



COVID-19 Literature Digest – 06/01/2021

Dear all,

Please find [today's report](#) below.

PHE'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 three times per week (Mon, Wed, 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 The reports include both preprints, which should be treated with caution as they are NOT peer-reviewed and may be subject to change, and also research that has been subject to peer review and wider scrutiny.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 PHE. We do not accept responsibility for the availability, reliability or content of the items included in this resource.

To join our email distribution list 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 PHE Behavioural Sciences Weekly Report.

Best wishes,

Bláthnaid Mahon, Emma Farrow, James Robinson
On behalf of the PHE COVID-19 Literature Digest Team

Report for 06.01.2021 (please note that papers that have **NOT been peer-reviewed** are highlighted in red).

Sections:

[Serology and immunology](#)

[Vaccines](#)

[Diagnostics and genomics](#)

[Epidemiology and clinical – children / pregnancy](#)

[Epidemiology and clinical – risk factors](#)

[Infection control / non-pharmaceutical interventions](#)

[Transmission](#)

Serology and immunology

Publication Date	Title / URL	Journal / Article type	Digest
06.01.2021	The duration, dynamics and determinants of SARS-CoV-2 antibody responses in individual healthcare workers	Clin Infect Dis / Article	<ul style="list-style-type: none"> • <i>This paper was previously included as a preprint.</i> • Authors present 6 months of data from a longitudinal seroprevalence study of 3276 UK healthcare workers (HCWs). • Anti-spike IgG levels remained stably detected after a positive result, e.g., in 94% (95% credibility interval, CrI, 91-96%) of HCWs at 180 days. Anti-nucleocapsid IgG levels rose to a peak at 24 (95% credibility interval, CrI 19-31) days post first PCR-positive test, before beginning to fall. • SARS-CoV-2 anti-nucleocapsid antibodies wane within months, and faster in younger adults and those without symptoms. However, anti-spike IgG remains stably detected. • Ongoing longitudinal studies are required to track the long-term duration of antibody levels and their association with immunity to SARS-CoV-2 reinfection.
05.01.2021	SARS-CoV-2 seroprevalence survey estimates are affected by anti-nucleocapsid antibody decline	J Infect Dis / Accepted manuscript	<ul style="list-style-type: none"> • Authors analysed 21,676 residual specimens from Ontario, Canada collected between Mar-Aug, 2020 to investigate the effect of antibody decline on SARS-CoV-2 seroprevalence estimates. • Testing specimens orthogonally using Abbott (anti-nucleocapsid) then Ortho (anti-spike) assays, seroprevalence estimates ranged from 0.4%-1.4%, despite ongoing disease activity. • Geometric mean concentration (GMC) of antibody-positive specimens decreased over time ($p=0.015$), and GMC of antibody-negative specimens increased over time ($p=0.0018$). • Association between the two tests decreased each month ($p<0.001$), suggesting anti-N antibody decline. Lowering the Abbott antibody index cut-off from 1.4 to 0.7 resulted in a 16% increase in positive specimens.
04.01.2021	Dose-dependent response to infection with SARS-CoV-2 in the ferret model and evidence of protective immunity	Nat Commun / Article	<ul style="list-style-type: none"> • <i>This paper was previously included as a preprint.</i> • Authors report a dose titration study of SARS-CoV-2 in the ferret model. • After a high (5×10^6 pfu) and medium (5×10^4 pfu) dose of virus is delivered, intranasally, viral RNA shedding in upper respiratory tract (URT) observed in 6/6 animals; only 1/6 ferrets show similar signs after low dose (5×10^2 pfu) challenge. • Following sequential culls pathological signs of mild multifocal

bronchopneumonia in approximately 5–15% of the lung is seen on day 3, in high and medium dosed groups.

- Ferrets re-challenged, after virus shedding ceased, are fully protected from acute lung pathology. The endpoints of URT viral RNA replication & distinct lung pathology are observed most consistently in the high dose group.

Vaccines

Publication Date	Title / URL	Journal / Article type	Digest
05.01.2021	Alternative Dose Allocation Strategies to Increase Benefits From Constrained COVID-19 Vaccine Supply	Ann Intern Med / Letters	<ul style="list-style-type: none"> • Authors developed a decision analytic cohort model to estimate direct benefits of vaccination against COVID-19 under alternative strategies for dose allocation. • The fixed strategy, modelled after current U.S. policy, reserves 50% of each vaccine instalment for second doses to be administered 3 weeks later. The flexible strategy (an illustrative example of many possible alternatives) reserves 10% of the supply for second doses during the first 3 weeks, 90% during each of the next 3 weeks, and 50% thereafter. • Under a steady vaccine supply of 6 million doses per week, the flexible strategy would result in an additional 23% to 29% of COVID-19 cases averted compared with the fixed strategy. • 2.4 million additional people received 2 doses of vaccine in flexible strategy because millions more received an initial dose during first 3 weeks; all second doses were administered on schedule. • Overall, the flexible strategy averted an additional 27% to 32% of COVID-19 cases compared with the fixed strategy in the context of this moderate supply reduction.
05.01.2021	Speed Versus Efficacy: Quantifying Potential Tradeoffs in COVID-19 Vaccine Deployment	Ann Intern Med / Letters	<ul style="list-style-type: none"> • Analysis presented here highlights the steep clinical and epidemiologic costs imposed by a 2-dose vaccination series in the context of ongoing pandemic response. • A single-dose vaccine with 55% effectiveness may confer greater population benefit than a 95%-effective vaccine requiring 2 doses.
23.12.2020	Safety and immunogenicity of INO-4800 DNA vaccine against SARS-CoV-2: A preliminary report of an open-label, Phase 1 clinical trial	EClinicalMedicine / Research Paper	<ul style="list-style-type: none"> • A DNA vaccine (INO-4800) targeting the full length spike antigen of SARS-CoV-2 was evaluated in two groups of 20 participants, receiving either 1.0 mg or 2.0 mg of vaccine intradermally followed by CELLECTRA® EP at 0 and 4 weeks. • INO-4800 demonstrated excellent safety and tolerability and was

immunogenic in 100% (38/38) of the evaluable vaccinated subjects by eliciting either or both humoral or cellular immune responses.

Diagnostics and genomics

Publication Date	Title / URL	Journal / Article type	Digest
04.01.2021	Comprehensive mapping of mutations to the SARS-CoV-2 receptor-binding domain that affect recognition by polyclonal human serum antibodies	bioRxiv (non-peer reviewed) / Article	<ul style="list-style-type: none"> • Study mapping how convalescent serum antibodies are impacted by all mutations to the SARS-CoV-2 spike's receptor-binding domain (RBD). • Binding by polyclonal serum antibodies is affected by mutations in three main epitopes in the RBD, but there is substantial variation in the impact of mutations both among individuals and within the same individual over time. • Despite this inter- and intra-person heterogeneity, the mutations that most reduce antibody binding usually occur at just a few sites in the RBD's receptor binding motif. • The most important site is E484, where neutralization by some sera is reduced >10-fold by several mutations, including one in emerging viral lineages in South Africa and Brazil.
30.12.2020	S gene dropout patterns in SARS-CoV-2 tests suggest spread of the H69del/V70del mutation in the US	medRxiv (non-peer reviewed) / Article	<ul style="list-style-type: none"> • Authors analyse 2 million RT-PCR tests in the US to identify the rate of S gene dropout, which has been recently shown to occur in tests from individuals infected with strains of SARS-CoV-2 that carry the H69del/V70del mutation. • Data shows a rise in S gene dropout in the US starting in early October, with 0.25% of daily positive tests exhibiting this pattern during the first week and growing slowly over time, with late December exhibiting the highest level yet, at 0.5%. • Data for 14 states with sufficient sample size suggests a recent expansion in Eastern USA, concentrated in Massachusetts, Ohio, and Florida. • It is not known whether the S gene dropout samples observed here represents the B.1.1.7. strain.
24.12.2020	Detection and molecular characterisation of SARS-CoV-2 in farmed mink (Neovision vision) in Poland	bioRxiv (non-peer reviewed) / Article	<ul style="list-style-type: none"> • Study investigated 91 individual minks from a farm in Northern Poland. • RT-PCR, antigen detection and NGS confirmed 15 animals were positive for SARS-CoV-2. • Results were verified by sequencing of full viral genomes. • Countrywide monitoring conducted by veterinary inspection so far has not detected the presence of SARS-CoV-2 on other mink farms.

29.12.2020	Paired SARS CoV-2 Spike Protein Mutations Observed During Ongoing SARS-CoV-2 Viral Transfer from Humans to Minks and Back to Humans	bioRxiv (non-peer reviewed) / Article	<ul style="list-style-type: none"> Examined the mutations that were associated with the transfer of SARS-CoV-2 from humans to minks and back to humans. The mutations outlined for SARS-CoV-2 show a pattern indicative of zoonotic transfer from humans to minks and back to humans.
------------	---	---------------------------------------	---

Epidemiology and clinical – children / pregnancy

Publication Date	Title / URL	Journal / Article type	Digest
05.01.2021	The incidence, characteristics and outcomes of pregnant women hospitalized with symptomatic and asymptomatic SARS-CoV-2 infection in the UK from March to September 2020: a national cohort study using the UK Obstetric Surveillance System (UKOSS)	medRxiv (non-peer reviewed) / Article	<ul style="list-style-type: none"> A national, prospective cohort study of all UK hospitalised pregnant women (PW; n=1148; 63% symptomatic) with confirmed SARS-CoV-2 from 1 Mar to 31 Aug 2020. Estimated incidence of hospitalisation with symptomatic SARS-CoV-2 was 2.0 per 1000 maternities and 1.2 per 1000 maternities for asymptomatic. Symptomatic PW were more likely to be overweight or obese (adjusted OR 1.86 and aOR 2.07, respectively), to be of Black, Asian or other minority ethnic group (aOR 6.24, aOR 4.36, and aOR 12.95, respectively), and to have a relevant co-morbidity (aOR 1.83). Symptomatic PW were more likely to be admitted to intensive care (aOR 57.67), but absolute risk of poor outcomes was low.

Epidemiology and clinical – risk factors

Publication Date	Title / URL	Journal / Article type	Digest
04.01.2021	Risk Factors Associated With All-Cause 30-Day Mortality in Nursing Home Residents With COVID-19	JAMA Intern Med / Original investigation	<ul style="list-style-type: none"> This cohort study was conducted at 351 US nursing homes among 5256 nursing home residents who had confirmed COVID-19. Findings include: odds of death among residents with moderate cognitive impairment 2.09 (95% CI, 1.68-2.59) times higher / with severe cognitive impairment 2.79 (95% CI, 2.14-3.66) times higher; with moderate impairment 1.49 (95% CI, 1.18-1.88) times higher / severe impairment were 1.64 (95% CI, 1.30-2.08) times higher. Increased age, male sex, and impaired cognitive and physical function were independently associated with mortality.

Infection control / non-pharmaceutical interventions

Publication Date	Title / URL	Journal / Article type	Digest
02.01.2021	Do school closures reduce community transmission of COVID-19? A systematic review of observational studies	medRxiv (non-peer reviewed) / Article	<ul style="list-style-type: none"> • Systematic review of empirical evidence from observational studies of the effect of school closures and re-openings on community transmission of SARS-CoV-2 (10 studies, covering 146 countries). • There was significant heterogeneity between studies. • Some studies reported large reductions in incidence and mortality associated with school closures, however, studies were at risk of confounding and collinearity, and studies at lower risk of bias reported no association. • Authors suggest varied evidence on effectiveness and harmful effects mean policymakers should take a measured approach before implementing school closures.

Transmission

Publication Date	Title / URL	Journal / Article type	Digest
05.01.2021	Genomic Evidence of In-Flight Transmission of SARS-CoV-2 Despite Predeparture Testing	Emerg Infect Dis / Article	<ul style="list-style-type: none"> • People entering New Zealand undergo managed isolation and quarantine (MIQ) for 14 days and mandatory testing; of 62,698 arrivals, testing in MIQ identified 215 cases of SARS-CoV-2 infection. • Dubai flight arriving on Sept 29 had 7 positive test results in MIQ. These 7 passengers originated from 5 different countries before a layover in Dubai; 5 had negative predeparture SARS-CoV-2 test results. All 7 SARS-CoV-2 genomes were genetically identical, except for a single mutation in 1 sample. • Despite predeparture testing, multiple instances of in-flight SARS-CoV-2 transmission are likely.

Overviews, comments and editorials

Publication Date	Title / URL	Journal / Article type
05.01.2021	U.S. COVID-19 Vaccination Challenges Go Beyond Supply	Ann Intern Med / Editorial

Produced by the PHE COVID-19 Literature Digest Team

To sign-up, email COVID.LitDigest@phe.gov.uk

A selection of previous digests [can be found here](#)

www.gov.uk/phe Follow us on Twitter @PHE_uk

Protecting and improving the nation's health