

2019-nCoV Literature Situation Report (Lit Rep)

March 23, 2021

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

- **Despite low adherence to mitigation measures and low rates of improvements to ventilation systems, minimal in-school transmission of COVID-19 was documented during in-person learning in a school system in Wood County, Wisconsin. Between August and November 2020, only 7 cases among children were attributed to school-based transmission despite high levels of community transmission (none among staff).** [More](#)
- **The influence of age on the SARS-CoV-2 antibody response following natural infection differs between children and adults, according to a cross-sectional study of pediatric and adult patients. Older children had lower levels of antibodies compared to younger children, whereas older adults had higher levels of antibodies compared to younger adults. Patients aged 19 to 30 years exhibited the lowest IgG levels.** [More](#)
- **Random testing combined with follow-up targeted testing in outbreak areas was estimated to avert a 154% higher COVID-19 case count at Clemson University, according to transmission models based on empirical testing data.** [More](#)
- **In New Hampshire nursing homes, SARS-CoV-2-naïve nursing home residents mounted antibody responses with nearly 4-fold lower median neutralization titers and half the anti-spike level compared to SARS-CoV-2-naïve healthcare workers.** [More](#)
- **Exposure to SARS-CoV-2 may still lead to the development of SARS-CoV-2-specific memory T cells in the absence of detectable SARS-CoV-2 virus or antibodies against SARS-CoV-2.** [More](#)

Non-Pharmaceutical Interventions

- *[Pre-print, not peer-reviewed]* Minimal in-school transmission of COVID-19 occurred despite low adherence to mitigation measures and minimal improvements in ventilation systems between August and November 2020 in Wood County, Wisconsin. According to surveys distributed to the administrations of participating schools, 89% of elementary students did not maintain 6 feet of physical distancing in the classroom, 95% were within 6 feet in lunchrooms, and 86% did not wear masks at recess. 86% and 68% of secondary students were able to maintain 6 feet of distancing in the classroom and in lunch, respectively. No students were 6 feet apart in the hallways, and new air filtration systems were only installed in 41% of schools. Mask compliance among teachers while indoors was 90% or greater in most elementary and secondary schools. Among 191 COVID-19 cases identified in schools, only 7 cases in children were attributed to in-school spread (none among staff) during the study period, despite high community transmission with a test positivity rate of up to 42% and 1,189 per 100,000 weekly cases.

Falk et al. (Mar 20, 2021). Details of COVID-19 Disease Mitigation Strategies in 17 K-12 Schools in Wood County Wisconsin. Pre-print downloaded Mar 23 from <https://doi.org/10.1101/2021.03.16.21253761>

Transmission

- The prevalence of COVID-19 infection among prison staff was estimated to be 3.2 times higher than the general U.S. population during the period of March 31, 2020 to November 4, 2020, according to an analysis of publicly available reports from the Bureau of Prisons. In 89% of jurisdictions, case burden among prison staff was greater than prisoners. The authors concluded that containment of COVID-19 was consistently poor in the prison environment, indicating needed vaccination priority to reduce occupational risk of COVID-19 in prisons.

Ward et al. (Feb 22, 2021). COVID-19 Cases Among Employees of U.S. Federal and State Prisons. *American Journal of Preventive Medicine*. <https://doi.org/10.1016/j.amepre.2021.01.018>

Testing and Treatment

- A novel strategy of random testing combined with follow-up targeted testing in outbreak areas (“surveillance-based informative testing”, SBIT) was associated with a 36% reduction in peak weekly COVID-19 cases at Clemson University in South Carolina over a 2-week period. The strategy helped identify outbreaks in 45 residence halls across 8 buildings. Transmission models based on testing data suggested that random surveillance testing alone without follow-up targeted testing would have resulted in 24% more cases throughout the semester, and up to 154% more cases in the absence of SBIT compared to voluntary testing alone.

Rennert et al. (Mar 22, 2021). Surveillance-Based Informative Testing for Detection and Containment of SARS-CoV-2 Outbreaks on a Public University Campus: An Observational and Modelling Study. *The Lancet Child & Adolescent Health*. [https://doi.org/10.1016/S2352-4642\(21\)00060-2](https://doi.org/10.1016/S2352-4642(21)00060-2)

- Presymptomatic patients were more likely to have atypical symptoms of COVID-19 when compared to symptomatic patients, according to a retrospective study (n=199) of patients identified via contact tracing in Malaysia. In the cohort, 21% of patients were presymptomatic, 27% were mildly symptomatic, and 52% were asymptomatic. Females were more likely to present as presymptomatic than males (p = 0.019). No demographic or clinical characteristics were significantly associated with being presymptomatic.

Tan et al. (Mar 9, 2021). The Prevalence and Clinical Significance of Presymptomatic COVID-19 Patients: How We Can Be One Step Ahead in Mitigating a Deadly Pandemic. *BMC Infectious Diseases*. <https://doi.org/10.1186/s12879-021-05849-7>

Vaccines and Immunity

- [Pre-print, not peer-reviewed] Nursing home (NH) residents had blunted antibody responses following vaccination with BNT162b2 mRNA vaccine (Moderna) when compared to healthcare workers. SARS-CoV-2-naïve NH residents mounted antibody responses with nearly 4-fold lower median neutralization titers and half the anti-spike level compared to SARS-CoV-2-naïve healthcare workers. In contrast, NH residents who had recovered from infection and were subsequently vaccinated had neutralization, anti-spike, and anti-RBD titers similar to healthcare workers who had recovered from infection and were subsequently vaccinated.

Canaday et al. (Mar 22, 2021). Reduced BNT162b2 MRNA Vaccine Response in SARS-CoV-2-Naive Nursing Home Residents. Pre-print downloaded Mar 23 from <https://doi.org/10.1101/2021.03.19.21253920>

- [Pre-print, not peer-reviewed] Swiss adults who were seropositive for SARS-CoV-2 IgG antibodies were less likely to have a SARS-CoV-2 PCR positive test than propensity-score-matched seronegative adults in the 8 months following antibody measurements. Of the 498 seropositive individuals, only 5 (1%) retested positive (likely indicative of reinfection) after a mean follow-up of 36 weeks. In contrast, 154 of 996 (16%) matched seronegative individuals tested positive during a similar mean follow-up of 35 weeks. These findings suggest that seropositivity is associated with a 94% reduction in hazard of retesting positive. The authors note that while testing rates were similar between seropositive and seronegative individuals, risk of detection may be underestimated among seropositive individuals if individuals with reinfection are less likely to be symptomatic.

Leidi et al. (Mar 20, 2021). Risk of Reinfection after Seroconversion to SARS-CoV-2 A Population-Based Propensity-Score Matched Cohort Study. Pre-print downloaded Mar 23 from <https://doi.org/10.1101/2021.03.19.21253889>

- The B.1.1.7 variant has a 7-fold higher binding affinity to the angiotensin converting enzyme-2 (ACE2) receptor in human cells than a parent SARS-CoV-2 strain isolated from Wuhan, suggesting a mechanism for the rapid emergence of this variant. Serum from individuals vaccinated with either the Pfizer-BioNTech or the Oxford-AstraZeneca and serum recovered from infection with the Wuhan strain, had only a modest 2-3-fold reduction in neutralization titers against the B.1.1.7 variant. Sera obtained from B.1.1.7-infected individuals show no reduction in titers against the parent strain compared to the B.1.1.7 variant.

Supasa et al. (Feb 18, 2021). Reduced Neutralization of SARS-CoV-2 B.1.1.7 Variant by Convalescent and Vaccine Sera. *Cell*. <https://doi.org/10.1016/j.cell.2021.02.033>

- Exposure to SARS-CoV-2 may still lead to the development of SARS-CoV-2-specific memory T cells in the absence of detectable SARS-CoV-2 virus or antibodies against SARS-CoV-2 antigens (spike and nucleocapsid). In blood samples collected from 69 individuals between 48 and 86 days after close contact with an individual with a confirmed SARS-CoV-2 infection, 58% and 14% of individuals developed SARS-CoV-2-specific CD4+ and CD8+ T cells, respectively. In contrast, only 3.7% of blood samples from 63 healthy donors collected before September 2019 contained detectable levels of CD4+ and CD8+ T cells.

Wang et al. (Dec 19, 2021). Exposure to SARS-CoV-2 Generates T-Cell Memory in the Absence of a Detectable Viral Infection. *Nature Communications*. <https://doi.org/10.1038/s41467-021-22036-z>

- SARS-CoV-2 antibody responses are distinct in different age groups, according to a cross-sectional study of a New York City hospital using 31,426 SARS-CoV-2 antibody test results from pediatric and adult patients. IgG levels were negatively correlated with age in the pediatric population ($r = -0.45$, $P < .001$), but moderately positively correlated with age in adults ($r = 0.24$, $P < .001$). Patients aged 19 to 30 years exhibited the lowest IgG levels, whereas adolescents and children had higher antibody levels.

Yang et al. (Mar 22, 2021). Association of Age With SARS-CoV-2 Antibody Response. *JAMA Network Open*. <https://doi.org/10.1001/jamanetworkopen.2021.4302>

Clinical Characteristics and Health Care Setting

- A systematic review of PubMed and Embase to investigate characteristics of lung sequelae in COVID-19 patients found that about half of COVID-19 patients still had residual abnormalities on chest computerized tomography (CT) and pulmonary function tests (PFTs) at about 3 months after hospital discharge. Residual CT abnormalities were present in 55.7% (95% CI 41.2-70.1) of patients. The most frequent chest CT abnormality was ground glass opacity in 44.1% (95% CI 30.5-57.8), followed by parenchymal band or fibrous stripe in 33.9% (95% CI 18.4-49.4).

So et al. (Mar 22, 2021). Radiological and Functional Lung Sequelae of COVID-19: A Systematic Review and Meta-Analysis. BMC Pulmonary Medicine. <https://doi.org/10.1186/s12890-021-01463-0>

Public Health Policy and Practice

- For adults aged ≤ 65 years, living with children under the age of 18 was associated with a higher risk of SARS-CoV-2 infection and having a COVID-19 related hospital admission during the second wave of the COVID-19 pandemic in England. These associations were not present during the first wave. Risk of infection was 6% and 22% higher among those living with children aged 0-11 years and 12-19 years, respectively; risk of hospitalization was 6% and 12% higher among those living with children aged 0-11 years and 12-19 years, respectively. However, in both waves, living with children aged 0-11 years was associated with a reduced risk of COVID-19-related mortality.

Forbes et al. (Mar 18, 2021). Association between Living with Children and Outcomes from Covid-19: OpenSAFELY Cohort Study of 12 Million Adults in England. BMJ. <https://doi.org/10.1136/bmj.n628>

Other Resources and Commentaries

- [Five Reasons Why COVID Herd Immunity Is Probably Impossible](#) – Nature (Mar 18)
- [Vaccination Certificates Could Entrench Inequality](#) – Nature (Mar 19)
- [Risk of SARS-CoV-2 Reinfection after Natural Infection](#) – The Lancet (Mar 17)
- [A Simple Rule for Interpreting COVID-19 Antibody Test Results, by Seroprevalence and Vaccination Status](#) – Journal of Microbiology, Immunology and Infection (Feb 27)
- [Weekly SARS-CoV-2 Screening of Asymptomatic Students and Staff to Guide and Evaluate Strategies for Safer in-Person Learning](#) – MedRxiv (Mar 22)
- [COVID-19 Vaccination Passports](#) – Science (Mar 19)
- [Not Quite a Block Party: COVID-19 Street Reallocation Programs in Seattle, WA and Vancouver, BC](#) – SSM - Population Health (Mar 9)
- [Supporting Families Struggling with Food Insecurity during the COVID-19 Pandemic: An Innovative Cross-Sector Collaboration](#) – Social Work in Health Care (Mar 23)
- [Social Norms and Vaccine Uptake: College Students' COVID Vaccination Intentions, Attitudes, and Estimated Peer Norms and Comparisons with Influenza Vaccine](#) – Vaccine (Mar 17)
- [COVID-19 Vaccine Decisions: Considering the Choices and Opportunities](#) – Microbes and Infection (Mar 17)
- [Perfect as the Enemy of Good: Tracing Transmissions with Low-Sensitivity Tests to Mitigate SARS-CoV-2 Outbreaks](#) – The Lancet Microbe (Mar 12)
- [Assessment of US Public School District Policies for Pandemic Preparedness and Implications for COVID-19 Response Activities](#) – Disaster Medicine and Public Health Preparedness (Mar 22, 2020)
- [Testing for SARS-CoV-2 Infection: A Key Strategy to Keeping Schools and Universities Open](#) – The Lancet Child & Adolescent Health (Mar 19)

- [Missing Again: US Racial and Ethnic Data for COVID-19 Vaccination](#) – The Lancet (Mar 17)
- [Covid-19: AstraZeneca Vaccine Is Not Linked to Increased Risk of Blood Clots, Finds European Medicine Agency](#) – BMJ (Mar 19)
- [Pandemic Whistle-Blower: We Need a Non-Political Way to Track Viruses](#) – Nature (Mar 19)
- [Airborne Transmission of Virus-Laden Aerosols inside a Music Classroom: Effects of Portable Purifiers and Aerosol Injection Rates](#) – Physics of Fluids (Mar 9)
- [An Engineered CRISPR-Cas12a Variant and DNA-RNA Hybrid Guides Enable Robust and Rapid COVID-19 Testing](#) – Nature Communications (Mar 19)
- [Newborn Antibodies to SARS-CoV-2 Detected in Cord Blood after Maternal Vaccination – a Case Report](#) – BMC Pediatrics (Mar 22)
- [SARS-CoV-2 Transmission without Symptoms](#) – Science (Mar 19)
- [The Potential Health and Economic Value of SARS-CoV-2 Vaccination alongside Physical Distancing in the UK: A Transmission Model-Based Future Scenario Analysis and Economic Evaluation](#) – The Lancet Infectious Diseases (Mar 19)
- [Sustained Neutralising Antibodies in the Wuhan Population Suggest Durable Protection against SARS-CoV-2](#) – The Lancet (Mar 20)
- [Messenger RNA Vaccines against SARS-CoV-2](#) – Cell (Mar 18)
- [Disease Transmission through Expiratory Aerosols on an Urban Bus](#) – Physics of Fluids (Jan 12)
- [Scientific Misinformation: A Perfect Storm, Missteps, and Moving Forward](#) – Cell (Mar 18)

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