

I hope everyone had a great Mother's Day.

Today I start with my perspective on herd immunity.

Under COVID-19 News I report on the WHO approval for EUA of China's Sinopharm vaccine. Next, the CDC's updated guidance on SARS-CoV-2 transmission.

Under Journal Review I selected 3 very different topics. The first on hand hygiene compliance during the pandemic. The second is a very nice follow-up from Israel on the efficacy of the Pfizer vaccine for HCWs. The last is a small series exploring the important role of memory T-cells which often get overlooked when we talk about neutralizing antibodies.

Have a wonderful Monday – comments are always welcomed.

Ed

### **VII: Will We Ever Reach Herd Immunity?**

As the country approaches 150 million vaccinated people [~58% getting at least one shot], the pace of vaccination has been slowing. The average number of people getting a first or single dose each day has fallen by about 50 percent from the peak on April 13. Vaccinations fell sharply in the days after April 13, when health officials announced a pause on the J&J vaccine to investigate reports of rare side effects, and they have not fully recovered. However, the data also shows a slowing uptake of the Pfizer and Moderna vaccines. Experts now believe that the US will not achieve "herd immunity" anytime soon. A major reason is that about 30 percent of the U.S. population is reluctant to get vaccinated. People tend to see themselves as individuals and not as part of the larger community.

To examine this further, we need to understand the definition of herd immunity. So, I went to the Merriam-Webster dictionary: "a reduction in the risk of infection with a specific communicable disease (such as measles or influenza) that occurs when a significant proportion of the population has become immune to infection (as because of previous exposure or vaccination) so that susceptible individuals are much less likely to come in contact with infected individuals". Notice it does not say eradication or zero. But if we look at it from a scientific perspective, herd immunity is really a mathematical guess. Bottom line in my opinion, we do not really know. Some respected public health authorities now say it must be 75-85%, but the goal posts keep moving. We have a fairly good idea of who has been immunized, but we often leave out how many people have natural immunity from previous infection. If we add the estimate of percent of general population with natural immunity to percent who have gotten at least one dose of a vaccine we may be closer to containment than many think.

Why are so many reluctant to take the vaccine? Researchers who talk to vaccine-hesitant people find that the levels of distrust, suspicion, and alienation that have marred politics are now thwarting the vaccination process. They find people doubt the competence of the medical establishment. This was reflected in the recent survey reported as few weeks ago in the Daily Briefing that the USPS (post service) had a higher trust factor than the CDC! Then there are sites like "Natural News", a far-right, anti-vaccination conspiracy theory, and fake news website. Need I say more. 😞

With respect to younger people who have not wanted to be vaccinated, 100 colleges and universities are making it mandatory. Houston Methodist recently announced mandatory vaccination. I am surprised

that more healthcare systems have not already done this since vaccination rates for HCW has been <80%. As HCWs we have an obligation to do everything possible to keep our patients safe which includes getting vaccinated. It was not long ago that we were having this discussion around influenza vaccinations for HCW. Now 17 states require them. By mandating vaccinations in health care, we set an example for others who may be hesitant about getting vaccinated. And perhaps on travel, if you want to get on a plane [planes are now full!] or a cruise ship, you are going to have to prove that you are vaccinated. That is going to drive change. Unfortunately, the sides are so divided that talking about the data and the science is not going to make a significant difference. But when people want to travel, go to concerts, or a sporting event and do other things — even back to work — I think requiring vaccinations will drive vaccinations to the next level and, like health care, make it safer for our communities. I suspect in the next few months the FDA will give full approval of the mRNA vaccines.

Reaching “herd immunity” is critical in both containing the disease, but also preventing the virus to mutate into strains that are more transmissible and could escape the efficacy of current vaccines. The sooner we can contain this virus, the fewer lives will be lost and the closer we can get back to normal. While we have made tremendous strides, our best shot at containing the virus continues to be vaccinating every American to create “herd immunity”. We are so close.

## **COVID-19 News**

### **WHO Lists Sinopharm COVID-19 Vaccine for Emergency Use**

The WHO approved emergency listing for China's Sinopharm vaccine, a step that clears the way for a sixth vaccine to be added to the COVAX program. Sinopharm is an inactivated vero cell virus vaccine which was reviewed by two WHO vaccine advisory groups. The WHO's technical advisory group (TAG) approved the vaccine for emergency listing. Meanwhile, the Strategic Advisory Group of Experts on Immunization (SAGE) recommended the vaccine for people 18 years of age and older on a two-dose schedule given 3 to 4 weeks apart. WHO advisors are also reviewing a second vaccine from China, one made by Sinovac. The vaccine has an efficacy rate of 79% in clinical trials.

### **CDC Update on SARS-CoV-2 Transmission**

May 7, 2021

On Friday, the CDC also updated its guidance on SARS-CoV-2, now clearly saying that inhalation of aerosol particles is a key way the virus is transmitted.

The principal mode by which people are infected with SARS-CoV-2 (the virus that causes COVID-19) is through exposure to respiratory fluids carrying infectious virus. Exposure occurs in three principal ways:

- (1) inhalation of very fine respiratory droplets and aerosol particles,
- (2) deposition of respiratory droplets and particles on exposed mucous membranes in the mouth, nose, or eye by direct splashes and sprays, and
- (3) touching mucous membranes with hands that have been soiled either directly by virus-containing respiratory fluids or indirectly by touching surfaces with virus on them.

The document clearly states transmission of SARS-CoV-2 can occur from inhalation of virus in air farther than 6 feet from source.

**Comment:** The change did not get a lot of attention. There was no news conference. I think this is another miss for the CDC since this change finally acknowledged what many of us had thought: SARS-CoV-2 can be transmitted by both large and small aerosol, and poor ventilation in a closed space can enhance transmission which is why many of us who advise schools, houses of worship, and businesses have emphasized the importance of ventilation. The change in mask guidance got enormous press for changes that many of us were already practicing, but why this recent change in transmission of SARS-CoV-2 did not get covered is above my pay grade. Finally, WHO also updated their guidance admitting small respiratory droplets can transmit SARS-CoV-2.

## Journal Review

### Hand Hygiene Compliance Rate During the COVID-19 Pandemic

JAMA Intern Med published online April 26, 2021

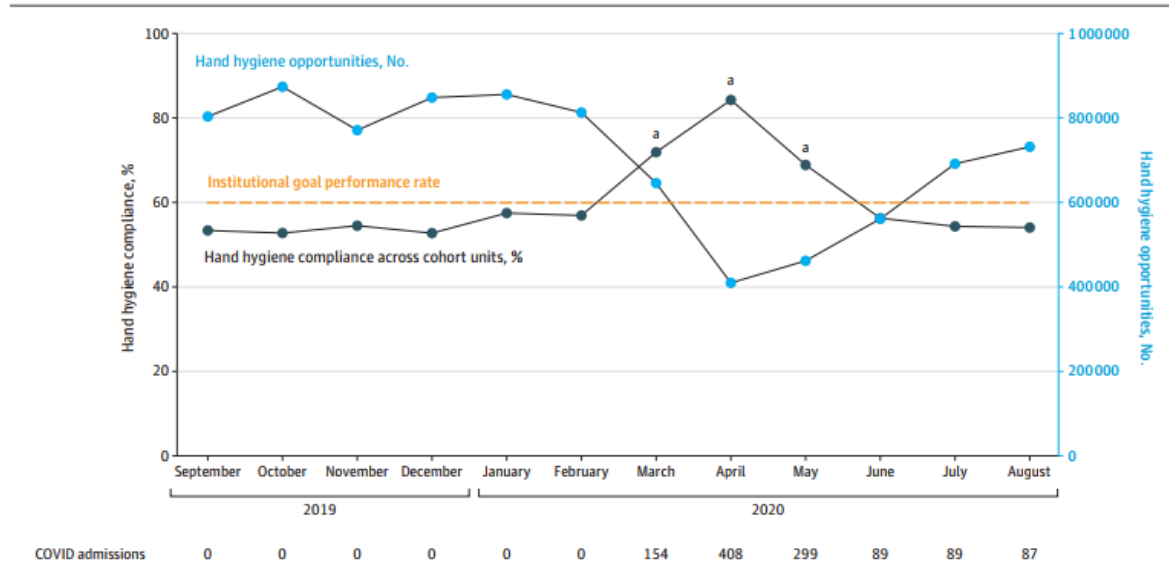
[doi:10.1001/jamainternmed.2021.1429](https://doi.org/10.1001/jamainternmed.2021.1429)

University of Chicago Medical Center (UCMC) implemented an automated hand hygiene monitoring system in 2015. An infrared sensor anonymously records all dispenser uses (numerator) and entries into and exits from inpatient rooms (denominator) to estimate hand hygiene compliance (numerator/denominator) for each inpatient unit. Graphical trends are displayed on centrally located unit monitors and weekly data are communicated through automated reports.

The investigators examined hand hygiene compliance by day, week, and month, from September 2019 through August 2020. They also examined compliance in units temporarily converted into COVID cohort units, which exclusively cared for patients with COVID-19, hypothesizing that such units would provide an estimate for maximum compliance. Analyses included 13 validated inpatient units (9 noncohort, 4 cohort) and 6 intensive care units (3 noncohort, 3 cohort), comprising 276 noncohort and 160 cohort beds.

Before the pandemic, monthly hand hygiene compliance across all units was similar to the September baseline of 54.5%. During the pandemic, compliance reached a daily peak of 92.8% on March 29, 2020, across all units, and 100% on March 28, 2020, across cohort units; a weekly peak of 88.4% across all units and 98.4% on cohort units during the week of March 29, 2020; and a monthly peak of 75.5% across all units and 84.4% on cohort units in April. Compliance declined across all units to a daily nadir of 51.5% on August 15, 2020, a weekly nadir of 55.1% that same week, and a monthly nadir of 56% in August. Statistical analyses demonstrated a significant association between month and hand hygiene compliance, for all units and cohort units specifically. Hand hygiene opportunities had an inverse relationship to compliance during the study.

Figure 2. Monthly Hand Hygiene Compliance Across Inpatient COVID Cohort Units From September 1, 2019, through August 31, 2020



**Comment:** The hospital achieved daily hand hygiene compliance rates higher than 90%, peaking at 100% across cohort units, significantly above national levels. Hand hygiene compliance was driven by fear and increased awareness of the importance of hand hygiene associated with the start of the pandemic. High compliance, however, was not sustained and regressed to the mean. This study demonstrates that high compliance is achievable, but difficult to sustain. This experience once again highlights how difficult it is to sustain high compliance with evidence-based interventions.

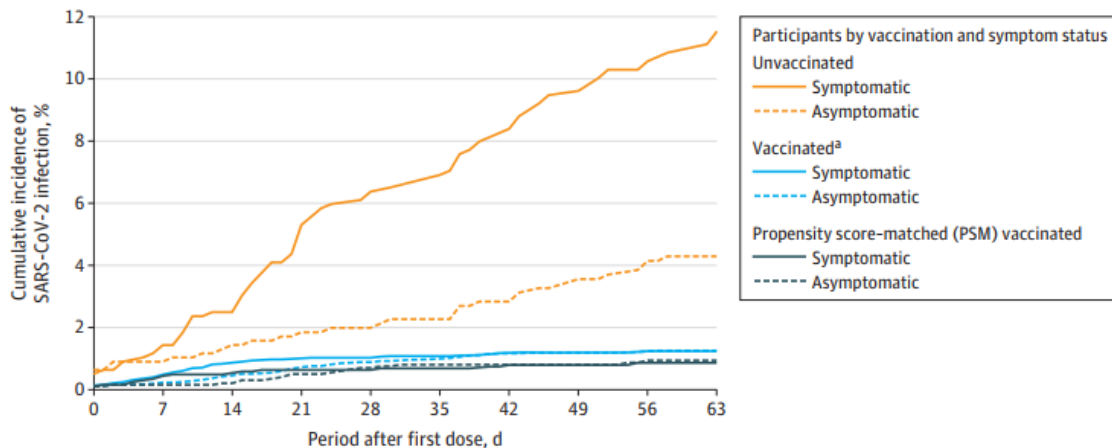
### Association Between Vaccination with BNT162b2 and Incidence of Symptomatic and Asymptomatic SARS-CoV-2 Infections Among Health Care Workers

JAMA published online May 6, 2021

[doi:10.1001/jama.2021.7152](https://doi.org/10.1001/jama.2021.7152)

This was a single-center, retrospective cohort study conducted at a tertiary medical center in Tel Aviv, Israel. Data were collected on symptomatic and asymptomatic SARS-CoV-2 infections confirmed via PCR tests in health care workers undergoing regular screening with nasopharyngeal swabs between December 20, 2020, and February 25, 2021. Logistic regression was used to calculate incidence rate ratios (IRRs) comparing the incidence of infection between fully vaccinated (Pfizer vaccine) and unvaccinated participants, controlling for demographics and the number of PCR tests performed.

A total of 6710 health care workers were followed up for a median period of 63 days; 5953 health care workers (88.7%) received at least 1 dose of the Pfizer vaccine, 5517 (82.2%) received 2 doses, and 757 (11.3%) were not vaccinated. Symptomatic SARS-CoV-2 infection occurred in 8 fully vaccinated health care workers and 38 unvaccinated health care workers (incidence rate, 4.7 vs 149.8 per 100 000 person-days, respectively, adjusted IRR, 0.03 [95% CI, 0.01-0.06]). Asymptomatic SARS-CoV-2 infection occurred in 19 fully vaccinated health care workers and 17 unvaccinated health care workers (incidence rate, 11.3 vs 67.0 per 100 000 person-days, respectively, adjusted IRR, 0.14 [95% CI, 0.07-0.31]).



**Comment:** Vaccination of HCWs was associated with an adjusted incidence rate ratio of 0.03 for symptomatic infection and 0.14 for asymptomatic infection more than 7 days after the second dose. Incidence rate ratios were statistically significant. Characteristics of a single-center, retrospective cohort study might limit the generalizability of the findings. Vaccinated HCWs underwent fewer PCR tests for SARS-CoV-2 infection than unvaccinated HCWs after January 15, 2021, potentially biasing toward more observed infections in the unvaccinated cohort, although their analyses attempted to account for this possible imbalance. Other confounders may be present that were unaccounted for in the regression analyses and in the adjustments for propensity score. This study is consistent with the study reviewed last week from Lancet. Israel reported on the first 4 months of the nationwide vaccination campaign to ascertain incident cases of laboratory-confirmed SARS-CoV-2 infections and outcomes, as well as vaccine uptake in residents of Israel aged 16 years and older. They found:

- 95.3% against SARS-CoV-2 infection (95% CI, 94.9 – 95.7)
- 91.5% against asymptomatic SARS-CoV-2 infection (95% CI, 90.7 – 92.2)
- 97.0% against symptomatic COVID-19 (95% CI, 96.7 – 97.2)
- 97.2% against COVID-19 related hospitalization (95% CI, 96.8 – 97.5)
- 97.5% against severe or critical hospitalization (95% CI, 97.1 – 97.8)
- 96.7% against COVID-19 related death (95% CI, 96.0 – 97.3)

These two studies taken together provide a powerful message on the efficacy of vaccination on both symptomatic and asymptomatic disease in a country which has a predominance of the B.1.1.7 (UK) variant known to be more transmissible.

### Longitudinal Analysis of Human Memory T-Cell Response According to the Severity of Illness up to 8 Months after SARS-CoV-2 Infection

J Infect Dis March 26, 2021

[doi/10.1093/infdis/jiab159/6184114](https://doi.org/10.1093/infdis/jiab159/6184114)

Understanding the memory T-cell response to SARS-CoV-2 is important for assessing the longevity of protective immunity after SARS-CoV-2 infection or coronavirus disease-2019 (COVID-19) vaccination. The investigators analyzed peripheral blood mononuclear cells from healthy volunteers or patients with Covid-19 who experienced asymptomatic, mild, or severe disease at 2, 5, and 8 months post symptom onset (PSO).

SARS-CoV-2-specific OX40<sup>+</sup>CD137<sup>+</sup> CD4 T cells and CD69<sup>+</sup>CD137<sup>+</sup> CD8 T cells persisted at 8 months PSO. Memory CD4<sup>+</sup> T cell responses tended to be greater in patients with severe disease.

**Comment:** Although this is a small series, it does demonstrate that memory response to SARS-CoV-2 persists for at least 8 months PSO. More studies are necessary to determine not just longevity but perhaps more importantly, protective effect from reinfection.