2019-nCoV Literature Situation Report (Lit Rep)
September 25, 2020

The scientific literature on COVID-19 is rapidly evolving and these articles were selected for review based on their relevance to Washington State decision making around COVID-19 response efforts. Included in these Lit Reps are some manuscripts that have been made available online as pre-prints but have not yet undergone peer review. Please be aware of this when reviewing articles included in the Lit Reps.

Key Takeaways

- **Both surgical masks and KN95 masks reduce outward particle emissions during coughing (74% reduction) and speaking (90% reduction).** More
- **Despite similar rates of testing, non-English speakers from a variety of language groups had a 4.6-fold higher proportion of positive SARS-CoV2 tests in King County, WA.** More
- **Healthcare professionals with COVID-19 had similar age and sex distributions relative to the overall US healthcare workforce, but those who died from COVID-19 tended to be older and were more likely to be male and to identify as Black or Asian.** More
- **A systematic review and meta-analysis found that children and adolescents had a 44% lower odds of becoming infected with SARS-CoV-2 after potential exposure to an index case.** More

Non-Pharmaceutical Interventions

- Surgical masks and unvented KN95 respirators reduce outward particle emissions by 90% during speaking and 74% during coughing, compared to wearing no mask. These masks decreased the outward particle emission of a coughing superemitter who produced up to two orders more expiratory particles than average. Due to experimental confounding, the study was not able to directly determine the degree to which cotton masks blocked exhaled particles but the authors note that double-layer cotton masks reduced the emission of larger particles, indicating some reduction expiratory particle emission.

    Asadi et al. (Sept 24, 2020). Efficacy of masks and face coverings in controlling outward aerosol particle emission from expiratory activities. Nature.
    https://doi.org/10.1038/s41598-020-72798-7

Transmission

- A systematic review and meta-analysis (32 studies with 41,640 children and adolescents and 268,945 adults) found that children and adolescents younger than 20 years had 44% lower odds of becoming infected with SARS-CoV-2 after potential exposure to an index case (secondary attack rate) compared to adults 20 years and older. Data were insufficient to conclude whether transmission of SARS-CoV-2 by children is lower than by adults.

    Viner et al (Sept 25, 2020). Susceptibility to SARS-CoV-2 Infection Among Children and Adolescents Compared With Adults: A Systematic Review and Meta-analysis. JAMA.
    https://dx.doi.org/10.1001/jamapediatrics.2020.4573

Geographic spread

- In Utah, areas classified as very high deprivation had three-fold higher risk of SARS-CoV2 infection when compared to low deprivation areas. Deprivation was measured using Utah's health improvement index in the period of March 3-June 9, 2020 and high deprivation areas contained larger proportions of Hispanic and non-white residents. Rates of hospitalization and testing were also higher in higher-deprivation areas.

    Lewis et al. (Sept 25, 2020). Disparities in COVID-19 Incidence, Hospitalizations, and Testing, by Area-Level Deprivation — Utah, March 3–July 9, 2020.MMWR.
    http://dx.doi.org/10.15585/mmwr.mm6938a4

Testing and Treatment

- Out of a patient population of 562,242 in King County, WA, a slightly lower percentage of non-English speakers had been tested for SARS-CoV-2 compared to English-speakers (5% vs 6%), but the proportion of positive tests was 4.6-fold higher among non-English speakers (19% vs 4%). The elevated proportion of positive tests was observed across multiple languages.

    Kim et al. (Sept 24, 2020). Assessment of Disparities in COVID-19 Testing and Infection Across Language Groups in Seattle, Washington. JAMA Network Open.
    https://doi.org/10.1001/jamanetworkopen.2020.21213

- [*Pre-print, not peer reviewed*] Dried blood spot (DBS) sampling was validated for detection of SARS-CoV-2-specific antibodies. DBS sampling achieved a sensitivity of 98.1% and specificity of 100% for detecting anti-spike glycoprotein antibodies based on samples from 87 matched DBS and serum samples obtained from eighty individuals.

    Morley et al. (Sept 25, 2020). Sensitive detection of SARS-CoV-2-specific-antibodies in dried blood spot samples. Pre-print downloaded Sept 25 from https://doi.org/10.1101/2020.07.01.20144295

- [*Pre-print, not peer reviewed*] A comparison of ten commercial serological tests for SARS-CoV-2 antibodies found sensitivity ranging from 61% to 87% and specificity ranging from 82% to 100% when compared to an in-house ELISA. The in-house test was selected as the reference test because there is no accepted "gold standard" for the detection of SARS-CoV2 antibodies. Across tests, the likelihood of detecting antibodies was highest in samples collected 20 days after symptom onset.

    Pickering et al. (Sept 25, 2020). Comparative assessment of multiple COVID-19 serological technologies supports continued evaluation of point-of-care lateral flow assays in hospital and community healthcare settings. Pre-print downloaded Sept 25 from https://doi.org/10.1101/2020.06.02.20120345

- Corticosteroid treatment of COVID-19 patients was not statistically significantly associated with lower mortality across all patients with COVID-19, but there was significantly lower mortality among the sub-group of patients with severe respiratory failure. A multicenter observational study (February 22 to June 30, 2020) found that 170 of 513 COVID-19 patients were treated with corticosteroids, and corticosteroid treatment was not significantly associated with lower 30-day mortality (aOR=0.59, p=0.33). In a subgroup analysis among 135 patients with severe respiratory failure (PO2/FiO2 < 200 mmHg) at admission, corticosteroid treatment was associated with lower risk of 30-day mortality (aOR=0.2, p = 0.04). *[EDITORIAL NOTE. The lack of a statistically significant*

overall treatment effect should be interpreted with caution because the study was insufficiently precise to detect a clinically meaningful effect]

> *Bartoletti et al. (Sept 21, 2020). Efficacy of corticosteroid treatment for hospitalized patients with severe COVID-19: a multicenter study. Clinical Microbiology and Infection.*
> *https://doi.org/10.1016/j.cmi.2020.09.014*

Vaccines and Immunity

- [Pre-print, not peer reviewed] A one-dose vaccine candidate was shown to have an acceptable safety profile and demonstrated immunogenicity. These results come from a multi-center phase 1/2a randomized, double-blinded, placebo-controlled clinical study of the Ad26.COV2.S vaccine candidate. The vaccine platform utilizes Janssen Pharmaceutical's replication incompetent adenovirus serotype 26 (Ad26) 54 vector and includes a stabilized SARS-CoV-2 Spike (S) protein insert. The Ad26.COV2.S is the only one-dose vaccine currently entering Phase III clinical trials in the US.

  > *Sadoff et al. Safety and immunogenicity of the Ad26.COV2.S COVID-19 vaccine candidate: interim results of a phase 1/2a, double-blind, randomized, placebo-controlled trial. Pre-print downloaded Sept 25 from https://doi.org/10.1101/2020.09.23.20199604*

Clinical Characteristics and Health Care Setting

- Risk factors for mortality in health care personnel with COVID-19 were older age, male sex, Asian or Black self-identification, or the presence of an underlying comorbidity. Data from 100,570 laboratory confirmed and probable COVID-19 cases reported to CDC (February 12 - July 16, 2020) demonstrate that the median age of infected healthcare workers was 41 years (IQR = 30 - 53) and 79% of cases were female. Among these health care professionals with COVID-19, the most frequent job settings were nursing and residential care facilities and nursing was the most common occupation.

  > *Hughes et al. (Sept 25, 2020). Update: Characteristics of Health Care Personnel with COVID-19 — United States, February 12–July 16, 2020. MMWR.*
  > *http://dx.doi.org/10.15585/mmwr.mm6938a3*

- Clinical variables present on admission that were associated with in-hospital death among COVID-19 patients were older age, low oxygen saturation and elevated respiratory rate in a multicenter study. Laboratory measurementsassociated with in-hospital mortality included markers of renal and hepatic dysfunction and elevated procalcitonin and lactic acid.

  > *Bahl et al. (Sept 25, 2020). Early predictors of in-hospital mortality in patients with COVID-19 in a large American cohort. Internal and Emergency Medicine.*
  > *http://dx.doi.org/10.15585/mmwr.mm6938a3*

Modeling and Prediction

- [Pre-print, not peer reviewed] In a modeling study, quarantining an infected traced contact for 10 days was estimated to prevent 75-99% of their onward transmission. In the scenario of a contact being infected on a return flight, a 10 day quarantine was estimated to prevent 99% of onward transmission.

  > *Ashcroft et al. (Sept 25, 2020). Quantifying the impact of quarantine duration on COVID-19 transmission. Pre-print downloaded Sept 25 from*
  > *https://doi.org/10.1101/2020.09.24.20201061*

- A mathematical model suggests that targeted sheltering of specific age groups combined with adherence to physical distancing by the rest of the population may be sufficient to thwart a substantial fraction of infections and deaths. Physical distancing could be achieved by engaging in activities such as staggered work schedules, increasing spacing in restaurants and prescribing times to use the gym or grocery store.

  Wilder et al. Modeling between-population variation in COVID-19 dynamics in Hubei, Lombardy, and New York City. PNAS. https://doi.org/10.1073/pnas.2010651117

Other Resources and Commentaries

- Risk assessment of COVID-19 airborne infection during hybrid learning – medRxiv (Sept 25)
- Rapid Determination of SARS-CoV-2 Antibodies Using a Bedside, Point-of-Care, Serological Test – Emerging Microbes & Infections (Sept 25)
- It's Time to Put Children and Young People First During the Global COVID-19 Pandemic – JAMA (Sept 25)
- SARS-CoV-2 Antibodies in Pregnant Women Admitted to Labor and Delivery – American Journal of Obstetrics and Gynecology (Sept 25)
- Significant relaxation of SARS-CoV-2-targeted non-pharmaceutical interventions may result in profound mortality: A New York state modelling study – PlosOne (Sept 24)
- Lessons Learned from the Re-emergent COVID-19 Cases in Areas of Long Reported No Community Transmission – Clinical Infectious Diseases (Sept 24)
- Predictors at admission of mechanical ventilation and death in an observational cohort of adults hospitalized with COVID-19 – Clinical Infectious Diseases (Sept 24)
- Evidence for and level of herd immunity against SARS-CoV-2 infection: the ten-community study – medRxiv (Sept 25)
- Homeless Shelter Characteristics and Prevalence of SARS-CoV-2 – Western Journal of Emergency Medicine (Sept 25)
- The Right Kind of Pooled Testing for the Novel Coronavirus: First, Do No Harm – AJPH (Sept 24)
- Physics of virus transmission by speaking droplets – PNAS (Sept 24)
- Development and Usability Testing of a Web-based COVID-19 Self-triage Platform – Western Journal of Emergency Medicine (Sept 25)
- Food Insecurity During COVID-19: An Acute Crisis With Long-Term Health Implications – AJPH (Sept 24)
- Multisystem Inflammatory Syndrome in Children and SARS-CoV-2 Serology – Pediatrics (Sept 25)
- FeverIQ - A Privacy-Preserving COVID-19 SymptomTracker with 3.6 Million Reports – medRiv (Sept 25, 2020)

Report prepared by the UW Alliance for Pandemic Preparedness and Global Health Security and the START Center in collaboration with and on behalf of WA DOH COVID-19 Incident Management Team