

May 22: COVID-19 Clinical Update

SARS-CoV-2 Vaccine Development and On the Front Lines at Delnor Hospital

This daily communication is intended to facilitate the sharing of important clinical information during the COVID-19 healthcare crisis and to help respond to questions from physicians across Northwestern Medicine.

In today's issue, Infectious Disease physician Richard T. D'Aquila, MD, reports on recent progress toward development of a vaccine for SARS-CoV-2, and Emergency Medicine physician Parkson P. Lin, DO, shares his experience with treating the first COVID-19 patients at Delnor Hospital and managing his own recovery from the illness.

RAPID DEVELOPMENT OF A SARS-COV-2 VACCINE

Rapid development of an effective vaccine for SARS-CoV-2 is urgently needed. More than 100 candidates are in pre-clinical or clinical development, according to the [World Health Organization](#). Scientists are searching for a vaccine that induces neutralizing antibodies directed against the virus spike glycoprotein that mediates cell entry, and perhaps other immune responses. Many patients who have recovered from COVID-19 have anti-spike neutralizing antibodies, but their ability to protect against reinfection is still under study.

While most vaccines take years to develop, the pace of progress so far is unprecedented. A vaccine is expected to be submitted for approval by the end of this year or early 2021. Several candidates are in development to provide alternatives to potential problems, like antibody-dependent enhancement of infection (ADE) and vaccine-associated enhanced respiratory disease that stymied vaccine candidates for respiratory syncytial virus and HIV. Scientists are actively looking for these problems in SARS-CoV-2 vaccine candidates.

Trials underway

- United States: Results were released this week for the first phase of a trial for a [new platform for vaccine delivery by Moderna](#) (spike glycoprotein-encoding RNA coated with lipid nanoparticles, called mRNA-1273). Of 30 participants (out of 45) with results reported, all had levels of total antibodies. Eight of those 30 had levels of neutralizing antibodies tested; each had levels of neutralizing antibodies similar to those seen in recovered COVID-

19 patients. The second phase trial starts soon with 600 participants, and phase three is expected to begin this summer.

- Germany: U.S.-based Pfizer has partnered with Germany-based BioNTech to begin the first [rapid clinical trial in Germany](#) of an RNA vaccine called BNT162. Upon regulatory approval in Germany, the partners will extend the trial in the U.S.
- United Kingdom: A large trial of more than 1,000 participants is underway to test a novel vaccine platform using a non-replicating chimpanzee adenovirus vector to express the SARS-CoV-2 spike glycoprotein called ChAdOx1-nCoV-19. Recently reported vaccinations of six rhesus macaques indicated the presence of neutralizing antibodies and T-cell responses in all vaccinated monkeys, as well as protection from pneumonia (and not infection) upon re-challenge. Read the [study](#).

On Wednesday, May 20, researchers [reported in Science](#) that in another recent animal trial of a SARS-CoV-2 vaccine, nine rhesus macaques infected with the virus developed neutralizing antibodies, consistent with the results from the animal study described above. And, when they were re-challenged, they were protected from repeat pneumonia, had lower viral loads and brisk anamnestic immune responses. A [report in the New York Times](#) indicates the researchers also found that an adenovirus 26-based SARS-CoV-2 vaccine (the same adenovirus vector used for a successful Ebola vaccine) also protects macaques from pneumonia on re-challenge; human trials of this vaccine candidate will start in the near future.

INSIDE THE DELNOR HOSPITAL EMERGENCY DEPARTMENT WITH PARKSON LIN, DO

Q: You treated and were exposed to the first COVID-19 patients at Delnor Hospital in March. What was that experience like?

A: Initially, we encountered a handful of patients who had recently traveled from high-risk countries or who were potentially exposed to positive COVID-19 individuals, but they tested negative. Our first COVID-19 patient also initially tested negative.

After the exposure, the team and I were required to isolate for two weeks. The initial few days were difficult, being confined to a guest room and eating meals away from my family. Thankfully, my team and I tested negative and returned to work after the quarantine was over.

Q: What is different about working in the ED during this pandemic, and how have things changed since the first COVID-19 patient?

A: Since the pandemic started, our ED has been prepared to safely care for patients and staff. Taking the time to properly don and doff PPE has changed our workflow, but it's necessary to protect ourselves. We also use technology to communicate with patients to conserve PPE and limit exposure.

Q: Is there anything you've been surprised to learn from working during this pandemic?

A: Regarding the first COVID-19 patient at Delnor Hospital, I was surprised to learn that she was ill for three weeks without any travel or known exposures. At the time, community spread was relatively unknown, and it indicates the virus was active earlier than thought. Also, I am very impressed with the speed and progress of NM's research on COVID-19 treatments.

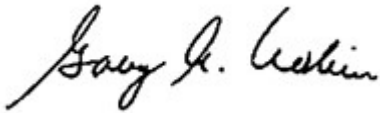
Q: If there was one misconception you could correct about COVID-19, what would it be?

A: Caregivers and patients should not assume that COVID-like symptoms — even mild ones — are "just a cold," especially in low-risk populations. I have never seen a virus affect so many young and healthy patients.

Q: How are you and your team relieving stress?

A: We are lucky to have the amazing support of our community. Our team appreciates the many cards, flowers and meals that we receive almost daily. Also, I try to spend more time with my family, video chat with friends and enjoy the outdoors. Thanks to the stay-at-home order, my kids and I are proficient at beating Bowser in Mario Odyssey.

Thank you for your extraordinary dedication and collaboration in providing exceptional care to our patients and supporting one another during this unprecedented crisis. If you have questions or would like to share the story of an NM hero, please email us at covid-19md@nm.org.

A handwritten signature in black ink that reads "Gary A. Noskin". The signature is fluid and cursive, with the first name "Gary" being more prominent than the last name "Noskin".

Gary A. Noskin, MD
Senior Vice President, Quality
Northwestern Memorial HealthCare
Chief Medical Officer
Northwestern Memorial Hospital