

I started my career in healthcare Information Technology at Susquehanna Health in 1997. My degree is in Industrial Engineering from Penn State University where prior to serving in IT, I worked in both manufacturing and healthcare as a lean/six sigma engineer. I was fortunate enough to move into IT at the advent of information technology in healthcare.

In the early 1990's, healthcare IT was, for the most part, data processing and data entry. It dealt mostly with billing of insurance companies and the consumer for the services that were provided. During this time, the healthcare industry was in a quality crisis. The industry was slow to realize that clinical care should be supported by systems that are carefully and consciously designed to promote safe, effective, patient-centered, timely, and efficient care. The industry eventually realized that information technology plays a critical role in the support of the design of those systems.

At Susquehanna Health, this meant that our need for trained IT professionals grew exponentially. Our IT department grew from a staff of 10 to its current total of 75 to support the growing IT needs of our organization. We transitioned from basic data processing to developing and supporting complex systems such as electronic medical records in physician offices, computerized physician order entry (versus hand written orders) and viewing images on computers called PACS (rather than on viewing stations with actual film). The industry changed and we were able to evolve to support the change.

As an industry, healthcare is moving from actual in-person visits to virtual telemedicine visits with physicians from across the state, nation and world. If we look at other states in order to provide a better understanding of where telemedicine might progress in Pennsylvania - in California over 50 percent of last year's patient visits at Kaiser Permanente were conducted online, by virtual visits or through the health system's applications.

All of this technology requires additional bandwidth to support these connection points. In its most basic definition, bandwidth describes the level of traffic, and amount of data that can transfer between users through a network. For example, bandwidth is the number of tables in a restaurant, and the network traffic is the number of diners. The more tables in the restaurant, the more people can dine at the same time. The higher the bandwidth, the more users can be

connected to systems and fully utilize these systems in an efficient manner. With all this change in healthcare and other industries came the need for broadband. The term broadband came to mean the capacity to transfer large amounts of data quickly over a connection.

Let me give you some examples of these greater bandwidth, or broadband needs. In 1997, we were installing 56K circuits to support our physician offices. In 2018, this same connectivity is reaching 100 megabytes --- almost 2,000 times greater the connection speed. In 1997, our hospitals were being supported by 100 megabyte connections. These connections are now one-to-10 gigabytes or 100 times greater the bandwidth.

While this broadband connectivity is more established and plentiful in our system's southern region in locations like Williamsport, and even Lock Haven and Sunbury thanks to our regional telecommunication companies, this is not the case in the northern tier of Pennsylvania.

Locations such as Soldiers + Sailors Memorial Hospital, Cole Memorial Hospital and the surrounding provider offices in this region do not have the telecommunication companies or infrastructure to support the advanced healthcare technology needs to which I am referring.

In these underserved regions, the return on investment is not incentivized enough for the telecommunication companies. The locations are too remote, the terrain too difficult and the distance too far from a population center to make it feasible and economical. The result-partnerships between telecommunication providers are formed which increases the cost, complexity and the support of the broadband connection. In these cases, the reliability of the network also comes into question. And, the cost of redundant connections becomes almost impossible to financially support.

The only thing that has saved our organization and these healthcare locations in the northern tier from extreme costs which greatly limit the quality of healthcare and technology that we can deliver in this region is the grant funding we have been able to realize through organizations like The Rural Healthcare Program. The RHC Program supports healthcare facilities in bringing world-class medical care to rural areas through increased connectivity providing up to \$400 million annually in reduced rates for broadband and telecommunication services.

Susquehanna Health, now UPMC Susquehanna, has had the opportunity to receive funding from this program through two different funding agencies - the Pennsylvania Mountains Healthcare Alliance and Spectratel. Both of these agencies have been invaluable to our connectivity success in this region. However, the ability to receive funding is becoming more difficult as the demand for funding due to increased needs and additional facilities has limited the ability to participate in these grant opportunities. The dollars available are being spread thinner and putting stress on the funding stream. Without this funding, deploying the best and effective technology could be compromised for this northern region of healthcare.

The broadband needs in healthcare will only increase. The technology innovations of 10 years in the future will make today's technology look simple and antiquated. A 100 megabyte or even 10 gigabyte connection may seem small compared to the future technology need and innovation, such as artificial intelligence and machine learning.

Our mission at UPMC Susquehanna is "to extend God's healing love by providing outstanding care today and shaping tomorrow's healthcare through clinical and technological innovation and education." In part, this can only be achieved, especially in our northern tier at locations such as Soldiers + Sailors Memorial Hospital, Cole Memorial Hospital and the surrounding provider offices through proper and economical broadband support.