



International EPI Cell Daily Evidence Digest – 03/07/2020

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
- Diagnostics
- Genomics
- Epidemiology and clinical - children and pregnancy
- Epidemiology and clinical - risk factors
- Epidemiology and clinical - other
- Infection control
- 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Please note that we are including preprints (**highlighted in red**), which are preliminary reports of work that have NOT been peer-reviewed.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
01.07.2020	Diagnostic accuracy of serological tests for covid-19: systematic review and meta-analysis	BMJ / Research	<ul style="list-style-type: none">• A systematic review and meta-analysis was performed to determine the diagnostic accuracy of serological tests for covid-19. 5016 references were identified and 40 studies included.• Higher quality clinical studies assessing the diagnostic accuracy of serological tests for covid-19 are urgently needed.• Currently, available evidence does not support the continued use of existing point-of-care serological tests.
01.07.2020	Human IgG neutralizing monoclonal antibodies block SARS-CoV-2 infection	Cell Reports / Article	<ul style="list-style-type: none">• More than one thousand memory B cells specific to SARS-CoV-2 S1 or RBD (receptor binding domain), were purified to obtain 729 paired heavy and light

			<p>chain fragments.</p> <ul style="list-style-type: none"> • Altogether, this study identified 11 potent human neutralizing antibodies for COVID-19 as therapeutic candidates.
30.06.2020	Phase 1/2 Study to Describe the Safety and Immunogenicity of a COVID-19 RNA Vaccine Candidate (BNT162b1) in Adults 18 to 55 Years of Age: Interim Report	medRxiv (non-peer reviewed) / Article	<ul style="list-style-type: none"> • Study reporting the available safety, tolerability, and immunogenicity data from an ongoing placebo-controlled, observer-blinded dose escalation study among healthy adults, 18-55 years of age, randomized to receive 2 doses, separated by 21 days, of 10 µg, 30 µg, or 100 µg of BNT162b1, a lipid nanoparticle-formulated, nucleoside-modified, mRNA vaccine that encodes trimerized SARS-CoV-2 spike glycoprotein RBD. • Results support further evaluation of this mRNA vaccine candidate.
01.07.2020	Sensitive detection of SARS-CoV-2-specific-antibodies in dried blood spot samples	medRxiv (non-peer reviewed) / Article	<ul style="list-style-type: none"> • Study to validate the use of dried blood spot sampling (DBS) for the detection of SARS-CoV-2-specific antibodies. Eighty-seven matched DBS and serum samples were obtained from eighty individuals, including thirty-one who were previously PCR-positive for SARS-CoV-2. • Eluates from DBS samples are a reliable and reproducible source of antibodies to be used for the detection of SARS-CoV-2-specific antibodies.
01.07.2020	A translational multiplex serology approach to profile the prevalence of anti-SARS-CoV-2 antibodies in home-sampled blood	medRxiv (non-peer reviewed) / Article	<ul style="list-style-type: none"> • Swedish study describing a translational approach combining home blood sampling by finger-pricking with multiplexed serology to assess the exposure to the SARS-CoV-2 virus in a general population. • After receiving 55% (1097/2000) of the cards back within three weeks, 80% (878/1097) were suitable for the analyses of IgG and IgM titres. • Measuring the immune response against several SARS-CoV-2 proteins in a multiplexed workflow can provide valuable insights about the serological diversity and improve the certainty of the classification. Combining such assays with home-sampling of blood presents a viable strategy for individual-level diagnostics and towards an unbiased assessment of the seroprevalence in a population.

Diagnostics

Publication Date	Title/URL	Journal/ Article type	Digest
29.06.2020	SARS-CoV-2 Detection, Viral Load and Infectivity over the Course of an Infection: SARS-CoV-2 Detection, Viral Load and Infectivity	J Infect / Article	<ul style="list-style-type: none"> • A systematic literature search to summarise the evidence on the detection pattern and viral load of SARS-CoV-2 over the course of an infection (including any asymptomatic or pre-symptomatic phase), and the duration of infectivity. • SARS-CoV-2 viral loads peak from upper respiratory tract samples around symptom onset. Viral loads from sputum samples may be higher than upper

respiratory tract samples. Viral loads appear to be similar between asymptomatic and symptomatic patients.

- The prolonged virus detection in stool samples has unclear clinical significance. Patients may not be infectious for the entire duration of virus detection.

Genomics

Publication Date	Title/URL	Journal/ Article type	Digest
02.07.2020	Tracking changes in SARS-CoV-2 Spike: evidence that D614G increases infectivity of the COVID-19 virus	Cell / Article	<ul style="list-style-type: none"> • A SARS-CoV-2 variant carrying the Spike protein amino acid change D614G has become the most prevalent form in the global pandemic, and dynamic tracking of variant frequencies revealed a recurrent pattern of G614 increase at multiple geographic levels: national, regional and municipal. • The shift occurred even in local epidemics where the original D614 form was well established prior to the introduction of the G614 variant. • In infected individuals G614 is associated with lower RT-PCR cycle thresholds, suggestive of higher upper respiratory tract viral loads, although not with increased disease severity. • These findings illuminate changes important for a mechanistic understanding of the virus, and support continuing surveillance of Spike mutations to aid in the development of immunological interventions.
01.07.2020	Rapid, Sensitive, Full-Genome Sequencing of Severe Acute Respiratory Syndrome Coronavirus 2	Emerg Infect Dis / Dispatch	<ul style="list-style-type: none"> • This article describes validated protocols for generating high-quality, full-length SARS CoV-2 genomes from primary samples. • One protocol uses multiplex reverse transcription PCR, followed by MinION or MiSeq sequencing; the other uses singleplex, nested reverse transcription PCR and Sanger sequencing. • These protocols enable sensitive virus sequencing in different laboratory environments.
30.06.2020	Unsupervised cluster analysis of SARS-CoV-2 genomes indicates that recent (June 2020) cases in Beijing are from a genetic subgroup that consists of mostly European and South(east) Asian samples, of which the latter are the most recent	bioRxiv (non-peer reviewed) / Article	<ul style="list-style-type: none"> • Assessed three recently identified SARS-CoV-2 genomes in Beijing from June 2020 and attempted to determine the origin of these genomes, made available in the GISAID database. Analysed 7,643 SARS-CoV-2 genomes. • Found that the newly discovered virus genomes from Beijing are in a genetic cluster that consists mostly of cases from Europe and South(east) Asia. The sequences of the new cases are most related to virus genomes from a small number of cases from China (Mar 2020), cases from Europe (Feb to early May 2020), and cases from South(east) Asia (May to June 2020).

			<ul style="list-style-type: none"> • These findings could suggest that the original cases of this genetic cluster originated from China in Mar 2020 and were re-introduced to China by transmissions from samples from South(east) Asia between April and June 2020.
01.07.2020	A genome epidemiological study of SARS-CoV-2 introduction into Japan	medRxiv (non-peer reviewed) / Article	<ul style="list-style-type: none"> • Evaluated SARS-CoV-2 genome sequences from COVID-19 cases until early April and characterised the genealogical networks to demonstrate possible routes of spread in Japan. • Some of the primary clusters identified during Jan and Feb in Japan directly descended from Wuhan-Hu-1-related isolates in China and other distinct clusters. • Clusters were almost contained until mid-March; the haplotype network analysis demonstrated that COVID-19 cases from late Mar through early April may have caused an additional large cluster related to the outbreak in Europe, leading to additional spread within Japan. • Genome surveillance suggested that at least two distinct SARS-CoV-2 introductions from China and other countries occurred.
01.07.2020	Genetic architecture of host proteins interacting with SARS-CoV-2	bioRxiv (non-peer reviewed) / Article	<ul style="list-style-type: none"> • UK study which integrated large-scale genomic and aptamer-based plasma proteomic data from 10,708 individuals to characterize the genetic architecture of 179 host proteins reported to interact with SARS-CoV-2 proteins or to participate in the host response to COVID-19. • They identified 220 host DNA sequence variants acting in cis (MAF 0.01-49.9%) and explaining 0.3-70.9% of the variance of 97 of these proteins. • Systematic characterization of pQTLs across the phenome identified protein-drug-disease links and establish the first link between a recently reported variant for respiratory failure of COVID-19 patients at the ABO locus and hypercoagulation, i.e. maladaptive host response.

Epidemiology and clinical - children and pregnancy

Publication Date	Title/URL	Journal/ Article type	Digest
02.07.2020	Emergence of Kawasaki disease related to SARS-CoV-2 infection in an epicentre of the French COVID-19 epidemic: a time-series analysis	The Lancet Child & Adolescent Health / Article	<ul style="list-style-type: none"> • This study further suggests that viral respiratory infections, including SARS-CoV-2, could be triggers for Kawasaki disease and indicates the potential timing of an increase in incidence of the disease in COVID-19 epidemics.

Epidemiology and clinical - risk factors

Publication Date	Title/URL	Journal/ Article type	Digest
02.07.2020	Rapid Risk Assessment: Resurgence of reported cases of COVID 19 in the EU/EEA, the UK and EU candidate and potential candidate countries	European Centre for Disease Control and Prevention / Rapid risk assessment	<ul style="list-style-type: none"> • While decreasing trends in disease incidence are being observed in Europe overall (12% decrease in 14-day incidence of reported cases between 16 and 30 June), there is still community transmission reported in most EU/EEA countries, the UK and EU candidate and potential candidate countries. • Additionally, some countries are reporting a resurgence of observed cases or large localised outbreaks. • In this risk assessment, ECDC is assessing the risks associated with these reported increases of incident cases in some countries.
02.07.2020	Neurological associations of COVID-19	The Lancet Neurology / Rapid review	<ul style="list-style-type: none"> • A growing number of case reports and series describe a wide array of neurological manifestations in 901 patients, but many have insufficient detail, reflecting the challenge of studying such patients. • Although the proportion of infections leading to neurological disease will probably remain small, these patients might be left with severe neurological sequelae, and with so many people infected, the overall number of neurological patients, and their associated health burden and social and economic costs might be large. • Health-care planners and policy makers must prepare for this eventuality, while the many ongoing studies investigating neurological associations increase our knowledge base.
01.07.2020	Risk factors associated with COVID-19 infection: a retrospective cohort study based on contacts tracing	Emerg Microbes Infect / Article	<ul style="list-style-type: none"> • This article estimates the attack rates, and identifies the risk factors of COVID-19 infection, through a retrospective cohort study, where 11,580 contacts of COVID-19 cases in Guangdong Province from Jan 10 to Mar 15, 2020 were investigated. • All contacts were tested by RT-PCR to detect their infection of SARS-COV-2, and attack rates by characteristics were calculated, and logistic regression was used to estimate the risk factors of infection for COVID-19. • A total of 515 of 11,580 contacts were identified to be infected with SARS-COV-2. • Children, old people, females and family members are susceptible to be infected with COVID-19, while index cases in incubation period had lower contagiousness.
29.06.2020	A phenome-wide association study (PheWAS) of COVID-19 outcomes by	medRxiv (non-peer reviewed) / Article	<ul style="list-style-type: none"> • Report of a disease phenome-wide association study (PheWAS) using data representing 5,698 COVID-19 patients in the US, stratified by race, exploring the association of 1,043 pre-occurring conditions with several COVID-19

	race using the electronic health records data in Michigan Medicine		<p>outcomes.</p> <ul style="list-style-type: none"> • Obesity, iron deficiency anaemia and type II diabetes were associated with susceptibility in the full cohort, while ill-defined descriptions/complications of heart disease and stage III chronic kidney disease were associated among non-Hispanic White (NHW) and non-Hispanic Black/African American (NHAA) patients, respectively. • The top phenotype hits in all cohorts for hospitalization were acute renal failure, hypertension, and insufficiency/arrest respiratory failure, respectively.
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Epidemiology and clinical – other

Publication Date	Title/URL	Journal/ Article type	Digest
29.06.2020	Preliminary investigation into COVID-19 exceedances in Leicester (June 2020).	Public Health England / Report	<ul style="list-style-type: none"> • This report presents a summary of the descriptive epidemiology of COVID-19 in Leicester. • The strongest evidence of an outbreak is given by the numbers of new infections identified in children and working age people, and rising proportion of positive tests also seen in these age groups, from late May onwards. • These are trends not observed in other parts of the Midlands, or related travel areas. • Evidence for the scale of the outbreak is limited and may, in part, be artefactually related to growth in availability of testing. • If an outbreak is occurring, then care should be taken to ensure that the artificial geographical reporting boundaries do not obscure a problem that may cross the East Midlands and East of England border.
02.07.2020	Excess all-cause mortality during the COVID-19 pandemic in Europe – preliminary pooled estimates from the EuroMOMO network, March to April 2020	Eurosurveillance / Rapid communication	<ul style="list-style-type: none"> • A remarkable excess mortality has coincided with the COVID-19 pandemic in Europe. • This article presents preliminary pooled estimates of all-cause mortality for 24 European countries/federal states participating in the European monitoring of excess mortality for public health action (EuroMOMO) network, for the period March–April 2020. • Excess mortality particularly affected ≥ 65 year olds (91% of all excess deaths), but also 45–64 (8%) and 15–44 year olds (1%). No excess mortality was observed in 0–14 year olds.
01.07.2020	Estimation of Excess Deaths Associated With the COVID-19 Pandemic in the United States, March to May 2020	JAMA Intern Med / Original investigation	<ul style="list-style-type: none"> • This observational study evaluated the numbers of US deaths from any cause and deaths from pneumonia, influenza, and/or COVID-19 from Mar 1 through May 30, 2020, using public data of the entire US population from the National

			<p>Centre for Health Statistics (NCHS).</p> <ul style="list-style-type: none"> • The number of excess all-cause deaths was 28% higher than the official tally of COVID-19-reported deaths during that period. • Excess deaths provide an estimate of the full COVID-19 burden and indicate that official tallies likely undercount deaths due to the virus, and the mortality burden and the completeness of the tallies vary markedly between states.
02.07.2020	COVID-19 in health-care workers in three hospitals in the south of the Netherlands: a cross-sectional study	The Lancet Infectious Diseases / Article	<ul style="list-style-type: none"> • 10 days after the first reported case of SARS-CoV-2 infection in the Netherlands (on Feb 27, 2020), 55 (4%) of 1497 health-care workers in nine hospitals located in the south of the Netherlands had tested positive for SARS-CoV-2 RNA. • This study aimed to gain insight in possible sources of infection in health-care workers. • Although direct transmission in the hospitals cannot be ruled out, the study data did not support widespread nosocomial transmission as the source of infection in patients or health-care workers.
02.07.2020	High Proportion of Asymptomatic SARS-CoV-2 Infections in 9 Long-Term Care Facilities, Pasadena, California, USA, April 2020	Emerg Infect Dis / Dispatch	<ul style="list-style-type: none"> • The authors' analysis of coronavirus disease prevalence in 9 long-term care facilities demonstrated a high proportion (40.7%) of asymptomatic infections among residents and staff members.
02.07.2020	Introductions and early spread of SARS-CoV-2 in France, 24 January to 23 March 2020	Eurosurveillance / Rapid communication	<ul style="list-style-type: none"> • Following SARS-CoV-2 emergence in China, a specific surveillance was implemented in France. • Phylogenetic analysis of sequences retrieved through this surveillance suggests that detected initial introductions, involving non-clade G viruses, did not seed local transmission. • Nevertheless, identification of clade G variants subsequently circulating in the country, with the earliest from a patient who neither travelled to risk areas nor had contact with travellers, suggests that SARS-CoV-2 might have been present before the first recorded local cases.
01.07.2020	Retrospective detection of SARS-CoV-2 in hospitalized patients with influenza-like illness	Emerg Microbes Infect / Letter	<ul style="list-style-type: none"> • The authors' retrospectively screened for the SARS-CoV-2 RNA in 1271 nasopharyngeal swab samples, as well as the prevalence of IgM, IgG, and total antibodies against SARS-CoV-2 in 357 matched serum samples collected from hospitalized patients with influenza-like illness between December 1, 2018 and March 31, 2020 in Shanghai Ruijin Hospital. • The onset date of the earliest COVID-19 case in this study was Jan 25, 2020. • Before this time point, the presence of SARS-CoV-2 was not observed, which limited the possibility that SARS-CoV-2 has already spread among the population before the large-scale outbreak.

01.07.2020	Report 29 - The impact of the COVID-19 epidemic on all-cause attendances to emergency departments in two large London hospitals: an observational study	Imperial College / Report	<ul style="list-style-type: none"> Assessed how the reorganisation of hospital care and admission policies to respond to the COVID-19 epidemic affected ED attendances and emergency hospital admissions. The findings suggest emergency healthcare seeking to hospitals drastically changed amongst the population within the catchment area of ICHNT. This trend was echoed regionally and nationally, suggesting those suffering a medical emergency may not have attended other (i.e. closer-to-home) hospitals.
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Infection control

Publication Date	Title/URL	Journal/ Article type	Digest
02.07.2020	Use of gloves in healthcare and non-healthcare	European Centre for Disease Control and Prevention / Technical report	<ul style="list-style-type: none"> This document aims to provide scientific evidence and guidance for healthcare settings and the public on using gloves as a preventive measure during the COVID-19 pandemic. There is currently insufficient evidence to recommend the regular use of gloves as a preventive measure in the context of COVID-19 to the public and to people in most occupations. Use of gloves in the community may lead to the misconception that hand hygiene practices can be neglected. Regular use of gloves may confer the risk of dermatological side effects. The generation of waste from unnecessary glove use causes environmental damage.
01.07.2020	COVID-19 Aviation Health Safety Protocol: Guidance for the management of airline passengers in relation to the COVID-19 pandemic	European Centre For Disease Control and Prevention / Technical Guidance	<ul style="list-style-type: none"> Guidelines developed by the European Union Aviation Safety Agency (EASA) and the ECDC. This is issue no 2. Their purpose is to serve as an aviation health safety protocol and to provide a source of best practice on how airport operators, aeroplane operators conducting commercial and non-commercial passenger transport operations (hereinafter aeroplane operators) and national aviation authorities can ensure the health and safety of passengers, as well as the staff and crew who serve them, by maintaining safe and secure operations whilst minimising the risk of virus transmission.
02.07.2020	How to Safely Reopen Colleges and Universities During COVID-19: Experiences From Taiwan	Ann Intern Med / Article	<ul style="list-style-type: none"> The guidelines delineated creation of a task force at each university; school-based risk screening based on travel history, occupation, contacts, and clusters; measures on self-management of health and quarantine; general hygiene measures (including wearing masks indoors); principles on ventilation

			<p>and sanitization; regulations on school assemblies; a process for reporting suspected cases; and policies on school closing and make-up classes.</p> <ul style="list-style-type: none"> • Taiwan's experience suggests that, under certain circumstances, safely reopening colleges and universities this fall may be feasible with a combination of strategies that include containment (access control with contact tracing and quarantine) and mitigation (hygiene, sanitation, ventilation, and social distancing) practices.
01.07.2020	Managing COVID-19 spread with voluntary public-health measures: Sweden as a case study for pandemic control	Clin Infect Dis / Article	<ul style="list-style-type: none"> • In advance of effective antiviral therapies, countries have applied different public-health strategies to control spread and manage healthcare need, and Sweden has taken a unique approach of not implementing strict closures, instead urging personal responsibility. • This article analyses the results of this and other potential strategies for pandemic control in Sweden. • The Swedish COVID-19 strategy has thus far yielded a striking result: mild mandates overlaid with voluntary measures can achieve results highly similar to late-onset stringent mandates. • However, this policy causes more healthcare demand and mortality than early stringent control and depends on continued public will.
01.07.2020	Increasing Temperature and Relative Humidity Accelerates Inactivation of SARS-CoV-2 on Surfaces	mSphere / Article	<ul style="list-style-type: none"> • The results show that SARS-CoV-2 decayed more rapidly when either humidity or temperature was increased but that droplet volume (1 to 50 µl) and surface type (stainless steel, plastic, or nitrile glove) did not significantly impact decay rate. • The authors' have developed a simple mathematical model that can be used to estimate virus decay on nonporous surfaces under a range of conditions and which may be utilized operationally to identify indoor environments in which the virus is most persistent.

Overviews, comments and editorials

Publication Date	Title/URL	Journal/ Article type
01.07.2020	Early lessons from a second COVID-19 lockdown in Leicester, UK	The Lancet / Correspondence
30.06.2020	Respiratory failure and non-invasive respiratory support during the covid-19 pandemic: an update for re-deployed hospital doctors and primary care physicians	Bmj / Article
01.07.2020	Accelerating Development of SARS-CoV-2 Vaccines - The Role for Controlled Human Infection Models	N Engl J Med / Article

Produced by the PHE COVID-19 Literature Digest Team