even in hotspot areas. Most PCR-confirmed cases have</li></ul>

			detectable antibodies, but a substantial proportion of people with symptoms compatible with COVID-19 did not have a PCR test and at least a third of infections determined by serology were asymptomatic.
06.07.2020	<a href="#">Seroprevalence of SARS-CoV-2 Among Frontline Healthcare Personnel During the First Month of Caring for COVID-19 Patients - Nashville, Tennessee</a>	Clin Infect Dis / Article	<ul style="list-style-type: none"> <li>• Among 249 healthcare personnel who worked in hospital units with COVID-19 patients for one month, 19 (7.6%) tested positive for SARS-CoV-2 antibodies. Only 11 (57.9%) of the 19 personnel with positive serology reported symptoms of a prior illness, suggesting asymptomatic healthcare personnel could be an important source of SARS-CoV-2 transmission.</li> </ul>
06.07.2020	<a href="#">Marked T cell activation, senescence, exhaustion and skewing towards TH17 in patients with COVID-19 pneumonia</a>	Nat Commun / Article	<ul style="list-style-type: none"> <li>• Here the authors show that, compared with healthy controls, COVID-19 patients' T cell compartment displays several alterations involving naïve, central memory, effector memory and terminally differentiated cells, as well as regulatory T cells and PD1+CD57+ exhausted T cells.</li> <li>• Significant alterations exist also in several lineage-specifying transcription factors and chemokine receptors.</li> <li>• Patients display significant increases of proinflammatory or anti-inflammatory cytokines, including T helper type-1 and type-2 cytokines, chemokines and galectins; their lymphocytes produce more tumour necrosis factor (TNF), interferon-<math>\gamma</math>, interleukin (IL)-2 and IL-17, with the last observation implying that blocking IL-17 could provide a novel therapeutic strategy for COVID-19.</li> </ul>
06.07.2020	<a href="#">Clinical Validity of Serum Antibodies to SARS-CoV-2: A Case-Control Study</a>	Ann Intern Med / Article	<ul style="list-style-type: none"> <li>• Case-control study finding sensitivity and specificity of SARS-CoV-2 IgG assay were 0.976 (95% CI, 0.928 to 0.995) and 0.988 (CI, 0.974 to 0.995), respectively, when performed 14 days or later after symptom onset, but sensitivity decreased at earlier time points. Immunoglobulin G developed rapidly and was sustained at high levels throughout follow-up (up to 58 days).</li> <li>• Antibodies to SARS-CoV-2 predicted the odds of developing ARDS, which increased by 62% (CI, 48% to 81%; <math>P &lt; 0.001</math>) for every 2-fold increase in IgG.</li> <li>• In 6 COVID-19 case patients and 12 non-COVID-19 control patients who repeatedly tested NAAT-negative, antibodies were present in 5 of 6 case patients and none of the 12 control patients (<math>P = 0.001</math>).</li> </ul>
06.07.2020	<a href="#">An evaluation of COVID-19 serological assays informs future diagnostics and exposure assessment</a>	Nat Commun / Article	<ul style="list-style-type: none"> <li>• Detailed comparison of serological COVID-19 assays showing that among the selected assays there is a wide diversity in assay performance in different scenarios and when correlated to virus neutralizing antibodies.</li> <li>• The Wantai ELISA detecting total immunoglobulins against the receptor binding domain of SARS CoV-2, has the best overall characteristics to detect functional antibodies in different stages and severity of disease,</li> </ul>

including the potential to set a cut-off indicating the presence of protective antibodies.

## Epidemiology and clinical - risk factors

Publication Date	Title/URL	Journal/ Article type	Digest
06.07.2020	<a href="#">Obesity and COVID-19 in New York City: A Retrospective Cohort Study</a>	Ann Intern Med / Letter	<ul style="list-style-type: none"> <li>• In this study of 1,687 adults hospitalized with COVID-19 in NY City they showed that obesity was an independent risk factor for respiratory failure but not for in-hospital mortality.</li> <li>• The findings, at least in part, explain the extensive use of invasive mechanical ventilation reported in the US, where the prevalence of obesity exceeds 40%.</li> </ul>
08.07.2020	<a href="#">Association between male sex and outcomes of Coronavirus Disease 2019 (Covid-19) - a Danish nationwide, register-based study</a>	Clin Infect Dis / Article	<ul style="list-style-type: none"> <li>• Nationwide register-based follow-up study of 4842 Covid-19 patients in Denmark, 2,281 (47.1%) of whom were men.</li> <li>• Alcohol diagnosis, diabetes, hypertension, sleep apnea, prior MI and IHD (all <math>P &lt; 0.001</math>) as well as AF, stroke and HF (all <math>P = 0.01</math>) were more often seen in men, and so was CKD (<math>P = 0.03</math>). Obesity diagnosis (<math>P &lt; 0.001</math>) was more often seen in women. Other comorbidity differences were insignificant (<math>P &gt; 0.05</math>).</li> <li>• The fully adjusted average risk ratio was 1.63 [95% CI 1.44-1.84], meaning that men with Covid-19 infection have &gt;50% higher risk of all-cause death, severe Covid-19 infection, or ICU admission than women. The excess risk was not explained by age and comorbidities.</li> </ul>
07.07.2020	<a href="#">Coronavirus Disease Exposure and Spread from Nightclubs, South Korea</a>	Emerg Infect Dis / Research Letter	<ul style="list-style-type: none"> <li>• Short communication describing contact tracing and testing efforts following an outbreak of COVID-19 linked to nightclubs in Seoul, South Korea, which identified 246 COVID-19 cases associated with the reopening of nightclubs in Seoul.</li> <li>• To conduct contact tracing for this outbreak, public health officials used multiple forms of advanced information technology, including location data from mobile devices, credit card payment history, geographic positioning service data, drug utilization review, public transportation transit pass records, and closed-circuit television footage.</li> </ul>

Epidemiology and clinical – other

Publication Date	Title/URL	Journal/ Article type	Digest
07.07.2020	<a href="#">COVID-19: Care Homes in England. Updated 7th July</a>	Oxford COVID-19 Evidence Service / Briefing	<ul style="list-style-type: none"> <li>• Data from care homes shows that 6,608 out of 15,507 care homes (42.6%) in England have confirmed or suspected outbreaks of COVID reported up to the week commencing the 22nd of June</li> <li>• The dataset is from PHE infectious disease outbreaks in care homes.</li> <li>• Week ending 29th June: The South East has the highest number of COVID outbreaks (1,238); the North East the highest proportion (54%)</li> </ul>
06.07.2020	<a href="#">Community prevalence of SARS-CoV-2 in England: Results from the ONS Coronavirus Infection Survey Pilot</a>	medRxiv (not peer-reviewed) / Article	<ul style="list-style-type: none"> <li>• 34,992 Individuals aged 2 years and over from 16,722 private residential households participated in repeated cross-sectional surveys of population-representative households with longitudinal follow-up, to estimate the percentage of individuals infected with SARS-CoV-2 over time in the community in England.</li> <li>• The percentage of people in private-residential households testing positive for SARS-CoV-2 reduced from 0.32% on 26 April to 0.08% on 28 June, although the prevalence stabilised near the end of the pilot.</li> <li>• Working outside the home was an important risk factor, indicating that continued monitoring for SARS-CoV-2 in the community will be essential for early detection of increases in infections following return to work and other relaxations of control measures.</li> </ul>
07.07.2020	<a href="#">Signs and symptoms to determine if a patient presenting in primary care or hospital outpatient settings has COVID-19 disease</a>	Cochrane Database Syst Rev	<ul style="list-style-type: none"> <li>• Assessed the diagnostic accuracy of signs and symptoms to determine if a person presenting in primary care or to hospital outpatient settings, such as the emergency department or dedicated COVID-19 clinics, has COVID-19 disease or COVID-19 pneumonia.</li> <li>• Based on currently available data, neither absence nor presence of signs or symptoms are accurate enough to rule in or rule out disease.</li> <li>• Prospective studies in an unselected population presenting to primary care or hospital outpatient settings, examining combinations of signs and symptoms to evaluate the syndromic presentation of COVID-19 disease, are urgently needed. Results from such studies could inform subsequent management decisions such as self-isolation or selecting patients for further diagnostic testing.</li> </ul>
08.07.2020	<a href="#">Development and delivery of a real-time hospital-onset COVID-19 surveillance system using network analysis</a>	Clin Infect Dis / Article	<ul style="list-style-type: none"> <li>• Report from Imperial College on the design and implementation of a hospital-onset COVID-19 infection (HOICI) surveillance system for an acute healthcare setting to target prevention interventions.</li> <li>• Real-time surveillance reports revealed: changing rates of HOICI</li> </ul>

			throughout the course of the COVID-19 epidemic; key wards fuelling probable transmission events; HOCl over-represented in particular specialities managing high-risk patients; the importance of integrating analysis of individual prior pathways; and the value of co-design in producing data visualisation.
07.07.2020	<a href="#">SARS-CoV-2 in fruit bats, ferrets, pigs, and chickens: an experimental transmission study</a>	The Lancet Microbe / Article	<ul style="list-style-type: none"> <li>• Investigated the susceptibility of potential animal hosts and the risk of anthropozoonotic spill-over infections.</li> <li>• Intranasally inoculated nine fruit bats, ferrets, pigs, and 17 chickens with 10<sup>5</sup> TCID<sub>50</sub> of a SARS-CoV-2 isolate per animal. Animals were monitored for clinical signs and for virus shedding by nucleic acid extraction from nasal washes and rectal swabs (ferrets), oral swabs and pooled faeces samples (fruit bats), nasal and rectal swabs (pigs), or oropharyngeal and cloacal swabs (chickens) on days 2, 4, 8, 12, 16, and 21 after infection by quantitative RT-PCR (RT-qPCR).</li> <li>• Pigs and chickens could not be infected intranasally by SARS-CoV-2, whereas fruit bats showed characteristics of a reservoir host. Virus replication in ferrets resembled a subclinical human infection with efficient spread. Ferrets might serve as a useful model for further studies—e.g., testing vaccines or antivirals.</li> </ul>

## Infection control

Publication Date	Title/URL	Journal/ Article type	Digest
06.07.2020	<a href="#">Scoping Report on Hospital and Health Care Acquisition of COVID-19 and its Control. DELVE Report No. 3.</a>	Royal Society DELVE Initiative / Report	<ul style="list-style-type: none"> <li>• The focus of this report is on SARS-CoV-2 infection acquired in hospital.</li> <li>• Using publicly available data, they estimate that at least 10% of all COVID-19 infections in England were among patient-facing healthcare workers and resident-facing social care workers during the period from 26th April to 7th June 2020. An estimated further 1% of infections in this period were acquired by inpatients in hospital, with an additional 6% of all infections among care home residents.</li> <li>• The report sets out a suggested framework for effective centralised surveillance and monitoring of hospital acquired infections, linked to rapid infection control responses with sharing of best practice, coordinated through local teams.</li> </ul>
07.07.2020	<a href="#">It is Time to Address Airborne Transmission of COVID-19</a>	Clin Infect Dis / Open Letter	<ul style="list-style-type: none"> <li>• The 239 authors of this open letter appeal to the medical community and to the relevant national and international bodies to recognize the</li> </ul>

			<p>potential for airborne spread of COVID-19.</p> <ul style="list-style-type: none"> <li>• There is significant potential for inhalation exposure to viruses in microscopic respiratory droplets (microdroplets) at short to medium distances (up to several meters, or room scale), and are advocating for the use of preventive measures to mitigate this route of airborne transmission.</li> <li>• They state that it is understood that there is not as yet universal acceptance of airborne transmission of SARS-CoV2; but in their collective assessment there is more than enough supporting evidence so that the precautionary principle should apply.</li> </ul>
08.07.2020	<a href="#">Investigating SARS-CoV-2 surface and air contamination in an acute healthcare setting during the peak of the COVID-19 pandemic in London</a>	Clin Infect Dis / Article	<ul style="list-style-type: none"> <li>• Prospective cross-sectional observational study to evaluate SARS-CoV-2 surface and air contamination during the COVID-19 pandemic in London.</li> <li>• Viral RNA was detected on 114/218 (52.3%) of surfaces and 14/31 (38.7%) air samples but no virus was cultured.</li> <li>• Viral RNA was detected on surfaces and in air in public areas of the hospital but was more likely to be found in areas immediately occupied by COVID-19 patients than in other areas. The high PCR Ct value for all samples</li> <li>• These findings of extensive viral RNA contamination in the absence of cultured virus underlines the potential risk from environmental contamination in managing COVID-19, and the need for effective use of PPE, physical distancing, and hand/surface hygiene.</li> </ul>
04.07.2020	<a href="#">Global Assessment of the Relationship between Government Response Measures and COVID-19 Deaths</a>	medRxiv (non-peer reviewed) / Article	<ul style="list-style-type: none"> <li>• Observational study by researchers at Oxford University, aiming to provide an early global assessment of the impact of government stringency measures on the rate of growth in deaths from COVID-19 in 170 countries.</li> <li>• Daily data was collected on a range of containment and closure policies for 170 countries from Jan 1, 2020 until May 27, 2020 and combined into an aggregate stringency index (SI) score for each country on each day.</li> <li>• For each day of delay to reach an SI 40, the average daily growth rate in deaths was 0.087 percentage points higher (0.056 to 0.118, P&lt;0.001). In turn, each additional point on the SI was associated with a 0.080 percentage point lower average daily growth rate (-0.121 to -0.039, P&lt;001). These daily differences in growth rates lead to large cumulative differences in total deaths.</li> </ul>

## Modelling

Publication Date	Title/URL	Journal/ Article type	Digest
08.07.2020	<a href="#">Optimising benefits of testing key workers for infection with SARS-CoV-2: A mathematical modelling analysis</a>	Clin Infect Dis / Article	<ul style="list-style-type: none"> <li>• Explored the impact of testing staff on absence durations from work and transmission risks to others.</li> <li>• Used a decision-analytic model for 1,000 key workers to compare the baseline strategy of (S0) no RT-PCR testing of workers to testing workers (S1) with COVID-19-like symptoms in isolation, (S2) without COVID-19-like symptoms but in household-quarantine, and (S3) all staff.</li> <li>• Based on optimising absence durations or transmission risk the modelling suggests testing staff in household-quarantine or all staff, depending on infection levels and testing capacities.</li> </ul>
03.07.2020	<a href="#">Ultraviolet A Radiation and COVID-19 Deaths: A Multi Country Study</a>	medRxiv (non-peer reviewed) / Article	<ul style="list-style-type: none"> <li>• Ecological model and meta-analysis to determine whether UVA exposure might be associated with COVID-19 deaths</li> <li>• Daily mean UVA (Jan-April 2020) varied between 450 to 1,000 KJ/m<sup>2</sup> across the USA, Italy and England. The fully adjusted model showed an inverse correlation between UVA and COVID-19 mortality with a Mortality Risk Ratio (MRR) of 0.73 (0.62 to 0.87) per 100KJ/m<sup>2</sup> increase UVA in the USA, 0.81 (0.71 to 0.93) in Italy and 0.51 (0.39 to 0.66) in England. Pooled MRR was 0.68 (0.53 to 0.66).</li> <li>• This analysis, replicated in 3 independent national datasets, suggests ambient UVA exposure is associated with lower COVID-19 specific mortality. This effect is independent of vitamin D, as it occurred at irradiances below that likely to induce significant cutaneous vitamin D<sub>3</sub> synthesis. It is recognised that causal interpretations must be made cautiously in observational studies.</li> </ul>

## Overviews, comments and editorials

Publication Date	Title/URL	Journal/ Article type
07.07.2020	<a href="#">Lessons from Leicester: a covid-19 testing system that's not fit for purpose</a>	BMJ / Editorial
06.07.2020	<a href="#">Developing a SARS-CoV-2 Vaccine at Warp Speed</a>	JAMA / Viewpoint
06.07.2020	<a href="#">The Development of COVID-19 Vaccines: Safeguards Needed</a>	JAMA / Viewpoint
06.07.2020	<a href="#">SARS-CoV-2 seroprevalence in COVID-19 hotspots</a>	The Lancet / Comment
06.07.2020	<a href="#">Assessment of patients who tested positive for COVID-19 after recovery</a>	The Lancet Infectious Diseases / Comment

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[COVID-19-associated acute respiratory distress syndrome: is a different approach to management warranted?](#)

The Lancet Respiratory Medicine / Viewpoint

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