Musings on Medicine and Computers
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When Mary Phillips asked if I would be willing to write an article for the ICON newsletter, I didn't want to say no, even though I was a newbie. After all, Mary had done so much for me. When I attended the Mercy Seniors' Computer Course last year, she sat next to me, guiding me on my journey into Windows 10 which I had never before used. She was forever patient and encouraging.

Mary also introduced me to the ICON meetings at our local libraries, and I soon joined ICON and tried to attend as many of the meetings as I could. Month after month I would observe Mary arriving early and staying late, lugging equipment and paperwork in and out of these meetings, using her time and skills as a top-notch teacher to lead and guide our group into new worlds of technology. From Mary as well as from our guest speakers, I learned about things ranging from genealogy to drones.

I did not want to admit to anyone that I had worked with computers for many years in a limited setting.

You see, the computers that I used at the hospitals or out-patient facilities where I worked had already been purchased, set up, turned on, and preloaded with the programs and apps that we needed to use. In addition, there was a group of savvy computer information technologists at our beck and call if there was ever a question or problem.

So what can I, someone with somewhat "limited" computer experience, discuss in an article?

That got me thinking. Since I am trying to cultivate an attitude of gratitude, I thought I would share my gratitude for computers in Medicine, which have changed all of our lives, mostly for the better.

When I started medical school in 1977 (Case Western Reserve University in Cleveland, Ohio), we had a refrigerated room full of large bulky computers tucked away somewhere, but we never worked with them. If I wanted to better understand something or look something up – in medical school or in my early years of medical practice – I had to make a mad dash to the medical library to search for a book that might have the information I might need. (…and I would be praying that book was not checked out!) As I progressed in my studies and years of experience as a diagnostic radiologist, my mad dashes became less frequent, but occasionally a disease we didn't see too often or a pressing question caused me to hit the books. This was especially difficult when I was on call in the middle of the night, the only physician available, and was even worse if the

medical library was locked. It was also very time consuming and took me away from my patients.

Voila! The biggest benefit of having a laptop or an iPhone connected to the internet was that medical information was now at my fingertips. The mad dashes to the library became things of the past.

In addition, when I was on call at night, for most of my career, I would have to physically be present at the hospital or drive in from home at 3 a.m. or whatever ungodly time I was called. Now I could sit in front of a computer screen at my home and call up the x-ray images I needed to read. I did not even have to get out of my pajamas or bunny slippers to make the harrowing drive through fog, ice, and snow.

Computers also translated into great benefits in a number of other helpful ways. When I started my career, patient requisitions for imaging tests were written out by hand and had to make it down to the X-ray department. Imagine the frustration we felt when we got a requisition for a test "to be done TODAY" at 6 p.m., particularly noting the test was ordered at 1 p.m. Computers did away with these delays.

Our reports of completed tests also got out sooner. For many years, after interpreting an x-ray, I dictated my findings into a machine that was transcribed by a pool of transcriptionists. It sometimes took a couple of days for the report to be typed. Toward the latter part of my career, this time was chopped since we were now typing our own reports or using voice dictation algorithms. Signing a completed report was also much easier. Back in the day when each report was typed using carbon copies, if we altered a single word on the page (such as changing the word left to right, a critical change), the entire report had to be retyped for just that one word and sent back to the typing pool. That might cause a delay of an additional few days. Now we could just pull up the reports on our computer monitors, make changes ourselves, push the button, and send the report on its way immediately.

The way that x-rays were taken and stored also evolved during my career due to computer technology. We went from using film (like film in your old camera, only bigger and heavier film) to using digital images that were quicker to acquire and easier to store and retrieve.

With our old-fashioned x-ray film, we had to take time to put the films up on lightboxes and take time to sort through dozens of old films in heavy folders to search for comparison views so we could assess for new or interval changes. Sometimes those old films were even stored in the bowels of the hospital and we had to wait hours to get them, delaying our final interpretation. Even worse, sometimes the old films were lost!

I had a ruler, a magnifying glass, and a "hot light" sitting next to me on my desk. My "hot light" was bolted down, but sometimes someone would "borrow" my ruler or magnifying glass and I would become irate. These tools are no longer needed since computers come with their own measuring and magnifying tools, and the background and intensity

of images can be "dialed" up or down. This also slashed the need for radiologic technologists to re-take films if an image was over or underexposed. This translated into less radiation for the patient as well as great time savings.

Many computerized imaging studies which we use commonly today were also either not in existence or only being dreamt of in the 1970s. This includes the CT scanner, invented by British engineer Godfrey Hounsfield (a Nobel Prize winner that I had the privilege of meeting). The "C" in CT stands for computerized – and CT is shorthand for computerized tomography. This allows for making x-ray slices of body parts, improving our diagnostic capabilities. Without going into all the computer detail and physics involved, let me simply say that this was revolutionary. Diagnoses are now made more quickly, more accurately, and often with less pain for the patient because of CT and computers.

When I started my radiology residency in 1981 at Washington University, it took an entire hour to do a CT scan on a patient's chest. This meant that the patient had to hold their breath multiple times and the images were more likely to be degraded by motion artifact. In addition, only a limited number of patients could be scanned in a day and there was a waiting list so we scanned into the night hours. Today, it only takes a matter of seconds or less to scan someone's chest (or other body part), so it can be done on a single breath-hold. It actually takes longer to get the patient on and off the scanning table than it does to do the scan itself! This means quicker diagnoses and increased patient "throughput."

Virtually all of our current imaging modalities are dependent on computers, ranging from digital mammography to MRI (magnetic resonance imaging).

I have just touched the tip of the iceberg here, but I think you get the idea. Computers in Medicine have been extraordinary and they are here to stay, unless they are replaced by another technology that is currently in someone's imagination.