UK Health Security Agency

COVID-19 Literature Digest – 10/12/2021

Dear all,

Please find today's report below.

UKHSA's COVID-19 Literature Digest has been produced since February 2020. A selection of our previous Digests can be found here. This resource aims to highlight a small selection of recent COVID-19 papers that are relevant to UK settings, contain new data, insights or emerging trends. The Digest Team generate a report once per week (Fri). The reports include both preprints, which should be treated with caution as they are NOT peer-reviewed and may be subject to change, and also research that has been subject to peer review and wider scrutiny. The Digest is very rapidly produced and does not claim to be a perfect product; the inclusion or omission of a publication should not be viewed as an endorsement or rejection by UKHSA. We do not accept responsibility for the availability, reliability or content of the items included in this resource.

To join our email distribution list, or to be removed, please send a request to COVID.LitDigest@phe.gov.uk. If you are interested in papers relating to behaviour and social science please contact COVID19.behaviouralscience@phe.gov.uk to sign up to receive the Behavioural Sciences Weekly Report.

Best wishes,

Emma Farrow, James Robinson
On behalf of the UKHSA COVID-19 Literature Digest Team

Report for 10.12.2021 (please note that papers that have **NOT been peer-reviewed** are highlighted in red).

Sections:

Serology and immunology

Publication Date	Title/URL	Journal / Article type	Digest
08.12.2021	SARS-CoV-2 Omicron has extensive but incomplete escape of Pfizer BNT162b2 elicited neutralization and requires ACE2 for infection	medRxiv (non-peer reviewed) / Article	Omicron. • South African study: isolated live Omicron virus and human lung cell line clone to express ACE2 receptor. • Omicron still requires binding to ACE2 receptor to infect cells. • 14 plasma samples from 12 BNT162b2 [Pfizer] vaccinated participants (6/12 had prior infection, all with ancestral D614G virus) tested for neutralisation of Omicron versus ancestral D614G virus: 41-fold decline against Omicron. • 5 participants, all previously infected, showed relatively high neutralisation titers with Omicron.
06.12.2021	Minimal cross-over between mutations associated with Omicron variant of SARS-CoV-2 and CD8+ T cell epitopes identified in COVID-19 convalescent individuals	bioRxiv (non-peer reviewed) / Article	Omicron. • US authors examined if viral epitopes targeted by CD8+ T-cell response in 30 individuals who recovered from COVID-19 in 2020 were mutated in Omicron variant. • Only one of 52 previously identified epitopes (found in 2/30 individuals) contained an amino acid that was mutated in Omicron. • These data suggest that the T-cell immune response in previously infected, and most likely vaccinated individuals, should still be effective against Omicron.
07.12.2021	Reduced Neutralization of SARS-CoV-2 Omicron Variant by Vaccine Sera and monoclonal antibodies	medRxiv (non-peer reviewed) / Article	Omicron. • German authors share in vitro findings, using isolate from double vaccinated [1273-mRNA / Moderna] returnee from Zimbabwe. • In contrast to Delta: (i) neutralisation efficacy of vaccine-elicited sera against Omicron was severely reduced; (ii) monoclonal antibodies imdevimab and casirivimab failed to neutralize Omicron. • Neutralisation of Omicron was 32.8-fold reduced using sera from double BNT162b2-vaccinated and infected individuals.

			• Variant-specific vaccines and mAb agents may be required due to Omicron / emerging variants of concern.
01.12.2021	Effectiveness and durability of protection against future SARS-CoV-2 infection conferred by COVID-19 vaccination and previous infection; findings from the UK SIREN prospective cohort study of healthcare workers March 2020 to September 2021	medRxiv (non-peer reviewed) / Article	• Prospective cohort study of 35,768 UK healthcare workers, of whom 27% (n=9,488) had a prior SARS-CoV-2 infection. Vaccine coverage was high (97% had two-doses). • Adjusted vaccine effectiveness (aVE) decreased from 81% 14-73 days after dose-2 to 46% >6-months; no significant difference for short-interval BNT162b2 (Pfizer-BioNTech) but significantly lower aVE (50%) 14-73 days after dose-2 from ChAdOx1. • Infection-acquired immunity showed evidence of waning in unvaccinated follow-up but remained over 90% in those who received two doses of vaccine, even 15-months after infection.
07.12.2021	Pre-existing humoral immunity to human common cold coronaviruses negatively impacts the protective SARS-CoV-2 antibody response	Cell Host & Microbe / Article	• Authors assess human common cold CoV (hCCCoV) antibodies before and after SARS-CoV-2 infection. • Betacoronavirus hCCCoV antibodies are boosted after SARS-CoV-2 infection. • Baseline hCCCoV antibodies do not protect against SARS-CoV-2 infection. • Pre-existing hCCCoV antibodies may hinder effective immunity against SARS-CoV-2.

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Vaccines

Publication Date	Title/URL	Journal / Article type	Digest
08.12.2021	Pfizer and BioNTech Provide Update on Omicron Variant	Pfizer (non-peer reviewed) / News	Omicron. • Preliminary lab studies demonstrate 3 doses of BNT162b2 [Pfizer] vaccine neutralize Omicron; two doses show significantly reduced neutralization titers • A third dose increases neutralizing antibody titers by 25-fold; titers after booster are comparable to those after two doses against the wild-type virus. • 80% of epitopes in spike protein recognized by CD8+ T cells are not affected by Omicron mutations, so two doses may still induce protection against severe disease.

			• A variant-specific vaccine for Omicron is expected to be available by March 2022.
11.11.2021	Increased risk of SARS-CoV-2 reinfection associated with emergence of the Omicron variant in South Africa	medRxiv (non-peer reviewed) / Article	Omicron. • Retrospective analysis of South African epidemiological surveillance data; 2,796,982 individuals with positive test result at least 90 days prior to 27.11.2021. • 35,670 suspected reinfections* were identified (*sequential positive tests at least 90 days apart considered as suspected reinfections). • With Omicron, estimated hazard ratio for reinfection versus wave one was 2.39. • Population-level evidence suggests Omicron is associated with substantial ability to evade immunity from prior infection. (no evidence of immune escape associated with Beta or Delta variants).
06.12.2021	Immunogenicity, safety, and reactogenicity of heterologous COVID-19 primary vaccination incorporating mRNA, viral-vector, and protein-adjuvant vaccines in the UK (Com-COV2): a single-blind, randomised, phase 2, non-inferiority trial	Lancet / Article	• Phase 2 trial included 1072 participants previously vaccinated with a single dose of Oxford-AstraZeneca (n=540) or Pfizer–BioNTech (n=532). • Findings suggest heterologous second dosing with Moderna, but not Novavax vaccine, increased transient systemic reactogenicity compared with homologous schedules. • Associated comment: https://dx.doi.org/10.1136/bmj.n3030
08.12.2021	BNT162b2 Vaccine Booster and Mortality Due to Covid-19	N Engl J Med / Article	• 843,208 Israeli participants ≥ 50 years old, of whom 758,118 (90%) received booster during 54-day study period. • Death due to Covid-19: 65 participants in booster group (0.16 per 100,000 persons per day) / 137 in non-booster group (2.98 per 100,000 persons per day). • Participants who received a booster at least 5 months after a second dose of BNT162b2 had 90% lower mortality due to Covid-19. • Linked editorial: https://dx.doi.org/10.1056/NEJMe2117592
08.12.2021	Protection against Covid-19 by BNT162b2 Booster across Age Groups	N Engl J Med / Article	• Study of 4,696,865 Israeli adults (30 July to 10 October 2021) receiving two doses of Pfizer-BioNTech at least 5 months earlier; primary analysis examined those receiving booster dose at least 12 days earlier (booster group) with a non-booster group; secondary analysis of those receiving booster 3 to 7 days earlier (early post-booster group). • Confirmed infection was lower in booster vs non-booster group by a factor of approximately 10. Also lower in the booster vs early post-booster group by a factor of 4.9 to 10.8.

			• Rates of severe illness in primary / secondary analyses lower in booster group by a factor of 17.9 and 6.5, respectively, among those ≥60 years; and among those 40-59 years by a factor of 21.7 and 3.7 • Among those ≥60 years, mortality in primary/secondary analysis was lower by a factor of 14.7 and 4.9.
01.12.2021	Comparative magnitude and persistence of SARS-CoV-2 vaccination responses on a population level in Germany	medRxiv (non-peer reviewed) / Article	• Population-based study (n=1731 participants) examining vaccine responses for all currently available vaccines and dose schedules (mRNA-1273, BNT162b2, AZD1222, Ad26.CoV2S.2 or a combination of AZD1222 plus either mRNA-1273 or BNT162b2) in Germany. • Antibody titers against SARS-CoV-2 antigens / ACE2 binding inhibition against wild-type and Alpha, Beta, Gamma and Delta were analysed. • Homologous mRNA or heterologous vaccination elicited the highest immune responses. • High percentage of non-responders for Ad26.CoV2.S (Janssen) suggests a mRNA-based booster may be needed.
05.11.2021	Epidemiology of myocarditis and pericarditis following mRNA vaccines in Ontario, Canada: by vaccine product, schedule and interval	medRxiv (non-peer reviewed) / Article	• Cohort study in Ontario, Canada, where 19,740,741 doses of mRNA [Moderna or Pfizer-BioNTech] vaccines were administered (to 04.09.2021) • There were 297 reports of myocarditis/pericarditis: 69.7% occurred following the second vaccine dose; 76.8% occurred in males; median age 24 years. • Highest reporting rate in males aged 18-24 years following Moderna as second dose (5.1 times higher than the rate following Pfizer-BioNTech). • Overall reporting rates higher when inter-dose interval was ≤30 days for both vaccine products, and among Moderna second-dose recipients with heterologous schedule.
02.12.2021	Association of COVID-19 Vaccination With SARS-CoV-2 Infection in Patients With Cancer: A US Nationwide Veterans Affairs Study	JAMA Oncol / Article	• Cohort study of US Veterans Affairs patients who received systemic therapy for cancer between 15.08.2021 and 04.05.2021: vaccinated patients (n=29, 152) matched 1:1 to unvaccinated or not yet vaccinated controls. • Overall vaccine effectiveness (VE) in matched cohort was 58% starting 14 days after second dose. • Patients receiving chemotherapy ≤3 months prior to first vaccination dose had VE of 57%, compared to 76% for those receiving endocrine therapy and 85% for those who had not received systemic therapy ≥6 months prior.

07.12.2021	High seroconversion rate and SARS-CoV-2 Delta neutralization in PLWHIV vaccinated with BNT162b2	medRxiv (non-peer reviewed) / Article	• Cohort study of people living with HIV (PLWHIV), with CD4 cell count <500/mm3 and a viral load <50 copies/ml on stable antiretroviral therapy at least 3 months; 85 participants received two Pfizer-BioNTech vaccine doses. • Results suggest a high seroconversion rate and Delta neutralisation; no notable adverse effects or COVID-19 reported.
08.12.2021	The challenge of limited vaccine supplies: impact of prior infection on anti-spike IgG antibody trajectories after a single COVID-19 vaccination	medRxiv (non-peer reviewed) / Article	• Authors compared anti-spike IgG antibody responses after single dose of ChAdOx1, BNT162b2, or mRNA-1273 vaccines in COVID-19 Infection Survey of UK population. • Prior infection significantly boosted antibody responses for all three vaccines, producing higher peak level and longer half-life, and a response comparable to those without prior infection receiving two vaccinations. • Single-dose vaccination for previously infected may provide protection in populations with high rates of previous infection faced with limited vaccine supply, as an interim measure.

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Diagnostics and genomics

Publication Date	Title/URL	Journal / Article type	Digest
03.12.2021	Virucidal efficacy of guanidine-free inactivants and rapid test buffers against SARS-CoV-2	Sci Rep / Article	• Study assessed inactivation effectiveness of 24 next-generation (guanidine-free) nucleic acid extraction lysis buffers and 12 rapid antigen test buffers against SARS-CoV-2. • Only 3 of 12 LFIA buffers tested were effective at inactivating SARS-CoV-2; suggests additional control measures should be implemented to ensure the protection of test operators.
07.12.2021	A prospective diagnostic evaluation of accuracy of self-taken and healthcare worker-taken swabs for rapid COVID-19 testing	medRxiv (non-peer reviewed) / Article	• Prospective diagnostic accuracy evaluation included 249 participants; 30.1% (75/249) positive by RT-PCR • Self-taken RDT swabs had a sensitivity of 90.5%, compared to 78.4% for healthcare worker [HCW]-taken swabs. • Specificity for self-taken swabs 99.4%, versus 98.9% for HCW-taken. • Positive predictive values of self-taken RDTs (98.5%) and HCW-taken RDTs (96.7%) not significantly different; however, negative predictive values of self-taken swab was significantly higher (96.1% vs 91.5% for HCW-taken).

05.12.2021	Clinical Evaluation of a Combo Rapid Antigen Test QuickNavi-Flu+COVID19 Ag for Simultaneous Detection of SARS-CoV-2 and Influenza Viruses	medRxiv (non-peer reviewed) / Article	• Authors prospectively evaluated the clinical performance of a newly developed antigen test which can detect SARS-CoV-2 and influenza viruses at the same time with a single testing device. • For SARS-CoV-2 detection in nasopharyngeal samples, the sensitivity and specificity of the antigen test were 80.9% and 99.8%, respectively. • During the study period, influenza viruses were not detected.
30.11.2021	Normalisation of SARS-CoV-2 concentrations in wastewater: the use of flow, conductivity and CrAssphage	medRxiv (non-peer reviewed) / Article	• Without normalisation impact of rain/snowmelt in a combined sewer network may misrepresent actual short-term trends of COVID-19 circulation in population. • Authors investigated three normalization methods (using flow, conductivity and CrAssphage) at 9 monitoring locations between Sep 2020 and Aug 2021.
03.12.2021	SARS-CoV-2 variants of concern and variants under investigation in England: technical briefing 30	Gov.uk (non-peer reviewed) / Research and analysis	Omicron. • Includes an update on the Omicron (B.1.1.529) variant • Omicron can be detected through current genotyping panel in use in England [K417N must be present, and P681R, E484K, and K417T must not be present]; additional targets for Omicron are being validated • The Omicron global phylogeny shows little diversity, compatible with a recent emergence and rapid spread • A deletion at position 69/70 of the spike protein allows Omicron to be tracked through S gene target failure (SGTF) in some PCR tests. • Structural modelling by University of Oxford indicates mutations in Omicron are highly likely to affect the binding of natural and therapeutic antibodies and enhance binding to human ACE2. • Little evidence of Omicron in wastewater surveillance up to 21 November 2021.
03.12.2021	Omicron variant of SARS-CoV-2 harbors a unique insertion mutation of putative viral or human genomic origin	OSF Preprints (non-peer reviewed) / Article	Omicron. • Compares the mutations of Omicron with prior VOC (Alpha, Beta, Gamma, Delta), VOI (Lambda, Mu, Eta, Iota and Kappa), and all 1523 SARS-CoV-2 lineages. • Omicron's Spike protein has 26 distinct amino acid mutations (23 substitutions, two deletions and one insertion) compared to other VOC • The insertion mutation (ins214EPE) has not been previously observed in any other SARS-CoV-2 lineage; it is plausible the Omicron insertion could have evolved in a co-infected individual.
09.12.2021	B.1.1.529 escapes the majority of SARS-CoV-2 neutralizing antibodies of diverse epitopes	bioRxiv (non-peer reviewed) / Article	Omicron.

			• Authors use high-throughput yeast display screening to determine RBD escaping mutation profiles for 247 human anti-RBD NAbs identified from SARS-CoV/SARS-CoV-2. • Various single mutations of Omicron could impair NAbs of different epitope groups • In total, over 85% of tested NAbs are escaped by Omicron. • Omicron escaped four neutralising antibodies drugs (LY-CoV016/LY-CoV555 cocktail, REGN-CoV2 cocktail, AZD1061/AZD8895 cocktail, and BRII-196) while two function at reduced efficacy (VIR7831 and DXP-604).
07.12.2021	Mechanisms of SARS-CoV-2 Evolution Revealing Vaccine-Resistant Mutations in Europe and America	J Phys Chem Lett / Article	Omicron. • By tracking evolutionary trajectories of vaccine-resistant mutations in more than 2.2 million SARS-CoV-2 genomes, authors demonstrate that vaccine-breakthrough or antibody-resistant mutations provide a new mechanism of viral evolution. • Occurrence and frequency of vaccine-resistant mutations correlate strongly with vaccination rates in Europe and America.
07.12.2021	Receptor binding and escape from Beta antibody responses drive Omicron-B.1.1.529 evolution	bioRxiv (non-peer reviewed) / Article	Omicron. • Modelling suggests Omicron contains 30 substitutions plus deletions and an insertion in Spike; mutations include Q498R and N501Y. • Together with increased charge complementarity between the RBD and ACE2, these substantially increase affinity and potentially virus transmissibility through increased syncytia formation. • Mutations will likely compromise binding of many potent monoclonal antibodies (including those under commercial development), however residual binding should provide protection from severe disease.
02.12.2021	Structural basis for continued antibody evasion by the SARS-CoV-2 receptor binding domain	Science / Article	• Authors demonstrate mechanisms through which SARS-CoV-2 receptor binding domain (RBD) can tolerate large numbers of simultaneous antibody escape mutations • Pseudotypes containing up to seven mutations are more resistant to neutralisation by therapeutic antibodies and serum from vaccine recipients. • Identifies an antibody that binds the RBD core to neutralise pseudotypes for all tested variants; however, RBD can acquire an N-linked glycan to escape neutralisation.

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Epidemiology and clinical - children and pregnancy

Publication Date	Title/URL	Journal / Article type	Digest
07.12.2021	Systematic review of cardiac adverse effects in children and young people under 18 years of age after SARS-CoV-2 vaccination	medRxiv (non-peer reviewed) / Systematic Review	• Systematic review of myocarditis and pericarditis in children and young people (CYP, <18 years) following vaccination with mRNA vaccines up to 14.09.2021. Included 21 studies (17 case reports/series; 3 studies described reporting rates from passive surveillance databases; one describing 22 cases from the US Vaccine Safety Datalink). • Overall, findings suggest cardiac adverse effects are rare and most cases are mild and self-limiting without significant treatment. No data yet available on children <12 years.
30.11.2021	Large increases in SARS-CoV-2 seropositivity in children in England: Effects of the Delta wave and vaccination	J Infect / Letter	• Analyses 5209 UK paediatric sera (age groups 1-4 years, n= 945; 5-11 years, n=1525; 12-15 years, n=2033; 16-17 years, n=706) obtained during 01.09.2020 to 31.10.2021. • Overall national prevalence estimate of seropositivity [using Roche S assay] increased from 7.6% for the period September to October 2020 to 31.5% in March and April 2021; after remaining stable over summer, this increased to 46.1% in October 2021 .
06.12.2021	Child mortality in England during the first year of the COVID-19 pandemic	Arch Dis Child / Article	• Utilises data from the National Child Mortality Database covering deaths of children under 18 years in England from 01.04.2020 to 31.03.2021 [during COVID-19 pademic], and the same period in 2019-2020. • There were 356 fewer deaths in 2020–2021 than in 2019–2020 (relative risk [RR] 0.90). • Deaths from infection (RR 0.49) and other underlying medical conditions (RR 0.75) were lower in 2020–2021 versus 2019–2020.

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Epidemiology and clinical - long-term complications / sequelae

Publication Date	Title/URL	Journal / Article type	Digest
09.12.2021	Changes in the trajectory of Long Covid symptoms following COVID-19 vaccination: community-based cohort study	medRxiv (non-peer reviewed) / Article	• UK observational cohort study of 28,356 COVID-19 Infection Survey participants who received at least their first vaccination after test-confirmed infection.

			• First vaccination associated with 12.8% decrease in odds of Long Covid, increasing by 0.3% per week after first dose. • Second dose associated with 8.8% decrease in odds, subsequently decreasing by 0.8% per week. • Likelihood of Long Covid symptoms reduced after vaccination; sustained over follow-up period after second dose.
03.12.2021	Brain Injury in COVID-19 is Associated with Autoinflammation and Autoimmunity	medRxiv (non-peer reviewed) / Article	• Authors investigate relationship between (i) serum markers of brain injury (neurofilament light [NfL], Glial Fibrillary Acidic Protein [GFAP] and total Tau) and (ii)markers of dysregulated host response including measures of autoinflammation (proinflammatory cytokines) and autoimmunity. • 250 serum samples, from 175 patients, and up to 3 timepoints: acute [0-14 days], subacute [15–70 days], convalescent [at outpatient follow up; >80 days]. • During hospitalisation, COVID-19 patients demonstrated elevations of NfL and GFAP in a severity-dependant manner; evidence of ongoing active brain injury at follow-up 4 months later.

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Epidemiology and clinical – risk factors

Publication Date	Title/URL	Journal / Article type	Digest
07.12.2021	Disparities in COVID-19 infection, hospitalisation and death in people with schizophrenia, bipolar disorder, and major depressive disorder: a cohort study of the UK Biobank	Mol Psychiatry / Article	• Study using UK Biobank data 447,296 participants; included people with severe mental illness (SMI; schizophrenia / psychosis n=1925; bipolar disorder [BD] n=1483; and major depressive disorder (MDD) n=41,448) and linked non-SMI (n=402,440) • Unadjusted analyses found higher odds of COVID-19 mortality for schizophrenia / psychosis (odds ratio [OR] 4.84), BD (OR 3.76), and MDD (OR 1.99) compared to non-SMI. • Higher odds of infection and hospitalisation across all SMI groups, particularly schizophrenia / psychosis (OR 1.61; OR 3.47) and BD (OR 1.48; OR 3.31). • Adjusted models found significantly higher mortality and hospitalisation among all SMI groups; infection odds only significantly higher for MDD.

01.12.2021	All-cause and cause-specific mortality in people with mental disorders and intellectual disabilities, before and during the COVID-19 pandemic: cohort study	Lancet Reg Health Eur / Research Paper	• Uses prospective data (N=167,122) from a large mental healthcare provider in London, UK to assess age- and gender-standardised mortality ratios (SMRs) across nine psychiatric conditions. • Compared to pre-pandemic (2019-2020), all-cause SMRs increased, with COVID-19 SMRs elevated across all conditions, particularly: learning disabilities (SMR: 9.24), pervasive developmental disorders (5.01), eating disorders (4.81), schizophrenia-spectrum disorders (3.26), dementia (3.82), personality disorders (4.58) [increased SMRs similar across ethnic groups].

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Epidemiology and clinical – other

Publication Date	Title/URL	Journal / Article type	Digest
02.12.2021	Contrasting SARS-CoV-2 epidemics in Singapore: Cohort studies in migrant workers and the general population	Int J Infect Dis / Article	• Prospective serological cohort studies in Singapore (May to July 2020) included: i) 478 residents of a SARS-CoV-2 affected migrant worker dormitory, and; ii) 937 community-dwelling Singaporean adults for whom pre-pandemic sera were available. • No evidence of community exposure in Singapore prior to September 2019. • Data suggests just 0.16% of the Singapore general population were infected with SARS-CoV-2 in 2020; comparison with national case notification data suggests around 1 in 4 infections were associated with symptoms. • In contrast, 63.8% of migrant worker cohort had been infected by July 2020; no symptoms reported in almost all cases.

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Infection control / non-pharmaceutical interventions

Publication Date	Title/URL	Journal / Article type	Digest
08.12.2021	Disentangling post-vaccination symptoms from early COVID-19	EClinicalMedicine / Article	• UK study of 14,842 users of COVID Symptom Study (CSS) app who experienced systemic symptoms post-vaccination, overlapping with potential COVID-19 symptoms.

			• Most had no fever, anosmia / dysosmia, persistent cough. Many only had symptoms commonly seen post-vaccination (headache, myalgia, fatigue). • Post-vaccination symptoms per se cannot be differentiated from COVID-19 with clinical robustness, using symptom profiles or machine-derived models. • Individuals presenting with systemic symptoms post-vaccination should be tested for SARS-CoV-2 or quarantine, to prevent community spread.
08.12.2021	Relative contribution of leaving home for work or education, transport, shopping and other activities on risk of acquiring COVID-19 infection outside the household in the second wave of the pandemic in England and Wales	medRxiv (non-peer reviewed) / Article	• UK study to understand relative importance of different activities / settings in COVID-19 transmission in England and Wales during second wave (01/10/2020 - 01/05/2021). • Intensive range of non-pharmaceutical interventions in place including advice to work from home, closure of non-essential businesses e.g. hospitality and leisure venues, restrictions on social gatherings. • Analysis of 10475 adult participants (874 infections acquired outside household / 9601 uninfected): infection independently associated with: (i) leaving home for work (AOR 1.20); (ii) public transport use (AOR for use more than once per week 1.82); (iii) shopping (AOR for shopping more than once per week 1.69). • During periods of intense COVID-19 transmission, increasing proportion of people who (i) work from home; (ii) cycle or walk if have to go into work; (iii) can shop online for essential goods is expected to significantly impact on transmission and risk of severe disease.

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Transmission

Publication Date	Title/URL	Journal / Article type	Digest
04.12.2021	Hidden hazards of SARS-CoV-2 transmission in hospitals: A systematic review	Indoor Air / Review	• Systematic review up to 01.06.2021 included 51 observational cross-sectional studies (6258 samples). • SARS-CoV-2 RNA detected in 1/6 samples and up to 7.62 m away from nearest patients. • Patient areas had highest detection rates and viral concentrations; air outlets and hospital floors were most frequently and heavily

			contaminated surfaces; viable virus was recovered from the air and fomites. • Air- and surface-borne SARS-CoV-2 contamination was significantly increased by aerosol-generating procedures (OR [air] = 2.56; OR [surface] = 1.95), and significantly decreased by patient masking (OR [air] = 0.41; OR [surface] = 0.45). • Limitations include: range of patient, location, and sampling-specific information; small volumes of air sampled; infrequent use of more sensitive identification methods.
04.12.2021	Quantifying the contribution of pathways of nosocomial acquisition of COVID-19 in English hospitals	Int J Epidemiol / Article	• Between 01.03.2020 and 31.12.2020, nosocomial SARS-CoV-2 infections as were identified in 0.5% of patients admitted to acute NHS trusts in England. • Modelling suggests the most likely route of nosocomial transmission to patients was indirect transmission from other infected patients, e.g. through HCWs acting as vectors or contaminated fomites, followed by direct transmission between patients in the same bay. • The most likely route of transmission to HCWs is from other infected HCWs.
03.12.2021	Probable Transmission of SARS-CoV-2 Omicron Variant in Quarantine Hotel, Hong Kong, China, November 2021	Emerg Infect Dis / Research Letter	Omicron. • Authors report detection of Omicron variant (B.1.1.529) in an asymptomatic, fully vaccinated traveller in a quarantine hotel in Hong Kong. • Omicron also detected in fully vaccinated traveller staying in a room across corridor from index patient, suggesting transmission despite strict quarantine precautions.

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Modelling

Publication Date	Title/URL	Journal / Article type	Digest
01.12.2021	Comparing human and model-based forecasts of COVID-19 in Germany and Poland	medRxiv (non-peer reviewed) / Article	• Comparison of real-time forecasts of COVID-19 cases and deaths in Germany and Poland over a 1-4 week horizon submitted to German and Polish Forecast Hub. • Crowd forecasts from researchers and volunteers compared to (i) forecasts from two semi-mechanistic models based on common

			epidemiological assumptions; (ii) ensemble of all other models submitted to Forecast Hub. • Crowd forecasts, despite being overconfident, outperformed all other methods across all forecast horizons when forecasting cases. • Forecasts based on computational models performed comparably better when predicting deaths, suggesting epidemiological modelling and human judgement can complement each other.
09.12.2021	The importance of saturating density dependence for population-level predictions of SARS-CoV-2 resurgence compared with density-independent or linearly density-dependent models, England, 23 March to 31 July 2020	Euro Surveill / Research	• Modelling study: COVID-19-associated mortality data from England show evidence of increasing with population density until a saturating level (adjusted for local age distribution, deprivation, ethnic minority population and proportion of key workers). • Suggests classical population-level models which assume linearity between density and transmission, or no relationship may, respectively, over- and underestimate the delay in infection resurgence following release of lockdown.
01.12.2021	Visualising SARS-CoV-2 transmission routes and mitigations	Bmj / Analysis	• Expert elicitation was used to support an interactive tool to visualise SARS-CoV-2 transmission and likely effects of environmental / behavioural mitigation measures in different contexts. • The tool can support decision makers and the public to make informed decisions about how best to reduce COVID-19 transmission.
07.12.2021	The effects of different travel modes and travel destinations on COVID-19 transmission in global cities	Sci Bull (Beijing) / Short Communication	• Models travel modes, travel destinations and COVID-19 transmission in 58 cities in 31 countries (15.02.2020 to 31.12.2020). • Key findings: i) travel destinations (i.e., transit stations, workplaces, and residence) contributed to transmission most, followed by infectious sources and travel mode; ii) commuting via public transit is a potential risk in most cities, highlighting importance of preventative measures such as facemasks and social distancing; iii) pedestrians were exposed to a higher infection risk when they ignored the suggested preventative measures; iv) driving was the safest way to commute due to less close contact with strangers.

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Overviews, comments and editorials

Publication Date	Title/URL	Journal / Article type
04.12.2021	Why do breakthrough COVID-19 infections occur in the vaccinated?	Qjm / Accepted Manuscript
27.11.2021	Complexity of immune responses in COVID-19	Semin Immunol / Review
02.12.2021	How bad is Omicron? What scientists know so far	Nature / News
03.12.2021	Covid-19: South Africa's surge in cases deepens alarm over omicron variant	BMJ / News
07.12.2021	Beyond Omicron: what's next for COVID's viral evolution	Nature / News Feature
01.12.2021	Immune-mediated neurological syndrome in SARS-CoV-2 infection: a review of literature on autoimmune encephalitis in COVID-19	Neurol Sci / Review
06.12.2021	Indoor aerosol science aspects of SARS-CoV-2 transmission	Indoor Air / Review
02.12.2021	Covid-19: UK approves monoclonal antibody sotrovimab for over 12s at high risk	BMJ / News

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UK Health Security Agency

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