

Hello, teachers, classroom aides, and other interested parties. I am an infectious diseases physician and have been working with my hospital system for the last 5 months in how to keep our various healthcare workers safe. I have set up this informational document in an FAQ sort of format, so you can hopefully get to sections of interest faster. There is a lot to cover!

How is SARS-CoV-2 spread?

SARS-CoV-2 is not spread through skin absorption. If you have a bucket of SARS-CoV-2, the virus that causes COVID-19, it is completely safe to put your hands in there provided you wash your hands before touching your face. The virus will not seep through your nails or crawl up your arm. Hand hygiene is very effective with soap and water or hand sanitizer for at least 20 seconds. SARS-CoV-2 is spread by droplet spread mostly, and those droplets then getting into your mucus membranes. If you do not touch your face, if you wash your hands, and if everyone wears masks transmission approaches zero. Research addressing these issues is noted below.

It appears that people are most infectious a few days before symptoms start (He X, et al. *Nature Medicine* 2020 <https://doi.org/10.1038/s41591-020-0869-5>), making things like temperature checks helpful but not a complete safeguard. A contact tracing study found that patients did not spread the virus after 6 days of symptoms (Cheng H-Y, et al. *JAMA Intern Med* published 5/1/2020 doi:10.1001/jamainternmed.2020.2020). Thus, masking everyone and keeping people home for the first 10 days of symptoms help tremendously in avoiding spread to others.

Is the virus only in respiratory secretions?

Yes, and you may have heard that is found in stool as well. While culturable RNA has been found in stool [Wang W, et al. *JAMA*. 2020. doi: 10.1001/jama.2020.3786], there's little evidence of fecal spread [Pan Y, et al. *Lancet Infect Dis*. 2020 Feb 24]. No virus was able to be cultured from the blood. There are conflicting studies on finding it in semen, with one finding it in patients with acute disease (Li D, et al. *JAMA Netw Open* 2020;3:e208292) and one not finding it in any men who recovered from mild-moderate illness (Pan F, et al. *Fertility and Sterility* 2020 <https://doi.org/10.1016/j.fertnstert.2020.04.024>). There was no evidence of SARS-CoV-2 in vaginal secretions (Qiu L, et al. *Clinical Infectious Diseases*, ciaa375, <https://doi.org/10.1093/cid/ciaa375>).

How contagious is SARS-CoV-2?

I will go into the data below, but basically if you're wearing a mask and the other person is wearing a mask the risk is extremely low. Household transmission rates (so when people are breathing and kissing and yelling and spewing droplets all over each other 24/7) ranges from 10-40%! So, even in that close, unmasked environment, the transmission is not even close to 100%. Walking next to someone or sitting across room with someone will obviously have a lower transmission rate than that. Data below...

A recent publication from China found that in 3 families having contact with each other, 8 of 15 people became positive (no masks worn at home) but with extensive contact tracing of people outside the home, only 6 of 285 patients tested positive in 14 days of follow up (no information on masking was given). They found a crude estimation of the attack rate to be 3.8% for symptomatic and 1% for asymptomatic and minimally symptomatic infection (Jiang X-L, et al. *JID* 2020;221:1948-52). The secondary household transmission rate is difficult to calculate from this study, as often everyone in the household had close contact with a COVID+ person. A study in South Korea looked at 97 COVID+ patients who worked together in a call center; there were 225 household contacts with 34 eventually testing positive. This gives a secondary attack rate of 16.2%, although no genomics was done to confirm this was the same virus (Park SY, et al. *Emerg Infect Dis.* 2020;26(8):1666-1670). A US study showed a secondary household attack rate of 10.5% (Burke RM, et al. *Weekly* 2020;69:245–246). Another South Korean publication, looking at their first 30 COVID-19 patients found that of 2,370 patients in contact with those 30 positive patients, only 13 people tested positive, leading to a secondary attack rate of 0.55%. There were 119 household contacts of the 30 positive patients, and 9 developed COVID-19. Household secondary attack rate here was 7.56% (*Osong Public Health Res Perspect* 2020 Apr;11:81-84. doi: 10.24171/j.phrp.2020.11.2.04). This is to illustrate that **even with intimate household contact, where people are not masked and share facilities like kitchens and bathrooms, the secondary attack rate is low.**

In a recent Los Angeles hospital exposure, a patient was on BiPap (high flow oxygen with aerosolization) for 3 days and subsequently intubated before testing positive for COVID-19. There were 40 healthcare workers exposed without recommended personal protection equipment (PPE). All healthcare workers were tested at day 5 and were negative, none developed subsequent symptoms despite the high-risk exposure (Personal communication with J. Grein, MD, 07/17/2020). In my own experience, we had a patient who we did not test until about 8 days into hospitalization, exposing dozens of healthcare workers. No one converted despite only wearing surgical masks for protection.

Masking (face coverings) and social distancing (6-foot separation between people) are often discussed together, along with hand hygiene. These measures together have proven effective in reducing transmission. Masking becomes more important when social distancing is not possible; thus it is not essential to both social distance *and* mask (https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/cloth-face-cover-guidance.html?CDC_AA_refVal=). Rather masking becomes more important when social distancing the full 6-feet is not possible. One review and meta-analysis looked at SARS-CoV-2, SARS-CoV and MERS and found that risk of transmission decreased at 1 meter distance compared to <1 meter (over 10,000 subjects evaluated), and 2 meters might decrease risk further. Face masks seemed to independently reduce risk as well (Chu DK, et al. *Lancet* 2020;395:1973-87). The take home is that masking at less than 3-6 feet is essential and at greater than 6 becomes less important. But universal masking by far carries the biggest risk reduction.

Is my mask a cesspool of virus?

Not touching the front of the mask is probably important; hand sanitizing is important if mask adjustment is necessary. Laundering masks daily or cycling them every 5 days (ie,, a mask for Monday, for Tuesday, etc) is important to remove any contamination from the masks. It is unclear what risk the front of masks holds. In one study, researchers swabbed HCWs caring for COVID+ patients (goggles, N95

masks, shoes); they did 90 swabs on 30 HCWs. No virus was found (Ong SWX, et al. Infect Control & Hospital Epidem 2020 DOI: 10.1017/ice.2020.91). Similarly, scrubs or special clothing is not necessary, although daily laundering of clothes is recommended. Thus, clothing that can hold up to such frequent washings is probably best. Shoe coverings and hair coverings are not necessary.

As an example of the efficacy of cloth masks, there was a recent evaluation of 2 hair stylists in Missouri who were symptomatic and eventually tested positive for COVID-19. They had contact with 139 clients, and stylists and clients wore masks. No client developed symptoms and of the 67 clients who did get tested, none tested positive (Hendrix MJ, et al. Weekly / July 17, 2020 / 69(28);930-932 <https://www.cdc.gov/mmwr/volu doi:10.1001/jamainternmed.2020.2020 mes/69/wr/mm6928e2.htm>).

Do I need to wear gloves? What about the environment?

Gloves, when providing direct patient care for COVID+ patients, is very important. We do oral care for patients, help feed them and clean up after them. Gloves for teachers who teach students with special needs, or for teachers of younger students who might have potty accidents, are important – as they always were for other bacteria/viruses. Gloves during other, normal social times, are not necessary. Simply washing your hands after various events (pumping gas, going to the grocery store, interacting with students, etc) will afford you more protection than wearing gloves throughout. Often people touch other things (phones, wallets, their face/head) with the gloved hands, which defeats the purpose of wearing gloves.

One study looked at environments within households where patients with COVID-19 lived. They did 5 swabs in 3 households (15 swabs – 3 per bedroom, 1 per kitchen and 1 per bathroom in all 3 houses). Only 2 of 15 swabs were positive (one bathroom, one kitchen both from the same patient). Thus, in environments where known patients were unmasked and touching surfaces frequently, only 13.3% of surfaces tested positive (Jiang X-L, et al. JID 2020;221:1948-52). Masking students and disinfecting after each class should provide a clean and uncontaminated surface for students and teachers. Schools should provide disinfectant from the EPA's list of effective products (<https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2-covid-19>, accessed 7/19/2020), and gloves should be worn when using disinfectants.

Do I need to shower when I get home?

There is no data on this one. In the beginning of the pandemic, I would remove my clothes in the laundry room and shower immediately. I do not do that anymore. I use my typical routine of a morning shower. I do change my clothes when I get home as I always have, but I am also caring for patients with a multitude of infectious diseases that I don't want to bring home. There is no evidence that it lives in hair. I always leave my shoes in the garage as always, because I walk around floors where bodily fluids could have spilled without my knowledge. The bottoms of shoes are always disgusting, so not walking across your carpet is probably a good idea anyway.

What if a student in my class sneezes or coughs?

People will sneeze and cough. That is one reason we are all wearing masks! If a student appears ill, or if s/he has a constant cough, I think it's reasonable to ask them if they've seen the school nurse (if that's ok with your school policy; please check first!). It is also reasonable to contact the school nurse out of caution so the nurse can check in with the student in a more private way. The errant sneeze is not going to be the cause of massive spread of COVID-19.

What if I live with someone who is elderly/immunocompromised/ill/etc?

My parents are over 60 with various ailments that puts one in a high-risk category and one in the immunocompromised category. When the pandemic started, we pulled our children out of daycare so that if I got sick my parents could be there to help watch them without the risk of daycare germs (the kids are back in daycare now). I have not hugged my parents since March 20. We did social distanced drop-offs and pick-ups. I have only kissed my kids on the tops of their heads since March 20. You can live with someone without sharing droplets most of the time. If you must provide one-on-one care (eg, bathing an elderly parent), just wear a mask. You can eat at the same table if you are spaced out. You can watch TV in the same room – from opposite ends of the couch. You can prepare food for them - as always, hands should be washed first. If you are breast feeding, you can mask while baby is feeding (as always, washing/sanitizing hands before handling the baby). It requires some advanced thought at first, but it is possible to have at-risk people at home and keep them safe. Also, don't forget that all your efforts in the classroom – masks, hand sanitizing, cleaning – are keeping *you* safe, which keeps them safe.

I'm scared.

Let me tell you a secret: I was, too. We all were. But I now have read so many medical articles, so many opinions, so many theories, and so much data. I have personally taken care of over 200 COVID-19+ patients. We know how to keep ourselves safe now. We know how to protect each other. We know how effective masks are. Welcome to the essential worker family: we are here for you – to answer questions, to (metaphorically) hold your hands, and to get you the information you need to keep yourselves safe. You got this.

One last thought... One big issue that has been discovered at hospitals is during lunch and break times. People would let their guards down, sit and laugh closely with each other. They would huddle together, unmasked, over one coworker's phone looking at pictures of the new baby. They would smoke next to each other outside the side door. This is how COVID-19 spread in many hospitals: not from patients but from coworkers. Please be careful in your lounges, in your break rooms, and before and after school. Use that 6-foot spread and wear your masks when you are visiting with your coworkers. The same rules you operate under all day with students also apply during non-student working hours.