To: moreman@mindspring.com
Subject: Update on Covid Vaccines 01/19/2021

News is breaking now on a possible bad lot of Moderna Covid vaccine shipped between 1/4/2021 and 1/8/2021. We did NOT receive this lot number – 041L20A.

Since January 4, 2021 we received and have administered 200 Moderna Covid vaccines. We vaccinated our long term care patients and worked through the calling, scheduling and vaccinating of 106, 90+ year old patients. We are expecting a new shipment of Moderna this week. One of the issues we face is what we order has yet to be what we receive, so it is impossible to pre-schedule patients until we actually have vaccines in hand. We are now reaching the point where we have to consider the 2nd dose for patients first vaccinated so we have to mark doses for 2nd use when we do receive the vaccines.

As frustrating as it is to wait or to find an available vaccine, every patient at Sanus is on "The List." Our phones are ringing off the hook with patients wanting to know where they are on the list. We are calling patients in age and medical condition order as prioritized by Dr. Paulk daily. We are currently working on patients with date of birth between 1930 and 1939.

Billing Alert - If you are a Medicare Advantage patient (for example: Humana Medicare, Aetna Medicare, etc), we also need your traditional red, white & blue Medicare card to be able to file your Covid vaccine administration. Please make sure you bring both your Medicare Advantage card and your traditional Medicare card with you to your vaccine appointment. The only other way we can get this information is for you to meet with the Billing department and give them your social security number to look up your Medicare information.

Below is some additional information Dr Paulk put together regarding Covid-19 for those interested.

Dear SANUS Member –

Clearly, the elephant in the room is the virus going around the world, surging again as I write this. Now that some time has passed since this pandemic started, we do have some substantive information that we can explain. I wrote several sections, and some may be more science than you care to read. Hopefully, there is useful information herein for most readers.

The Covid-19 Virus

The formally named “SARS-CoV-2” virus belongs to the family of viruses called *Coronaviridae.* The public is only hearing the smallest amount of what the field of virology knows about this family. If you look up *Coronaviridae*, you will find over 36 coronaviruses – most of which you’ll never hear about. Thankfully, there were hundreds of brilliant scientists around the world that were aware of and had studied these viruses. In less than 12 months, this virus was identified, its genetics mapped, an antibody test was developed, a reverse transcriptase PCR test was developed, treatments were elucidated and improved, and multiple vaccines were introduced, with two having been approved and being administered now.

The Pandemic

As this new respiratory virus spread around the world, the World Health Organization declared the outbreak an *emergency* in January 2020, and a *pandemic* in March 2020. As

of year-end 2020, more than 84 million cases have been confirmed worldwide, with more than 1.84 million deaths. As a practice, we are getting numerous calls every day reporting new diagnoses of Covid by our patients. We are aware of 1-2 deaths per week. In our last 20 business days, we directly tested and found 14 positive cases.

The Illness caused by Covid-19

Symptoms of Covid-19 are highly variable, ranging from asymptomatic to critical illness on a ventilator in the MICU. The virus spreads mainly through the air when people are near each other. It leaves an infected person as they breathe, cough, sneeze, speak, or sing. It enters another person via their mouth, nose, or eyes. We're not sure how long the virus stays in the air – some airborne pathogens spew from one patient out and down to the surfaces below ("droplet" spread) while others can even become suspended in the air ("aerosolized") like the tiny floating particles you see when you are looking into the bright sunlight coming through a window. Once in the newly infected person, the virus must incubate. We know that the incubation can take as long as 14 days, but the median time to symptoms, if there are any, is 4-5 days.

Symptoms include:
Cough (can be very severe bronchitis-like cough, lasting weeks)
Fever or Chills (high fever over 102 is common for a few nights)
Fatigue (extreme, lasting)
Muscle or body aches
Headache (especially early in the illness)
New loss of taste or smell (early in the illness, sometimes the first symptom)
Sore throat
Congestion or runny nose (as though a common cold)
Nausea or vomiting
Diarrhea

Emergency warning signs for COVID-19:
Trouble breathing
Persistent pain or pressure in the chest
New confusion
Inability to awaken or stay awake
Bluish lips or face

Most people can stay at home while enduring the illness, but if someone starts showing warning signs, he or she should go to the ER for evaluation. At the point someone's lungs get sick enough to need supplemental oxygen, he or she should be admitted to the hospital and certain medications started. With regard to nomenclature, people that have been *exposed* are supposed to "quarantine" for 14 days. People who have *tested positive* are supposed to "isolate" for at least 10 days. Once someone has the virus replicating in his or her respiratory tract, we know that, almost always, the illness runs its course and the virus cannot replicate anymore after 10 days. In rare severe cases, the virus continues to be able to replicate for up to 20 days – so, severely ill people who survive are instructed to isolate for 20 days. Before stopping isolation, the CDC requires the last 24 hours be fever free (without the use of medicine to lower temperature), and that there be a general improvement in overall symptoms (though cough and loss of sense of taste/smell can persist for weeks). In either case, the virus can be found in the respiratory tract of patients for months after they are well – this is why we do NOT want to retest with rt-PCR testing to see if someone is well. The virus will persist as debris though it has lost the ability to be replicated.

The Treatments

Many putative treatments have come and gone over this last year. What I'm seeing at the major hospitals is a cocktail of the common supplements Vit C, Vit D, Zinc, melatonin, and the acid reducing medicine famotidine (Pepcid). Each one of these has shown some promise in one way or another in helping fight the virus. In some cases, some have shown direct benefit, and in others, some show benefit in patients who are deficient in these substances. In addition to these somewhat natural substances, there are some medicines that have shown benefit:

Traditional **antibiotics** are being used in patients with Covid "pneumonia." The inpatient usually has pulmonary infiltrates on chest X-ray or chest CT scan. Infiltrates represent sick areas of the lungs that do not allow easy oxygen passage. Because people with infiltrates can get bacterial pneumonia ON TOP OF their viral pneumonia, they are often given antibiotics (which kill bacteria) in addition to the anti-viral treatments.

Remdesivir is an anti-viral treatment that may have some benefit and is given as an IV infusion. It was originally developed as a possible treatment for Hepatitis C and for childhood respiratory syncytial virus – and did not work. Currently, it's being tested against several viral classes, including Ebola and Coronaviruses. For hospitalized, moderately to severely ill Covid patients, it is given as 6 vials over 5 days at an approximate cost of $2,300.00. Countless trials are underway to find out if a given treatment or combination of treatments affect the outcomes positively. This drug works by blocking viral RNA replication without blocking human RNA replication.

Dexamethasone (a strong steroid) is now the standard of care for patients suffering from Covid pneumonia and requiring supplemental oxygen. We believe that in some, the immune system response to Covid becomes inordinate and unbridled, the "cytokine storm." Dexamethasone may reduce this immune response that has transitioned from life-saving to life-threatening immune over-reaction. Compare to a bee-sting allergy – a life-threatening immune overreaction to something most people can weather easily. Many people wonder why we are not giving dexamethasone as soon as we know someone have Covid. The studies have ONLY shown benefit in patients with significant hypoxia (low oxygen). Those benefitting the most are the ones that require being on a ventilator. Other patients, less sick, have shown a tendency to do WORSE if given this medicine. Again, during milder illness, the greater good is to leave the immune system alone to do its job.

Convalescent plasma is being given to the sickest patients. It does seem that antibodies to Covid are protective, thus if we take the antibodies that a recovered patient has made and give them to a patient battling the disease, we may give them an advantage – approximating what it would be like if the patient had made his or her own antibodies. So, people who have had and recovered from Covid have very valuable product in their bloodstream. The liquid part of their blood can be given to a patient, and thus that patient receives antibodies that "know" how to fight Covid.

For patients who are not admitted to the hospital, but who are infected with Covid-19 and are at increased risk of progression to severe disease, we have a treatment. **Regeneron** has a medicine that is a "cocktail" of two man-made antibodies. Note, "Regeneron" is not a medicine – it is a company that makes several different medicines. Casirivimab and imdevimab are the generic names of the two antibodies that are in the cocktail. Again, with this infusion, we are giving antibodies that can immediately fight the ongoing infection. The antibodies attack and "block" the spike protein on the Covid-19 virus' surface. There are two different antibodies to help prevent a mutation from helping the virus "escape" the treatment. If you remember that AIDS killed nearly everyone until 1995-1996, when we discovered adding three medicines together finally worked – it was because two of the medicines in effect batted the virus back and forth as it tried to mutate. If it mutated one way, one drug worked and if it mutated back the other way, the other drug worked. In using Regeneron's cocktail, it was seen that people outside the hospital suffering from Covid-19 infection and who were at high risk of progression to severe disease did better if they received the cocktail within the first few days after testing positive. Without the cocktail, about 9% went on to have severe disease, and with the cocktail, only about 3% became dangerously ill. Think about those numbers closely -- we are possibly cutting about 66% off the number of people going into the

hospital and dying or almost dying by giving this infusion judiciously and quickly after a positive result. We are using this medicine now.

The Vaccines

There are two vaccines approved for emergency use in the US currently.

1. From *Pfizer*, novel vaccine, given as two injections three weeks apart. The vaccine is very difficult to store and use correctly – it requires being stored as a powder, at -70 degrees Celsius (or colder) which is about -90 degrees Fahrenheit. It must be shipped on dry ice (-74 C) and this has to be meticulously refreshed until a very expensive specialty freezer receives the vials. When ready to be used, the vials are reconstituted with sterile water, and the doses have to be injected very soon so that the vaccine is not degraded in efficacy.
2. From *Moderna*, also a novel vaccine, given as two injections four weeks apart. It only requires normal freezer temperatures and lasts longer once brought to room temperature.

Both vaccines are unique as they are "mRNA vaccines." This discussion gets involved, but in short, rather than giving us little pieces and parts of the real virus that then prompts our immune system to make antibodies … these vaccines are pieces of genetic code that act as Trojan Horses. Their genetic information makes its way to our cells, that then unwittingly follow the genetic code and MAKE Covid-19 spike protein. The mRNA ONLY has instructions for making the spike protein, not the rest of the virus. Once our cells make the spike protein, we're back to the same place as a regular vaccine gets us: we have a foreign protein in us, and we make antibodies against it. Later, if we actually catch the virus, we already have antibodies against its surface spikes and the virus is immediately attacked and stopped.

The reason mRNA vaccines are such a good idea is that we don't have to spend weeks or months growing Covid-19 virus in vats, then treating live virus in some way to nearly destroy it, then separating the spikes from the rest of the virus to use to make a vaccine. This is faster and it avoids the substances required to grow the virus in the vats – like chicken egg used to grow influenza viruses for their vaccines.

The way of the future will be mRNA vaccines, almost certainly. We are watching science history be made.

The Tests

Rapid antigen test: This is the "quick" test done at small clinics and drive-through testing sites. It is pretty accurate, but quality controls will be less carefully maintained at pop-up locations. It is looking for evidence of proteins, that are specific to the virus, being present in a sample taken.

RT-PCR test: This is the definitive test that looks for viral RNA. It uses a technique that chemically duplicates any RNA or DNA in a given sample until there are thousands of copies of the original RNA or DNA that was present. By amplifying it this way, the RNA or DNA is present in such a quantity that it is more easily found and measured. This is done on samples in crime investigations. This test can be positive AFTER you are well – because it is so able to find a "needle in a haystack." Even inactive viral particles will show up weeks to months after the illness is over. Our office is now able to get this test performed and resulted within 24 hours at a huge professional lab nearby.

Antibody test: This is the test to tell us if you have had the virus in the past. It will also be the test that tells us if you were successfully vaccinated. Both having the illness and getting the vaccine will give positive antibody tests. We would only want to do this test on someone who has not been given convalescent plasma or even the Regeneron products because they may make it appear that the patient has his or her "own" antibodies instead of those that were given to him or her in an IV.

Viral load testing: This is done to see how much of the virus is in someone at a given time. This is becoming more important to clinical treatment. It may inform physicians in the future to better treat the illness. For instance, in the 80's and early 90's, we tested for HIV antibodies. In the middle of the 90's, we became able to measure the HIV viral load. This

made it possible to measure the effectiveness of treatment at a given time, in a given patient. It was, and still is, very useful in HIV, Hepatitis C, and other viral infections. I expect it will be important with Covid also.

The Future

Following antibody levels: We already measure IF you have antibodies, but special labs can already measure HOW MUCH antibody you have. Over the following months, we will have serial testing of antibody levels to see if the antibodies persist. We need to know how long antibodies stay around, if they stay around better after the actual illness versus a vaccine, and even which vaccines invoke the immune system to make antibodies that last longer than others.

Repeat vaccinations: If we learn that significant numbers of patients do not have a persistent and protective antibody level after illness or vaccine, we may determine that repeat vaccinations are necessary. We repeat tetanus vaccines up to every 10 years because of this. On the other hand, we give flu shots every year for another reason – the flu virus constantly changes.

Better medications: HIV was essentially conquered because of multiple medicines that were used in combination that targeted several different paths in the viral "life." We have medicines that interfere with HIV replication, cell entry, virus-specific protein productions, etc. This same thing will happen, surely, for Covid. It will become easier to save someone from Covid if they contract it.

Documentation: I think we will have a once in a lifetime need for documentation of who HAS and who HAS NOT had the vaccine or the illness. Workplaces, schools, nursing facilities, etc., will need to know who is protected and who is still at risk. There will be complicated rules, laws, legal challenges, and more coming in these next few months and years. We are planning to create a card for our patients that will show confirmed vaccination dates and confirmatory antibody testing. I think these may be useful in some places and necessary in others.

In Closing

It has been a year of terrible losses because of this virus. One of the saddest moments I've experienced in a while was reading the text of an ICU note written about one of my patients with Covid. The patient's oxygen level was dropping, and she required emergency transfer to intensive care. There, because of a previous medical condition, the respiratory therapist was having trouble intubating her. In the event of a difficult intubation, the intensivist is called – usually a pulmonologist. Even using fiber-optics guided equipment, the tube could not be passed into the lungs. The oxygen kept dropping, and the emergency was quickly becoming life-threatening with only minutes to save her. Two more doctors were called to the unit: an anesthesiologist from the operating rooms and an ENT surgeon. All three doctors worked frantically to cut through the patient's neck to create an opening – first trying a "cricothyrotomy," and then a "tracheostomy." No effort was spared, but nothing worked to establish an airway, and her oxygen dropped, and the monitors alarmed until all was still.

I grieve her loss because only now do I fully appreciate the 20 years I saw her and how she endured her medical condition with grace and a smile. I grieve for those three doctors having to feel her slip away under their hands, unbelievably, in a room full of equipment that can save almost any life, at least for a while. The irony of her dying, not because of Covid directly, but because of the very problem she had endured without complaint for decades, isn't lost on me. This wonderful woman, if she could whisper to us now, just might tell us to see promise, to be thankful for what's coming. She just might point out that while we lost her, we're going to save hundreds of thousands of lives in the next 12 months.

I will never forget her kind smile, and I will try to garner a fraction of her grace. I continue to learn what seems like *less* medicine and *more* humanity as each year passes.

Kirk A. Paulk, MD

Company Name | Website

Sanus Medical | 5885 Glenridge Drive, Suite 250,
Atlanta, GA 30328