



International EPI Cell Daily Evidence Digest – 28/04/2020

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
- Genomics
- Epidemiology and clinical - children and pregnancy
- Epidemiology and clinical - risk factors
- Epidemiology and clinical - other
- Infection control
- Treatment
- Social sciences
- Miscellaneous
- 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Please note that we are including preprints (**highlighted in red**), which are preliminary reports of work that have NOT been peer-reviewed.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
27.04.2020	Olfactory and rhinological evaluations in SARS-CoV-2 patients complaining of olfactory loss	Rhinology / Article	<ul style="list-style-type: none">• In a study of 7,736 Covid-19 patients in China, of all the clinical symptoms, hyposmia was not reported in any patient.

27.04.2020	COVID-19 Associated Pulmonary Aspergillosis	Mycoses / Original article	<ul style="list-style-type: none"> • Patients with ARDS due to viral infection are at risk for secondary complications like invasive aspergillosis. • Clinicians caring for patients with ARDS due to COVID-19 should consider invasive pulmonary aspergillosis and subject respiratory samples to comprehensive analysis to detect co-infection.
23.04.2020	SARS-CoV-2 viral load in sputum correlates with risk of COVID-19 progression	Critical Care (London, England) / Research Letter	<ul style="list-style-type: none"> • The authors found that the viral load of the sputum specimen in the lower respiratory tract tested at baseline is closely related to the severity of COVID-19. More importantly, patients with a higher baseline viral load are more likely to become severe. • This finding apparently justifies the concept that early antiviral treatment, if effective, would reduce the risk of progression and thereby the mortality, which has been demonstrated in influenza.
23.04.2020	Comparison of Abbott ID Now and Abbott m2000 methods for the detection of SARS-CoV-2 from nasopharyngeal and nasal swabs from symptomatic patients	Journal of Clinical Microbiology / Letter to the editor	<ul style="list-style-type: none"> • The ID NOW COVID-19 assay demonstrated significantly different performance characteristics when compared to the Abbott RealTime SARS-CoV-2 assay.
24.04.2020	Validation of a SARS-CoV-2 spike ELISA for use in contact investigations and serosurveillance	bioRxiv (not peer reviewed) / Article	<ul style="list-style-type: none"> • In this study, the authors describe optimization and validation of a SARS-CoV-2-specific-enzyme linked immunosorbent assay (ELISA) using the prefusion-stabilized form of the spike protein. They performed receiver operator characteristic (ROC) analyses to define the specificities and sensitivities of the optimized assay and examined cross reactivity with immune sera from persons confirmed to have had infections with other coronaviruses. • These assays will be used to study chains of transmission and to conduct large-scale, cross sectional surveillance to define disease burden in the population.
20.04.2020	Optimized qRT-PCR approach for the detection of intra- and extracellular SARS-CoV-2 RNAs	bioRxiv (not peer reviewed) / Article (not peer reviewed) / Article	<ul style="list-style-type: none"> • The authors describe an alternative RT-PCR approach for the detection of SARS-CoV-2 RNA that can be used for the probe-based detection of clinical isolates in the diagnostics as well as in research labs using a low cost SYBR green method. • For the evaluation, they used samples from patients with confirmed SARS-CoV-2 infection and performed RT-PCR assays along with successive dilutions of RNA standards to determine the limit of detection. • They identified an M-gene binding primer and probe pair highly suitable for quantitative detection of SARS-CoV-2 RNA for diagnostic and research purposes.

19.04.2020	CoV2ID: Detection and Therapeutics Oligo Database for SARS-CoV-2	bioRxiv (not peer reviewed) / Article	<ul style="list-style-type: none"> The authors describe the CoV2ID (http://covid.portugene.com/), a free database built to facilitate the evaluation of molecular methods for detection of SARS-CoV-2 and treatment of COVID-19. The database evaluates the available oligonucleotide sequences (PCR primers, RT-qPCR probes, etc.) considering the genetic diversity of the virus. Updated sequences alignments are used to constantly verify the theoretical efficiency of available testing methods. Detailed information on available detection protocols are also available to help laboratories implementing SARS-CoV-2 testing.
21.04.2020	A web-based Diagnostic Tool for COVID-19 Using Machine Learning on Chest Radiographs (CXR)	medRxiv (not peer reviewed) / Article	<ul style="list-style-type: none"> This paper reports the development and web deployment of an inference model for Coronavirus COVID-19 using machine vision on chest radiographs (CXR). The performance metrics showed an accuracy of 99%, a recall valued of 99.8%, a precision of 99% and an F1 score of 99.8% for COVID-19 inference. The model was further successfully validated on CXR images from an independent repository. The implemented model was deployed with a web graphical user interface for inference (https://medics-inference.onrender.com) for the medical research community; an associated cron job is scheduled to continue the learning process when novel and validated information becomes available.
23.04.2020	Contrast enhanced ultrasonography (CEUS) to detect abdominal microcirculatory disorders in severe cases of COVID-19 infection: First experience	Clinical Hemorheology and Microcirculation / Research article	<ul style="list-style-type: none"> Contrast enhanced sonography (CEUS) can be an important part of a fast and effective bedside diagnosis in severe cases of COVID-19 infection, even taking into account all the complex measures, the required special ultrasound equipment and the necessary high level of experience of the examiner.
27.04.2020	Classification of COVID-19 patients from chest CT images using multi-objective differential evolution-based convolutional neural networks	European Journal of Clinical Microbiology & Infectious Diseases / Original article	<ul style="list-style-type: none"> In this paper, a convolutional neural networks (CNN) is used to classify the COVID-19-infected patients as infected (+ve) or not (-ve). Extensive experiments are performed by considering the proposed and the competitive machine learning techniques on the chest CT images. Extensive analysis shows that the proposed model can classify the chest CT images at a good accuracy rate.
22.04.2020	Inf-Net: Automatic COVID-19 Lung Infection Segmentation from CT Scans	medRxiv (not peer reviewed)	<ul style="list-style-type: none"> A novel COVID-19 Lung Infection Segmentation Deep Network (Inf-Net) is proposed to automatically identify infected regions

		reviewed) / Article	from chest CT scans. In their Inf-Net, a parallel partial decoder is used to aggregate the high-level features and generate a global map. Then, the implicit reverse attention and explicit edge-attention are utilized to model the boundaries and enhance the representations. Moreover, to alleviate the shortage of labelled data, they present a semi-supervised segmentation framework based on a randomly selected propagation strategy, which only requires a few labelled images and leverages primarily unlabelled data.
27.04.2020	AI Augmentation of Radiologist Performance in Distinguishing COVID-19 from Pneumonia of Other Etiology on Chest CT	Radiology / Original research	<ul style="list-style-type: none"> • Artificial Intelligence assistance improved radiologists' performance in distinguishing COVID-19 from non-COVID-19 pneumonia on chest CT. • 521 patients with positive RT-PCR for COVID-19 and abnormal chest CT findings were retrospectively identified from ten hospitals from January 2020 to April 2020. 665 patients with non-COVID-19 pneumonia and definite evidence of pneumonia on chest CT were retrospectively selected from three hospitals between 2017 and 2019.
27.04.2020	CO-RADS - A categorical CT assessment scheme for patients with suspected COVID-19: definition and evaluation	Radiology / Original research	<ul style="list-style-type: none"> • CO-RADS is a categorical assessment scheme for pulmonary involvement of COVID-19 on non-enhanced chest CT providing very good performance for predicting COVID-19 in patients with moderate to severe symptoms and has a substantial interobserver agreement, especially for categories 1 and 5.
20.04.2020	The production of antibodies for SARS-CoV-2 and its clinical implication	medRxiv (not peer reviewed) / Article	<ul style="list-style-type: none"> • The concentration of SARS-CoV-2 IgM and IgG antibodies peaked on day 19-21 after symptom onset, and antibody testing on day 16-21 is associated with increased detection rates, but the antibody concentration does not affect the course and outcome of the infection. Recovering patients with re-detectable positive SARS-CoV-2 RNA displayed lower concentration of IgG, but the downward trend of IgG during recovery indicated its limited duration of protection, and the protective effect of IgG remains to be investigated.
27.04.2020	Profile of IgG and IgM antibodies against severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)	Clinical Infectious Diseases / Accepted manuscript	<ul style="list-style-type: none"> • The authors profiled the serological responses to SARS-CoV-2 nucleocapsid (N) protein and spike (S) glycoprotein. • The majority of the patients developed robust antibody responses between 17 and 23 days after illness onset. • Delayed, but stronger antibody responses were observed in critical patients.

21.04.2020	SARS-CoV-2 serological analysis of COVID-19 hospitalized patients, pauci-symptomatic individuals and blood donors	medRxiv (not peer reviewed) / Article	<ul style="list-style-type: none"> • The authors performed a pilot study to assess the levels of anti-SARS-CoV-2 antibodies in samples taken from 491 pre-epidemic individuals, 51 patients from Hospital Bichat (Paris), 209 pauci-symptomatic individuals in the French Oise region and 200 contemporary Oise blood donors. • Overall, the results obtained with four assays were similar, with differences in sensitivity that can be attributed to the technique and the antigen in use. High antibody titres were associated with neutralisation activity, assessed using infectious SARS-CoV-2 or lentiviral-S pseudotypes. In hospitalized patients, seroconversion and neutralisation occurred on 5-14 days post symptom onset, confirming previous studies. Seropositivity was detected in 29% of pauci-symptomatic individuals within 15 days post-symptoms and 3% of blood of healthy donors collected in the area of a cluster of COVID cases.
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Genomics

Publication Date	Title/URL	Journal/ Article type	Digest
27.04.2020	ACE2 correlated with immune infiltration serves as a prognostic biomarker in endometrial carcinoma and renal papillary cell carcinoma: implication for COVID-19	Aging / Research paper	<ul style="list-style-type: none"> • Angiotensin-converting enzyme 2 (ACE2) expression increased significantly in UCEC and KIRP, elevated ACE2 was positively correlated with immune infiltration and prognosis. • Tumour tissues may be more susceptible to SARS-CoV-2 infection in COVID-19 patients with UCEC and KIRP, which may worsen the prognosis.
27.04.2020	Focus on Receptors for Coronaviruses with Special Reference to Angiotensin-converting Enzyme 2 as a Potential Drug Target - A Perspective	Endocrine, Metabolic & Immune Disorders Drug Targets / Perspective	<ul style="list-style-type: none"> • Three key papers have demonstrated the ability of a polyphenol, resveratrol (RES), to experimentally deactivate the renin-angiotensin system (RAS) system in maternal and post-weaning high fat diet, arterial ageing and high fat diet, respectively. • In all these experimental models, RES led to an increase of ACE2 with reduction of organ damage, such as liver steatosis and aorta media thickness and decrease of adipose tissue mass, respectively. • These findings suggest that also in the case of RES effects on COVID-19 infection, the dual role of ACE2 should be taken into serious consideration.

25.04.2020	SARS-CoV-2 Productively Infects Human Gut Enterocytes	bioRxiv (not peer reviewed) / Article	<ul style="list-style-type: none"> • In human small intestinal organoids, enterocytes were readily infected by SARS-CoV and SARS-CoV-2 as demonstrated by confocal- and electron-microscopy. Consequently, significant titers of infectious viral particles were measured. mRNA expression analysis revealed strong induction of a generic viral response program. They conclude that intestinal epithelium supports SARS-CoV-2 replication.
27.04.2020	Kallikrein-kinin blockade in patients with COVID-19 to prevent acute respiratory distress syndrome	ELife / Short report	<ul style="list-style-type: none"> • The authors hypothesize that a bradykinin-dependent local lung angioedema via B1 and B2 receptors is an important feature of COVID-19. • They propose that blocking the B2 receptor and inhibiting kallikrein activity might have an ameliorating effect on early disease caused by COVID-19 and might prevent acute respiratory distress syndrome (ARDS).
27.04.2020	A potential ex vivo infection model of human induced pluripotent stem cell-3D organoids beyond coronavirus disease 2019	Histology and Histopathology / Review	<ul style="list-style-type: none"> • Organoids derived from human induced pluripotent stem cells (iPSCs) may serve as suitable infection models for ex vivo mimicking of the viral life cycle and drug screening.
26.04.2020	SARS-CoV-2 RNA dependent RNA polymerase (RdRp) targeting: An in silico perspective	Journal of biomolecular structure & dynamics / Article	<ul style="list-style-type: none"> • The results show the effectiveness of Sofosbuvir, Ribavirin, Galidesivir, Remdesivir, Favipiravir, Cefuroxime, Tenofovir, and Hydroxychloroquine, in binding to SARS-CoV-2 RdRp. • Additionally, Setrobuvir, YAK, and IDX-184, show better results, while four novel IDX-184 derivatives show promising results in attaching to the SARS-CoV-2 RdRp.
27.04.2020	Disparate temperature-dependent virus - host dynamics for SARS-CoV-2 and SARS-CoV in the human respiratory epithelium	bioRxiv (not peer reviewed) / Article	<ul style="list-style-type: none"> • Human airway epithelial cell (hAEC) culture model used to investigate impact of ambient temperatures in upper (33°C) / lower respiratory tract (37°C) on viral replication kinetics and host innate immune response dynamics during SARS-CoV-2 and SARS-CoV infections. • SARS-CoV-2 replicated more efficiently at temperatures encountered in the upper respiratory tract, and displayed higher sensitivity to type I and type III IFNs than SARS-CoV. • Time-resolved transcriptome analysis highlighted a temperature-dependent induction of IFN-mediated antiviral response, whose amplitude inversely correlated with the replication kinetic efficiencies of both SARS-CoV-2 and SARS-CoV at temperatures found in the upper and lower respiratory tract.
23.04.2020	Emerging genetic diversity among clinical isolates of SARS-CoV-2: Lessons for today	Infection, Genetics and	<ul style="list-style-type: none"> • Every continent seems to have multiple introductions of different viral strains.

		Evolution / In press, journal pre-proof	<ul style="list-style-type: none"> • 5' terminal of the viral genome is more prone to mutations compared to 3' end. • ORF1ab, spike, ORF3a and E are key protein prone to mutations. • Receptor Binding Domain of spike protein emerged as mutational hotspot. • This phylogenetic analyses reveal at least five different clades of SARS-CoV-2.
26.04.2020	Emergence of multiple variants of SARS-CoV-2 with signature structural changes	bioRxiv (not peer reviewed) / Article	<ul style="list-style-type: none"> • Study explores divergence pattern of SARS-CoV-2 using whole genome sequences of isolates from COVID-19 affected countries. Phylogenomic analysis indicates at least four distinct groups. • Emergent groups are associated with signature structural changes in specific proteins. Study reveals the differential levels of divergence patterns for the protein coding regions. • Also predict impact of structural changes on a couple of important viral proteins via structural modelling techniques.
24.04.2020	Evolution and molecular characteristics of SARS-CoV-2 genome	bioRxiv (not peer reviewed) / Article (not peer reviewed) / Article	<ul style="list-style-type: none"> • The evolution and molecular characteristics of more than 3500 genomic sequences provide a new perspective for revealing the epidemiology mechanism of SARS-CoV-2 and coping with SARS-CoV-2 effectively.
27.04.2020	A SARS-CoV-2 vaccine candidate would likely match all currently circulating strains	bioRxiv (not peer reviewed) / Article (not peer reviewed) / Article	<ul style="list-style-type: none"> • Authors analysed SARS-CoV-2 sequence diversity across 5,700 sequences sampled since December 2019. The Spike protein, the target immunogen of most vaccine candidates, showed 93 sites with shared polymorphisms; only one of these mutations was found in more than 1% of currently circulating sequences. • Little evidence that the virus has adapted to its human host since Dec 2019 - findings suggest a single vaccine should be efficacious against current global strains.
26.04.2020	Structural Basis of RNA Cap Modification by SARS-CoV-2 Coronavirus	bioRxiv (not peer reviewed) / Article (not peer reviewed) / Article	<ul style="list-style-type: none"> • In SARS coronaviruses, the non-structural protein 16 (nsp16) methylates the 5'-end of virally encoded mRNAs to mimic cellular mRNAs, protecting the virus from host innate immune restriction. • Authors report: i. large conformational changes associated with substrate binding as the enzyme transitions from a binary to a ternary state, providing new mechanistic insights into the 2'-O methylation of the viral mRNA cap; ii. a distantly located ligand-

			binding site unique to SARS-CoV-2 that may serve as an alternative target site for antiviral development.
23.04.2020	How fast does the SARS-Cov-2 virus really mutate in heterogeneous populations?	medRxiv (not peer reviewed) / Article	<ul style="list-style-type: none"> • The authors discuss the problem of determining the mutational support of genes in the SARS-Cov-2 virus and estimating the distribution of mutations within different genes using small sample sizes that do not allow for accurate maximum likelihood estimation. • They use state-of-the art polynomial estimator techniques and the Good-Turing estimator to obtain estimates based on only roughly 1, 000 samples per category. • Their analysis reveals an interesting finding: the mutational support appears to be statistically more significant in patients which appear to have lower infection rates and handle the exposure with milder symptoms, such as women and people of relatively young age (≤ 55).
27.04.2020	Evidence for host-dependent RNA editing in the transcriptome of SARS-CoV-2	bioRxiv (not peer reviewed) / Article (not peer reviewed) / Article	<ul style="list-style-type: none"> • Authors analyse RNA sequences from bronchoalveolar lavage fluids derived from infected patients; identify nucleotide changes that may be signatures of RNA editing: Adenosine-to-Inosine changes from ADAR deaminases and Cytosine-to-Uracil changes from APOBEC ones. Results suggest that APOBECs and ADARs are involved in Coronavirus genome editing. • A mutational analysis of genomes from different strains of human-hosted Coronaviridae reveals mutational patterns compatible to those observed in the transcriptomic data.

Epidemiology and clinical - children and pregnancy

Publication Date	Title/URL	Journal/ Article type	Digest
27.04.2020	Atypical presentation of COVID-19 in young infants	The Lancet / Correspondence	<ul style="list-style-type: none"> • The authors describe their experience of COVID-19 in five young infants. • Although infants might initially present signs of severe infection, the youngest children tolerate and rapidly improve from COVID-19, in contrast to adults admitted to hospital with COVID-19. • However, because little is known about SARS-CoV-2 infection in infants, close monitoring is required for at least 2 weeks after the diagnosis.

27.04.2020	An international registry for emergent pathogens and pregnancy	The Lancet / Correspondence	<ul style="list-style-type: none"> • The authors have adjusted the Zika virus international web registry to create COVI-Preg, a structured data collection tool available to any facility assessing pregnant patients for SARS-CoV-2 infection.
23.04.2020	Coronavirus disease 2019 (COVID-19) in pregnant women: A report based on 116 cases	American Journal of Obstetrics and Gynecology / Journal pre-proof	<ul style="list-style-type: none"> • SARS-CoV-2 infection during pregnancy is not associated with an increased risk of spontaneous abortion and spontaneous preterm birth. • There is no evidence of vertical transmission of SARS-CoV-2 infection when the infection manifests during the third-trimester of pregnancy.
27.04.2020	Infections in pregnancy with COVID-19 and other respiratory RNA virus diseases are rarely, if ever, transmitted to the fetus: Experiences with coronaviruses, HPIV, hMPV RSV, and influenza	Archives of Pathology & Laboratory Medicine / Early online release	<ul style="list-style-type: none"> • It appears that the absence thus far of maternal-foetal transmission of the SARS-CoV-2 virus during the COVID-19 pandemic is similar to other coronaviruses, and is also consistent with the extreme rarity of suggested or confirmed cases of intrauterine transmission of other respiratory RNA viruses. • This observation has important consequences for pregnant women as it appears that if intrauterine transmission of SARS-CoV-2 does eventually occur, it will be a rare event.
27.04.2020	Vaginal delivery in SARS-CoV-2 infected pregnant women in Northern Italy: a retrospective analysis	BJOG: International Journal of Obstetrics and Gynaecology / Research article	<ul style="list-style-type: none"> • Although post-partum infection cannot be excluded with 100% certainty, these findings suggest that vaginal delivery is associated with a low risk of intrapartum SARS-Cov-2 transmission to the new-born.
23.04.2020	Analysis of the susceptibility to COVID-19 in pregnancy and recommendations on potential drug screening	European Journal of Clinical Microbiology & Infectious Diseases / Journal pre-proof	<ul style="list-style-type: none"> • Drugs that show superior maternal and foetal safety are worthy of consideration for pregnant women with COVID-19, such as chloroquine, metformin, statins, lobinavir/ritonavir, glycyrrhizic acid, and nanoparticle-mediated drug delivery (NMDD), etc. • Pregnant women are susceptible to COVID-19, and special attention should be paid to the selection of drugs that are both effective for maternal diseases and friendly to the foetus.
23.04.2020	Clinical analysis of ten pregnant women with COVID-19 in Wuhan, China: A retrospective study	International Journal of Infectious	<ul style="list-style-type: none"> • All the 10 observed pregnant women including 9 singletons and 1 twin were native people in Wuhan. All of them were diagnosed mild COVID-19, and none of the patients developed severe COVID-

		Diseases / Journal pre-proof	<p>19 or died.</p> <ul style="list-style-type: none"> • Pulmonary CT screening on admission may be necessary to reduce the risk of nosocomial transmission of COVID-19 during the outbreak period. COVID-19 is not an indication of caesarean section.
26.04.2020	Clinical role of lung ultrasound for the diagnosis and monitoring of COVID-19 pneumonia in pregnant women	Ultrasound in Obstetrics & Gynecology / Case series	<ul style="list-style-type: none"> • All patients showed ultrasound features indicative of COVID-19 pneumonia at admission: irregular pleural lines and vertical artefacts (B-lines) were observed in all four cases, whereas patchy areas of white lung in two cases. • Lung ultrasound was more sensitive than chest X-ray in detecting COVID-19. • Three patients had resolution of lung pathology at ultrasound after 96 h of admission. Two pregnancies are ongoing, whereas two patients had caesarean delivery with no foetal complications. • PCR testing of both cord blood and new-born swabs were negative in both cases.

Epidemiology and clinical - risk factors

Publication Date	Title/URL	Journal/ Article type	Digest
27.04.2020	Early risk factors for the duration of SARS-CoV-2 viral positivity in COVID-19 patients	Clinical Infectious Diseases / Accepted manuscript	<ul style="list-style-type: none"> • These findings provide early laboratory parameters such as count of CD8+ T cells, as risk factors for the duration of SARS-CoV-2 viral positivity, which have significance in control and prevention of the disease.
20.04.2020	Prevalence and Impact of Myocardial Injury in Patients Hospitalized with COVID-19 Infection	medRxiv (not peer reviewed) / Article	<ul style="list-style-type: none"> • Authors describe the degree of myocardial injury (reflected by troponin elevation) and associated outcomes in a large hospitalized cohort (n=2,736) with laboratory-confirmed COVID-19. • Even small amounts of myocardial injury (e.g. troponin I 0.03-0.09ng/mL, n=455, 16.6%) were associated with death. • Greater amounts (e.g. troponin I >0.09 ng/dL, n=530, 19.4%) were associated with more pronounced risk.
23.04.2020	Clinical and historical features associated with severe COVID-19 infection: a systematic review	medRxiv (not peer reviewed)	<ul style="list-style-type: none"> • Study aimed to evaluate existing literature for factors associated with COVID-19 illness severity - of 6202 articles, 63 eligible for inclusion; studies analysed data from 17648 COVID-19 patients.

		reviewed) / Article	<ul style="list-style-type: none"> • Predictors most frequently associated with COVID-19 disease severity: age, absolute lymphocyte count, hypertension, lactate dehydrogenase (LDH), C-reactive protein (CRP), history of any pre-existing medical condition.
27.04.2020	Effect of Latitude on COVID-19	CEBM Research / Rapid review	<ul style="list-style-type: none"> • The authors analysed the effect of latitude on global deaths and cases per million in the Northern Hemisphere and globally. • The relationship to seasonality and evidence of an association with weather conditions, the concentration of COVID's impact in a small number of countries and the association with latitude provides evidence that environmental factors impact on the transmission of SARs-CoV-2.
23.04.2020	Impact of temperature on the dynamics of the COVID-19 outbreak in China	Science of the Total Environment / Article	<ul style="list-style-type: none"> • Temperature is an environmental driver of the COVID-19 outbreak in China. • The incidence of COVID-19 decreases with the increase of temperature. • A modified susceptible-exposed-infectious-recovered model was developed.
05.04.2020	Exposure to air pollution and COVID-19 mortality in the United States: A nationwide cross-sectional study	medRxiv (not peer reviewed) / Article	<ul style="list-style-type: none"> • Investigated if long-term average exposure to fine particulate matter (PM2.5) is associated with increased risk of COVID-19 death in U.S via nationwide, cross-sectional study using county-level data. • An increase of only 1 µg/m3 in PM2.5 is associated with an 8% increase in the COVID-19 death rate (95% confidence interval [CI]: 2%, 15%).
23.04.2020	Role of the atmospheric pollution in the Covid-19 outbreak risk in Italy	medRxiv (not peer reviewed) / Article	<ul style="list-style-type: none"> • Actual data on to COVID-19 outbreak in Italian provinces and corresponding long-term air quality evaluations, were obtained from Italian and European agencies, elaborated and tested for possible interactions. • Results reveal that, beside concentrations, the chronicity of exposure may influence the anomalous variability of SARS-CoV-2 in Italy. Long-term air-quality data significantly correlated with cases of Covid-19 in up to 71 Italian provinces (updated 6 April) providing further evidence that chronic exposure to atmospheric contamination may represent a favourable context for the spread of the virus.
21.04.2020	Risk of COVID-19 is associated with long-term exposure to air pollution	medRxiv (not peer reviewed)	<ul style="list-style-type: none"> • The authors collate individual level data of confirmed COVID-19 cases during the first wave of the epidemic in mainland China by March 6, 2020. These were paired with a mobile phone dataset,

		reviewed) / Article	<p>covering human movements from Wuhan before the travel ban and inner-city movements during the time of emergency response from 324 cities in China.</p> <ul style="list-style-type: none"> • Adjusting for socio-economic factors, an increase of 10 µg/m³ in NO₂ or PM_{2.5} was found to be associated with a 22.41% or 15.35% increase in the number of COVID-19 cases, and a 19.20% or 9.61% increase in severe infection, respectively.
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Epidemiology and clinical – other

Publication Date	Title/URL	Journal/ Article type	Digest
27.04.2020	Epidemiology and transmission of COVID-19 in 391 cases and 1286 of their close contacts in Shenzhen, China: a retrospective cohort study	The Lancet Infectious Diseases / Article	<ul style="list-style-type: none"> • This data on cases, as well as their infected and uninfected close contacts, provide key insights into the epidemiology of SARS-CoV-2. • This analysis shows that isolation and contact tracing reduce the time during which cases are infectious in the community, thereby reducing the R. • The overall impact of isolation and contact tracing, however, is uncertain and highly dependent on the number of asymptomatic cases.
27.04.2020	What is happening to non-covid deaths?	BMJ / Data Briefing	<ul style="list-style-type: none"> • This article analyses the data on deaths from causes other than covid-19. • It seems impossible properly to answer concerns about the wider effect current measures might be having on the health of the population as the data are incomplete and too uncertain.
27.04.2020	Six Countries: Three-quarters of the COVID Deaths	CEBM Research / Article	<ul style="list-style-type: none"> • As of the 26th April, six countries accounted for 155,457 out of 206,008 (75.5%) COVID-19 deaths - Belgium, France, Italy, Spain, the UK and the US. • These six countries have been disproportionately affected by Covid-19: their combined death rate is 27.3 per 100,000, which is 39 times higher than the rest of the world's average of 0.7 per 100,000. • The authors state they have documented this so investigations focus on the factors that predisposed these six countries to such high death rates.

27.04.2020	Coronavirus Disease 2019 in a Hemodialysis Patient	Blood Purification / Case report	<ul style="list-style-type: none"> • The authors describe the case of a 49-year-old male undergoing maintenance haemodialysis (HD) who got infected with COVID-19 and our experience in performing HD for him. • The difficulties in diagnosis, infection control, and treatment of COVID-19 in maintenance HD patients are discussed in this report.
26.04.2020	Two distinct cases with COVID-19 in kidney transplant recipients	Am J Transplant / Care Reports	<ul style="list-style-type: none"> • Kidney transplant (KT) recipients are one of the vulnerable populations for infection with SARS-Cov-2. • Here the authors demonstrate two distinct KT cases with different clinical progress. These apparently different cases suggest that assertive screening and management could improve the clinical course. • In addition, antiviral agents should be used cautiously, especially in patients on calcineurin inhibitors.
22.04.2020	Characterization of clinical progression of COVID-19 patients in Shenzhen, China	medRxiv (not peer reviewed) / Article	<ul style="list-style-type: none"> • Using data from Shenzhen, China, where all cases were monitored in hospital, authors characterized clinical progression of COVID-19 cases and determined important predictors for faster clinical progression to key clinical events and longer use of medical resources.
23.04.2020	Clinical and epidemiological features of COVID-19 family clusters in Beijing, China	Journal of Infection / Journal pre-proof	<ul style="list-style-type: none"> • SARS-CoV-2 is transmitted quickly in the form of family clusters. While the infection rate is high within the cluster, the disease manifestations, latent period, and virus shedding period varied greatly. • The authors recommend rigorously testing contacts even during the no-symptom phase and consider whether viral shedding has ceased before stopping isolation measures for an individual.
27.04.2020	Epidemiological characteristics and incubation period of 7,015 confirmed cases with Coronavirus Disease 2019 outside Hubei Province in China	Journal of Infectious Diseases / Accepted manuscript	<ul style="list-style-type: none"> • Rapidly transmitting COVID-19 has a short incubation period. • The onset mainly occurs among young to middle-aged adults. • Traffic restrictions played an important role in the decreased number of imported cases outside Hubei.
27.04.2020	Vascular skin symptoms in COVID-19: a French observational study	Journal of the European Academy of Dermatology and Venereology / Letter to editor	<ul style="list-style-type: none"> • Skin symptoms of COVID-19 have been poorly described but may include erythematous rash, urticaria and chicken pox like lesions.

27.04.2020	Interactive web-based graphs of novel coronavirus COVID-19 cases and deaths per population by country	Clinical Infectious Diseases / Letter	<ul style="list-style-type: none"> The authors launched a daily updated website, Transition of New Coronavirus COVID 19 Cases and Deaths per Population by Country https://web.sapmed.ac.jp/canmol/coronavirus/index_e.html It includes graphs of COVID 19 cases and deaths per one million population over time based on European Centre for Disease Prevention and Control (ECDC), World Health Organization (WHO) situation reports, and population data of the United Nations.
24.04.2020	The Data set for Patient Information Based Algorithm to Predict Mortality Cause by COVID-19	Data in brief / Article	<ul style="list-style-type: none"> The data of COVID-19 disease in China and then in South Korea were collected daily from several different official websites. These data provide the scientific community with a new methodology to estimate the death rate and then predict the death cases during an epidemic.
13.04.2020	International Electronic Health Record-Derived COVID-19 Clinical Course Profiles: The 4CE Consortium	medRxiv (not peer reviewed) / Article	<ul style="list-style-type: none"> Describes an international consortium (4CE) of 96 hospitals across 5 countries (www.covidclinical.net), with the aim of establishing a framework to capture the trajectory of COVID-19 disease in patients and their response to interventions.

Infection control

Publication Date	Title/URL	Journal/ Article type	Digest
27.04.2020	Aerodynamic analysis of SARS-CoV-2 in two Wuhan hospitals	Nature / Unedited manuscript accepted for publication	<ul style="list-style-type: none"> The authors propose that SARS-CoV-2 may have the potential to be transmitted via aerosols. Their results indicate that room ventilation, open space, sanitization of protective apparel, and proper use and disinfection of toilet areas can effectively limit the concentration of SARS-CoV-2 RNA in aerosols.
04.04.2020	Medical masks vs N95 respirators for preventing COVID-19 in healthcare workers: A systematic review and meta-analysis of randomized trials	Influenza Other Respir Viruses / Systematic Review	<ul style="list-style-type: none"> Low certainty evidence suggests that medical masks and N95 respirators offer similar protection against viral respiratory infection including coronavirus in healthcare workers during non-aerosol-generating care. Preservation of N95 respirators for high-risk, aerosol-generating procedures in this pandemic should be considered when in short supply.
23.04.2020	The role of community-wide wearing of face mask for control of coronavirus disease 2019 (COVID-19) epidemic due to SARS-CoV-2	Journal of Infection /	<ul style="list-style-type: none"> Community-wide mask wearing may contribute to the control of COVID-19 by reducing virus shedding in saliva and respiratory droplets from individuals with subclinical or mild COVID-19.

		Journal pre-proof	
23.04.2020	Using effective hand hygiene practice to prevent and control infection	Nursing Standard / Evidence and practice	<ul style="list-style-type: none"> • This article details the correct procedure required for effective hand hygiene and emphasises the need for nurses to keep up to date with evidence-based guidelines. • It also outlines the differences between hand decontamination using alcohol-based hand gels and soap and water, and the complex factors that can interfere with effective hand hygiene compliance.
27.04.2020	First reported nosocomial outbreak of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in a paediatric dialysis unit	Clinical Infectious Diseases / Accepted manuscript	<ul style="list-style-type: none"> • Forty-eight cases were involved in this nosocomial outbreak. • Person-to-person transmission was at the heart of a hospital outbreak of SARS-CoV-2 between healthcare workers (HCWs) and patients in the paediatric dialysis unit at the UHM. • This epidemiological observation highlights the need to develop strategies to trace and monitor SARS-CoV-2 infected HCWs in order to prevent COVID-19 outbreaks in the hospital setting.
24.04.2020	What can countries learn from Hong Kong's response to the COVID-19 pandemic?	CMAJ : Canadian Medical Association journal	<ul style="list-style-type: none"> • Hong Kong has a relatively low number of cases of COVID-19 despite being an international travel hub and despite its proximity to Wuhan, China. • Public health measures, including border control and social distancing, high-volume testing for SARS-CoV-2, aggressive contact tracing and quarantine centres, likely contributed substantially to the control, especially during the early period after the first confirmed case. • The practice of personal protective behaviours, including use of face masks, by most people in Hong Kong may also have played an important role in controlling the spread of SARS-CoV-2 in the region.
22.04.2020	Proactive social distancing mitigates COVID-19 outbreaks within a month across 58 mainland China cities	medRxiv (not peer reviewed) / Article	<ul style="list-style-type: none"> • Authors estimated the speed with which social distancing measures contained community transmission in each of 58 Chinese cities. • On average, containment was achieved 7.83 days (SD 6.79 days) after their implementation, with an average reduction in reproduction number (Rt) of 54.3% (SD 17.6%) over that time period. • A single day delay in the implementation of social distancing led to a 2.41 (95% CI: 0.97, 3.86) day delay in containment.

27.04.2020	Contact tracing for COVID-19: An opportunity to reduce health disparities and End the HIV/AIDS Epidemic in the US	Clinical Infectious Diseases / Accepted manuscript	<ul style="list-style-type: none"> • The authors argue that COVID-19 contact tracing may provide a unique opportunity to also conduct widespread HIV testing, among other health promotion activities.
24.04.2020	Wound Center Without Walls: The New Model of Providing Care During the COVID-19 Pandemic	Wounds / Ahead of print	<ul style="list-style-type: none"> • Due to multiple comorbidities, wound patients are at an increased risk for the most extreme complications of COVID-19 and providers must focus on reducing their exposure risk.
27.04.2020	Essential Long-Term Care Workers Commonly Hold Second Jobs and Double- or Triple-Duty Caregiving Roles	Journal of the American Geriatrics Society / Brief report	<ul style="list-style-type: none"> • Long-term care (LTC) workers commonly hold second jobs along with double- and triple-duty caregiving roles. • To slow the spread of Covid-19, both the paid and unpaid activities of these employees warrant consideration in the identification of appropriate clinical, policy, and informal supports.
23.04.2020	Restructured society and environment: A review on potential technological strategies to control the COVID-19 pandemic	Science of the Total Environment / In press, corrected proof	<ul style="list-style-type: none"> • The utilization of technologies will strengthen the defence line against the infection but it is purely in the hands of humans to mitigate the spread. • This paper explores the way organisations and the public have changed their activities with the help of technology to help fight against the COVID-19 infection.

Treatment

Publication Date	Title/URL	Journal/ Article type	Digest
27.04.2020	COVID-19 cytokine storm: the interplay between inflammation and coagulation	The Lancet Respiratory Medicine / Correspondence	<ul style="list-style-type: none"> • Antithrombin and antifactor Xa direct oral anticoagulants are well established in the prevention and management of venous thromboembolism, and since thrombin is the main activator of PAR-1, and coagulation factor Xa can induce production of proinflammatory cytokines via activation of PAR-2 and PAR-1,5 these drugs might be promising in ameliorating disease progression and severity of COVID-19.
06.04.2020	Antiviral therapy in management of COVID-19: a systematic review on current evidence	Arch Acad Emerg Med / Systematic Review	<ul style="list-style-type: none"> • Only one clinical trial on the efficacy of antiviral therapy in management of COVID-19 was found. • The results depicted that adding Lopinavir-Ritonavir to the standard treatment regimen of patients with severe COVID-19 has no benefits.

27.04.2020	Infectious Diseases Society of America Guidelines on the Treatment and Management of Patients with COVID-19	Clinical Infectious Diseases / Accepted manuscript	<ul style="list-style-type: none"> • The objective of this paper was to develop evidence-based rapid guidelines intended to support patients, clinicians and other health-care professionals in their decisions about treatment and management of patients with COVID-19. • The Infectious Diseases Society of America (IDSA) formed a multidisciplinary guideline panel of infectious disease clinicians, pharmacists, and methodologists with varied areas of expertise.
27.04.2020	Managing COVID-19 in Renal Transplant Recipients: A Review of Recent Literature and Case Supporting Corticosteroid-sparing Immunosuppression	Pharmacotherapy / Review of therapeutics	<ul style="list-style-type: none"> • The purpose of this review is to summarize and compare inpatient immunosuppressant management strategies of recently published reports in the renal transplant population infected with SARS-CoV-2 and to discuss the limitations of corticosteroids in managing immunosuppression in this patient population.
23.04.2020	Direct oral anticoagulant plasma levels striking increase in severe COVID-19 respiratory syndrome patients treated with antiviral agents. The Cremona experience	Journal of Thrombosis and Haemostasis / Original article	<ul style="list-style-type: none"> • Direct oral anticoagulant (DOAC) patients treated with antiviral drugs show an alarming increase in DOAC plasma levels. In order to prevent bleeding complications, the authors believe that physicians should consider withholding DOACs from patients with SARS-CoV-2 and replacing them with alternative parenteral antithrombotic strategies for as long as antiviral agents are deemed necessary and until discharge.
27.04.2020	No evidence of increased risk for COVID-19 infection in patients treated with Dupilumab for atopic dermatitis in a high-epidemic area - Bergamo, Lombardy, Italy	Journal of the European Academy of Dermatology and Venereology / Letter to editor	<ul style="list-style-type: none"> • Atopic dermatitis (AD) is a chronic inflammatory skin disease. Patients with AD have increased infection risk, including skin infections and systemic infections. • Dupilumab, a fully human monoclonal antibody, blocks the shared receptor component for interleukin-4 (IL-4) and IL-13.
27.04.2020	Extracorporeal membrane oxygenation for critically ill patients with coronavirus-associated disease 2019: an updated perspective of the European experience	Minerva Cardioangiologica / Article	<ul style="list-style-type: none"> • Extracorporeal membrane oxygenation (ECMO) may play an important role in critically ill patients with COVID-19 refractory to less invasive treatments. • The increased risk of early death in older patients may be used to prioritize ECMO indication in resource-conscious settings, if confirmed externally.
26.04.2020	Rational Use of Tocilizumab in the Treatment of Novel Coronavirus Pneumonia	Clinical Drug Investigation / Leading article	<ul style="list-style-type: none"> • In this paper, the authors elaborate the role of cytokine storm in COVID-19, the mechanism of tocilizumab on cytokine storm and the key points of pharmaceutical care based on the actual clinical application for COVID-19 in their hospital, the latest research reports, clinical trial progress of tocilizumab, drug instruction from

			the US FDA, and "Diagnosis and Treatment Plan of Novel Coronavirus Pneumonia (seventh trial edition)" in China, so as to provide reference for the treatment of COVID-19.
26.04.2020	Noscapine, a possible drug candidate for attenuation of cytokine release associated with SARS-CoV-2	Drug Development Research / Commentary	<ul style="list-style-type: none"> Noscapine, a medication used for the treatment of cough, has been shown to inhibit bradykinin enhanced cough response in man. As it is already marketed in a number of countries as a cough medicine, even for children, a suitable formulation with all the required licenses is available that can be rapidly utilized in preliminary trials.
23.04.2020	Pharmacologic perspective: glycyrrhizin may be an efficacious therapeutic agent for COVID-19	International Journal of Antimicrobial Agents / In press, journal pre-proof	<ul style="list-style-type: none"> In this brief article, they discuss the therapeutic potential of glycyrrhizin for COVID-19 from the perspective of its pharmacological action including binding angiotensin converting enzyme II (ACE2), down-regulating proinflammatory cytokines, inhibiting the accumulation of intracellular ROS, inhibiting thrombin, inhibiting the hyperproduction of airway exudates, and inducing endogenous interferon.
27.04.2020	The role of adipocytes and adipocyte-like cells in the severity of COVID-19 infections	Obesity / Perspectives	<ul style="list-style-type: none"> To reduce the severity and mortality with COVID-19, the authors propose to probe for the clinical response to thiazolidinediones (TZDs), PPARγ agonists, that are the well-known anti-diabetic drugs. TZDs are able to stabilize lipofibroblasts in their "inactive" state, preventing the transition to myofibroblasts and thereby reducing the development of pulmonary fibrosis and stimulating its resolution.
22.04.2020	Cytotoxicity evaluation of chloroquine and hydroxychloroquine in multiple cell lines and tissues by dynamic imaging system and PBPK model	bioRxiv (not peer reviewed) / Article	<ul style="list-style-type: none"> Authors explore toxicity profile of Chloroquine and hydroxychloroquine in different tissues: evaluated cytotoxicity in 8 cell lines; adopted physiologically-based pharmacokinetic models (PBPK) to predict tissue risk.
27.04.2020	Remdesivir potently inhibits SARS-CoV-2 in human lung cells and chimeric SARS-CoV expressing the SARS-CoV-2 RNA polymerase in mice	bioRxiv (not peer reviewed) / Article (not peer reviewed) / Article	<ul style="list-style-type: none"> Authors report that remdesivir (RDV) is potently active against SARS-CoV-2 in vitro and in vivo. RDV potently inhibits SARS-CoV-2 replication in human lung cells and primary human airway epithelial cultures (EC50 = 0.01 μM). Weaker activity observed in Vero E6 cells (EC50 = 1.65 μM) due to their low capacity to metabolize RDV. In mice infected with chimeric virus (a chimeric SARS-CoV encoding the viral target of RDV), therapeutic RDV administration

diminished lung viral load and improved pulmonary function as compared to vehicle treated animals.

Social sciences

Publication Date	Title/URL	Journal/ Article type	Digest
01.05.2020	Public health messaging and harm reduction in the time of COVID-19	The Lancet Psychiatry / Correspondence	<ul style="list-style-type: none"> • Developing public health messaging tailored towards marginalised people who use drugs is of utmost importance - they should highlight the need to minimise sharing substance use supplies because respiratory infectious diseases can be easily transmitted via e-cigarettes, pipes, and nasal tubes. • Public health messages around self-isolation and physical distancing should be modified for people who use drugs, who live in shelters or who are involved in sex work.
21.04.2020	A multinational, multicentre study on the psychological outcomes and associated physical symptoms amongst healthcare workers during COVID-19 outbreak	Brain, behavior, and immunity / Research study	<ul style="list-style-type: none"> • Report of a study which demonstrates a significant association between the prevalence of physical symptoms and psychological outcomes among healthcare workers during the COVID-19 outbreak. • The authors postulate that this association may be bi-directional, and that timely psychological interventions for healthcare workers with physical symptoms should be considered once an infection has been excluded.
23.04.2020	Is Returning to Work during the COVID-19 Pandemic Stressful? A Study on Immediate Mental Health Status and Psychoneuroimmunity Prevention Measures of Chinese Workforce	Brain, Behavior, and Immunity / In press, corrected proof	<ul style="list-style-type: none"> • From 673 valid questionnaires, the authors found that 10.8% of respondents met the diagnosis of post-traumatic stress disorder (PTSD) after returning to work. • Returning to work had not caused a high level of psychiatric symptoms in the workforce. • Psychoneuroimmunity prevention measures were associated with less psychiatric symptoms. • More executives practiced hand hygiene and more workers avoided sharing utensils.
26.04.2020	Racial Capitalism: A Fundamental Cause of Novel Coronavirus (COVID-19) Pandemic Inequities in the United States	Health Education & Behavior / Article	<ul style="list-style-type: none"> • This paper explores why racism and capitalism shape COVID-19 inequities in the United States. • Interventions should address social inequality to achieve health equity across pandemics.

26.04.2020	Recovering from the COVID-19 Pandemic: A Focus on Older Adults	Journal of Aging & Social Policy / Perspectives	<ul style="list-style-type: none"> • During this pandemic, older adults have received stricter directives on social distancing, as they were one of the first groups encouraged to stay home. • Older adults who have experienced a prolonged period of isolation may encounter health effects that long outlast their time in quarantine. • The impact of this period of isolation on future physical and emotional well-being of older adults is yet to be determined.
22.04.2020	Deep Sentiment Classification and Topic Discovery on Novel Coronavirus or COVID-19 Online Discussions: NLP Using LSTM Recurrent Neural Network Approach	bioRxiv (not peer reviewed) / Article (not peer reviewed) / Article	<ul style="list-style-type: none"> • The authors used automated extraction of COVID-19–related discussions from social media and a natural language process (NLP) method based on topic modelling to uncover various issues related to COVID-19 from public opinions. • The findings shed light on the importance of using public opinions and suitable computational techniques to understand issues surrounding COVID-19 and to guide related decision-making.

Miscellaneous

Publication Date	Title/URL	Journal/ Article type	Digest
27.04.2020	Turning the crisis into an opportunity: digital health strategies deployed at-scale during the coronavirus (COVID-19) outbreak in Catalonia	JMIR Public Health and Surveillance / Accepted manuscript	<ul style="list-style-type: none"> • The authors present a list of digital health strategies implemented during the COVID-19 outbreak in Catalonia.

Modelling

Publication Date	Title/URL	Journal/ Article type	Digest
21.04.2020	The Impact of Online Information on Self-isolation Intention during the COVID-19 Pandemic: A cross-sectional study	Journal of medical Internet research /	<ul style="list-style-type: none"> • The authors investigate the impact of online information on individual-level intention to voluntarily self-isolate during the pandemic. Using the protection-motivation theory as a framework, they propose a model outlining the effect of

		Research study	cyberchondria and information overload on individuals' perceptions and motivation.
27.04.2020	A Quantitative Framework for Modeling COVID-19 Risk During Adjuvant Therapy Using Published Randomized Trials of Glioblastoma in the Elderly	Neuro-Oncology / Accepted manuscript	<ul style="list-style-type: none"> • Incorporation of COVID-19-associated risk models into analysis of randomized trials can help guide clinical decisions during this pandemic. • In elderly glioblastoma patients, these results support prioritization of hypofractionated radiation (RT) and highlight the utility of MGMT methylation status in decision-making in pandemic scenarios. • This quantitative framework can serve as a model for assessing COVID-19 risk associated with treatment across neuro-oncology.
16.04.2020	The estimated impact of non-pharmaceutical interventions on documented infections with COVID-19: A cross-country analysis	medRxiv (not peer reviewed) / Article	<ul style="list-style-type: none"> • Based on a Bayesian hierarchical model with a time-delayed effect for each NPI, the authors compare the effectiveness of NPIs in the early stages of the outbreak. Venue closures are associated with a reduction in the number of new cases by 36% (95% credible interval [CrI] 20-48 %), closely followed by gathering bans (34 %; 95% CrI 21-45 %), border closures (31 %; 95% CrI 19-42 %), and work bans on non-essential business activities (31 %; 95% CrI 16-44 %). Event bans lead to a slightly less pronounced reduction (23 %; 95% CrI 8-35 %). School closures (8 %; 95% CrI 0-23 %) and lockdowns (5 %; 95% CrI 0-14 %) appear to be the least effective among the NPIs considered in this analysis.
13.04.2020	Estimating the impact of mobility patterns on COVID-19 infection rates in 11 European countries	medRxiv (not peer reviewed) / Article	<ul style="list-style-type: none"> • By utilizing country specific mobility data in a Bayesian framework, authors estimate impact of each change in mobility pattern on R0 - results provide straightforward way for governments to analyse if non-pharmaceutical interventions (NPIs) are working and to what extent. • The changes in mobility have a large overlap with the introduction of governmental NPIs, highlighting the importance of government action for population behavioural change.
22.04.2020	Modeling COVID-19 Growing Trends to Reveal the Differences in the Effectiveness of Non-Pharmaceutical Interventions among Countries in the World	medRxiv (not peer reviewed) / Article	<ul style="list-style-type: none"> • Modelling study which leverages publicly available data to learn patterns of dynamic changes in the reproduction rate for sixteen countries covering Asia, Europe, North America, South America, Australia, and Africa. • China, South Korea, Argentina, and Australia are at the first level of NPIs, which are the most effective. Japan and Egypt are at the second level of NPIs, and Italy, Germany, France, Netherlands, and

			Spain, are at the third level. The US and UK have the most inefficient NPIs, and they are at the fourth level of NPIs.
20.04.2020	Estimating the undetected infections in the Covid-19 outbreak by harnessing capture-recapture methods	medRxiv (not peer reviewed) / Article	<ul style="list-style-type: none"> • The authors provide a lower bound estimator for the number of undetected cases. A "modified" version of the Chao estimator is proposed, based on the cumulative time-series distribution of cases and deaths. • An application to Austrian situation is provided and results from other European Countries are mentioned in the discussion.
21.04.2020	Association of infected probability of COVID-19 with ventilation rates in confined spaces: a Wells-Riley equation based investigation	medRxiv (not peer reviewed) / Article	<ul style="list-style-type: none"> • They obtained the quantum generation rate by a COVID-19 infector with a reproductive number based fitting approach, and then estimated the association between infected probability and ventilation rate with the Wells-Riley equation. • Interpretation: The risk of potential airborne transmission in confined spaces cannot be ignored. Strict preventive measures that have been widely adopted should be effective in reducing the risk of airborne transmitted infection.
20.04.2020	Modest effects of contact reduction measures on the reproduction number of SARS-CoV-2 in the most affected European countries and the US	medRxiv (not peer reviewed) / Article	<ul style="list-style-type: none"> • The authors conclude that calculating daily reproduction numbers (R_t) based on the daily number of deaths as well as of new infections may lead to more reliable estimates than those based on infection cases alone, as death based R_t are expected to be less susceptible to testing bias or limited capacities.
21.04.2020	Biased and unbiased estimation of the average lengths of stay in intensive care units in the COVID-19 pandemic	medRxiv (not peer reviewed) / Article	<ul style="list-style-type: none"> • Two estimation methods of ICU ALOS (average length of stay) were compared: the average LOS of already discharged patients at the date of estimation (DPE), and a standard parametric method used for analysing time-to-event data which fits a given distribution to observed data and includes the censored stays of patients still treated in the ICU at the date of estimation (CPE). A simulation study investigated the generalizability of the methods' patterns. • Interpretation: Discharges of short stays are more likely observed earlier during the course of an outbreak. Cautious unbiased ICU_ALOS estimates suggest parameterizing a higher burden of ICU bed occupancy than that adopted to date in COVID-19 forecasting models.
22.04.2020	Estimating Survival of Hospitalized COVID-19 Patients from Admission Information	medRxiv (not peer reviewed) / Article	<ul style="list-style-type: none"> • Demographic, laboratory, clinical, and treatment data (from 13 acute care facilities at Northwell Health) were extracted from electronic medical records and used to build and test the predictive accuracy of a survival probability calculator—the

			<p>Northwell COVID-19 Survival (NOCOS) calculator—for hospitalized COVID-19 patients. A total of 5,233 inpatients were included in the study.</p> <ul style="list-style-type: none"> • The authors claim their rapidly developed and deployed estimate of survival probability outperforms other general risk models. The 7 early predictors of in-hospital survival can help clinicians identify patients with increased probabilities of survival and provide critical decision support.
05.03.2020	Comparative Impact of Individual Quarantine vs. Active Monitoring of Contacts for the Mitigation of COVID-19: a modelling study	medRxiv (not peer reviewed) / Article	<ul style="list-style-type: none"> • This model highlights the urgent need for more data on the serial interval and the extent of pre-symptomatic transmission in order to make data-driven policy decisions regarding the cost-benefit comparisons of individual quarantine vs. active monitoring of contacts.
22.04.2020	Assessing suppression strategies against epidemic outbreaks like COVID-19: the SPQEIR model	medRxiv (not peer reviewed) / Article	<ul style="list-style-type: none"> • This paper compares several suppression approaches and potential exit strategies using a new extended epidemic SEIR model; will support establishment of mid- and long-term interventions. • Rapid, strong lock-down is effective suppression measure; combination of other strategies, e.g. social distancing, active protection and removal, can achieve similar suppression synergistically. • A user-friendly online shinyapp to interactively simulate different scenarios is available on: https://jose-ameijeiras.shinyapps.io/SPQEIR_model/
20.04.2020	Estimating the burden of SARS-CoV-2 in France	medRxiv (not peer reviewed) / Article	<ul style="list-style-type: none"> • Models applied to hospital and death data lead to an estimate of the impact of the lockdown and current population immunity. • Across all ages, men are more likely to be hospitalized, enter intensive care, and die than women. The lockdown reduced the reproductive number from 3.3 to 0.5 (84% reduction). • By 11 May, when interventions are scheduled to be eased, they project 3.7 million (range: 2.3-6.7) people, 5.7% of the population, will have been infected. Population immunity appears insufficient to avoid a second wave if all control measures are released at the end of the lockdown.
20.04.2020	ESTIMATING RO OF SARS-COV-2 IN HEALTHCARE SETTINGS	medRxiv (not peer reviewed) / Article	<ul style="list-style-type: none"> • To date, no specific estimate of R0 for SARS-CoV-2 is available for healthcare settings. Using inter-individual contact data, the authors highlight that R0 estimates from the community cannot translate directly to healthcare settings, with pre-pandemic R0

values ranging 1.3-7.7 in three illustrative healthcare institutions. This has implications for nosocomial Covid-19 control.

Guidance, consensus statements and hospital resources

Publication Date	Title/URL	Journal/ Article type
24.04.2020	NG167: COVID-19 rapid guideline: rheumatological autoimmune, inflammatory and metabolic bone disorders	NICE / Rapid guideline
24.04.2020	NG159: COVID-19 rapid guideline: critical care in adults	NICE / Rapid guideline
21.04.2020	Radiological Society of North America Expert Consensus Statement on Reporting Chest CT Findings Related to COVID-19. Endorsed by the Society of Thoracic Radiology, the American College of Radiology, and RSNA	Journal of thoracic imaging / Consensus statement
23.04.2020	Geospatial Mapping of Orthopaedic Surgeons Age 60 and Over and Confirmed Cases of COVID-19	Journal of Bone and Joint Surgery / Scientific article
24.04.2020	Novel Percutaneous Tracheostomy for Critically Ill Patients with COVID-19	The Annals of thoracic surgery / Article
24.04.2020	Considerations for Bedside Urologic Procedures in Patients with Severe Acute Respiratory Syndrome Coronavirus-2	Urology / Article

Overviews, comments and editorials

Publication Date	Title/URL	Journal/ Article type
01.04.2020	Covid-19 and early intervention. Evidence, challenges and risks relating to virtual and digital delivery	Early Intervention Foundation
27.03.2020	What policy makers need to know about COVID-19 protective immunity	The Lancet / Comment
27.04.2020	Richard Lehman's covid-19 reviews—27 April 2020	BMJ / Review
27.04.2020	Covid-19: What do we know so far about a vaccine?	BMJ / Overview
27.04.2020	Mobile phone data for informing public health actions across the COVID-19 pandemic life cycle	Science Advances / Editorial
27.04.2020	Impact of contact tracing on SARS-CoV-2 transmission	The Lancet Infectious Diseases / Comment
27.04.2020	Key ethical questions for research during the COVID-19 pandemic	The Lancet Psychiatry / Comment
27.04.2020	Anesthesia and COVID-19: What We Should Know and What We Should Do	Seminars in Cardiothoracic and Vascular Anesthesia / Review article
24.04.2020	Protecting vulnerable patients with inherited anaemias from unnecessary death during the COVID-19 pandemic	British Journal of Haematology / Short report

Produced by the PHE COVID-19 Literature Digest Team

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