Public Health England

International EPI Cell Daily Evidence Digest – 21/05/2020

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:

- Diagnostics
- Serology and immunology
- Genomics
- Epidemiology and clinical - children and pregnancy
- Epidemiology and clinical - risk factors
- Epidemiology and clinical - other
- Infection control
- Treatment
- Social sciences
- Modelling
- Guidance, consensus statements and hospital resources (no digest)
- 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Please note that we are including preprints (highlighted in red), which are preliminary reports of work that have NOT been peer-reviewed.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.

Diagnostics

Publication Date	Title/URL	Journal/ Article type	Digest
16.05.2020	Extended Storage of SARS-CoV2 Nasopharyngeal Swabs Does Not Negatively Impact Results of Molecular-Based Testing	medRxiv (non-peer reviewed) / Article	• Study demonstrating the long-term stability of nasopharyngeal swab specimens for SARS-CoV-2 molecular testing across three assays recently approved by the U.S. FDA under Emergency Use Authorization.

			• This study demonstrates that nasopharyngeal swab specimens can be stored under refrigeration or even ambient conditions for 21 days without clinically impacting the results of the real-time RT-PCR testing.

Serology and immunology

Publication Date	Title/URL	Journal/ Article type	Digest
19.05.2020	Serology characteristics of SARS-CoV-2 infection since exposure and post symptom onset	Eur Respir J / Article	• Serial sera of 80 patients with PCR-confirmed COVID-19 were collected. Total antibody (Ab), IgM and IgG antibodies against SARS-CoV-2 were detected, and the antibody dynamics during the infection were described. • The seroconversion rates for Ab, IgM and IgG were 98.8%, 93.8% and 93.8%, respectively. The first detectible serology marker was Ab, followed by IgM and IgG, with a median seroconversion time of 15, 18 and 20 days post exposure (d.p.e) or 9, 10 and 12 days post onset (d.p.o), respectively. • For patients in the early stage of illness (0-7 d.p.o), Ab showed the highest sensitivity (64.1%) compared to IgM and IgG (33.3% for both, $p<0.001$). The sensitivities of Ab, IgM and IgG increased to 100%, 96.7% and 93.3% 2 weeks later, respectively.
19.05.2020	Longitudinal Monitoring of SARS-CoV-2 IgM and IgG Seropositivity to Detect COVID-19	J Appl Lab Med / Article	• Study to evaluate the analytical performance parameters of the Diazyme SARS-CoV-2 IgM/IgG serology assays and describe the kinetics of IgM and IgG seroconversion observed in patients with PCR confirmed COVID-19. • Sensitivity and specificity for detecting seropositivity at ≥ 15 days following a positive SARS-CoV-2 PCR result, was 100.0% and 98.7% when assaying for the panel of IgM and IgG. The median time to seropositivity observed for a reactive IgM and IgG result from the date of a positive PCR was 5 days (IQR: 2.75-9 days) and 4 days (IQR: 2.75-6.75 days), respectively.
15.05.2020	Quantifying antibody kinetics and RNA shedding during early-phase SARS-CoV-2 infection	medRxiv (non-peer reviewed) / Article	• Existing data on SARS-CoV-2 IgG, IgM and RNA kinetics were combined using a formal quantitative approach that enables integration of 3,214 data points from 516 individuals, published in 22 studies. • This allowed the authors to determine the mean values and distributions of IgG and IgM seroconversion times and titre kinetics,

			and to characterize how antibody and RNA detection probabilities change during the early phase of infection. • They observed extensive variation in antibody response patterns and RNA detection patterns, explained by both individual heterogeneity and protocol differences such as targeted antigen and sample type.
16.05.2020	Serological prevalence of antibodies to SARS CoV-2 amongst cancer centre staff	medRxiv (non-peer reviewed) / Article	• Between 14 and 24 Apr 2020, 161 staff at four Rutherford Cancer Care centres (age m = 43) were tested for the presence of SARS CoV-2 antibodies, using the South Korean test for antibodies to SARS CoV-2: Sugentech SGTi-flex COVID-19 IgM/IgG1. • Out of 161, 12 samples (7.50%) tested positive of which 7 samples (4.35%) detected IgM only, 2 samples (1.24%) detected IgG only and 3 samples (1.86%) detected both IgM and IgG. • The low seroconversion rate in the sample population limits the current utility of the test as a way of reducing risk to vulnerable patient populations but longitudinal retesting will provide further data.
20.05.2020	CD8+ T cell cross-reactivity against SARS-CoV-2 conferred by other coronavirus strains and influenza virus	bioRxiv (non-peer reviewed) / Article	• Study investigating the potential extent of T cell cross-reactivity against SARS-CoV-2 that can be conferred by other coronaviruses and influenza virus, including generation of a map of public and private predicted CD8+ T cell epitopes between coronaviruses. • Moreover, to assess the potential risk of self-reactivity and/or diminished T cell response for peptides identical or highly similar to the host, the authors identified predicted epitopes with high sequence similarity with human proteome. • Lastly, they compared predicted epitopes from coronaviruses with epitopes from influenza virus deposited in IEDB to support vaccine development against different virus strains.

Genomics

Publication Date	Title/URL	Journal/ Article type	Digest
20.05.2020	Immunogenicity of a DNA vaccine candidate for COVID-19	Nat Commun / Article	• The authors have previously engineered a synthetic DNA vaccine targeting the MERS coronavirus Spike (S) protein, which is currently in clinical study. • They build on this prior experience to generate a synthetic DNA-based vaccine candidate, INO-4800, targeting SARS-CoV-2 S protein.

			• This preliminary dataset identifies INO-4800 as a potential COVID-19 vaccine candidate, supporting further translational study.
20.05.2020	Estrogen regulates the expression of SARS-CoV-2 receptor ACE2 in differentiated airway epithelial cells	Am J Physiol Lung Cell Mol Physiol / Article	• There is marked sexual dimorphism in the current COVID-19 pandemic. • This study reports that oestrogen can regulate the expression of ACE2, a key component for SARS-CoV-2 cell entry, in differentiated airway epithelial cells. • Further studies are required to elucidate the mechanisms by which sex steroids regulate SARS-CoV-2 infectivity.
20.05.2020	RdRp mutations are associated with SARS-CoV-2 genome evolution	bioRxiv (non-peer reviewed) / Article	• Study seeking to understand the effects of mutations in RNA-dependent RNA polymerase (RdRp), particularly the common 14408C>T mutation, on mutation rate and viral spread. • Results indicate that 14408C>T mutation increases the mutation rate, while the third-most common RdRp mutation, 15324C>T, has the opposite effect. It is possible that 14408C>T mutation may have contributed to the dominance of its co-mutations in Europe and elsewhere.
20.05.2020	Deep sequencing of B cell receptor repertoires from COVID-19 patients reveals strong convergent immune signatures	bioRxiv (non-peer reviewed) / Article	• Deep sequencing of B cell receptor (BCR) heavy chains from a cohort of 19 COVID-19 patients from the UK reveals a stereotypical naive immune response to SARS-CoV-2 which is consistent across patients and may be a positive indicator of disease outcome. • There was a strong convergent sequence signature across patients, with 777 clonotypes convergent between at least four of the COVID-19 patients, but not present in healthy controls. • A subset of the convergent clonotypes were homologous to known SARS and SARS-CoV-2 spike protein neutralising antibodies. Convergence was also demonstrated across wide geographies by comparison of data sets between patients from UK, USA and China, further validating the disease association and consistency of the stereotypical immune response even at the sequence level.
20.05.2020	SARS-CoV-2 targets cortical neurons of 3D human brain organoids and shows neurodegeneration-like effects	bioRxiv (non-peer reviewed) / Article	• Emerging clinical reports indicate that neurological symptoms of COVID-19 continue to rise, suggesting detrimental effects of SARS-CoV-2 on the central nervous system (CNS). • This study shows that a Dusseldorf isolate of SARS-CoV-2 enters 3D human brain organoids within two days of exposure. Using COVID-19 convalescent serum, the authors identified that SARS-CoV-2 preferably targets soma of cortical neurons but not neural stem cells, the target cell type of ZIKA virus.

20.05.2020	Intra-host Variation and Evolutionary Dynamics of SARS-CoV-2 Population in COVID-19 Patients	bioRxiv (non-peer reviewed) / Article	• Despite quite a few polymorphic sites identified among SARS-CoV-2 populations, intra-host variant spectra and their evolutionary dynamics remain mostly unknown. Using deep sequencing data, this study characterized consensus genomes and intra-host genomic variants from 32 serial samples collected from eight patients with COVID-19. • The 32 consensus genomes revealed the coexistence of different genotypes within the same patient. Further, 40 intra-host single nucleotide variants (iSNVs) were identified, most of which (30/40) iSNVs presented in single patient, while ten iSNVs were found in at least two patients or identical to consensus variants. • Genetic divergence was found between intra-host populations of the respiratory tract and gastrointestinal tract, along with a maintained viral genetic diversity within GIT, showing an increased population with accumulated mutations developed in the tissue-specific environments.

Epidemiology and clinical – children and pregnancy

Publication Date	Title/URL	Journal/ Article type	Digest
19.05.2020	Effects of coronavirus disease 2019 (COVID-19) on maternal, perinatal and neonatal outcomes: a systematic review	Ultrasound Obstet Gynecol / Review	• 24 studies, including a total of 324 pregnant women with COVID-19, met the eligibility criteria and were included in the systematic review. • The clinical characteristics of COVID-19 in pregnant women are summarised in this systematic review, however the authors note that there are insufficient good-quality data to draw unbiased conclusions with regard to the severity of the disease or specific complications of COVID-19 in pregnant women, as well as vertical transmission, perinatal and neonatal complications.
19.05.2020	Clinical Findings and Disease Severity in Hospitalized Pregnant Women With Coronavirus Disease 2019 (COVID-19)	Obstet Gynecol / Article	• Prospective multicentre cohort study of pregnant women with COVID-19 admitted to 12 Italian maternity hospitals between February 23 and March 28, 2020 (n=77). • In this cohort, one in five women hospitalized with COVID-19 infection delivered urgently for respiratory compromise or were admitted to the ICU. None, however, died. • Increased pregestational BMI and abnormal heart and respiratory rates on admission were associated with severe disease.

19.05.2020	Children are unlikely to be the main drivers of the COVID-19 pandemic - a systematic review	Acta Paediatr / Review	• 700 scientific papers and letters and 47 full texts were studied in detail and children accounted for a small fraction of COVID-19 cases and mostly had social contacts with peers or parents, rather than older people at risk of severe disease. • Data on viral loads were scarce, but indicated that children may have lower levels than adults, are rarely the index case and less likely to cause outbreaks. • Opening up schools and kindergartens is unlikely to impact COVID-19 mortality rates in older people.
19.05.2020	Gastrointestinal features in children with COVID-19: an observation of varied presentation in eight children	The Lancet Child & Adolescent Health / Correspondence	• Report eight children with COVID-19 presenting at a single centre in the UK with symptoms of atypical appendicitis before rapid deterioration requiring hospitalisation and, in some cases, intensive care support. All children had imaging confirming terminal ileitis and no surgical intervention was required at the time of writing. • The authors draw attention to an unusual presentation of COVID-19 in children and adolescents and recommend abdominal imaging when investigating for possible appendicitis.
19.05.2020	Comparative study of the clinical characteristics and epidemiological trend of 244 COVID-19 infected children with or without GI symptoms	Gut / Article	• Reports the clinical characteristics of 244 consecutive COVID-19 positive children from Wuhan, during the period 21 January to 20 March 2020. • Authors compared the differences between patients with and without GI symptoms (having at least one of the following: diarrhoea; nausea and vomiting; abdominal pain; and decreased feeding). • In the cohort, 34 of 244 (13.9%) presented with GI symptoms on admission. These patients were much younger (14 vs 86 months; $p<0.05$), and more than half were under 3 years old.
20.05.2020	Symptomatic Infants have Higher Nasopharyngeal SARS-CoV-2 Viral Loads but Less Severe Disease than Older Children	Clin Infect Dis / Letter	• Report of NP viral load among infants, children and adolescents who were hospitalized and discharged from a NY children's hospital. • Findings suggest symptomatic infants have higher NP viral loads at presentation but develop less severe disease as compared to older children and adolescents.
20.05.2020	Nasal Gene Expression of Angiotensin-Converting Enzyme 2 in Children and Adults	JAMA / Research letter	• This study investigated ACE2 gene expression in the nasal epithelium of children and adults, to ascertain whether the lower risk of COVID-19 among children is due to the differential expression of ACE2. • Results show age-dependent expression of ACE2 in nasal epithelium, the first point of contact for SARS-CoV-2 and the human body. Covariate-adjusted models showed that the positive

			association between ACE2 gene expression and age was independent of sex and asthma.

Epidemiology and clinical - risk factors

Publication Date	Title/URL	Journal/ Article type	Digest
20.05.2020	Viral and host factors related to the clinical outcome of COVID-19	Nature / Article	• Reports the clinical, molecular and immunological data from 326 confirmed cases of COVID-19 in Shanghai. • Genomic sequences showed a stable evolution and suggested two major lineages with differential exposure history during the early phase of the outbreak in Wuhan, with similar virulence and clinical outcomes. • The determinants of disease severity seemed to stem mostly from host factors such as age, lymphocytopenia, and its associated cytokine storm, whereas viral genetic variation did not significantly affect the outcomes.
30.04.2020	Disparities in the Population at Risk of Severe Illness From COVID-19 by Race/Ethnicity and Income	Am J Prev Med / Research letter	• The authors used data from the 2018 Behavioural Risk Factor Surveillance System, a nationally representative survey of >400,000 adults, to estimate the proportion of adults that have at least one of the CDC criteria for risk of severe illness from COVID-19 by age group, race/ethnicity, and household income, accounting for comorbidities. • People who are black, American Indian, or live in low-income households are more likely to have conditions associated with increased risk of illness from COVID-19 relative to those who are white or are living in higher-income households. These inequities in risk are compounded by structural disparities in access to medical insurance, wealth, and income volatility.
15.05.2020	Prognosis of COVID-19 in Patients with Liver and Kidney Diseases: An Early Systematic Review and Meta-Analysis	Trop Med Infect Dis / Systematic Review	• 22 studies including 5595 COVID-19 patients were included in this study with case fatality rate of 16%. • The prevalence of liver diseases and chronic kidney disease (CKD) were 3% (95% CI; 2-3%) and 1% (95% CI; 1-2%), respectively. • This study found an increased risk of severity and mortality in COVID-19 patients with liver diseases or CKD.
19.05.2020	Increased ACE2 Expression in the Bronchial Epithelium of COPD Patients who are Overweight	Obesity (Silver Spring) / Brief report	• Study investigating whether ACE2 bronchial epithelial expression is increased in COPD patients who are overweight compared to those who are not by RNA sequencing.

			• Increased ACE2 expression was observed in COPD patients who are overweight (mean BMI 29 kg/m(2)) compared to those not overweight (mean BMI 21 kg/m(2)) (p=0.004). • Increased ACE2 expression may cause increased SARS-CoV-2 infection of the respiratory tract. COPD patients who are overweight may be at greater risk of developing severe COVID-19.
16.05.2020	COVID-19 in London, a Case Series Demonstrating Late Improvement in Survivors	medRxiv (non-peer reviewed) / Article	• Case series of 15 survivors and 16 non-survivors, to determine whether the trajectories of survivors and non-survivors are different in patients admitted to intensive care in London. • Respiratory failure trajectories of survivors and non-survivors were similar once aligned indicating, from a respiratory function perspective, it is difficult to identify survivors from non-survivors with some survivors improving late in their disease (day 20 - 30 from symptom onset). • Non-survivors were admitted earlier in their disease ($p < 0.05$) and had worse organ failure requirements prior to the nadir of their respiratory function ($p < 0.05$) compared to survivors.
05.05.2020	Risk Stratification tool for Healthcare workers during the CoViD-19 Pandemic; using published data on demographics, co-morbid disease and clinical domain in order to assign biological risk	medRxiv (non-peer reviewed) / Article	• Study exploring the predictive role of basic demographics in order to establish a simple tool that could help risk stratify healthcare workers. • Mortality increased with increasing age from 50 years onwards. Male sex at birth and people of black and minority ethnicity groups had higher susceptibility to both hospitalisation and mortality. Similarly, vascular disease, diabetes and chronic pulmonary disease further increased risk. • A risk stratification tool was compiled using a Caucasian female <50years of age with no comorbidities as a reference. Each point allocated to risk factors was associated with an approximate doubling in risk.
15.05.2020	IL6 inhibition in critically ill COVID-19 patients is associated with increased secondary infections	medRxiv (non-peer reviewed) / Article	• Retrospective review of medical records and histopathologic post-mortem findings to determine whether IL-6 inhibition is associated with an increased occurrence of secondary infections in patients admitted to the intensive care unit (ICU). • The authors reviewed the occurrence and nature of secondary infections and clinical outcomes in patients who did and did not receive tocilizumab. For autopsy findings, they were interested in the lung pathology. • Receiving tocilizumab was associated with a higher risk of

			secondary bacterial (64.3% vs. 31.3%, p=0.010) and fungal (7.1% vs. 0%, p=0.096) infections. 7 cases underwent autopsy. In 3 cases, tocilizumab had previously been given. All 3 patients demonstrated evidence of pneumonia on pathology. Of the 4 cases that had not been given tocilizumab, 2 showed evidence of aspiration pneumonia and 2 exhibited diffuse alveolar damage.

Epidemiology and clinical – other

Publication Date	Title/URL	Journal/ Article type	Digest
20.05.2020	Olfactory Dysfunction in COVID-19: Diagnosis and Management	Jama / Article	• Describes possible approaches for the assessment and management of suspected COVID-19 related olfactory dysfunction.
20.05.2020	Loss of smell and taste as symptoms of COVID-19: what does the evidence say?	Oxford COVID-19 Evidence Service / Perspective	• A large, peer-reviewed report from UK and US community settings published in mid-May indicates that almost two-thirds of positive COVID-19 self-reported cases report a loss of smell or taste compared with a quarter of negative cases. • However, the current evidence base is predominantly of poor quality, due mainly to the retrospective and cross-sectional nature of the included study designs. Ongoing studies using symptom tracking in healthy users to prospectively track symptom development are needed to reduce uncertainty.
18.05.2020	What settings have been linked to SARS-CoV-2 transmission clusters?	Wellcome Open Research / Systematic review	• Systematic review to inform exit strategies by exploring the types of indoor and outdoor settings where transmission of SARS-CoV-2 has been reported to occur and result in clusters of cases. • Many examples were found of SARS-CoV-2 clusters linked to a wide range of mostly indoor settings. Few reports came from schools, many from households, and an increasing number were reported in hospitals and elderly care settings across Europe. • The authors identified possible places that are linked to clusters of COVID-19 cases and could be closely monitored and/or remain closed in the first instance following the progressive removal of lockdown restrictions.
19.05.2020	Findings from investigation and analysis of re-positive cases	KCDC / Press release	• Epidemiological investigation and contact investigation have been completed for 285 (63.8%) of the total 447 re-positive cases (as of 15 May). • 59.6% were tested as a screening measure, and 37.5% were tested

			because of symptom onset. Of the 284 cases for which symptoms were investigated, 126 (44.7%) were symptomatic. • From the 285 re-positive cases, a total of 790 contacts were identified (351=family; 439=others). From the monitoring of contacts, as of now, no case has been found that was newly confirmed from exposure during re-positive period alone.
15.05.2020	How Large Was the Mortality Increase Directly and Indirectly Caused by the COVID-19 Epidemic? An Analysis on All-Causes Mortality Data in Italy	Int J Environ Res Public Health / Article	• Study aimed at evaluating the extent of the total death excess during the COVID-19 epidemic in Italy. Data from 4433 municipalities providing mortality reports until April 15th, 2020 were included for a total of 34.5 million residents from all Italian regions. Data were analysed by region, sex and age, and compared to expected from 2015-2019. • In both genders, overall mortality was stable until February 2020 and abruptly increased from March 1st onwards. Within the municipalities studied, 77,339 deaths were observed in the period between March 1st to April 15th, 2020, in contrast to the 50,822 expected. • The extrapolation to the total Italian population suggests an excess of 45,033 deaths in the study period, while the number of COVID-19 deaths was 21,046.
20.05.2020	Prevalence of putative invasive pulmonary aspergillosis in critically ill patients with COVID-19	The Lancet Respiratory Medicine / Correspondence	• Patients that enter the ICU with COVID-19 are at high risk of developing secondary infections such as invasive pulmonary aspergillosis (IPA). • This prospective observational study suggests that the frequency of putative IPA is 30%. • Supports systematic screening for Aspergillus infection markers in critically ill patients with COVID-19.
20.05.2020	COVID-19-associated meningoencephalitis complicated with intracranial hemorrhage: a case report	Acta Neurochir (Wien) / Article	• Case of a 36-year-old coronavirus-positive patient that was admitted on emergency basis; his clinical presentation included neurological symptoms such as drowsiness and mild confusion. • Imaging revealed findings consistent with meningoencephalitis complicated by intracerebral hematoma and subdural hematoma. • The latter was surgically evacuated after it became chronic and evidence of coronavirus was found in the fluid.
20.05.2020	Prolonged Confusional state as first manifestation of COVID-19	Ann Clin Transl Neurol / Case study	• A 77 year old gentleman, normally fit and well, was admitted with acute confusion. • Investigations revealed hyponatraemia, raised CRP and positive for COVID-19. Treated with antibiotics and intravenous saline, sodium

			returned to normal. Delirium remained unchanged four weeks post incidence. • Neurological manifestations were documented in patients with COVID-19, however no report has shown delirium as a primary manifestation. This case illustrates acute confusion may be the only presenting symptom of COVID-19 without overt lung disease.
16.05.2020	Analysis of temporal trends in potential COVID-19 cases reported through NHS Pathways England	medRxiv (non-peer reviewed) / Article	• Fully reproducible analysis of temporal trends in NHS Pathways reports until 14th May 2020, nationally and regionally, which demonstrates that rates of growth/decline and effective reproduction number estimated from these data may be useful in monitoring transmission. • Further, the authors assess the correlation between NHS Pathways reports and a publicly available NHS dataset of COVID-19-associated deaths in England, finding that enquiries to 111/999 were strongly associated with daily deaths reported 16 days later. • Results highlight the potential of NHS Pathways as the basis of an early warning system. However, this dataset relies on self-reported symptoms, which are at risk of being severely biased.

Infection control

Publication Date	Title/URL	Journal/ Article type	Digest
20.05.2020	Simulated Sunlight Rapidly Inactivates SARS-CoV-2 on Surfaces	J Infect Dis / Article	• In this study, simulated sunlight rapidly inactivated SARS-CoV-2 suspended in either simulated saliva or culture media and dried on stainless steel coupons. Ninety percent of infectious virus was inactivated every 6.8 minutes in simulated saliva and every 14.3 minutes in culture media when exposed to simulated sunlight representative of the summer solstice at 40oN latitude at sea level on a clear day. • Significant inactivation also occurred, albeit at a slower rate, under lower simulated sunlight levels. • The present study provides the first evidence that sunlight may rapidly inactivate SARS-CoV-2 on surfaces, suggesting that persistence, and subsequently exposure risk, may vary significantly between indoor and outdoor environments.

18.05.2020	The impact of physical distancing measures against COVID-19 transmission on contacts and mixing patterns in the Netherlands: repeated cross-sectional surveys	medRxiv (non-peer reviewed) / Article	• 2020 repeat of a cross-sectional survey carried out in the Netherlands in 2016/2017 in which participants retrospectively reported the number, age and gender of different persons they had contacted (spoken to in person or touched) during the previous day. • The average number of contacts in the community was reduced by 71% (95% confidence interval: 71-71). The reduction in the number of community contacts was highest for children and adolescents (between 5 and 20 years) and smallest for elderly persons of 80 years and older. • The substantial reduction in contacts has contributed greatly in halting the COVID-19 epidemic. This reduction was unevenly distributed over age groups, household sizes and occupations.

Treatment

Publication Date	Title/URL	Journal/ Article type	Digest
20.05.2020	The immunology of COVID-19: is immune modulation an option for treatment?	The Lancet Rheumatology / Review	• This review discusses the immunological aspects of COVID-19 and the potential implication of disease-modifying anti-rheumatic drugs in treatment.
16.05.2020	Systematic and Statistical Review of COVID19 Treatment Trials	medRxiv (non-peer reviewed) / Systematic review	• Systematic review and meta-analysis of the current data regarding human controlled COVID-19 treatment trials. Medications assessed included lopinavir/ritonavir, arbidol, hydroxychloroquine, favipiravir, and heparin. Statistical analyses were performed for common viral clearance endpoints whenever possible. • Current medications assessed (Lopinavir/ritonavir, Hydroxychloroquine, Arbidol) do not show significant effect on COVID-19 viral clearance rates. Favipiravir shows favourable results compared to other tested medications. Heparin shows benefit for severe cases of COVID-19.
15.05.2020	Trialstreamer: a living, automatically updated database of clinical trial reports	medRxiv (non-peer reviewed) / Article	• Report describing the development and evaluation of a system, Trialstreamer, to automatically find and categorize all new RCT reports. • As of May 2020, they have indexed 669,895 publications of RCTs, of which 18,485 were published in the first four months of 2020 (144/day). They additionally include 303,319 trial registrations from

			ICTRP. Daily updates of this database are available at https://trialstreamer.robotreviewer.net/.
19.05.2020	Type I and Type III IFN Restrict SARS-CoV-2 Infection of Human Airway Epithelial Cultures	bioRxiv (non-peer reviewed) / Article	• SARS-CoV-2 infection was modelled using primary human airway epithelial (pHAE) cultures, which are maintained in an air-liquid interface. • Study findings demonstrate that SARS-CoV-2 induces a strong pro-inflammatory cytokine response yet blocks the production of type I and III IFNs. Further, SARS-CoV-2 is sensitive to the effects of type I and III IFNs, demonstrating their potential utility as therapeutic options to treat COVID-19 patients.

Social sciences

Publication Date	Title/URL	Journal/ Article type	Digest
19.05.2020	Reducing SARS-CoV-2 transmission in the UK: A behavioural science approach to identifying options for increasing adherence to social distancing and shielding vulnerable people	Br J Health Psychol / Article	• Article describing a systematic method for producing a very rapid response (3 days) to a UK government policy question in the context of reducing SARS-CoV-2 transmission: "What are the options for increasing adherence to social distancing (staying at home except for essential journeys and work) and shielding vulnerable people (keeping them at home and away from others)?" This was prior to social distancing legislation being implemented. • Responding to policymakers very rapidly as has been necessary during the COVID-19 pandemic can be facilitated by using a framework to structure the thinking and reporting of multidisciplinary academics and policymakers.
14.05.2020	Who is lonely in lockdown? Cross-cohort analyses of predictors of loneliness before and during the COVID-19 pandemic	medRxiv (non-peer reviewed) / Article	• This study compared socio-demographic predictors of loneliness before and during the COVID-19 pandemic using cross-cohort analyses of data from UK adults captured before the pandemic (UK Household Longitudinal Study, n=31,064) and during the pandemic (UCL COVID-19 Social Study, n=60,341). • Risk factors for loneliness were near identical prior to and during the pandemic. Young adults, women, people with lower education or income, the economically inactive, people living alone, and urban residents had a higher odds of being lonely. • Some people who were already at risk for being lonely (e.g. young adults aged 18-30, people with low household income, and adults

			living alone) experienced a heightened risk during the COVID-19 pandemic compared to usual (indicated by higher coefficients). Further, being a student emerged as a higher risk factor during lockdown than usual.
15.05.2020	Comparative Analysis of the Application of Behavioural Insights of 33 Worldwide Governments on the Landing Pages of their COVID-19 Official Websites and their Impact on the Growth Scale of the Pandemic	medRxiv (non-peer reviewed) / Article	• Through the analysis 18 behavioural mechanisms present on the landing pages of the websites of 33 institutional governments from March 1st til May 1st 2020 compared to the WHO data on the number of COVID-19 cases and deaths per million for each country, the authors show that a behavioural consensus was observed across all 33 countries and that Individual and Social nudges had no impact. • Whilst the decisions in every country were taken with the same aim: to limit population movements and social life, only the environmental nudges effectively helped slow the virus growth scale. • Public health policies need to address behavioural change of the population on a global scale in a more targeted manner and it is hoped that this paper will provide some insight on how to do so.
16.05.2020	Trust, threats, and consequences of the COVID-19 pandemic in Norway and Sweden: A comparative survey	medRxiv (non-peer reviewed) / Article	• Norway and Sweden, two neighbouring countries with similar populations, health care systems and socioeconomics, have reacted differently to the COVID-19 pandemic. This study compared peoples' attitudes towards authorities and control measures, and effects on life in Norway and Sweden. • People had high trust in the health services in both countries, but differed in the degree of trust in their government (17% had high trust in Norway and 37% in Sweden). More Norwegians than Swedes agreed that school closure was a good measure (66% Norway and 18% in Sweden), and that countries with open schools were irresponsible (65% in Norway and 23% in Sweden). • About the same amount responded that COVID-19 was a large to very large threat to the population (53% in Norway and 58% in Sweden), whereas more Norwegians than Swedes responded that the threat from repercussions of the mitigation measures were large or very large (71% in Norway and 56% in Sweden).

Modelling

Publication Date	Title/URL	Journal/ Article type	Digest

20.05.2020	Individual quarantine versus active monitoring of contacts for the mitigation of COVID-19: a modelling study	The Lancet Infectious Diseases / Article	• A stochastic branching model was used to estimate the comparative efficacy of individual quarantine and active monitoring of contacts to control SARS-CoV-2. The authors fit a model to the incubation period distribution (mean 5·2 days) and to two estimates of the serial interval distribution: a shorter one with a mean serial interval of 4·8 days and a longer one with a mean of 7·5 days. • Individual quarantine in high-feasibility settings, where at least 75% of infected contacts are individually quarantined, contains an outbreak of SARS-CoV-2 with a short serial interval (4·8 days) 84% of the time.
15.05.2020	COVID-19 in England: spatial patterns and regional outbreaks	medRxiv (non-peer reviewed) / Article	• Modelling study investigating the spatiotemporal distribution of COVID-19 cases in England using Public Health England SARS-CoV-2 testing data at the Lower Tier Local Authority region level • A wide range of spatial heterogeneity in COVID-19 epidemic distribution and infection rate exists in England currently. Future work should incorporate fine-scaled demographic and health covariates, with continued improvement in spatially-detailed case reporting data. • The authors flag up several caveats relating to limitations of using testing data alone, rather than other measures of prevalence.
16.05.2020	When Can Elimination of SARS-CoV-2 Infection be Assumed? Simulation Modelling in a Case Study Island Nation	medRxiv (non-peer reviewed) / Article	• Modelling study to determine the length of time from the last detected case of SARS-CoV-2 infection before elimination can be assumed at a country level, using data from the case study island nation of New Zealand along with relevant parameters sourced from the NZ and international literature. This included a testing level for symptomatic cases of 7,800 tests per million people per week. • For a 99% probability of epidemic extinction, the equivalent time period was 37 to 44 days. In scenarios with lower levels of symptomatic cases seeking medical attention and lower levels of testing, the time period was up to 53 to 91 days (95% level).
20.05.2020	Contact tracing strategies for COVID-19 containment with attenuated physical distancing	medRxiv (non-peer reviewed) / Article	• A simple epidemic model is used to evaluate how contact tracing might enable modification of current physical distancing restrictions. • Testing and tracing coverage need to exceed 50% in order to see substantial gains; if both are below 50%, contact tracing cannot reduce transmission by more than 10%. • With 90% testing and tracing as well as high isolation and quarantine efficacy, contact tracing could reduce overall transmission

			by >45%, which would allow for partial loosening of physical distancing measures.

Guidance, consensus statements

Publication Date	Title/URL	Journal/ Article type
21.05.2020	Cytokine adsorption devices for treating respiratory failure in people with COVID-19 [MIB217]	NICE Guidance / Medtech innovation briefing

Overviews, comments and editorials

Publication Date	Title/URL	Journal/ Article type
20.05.2020	Nasal ACE2 Levels and COVID-19 in Children	Jama / Editorial
20.05.2020	A future vaccination campaign against COVID-19 at risk of vaccine hesitancy and politicisation	The Lancet Infectious Diseases / Comment

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