



My Experience with SARS-CoV-2, with a Focus on Testing

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ABSTRACT Testing for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) got off to a slow start in the United States. In this commentary, I describe my experience with CoV disease 2019 (COVID-19), with a focus on being tested at the University of North Carolina—Chapel Hill Respiratory Diagnostic Center on its inaugural day.

KEYWORDS COVID-19, COVID-19 testing, SARS-CoV-2, molecular diagnostics

On March 5th and 6th, I participated in an NIH study section meeting held in a hotel conference room in Washington, DC. Panel members sat next to each other for about 10 h each day as we discussed over 60 grant proposals. On March 8th, I noticed feeling cold during a bike ride with friends. It was a cool day, but the ride did not warm me up, and I felt cold the rest of the day. The next morning, I felt achy all over. I was perplexed by how sore and tired I felt, given the easy pace of the previous day's ride. By the time I got to my office, I began to wonder if I was actually ill. Maybe it was the beginnings of a cold? However, I had no respiratory symptoms, only chills and achiness. I participated in two meetings that morning, one with lab members and one with a few other faculty members. I sat as far away from everyone as possible, warning them that I thought I might be coming down with a cold or possibly the flu, and then went home. Continuing to have some chills and body aches, I worked from home the next two days. Thursday morning (March 12th) I felt a bit better. As I listened to a morning news show, I heard about Tom Hanks and Rita Wilson testing positive for coronavirus (CoV) disease 2019 (COVID-19). The symptoms that they described were the same as mine: chills and body aches but no cough. At this time, the COVID-19 symptoms that we were being told to look out for were fever, cough, and shortness of breath. So, with no cough or shortness of breath, despite what I had just heard, I (foolishly) went into the lab. I spoke with my grad students and postdocs, keeping my distance. I told them that I was feeling better but was not yet 100%. Their response was an overwhelming "Go home!" So I went home. The chills and body aches persisted, but they were not severe. Still thinking that I might have a mild flu, I begged off social outings Friday and Saturday and just stayed home.

Sunday night, March 15th, at about 11:00 pm, I received e-mail messages from several of the grant review panel members. Apparently, another panel member, who had been sitting next to me for those two long days, was in the intensive-care unit (ICU) with COVID-19. Yikes! It felt like needles shooting through my skin. It now seemed like a real possibility that I was infected with the novel coronavirus. I contacted all of the people with whom I had interacted since returning from the study section meeting, which, fortunately, was not very many, and let them know that I had been exposed. I sent an e-mail message to my physician, left messages on the UNC COVID-19 hotlines, and contacted Nat Moorman, the faculty member in our department who was coordinating the effort to plan a departmental shutdown, should it come to that. Nat is also a virologist. He got back to me right away and asked if he could share my information with a few key people, such as UNC's occupational health physician. The next morning (March 16th), I got a call from my physician as well as the occupational health physician. They arranged an appointment for me at UNC's drive-through Respiratory Diagnostic

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Center (RDC), which was about to have its grand opening that morning at 10:00 a.m. Located within the parking area for the Ambulatory Care Center at UNC, the RDC was incredibly well designed. As I entered the parking area, I was greeted by staff wearing full personal protective equipment (PPE), who directed me to follow a cone-lined lane when I told them that I had an appointment to be tested for COVID-19. At the first checkpoint, I was asked for identification by a PPE-protected staff person, who then passed me a plastic bag with paperwork, labels, and a pen through the passenger-side car window. At the next station, I completed the questionnaire about my symptoms, exposure, and health risks, applied labels with my name and medical record number to the forms, and placed them back in the plastic bag, which I handed to a PPE-protected staff person, again through the passenger-side car window. I drove to the next and final station, where there was a team of PPE-protected staff people waiting on the driver's side of the car. They instructed me to lower my window and tilt my head back and then proceeded to insert a long, thin, nasopharyngeal swab into my nose so far that it felt like they were sampling my brain. It was uncomfortable, to put it mildly. The swab was placed in a test tube with transport medium to which my final identification label had been affixed. I was told that I would receive my test results within four days, and I drove away. I was impressed by how fast and easy the process was and especially by how much thought had gone into the design of the stations and the process for getting the right information in the right places with minimal risk to staff, while maintaining respect for and the confidentiality of the patient. Every step of the process, and every risk, had clearly been considered carefully in setting up this drive-through testing station.

That afternoon, Melissa Miller, the Director of the Clinical Molecular Microbiology Laboratory at UNC, posted on Twitter that the first run of the assay that her team had developed for detecting severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was complete. I wondered if my sample was one of them. The next morning, March 17th at 7:00 a.m., my phone rang. My test result was positive. I was told that it was a "presumptive" result, as my sample had to be sent to the CDC for confirmation, but not only was I expecting a positive result, I trusted the UNC test completely. Melissa Miller is one of the world's experts in developing molecular diagnostics for viruses and other pathogens, and her team at UNC is outstanding. I knew that the chance of a false positive (or a false negative) was very low. I immediately informed the people with whom I had been in contact of my result and then fielded calls throughout the day from my physician, the UNC occupational health physician, Nat Moorman, and a representative from the Chatham County Department of Health. It felt good to know that so many people cared about me. My result (which was confirmed by the CDC several days later) put several gears in motion, such as the county health department and UNC occupational health reaching out to everyone with whom I had been in contact, instructing them to self-quarantine for 14 days. I was instructed to isolate at home until I had gone at least three consecutive days with no fever (which I reported daily, along with any other symptoms, online) and for at least 10 days after the onset of symptoms. I know now that I was the first positive COVID-19 test result in UNC's Clinical Microbiology Laboratory, and I was the first UNC employee confirmed to have the virus. The university began transitioning to remote education and shutting down research labs within days.

The fever and chills persisted for another week. The body aches subsided, but I began to feel tightness in my chest when I inhaled deeply, similar to how I felt as a kid after a summer day of playing and swimming in the smoggy greater Los Angeles area of California. This development concerned me, as reports were emerging of patients doing well for a week and then crashing with respiratory failure the next. Fortunately for me, the respiratory involvement never progressed to anything worse, and all of my symptoms were gone by the next week. I feel extremely lucky; as far as I can tell, I am just as healthy now as I was before my encounter with SARS-CoV-2. I am grateful that it appears that I transmitted this awful virus to no one. However, few people with whom I had interacted were tested, and this has been a source of frustration. Three of my lab

members did have some cold-like symptoms in the days after I had gone into the lab. Two were told that their exposure risk was too low to warrant testing, and neither developed serious disease. The third was tested because of an additional circumstance and was negative. No one else with whom I knew I had interacted had any symptoms. My husband, who was exposed day and night to me, a person with lab-confirmed COVID-19, for the 10 days prior to my diagnosis, was unable to get tested for the virus, because he had no symptoms. He was also unable to get tested for antibodies for the same reason. Given the apparent communicability of SARS-CoV-2, we assumed that he must have had an asymptomatic infection, and this view was shared by physicians and virologists with whom we spoke. With hopes of donating plasma, my husband was finally tested for antibodies in mid-May. He was surprisingly, shockingly, negative. Whether he avoided infection because I had no overt respiratory symptoms, because of his diligent handwashing and disinfecting practices, or because he is somehow just not susceptible, we may never know. I am confident, however, that because of the hard work of our research and clinical scientist colleagues, we will control this virus, and that with bolstered public support, we will be better prepared for those that emerge in the future.