

## **COVID-19 (Novel Coronavirus) Pandemic - Patient Self-Testing**

**March 26, 2020.** Like everyone else I am trying to figure out what will be the end game with the COVID-19 pandemic. And on a personal basis I am trying to determine how it will impact my daily life and for how long? I am 81 years old with a heart condition; the profile of a person who is deemed to be most vulnerable to serious consequences if infected with COVID-19.

Government officials and medical advisors are all telling me not to leave the house, and I am heeding the advice except for occasional trips to the market for groceries, or the pharmacy for prescription refills, or solo walks near my home. Instead of worrying about lots of idle time on my hands, I see the opportunity to think about what may potentially ensue in the future. One area that has intrigued me for a longtime is tele-medicine along with patient self-testing and monitoring of their own health.

First, I would like to start with a story of which the relevance will become apparent later. On Tuesday, February 25, 2020 I had a scheduled appointment with my cardiologist, who has been monitoring my heart condition (A-Fib) for 14 years. Leading up to the meeting with the doctor I had been experiencing headaches, rapid pulse rate and shortness of breath; a sign that my heart might be out of normal sinus rhythm. An EKG at the doctor's office the day of the appointment confirmed my suspicions, and the cardiologist scheduled a cardioversion for the following Monday, March 2 at the hospital to shock my heart back into normal rhythm.

In the situation described above the bad news was my heart was in A-Fib and of course the good news the cardiologist was able to cardiovert my heart back into normal sinus rhythm. Suppose the follow-up appointment had been scheduled one month later (March 25) in the midst of the COVID-19 escalation. The doctor probably would have been canceling appointments for routine visits. And if I did get as far as having an appointment and an EKG evaluated, the hospital might have considered my situation elective and the cardioversion not necessary in light of patient priorities, increasing my level of vulnerability.

I take blood thinners daily and for the past 10 years I have been self-administering blood tests on myself to ensure that my blood density stays within a prescribed range. I report the results of each test, called PT/INR, electronically and the intermediary forwards the results electronically to my cardiologist. I perform the test at my own convenience and saves the time of me going to a lab to draw and test my blood. The process works great.

I also have a pacemaker installed in my chest to regulate my heart rate and keep it above a prescribed rate. My heart rate is set not to go below 70. Next to my bed in my home there is a monitoring device that is connected via Bluetooth to my pacemaker and electronically to my cardiologist's office. The device samples my pacemaker for readings on a periodic basis, or I can force an immediate reading, if requested. The pacemaker and the process works great.

When I go for an appointment with my cardiologist, the first thing that the nurse does is take my vitals: blood pressure, pulse and weight. I am then given an EKG. Self-administering blood pressure and pulse and weight from home would not be an issue. We would just need a mechanism to transmit the vitals electronically; something that should not be difficult to do.

The missing link is the ability to self-administer an EKG. There are a number of products on the market, including smartphone applications, watches and finger pads, and I have tried them all without finding one that yields consistent, reliable test results. At the very least labs that do blood work could be commissioned to perform EKGs and report results to my doctor electronically.

In this piece I probably got too deep in how to get there but what I am trying to illustrate is that to make tele-medicine work the patient can and needs to be involved in self-testing. In my example, if the doctor has received all of the requisite information electronically (i.e., vitals, EKG reading, PT/INR), then video-conferencing could become the preferred way for both doctors and patients to interact, thus becoming a substitute for office visits.

If the doctor is armed with all the requisite information prior to a patient consultation, it might be easy to off load work when appropriate to a Physician's Assistant (PA) or notify the client in advance that everything looks good and there is no need to have an in-office visit appointment or a video consultation.

One more story; not totally relevant but does illustrate medical interactions between doctors and patients separated by very long distances. About 7 years ago my wife and I took a trip to Peru and the last leg of the trip was a one hour flight from sea-level to a town 12,000 feet up in the Andes. I had an immediate reaction to the altitude change; my blood oxygen level went dangerously low: and I required medical treatment. As I was laying in a bed being attended to by a Peruvian doctor. I dashed off an email to my cardiologist (Yes, my doctor gave me his email address) and the cardiologist got right back to me requesting a phone number to call. He called promptly and asked to speak to the Peruvian physician. It so happens that my cardiologist also speaks Spanish and here I was laying a bed up in the Andes listening to the doctors converse about me in Spanish and separated by 4000 miles. Very cool and very reassuring.

I have one more personal example of electronic healthcare in action. About a year ago (March 2019) I was experiencing dizzy spells and my cardiologist decided to equip me with a heart monitor that I would wear 24 hours a day. The monitor consisted of 3 leads attached to my skin and connected to a monitor device the size of a smartphone that I wore clipped to my belt. The monitor was in constant communication with my doctor's office using cellular technology. One morning after wearing the monitor for about 2 weeks I awoke feeling strange and then tried to go back to sleep. Moments later my phone rang; it was my cardiologist telling me that my heart had stopped and that I had to get to the hospital immediately. After a weekend in ICU, I had a pacemaker implanted. Technology saved my life.

There are lots of exciting electronic advances going on in medicine such as remote surgeries utilizing robots, but it is the simple interactions between doctors and patients that I described in this missive that have the potential to save time and increase productivity. In this time when it is unknown how long vulnerable patients like myself will be shelter-in-place and unable to visit their doctor, tele-medicine could become the modern version of doctor in-home visits that I remember as a child.