



March 30, 2020

Dear friends,

Given the times, I wanted to provide some information and opinions pertinent to the current pandemic. Although the specifics are changing daily, I can provide some general background information about COVID-19 (a disease caused by the virus SARS-CoV-2), plus how the virus is affecting things at the University of Wisconsin Carbone Cancer Center.

Coronaviruses are RNA viruses (their genetic information is stored as RNA rather than DNA like us) that are commonly found in humans and other mammals. There are four types of these viruses that cause the “common cold” and two types that are more serious and were the causes of smaller epidemics from 2002 and 2012: SARS (Severe Acute Respiratory Syndrome) and MERS (Middle East Respiratory Syndrome), respectively. Like influenza, coronaviruses undergo mutational change in animals that result in their ability to infect/survive in human cells; interaction between humans and infected animals (primarily handling live or dead animals) results in the transfer from animals to humans.

COVID-19 is a new or novel coronavirus strain very similar to SARS, presumed to originate from bats (the genetic sequence of COVID-19 is very similar to common bat coronaviruses but with single or multiple new genetic mutations), and MERS, which is found in camels. For COVID-19, SARS and MERS, it is not clear whether viral transmission goes from the originating animal to humans or through another animal intermediary (evidence has pointed toward cats, snakes or camels; e.g. bats to cats to humans). Epidemiology done in Wuhan, China found one of the earliest cases of COVID-19 occurred in a seafood/animal meat market worker.

The animal origin and mutational changes in coronaviruses that have resulted in COVID-19 have led to its predilection for binding to respiratory and gastrointestinal tract lining cells and an ability to enter human cells and infect them while being new or “novel enough” that the entire human population lacks immunity to it. Hence the potential for a pandemic – i.e., an epidemic that spreads worldwide throughout the whole human race.

COVID-19 vs. Influenza: The similarities and the differences

- Both are viruses which means regular antibiotics don't work against either. While there are no medications that directly eradicate influenza or COVID-19, there are antiviral medications which lessen the severity of influenza.
- Both are transmitted principally by droplets on surfaces, through contact; a worry about COVID-19 is evidence that droplets (after a cough or sneeze) can exist in the air for a few hours and the virus can exist on hard surfaces for days.
- Epidemiologic data show that one person with influenza on average infects 1.3 others (e.g. 3 people with influenza results in 4 new cases of influenza); a person with COVID-19 appears to infect on average 2.7 people and thus is at least twice as contagious as influenza.
- Seriousness of illness: approximately 1% of people with influenza get sick enough to require hospitalization and approximately 0.1% (or 1 in a thousand) die from influenza. Early COVID-19 results show 5-10% of people infected require hospitalization and 1 to 2% of those infected die from COVID-19. These early results



suggest that COVID-19 is at least ten times as lethal as influenza. From a utilization standpoint, those that survive COVID-19 require hospitalization lengths on average twice as long as those hospitalized for influenza.

- These differences make it clear why we are more concerned about COVID-19 than influenza at this moment.

Vaccines or treatments? Treatments that kill off viruses in humans (or animals) like antibiotics kill bacteria have been very difficult to find. There are many potential explanations for this. Treatment of influenza and COVID-19 is focused on managing symptoms and supporting damaged organ function until a person's immunity stops the virus from further growth/progression/spread. That has led to the focus on developing anti-viral vaccines to prevent viral infections through stimulating the immune system to immediately recognize the specific virus and attack the virus. The key clinical issue with any experimental vaccine (and we study various vaccines here) is determining whether it actually produces an effective and sustained clinical immunity to the specific virus. There are many examples of failed experimental vaccines, usually due to ineffectiveness and rarely due to side effects.

There are multiple different types of vaccines being proposed for COVID-19, which is encouraging. We can get hints of potential effectiveness within weeks of giving experimental vaccines but the most important finding is evidence that it actually protects people from becoming infected – that takes many months to a year.

Some have asked: why not just give an experimental vaccine to all of us? After all, what do we have to lose since there isn't a treatment? At this time, this is why we are not exploring this option:

- Historically, most experimental vaccines, on average, don't work.
- Using our rapidly diminishing health care resources on a potentially ineffective measure could jeopardize lives.
- The potential of giving people a false sense of security could lead to a higher infection rate.

Ultimately, we may have to reconsider the above, but the medical community's caution is based on many historical examples of emergency therapeutic or prevention attempts causing more harm than good.

Although no drug has yet been proven effective against COVID-19 (through carefully done clinical trials), severely ill patients with COVID-19 currently admitted to UW Hospitals are often receiving various agents reported to provide potential benefit. Infectious disease clinicians at UW Hospitals are planning to participate in randomized controlled studies with other institutions around the country to examine the efficacy of chloroquine and other anti-viral agents in large controlled clinical trials.

COVID-19, Cancer Patients and UW Carbone Staff. Because the main ongoing process to prevent people from developing a serious COVID-19 infection is to never get exposed to the virus, we are limiting how often and how long our patients are in our facilities. All patients with newly diagnosed or active cancer are undergoing treatments as before with modifications to limit their exposure to people. Patients without active cancer issues are being followed via Tele-health (phone/video) to limit their exposure.



Our patients are appropriately concerned about COVID-19 for themselves and their loved ones. To date, the patients I have been seeing are grateful for anyone and everyone's efforts to reduce the spread of COVID-19. Many realize that the more it spreads, the more risk they have of exposure and infection, which would lead to delays in their treatment (at best) and hospitalization or worse.

The clinical staff throughout UW Health and UW Carbone are vigorously and optimistically carrying on with what they love doing – taking care of people with cancer. When possible, staff are refraining from direct patient contact but are performing care through phone or “MyChart” applications. While staff and their families do acknowledge the increased risk of providing health care during a pandemic, they strongly believe that caring for real-life heroes – our patients and their families – is incredibly important. Going forward, we will be sharing the stories of our healthcare workers who are going above and beyond during these unprecedented times.

COVID-19 and Cancer Research at UW Carbone. Because of the important need to also protect our staff from becoming exposed/infected, research has slowed down but is also continuing. Vital laboratory-based discovery cancer research continues in most labs as long as processes are in place to adhere to social distancing. Rather than staff being here daily or frequently, staff and researchers are physically here infrequently to perform only those procedures that can't be done remotely. This translates to a person being in the lab alone for a few hours each week. Clinical cancer research is continuing in a limited fashion, focusing on our studies offering therapies not otherwise available. Clinical research staff are primarily working from home and communicating with patients via Tele-health.

Cancer Research Updates.

- We successfully recompleted our grant which designates UW Carbone **as one of 5 lead cancer centers across the country** to perform NCI-sponsored clinical trials testing new potential cancer prevention agents. As a lead cancer center, our UW Carbone Cancer Prevention Consortium has grown further with the Mayo Clinic recently joining our UW Carbone led group in addition to our existing group, which includes Johns Hopkins, the University of Minnesota, the University of Washington and others.
- We just completed a **first-in-human** clinical trial of a potential breast cancer prevention vaccine.
- Currently, 15-20 of our researchers **lead nationwide** cancer clinical trials, which are testing new targeted therapies, prevention agents and cancer imaging.
- Dr. Dusty Deming was one of a handful of researchers **nationwide selected to lead** the NCI MATCH clinical trial which matches up specific cancer agents with cancer patients with specific types of mutations in their tumors.
- Dr. Ruth O'Regan (Carbone Deputy Director) was recently elected to the position of Vice Chair of the Board of Directors of the National Comprehensive Cancer Network (NCCN), the most influential cancer organization **in the world** relative to determining cancer care standards.
- Biomedical Engineers Sarah Gong, PhD, and Kris Saha, MD, had their research highlighted by the Director of NIH as an important **scientific breakthrough**. They are looking at developing synthetic particles, which are smaller than human cells, which can deliver medicines or gene therapies directly into cells.



- Dr. Mario Otto is launching a **first-in-the world** pediatric clinical trial that uses the novel cancer imaging and therapeutic agent CLR-131, which specifically enters cancer cells and can deliver therapeutic radiation directly to the cancer cell.
- Dr. Lee Wilke (Carbone Associate Director of Clinical Research) a **world-renowned** breast cancer surgeon and Dr. Fred Lee (radiologist and inventor of tumor ablation techniques) have developed and started testing a **novel device** based on GPS which allows more precise localization of breast tumors at the time of surgery.

Of note; despite the pandemic we continue to recruit both new and established cancer researchers to UW Carbone in order to more quickly and widely advance our cancer knowledge and application of that knowledge to our patients. The pandemic has certainly slowed things down and made them more difficult, but our desire and need to do more is not deterred.

As always, we are incredibly grateful for your willingness to partner with us as we advance cancer research and care. Please feel free to contact me via email or phone with any questions.

Sincerely,

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