COVID-19 Literature Digest – 23/12/2020

Dear all,

Please find today’s report below.

** Please note that the next Literature Digest report will be on Monday the 4th January. **

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 The reports include both preprints, which should be treated with caution as they are NOT peer-reviewed and may be subject to change, and also research that has been subject to peer review and wider scrutiny.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.

Wishing you all a safe and happy holiday,

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

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Report for 23.12.2020 (please note that papers that have NOT been peer-reviewed are highlighted in red).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
### Epidemiology and clinical – other

**Infection control / non-pharmaceutical interventions**

**Transmission**

**Treatment**

**Modelling**

**Overviews, comments and editorials (no digest)**

### Serology and immunology

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| 22.12.2020       | Antibody Responses 8 Months after Asymptomatic or Mild SARS-CoV-2 Infection | Emerg Infect Dis / Dispatch | • Researchers in South Korea investigated antibody responses of 58 persons 8 months after asymptomatic or mildly symptomatic infection with SARS-CoV-2 to address concerns about the impact of waning humoral immunity on the usefulness of serologic testing.  
• For 3 of 4 immunoassays used, seropositivity rates were high (69.0%-91.4%).  
• Limitations include a relatively small sample size and a predominantly young population. |

### Vaccines

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• By using mathematical modelling, this document provides EU/EEA countries with information on factors that may affect the choice of COVID-19 vaccination. |

### Diagnostics and genomics

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| 21.12.2020       | Investigation of novel SARS-COV-2 variant: Variant of Concern 202012/01 | Gov.uk / Guidance | • A novel variant has been identified which has spread rapidly within the UK. Authors have assessed this variant as having substantially increased transmissibility with high confidence. Further studies are underway to characterise the variant and updates will be provided.  
• The new variant is defined by 23 mutations: 13-non synonymous mutations, 4 deletions and 6 synonymous mutations. |
• The most unusual and concerning single mutation in this cluster is N501Y. However, the summative effect of this large number of mutations is also unknown and of concern.
• It is highly likely that N501Y affects the receptor binding affinity of the spike protein and it is possible that this mutation alone or in combination with the deletion at 69/70 in the N terminal domain (NTD) is enhancing the transmissibility of the virus.

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| 23.12.2020 | Sequencing of SARS-CoV-2                                                     | European Centre for Disease Prevention and Control / Technical guidance                | • This technical note aims to provide guidelines to laboratories and relevant stakeholders in the European Union (EU), European Economic Area (EEA) and other countries in the WHO European region in making decisions on establishing sequencing capacities and capabilities, in making decisions on which technologies to use and/or in deciding on the role of sequencing for SARS-CoV-2 diagnostics, research, outbreak investigations and surveillance.
• It addresses the most used sequencing technologies and their applications and proposes a central standardisation process to analyse and report the findings of SARS-CoV-2 genetic characterisations. |
| 21.12.2020 | Multiplex assays for the identification of serological signatures of SARS-CoV-2 infection: an antibody-based diagnostic and machine learning study | The Lancet Microbe / Article                                                          | • Authors use a multiplex assay, machine learning and Bayesian modelling to analyse SARS-CoV-2 positive serum samples from 215 adults in four French hospitals, and 335 negative control serum samples collected from healthy adult donors before the start of the epidemic (France, Thailand, and Peru).
• IgG antibody responses to trimeric spike protein (Stri) identified individuals with previous SARS-CoV-2 infection with 91.6% (95% CI 87.5–94.5) sensitivity and 99.1% (97.4–99.7) specificity.
• Using a serological signature of IgG and IgM to multiple antigens, it was possible to identify infected individuals with 98.8% (96.5–99.6) sensitivity and 99.3% (97.6–99.8) specificity.
• When applied to population-level surveys, statistical analysis of multiplex data allows estimation of seroprevalence levels less than 2%, below the false-positivity rate of many other assays. |

Epidemiology and clinical – children / pregnancy

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• Included a cohort study of 127 pregnant women presenting for care at 3 tertiary hospitals. |
care centres in Boston, Massachusetts. 64 tested positive for SARS-CoV-2 (mean age, 31.6 years) and 63 tested negative (mean age, 33.9 years).

- Findings suggest that, although low rates of maternal viremia and patterns of placental SARS-CoV-2 receptor distribution may underlie the rarity of vertical transmission, reduced transplacental transfer of anti–SARS-CoV-2 antibodies may leave neonates at risk for infection.

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<th>Epidemiology and clinical – risk factors</th>
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| 21.12.2020 | Occupational exposures associated with being a COVID-19 case; evidence from three case-control studies | medRxiv (non-peer reviewed) / Article | • Authors conducted three retrospective, frequency-matched case-control studies using case data from the NHS Test and Trace programme to investigate occupational risk factors.
• Across all study periods there was strong statistical evidence that working in healthcare (pOR 2.87, aOR range 2.72-3.08), social care (pOR 4.15, aOR range 2.46-5.41) or hospitality (pOR 2.36, aOR range 2.01-2.63) were associated with increased odds of being a COVID-19 case.
• There was also evidence that working in warehouses was associated with increased odds (pOR 3.86, aOR range 1.06-14.19), with a substantial increase in odds over the study periods. A similar pattern was observed in education and construction.
• It is not possible to determine how much of the transmission of SARS-CoV-2 took place within the workplace, and how much was associated with social, household or transport exposures. |
| 21.12.2020 | Clinical outcomes and risk factors for COVID-19 among migrant populations in high-income countries: a systematic review | medRxiv (non-peer reviewed) / Article | • Systematic review (158 studies from 15 countries) to assess clinical outcomes of COVID-19 in migrant populations, indirect health and social impacts, and to determine key risk factors.
• Data suggests migrants are at increased risk of infection and disproportionately represented among COVID-19 cases.
• Available datasets also suggest a disproportionate representation of migrants in reported COVID-19 deaths.
• Migrants who are undocumented, working in health and care, or housed in camps and labour compounds may have been especially affected.
• Migrants generally have higher levels of risk factors, such as high-risk occupations, overcrowded accommodation, and linguistic or financial barriers to healthcare. |
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| 21.12.2020       | Excess Mortality in California During the Coronavirus Disease 2019 Pandemic, March to August 2020 | JAMA Intern Med / Research letter | • Time-series models were used to estimate excess deaths in California between Mar and Aug 2020 by age, sex, race/ethnicity, and educational level.  
• In total, 146,557 deaths were recorded in California, with an estimated 19,806 (95% prediction interval, 16,364-23,210) excess deaths over historical trends.  
• Older adults (>65 years), Black and Latino residents, and those without college degrees experienced the highest per capita excess mortality.  
• Following statewide shelter-in-place, Latino residents and those without a high school degree/GED had the greatest increase in excess per capita mortality, with rates more than tripling after reopening.  
• The authors speculate this pattern reflects the risk of COVID-19 death faced by low-wage, essential workers and their social networks owing to occupational exposure, crowded housing, and inadequate access to testing or treatments. |

**Epidemiology and clinical – other**

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• Unadjusted hospital mortality fell from 32.3% in March/April to 16.4% in June/July 2020.  
• The fall in hospital mortality in COVID-19 patients during the first wave in the UK was partly accounted for by changes in case mix and illness severity.  
• A significant reduction was associated with differences in respiratory support and critical care use, which may partly reflect improved clinical decision making.  
• The remaining improvement in mortality is not explained by these factors, and may relate to community behaviour on inoculum dose and hospital capacity strain. |

**Infection control / non-pharmaceutical interventions**

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• Among students, mitigation strategies reduced COVID-19 cases from 3746 with... |
no mitigation to 493 with extensive social distancing and masks, and further to 151 when laboratory testing was added among asymptomatic persons every 3 days. Among faculty, these values were 164, 28, and 25 cases, respectively.

- Extensive social distancing with a mandatory mask-wearing is very cost-effective, while routine laboratory testing would require low-cost tests to be economically attractive.

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| 21.12.2020       | **Underdetection of COVID-19 cases in France threatens epidemic control** | Nature / Article | • Authors estimate the detection rate of COVID-19 symptomatic cases in France after lockdown using virological and participatory syndromic surveillance data, coupled with transmission modelling.  
• Findings suggest approximately 90,000 incident symptomatic infections (9 out 10 cases) were not ascertained by the surveillance system in the first 7 weeks following lockdown, although the test positivity rate did not exceed WHO recommendations (5%).  
• Median detection rate increased from 7% to 38% over time, with large regional variations, owing to a strengthening of the system and a decrease of epidemic activity.  
• According to participatory surveillance data, only 31% of individuals with COVID-19-like symptoms consulted a doctor in the study period.  
• Testing strategy will be once again of critical value to lift current restrictive measures in Europe and avoid a third wave. |
• Also addresses transmission to and from staff in school settings, school-related mitigation measures including risk communication, testing, contact tracing and the efficacy of partial and full school closures.  
• Builds upon evidence presented in the previous report from ECDC on this topic, which was published on Aug 6, 2020.  
• Does not consider the epidemiology of COVID-19 in relation to new variants of SARS-CoV-2. |
| 17.12.2020       | **Possible Aerosol Transmission of COVID-19 Associated with an Outbreak in an Apartment in Seoul, South Korea, 2020** | Int J Infect Dis / Perspectives | • Authors investigated the epidemiological relationship among infected cases on a recent cluster infection of COVID-19 in an apartment building in Seoul, South Korea. |
• All infected cases were found along two vertical lines of the building, and each line was connected through a single air duct in the bathroom for natural ventilation.
• The investigation found no other possible contact between the cases than the airborne infection through a single air duct in the bathroom.
• This study is an epidemiological investigation outlining one potential scenario, and it does not include genomic sequencing or air samples to provide robust evidence of SARS-CoV-2 aerosol transmission.

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| 22.12.2020       | A Neutralizing Monoclonal Antibody for Hospitalized Patients with Covid-19 | NEJM / Original article | • Hospitalised COVID-19 patients without end-organ failure were randomly assigned to receive 7000mg of LY-CoV555 (n=163) or matching placebo (n=151), in addition to receiving high-quality supportive care including the antiviral drug remdesivir and, when indicated, supplemental oxygen and glucocorticoids.  
• Concluded that monoclonal antibody LY-CoV555, when co-administered with remdesivir, did not demonstrate efficacy among hospitalized patients who had Covid-19 without end-organ failure. |

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• Among control measures implemented, only national lockdown brought the reproduction number below 1 consistently; introduced one week earlier it could have reduced first wave deaths from 36,700 to 15,700 (95%Crl: 8,900–26,800).  
• Improved clinical care reduced the infection fatality ratio from 1.25% (95%Crl: 1.18%–1.33%) to 0.77% (95%Crl: 0.71%–0.84%).  
• The infection fatality ratio was higher in the elderly residing in care homes (35.9%, 95%Crl: 29.1%–43.4%) than those residing in the community (10.4%, 95%Crl: 9.1%–11.5%).  
• England is still far from herd immunity, with regional cumulative infection incidence to 1st Dec 2020 between 4.8% (95%Crl: 4.4%–5.1%) and 15.4% (95%Crl: 14.9%–15.9%) of the population. |
• Modelling explores changes in the effective R number and the age distribution of COVID-19 cases in the UK, in four scenarios: (1) "normal": time use and contact patterns as observed historically, (2) "pre-lockdown": patterns as seen before the Nov 2020 lockdown, (3) "lockdown": patterns restricted as in Nov 2020, and (4) "festive break": similar to 3 but with social visits over the holiday period as in 1.
• Across ages, estimated $R_{eff}$ decreases during the festive break in scenarios 1-3 and returns to pre-holiday levels in scenarios 2-3, while remaining relatively stable in scenario 4.
• Relative incidence is likely to decrease in children aged 0-15 but increase in other ages.
• Changes in age distribution were large during the holidays, and are likely to start before the holidays for individuals aged 16-24 years in scenarios 1-3.
• Modelling findings suggest that increased contacts during the festive period may shift the age distribution of COVID-19 cases from children towards adults. Given that COVID-19-related hospitalisations and deaths rise by age, more intergenerational mixing risks an increased burden in the period following the holidays.

Overviews, comments and editorials

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Produced by the PHE COVID-19 Literature Digest Team

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