Public Health England

International EPI Cell Daily Evidence Digest – 30/04/2020

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Please note that we are including preprints (highlighted in red), which are preliminary reports of work that have NOT been peer-reviewed.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
29.04.2020	Clinical characteristics of patients with 2019 coronavirus disease in a non-Wuhan area of Hubei Province, China: a retrospective study	BMC Infectious Diseases / Research article	• The mortality rate of patients in Jingzhou was lower than that of Wuhan. • The authors found liver, kidney, digestive tract, and heart injuries in COVID-19 cases besides respiratory problems. •

			Combining chest computed tomography images with the qPCR analysis of throat swab samples can improve the accuracy of COVID-19 diagnosis.
29.04.2020	[Elevations of serum cancer biomarkers correlate with severity of COVID-19](#)	Journal of Medical Virology / Research article	• In this retrospective study, the authors evaluated the levels of a series of serum biomarkers in COVID-19 patients (mild: 131; severe: 98; critical: 23). • They found that there were significant increases in levels of human epididymis protein 4, cytokeratin-19 fragment (CYFRA21-1) , carcinoembryonic antigen (CEA), carbohydrate antigens (CA) 125 and 153 in COVID-19 mild cases as compared to normal control subjects; their levels showed continuous and significant increases in severe and critical cases. • They concluded that elevations of serum cancer biomarkers positively correlated with the pathological progressions of COVID-19, demonstrating diffuse and acute lung injuries.
24.04.2020	[Laboratory Findings of COVID-19 Infection are Conflicting in Different Age Groups and Pregnant Women: A Literature Review](#)	medRxiv (not peer reviewed) / Literature review	• This review aims to describe the COVID-19 laboratory findings in neonates, children, adults, elderly and pregnant women altogether for the first time. • The most attracting and reliable markers of COVID-19 in patients were: normal C-reactive protein (CRP) and very different and conflicting laboratory results regardless of clinical symptoms in neonates, normal or temporary elevated CRP, conflicting WBC count results and procalcitonin elevation in children, lymphopenia and elevated lactate dehydrogenase (LDH) in adult patients, lymphopenia and elevated CRP and LDH in the elderly people and high CRP, leucocytosis and elevated neutrophil ratio in pregnant women.
29.04.2020	[Massively multiplexed nucleic acid detection using Cas13](#)	Nature / Article	• The authors have developed Combinatorial Arrayed Reactions for Multiplexed Evaluation of Nucleic acids (CARMEN), a platform for scalable, multiplexed pathogen detection. In the CARMEN platform, nanolitre droplets containing CRISPR-based nucleic acid detection reagents7self-organize in a microwell array to pair with droplets of amplified samples, testing each sample against each CRISPR RNA (crRNA) in replicate.

27.04.2020	[In silico analysis of RT-qPCR designs recommended by WHO for detection of SARS-CoV-2 and a commercial kit validated following UNE/EN ISO 17025:2005 and two reference laboratories](#)	bioRxiv (not peer reviewed) / Article	• The present study approached the in silico specificity of the protocols currently recommended by WHO, a recently published RT-qPCR method, and the GPSTM CoVID-19 dtec-RT-qPCR Test. The analysis suggested the later RT-qPCR design as the more exclusive by far.
25.04.2020	[Pooled RNA sample reverse transcriptase real time PCR assay for SARS CoV-2 infection: a reliable, faster and economical method](#)	medRxiv (not peer reviewed) / Article	• In the search for novel methods to break the bottle neck in testing, methods like pooling of samples are being considered. • The present study demonstrated that pool testing with 8 RNA samples can easily detect even up to a single positive sample with Ct value as high as 38. The present study also showed that the results of pool testing is not affected by number of positive samples in a pool. • Pooling of 8 RNA samples can reduce the time and expense by one eighth, and can help expand diagnostic capabilities, especially during constrained supply of reagents and PCR kits for the diagnosis of SARS-CoV-2 infection.
24.04.2020	[Development and potential usefulness of the COVID-19 Ag Respi-Strip diagnostic assay in a pandemic context](#)	medRxiv (not peer reviewed) / Article	• The authors describe the conception, the analytical and clinical performances as well as the risk management of implementing the COVID-19 Ag Respi-Strip in a diagnostic decision algorithm. • Four hundred observations were recorded for the analytical performance study and thirty tests were analysed for the cross-reactivity study. The clinical performance study was performed in a retrospective multi-centric evaluation on aliquots of 328 nasopharyngeal samples. COVID-19 Ag Respi-Strip results were compared with qRT-PCR as golden standard for COVID-19 diagnostics. • The authors conclude that the COVID-19 Ag Respi-Strip represents a promising rapid SARS-CoV-2 antigen assay for the first-line diagnosis of COVID-19 in 15 minutes. Its role in the proposed diagnostic algorithm is complementary to the currently-used molecular techniques.
29.04.2020	[Prolonged SARS-CoV-2 RNA shedding: Not a rare phenomenon](#)	Journal of Medical Virology / Letter to the editor	• Almost 10% patients diagnosed of COVID-19 had a RNA shedding longer than 30 days even if the symptom elimination.

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			• The IgM was in a high level in the 9(th) week after symptom onset in these prolonged-RNA-shedding patients.
28.04.2020	Coronavirus disease 2019 (COVID-19) imaging reporting and data system (COVID-RADS) and common lexicon: a proposal based on the imaging data of 37 studies	European radiology	• Updated their published systematic review on imaging findings in COVID-19 to include 37 published studies pertaining to diagnostic features of COVID-19 in chest CT. Using the reported imaging findings of 3647 patients, they summarized the typical chest CT findings, atypical features, and temporal changes of COVID-19 in chest CT. Subsequently, they extracted a list of descriptive terms and mapped it to the terminology that is commonly used in imaging literature.
28.04.2020	Quantitative computed tomography of the coronavirus disease 2019 (COVID-19) pneumonia	Radiology of infectious diseases (Beijing, China) / Article	• Thirty cases were enrolled: 16 (53.33%) of them were male, and the mean age was 48 years old. The interval from onset symptoms to first chest CT scan was 8 days. • The proportion of ground glass opacity (GGO), consolidation and the total lesion based on the quantitative method was positively correlated with the semi-quantitative CT score, CRP and ESR, respectively, and was negatively correlated with the lymphocyte count. There was a positive correlation trend between the proportion of total infection and the pneumonia severity index and a tendency that patients with severe COVID-19 pneumonia had higher percentage of consolidation and total infection. • Quantitative CT may have potential in assessing the severity of COVID-19 pneumonia on admission.
29.04.2020	Laboratory information system requirements to manage the COVID-19 pandemic: a report from the Belgian national reference testing center	Journal of the American Medical Informatics Association / Accepted manuscript	• Describes the development, implementation and requirements of laboratory information system (LIS) functionality to manage test ordering, registration, sample flow, and result reporting during the COVID-19 pandemic

Genomics

Publication Date	Title/URL	Journal/ Article type	Digest
28.04.2020	Controlling the SARS-CoV-2 outbreak, insights from large scale whole genome sequences generated across the world	bioRxiv (not peer reviewed) / Article	• The authors used the current sequencing archives (NCBI and GISAID) to investigate 5,349 whole genomes, looking for evidence of strain diversification and selective pressure.

Date	Title	Source / Type	Summary
			• They used 3,958 SNPs to build a phylogenetic tree of SARS-CoV-2 diversity and noted strong evidence for the existence of two major clades and six sub-clades, unevenly distributed across the world. They also noted that convergent evolution has potentially occurred across several locations in the genome, showing selection pressures, including on the spike glycoprotein where they noted a potentially critical mutation that could affect its binding to the ACE2 receptor. They also report on mutations that could prevent current molecular diagnostics from detecting some of the sub-clades. • The worldwide whole genome sequencing effort is revealing the challenge of developing SARS-CoV-2 containment tools suitable for everyone and the need for data to be continually evaluated to ensure accuracy in outbreak estimations.
29.04.2020	COVID-19 Related Genes in Sputum Cells in Asthma: Relationship to Demographic Features and Corticosteroids	American Journal of Respiratory and Critical Care Medicine / Article	• Higher expression of angiotensin converting enzyme 2 (ACE2) and transmembrane protease serine 2 (TMPRSS2) in males, African Americans, and patients with diabetes mellitus provides rationale for monitoring these asthma subgroups for poor COVID19 outcomes. • The lower expression of ACE2 and TMPRSS2 with inhaled corticosteroids (ICS) use warrants prospective study of inhaled corticosteroids (ICS) use as a predictor of decreased susceptibility to SARS-CoV-2 infection and decreased COVID19 morbidity.
28.04.2020	Expression of the SARS-CoV-2 cell receptor gene ACE2 in a wide variety of human tissues	Infectious Diseases of Poverty / Research article	• The findings of this study indicate that SARS-CoV-2 may infect other tissues aside from the lungs and infect persons with different sexes, ages, and races equally. The different host immune responses to SARS-CoV-2 infection may partially explain why males and females, young and old persons infected with this virus have markedly distinct disease severity. This study provides new insights into the role of ACE2 in the SARS-CoV-2 pandemic.
26.04.2020	Integrated analysis of bulk multi omic and single-cell sequencing data confirms the molecular origin of hemodynamic changes in Covid-19 infection explaining coagulopathy and higher geriatric mortality	medRxiv (not peer reviewed) / Article	• In this study, through an integrated analysis of bulk RNA-sequencing data from Covid-19 patients with data from single-cell sequencing studies on lung tissues, the authors found that most of the cell-types that contributed to altered

			gene expression in COVID-19 were of hematopoietic origin.
			• Their results present molecular evidence for pursuing both anti-inflammatory and anticoagulation therapy for better patient management especially in older patients.
29.04.2020	Interferon-induced transmembrane protein-3 genetic variant rs12252-C is associated with disease severity in COVID-19	Journal of Infectious Diseases / Accepted manuscript	• The authors report that homozygosity for the C allele of rs12252 in the interferon-induced transmembrane protein 3 (IFITM3) gene is associated with more severe disease in an age dependent manner. • This supports a role for IFITM3 in disease pathogenesis and the opportunity for early targeted intervention in at risk individuals.
28.04.2020	A collection of designed peptides to target SARS-Cov-2 – ACE2 interaction: PepI-Covid19 database	bioRxiv (not peer reviewed) / Article	• The authors present PepI-Cov19 database, a repository of peptides designed to target the interaction between the RDB of SARS-CoV-2 and ACE2 as well as the dimerization of ACE2 monomers. • PepI-Covid19 database provides an easy and convenient access to this wealth of information to the scientific community with the view of maximizing its potential impact in the development of novel therapeutic agents.
29.04.2020	An engineered stable mini-protein to plug SARS-Cov2 Spikes	bioRxiv (not peer reviewed) / Article	• Starting from the available structural data on the interaction between SARS-CoV-2 Spike protein and the host ACE2 receptor, the authors engineered a mini-protein with the aim of creating a soluble and stable Spike interactor. This mini-protein, which was recombinantly produced in high yields, possesses a stable α helical conformation and is able to interact with the RBD of glycosylated Spike protein from SARS-CoV-2 with nanomolar affinity, as measured by microscale thermophoresis. • By plugging the Spike protein, this mini-protein constitutes a valid tool for the development of treatments against different types of coronavirus.
29.04.2020	Mass spectrometry analysis of newly emerging coronavirus HCoV-19 spike S protein and human ACE2 reveals camouflaging glycans and unique post-translational modifications	bioRxiv (not peer reviewed) / Article	• In this study, post-translational modification (PTM) of recombinant HCoV-19 S and hACE2 were characterized by LC-MSMS. They revealed that both proteins were highly decorated with specific proportions of N-glycan subtypes. • The PTM and glycan maps of both HCoV-19 S and hACE2 provide additional structural details to study mechanisms

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			underlying host attachment, immune response mediated by S protein and hACE2.
29.04.2020	Stilbene-based Natural Compounds as Promising Drug Candidates against COVID-19	Journal of biomolecular structure & dynamics / Article	• The current study aimed to repurpose stilbenoid analogs, reported for some other biological activities, against SARS-CoV-2 spike protein and human ACE2 receptor complex for their affinity and stability using molecular dynamics simulation and binding free energy analysis based on molecular docking. Four compounds in total were probed for their binding affinity using molecular docking. • The findings in this study are promising and call for further in vitro and in vivo testing of stiblenoids, especially resveratrol against the COVID-19.
29.04.2020	An in-silico evaluation of different Saikosaponins for their potency against SARS-CoV-2 using NSP15 and fusion spike glycoprotein as targets	Journal of Biomolecular Structure & Dynamics / Article	• The present study was undertaken to screen and evaluate the potency of different Saikosaponins against different sets of SARS-CoV-2 binding protein via computational molecular docking simulations. • From the binding energy and interaction studies, Saikosaponins U and V showed the best affinity towards both the proteins suggesting them to be future research molecule as they mark the desire interaction with NSP15, which is responsible for replication of RNA and also with 2019-nCoV spike glycoprotein which manage the connection with ACE2.

Epidemiology and clinical - children and pregnancy

Publication Date	Title/URL	Journal/ Article type	Digest
25.03.2020	Outcome of Coronavirus spectrum infections (SARS, MERS, COVID 1 -19) during pregnancy: a systematic review and meta-analysis	American journal of obstetrics & gynecology MFM / Systematic review	• The aim of this systematic review was to report pregnancy and perinatal outcomes of Coronavirus (CoV) spectrum infections, and particularly COVID-19 disease due to SARS-COV-2 infection during pregnancy. • The pregnancy outcomes observed included miscarriage, preterm birth, pre-eclampsia, preterm pre-labor rupture of membranes, foetal growth restriction, and mode of delivery. The perinatal outcomes observed were foetal distress, Apgar score < 7 at five minutes, neonatal asphyxia,

			admission to neonatal intensive care unit, perinatal death, and evidence of vertical transmission. • In mothers infected with coronavirus infections, including COVID-19, >90% of whom also had pneumonia, preterm birth is the most common adverse pregnancy outcome. Miscarriage, preeclampsia, caesarean, and perinatal death (7-11%) were also more common than in the general population.
25.04.2020	[Pregnancy and breastfeeding during COVID-19 pandemic: A systematic review of published pregnancy cases](#)	medRxiv (not peer reviewed) / Systematic review	• Review of the impact of COVID-19 on pregnancy and description of the outcome of published cases of pregnant women diagnosed with COVID-19, as well as the characteristics of COVID-19 positive women who delivered in Portugal by 31 of March 2020. • A PubMed search identified 30 original studies reporting 212 cases of pregnant women with COVID-19 (30 discharged while pregnant), 200 from China and 12 from other countries. The 182 published deliveries resulted in one stillbirth and 185 live births. Four women with severe COVID-19 required admission to an intensive care unit but no cases of maternal death were reported. There was one neonatal death. Preterm births occurred in 28.7% of cases, but it is unclear whether this was iatrogenic. All cases with amniotic fluid, placenta, and/or cord blood analysed for SARS-CoV-2 virus were negative. Four newborns were positive for SARS-CoV-2 and three newborns had high levels of IgM antibodies. None of the first eight infants born in Portugal tested positive. Breast milk samples from 13 mothers and described in seven studies showed no evidence of SARS-CoV-2.
29.04.2020	[Early Acute Respiratory Support for Pregnant Patients With Coronavirus Disease 2019 (COVID-19) Infection](#)	Obstetrics and Gynecology / Current commentary	• The authors summarize the basic initial respiratory support interventions recommended for pregnant patients with infection with the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

Epidemiology and clinical - risk factors

Publication Date	Title/URL	Journal/ Article type	Digest
29.04.2020	Out-of-Hospital Cardiac Arrest during the Covid-19 Outbreak in Italy	New England Journal of Medicine / Correspondence	• Using the Lombardia Cardiac Arrest Registry, this study compared out-of-hospital cardiac arrests that occurred in the provinces of Lodi, Cremona, Pavia, and Mantua during the first 40 days of the Covid-19 outbreak (Feb 21 through Mar 31, 2020) with those that occurred during the same period in 2019. • The cumulative incidence of out-of-hospital cardiac arrest in 2020 was strongly associated with the cumulative incidence of Covid-19, and the increase in the number of cases of out-of-hospital cardiac arrest over the number in 2019 (133 additional cases) followed the time course of the Covid-19 outbreak.
29.04.2020	Report 17: Clinical characteristics and predictors of outcomes of hospitalised patients with COVID-19 in a London NHS Trust: a retrospective cohort study	Imperial College / Report 17	• The authors performed a retrospective cohort study on all patients hospitalised with laboratory-confirmed SARS-CoV-2 infection at Imperial College Healthcare NHS Trust between Feb 25 and Apr 5, 2020. Outcomes were recorded as of April 19, 2020. Logistic regression models, survival analyses and cumulative competing risk analyses were performed to evaluate factors associated with COVID-19 hospital mortality. • Findings are that older age, male sex and admission hypoxia, thrombocytopenia, renal failure, hypoalbuminaemia and raised bilirubin are associated with increased odds of death. Ethnic minority groups were over-represented in the cohort and, compared to whites, people of black ethnicity may be at increased odds of mortality.
29.04.2020	Is there an association between exposure to air pollution and severity of COVID-19 infection?	CEBM Research / Rapid review	• There is very limited data to date, and only one study was found which had adjusted for confounders, but emerging evidence suggests there may be a positive association between long-term exposure to ambient air pollution and COVID-19 mortality. • These data might be of particular importance as international lockdown measures are eased, given the restrictions have caused a considerable fall in levels of air pollution.

29.04.2020	[COVID-19 and obesity - lack of clarity, guidance, and implications for care](#)	The Lancet Diabetes & Endocrinology / Correspondence	• BMI of 40kg/m2 or higher has been identified as a risk factor for severity of illness by the CDC. • However, there is no available data to show adverse COVID-19 outcomes specifically in these people. The scarcity of information regarding the increased risk of illness has led to ambiguity and might increase anxiety. More evidence is needed.
25.04.2020	[Key predictors of attending hospital with COVID19: An association study from the COVID Symptom Tracker App in 2,618,948 individuals](#)	medRxiv (not peer reviewed) / Article	• The COVID Symptom Tracker mobile application co-developed by physicians and scientists at Kings College London, Massachusetts General Hospital, Boston and Zoe Global Limited was launched in the UK and US on 24th and 29th March 2020 respectively. It captured self-reported information related to COVID-19 symptoms and testing. • Data from 2,618,948 users of the COVID Symptom Tracker App were analysed for outcomes including visit to hospital and for those who attended hospital, the need for respiratory support in three subgroups (i) self-reported COVID-19 infection with classical symptoms (SR-COVID-19), (ii) self-reported positive COVID-19 test results (T-COVID-19), and (iii) imputed/predicted COVID-19 infection based on symptomatology (I-COVID-19). • Being older, obese, diabetic or suffering from pre-existing lung, heart or renal disease placed participants at increased risk of visiting hospital with COVID-19.
06.04.2020	[Clinical characteristics and outcomes of patients with severe covid-19 with diabetes](#)	BMJ Open Diabetes Research & Care / Article	• Of 193 patients with severe covid-19, 48 (24.9%) had diabetes. • Patients with severe covid-19 with diabetes exhibit severe inflammation response. • Patients with severe covid-19 with diabetes were older, more likely to receive mechanical ventilation and admission to intensive care unit, and had higher mortality.
28.04.2020	[Renal Involvement and Early Prognosis in Patients with COVID-19 Pneumonia](#)	Journal of the American Society of Nephrology / Article	• They found that 251 of the 333 patients (75.4%) had abnormal urine dipstick tests or AKI. Of 198 patients with renal involvement for the median duration of 12 days, 118 (59.6%) experienced remission of pneumonia during this period, and 111 of 162 (68.5%) patients experienced remission of proteinuria. Among 35 patients who developed

Date	Title	Category	Summary
			AKI, 16 (45.7%) experienced complete recovery of kidney function. Patients with renal involvement had higher overall mortality compared with those without renal involvement. • Renal abnormalities occurred in the majority of patients with COVID-19 pneumonia. Although proteinuria, hematuria, and AKI often resolved in such patients within 3 weeks after the onset of symptoms, renal complications in COVID-19 were associated with higher mortality.
28.04.2020	Patients with cancer appear more vulnerable to SARS-COV-2: a multi-center study during the COVID-19 outbreak	Cancer discovery	• The authors performed a multi-centre study including 105 cancer patients and 536 age-matched non-cancer patients confirmed with COVID-19. • The results showed COVID-19 patients with cancer had higher risks in all severe outcomes. Patients with haematological cancer, lung cancer, or with metastatic cancer (stage IV) had the highest frequency of severe events. Non-metastatic cancer patients experienced similar frequencies of severe conditions to those observed in patients without cancer. Patients who received surgery had higher risks of having severe events, while patients with only radiotherapy did not demonstrate significant differences in severe events when compared to patients without cancer. • These findings indicate that cancer patients appear more vulnerable to SARS-COV-2 outbreak.
28.04.2020	Analysis of the susceptibility of lung cancer patients to SARS-CoV-2 infection	Molecular cancer / Article	• Investigated the gene expression of ACE2 and transmembrane serine protease 2 (TMPRSS2) with prognosis in lung adenocarcinoma (LUAD) and lung squamous cell carcinoma (LUSC). • Lung cancer patients in each age stage, subtype, and pathological stage are susceptible to SARS-CoV-2 infection, except for the primitive subtype of LUSC. LUAD patients are more susceptible to SARS-CoV-2 infection than LUSC patients. The findings are unanimous on tissue expression in gene and protein levels.
29.04.2020	Pulmonary Embolism and Increased Levels of d-Dimer in Patients with Coronavirus Disease	Emerging infectious diseases / Case report	• The authors report on three patients with coronavirus disease who had a decline in respiratory status during their hospital course that responded well to intravenous steroids and interleukin-6 receptor antagonist therapy.

			• These patients later showed development of persistent hypoxia with increased levels of d-dimer levels and were given a diagnosis of pulmonary embolisms.
29.04.2020	Correlation between Heart fatty acid binding protein and severe COVID-19: A case-control study	PLoS One / Research article	• These data indicate that the elevation of heart-fatty acid binding protein (HFABP) is closely related to the severity of COVID-19 in the patients, and elevated HFABP may cause rapid development of patients with mild COVID-19 into severe COVID-19.
24.04.2020	Supplementing the National Early Warning Score (NEWS2) for anticipating early deterioration among patients with COVID-19 infection	medRxiv (not peer reviewed) / Article	• Retrospective observational cohort study with UK setting, showing that the addition of age and a minimal set of common blood tests taken in patients on admission to hospital significantly improves the National Early Warning Score (NEWS2) for risk-stratification of severe COVID disease. • NEWS2 total score was a weak predictor for severity of COVID-19 infection at 14 days. The addition of age and common blood tests (CRP, neutrophil count, estimated GFR and albumin) provided substantial improvements to a risk stratification model but performance was still only moderate. Common comorbidities hypertension, diabetes, heart, respiratory and kidney diseases have minor additional predictive value. • Adding age and a minimal set of common blood parameters to NEWS2 improves the risk stratification of patients likely to develop severe COVID-19 outcomes. The addition of a few common parameters is likely to be much easier to implement in a short time-scale than a novel risk-scoring system.
25.04.2020	The values of coagulation function in COVID-19 patients	medRxiv (not peer reviewed) / Article	• Study aiming to investigate the blood coagulation function in COVID-19 patients, and the correlation between coagulopathy and disease severity. • The levels of TAT, PIC, TM, t-PAIC, PT, INR, FIB, and DD in COVID-19 patients were higher than healthy controls (p<0.05), and also higher in the patients with thrombotic disease. What's more, the patients with thrombotic disease had a higher case-fatality. TAT, PIC, TM, t-PAIC, PT, INR, APTT, FIB, DD, and PLT were also found correlated with disease severity. Meanwhile, they found that there were

			significant difference in TAT, TM, t-PAIC, PT, INR, APTT, DD, and PLT in the death and survival group. • Using univariate and multivariate logistic regression analysis also found that t-PAIC and DD were independent risk factors for death in patients and are excellent predicting the mortality risk of COVID-19.
24.04.2020	Gender-Based Disparities in COVID-19: Clinical Characteristics and Propensity-matched Analysis of Outcomes	medRxiv (not peer reviewed) / Article	• Retrospective cohort study to determine whether the disparity in COVID-19 mortality is due to gender differences in high-risk characteristics. • A total of 5980 males and 7730 females diagnosed with COVID-19 were identified. Males were significantly older than females (54.9 (18.3) vs. 50.9 (18.4), p-value <0.0001). There were significant differences in patient characteristics, but after propensity matching, both groups (N=5350 each group) were balanced. • Results showed males are more severely affected and have higher mortality from COVID-19. This gender-specific risk is especially more pronounced in advanced age. Gender disparity in poor outcomes can only be partially explained by differences in high-risk behaviour and comorbidities. Further research is needed to understand the causes of this disparity.
24.04.2020	Clinical Laboratory Parameters Associated with Severe or Critical Novel Coronavirus Disease 2019 (COVID-19): A Systematic Review and Meta-analysis	medRxiv (not peer reviewed) / Systematic review	• Systematic review aiming to assess clinical laboratory parameters which may serve as markers or predictors of severe or critical COVID-19 disease. • Forty-five studies in 6 countries were included. Compared to non-severe COVID-19 cases, severe or critical COVID-19 disease was characterised by higher neutrophil count and lower lymphocyte and CD4 counts. Other notable results were observed for C-reactive protein, interleukin-6, Troponin I, and D-dimer. • Relative to non-severe COVID-19, severe or critical COVID-19 is characterised by increased markers of innate immune response, decreased markers of adaptive immune response, and increased markers of tissue damage and major organ failure. These markers could be used to recognise severe or critical disease and to monitor clinical course of COVID-19.

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24.04.2020	Liver Chemistries in Patients with Severe or Non-Severe COVID-19: a Meta-Analysis	medRxiv (not peer reviewed) / Meta-analysis	• In this meta-analysis of 37 studies, comprising 6,235 patients, the authors describe three patterns of liver impairment related to COVID-19, including hepatocellular injury, cholestasis, and synthetic disfunction, according to the severity of the COVID-19. • Patients with abnormal liver tests are at higher risks of progressing to severe disease. Close monitoring on liver chemistries helps to early warn against disease progression.
29.04.2020	Hyposalivation as a potential risk for SARS-CoV-2 infection: Inhibitory role of saliva	Oral Diseases / Letter to the editor	• Hyposalivation could be a potential risk factor for acute respiratory infection.
21.04.2020	Low incidence of daily active tobacco smoking in patients with symptomatic COVID-19	Qeios (not peer-reviewed) / Article	• Study aiming to evaluate the correlation of daily smoking with the susceptibility to develop SARS-CoV-2 infection. • The estimated rates of daily current smokers in COVID-19 in- and out-patients in a large French university hospital were compared to those of daily current smokers in the 2018 French general population, established in 2018, after standardization of the data for sex and age. • This cross sectional study in both COVID-19 out- and inpatients strongly suggests that daily smokers have a much lower probability of developing symptomatic or severe SARS-CoV-2 infection as compared to the general population.

Epidemiology and clinical – other

Publication Date	Title/URL	Journal/ Article type	Digest
29.04.2020	Variation in COVID-19 Hospitalizations and Deaths Across New York City Boroughs	JAMA / Research letter	• This study aimed to examine population characteristics and hospital bed capacities across the 5 boroughs and evaluate whether differences in the rates of COVID-19 testing, hospitalizations, and deaths have emerged in these communities.
28.04.2020	Epidemiological and clinical features of asymptomatic patients with SARS-CoV-2 infection	Journal of Medical Virology / Article	• Fifteen (4.4%) of 342 SARS-CoV-2 infected patients did not develop any symptoms during the course of the disease. • The median time from exposure to diagnosis was 7.0 days. Of the 15 patients, 14 patients were diagnosed by testing positive for SARS-CoV-2 in throat swabs, while 1 patient

			only tested positive for SARS-CoV-2 in anal swab. During hospitalization, only 1 (6.7%) patient developed lymphopenia. Abnormalities of chest CT examinations were detected in 8 (53.4%) patients on admission. • Patients without any symptoms but with SARS-CoV-2 exposure should be closely monitored and tested for SARS-CoV-2 using both anal and throat swabs to exclude infection.
25.04.2020	The role of asymptomatic SARS-CoV-2 infections: rapid living systematic review and meta-analysis	medRxiv (not peer reviewed) / Systematic review	• From 11 included studies, the authors estimate an upper bound for the proportion of asymptomatic SARS-CoV-2 infections of 29% (95% confidence interval 23 to 37%) in eight studies. • In modelling studies, 40-60% of all SARS-CoV-2 infections are the result of transmission from pre-symptomatic individuals, with a smaller contribution from asymptomatic individuals. • An intermediate contribution of pre-symptomatic and asymptomatic infections to overall SARS-CoV-2 transmission means that combination prevention, with enhanced hand and respiratory hygiene, testing tracing and isolation strategies and social distancing, will continue to be needed. The findings of this systematic review of publications early in the pandemic suggests that most SARS-CoV-2 infections are not asymptomatic throughout the course of infection.
27.04.2020	Objective evaluation of anosmia and ageusia in COVID-19 patients: Single-center experience on 72 cases	Head & neck	• Olfactory and gustatory function was objectively tested in 72 COVID-19 patients treated at University Hospital of Sassari. • Overall, 73.6% of the patients reported having or having had chemosensitive disorders. Olfactory assessment showed variable degree hyposmia in 60 cases and anosmia in two patients. Gustatory assessment revealed hypogeusia in 33 cases and complete ageusia in one patient. Statistically significant differences in chemosensitive recovery were detected based on age and distance from the onset of clinical manifestations. • Olfactory and gustatory dysfunctions represent common clinical findings in COVID-19 patients.

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25.04.2020	FIRST DETECTION OF SARS-COV-2 IN UNTREATED WASTEWATERS IN ITALY	medRxiv (not peer reviewed) / Article	• Twelve influent sewage samples, collected between February and April 2020 from Wastewater Treatment Plants in Milan and Rome, were tested adapting, for concentration, the standard WHO procedure for Poliovirus surveillance. • Molecular analysis was undertaken with three nested protocols. SARS-CoV-2 RNA detection occurred in volumes of 250 mL of wastewaters collected in both areas at high (Milan) and low (Rome) epidemic circulation, according to clinical data. Overall, 6 out of 12 samples were positive. • The study shows that WBE has the potential to be applied to SARS-CoV-2 as a sensitive tool to study spatial and temporal trends of virus circulation in the population.

Infection control

Publication Date	Title/URL	Journal/ Article type	Digest
29.04.2020	Preventing major outbreaks of COVID-19 in jails	The Lancet / Correspondence	• Suggests interventions to reduce the spread of COVID-19 within jails, and when prisoners are released.
29.04.2020	Maximising application of the Aerosol Box in protecting healthcare workers during the covid-19 pandemic	Anaesthesia / Correspondence	• The authors report the rapid evolution of the Aerosol Box, originally designed by Dr Hsien Yung Lai, Mennonite Christian Hospital, Taiwan. • The Aerosol Box was intended to protect healthcare workers performing aerosol generating procedures (AGPs), specifically tracheal intubation, by providing a physical barrier to droplet and/or aerosol exposure.
29.04.2020	Adapting reusable elastomeric respirators to utilise anaesthesia circuit filters using a 3D-printed adaptor; a potential alternative to address N95 shortages during the COVID-19 pandemic	Anaesthesia / Article	• Designed a 3D-printed adaptor that permits elastomeric respirators to interface with anaesthesia circuit filters and created a simple modification to divert exhaled breaths through the filter. They conducted a feasibility study evaluating the performance of our modified elastomeric respirators. • Four of eight subjects self-reported discomfort; two reported facial pressure, one reported exhalation resistance and one reported transient dizziness on exertion. • Reusable elastomeric respirators to utilise anaesthesia

Publication Date	Title/URL	Journal/ Article type	Digest
			circuit filters through a 3D-printed adaptor may be a potential alternative to disposable N95 respirators during the COVID-19 pandemic.
29.04.2020	Universal Masking in Hospitals in the COVID-19 era: Is it Time to consider Shielding?	Infection Control and Hospital Epidemiology / Commentary	• This viewpoint summarizes the rationale behind a universal masking policy in healthcare settings, important considerations before implementing such a policy, the challenges with masking and discusses proposed solutions such as universal face shields.
29.04.2020	Health workers' safety during tracheostomy in COVID-19 patients: Homemade protective screen	Head & Neck / Special issue	• The authors report the use of external fixator equipment to set up a physical interface between the patient's neck and the caregiver performing a tracheostomy in COVID-19 patients. • This physical interface is an additional safety measure that prevents the direct projection of secretions or droplets. It should, of course, only be considered as a complement to strict compliance with barrier precautions and personal protective equipment.

Treatment

Publication Date	Title/URL	Journal/ Article type	Digest
29.04.2020	Progressive respiratory failure in COVID-19: a hypothesis	The Lancet Infectious Diseases / Correspondence	• COVID-19 might be associated with hypercoagulability, and clinicians should consider a pulmonary embolism in cases of progressive respiratory failure.
29.04.2020	Effects Of ARBs And ACEIs On Virus Infection, Inflammatory Status And Clinical Outcomes In COVID-19 Patients With Hypertension: A Single Center Retrospective Study	Hypertension / Article	• 126 COVID-19 patients with pre-existing hypertension at Hubei Provincial Hospital of Traditional Chinese Medicine (HPHTCM) in Wuhan from January 5 to February 22, 2020 were retrospectively allocated to angiotensin II receptor blockers or angiotensin-converting enzyme inhibitors (ARBs/ACEIs) group (n=43) and non-ARBs/ACEIs group (n=83) according to their antihypertensive medication. • These findings thus support the use of ARBs/ACEIs in COVID-19 patients with pre-existing hypertension.
24.04.2020	Role of Drugs Affecting the Renin-Angiotensin-Aldosterone System on Susceptibility and Severity of	medRxiv (not peer reviewed) / Case-control study	• Using a cohort of 610 COVID-19 cases and 48,667 population-based controls from Zheijang, China the authors tested the role of usage of ACEIs, ARBs, CCBs and other

	COVID-19: A Large Case-Control Study from Zhejiang Province, China		medications on risk and severity of COVID 19. • Individuals with hypertension taking CCBs had significantly increased risk of manifesting symptoms of COVID-19 whereas those taking ARBs and diuretics had significantly lower disease risk. Other antihypertensive drugs were not associated with increased risk of severe or critical form of the infection. Use of glucocorticoids was significantly associated with a severe/critical form of COVID-19. • The authors found no evidence to alter ARBs or ACEIs therapy in the context of the pandemic. Patients on corticosteroids with COVID-19 are at higher risk of developing a severe form of COVID-19 and therefore should be monitored closely.
29.04.2020	Internet Searches for Unproven COVID-19 Therapies in the United States	JAMA Internal Medicine / Research letter	• When several high-profile figures, including entrepreneur Elon Musk and President Donald Trump, endorsed the use of chloroquine, a malarial prophylaxis drug, and hydroxychloroquine (with the antibiotic azithromycin), a lupus and rheumatoid arthritis treatment, to treat COVID-19, it drew massive public attention that could shape individual decision-making. • This article examined the Google search trends after these endorsements. Demand for chloroquine and hydroxychloroquine increased substantially following endorsements by high-profile figures and remained high even after a death attributable to chloroquine-containing products was reported.
29.04.2020	The Effect of Chloroquine, Hydroxychloroquine and Azithromycin on the Corrected QT Interval in Patients with SARS-CoV-2 Infection	Circulation. Arrhythmia and Electrophysiology / Article	• Two hundred and one patients were treated for COVID-19 with chloroquine/hydroxychloroquine. Ten patients (5.0%) received chloroquine, 191 (95.0%) received hydroxychloroquine and 119 (59.2%) also received azithromycin. • In the largest reported cohort of COVID-19 patients to date treated with chloroquine/hydroxychloroquine {plus minus} azithromycin, no instances of Torsade de pointes (TdP) or arrhythmogenic death were reported. • Although use of these medications resulted in QT prolongation, clinicians seldomly needed to discontinue therapy.

Date	Title	Source / Type	Summary
24.04.2020	Concentration-dependent mortality of chloroquine in overdose	medRxiv (not peer reviewed) / Article	• Individual data from prospectively studied French patients who had taken intentional chloroquine overdoses and were managed in the national toxicology intensive care unit in Paris were pooled. • In total, 258 patients were studied of whom 26 died (10%). There was a steep sigmoid relationship between admission whole blood chloroquine concentrations and death. • High-dose chloroquine treatment regimens which result in whole blood chloroquine concentrations below 10umol/L for the majority of patients should not result in life-threatening cardiovascular toxicity.
29.04.2020	Quantitative clinical pharmacology input to SARS-CoV-2 therapeutics should be based on robust data	Clinical Pharmacology and Therapeutics / Letter to the editor	• The authors of this letter, suggest that results published by Garcia-Cremades et al (https://doi.org/10.1002/cpt.1856), about the association between hydroxychloroquine (HCQ) and viral load, should be interpreted with caution.
29.04.2020	Remdesivir in adults with severe COVID-19: a randomised, double-blind, placebo-controlled, multicentre trial	The Lancet / Article	• In this study of adult patients admitted to hospital for severe COVID-19, remdesivir was not associated with statistically significant clinical benefits. However, the numerical reduction in time to clinical improvement in those treated earlier requires confirmation in larger studies.
29.04.2020	Evaluation of 19 antiviral drugs against SARS-CoV-2 Infection	bioRxiv (not peer reviewed) / Article	• The authors report that after screening 19 antiviral drugs that are either in clinical trials or with proposed activity against SARS-CoV-2, remdesivir was the most effective. • Chloroquine only effectively protected virus-induced cytopathic effect at around 30 micromolar with a therapeutic index of 1.5. • Velpatasvir, ledipasvir, litonavir, lopinavir, favilavir, sofosbuvir do not have direct antiviral effect.
25.04.2020	Lopinavir-ritonavir alone or combined with arbidol in the treatment of 73 hospitalized patients with COVID-19: a pilot retrospective study	medRxiv (not peer reviewed) / Article	• Retrospective observational study aiming to evaluate the antiviral efficacy of lopinavir/ritonavir alone or combined with arbidol in the treatment of hospitalized patients with COVID-19. • Treatment with lopinavir-ritonavir alone was not different from lopinavir-ritonavir combined with arbidol in overall cure rate of COVID-19 hospitalized patients (92.3% and 97.1%, respectively).

			• In a modified intention-to-treat analysis, lopinavir-ritonavir combined with arbidol led to a median time of hospital stay that was shorter by 1.5 days than group-LR. • No benefit was observed in the anti-virus effect of lopinavir-ritonavir combined with arbidol compared with lopinavir-ritonavir alone in the hospitalized patients with COVID-19.
21.04.2020	Risk of drug-induced Long QT Syndrome associated with the use of repurposed COVID-19 drugs: a systematic review	medRxiv (not peer reviewed) / Systematic review	• The level of risk was estimated for the six COVID-19 drugs (azithromycin, chloroquine, favipiravir, hydroxychloroquine, lopinavir/ritonavir, and remdesivir) being proposed compared to 23 torsadogenic drugs. Number of proarrhythmic adverse events were identified for these drugs in the U.S. FDA Adverse Event Reporting System (FAERS) database. • Estimators of LQTS risk levels indicated a very high or high risk for all COVID-19 repurposed drugs with the exception for azithromycin, although cases of TdP have been reported with this drug. There was excellent agreement among the various indices used to assess risk of drug-induced LQTS for the six repurposed drugs and 23 torsadogenic compounds. • The risk-benefit assessment for the use of repurposed drugs to treat COVID-19 is complicated since benefits are currently anticipated, not proven. Mandatory monitoring of the QT interval shall be performed, as such monitoring is possible for hospitalized patients or with the use of biodevices for outpatients prescribed these drugs.
24.04.2020	A Novel Protein Drug, Novaferon, as the Potential Antiviral Drug for COVID-19	medRxiv (not peer reviewed) / Article	• Study aiming to determine the anti-SARS-CoV-2 effects of Novaferon in vitro, along with a randomized, open-label, parallel group study to explore the antiviral effects of Novaferon for COVID-19. • Novaferon inhibited the viral replication in infected cells (EC50=1.02 ng/ml), and protected healthy cells from SARS-CoV-2 infection (EC50=0.1 ng/ml). Results from the 89 enrolled COVID-19 patients showed that both Novaferon and Novaferon plus Lopinavir/Ritonavir groups had significantly higher SARS-CoV-2 clearance rates on day 6 than the Lopinavir/Ritonavir group (50.0% vs.24.1%, p = 0.0400, and 60.0% vs.24.1%, p = 0.0053).

			• Median time to SARS-CoV-2 clearance were 6 days, 6 days, and 9 days for three groups respectively, suggesting a 3-day reduction of time to SARS-CoV-2 clearance in both Novaferon and Novaferon plus Lopinavir/Ritonavir groups compared with Lopinavir/Ritonavir group.
24.04.2020	Cell-based therapies for COVID-19: A living systematic review	medRxiv (not peer reviewed) / Systematic review	• Living systematic review aiming to provide a timely, rigorous and continuously updated summary of the available evidence on the role of cell-based therapies in the treatment of patients with COVID-19. • The authors screened 1,043 records but no study was considered eligible. They identified 61 ongoing studies, including 39 randomised trials evaluating different types of cell-based therapies in COVID-19. • They did not find any studies that met the inclusion criteria and hence there is no evidence to support or refute the use of cell-based therapies in the treatment of patients with COVID-19.
29.04.2020	Can melatonin reduce the severity of COVID-19 pandemic?	International Reviews of Immunology / Commentary	• The authors suggest that by using the safe over-the-counter drug melatonin, it may be possible to prevent the development of severe disease symptoms in coronavirus patients, reduce the severity of their symptoms, and/or reduce the immuno-pathology of coronavirus infection on patients' health after the active phase of the infection is over.
22.04.2020	A nicotinic hypothesis for Covid-19 with preventive and therapeutic implications	Qeios (not peer-reviewed) / Article	• The authors hypothesize that the nicotinic acetylcholine receptor (nAChR) plays a key role in the pathophysiology of Covid-19 infection and might represent a target for the prevention and control of Covid-19 infection.
28.04.2020	Multiplex Ventilation: A Simulation-based Study of Ventilating Two Patients with One Ventilator	Respiratory care / Research article	• These experiments confirmed the potential for markedly different ventilation and oxygenation for patients with uneven respiratory system impedances during multiplex ventilation. Three critical problems must be solved to minimize risk: (1) partitioning of inspiratory flow from the ventilator individually between the two patients, (2) measurement of V(T) delivered to each patient, and (3) provision for individual PEEP. The authors provide suggestions for solving these problems.

Publication Date	Title/URL	Journal/ Article type	Digest
29.04.2020	Effect of Convalescent Plasma Therapy on Viral Shedding and Survival in COVID-19 Patients	Journal of Infectious Diseases / Accepted manuscript	• Convalescent plasma treatment can discontinue SARS-CoV-2 shedding but cannot reduce mortality in critically end-stage COVID-19 patients, and treatment should be initiated earlier.

Social sciences

Publication Date	Title/URL	Journal/ Article type	Digest
29.04.2020	The experiences of health-care providers during the COVID-19 crisis in China: a qualitative study	The Lancet Global Health / Article	• Reports a qualitative study using an empirical phenomenological approach. Nurses and physicians were recruited from five COVID-19-designated hospitals in Hubei province using purposive and snowball sampling. They participated in semi-structured, in-depth interviews by telephone. Nine nurses and four physicians were recruited. • The intensive work drained health-care providers physically and emotionally. Health-care providers showed their resilience and the spirit of professional dedication to overcome difficulties. Comprehensive support should be provided to safeguard the wellbeing of health-care providers. Regular and intensive training for all health-care providers is necessary to promote preparedness and efficacy in crisis management.
01.05.2020	Suicide prevention during the COVID-19 outbreak	The Lancet Psychiatry / Correspondence	• The challenge of the COVID-19 outbreak might bring with it an opportunity to advance the field of suicide prevention and thus to save lives. These suicide prevention efforts should be integrated into the overall reaction programme for dealing with the COVID-19 crisis.
01.05.2020	COVID-19, unemployment, and suicide	The Lancet Psychiatry / Correspondence	• The authors modelled the effect of unemployment on suicide on the basis of global public health data from 63 countries, and applied this to the current pandemic.
01.05.2020	Mental health services in Italy during the COVID-19 outbreak	The Lancet Psychiatry / Correspondence	• Several rapid modifications must be implemented in the context of a department of mental health during a pandemic to protect patients with severe mental disorders and staff. • This is an overview of an approach that optimises shared procedures and limits the need for face-to-face services.

Date	Title	Journal / Type	Summary
29.04.2020	Coronavirus (COVID-19) in the United Kingdom: A personality-based perspective on concerns and intention to self-isolate	British Journal of Health Psychology / Brief report	• UK respondents (N = 202) completed a personality questionnaire (RST-PQ), measures of illness attitudes, concerns about the impact of coronavirus on health services and socio-economic infrastructures, personal safety, and likelihood of voluntary self-isolation. • Personal safety concerns were highest in those with negative illness attitudes and higher fight–flight–freeze system (FFFS, reflecting fear/avoidance) scores.
27.04.2020	Agile requirements engineering and software planning for a digital health platform to engage the effects of isolation caused by social distancing: A case study and feasibility study protocol	JMIR public health and surveillance / Accepted preprint	• This project aims to provide a tool for older people, their families, and peers to improve their wellbeing and health during and after regulated social distancing. • Making use of a pre-existing software framework for health behaviour change, a proof of concept was developed, and multi-stage application development and deployment for the solution created. • This case study lays the foundations for future app development to combat mental and societal issues arising from social distancing measures.
14.04.2020	Survey of Insomnia and Related Social Psychological Factors Among Medical Staff Involved in the 2019 Novel Coronavirus Disease Outbreak	Frontiers in Psychiatry / Research article	• 1,563 medical staff members in China took part in this study. • Results found that more than one-third of the medical staff suffered insomnia symptoms during the COVID-19 outbreak. • Interventions for insomnia among medical staff are needed considering the various sociopsychological factors at play in this situation.
27.04.2020	Functional Fear Predicts Public Health Compliance in the COVID-19 Pandemic	International journal of mental health and addiction / Article	• In this study, they recruited an international community sample (N = 324) to complete measures of self-perceived risk of contracting COVID-19, fear of the virus, moral foundations, political orientation, and behaviour change in response to the pandemic. • Consistently, the only predictor of positive behaviour change (e.g., social distancing, improved hand hygiene) was fear of COVID-19, with no effect of politically relevant variables. The authors discuss these data in relation to the potentially functional nature of fear in global health crises.

Miscellaneous

Publication Date	Title/URL	Journal/ Article type	Digest
25.04.2020	CovidNLP: A Web Application for Distilling Systemic Implications of COVID-19 Pandemic with Natural Language Processing	medRxiv (not peer reviewed) / Article	• Description of a natural language processing tool to develop a CovidNLP dashboard in order to speed up knowledge discovery. They summarised all the articles in the WHO repository of peer-reviewed and curated research articles through an extractive summarizer followed by an exploration of the feature space using word embeddings which were then used to visualize the summarized associations of COVID-19 as found in the text. • Clinicians, researchers, and policymakers will not only discover the direct effects of COVID-19 but also the systematic implications such as the anticipated rise in TB and cancer mortality due to the non-availability of drugs during the export lockdown as highlighted by the models. • The resource will be continuously updated with new literature and is publicly available in a user-friendly fashion at http://covidnlp.tavlab.iiitd.edu.in/.

Modelling

Publication Date	Title/URL	Journal/ Article type	Digest
29.04.2020	Institutional, not home-based, isolation could contain the COVID-19 outbreak	The Lancet / Correspondence	• The authors modelled and compared two types of isolation measures: institution-based isolation and home-based isolation. • Relative to the baseline with no control measures, the models showed that home-based isolation causes an 8-day delay (IQR 5–11) in the epidemic peak, with a corresponding reduction of 7100 cases (IQR 6800–7400) at this peak and 190 000 cases averted throughout the epidemic (IQR 185 000–194 000). • Institution-based isolation created a peak delay of 18 days and a reduction of 18 900 cases (18 700–19 100). A total of 546 000 cases (IQR 540 000–550 000) are averted

			throughout the epidemic, representing roughly a 57% reduction in comparison to 20% reduction through home-based isolation.
29.04.2020	Population flow drives spatio-temporal distribution of COVID-19 in China	Nature / Article	• Rapid and accurate tracking of aggregate population flows may therefore be epidemiologically informative. • The authors use mobile-phone-data-based counts of 11,478,484 people egressing or transiting through the prefecture of Wuhan between 1 January and 24 January 2020 as they moved to 296 prefectures throughout China. • This approach can be used by policy-makers in any nation with available data to make rapid and accurate risk assessments and to plan allocation of limited resources ahead of ongoing outbreaks.
24.04.2020	A prototype for decision support tool to help decision-makers with the strategy of handling the COVID-19 UK epidemic	medRxiv (not peer reviewed) / Article	• The primary objective of this work was to model and compare different exit scenarios from the lock-down for the COVID-19 UK epidemic, using a stochastic model which is more flexible than the SEIR/SEIRS models. • Different models are presented for a variety of exit dates in May, and for regions with high initial reproductive number chosen to be R0=2.5, medium R0=2.3 and low R0=2. For each scenario considered, they plot the expected proportion of infected at time t and the expected number of deaths at time t, using a total mortality rate of 0.66% which is pessimistic compared to other studies. • Their analysis suggests a value around 0.5% for the mortality rate, assuming that the isolation of older and vulnerable people continues and the public carries on certain level of isolation until the end of 2020; also they assume that immunity is kept for at least a year and there is no international travel influence.
25.04.2020	Demographic and Socio-Economic Factors, and Healthcare Resource Indicators Associated with the Rapid Spread of COVID-19 in Northern Italy: An Ecological Study	medRxiv (not peer reviewed) / Article	• Ecological study aiming to identify potential province-level socioeconomic determinants of the virus's dissemination, and explain between-province differences in the speed of its spread, based on data from 36 provinces of Northern Italy. • Demographic and socioeconomic factors, and healthcare organization variables were found associated with a

			significant difference in the rate of COVID-19 spread in 36 provinces of Northern Italy. An aging population seemed to naturally contain social contacts. The availability of healthcare resources and their coordination could play an important part in spreading infection.
23.04.2020	A path out of COVID-19 quarantine: an analysis of policy scenarios	medRxiv (not peer reviewed) / Article	• Analysis of the two major strategies currently implemented around the world in the fight against COVID-19: Social distancing and shelter-in-place measures to protect the susceptible, and testing and contact-tracing to identify, isolate and treat the infected. The majority of countries have principally relied on the former. • The authors infer that in the examples of Italy, Canada and the United States., the current level of national shutdown is equivalent to about half the population being under quarantine. They demonstrate that in the absence of other measures, scaling back social distancing in such a way as to prevent a second wave will take prohibitively long. In contrast, South Korea, a country that has managed to control and suppress its outbreak principally through mass testing and contact tracing, and has only instated a partial shutdown. • For all four countries, they find that a "brute-force" approach of untargeted universal testing requires an average testing rate of once every 36 to 48 hours for every individual, depending on the country. If testing is combined with contact tracing, and/or if tests are able to identify latent infection, then an average rate of once every 4 to 5 days is sufficient.
25.04.2020	The nexus of travel restriction, air pollution and COVID-19 infection: Investigation from a megacity of the southern China	medRxiv (not peer reviewed) / Article	• This study aimed to reveal the nexus of travel restriction, air pollution and COVID-19 in Shenzhen, one of the top 4 megacities in China. The authors evaluated the relationship of the traffic and passenger population, travel intensity, NO2, PM10, PM2.5 and the number of COVID-19 confirmed cases. • The results suggested that traffic control and travel restriction had a significant correlation with the number of COVID-19 confirmed cases, which shown negative correlation with the traffic intensity of the city, NO2,

			PM10 and PM2.5 show significant positive correlation with the traffic intensity, traffic control and travel restriction would slow down and prevent the spread of the viruses at the outbreak period.
23.04.2020	[Influence of socio-ecological factors on COVID-19 risk: a cross-sectional study based on 178 countries/regions worldwide](#)	medRxiv (not peer reviewed) / Article	• The authors describe the Potential Risk Assessment Framework for COVID-19, using spatial econometrics method to assess the global and local correlation of COVID-19 risk indicators. • They found that 37, 29 and 39 countries/regions were strongly opposite from the IR, CMR and DCI index "spatial autocorrelation hypothesis", respectively. The IR, CMR and DCI were significantly associated with some socio-economic factors. • They also found that climatic factors (temperature, relative humidity, precipitation and wind speed) did not significantly reduce COVID-19 risk. To fight against COVID-19 more effectively, countries/regions should pay more attention to controlling population flow, improving diagnosis and treatment capacity, and improving public welfare policies.
22.04.2020	[COVID-19 containment policies through time may cost more lives at metapopulation level](#)	medRxiv (not peer reviewed) / Article	• The author shows that temporally restricted containment efforts, that have the potential to flatten epidemic curves, can result in wider disease spread and larger epidemic sizes in metapopulations. • Longer-term rewiring of metapopulation networks or the enforcement of feasible long-term measures that decrease disease transmissions appear to be more efficient than temporarily restricted intensive mitigation strategies (e.g. short-term mass quarantine).
23.04.2020	[Significantly Improved COVID-19 Outcomes in Countries with Higher BCG Vaccination Coverage: A Multivariable Analysis](#)	medRxiv (not peer reviewed) / Article	• The hypothesis that vaccination against tuberculosis with BCG correlates with better outcomes for COVID-19 patients was tested by combining the information on demography, economy, major chronic diseases, and immunization policies with COVID-19 outcomes in 55 countries covering 62.9% of the world population. • Years of BCG admission were found to be negatively correlated with COVID-19 deaths per million at varying times post alignment.

	• Analysing countries according to an age group partition across several time-points, reveals that the strongest correlation is attributed to the coverage in BCG vaccination of the young population (<25 years), to a lesser degree the middle age group (25-64 years), while BCG coverage status of the elderly (>65 years) was insignificant. More specifically, the signal is attributed to recent immunizations (last 15 years) rather than past policies.

Guidance, consensus statements and hospital resources

Publication Date	Title/URL	Journal/ Article type
28.04.2020	Expert recommendations on blood purification treatment protocol for patients with severe COVID-19: Recommendation and consensus	Chronic diseases and translational medicine / Perspective
23.04.2020	Analysis of national and international guidelines on respiratory protection equipment for COVID-19 in healthcare settings	medRxiv (not peer reviewed) / Article
26.04.2020	Systematic review of international guidelines for tracheostomy in COVID-19 patients	medRxiv (not peer reviewed) / Review of guidelines

Overviews, comments and editorials

Publication Date	Title/URL	Journal/ Article type
01.05.2020	Virtual treatment and social distancing	The Lancet Psychiatry / Correspondence
01.05.2020	Decolonising COVID-19	The Lancet Global Health / Editorial
29.04.2020	Moving Personal Protective Equipment Into the Community: Face Shields and Containment of COVID-19	JAMA / Viewpoint
28.04.2020	The trinity of COVID-19: immunity, inflammation and intervention	Nature reviews. Immunology / Review
29.04.2020	Remdesivir for COVID-19: challenges of underpowered studies	The Lancet / Comment
29.04.2020	COVID-19 in Nigeria: a disease of hunger	The Lancet Respiratory Medicine / Spotlight
01.05.2020	Isolation and inclusion	The Lancet Psychiatry / Editorial
29.04.2020	Focusing on health-care providers' experiences in the COVID-19 crisis	The Lancet Global Health / Comment
29.04.2020	Promoting healthy movement behaviours among children during the COVID-19 pandemic	The Lancet Child & Adolescent Health / Comment

23.04.2020	Optimal Nutritional Status for a Well-Functioning Immune System Is an Important Factor to Protect against Viral Infections	Nutrients
29.04.2020	Current perspectives on Coronavirus 2019 (COVID-19) and cardiovascular disease: A white paper by the JAHA editors	Journal of the American Heart Association / Article
29.04.2020	Developing Vaccines for SARS-CoV-2 and Future Epidemics and Pandemics: Applying Lessons from Past Outbreaks	Health Security / Commentary
29.04.2020	Ethical aspects of the COVID-19 crisis: How to deal with an overwhelming shortage of acute beds	European Heart Journal. Acute Cardiovascular Care / Research article

Produced by the PHE COVID-19 Literature Digest Team

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