SPEAKER:
Recording in progress

ARIA JAVIDAN hello everyone, my name is aria Java, welcome to the latest in a series called Connecting Closer To Home - Why Broadband and Telehealth Need Each Other, which is hosted by the Telehealth Technology Assessment Center.

Just to provide a little paragraph. Located around the country there will national centers, one focused on (unknown term) and the other focused on telehealth.… And supporting telehealth access services in communities.

Just a few tips before we get started today, your audio has been muted. Questions will be answered at the end of the presentation. Please only use the chat feature for communication regarding technology issues. Please note that close captioning is available located at the bottom of your screen.

Today's webinar is also being recorded, and you will be able to listen to past webinars as well as this @telehealthresourcecenter.org.

With that, I will welcome Jordan Berg from the Telehealth Technology Assessment Center.

JORDAN BERG:
My name is Jordan Berg, I am the principal investigator for the Telehealth Technology Assessment Center just wanted two razor centers for TTAC, the other being in California, we are the Telehealth Technology Assessment Center out here in Anchorage Alaska.

I am a long time Alaskan resident and I have worked with the tribe (indiscernible), the last 12 years has been in telehealth medicine. I get to talk about something that matters a lot where I live, and hopefully matters where you live which is talking about -- broadband and telehealth and how they really need each other.

Let's talk a little bit about who TTAC is, we are your federally funded telehealth resource Center through the office for the advancement of health. Telehealth works from infrastructure to resource devices. We work for 12 regional TRCs – and we also work with organizations and individuals throughout the country.

This is our team: you can see, I may be wearing the exact same shirt, then they are talking about

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telehealth technology. Condition is our marketing specialist and (Name) is our technology specialist. If you happen to any regional conferences seen our tech showcase, you probably met me and Calvin. Patricia tends to work a little bit behind the scenes.

What are some things that TTAC does? We provide technical assistance to individuals and organizations, as well as resource centers. We maintain a wide variety of (indiscernible) which feature articles about telehealth technologies that we think are interesting might have impact on telehealth applications for organizations and individuals.

We have a variety of special projects we are engaged with, and right now we are finishing up our reports for our tilt technology survey that we did back in the spring. We are pulling together some of the conclusions from that.

We are going to talk a little bit about the telehealth broadband pilot program today, which is a measurement program for broadband in underserved rural communities. We will get to that.

And we also do something that we call the telehealth technology showcase, where we travel to a variety of events with about nine cases of telehealth equipment, we let people try this technology in a neutral environment where we can talk about technologies that are advancing telehealth in medicine.

That is what we do in general, but what are we doing today? Today, we want to provide you with an overview of some of the key things that you might need to know about broadband in telehealth.

We're going to start with the definition of what broadband is, focusing on kind of some of the key metrics that we want you to measure and be aware of. We want to talk about how broadband matters to digital health and telehealth. We are going to get a little overview of what (indiscernible) broadband is in the United States, and some of the steps that are being taken to measure broadband availability.

Finally, we will leave you with some resources to further your learning in the space, and give time for questions at the end.

I wanted to, at this point, talk about who is the audience that we kind of root this presentation for, and want to set some expectations as to what we are going to look today.

So, this is for patients who are looking to connect, and what is important to consider patients need to connect to services you are offering and providing. This is for digital health providers that are providing these services to consumers from their home.

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So, if you are a provider delivering care from your home or if you for supporting providers delivering care from home. Again, a lot of the topics we have are going to be consumer broadband and consumer connectivity, as we see this is the space for the most amount of growth we want to focus in on. So I just wanted to set expectations as to what the broader topics are going to be.

A high level, and this may be things folks know, but we want to make sure that we start with the very beginning. So, we talk about broadband and what are we talking about when we talk about broadband? Well, broadband is internet access that has two main features: one is it is always on and 2 is it is always fast.

This is defined in the US national broadband plan that was published way back in 2009. Some of us will remember the days of dial-up internet where you had a phone line and you connected to the phone line through your phone modem and it made a bunch of noises. And if anybody was on the other line, it will disconnect you from the internet. You actually think that phone line and it was periodic: you are periodically connected and disconnected from the phone line. And, it took you about 20 minutes to download an image.

So broadband is always accessible and always on and is always fast, to some degree of fast. That definition has changed over the years, and in fact it has recently, as of March, the FCC has updated what the standard for broadband activity is.

As of 14 March, disputes considered to be broadband speeds are 100 Mb per second download speed and 20 Mb per second upload speed. So, we will talk right now about what we mean by upload and download speeds. And, we will talk about what megabits per second or first. That is a good that you do.

Information moved across the internet is moved in something called bits which is basically a 1 or 0, which means everything can be broken down into multiple steps eventually becomes bits. This is the information we move across. Megabits per second are millions of bits per second. This is the measurement we use to track how fast the internet is per second. You have gigabits which are a thousand megabits. We will talk about gigabits and megabits, but they are measurements of speed for connectivity.

When we talk about on low speed, we are talking about is your ability to pull information from the internet. So fast can you download a video? How fast can you pull a document from the internet? How fast can you access images and a webpage?

That is all based on your download speed. Your upload speed is how quickly you can share information to the internet. So, upload speed is, in a videoconference like this, my camera is sharing information and

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I am also sharing information from my slides, here. And, how fast can I get that information from where it is that with me to another location, to the recipient on the other side?

Historically, we have consumed from the internet more than we have shared from the internet. Download speed has been more the priority, so you can see this is an asymmetric connection, where the hundred megabits download speed is higher than the 20 Mb per second upload speed.

When you are watching a video, consuming content or shopping, the more important is the download speed where you can pull information, read it quickly, and collect the data that you need.

Upload speed is something that is more important with the advent of videoconferencing. Videoconferencing is something where it is important that my video and audio get across the internet quickly.

One of the things we really try to focus on is that you can get a really high download speed number, but the applet speed number — especially to do life telemedicine visits and videoconferencing — is more important that we are managing and are aware of.

Just for historical context, this is the new standard from March 14, 2024. What was it before this date? It is actually increased from 25 Mb per second down and 5 Mb per second up. The standard that the FCC has put up as more than quadrupled in applet speed. This reflects the higher demands we are putting on our internet conductivity now, and we will talk about what is dictating a demand in a couple of slides here.

Continuing our conversations about what is broadband, she talked briefly about the different types of ways we can connect to broadband speed internet. Again, broadband speed is fast, always on internet. Can we connect to this?

In order and speeds that these technologies support, we are going to talk first about fiberoptics. Fiber-optic, in terms of deploying networks across the United States, fiber-optic is the gold standard. It is very, very fast, it can transmit data over long distances, and it actually uses glass tubes inside of the cable to transmit those bits, those ones and zeros with little bursts of light.

So, we get speed through the cable that are approaching the speed of light, is about 70% of the speed of light. This ability to transmit this information can happen very, very quickly. What we see in the little image there is that you actually have a number of these many glass tubes that can stretch over very long distances and these pulses of light are transmitted down his glass tubes so that you are actually using all of the tubes at once so you can transmit those bursts of light back and forth are really incredible speeds.

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What speeds are we talking about when we talk about fiber? So, instead of measuring speeds for fiber in megabits, we are actually considering speeds in gigabits. You can have up to 10 Gb per second through a fiber connection. Most of the commercial plans that are offered are going to have speeds in the range of 1-10… But when we see speeds that are (indiscernible), that is more than enough to meet that requirement.

Fiber is interesting because it is also symmetrical, so he can receive as fast as it transmits. You will see your upload and download speeds should be or can be the same through fiber connection.

So, one of the challenges with fiber-optic connectivity, are around the availability. According to broadband now, with .com, we have many of the US communities that have broadband internet. This will change rapidly as we have funding opportunities rolling out across the United States, and that is one of the things that is being a major point of focus: getting these fiber lines installed to serve these communities, the rural and underserved communities. This is really our way of getting the fastest speeds to the most people.

But again, fiber does not come to everybody's door. A lot of communities are waiting in the wings for fiber come to their communities. When it does come, it will have substantial impact on the quality and speed of internet to these locations.

Another common platform or at other comments in the broadband connection is capable. This is using coaxial cable, the same type of cable that actually goes into your cable box. Again, another type of technology, although court cutting has been prevalent lately, but that is another cable that comes to your house. Keep can be used to connect to a cable modem, which can provide fast speeds as well as the

Cable speeds tend to be any hundreds of megabits range, up to a gigabit speed that you can get through the cable modems. They are not symmetrical, they tend to prefer download speeds to upload speeds, and they generally are not a dedicated connection. The cable comes to your wall can have variable speeds, depending with doing on the cable network and your community.

I think that assessing this, particularly during COVID, we seen this fairly often when people were trying to work from home or doing school work and use these consumer grade broadband connections. We would notice a slowdown on these cable networks.

DSL is another technology. It actually uses phone lines, so the copper phone connections that we have. These are typically more affordable and they are widely accessible because the phone lines are kind of everywhere and most homes have a phone like connection into them.

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They tend to be 20 Mb per second with the download and 1-5 Mb per second with the applicant.… We are definitely talking an order of magnitude less than some of the other connection times we have looked at.

Other key broadband technologies are satellite. We have actually seen -- the benefits of satellite are that we do not require terrestrial infrastructure. When we talk about fiber, which is about playing fiber and getting fiber to communities.

Well, with satellite, you do not actually need what we would call "terrestrial infrastructure" or hardware that is on the earth. What we are looking for is a satellite dish, and sometimes communities are served by large satellite dishes that actually connect to other technologies like cable or light DSL and they have repeaters. You have one satellite that is collecting all the information and transferring it out to communities. We see a lot of that here in Alaska.

But a lot of times these satellites are for one individual residence, so each satellite is connecting to the satellites from these dishes. This means that you could be really anywhere, as long as you can see where that soft but it is in the sky, you can get connectivity. So, there are two main types of satellites that are providing connectivity: one is the GEO -- geostationary Earth orbit. The earth rotates with the satellite specific distance away, always looking down at the earth this provides a stable way to look at the satellite. We can see the satellite open sky that is always over our heads, that is a geostationary satellite.

The other type is a low Earth orbit satellite, and this is been used in (indiscernible) for decades now. The challenge is, because the satellite is so far away, we tend to have far more latency ranging from after the second to a full second for the satellite to go out, bounce back to another receiver and for that connection to go down on its way. What we end up with is latency for the lag that it takes for that signal to go up into space, come down and for the signal to be returned. In video, it is very easy to notice this.

You know, we have all had issues where we try to sing happy birthday over soon, and everybody is the off because there is a delay of 1/4-1/2 a second, and with a satellite that can be up to 1-2 seconds. You were not able to go!

Most of the time it doesn't matter with video,… But Ford just in time to locations or applications that require low latency, this is a big challenge.

The other kind of key satellite technology we can think about is low Earth orbit. This is an emerging technology. There are a few providers out there that are providing these low Earth orbit satellites. These

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outlets are much closer to the earth, moving much faster and they are doing multiple laps -- orbit of the earth really pretty quickly.

So they are not the geostationary that we can always look up and see that satellite, these ones are coming up over the horizon and setting over the horizon pretty frequently.

How do we do internet through those? Well, we have -- constellations of these low Earth orbit satellites. There could be hundreds overhead at any one time. By linking the satellites together and handing off traffic to each of the satellites, we are able to build a network, and internet network, of these low Earth orbit satellites.

What are the benefits of these low Earth orbit satellites? We can support speeds of anywhere from 50-250 MB per second, and Starlink is a good example of this. We do have a lot of Star link connections up here in Alaska.… Hundred and 10 connection, but that is incredible speed for a satellite connection, and they tend to be lower latency.

Where we were having 700 ms delays on satellites, is about 1/4 of a second one-way, we have met! 50 ms delay on the low Earth orbit satellite which is less than 1/10 of a second so these are much faster, much lower latency connections that are available.

They are a new technology. Some of the challenges we have with low birth orbit is the same thing we have with fiber: these constellations are being built, there are thousands of these devices out there now, and we are starting to have pretty robust networks of these low Earth orbit satellites, but they are not fully deployed yet. Not every community has served equally.

But, once these are connected, but he and the world should be able to look up in the sky and see dozens of these satellites and have pretty fast connectivity because of the sample.

The last type of internet connection we want this is considered from and in other instances it is not, but it is important for us to talk about cellular connectivity. Cellular connectivity… Which uses the same kinds of SIM cards in your phone, maybe using multiple SIM cards, they are able to pull down fast speeds using the latest 5G technology and, these are ubiquitous, they are everywhere.

Everyone has a cell phone, everyone has a data plan – I say that, but there are challenges because not everybody has them. But these are very very common and a lot of cases, where we reach to patients, they may not have a broadband fixed internet connection, but they will have their mobile plan and connectivity through that.

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So, what are the challenges with this? This is a common way for patients to connect. We have 4G, 5G which really support fast connections. The issue with these is that there is a lot of variability around these data plans, around the cellular connectivity that we have to take into account.

Wotton, is that the strength of the cellular connections will grow or we can depending on your distance from the tower, depending on the couch amount of towers in your area. You could be in one place in the community, have good connectivity and really fast speeds from your cellular connection, and then you drive to another community and all of a sudden that same network and same connection you had on your phone is nowhere near as fast nor robust and is more prone to fail.

The other thing we see is a lot of cellular connectivity, there are still plans that are charging for gigabit. So the actual amount of data you are downloading, the actual data you are streaming on a video call can we attack -- tacked on your bill. So you could be paying overage these. Especially for lower income folks, we are choosing through connectivity and other things you need just to continue to live, those expenses and overages can become really detrimental.

The other thing that tends to happen in these plans is that even if you have an unlimited plan, the ISP — the cellular provider — once they see you have reached a certain amount of data, they can travel you -- throttle you.… They can cap you. So you can go from having a fast connection, but once you have used up your amount, they can throttle you, reducing your speed.

… Let's talk a little bit about why this matters to us why this is important. With the couple of examples of what the infrastructure looks like for connecting for digital health. I want to talk a little bit about the impact that this has.

So, broadband really is fundamental to what we are trying to do in digital health. We have to have stable, fast, high quality internet connectivity to create the opportunities to deliver digital health.

Good internet is really helpful for when we need to deliver just-in-time care, whether that is behavioral health, emergency consultations, urgent care, people in crisis. They need to be able to connect when they need to connect. So, having good connectivity that is delivering consistent speeds and that is not being throttled by ISPs or plans, that is a vital element for digital health.

Good connectivity allows us to provide good health -- digital health services wherever the provider needs to deliver them from. That could be a home environment, work, school, anywhere they are. That comes with its own set of challenges, because if we are a provider delivering care, there are things we need to make sure of that we are not delivering telehealth from the beach, that we are not in places we can be overheard. This raises privacy concerns from the provider side and from the patient side. Making sure

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that we know the locations we are delivering care to our secure and that we're doing what we need to do make sure we are maintaining the privacy and security of those locations.

And, the reliability of the networks. If we are doing these telehealth visits we are on the move, we are switching from tower to tower for example for cellular connectivity, that increases the likelihood that the call could be dropped or we can have that outcome/that activity -- that connectivity.

We want to make sure we are getting the care is needed, but that we are taking steps to make sure the connection is solid.

Broadband connectivity is a prerequisite telehealth. The image we have here, these are the four pillars we build telehealth on, right? We need access and services, we need providers to be able to access the tools we/they need. We need to make sure that the provider is digitally literate and they can access the technology, and reap the benefits of being digitally connected.… Finally, good connectivity is gives us the ability to give good care. This allows us to provide healthcare will remain not have otherwise.

So, I wanted to provide a little before and after – I'm going to go back, sorry.

So, those of the philosophical reasons why this matters, but I do want to give couple examples of what the sorts of things are that we can do with a stable, high-speed internet connection.

We can provide video visits, primary care visits from a patient home to a clinic. We can provide consultative services from clinical or hospital environments. We can provide individual conferencing for group conferencing, where we are bringing in family members or other specialists who are able to do not just one participant on call, but we can support multiple participants on the call.

We can provide… Where these are reviewed and sent back, whether between writers or a patient and provider. We are able to provide support for location monitoring and using blood pressure monitors, weight scales, and devices that need to be recording this information on the cloud or EHR.

We are able to provide hospital services where we can monitor SPO 2 and vital signs and telehealth visits, and be able to keep patient outside of the hospital and provide these high acuity detailed medical visits to patients at home, instead of having them stay inpatient.

We are able to access our EHR when we needed, so access to records and images, notes so that we can actually deliver care from really anywhere that we are able to access these resources.

And finally, we are able to put in patient information like fitness tracking for data that they are collecting

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low devices or glucometers or all the other ways we collect digital information stored and send it and do it with providers.

The next section here, I like to do — well I'm doing it for the first time, but I want to call this, "A tale of two telehealth." I want to draw a contrast between the way we used to do to level in the way we do it now and show why the connectivity is we used to have not really up to the challenges… They are not meeting the needs for the telehealth we are trying to deliver.

So this is the way that it was, the way it used to be: typically for a telehealth visit – and with confinements to video this is, videoconferencing – we would connect to a video visit we would have a dedicated Cart… And it connected to the internet and they could probably connect to a dedicated internet connection, media subsidized line that was needed specifically for telehealth or at least just for -- subsidized for that medical clinic for telehealth care.

All the traffic was handled through on-site premises servers. The connections were happening locally, within the organization. All hardware was integrated into the cart, so you had an exam K hardware plugged into the device. It was customized to do the one job it had: videoconferencing, and you have staff on the ends.

You have staff with the video card on one end and this was a one-to-one relationship with every well understood and points and really well understood connectivity. That's the way it was.

Was the way it is now? You can see we have a much more complicated view.… They are accessing information through the Cloud, which may be… We will be connecting to the cloud through a private network, to ensure that data is being secured and that can add a certain amount of overhead.

Then, we are connecting from these locations through the internet, through cloud-based services to the patient wherever they are. I put patient location because they may not be communicating from home. He might be connecting from a laptop, from work, from a tablet.

But we connect to the patient through their modem which goes to their modem which provides connectivity to whatever the location is and then a variety of devices.… We have general devices: the phone, but for the laptop they are using 10 to 30 different jobs and not just the one from the previous situation.

… Is considering consumer software rather than being the dedicated software for healthcare that we had had previously, so that requires a lot more back and forth through the internet to the resources that we need in the back.

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We have a lot of telehealth peripherals now that connect to their own cloud storage. They are actually connecting with their cloud and maybe connecting back to our EHR and sending that information through the loop. We have various provider locations where supporting.

We can see that the way we are doing our telehealth now is different. Other advantages to doing it this way keep absolutely there are. And this is why we do it this way: the platforms connecting to the video platforms are accessible and easier to deploy and easier to scale and easier to reach the patients. Now we are able to reach any patient because of using these tools for the internet, through the cloud infrastructures. We don't have to support all this infrastructure at the hospital or clinic providers has. We are able to offload a lot of that to providers that are able to do this for us.

So let's take a look at these two tales of telehealth: the way it was is we had specialized hardware, he had been located -- dedicated networking, special hardware.

The way it is now, we have dedicated devices that can be doing jobs all at once. We are running shared networks and circuits. It's going out as the same traffic as everyone else, especially when we reach the patient's home location. There could be YouTube or games or school work being done. We are on is more congested networks, but all of this is more affordable than it has been. The cost for more speed and more axis has gone down.

The way it was, it was difficult to upgrade and expand these telehealth systems once we got them, so we would end up with these cards that we would have to support for years and years and years and the cost to maintain the software became very expensive. Sometimes these cards just stopped getting used and were covered with dust.

But, the advantage would be that they are local and we have the minor networks we were able to manage them. The disadvantage was they were local, so we knew the endpoints they would be, and they could only be in those locations.

What is it like now? Well, it is easier to expand our telehealth communities through software and web-based applications and through consumer great hardware. It is hard to manage that hardware, to know where it is at and know the environment it will be interacting from, but this makes us a lot more location-agnostic. We can come from a variety of different connection types.

All this to say that there are a couple of key takeaways I want to make sure we are pointing out here to ensure we are understanding: we have gone from really emphasizing the portents of institutional networks, these subsidized healthcare connections. Making sure our clinics and hospitals and schools

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and libraries have connectivity.

To understanding that these residential networks are where a lot of the value for some of the things with telehealth being delivered. So, we need to be able to have good connectivity both in and out of these home locations.

We need to be comfortable and familiar with connecting to personal devices. Particularly when reaching out to patients. So, making sure we can navigate their wireless environments, if they have cell phones and data plans that are expensive, we can recognize this and offload some of the costs to the patient… We need to understand the cost to the patient.

We are looking at different hardware and software configurations which can bring challenges. And, we need to understand the importance of computer literacy. It is not just connecting one to another with a single button push and you are on the call. We need to make sure everybody is comfortable with the technology, how it works and why we use it.

So simply embracing the challenges we have managing all of these different variety points: more points, buried locations, this is the new normal.

Alright, I do want to talk about the state of broadband in the US and some tools that are being used to identify some of these residential gaps and how interested.

There is a lot of question how many people in the United States actually do not broadband access. We have gotten a variety of different data sources. The FCC says there are about 14.5 million, and this data has changed. Now that we are dealing with the hundred megabits down and 20 Mb out, this increases. The more people that were in that 25/3 are no longer in the 100/20.

Some organizations actually indicate that this is reported by the access reported by the FCC data is probably not counting everybody else, which will talk about an event.

Microsoft, in 2020, did a test about speeds coming off their devices. They updated this and said they were close to 120.4 million people who did not have access to this.

These numbers go down significantly year-over-year as more fiber gets deployed and more broadband access to rural locations but it is a problem.

The other big issues we have to address is that historically, rural and tribal America lag far behind the rest of urban America getting system broadband and having access to affordable connectivity. We also

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see in urban areas, affordability limits access to care and the key limiting factors there are the ability to access the services and how much the services actually cost.

We have to consider where the services are being delivered, and then how much actual connectivity is to access the services. An individual may be able to access a good plan, but if they cannot afford to pay for it, mainly because they have to go to a DSL connection, or it may be a need to go to their local library to connect to telehealth services. This may be a problem.

The lack of this digital access is reinforcing a lot of the same social and economic disparities that are already went in our society, so this digital gap, this digital access gap is actually/could be exacerbating a lot of the other social inequalities that we already have.

What else has changed? We have had unprecedented investment in broadband across the United States. The first thing we have here is the affordable care program. This is a program that actually gave money or subsidized internet connectivity for individuals, for consumers. And, it actually helped consumers get devices.

This program was funded through the FCC. Prior to that 14 billion that was funded for that, it was all spent at ended June 1, 2024. This program is no longer there, but it was a major investment for consumers and trying to help consumers access to affordable connectivity.

Some ISPs continued to deliver the services for former affordable care members at those reduced rates, just with them eating the subsidized costs because they have had more people actually sign up for services and maintain these services.

Another major source of funding is the BEAD funding which stands for broadband equity, access and deployment program. $42.45 billion has been used for band expansion. There has been 56 eligible entities determined, states and territories, applied and have been equity access in employment plans, BEAD plans. These are in the process of being finalized and approved, and it always will soon be rolling out for BEAD deployments.

Another form of funding is the digital equity act which is focused on making sure that access to digital equity is available. This could be device access, digital education, making sure that people know where and how to access these resources. So this is in the middle of rolling out. Each state has been given money to create a digital equity planning grant. Each state has approved plans to received capacity grants to improve their digital equity, according to their digital state plan. And there are a variety of competitive grants that can be applied to to get money for non-state, nongovernment organizations to enhance training and reduce the digital gap.

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Broadband USA is hosting a variety of broadband webinars. This is open to a lot more stakeholders that the government funding deficit. Submission date is September 23, 2024. Broadband USA has a lot more information about this if you want to participate.

Spent a lot of effort measuring the gap in connectivity. There are a couple of maps I want to point out here: one is the FCC broadband map which are to overlaying each other. The fabric map is a measurement of a map of locations. What are all the locations, houses and people we can serve to get broadband to?

Overlaying that is the broadband mapping which shows the services the ISPs in those locations.

The 2nd we have here, so the SEC broadband map shows the potential for connectivity in these communities, as reported by the internet source providers.

The map below is broadband mapping.com using public data sets like (unknown term) and some of the other public speed tests that people can take, and acting that geographic locations. There are a few programs that do this mapping, but this is filterable by ISP and overtime and you can see the speed tests are and how they are landing.

I want to talk about program that TTAC has been working on: telehealth Broadband Pilot Program. This has been going on for the past two years. Our focus is on four states: Alaska, Michigan, Texas and West Virginia. Within those states, we have 20 different counties that we have been working with, working in evaluation partnered with the University of Arkansas medical school, the rural telehealth evaluation center there in processing the data and looking at the data we are collecting there to generate reports and trends in findings from the data.

Then, we have been partnering with Exactly Labs who have provided the tools I'm about to show you.

But before we get into that, why are we doing this? When we think about the internet, we think about a light switch: either you have it or you do not. The promise that we have is that the internet is not binary, it doesn't flicker on and off. We can have outages, because in reality it flickers. We can have spikes and outages. When it flickers, we can have friction in telehealth: maybe the provider is not able to access talk to the agent, the audio is garbled. Maybe a telemedicine tool exam camera is not able to get images.

So, how do we measure that flicker? One of the things we are looking to do is we want to be able to test not only in a moment and just a lot of the tests we take – which is do we have a problem or how fast is my internet, we take his beat. That's great, that's a snapshot.

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So telehealth build pods, built on a raspberry pi, built on a testing software. We run to test and we can run this with a lot of frequency. We can run hourly tests, 50 minute tasks, we can run tests over any given period of time which gives us the movie of that connectivity. And it gives us a movie download to a network level, granular, rather than house or ZIP Code or census area.

Here, you can see some of the pods we have deployed through the city the last -- the state of Alaska, and we are able to conclude some interesting trends from this.

Some of the other tools we have worked through the program is that we have a speed test widget. You can click this onto a website and get those speed tests, again no snapshots. We can affect this into any website and collect that data at that/for that to get a group of people. If we had a particular project that required a speed test, that is something they can do. Then we can report back on the data and map it over time using that speed test data.

You also have a mobile app which does interesting things for us: 1, it allows us to do a speed test on demand. The other thing it does, when we did not background moved, it measures cellular connectivity just like one of our pod begins can do on an hourly level for every 15 minute increments.

When we have that cellular activity and we can run these tests were time, we can do is drive around the community and map out what the cellular community looks like and map out those dead spots.

This is a trend that was done from Anchorage down to the homework area. -- Homer area. We were able to map these dead zones where the internet came back, where is strong and where this week.

A couple key trends we found with the (unknown term) is that the challenges are maybe not what we expected when we started looking at this. Some of the things we are finding, some folks that are testing their internet, if you have the internet. We are actually measuring that their internet might be OK. The challenge is is there is something beyond the internet be with you to their door: may be older equipment, and older router or modem?

… A lot of times we can have these individuals go back to their internet service providers, get a new modem or router and all of a sudden they get speeds much more closer to what were advertised.

Some of the other challenges we have seen are around micro outages where internet will kind of go out for a period of the day. It may last one minute, 15 minutes, but it is unexpected and so the users are not sure if that is happening at the ISP level, at their network level, but we have multiple pods at the location and we can see if it is an outage in the garage or if this is just for the user. It might be something they

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have going on in their local network, with the router.

These little micro outages can really be impactful, that is when you are doing your care. These are friction points we talked about.

I wanted to leave you guys some resources. We have laid out a lot of the information for you: we talked about why it is important when we are talking about telehealth but where should we go?

There are a variety of different resources and I will go through all of them,… They have made a requirement for these nutrition labels for each plan which is a really great way to pair with different testing tools to say, "You getting what you expect to get from your ISP?"

You can take a test, look at this nutrition label, and actually get useful information to say that yes, I'm getting what I'm supposed to be getting so it's probably not an issue with my ISP. Or, this is not what I should be getting, I need to have a conversation with my ISP to get these numbers up to snuff. This is a great way to see if you are getting what you are supposed to be getting.

Please submit your questions through our telehealth technology to work, because I see we are out of time.

ARIA JAVIDAN:
We are out of time, so we don't have time to answer those questions in the Q&A, but I will make sure to forward those to you after the presentation. And if you have questions, you can always contact the TTAC.org

Just a reminder that our next webinar will be held on -- Thursday, September 19 will be on accessing telehealth points across Oklahoma.

Lastly, we ask that you complete the survey that will pop up at the conclusion of this webinar. Your feedback is very valuable to us. Thank you again to the Telehealth Technology Assessment Center and thank you to Jordan for his presentation. Have a great day everyone!

(End of Webinar, 3:00 PM ET)

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