

Notes from *Update on COVID-19 Science for Churches*

On Tuesday, August 11, 2020, and Wednesday, August 12, 2020, Lisa Allgood, a Commissioned Ruling Elder and a professional immunocytochemist, led Zoom conversations on COVID-19 for the Presbytery of Boston and Northern New England, with people joining in from across the country. At these meetings, she shared the most recent available information on COVID-19 and what that means for church-related gatherings. The meetings are available on the Presbytery of Boston Resource page at <https://www.presbyteryofboston.org/Resources/COVID-19-Resources>

The following notes are not verbatim, but pretty darn close! - Dayle

This is not the first coronavirus that we've seen. There are four coronaviruses that just cause common colds. They're very mild. They're infectious, but they're not very virulent, which means they don't cause a lot of disease. There are two others that are considered "minimal pandemics": 1) The SARS virus that came out of Singapore, and 2) the MERS virus that came out of the Middle East. They were very highly virulent. They caused very serious illness, they were very infectious, they caused a high degree of fatality, & then they petered out and did not continue to infect (They're still around, but they're not highly infectious.).

That's not what we're facing with this virus. This virus is nasty. It's highly infectious and highly virulent. It is not highly fatal; however, it causes significant disease in a number of different body cavities. The long-lasting consequences of it are only now just beginning to be understood (we've only known about it for about eight months). We learn something new every day. The fatality rate is almost completely correlated to age and other comorbid conditions. But because it's so infectious, it's going to be around for a long period of time. It is not going to peter out. It is likely we'll be living with it for a very long time. Even once we get vaccinations, to a certain point, the virus will still be there at a low level, so don't throw your masks away!

Infectiousness of this virus is quite insidious, because 40% of the people who are actively infected and infectious do not show symptoms. Another 20% show such mild symptoms they don't even consider the possibility they might have covid (such as a dry throat). Fever is actually NOT one of the most prevalent symptoms for those who have mild COVID-19, meaning temperature checks are not predictive of whether or someone is infected. This means you never know if you're dealing with someone who is infected but just not displaying symptoms. The latest data shows that you can be infectious up to eight days before you develop symptoms. **The bottom line is that you just don't know if you're sitting across the table from someone who is infectious (or if YOU'RE infectious).** This is an insidious & strange disease.

COVID-19 has three times the infectivity of most other respiratory viruses. Chances of getting infected are predicated on two factors: 1) the # of virus particles you are exposed to, and 2) the amount of time you're exposed to them. **The point of maximum chance that you will get infected if you're across from someone who is infectious is only 15 minutes, which is a really short period of time.** So when you start talking about congregations getting back together in the sanctuary, even if it's only for 30 minutes, you've just doubled the maximum chance of you being infected.

It's not yet known if this virus becomes latent (e.g like the chicken pox virus that stays in your body after you've been exposed to it & then re-emerges years later as shingles). It's not a type of virus that normally becomes latent, but it's possible it could – it's still too new to know for sure.

It's also not yet known whether or not you can become re-infected with the virus.

The U.S. has hit 5 million cases, one million of which were diagnosed in the last 17 days. As of today we are at about 54,000 new cases per day. The US has a Covid-19-related death about every 15 seconds. The infection rate of this virus, as it moves exponentially, has become faster & faster & faster. As of today, the U.S. is at 15 times the infectivity rate of any other country in the world. We have not got this under control. This is why all those other countries are not letting us cross their borders.

The virus is airborne. It is a micro-particle, so it can hang onto dust particles and very, very small droplets, which is why you need to wear a mask. You can also get it by touching a surface & then getting it in the mucosal surface areas of your face. It lasts about 3-4 days on an impermeable surface, like a metal doorknob or wooden pew. It lasts 1-2 days on a permeable surface, like a hymnal or piece of paper.

Symptomology:

- It is inhaled as a respiratory virus, but it doesn't stop there. It can affect the GI system, the central nervous system, the cardiac system, liver, blood vessels (causing clots in the large and even the smallest vessels in your body, which is very unusual, and it can cause blood clots in the lungs. Two things that have been learned in the last couple of months:
 - 1) The virus is clearly getting into the central nervous system because of loss of sense of taste/smell. Has also caused seizures & psychosis.
 - 2) The virus can actually cross the blood-brain barrier & get into the brain.
- Depending on your baseline health, Covid-19 can cause a cytokine storm, like many viruses. A cytokine is a chemical that the immune cells in your body release that act to direct the immune cells to a site of infection. If the immune cells put out too many cytokines, this results in a hyper-immune response, or cytokine storm, which is partly what begins to shut organs down, causing liver, kidney, heart, lung, & brain damage. What is being seen are cardiac arrest, strokes, seizures, loss of cognitive function, & permanent neurologic damage. Covid-19 affects the islet cells of the pancreas, so not only is diabetes a pre-disposing condition, the virus can also CAUSE diabetes.

So this not a virus you want to mess with. Because it is so infectious & not going to go away, you want to continue to take precautions.

Statistics – deaths & co-morbidities:

- Fatality is about 1%, which is 10% higher than the flu virus, and five times lower than Ebola.
- The fatality rate is directly related to age: on the high end, about 300 deaths out of 1000 cases if age 85 & above, at the low end about 0.3 deaths out of 1000 if in the 0-18 age range.
- For every one death there are another 19 people who have to be hospitalized long-term.

- For every one death, there are 18 people who have long-term or permanent heart damage.
- For every one death, there are 10 people who will have long-term or permanent lung damage (Ms. Allgood has herself seen cat scans of young healthy female cross country runners – some of the healthiest people in the country - who have permanent what is termed “ground glass” damage to the bottoms of their lungs).
- For every one person who dies, there will be 3 strokes.
- For every one person who dies, there will be two who have permanent neurological deficits.
- For every one person who dies, there will be another two who have permanent or long-term cognitive dysfunction.
- Of those individuals who have any symptoms of Covid-19, even mild ones, only 12% are absolutely symptom-free at the end of two months.

Infectivity is correlated to age and underlying medical conditions. Those most vulnerable are individuals who have cardiovascular disease, lung disease (especially if part of lung has been removed), are oncology patients, or are immune-suppressed in any way (if taking steroid or oncology drugs for anything). These people are much more susceptible to getting symptomology along with infectivity. It is important to remember, however, that everybody of any age can get infected **and can be infectious**.

If you get tested, it’s only for that specific point in time. So if you have to wait 3-4 days to get results, it’s possible you could have gotten Covid-19 in that interim 3-4 days even if you test negative on the test.

The length of time between exposure & positive test depends on type of test. If the test is looking for RNA particles (nasal swab test), which is what the virus sheds in the body, that’s the most predictive test, and it can take 2-3 days from the time of infection before you can see viral shedding. If the test is looking for antibodies, the antibodies that are produced from the time of infection take up to a week to show up in the test.

Kids & school:

- Because kids’ immune systems aren’t as fully developed & just by nature of the number of years they’ve been on earth they haven’t been exposed to as many things as someone who is older, their response to the virus *for the most part* tends to be not as severe as it is for older adults. The reason for this is two-fold: 1) Their innate immune system, 2) They don’t have the comorbid conditions that an older person has. So they present with milder symptoms. They present with some of the non-classic symptoms. They tend to get fevers, but they may not develop all of the other symptoms. Right now they’re less than 5% of the US cases in the 0-18 age group. Those who are showing symptomology tend to have an underlying disease of some kind – making them immunosuppressed -- or they have some other underlying medical condition. Guidance for kids is **the same** as for adults: wear a mask, wash hands, physically distance, limit the number of things that are touched & shared. Some children who get ill have presented with unusual hyperimmune responses: MISCS (multi-system inflammatory syndrome), which mimics Kawasaki disease. It can cause serious neurologic damage.

The upticks we’ve seen in the spread of the virus after re-opening are almost entirely the results of small social gatherings, such as parties, receptions, worship services, wedding showers, funerals, backyard gatherings, etc. In Ohio, a 56-year-old man with Covid-19 attended a church service in June and infected

53 people, 18 of whom infected others; a total of 91 people became infected (it wasn't disclosed if people were wearing masks or physically distancing).

The natural antibody response to this virus is very mild & weak. If you're one of the 40% who got Covid-19 and had no symptoms, your antibodies probably aren't going to show up after about two weeks because you didn't really develop very many. If you had significant symptomology, then antibodies can be detected 3-4 months later. So the innate immune response is weak & doesn't last long. You might even have had Covid-19 & **not** have antibodies.

Airborne Transmission Issues:

- In summer, virus particles that come out of your mouth are bigger because of the heat & humidity in the air; therefore, they don't travel as fast or far, and they fall sooner. This is partly why the flu dissipates in the summer. But the drier the airborne particles are, the smaller they are, and the further they travel; consequently, being indoors and using heating systems (which dry out the air) is going to be a real problem this fall & winter. In addition, HVAC systems, air conditioners, & even ceiling fans recycle exhaled air. They push the recycled air down from above & then it circulates until it eventually makes it back up to the HEPA filter, if there is one. So the air that is pushed into the room is "clean" for about 10 seconds before it gets inhaled & exhaled & re-circulated throughout the room. **This re-circulated air can cause infections no matter how physically distanced people are from the source of the infection.** If congregations must have services indoors, air condition (or heat) the room for 24 hours prior to the service, & then shut off air/heat during service.
- The best air filtration is to open windows & doors that allow for a **one-way** continual stream of air, where the air enters one side of the room & exits the other side. Any fresh air that you can let in is better than recycled air.
- Singing is another issue. Think of singing as a four-minute sustained cough. A cough goes 50 mph and travels at least 24 feet. If you're doing that for 4 minutes, you're putting a lot of infectivity out there (A sneeze travels 200 mph, btw.). Six feet isn't nearly enough to maintain a safe distance.
- Outdoor services are best. Maintain a physical distance of 6 to 8 to 12 feet. Limit the number of times people touch things, and limit the number of people who touch things: People should all bring their own stuff: chair, print out their own bulletins. Don't use hymnals – provide hymn words/music that people can print out. Collection plates should be placed on a table so no one touches them. Use pre-packaged communion sets. Car worship is good as long as nobody gets out of cars.

Treatments:

Convalescent plasma from people who had antibodies is **not** proving to be useful partly because those antibodies are so weak.

The following treatments are bringing down fatality rates & the amount of time people are hospitalized:

- If you hit viral symptoms at two different times during the illness, you can significantly reduce the amount of time you're symptomatic & in hospital. An immune booster/anti-viral (e.g Remdesivir) will decrease the amount of virus that can be re-shed in the body. Later, to keep the immune response from becoming a cytokine storm, if you give an immunosuppressant like dexamethasone (a steroid), then you can balance the viral shed & the immune system to the point where the body has the best chance of healing.
- Turning someone on their stomach clears lungs faster & improves recovery time.

Vaccines:

- There are currently about 150 different vaccines in various stages of testing.
- Of the above vaccines, about seven are now in Phase 3 clinical testing, which is the large-scale tens of thousands of patient clinical trials.
- One type of vaccine **produces antibodies but also produces T-cell response in body** (T-cells come from the thymus, which explains the "T."). There are two different kinds of T-cells: one is a helper cell, which helps the immune system to recognize a virus or bacteria that it's seen before. The other is a T-killer cell, which creates the response that actually goes after the infected cells to kill the cells & stop the viral shed. The vaccines that are being developed are improving the T-cell response as well – improving the system on both sides. All vaccines do this, but they do it in different levels. And since the antibody response to this still appears to be weak, this T-cell response is actually looking pretty good. There are two of these that have gone into phase 3 trials (one from Moderna, one from Pfizer). They are based on the MRNA ("Messenger" RNA) of the virus, so it's the **UN**infectious part of the virus, but it's enough to prime the immune system to recognize the **whole** virus. The downside is that the vaccine has to be kept at -70 degrees F, which makes transport & delivery of the vaccine tough. Also, there's never been an MNRA vaccine that's been commercialized – this is a very, very new kind of vaccination technology.
- Other types of vaccines require taking another type of virus & attach to that virus which is infectious but not virulent (an adenovirus or a vesicular stomatitis virus), attach the coronavirus protein to it, & then put that into an adjuvant (something that boosts the immune response) & use that as the vaccine. That's the typical type of vaccination for mumps, rubella, etc. Sanofi, GSK, Glaxo SmithKline, Novavax, and Merck, Sharp & Dohme all have these kinds of vaccines in Phase 3 trials (Note: Merck, Sharp & Dohme is the only pharmaceutical company that has an approved vaccine for Ebola as of 2019.). Most of these vaccines will require a booster. One may be oral. Two are intended to be single doses (Johnson & Johnson and Merck). This virus doesn't mutate very fast, but because the immune response it is weak, so you still may need to have a vaccination every year. The flu virus requires a vaccination every year for a **different** reason; for Covid-19, a repeat vaccination would be to continue to boost its efficacy.
- There probably won't be a viable vaccine by election time; it's more likely to be out by first quarter of next year. Then there is the rubric of who gets it first: 1) the elderly, 2) front-line health care workers & nursing home workers. The rest of population is looking at getting vaccines in mid-to-fall of next year. Churches should consider this for planning purposes.

- When you develop a vaccine, it's not about mitigating the amount of virus any individual gets, but rather mitigating the amount the population gets. Herd immunity is achieved when 70% of the population has some degree of immunity – at this percent viral replication tends to be kept very low. Sweden's attempt to achieve herd immunity with this virus is now considered a failure. The vaccines currently being developed will probably have a degree of immunity of 50 to 70%. Everybody on record at CDC has said they'll go with 50% - they're willing to go with a lower epidemiologic immunity just to start getting the vaccine out there.

The virus that hit Seattle came from China. The virus in Europe was one of the mutations of the virus from China and it was much more infectious & more virulent form of the virus. It was this mutated virus that hit the east coast – NY, Boston, Washington DC. Sweden decided to go the herd immunity route & now has the higher per capita death rate of any country in Europe. Just allowing yourself to be exposed is not a good idea. The "R" number (reinfection #) was four in NY. This is an exponential number. Keep in mind that if you're meeting with ten people, and each one of those people has each met with 10 people, you just met with 100 people (from a CDC doctor's meeting).

UV rays may or may not help. And if they are strong/intense enough to be capable of helping, they may be pretty bad for humans.

There may be a second wave coming. It may not look like the 1918 virus second wave because we're still dealing with our first wave. Winter is probably going to make things worse because people will have to be inside more. And also people are experiencing "fatigue" – about having to physically distance & wearing masks. Dr. Allgood feels we should prepare ourselves to continue to maintain our vigilance for at least another 10 months.

Recommendations for churches that are considering conducting on-site worship services:

- **It is impossible to eliminate the risk of getting this virus if you meet together for longer than 15 minutes, even if you wear a mask and physically distance yourself.** It's imperative that the church elders make this clear to all who may attend indoor worship services.
- There's not a "one & done" response to this virus. It's an ongoing, very fluid situation: You may be in a "safe" phase one week, but the next week you're not. The easiest way for churches to be safe and to keep the virus from spreading is to stay physically closed & virtual until the country has some level of comfort that the spread is controlled. And in the US it is **not** a controlled spread at this point.
- The CDC website and the website www.covidactnow.org – show real-time Covid-19 data and risk level for your community (covidactnow.org uses five different parameters.). Some churches are using these as guidelines to determine whether it's safe to have in-person worship at any particular time (this helps keep decisions objective based on facts/science rather than subjective/based on "fatigue" or "what other churches are doing."). Caveat: Congregants may be coming to church from different areas/counties, so while the church's location may be "ok," some of the areas in which people live and work may not.
- Keep a list of everybody who attends worship services, and even where people sit (make map or take cell phone photos), in case there is an exposure and a need for contact tracing.

- Allow people to go into **ONLY** the sanctuary to avoid having to clean a lot of other places. You're probably ok not sanitizing the sanctuary if it's only used every seven days. Put tape on the floor six feet apart wherever needed to help maintain physical distancing. One way churches that have opened are handling bathrooms is by letting in only one person at a time & having them clean up after themselves when they're finished (leave alcohol wipes in the bathroom for them to use to wipe everything down with that they've touched).
- Outside groups (such as AA): Put out a manifesto that essentially says "Here's what needs to be true for us to open our facility for you." Some requirements might include the following: masks must be worn, people must be physically distanced, groups must perform temperature checks, groups must be limited to using a specific part of building, groups must clean up after themselves. *Church insurance boards are getting nervous about churches opening & allowing smaller groups in. Some are now asking for waivers: a form that indemnifies both the church and the Presbytery of any harm & they've added Covid-19 to that. The Presbytery of Botson did hold an insurance board seminar too.*
- The Presbytery of Boston is strongly encouraging churches to continue with exclusively virtual services, and to use this time to find ways to develop fantastic "hybrid" services once it's safe enough to have them. They will be gathering information on creating great hybrid services and post that information on their website: <https://presbyteryofboston.org>.