



COVID-19 Literature Digest – 04/11/2020

Dear all,

This week's Guest Editor is Dr. Chikwe Ihekweazu - Infectious Disease Epidemiologist and Director General of the Nigeria Centre for Disease Control.

If you only read three papers this week...

It's an honour to be the first International Guest Editor and I thank PHE's International Health Strengthening Programme for inviting me, and the Digest Team for the interesting series.

In the last few weeks, there has been a spike in new cases in Europe including the United Kingdom. Most countries have begun to describe the pandemic in waves and are now comparing data from the first wave to the current (second) wave. My [first paper](#) is a report by the UK COVID-19 Clinical Information Network (CO-CIN) based on the ISARIC-CCP-UK study comparing outcomes between the first and second wave. The current data shows that there is no strong evidence to show a difference in time from symptom onset to death or time from hospital admission to death. While there is a disclaimer to show that it is still too early to reach conclusions on the second wave, it is very important to build on lessons from the first wave. In Nigeria, one of our biggest priorities is ensuring that people who have symptoms are aware, request a test promptly and are brought into care early. This is in order to control spread, but also to reduce the risk of mortality.

My [second paper](#) is by the SAGE on the role of ventilation in preventing transmission of SARS-CoV-2 by aerosols. Evidence from this study shows that ventilation is an important factor in mitigating against the risk of far-field (>2m) aerosol transmission but has no impact on other transmission routes. Although the importance of far-field aerosol transmission is not yet known, evidence suggests it is a risk for COVID-19 spread in poorly ventilated spaces. In thinking long term, this paper presents strong arguments on the inclusion of infectious disease transmission considerations during building engineering. In addition to future plans, this paper provides evidence on the critical importance of monitoring and enforcing proper ventilation as part of COVID-19 risk assessments and prevention.

Finally, the [third paper](#) that is of interest is also one that keeps me awake at night. It answers the question "Are mask mandates associated with decreased hospitalisations due to COVID-19?". The study, [which has yet to be peer-reviewed](#), showed a statistically significant drop in hospitalisation rates due to COVID-19 in counties that have made the use of masks mandatory. Specifically, the study showed that mask mandates across 1,083 counties, in 49 U.S. states decreased hospitalisation rates of up to 7.13 (95% CI: -4.19, -10.1) percentage points in COVID-19 hospitalisations, even when controlling for other factors that could impact disease severity, including age, testing access, number of cases, and mobility. While the use of masks was made mandatory in Nigeria in May 2020, many people have now begun to ignore this measure, putting themselves and others at risk. A key priority in our risk communications is making evidence available to show that the use of masks is a very important COVID-19 preventive measure.*

Despite the novelty of COVID-19, there is rapid generation of evidence that can be applied to both current and future pandemic response activities. The evidence discussed in these papers are valuable to countries globally and can be adapted to context. The principle of global dissemination of scientific evidence should be highly promoted, as no country is safe until every country is safe.

Chikwe

**Please note that this preprint has since been withdrawn*

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, contains new data / insights or emerging trends. The Digest team generate a report three times per week (Mon, Wed, Fri), which includes both preliminary reports of work (preprints) that have NOT been peer-reviewed and 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, James Robinson
On behalf of the PHE COVID-19 Literature Digest Team

Report for 04.11.2020 (please note that papers that have **NOT been peer-reviewed** are highlighted in red).

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Serology and immunology

Publication Date	Title / URL	Journal / Article type	Digest
04.11.2020	Repeated cross-sectional sero-monitoring of SARS-CoV-2 in New York City	Nature / Article	<ul style="list-style-type: none"> • Retrospective, weekly cross-sectional analysis of anti-SARS-CoV-2 spike antibodies from Feb to July 2020 at a New York City hospital (10,000+ plasma samples). • Describes dynamics of seroprevalence in an 'urgent care' (UC) group, enriched for COVID-19 cases during the epidemic, and a 'routine care' group (RC), which more closely represents the general population. • Seroprevalence increased at different rates in both groups, with seropositive samples as early as mid-Feb, and levelled out at slightly above 20% in both groups by the end of May. • Seroprevalence was stable from May to July, suggesting lasting antibody levels in the population. • Data suggests an earlier than previously documented introduction of SARS-CoV-2 into New York City.
01.11.2020	Robust SARS-CoV-2-specific T-cell immunity is maintained at 6 months following primary infection	bioRxiv (non-peer reviewed) / Article	<ul style="list-style-type: none"> • Authors analysed SARS-CoV-2 cellular immune response in 100 donors six months following primary infection and related this to the profile of antibody level against spike, nucleoprotein and RBD over the previous six months. • Median T-cell responses were 50% higher in donors who had experienced an initial symptomatic infection indicating that the severity of primary infection establishes a set-point for cellular immunity that lasts for at least 6 months. • The rate of decline in antibody level varied between individuals and higher levels of nucleoprotein-specific T cells were associated with preservation of NP-specific antibody level, although no such correlation was observed in relation to spike-specific responses. • Concluded that data are reassuring that functional SARS-CoV-2-specific T-cell responses are retained at six months following infection although the magnitude of this response is related to the clinical features of primary infection.

Diagnostics

Publication Date	Title / URL	Journal / Article type	Digest
02.11.2020	The effect of heat on SARS-CoV-2 viability and RNA integrity as determined by plaque assay, virus culture and real-time RT-PCR	bioRxiv (non-peer reviewed) / Article	<ul style="list-style-type: none"> • The effect of heat on SARS-CoV-2/England/2/2020 viability was assessed by plaque assay and virus culture. • Findings indicate that high temperature heat inactivation of clinical samples prior to nucleic acid extraction could significantly affect the ability to detect virus in clinical samples from patients with lower viral loads by RT-PCR.
24.10.2020	Diagnosis of COVID-19 by analysis of breath with gas chromatography-ion mobility spectrometry - a feasibility study	EClinicalMedicine / Article	<ul style="list-style-type: none"> • Two independent observational studies (Edinburgh, UK; Dortmund, Germany) recruited 98 adult patients with possible COVID-19 at hospital presentation. • A total of 21/33 (63.6%) and 10/65 (15.4%) had COVID-19 in Edinburgh and Dortmund, respectively. • Multivariate analysis identified aldehydes (ethanal, octanal), ketones (acetone, butanone), and methanol that discriminated COVID-19 from other conditions. • These two studies independently indicate that patients with COVID-19 can be rapidly distinguished from patients with other conditions at first healthcare contact. • The identity of the marker compounds is consistent with COVID-19 derangement of breath-biochemistry by ketosis, gastrointestinal effects, and inflammatory processes. Development and validation of this approach may allow rapid diagnosis of COVID-19 in the coming endemic flu seasons.
02.11.2020	How to establish an academic SARS-CoV-2 testing laboratory	Nat Microbiol / Correspondence	<ul style="list-style-type: none"> • The authors document their experience and learnings from implementing an automated, medium-throughput testing facility for SARS-CoV-2 in the University of Birmingham Turnkey project.

Genomics

Publication Date	Title / URL	Journal / Article type	Digest
02.11.2020	Full genome viral sequences inform patterns of SARS-CoV-2 spread into and within Israel	Nat Commun / Article	<ul style="list-style-type: none"> • <i>This paper was previously included in the Digest as a pre-print.</i> • Authors sequenced 212 SARS-CoV-2 sequences and analyse to traced the origins and spread of the virus in Israel. • Data suggests travellers returning from the USA significantly contributed to viral spread in Israel, more than their proportion in incoming infected travellers. • Phylodynamic analysis suggests basic R number was initially around 2.5, dropping by more than two-thirds following implementation of social distancing measures.

- High levels of transmission heterogeneity in SARS-CoV-2 spread, with between 2-10% of infected individuals resulting in 80% of secondary infections.

Epidemiology and clinical – children / pregnancy

Publication Date	Title / URL	Journal / Article type	Digest
02.11.2020	Birth and Infant Outcomes Following Laboratory-Confirmed SARS-CoV-2 Infection in Pregnancy — SET-NET, 16 Jurisdictions, March 29–October 14, 2020	MMWR Morb Mortal Wkly Rep / Report	<ul style="list-style-type: none"> • US study - among 3,912 infants with known gestational age born to women with SARS-CoV-2 infection, 12.9% were preterm (<37 weeks), higher than a national estimate of 10.2%. Among 610 (21.3%) infants with testing results, 2.6% had positive SARS-CoV-2 results, primarily those born to women with infection at delivery.
02.11.2020	Update: Characteristics of Symptomatic Women of Reproductive Age with Laboratory-Confirmed SARS-CoV-2 Infection by Pregnancy Status — United States, January 22–October 3, 2020	MMWR Morb Mortal Wkly Rep / Report	<ul style="list-style-type: none"> • In an analysis of approximately 400,000 women aged 15–44 years with symptomatic COVID-19, intensive care unit admission, invasive ventilation, extracorporeal membrane oxygenation, and death were more likely in pregnant women than in non-pregnant women. • Pregnant women should be counselled about the risk for severe COVID-19–associated illness including death; measures to prevent infection with SARS-CoV-2 should be emphasized for pregnant women and their families.
01.11.2020	Association between living with children and outcomes from COVID-19: an OpenSAFELY cohort study of 12 million adults in England	medRxiv (non-peer reviewed) / Article	<ul style="list-style-type: none"> • Among 9,157,814 English adults ≤65 years, living with children 0-11 years was not associated with increased risks of recorded SARS-CoV-2 infection, COVID-19 related hospital or ICU admission, but was associated with reduced risk of COVID-19 death (HR 0.75, 95%CI 0.62-0.92). • Living with children aged 12-18 years was associated with a small increased risk of recorded SARS-CoV-2 infection (HR 1.08, 95%CI 1.03-1.13), but not associated with other COVID-19 outcomes. • Among 2,567,671 adults >65 years there was no association between living with children and outcomes related to SARS-CoV-2. • No consistent change in risk was observed following school closure.

Epidemiology and clinical – risk factors

Publication Date	Title / URL	Journal / Article type	Digest
02.11.2020	SARS-CoV-2 seroprevalence and transmission risk factors among high-risk close contacts: a retrospective cohort study	Lancet Infectious Diseases / Article	<ul style="list-style-type: none"> • Between Jan 23 and Apr 3, 2020, 7770 close contacts (1863 household contacts, 2319 work contacts, and 3588 social contacts) linked to 1114 PCR-confirmed index cases were identified. • Among 7518 (96.8%) of the 7770 close contacts with complete data, the

			<p>secondary clinical attack rate was 5.9% (95% CI 4.9–7.1) for 1779 household contacts, 1.3% (0.9–1.9) for 2231 work contacts, and 1.3% (1.0–1.7) for 3508 social contacts.</p> <ul style="list-style-type: none"> • Bayesian analysis of serology and symptom data obtained from 1150 close contacts estimated that a symptom-based PCR-testing strategy missed 62% of COVID-19 diagnoses, and 36% (27–45) of individuals with SARS-CoV-2 infection were asymptomatic. • Sharing a bedroom and being spoken to by an index case for 30 min or longer were associated with SARS-CoV-2 transmission among household contacts. • Among non-household contacts, exposure to more than one case, being spoken to by an index case for 30 min or longer, and sharing a vehicle with an index case were associated with SARS-CoV-2 transmission.
03.11.2020	Beyond the 405 and the 5: Geographic variations and factors associated with SARS-CoV-2 positivity rates in Los Angeles County	Clin Infect Dis / Accepted manuscript	<ul style="list-style-type: none"> • A geographic information system was used to integrate, map, and analyse SARS-CoV-2 testing data reported by Los Angeles County Department of Public Health, and data from the American Community Survey. • Between 1 Mar and 30 June 2020 there were 843,440 SARS-CoV-2 tests and 86,383 (10.2%) COVID-19 diagnoses reported. • Communities with high proportions of Latino/a residents, those living below the federal poverty line, and with high household densities had higher crude positivity rates. • Age-adjusted diagnosis rates were significantly associated with the proportion of Latino/as, individuals living below the poverty line, population, and household density.
03.11.2020	Association of poor housing conditions with COVID-19 incidence and mortality across US counties	PLoS One / Article	<ul style="list-style-type: none"> • Cross-sectional analysis of data for 3135 US counties to investigate association between poor housing condition and COVID-19 incidence and mortality. • Mean percentage of households with poor housing conditions was 14.2% (2.7% to 60.2%). • On 21 Apr, the mean number of COVID-19 cases and deaths were 255.68 (2877.03) cases and 13.90 (272.22) deaths per county, respectively. • In adjusted models standardised by county population, with each 5% increase in percent households with poor housing conditions, there was a 50% higher risk of COVID-19 incidence (IRR 1.50, 95% CI: 1.38-1.62) and a 42% higher risk of COVID-19 mortality (MRR 1.42, 95% CI: 1.25-1.61). • Results remained similar using earlier timepoints (3/31/2020 and 4/10/2020).
29.10.2020	Occupational risk of COVID-19 in the 1st vs 2nd wave of infection	medRxiv (non-peer reviewed) / Article	<ul style="list-style-type: none"> • A study of the entire Norwegian population aged 20-70 as of 01 Jan 2020 (N=3,553,407) using Standard Classification of Occupations codes to assess occupational COVID-19 infection risk. • Nurses, physicians, dentists, physiotherapists, bus/tram and taxi drivers had

		<p>1.5-3.5 times the odds of COVID-19 during the 1st wave of infection when compared to everyone in their working age.</p> <ul style="list-style-type: none"> • In the 2nd wave of the epidemic, bartenders, waiters, food service counter attendants, taxi drivers and travel stewards had 1.5-4 times the odds of COVID-19 when compared to everyone in their working age. • Teachers had no or only a moderately increased odds of COVID-19.
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Epidemiology and clinical – other

Publication Date	Title / URL	Journal / Article type	Digest
02.11.2020	Age-specific mortality and immunity patterns of SARS-CoV-2	Nature / Article	<ul style="list-style-type: none"> • <i>This paper was previously included in the Digest as a preprint.</i> • Authors use age-specific COVID-19 death data from 45 countries and the results of 22 seroprevalence studies to investigate consistency of infection and fatality patterns. • Age distribution of deaths in younger age groups (<65 years) is very consistent across different settings. • Estimates infection-to-fatality ratio (IFR) is lowest among 5-9 yo, with a log-linear increase by age among individuals older than 30 years. • Population age-structures and heterogeneous burdens in nursing homes explain some but not all of the heterogeneity between countries in IFRs. • Among the 45 countries analysed, approximately 5% of these populations had been infected by the 1st of Sept 2020, with much higher transmission likely to have occurred in a number of Latin American countries.
30.10.2020	High prevalence of SARS-CoV-2 swab positivity and increasing R number in England during October 2020: REACT-1 round 6 interim report	medRxiv (non-peer reviewed) / Article	<ul style="list-style-type: none"> • Reports interim results for round 6 of REACT-1 observations for swabs collected from the 16th to 25th October 2020 inclusive (86,000 participants). • Overall prevalence of community infection in England was 1.28% or 128 people per 10,000 (up from 60 per 10,000 in the previous round). • Nationally, prevalence increased across all age groups with the greatest increase in those aged 55-64 at 1.20% (up 3-fold from 0.37%). • In those aged over 65, prevalence was 0.81% (up 2-fold from 0.35%). • Prevalence remained highest in 18 to 24-year olds at 2.25%.

Infection control / non-pharmaceutical interventions

Publication Date	Title / URL	Journal / Article type	Digest
27.10.2020	Longitudinal monitoring of SARS-CoV-2 RNA on high-touch surfaces in a community setting	medRxiv (non-peer reviewed) / Article	<ul style="list-style-type: none"> • Conducted longitudinal swab sampling of high-touch non-porous surfaces in a Massachusetts town during a COVID-19 outbreak from Apr to June 2020. • Twenty-nine of 348 (8.3 %) surface samples were positive for SARS-CoV-2, including crosswalk buttons, trash can handles, and door handles of essential business entrances (grocery store, liquor store, bank, and gas station). • The estimated risk of infection from touching a contaminated surface was low (less than 5 in 10,000), suggesting fomites play a minimal role in SARS-CoV-2 community transmission. • The weekly percentage of positive samples (out of n=33 unique surfaces per week) best predicted variation in city-level COVID-19 cases using a 7-day lead time. • Environmental surveillance of SARS-CoV-2 RNA on high-touch surfaces could be a useful tool to provide early warning of COVID-19 case trends.

Modelling

Publication Date	Title / URL	Journal / Article type	Digest
27.10.2020	Effect of Timing of and Adherence to Social Distancing Measures on COVID-19 Burden in the United States	Annals of Internal Medicine / Article	<ul style="list-style-type: none"> • Modelling study that concluded that the timing of implementing and easing social distancing measures has major effects on the number of COVID-19 cases. • In NYC, implementing social distancing measures 1 week earlier would have reduced the total number of confirmed cases from 203 261 to 41 366 as of 31 May 2020, whereas a 1-week delay could have increased the number of confirmed cases to 1 407 600. A delay in implementation had a differential effect on the number of cases in the Milwaukee metro area versus Dane County, indicating that the effect of social distancing measures varies even within the same state.

Overviews, comments and editorials

Publication Date	Title / URL	Journal / Article type
02.11.2020	Measuring immunity to SARS-CoV-2 infection: comparing assays and animal models	Nat Rev Immunol / Article

02.11.2020

[Harms of public health interventions against covid-19 must not be ignored](#)

Bmj / Analysis

Produced by the PHE COVID-19 Literature Digest Team

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