

SPEAKER 1: My name is Dr. Bart Demaerschalk. I'm the vascular neurologist, and Medical Director of the Mayo Clinic Telestroke Program. I'm joined by my colleague, Mr. Dwight Channer, the Mayo Clinic Telestroke Program Manager. And RP7, which is a five-foot-tall, robot telemedicine platform, that allows telestrokeologists just like myself, and my colleagues, to transport ourselves in a virtual fashion hundreds or thousands of miles away, and provide immediate urgent neurological expertise to patients, hospitals and communities in need.

Mayo Clinic Telestroke began as a conceptual idea in 2005, with a tremendous recognition that telemedicine technology applied to consultations with emergency stroke could overcome and fulfill a need in the state of Arizona. With the recognition that 40% to 50% of individuals that inhabit the state are not close enough to receive emergency stroke care from designated primary stroke centers with neurological expertise.

In 2005, the idea was born. In 2007, Mayo Clinic participated in one of the preliminary randomized controlled trials comparing telemedicine audio video consultation for an emergency stroke patient to a traditional telephone communication between the emergency physician and neurologist. Telemedicine was found to be superior.

And thereafter, the Mayo Clinic Telestroke program emerged into a three-year-long registry called, STARR, Stroke Telemedicine for Arizona Rural Residents, which allowed us to carefully, and prospectively chronicle every patient with an emergency stroke in up to nine centers in the state, and the data concerning their EMS emergency hospitalization and care.

The Mayo Clinic Telestroke program benefited tremendously from funding from the Arizona Department of Health Services from 2007 through to March 31 of 2011, allowing us to develop a hub and spoke model, which has grown from the original two participating centers in Kingman and Yuma, to a total of 10 centers currently.

From as far south as Bisbee, Arizona, Copper Queen Community Hospital, Yuma Regional Medical Center in Yuma. And then along the west borders, Parker La Paz Regional Hospital. Kingman, Kingman Regional Medical Center. And then more centrally, Verde Valley Medical Center in Cottonwood. Flagstaff Medical Center in Flagstaff. Newest additions including Cobre Valley in Globe, and Summit Hospital in Show Low. And also care provided to a metropolitan urban hospital, Maricopa Integrated Health System or Maricopa Medical Center here, in Phoenix. We're also excited about a new participation out-of-state with Heartland Regional Medical Center in St. Joseph, Missouri.

So the network has grown from two participating spoke hospitals affiliated with Mayo Clinic Hospital through the Telestroke network, to a total of 10, with plans to continue expansion to the neighborhood of 30 or 40 spoke hospitals during the five year service line expansion.

We are absolutely impressed with what we've learned over the years of Mayo Clinic Telestroke. Recognizing that this telemedicine modality is both efficacious and effective, as well as safe and cost effective.

Our research, which is integrated into the clinical practice service line, has informed us that stroke neurologists participating in consultations by audio video telemedicine can provide 96% accuracy in the diagnosis of the stroke syndrome, and to determine that the patient is eligible or not for acute stroke treatment, including clot busting medication, tissue plasminogen activator.

Up to this point, we have consulted on over 500 emergency stroke patients in rural and remote centers in the state. We have provided outstanding quality performance and outcomes. The telestrokeologists, in other words, the stroke neurologists on-call for this service have fulfilled the service with a one minute median response time to the requesting emergency physician in the remote emergency department.

The consultations themselves take approximately 20 to 30 minutes to conduct. The neurologist also has an opportunity to review the neuroimaging or brain scan, CAT scan of the patient, as well as conduct an examination of the patient, the family and relatives, and collaborate with the emergency physician on the diagnosis and the appropriate emergency management plan.

Much money has been saved. We have successfully reduced transfer rates from approximately 80% to 90% down to approximately 30%. So the vast majority of patients following the Mayo Clinic Telestroke consultation are fully capable of being managed in their home hospital and in their community. So reducing the expenses of ground to air ambulance transfer.

We estimate that this Telestroke Network, like others, is highly cost effective if one utilizes a societal perspective at a long term viewpoint, it probably costs no more than \$2000 per quality-adjusted-life year saved, by implementation of the Telestroke network, compared to the standard, which has been in existence up until now. It's cost effective, almost cost saving. And provides insurers an opportunity to regain and improve patient outcomes and also at a reasonable cost.

We have learned that in the state of Arizona, outside of major metropolitan communities like, Phoenix and Tucson, most residents don't have immediate access to emergency neurology providers and expertise. Telemedicine consultation allows those neurological experts to be at the patient's bedside in a virtual manner. It provides tremendous assistance for the local outstanding emergency physicians that practice in remote and rural locations in our state.

Patients presenting to an emergency department with an acute stroke syndrome wouldn't ordinarily have access to neurological expertise, but Mayo Clinic Telestroke allows that to exist, such an emergency physician can dial a hotline, receive access to the Mayo Clinic telestrokeologist that can be present and in a collaborative manner, interact with the patient, their family members the nurse and the physician, and help with a collaborative diagnosis and emergency assistance, all of this occurring in the patient's and family's local community without the need for travel.

SPEAKER 2: Breakthroughs in technology are happening at a breathtaking pace. No technology has benefited more from innovation than the internet. Most people are familiar with the internet in terms of websites, browsing, email, instant messaging, but there's so much more to this technology.

Mayo Clinic Telestroke has leveraged the advancements to apply this in a field that we believe is up and coming, and has relevance in terms of patient care. We're able to provide expertise over distance by leveraging internet technologies.

Smartphones, tablets, PCs, have benefited us greatly. Mayo Clinic Telestroke is able to provide two-way audio visual communication over distance using these breakthroughs in internet technology.

Doctors are able to see patients over distance without restriction of bricks and mortar. The technology has really removed barriers that once existed for rural communities that don't have access to expert stroke neurology care. Mayo Clinic Telestroke by leveraging technology developments and advancements, is able to provide care over distance.

As an overview, the technology really provides videoconferencing capabilities. Doctors are able to communicate in real time over the internet. It's two-way audio visual communication. We have access to important brain imaging, again, over the internet.

There are a range of tools, we'll call it a tool belt, that our providers have access to, for performing consultations over distance. That range can go as complex as robotic equipment that our consultants are able to interact within the distant environment, driving a robot around if you will, with their face on the screen able to communicate as if they were in the environment themselves. All the way down to a simple fixed computer on wheels that is rolled around in the distance environment. Still, the key is two-way audio visual communication able to at least interact with the patient, the providers on the distant end. Within that context, we have multiple ways to access those types of equipment.

The providers are able to communicate over their phone. There are applications now available for smartphones that allow videoconferencing over the phone. We're able to review imaging over the phone. These are the CAT scans of patients that have acute stroke symptoms, we have the ability to review those imaging over smartphones, mobile tablets.

Traditional laptops, fixed desktops are still available, but as the technology has grown, developed, we have been able to take advantage of the breakthroughs. Technology is getting smaller, more efficient, and it's allowing providers the ability to do more, be available in different instances, the mobility factor is this is huge.