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Future Forward: Innovations in Hearing Aid Connectivity

Presenter: Erin Johnson, AuD

All right. Good morning or afternoon wherever you may be in the country. My name is Dr. Erin Johnson. I am an education and training audiologist with Starkey and happy to be here with you today. Just in case in the last couple of seconds we've had anybody else log on, we'll just cover those quick Housekeeping points.

I know Melissa just mentioned them, but we want to make sure everybody's on the same page here. From the housekeeping standpoint, if you would like to ask a question during the presentation today, you can do that through the chat or the Q and A section. I will be watching those and answering those throughout the presentation. Or there may be some that I reserve for the end of the class, but we'll make sure those questions get answered as we go along. Today there is a PDF handout of this presentation available for you in the pending courses on Audiology Online or by clicking the link in the Resources tab within that classroom.

Today there is a CU available for this session if you do participate in the CU program offered by Audiology Online. So after completing the course you'll go to your pending courses and pass that short multiple choice exam. And you do have seven days to complete that quiz and then 30 days if you are reviewing this recorded later. And finally, if you do need any technical assistance, please stay logged in and request that help by using the Q and A or by calling or emailing Audiology Online. There are a few kind of risks and benefits associated with today's course.

We've got all of those details listed here and they will be again in the handout if you would like to review these in more detail.

So today's learning outcomes for this course we want you to be able to know the difference between the different low energy Bluetooth protocols. Name three of our streaming accessories that are compatible with our current Edge AI hearing aids and be able to identify some of the benefits of the new Universal LE audio protocol. So some exciting topics today. All of the materials in the CEU courses are

based on evidence based information and again all of this content is available to you in your handouts if you would like to review any of this particular information.

So with that we are going to dive in again. I'm very grateful for you joining me this morning as we discuss how we can achieve success with connectivity and accessories. So I don't know about many of you, but when I entered entered into the field of Audiology, I had no idea that eventually we were going to not only have to be hearing aid experts, but also be experts in mobile phones. And Bluetooth technology and this idea of connectivity. And I only entered the field of audiology, I started grad school in 2007.

But we've seen a huge shift in the industry over these past few years when it comes to this idea of connectivity. So what we want to dive in today is a little bit of the history of what we mean by this term connectivity. But one of the great things about the field of audiology is that it is always evolving. We've been able to see this hearing aid technology grow and embrace advancements in technology over the years and, and if we take a little bit closer look at this timeline, it's actually quite fascinating to look at the history of this. So if we go clear back to 1937, a gentleman by the name of Joseph Polyaka filed for a patent in the UK on an induction loop hearing assistance system featuring what was called a telephone coil, which later would be shortened to telecoil or T coil, which we're all very familiar with at this point.

This was really designed to pick up the magnetic field produced by a telephone handset speaker coil, which could then be converted back to an audio signal. Now this patent was picked up by the UK's Multi Tone Electric Company in 1938 and they are the ones who then brought it to market. And it was really what is thought to be the first telecoil enabled hearing aid. It was called the Multi Tone vpm which really fit into a user's top pocket. So think kind of body worn hearing aid and they used it with external earphones now kind of progressing on.

In 1968 the first personal FM product was released by a company called Phonic Ear. And this was really revolutionary at the time because it was a fully wireless product enabling people to move around a physical space such as like a lecture hall and still hear that speaker clearly. Now this first iteration of FM systems was quite large though and had multiple pieces which obviously would be quite cumbersome for those users. Now if we go back to 1999, this is where we had the first ever Bluetooth device being revealed, which was a hands free mobile headset. And the following year the first mobile phone to utilize Bluetooth technology was released and that was the Ericsson T36.

Now this technology has since evolved significantly over the years, but that Bluetooth classic technology allowed continuous wireless connection and used what we call a point to point network topology and it allowed it to establish one on one device communications. Now today Bluetooth Classic audio streaming is widely used in wireless speakers. Headsets enhance free Car systems and obviously some hearing aids. Now interestingly, in 2005 Starkey introduced a product called Eli, which stood for ear level instrument and that was the hearing industry's first Bluetooth enabling device and the world's smallest Bluetooth audio device at the time. And it was essentially a DAI or direct audio input boot that would click onto the bottom of our BTE hearing aids and again allowed that wireless communication between hearing aid wearers and the assortment of modern Bluetooth signal sources.

Now at the time it could only provide about two and a half hours of continuous use, but was still quite revolutionary at that time. Now, although the next technology has been around since Much earlier, around 2009-2010, Near Field Magnetic induction radios or NFMI were introduced into the hearing aid field. And this allowed ear to ear communication between the devices. Now an NFMI works on the principle of magnetic induction, again which is somewhat similar to a telecoil. But with NFMI that communication could be two way and the signal could be encoded for security purposes.

So two devices or components each generate a special magnetic field and communication takes place via an interaction between those fields. An NFMI was really ideal for incorporation within hearing instruments because the components are very small and, and the power needs are quite minuscule. Now additionally, the magnetic field of the system does not extend beyond approximately about 3ft, which really ensured encoded communication with greatly reduced susceptibility to interference. Now hearing aids only made limited use of this NFMI technology for basic things like ear to ear user controls or bilateral control of the volume and program changes. But we've definitely seen developments in this technology allowing transfer of information at speeds actually 100 times faster than previous technology.

So this is where we see the benefits of say cross by cross technology and being able to live stream that Data. Now in 2012, Starkey worked with Apple to develop their proprietary low energy audio or Leah protocol that allowed for direct Bluetooth connectivity. And the first made for iPhone, hearing AIDS were introduced two years later in 2014. Now for Starkey, this was our Halo line of hearing aids. And those Halo hearing aids used that Leah protocol for direct Bluetooth streaming with iPhone.

But there was no protocol at that time for streaming with Android phones. And it really was in 2019 that Google released their audio streaming for hearing aids or that ASHA protocol. Although it did take some time, we did see all major hearing aid manufacturers eventually supporting that streaming protocol with compatible Android phones running that Android operating system 10 or later. Now one quick step back in this history. It was in 1998 that a nonprofit Bluetooth special interest group, or SIG, was founded by leading companies in the computing and telecommunication industries.

This organization really oversees the development of all Bluetooth standards. They're the ones that kind of have been a component of all of this process in the history of Bluetooth technology. Now in 2020, that Bluetooth special Interest Group, or we call it the SIG group, introduced a new LE audio

protocol, not to be confused with Apple's lea, which is really going to change the game in accessibility for our patients. And we're going to discuss all of this in more detail. But I wanted to give you a little bit of history of where we've been with wireless technology and connectivity in the world of our hearing aids.

So again, when we talk about connectivity, this, I would say arguably is one of the biggest reasons why people seek out hearing aid help currently is their desire to stay connected to family, friends, and just in general the world around them. And we use this term connectivity pretty broadly and to refer to a few different things. So in context of our talk today, what are we meaning when we talk about connectivity? So this is a phrase that we hear again in various forms. So whether that be connectivity with computers, phones, hearing aids.

Now, despite this concept being in a number of aspects, it again isn't often defined. So connectivity really for our purposes today is the ability to link to and communicate with other computer systems, electronic devices, software, or the Internet.

So how do we do this? This is where radios are used in our hearing aids and this is what allows us to do that connectivity to other devices in hearing aids. When we discuss radio options, we discuss it in a few different ways. We're looking at how can we connect hearing aids to accessories, as well as how we can connect them to our cellular devices. We also look at radios that are used between two hearing aids that aid in communication.

So we'll dive into these. Most hearing AIDS have a 2.4 GHz radio within them that allows the user to have that direct conn connectivity to our smartphones and manufacture specific accessories. Now, the high frequency nature of 2.4 GHz signal results in a shorter wavelength. And we know well that it just does not propagate well through and around the head and body. However, that 2.4 GHz signal has a lot of advantages such as fast data transmission while also maintaining low power consumption.

So that's why this has been a good option for our direct connectivity. It also has excellent stereo sound quality and a long distance signal streaming transmission range. So quite a lot farther than that NFMI that were mentioned earlier. Now, not all devices have NFMI antennas, but some hearing aids will have this radio within their devices as well. We have two devices, our RIC RT and our RIC312.

And again, that NFMI stands for near field Magnetic Induction. Again which features important properties like that ultra low power consumption. This radio also has the ability to create that reliable network in and around the human body that again is less susceptible to interference because it has such a short range, it's less susceptible to anything interfering with it. This in turn really results in an increased robustness of that signal and really makes it optimal technology for that direct ear to ear communication when it's a data stream. NFMI is generally preferred when we're going to be doing that large data stream between the ears.

So again we use that for our cross by cross options as well as our binaural speech and loud noise and our ear to ear phone programs as well in our 312.

Now another term that we use quite often is the term streaming. So what do we mean by streaming? Well, that's really receiving audio from an electronic source, whether that's a phone call, music, podcasts, or again from our accessories. So we're getting that audio directly from that source. And this is really where that Bluetooth comes into this conversation.

And we're really going to dive now into Bluetooth, which I know is everybody's favorite topic. I think in the last couple of years there's two topics that have been really hot in our industry. AI and then this Bluetooth technology. Now at the most basic level, Bluetooth is a method of that wireless communication between two devices. We're going to get into the specifics of Bluetooth, really with the intent of helping everyone understand Bluetooth better.

As we also recognize some of these terms are similar but don't always mean the same thing. So we know there's always sometimes some confusion as we're talking about everything Bluetooth, because of the similarity in some of our terms. So Bluetooth is used by most of us every day, yet very few people understand what Bluetooth is. Bluetooth is oftentimes more of an overarching umbrella term rather than one specific thing. So that Bluetooth really can actually be separated out in our terms for what we're talking about as either Bluetooth Classic or Bluetooth Low energy.

Now Bluetooth, when we think of Bluetooth Classic is a low power radio that streams data in that 2.4 GHz frequency band. Now Bluetooth Classic has become an industry standard radio protocol for wireless speakers, headphones in car entertainment systems, and a lot more. That Bluetooth Classic allows for wireless communication between two devices. And in hearing aids, though, that stream signal is sent to one primary hearing aid and then that input is then kind of ear to ear stream to the other ear. Now that Bluetooth Classic does allow for continuous wireless connection, but was primarily designed for data transfer, but could also support that audio streaming.

But although it was designed for relatively low power consumption for use in hearing aids, it can have a significant impact on that battery life because we do use such tiny batteries in our devices. So due to this fact and wanting to kind of be future forward, we at Starkey had made the decision not to use Bluetooth Classic for that audio streaming because it does only stream to one ear and can have a higher impact on our tiny batteries in that battery life for our patients.

Now, Bluetooth Low Energy was introduced in 2009. It was designed by that Bluetooth special interest group as an alternative to that Bluetooth Classic. The main priority was minimizing that power consumption and maximizing battery life in our tiny little wearable devices. It does offer the functionality of Bluetooth, but but with low power demands, making it really ideal for our tiny devices. With that limited battery life, it also allows devices to connect over short distances and transfer small amounts of

data.

Now, when we think about devices that use Bluetooth Classics, such as Apple's AirPods or Bose headphones, these devices are not designed to be worn for 12 plus hours daily and the data is sent in a continuous stream again leading to that battery drain. However, the level of that battery drain just wouldn't work for our hearing aid wearers. We know they would not be happy with 4 hours of use on their devices, which is why many manufacturers turn to this Bluetooth Low Energy. The data for Bluetooth Low energy devices is sent in short bursts, so it does not have as significant an impact on that battery drain for our tiny hearing aid batteries.

Now, Bluetooth Low energy can be further divided into what we call central devices and peripheral devices. So our central devices are typically more powerful and less constrained by resources. So these are the devices that can scan for peripheral devices. It can initiate those connections and consume the data that is provided by what we call the peripherals. So these peripheral devices, on the other hand, are low power devices that are providing data to that central device.

So the peripheral devices accept incoming connection requests after just advertising its presence to those other devices. And then once they're connected, the principal device stops advertising. So it's no longer kind of putting out battery consumption. In addition, that central device also stops scanning as well. So this allows it to conserve energy.

Now here's a visual to kind of help grasp this concept. So once again we have that central device which initiates outgoing to an advertising peripheral device. And these peripheral devices are the ones that are accepting that incoming connection request after advertising. So in this case that central device would be our smartphone, while peripheral devices are things such as our smartwatches, temperature sensors, heart rate monitors or our hearing aids. So there's kind of different categories of which can kind of establish that connection and which can just ask to have that connection established.

Now within the category of Bluetooth Low Energy, each phone manufacturer also utilizes their own proprietary Bluetooth Low Energy streaming protocol. Additionally, each manufacturer also has in addition to our accessories, we can also link into some of the other proprietary Bluetooth Low energy like that Leo2 and Asha. So each manufacturer though we, we create our own proprietary. And so that is why even though all of our we have all these manufacturers running on 2.4 GHz, we can't connect to other manufacturers accessories even though it's all Bluetooth Low Energy. And that is because we each have our own proprietary Bluetooth Low Energy protocol.

And again, Starkey also worked with Apple to develop their proprietary streaming protocol for hearing aids. Again called that Low Energy Audio or what we call as Leah. Now this first initial protocol was launched in 2012 and allowed for one way streaming. So between the iPhone or the iPad to the hearing aids so that that phone or that iPad could stream to our hearing aids. Now one of the main features was Live Listen which allowed the user to essentially make their compatible iPhone or iPad into a remote mic without needing to buy an additional accessories because we had that capability to stream directly to our hearing AIDS.

Now in 2021 Apple introduced the second version of their Low Energy audio or what we now call as Leah 2. This new version allowed for that two way or hands free streaming for phone and video calls. So essentially we added in the ability to use our hearing aid mics to pick our voice up and stream it back to those Apple devices. So allowing for that two way audio. Now audio streaming for hearing aids or what we know as Asha is that well known solution that works for Android devices running Android 10 or newer.

Now this protocol was introduced in 2019 by Google and it essentially provided a different proprietary extension to that Bluetooth Low Energy to support unidirectional streaming from a compatible Android device to a compatible hearing aid. So again, just from that smart device to our hearing aids.

Unfortunately, two way or hands free audio has never been supported with those Android phones and that Asha protocol. So that has actually been one of the struggles with using the current Bluetooth protocols. Now, some of Starkey's most recent product families have used these original Bluetooth low energy protocols.

So think our Livio Edge AI, our Evolve AI and our Genesis AI product families. But again, we all know that there has been some limitations with current Bluetooth low energy streaming protocols. So I'm sure you've all been in that pairing process and doing that Bluetooth troubleshooting with patients. But it's important to understand that a lot of these limitations that you and your hearing aid users have struggled with aren't due necessarily to the hearing aids. They're a result of limitations of Bluetooth technology itself.

And this would apply to every hearing aid manufacturer using this technology. One of the most frequent complaints is that the hearing aids have poor range, so they have to be quite close to that smartphone in order to have that uninterrupted streaming. We've also all heard that there were compatibility issues with some phones that two way audio obviously was only supported on Apple devices and not Android devices, and that the hearing aids haven't always maintained a consistent pairing with wearer's phone. Again, these all sound very familiar, correct? I know even with just the last two most recent iOS updates, it has messed with my Bluetooth connectivity, even just between my iPhone and my car where I'll drive past certain places here in Minneapolis and I will get Bluetooth interference.

And it's always the same place on my common drives that that Bluetooth has issues and it's only been since the most recent iOS updates. So we know that there is some issues with the current technology. It's got some downfalls. So as a result of these known issues, the Bluetooth Special Interest Group developed a new protocol called LE Audio. Again not to be confused with Low Energy Audio used by Apple as their proprietary.

So we do call that Leah and we call this new universal protocol Eliadio. Again, it is a Bluetooth low energy protocol, but it differs somewhat from the protocols used previously. Now, the specifications from that Bluetooth SIG group were released in 2020, but devices compatible with LE Audio are really just beginning to come to market. But we're actually quite excited because there are a large number of benefits to using this new kind of universal LE Audio and I'm sure our customers and our hearing aid wearers are going to be very excited about these improve. One of the most important aspects is that LE Audio will have a much better range than previous Bluetooth low energy protocols and it's going to have greatly improved sound quality, which is one of the things I'm most excited about.

The radio has also obviously very low power consumption. That's always going to be a priority, but mile ensuring that we're providing that better audio so we don't have to be worried about increased battery drain with our current products. Even though we are using LE Audio with compatible devices. And again, this is going to be a universal connection. This means compatible Android and Apple devices will use the same protocol and two way or hands free calling will be supported on these compatible devices as well, regardless of if they're Android or Apple.

The wearers will also be able to connect their hearing aids to more than one outside device. So an iPhone, a compatible PC, whatever devices that are running this LE audio protocol and finally using Elliottio will allow the wearers to use AuraCast. I'm sure many of you have started hearing this term auracast. I remember the first kind of team's message among our groups probably about two years ago saying hey, does anybody know what this AuraCast thing is? It's been coming up in the news in our industry.

Anybody? Sure. With what it is. And at that time nobody really knew what that oracast technology is, but we've really seen it as a common topic in the conversation over the last two years because it's going to have such amazing benefits for our patients as it becomes readily available. So it's become a

hot topic and it is very exciting technology that really is going to drastically improve accessibility for our hearing aid patients.

And I'm going to share a short video here in a second on this technology, but I want to break down a little bit more with kind of this term of LE Audio. This new universal protocol. It's going to allow wearers not only to connect with what we call our unicast devices, but it's going to open up this availability for AuraCast. So there's kind of two buckets we can think of for this new Universal LE Audio. So from this unicast perspective, this is something we should all be very familiar with.

This is essentially what we have been using with our current smartphone devices. It enables that direct streaming connection from our electronic devices, but it's essentially a one on one. I can connect my hearing aids to my smartphone, my hearing aids to my computer. So kind of this one on one connection with our own personal electronic devices. But this new LE Audio protocol is going to Allow for connectivity to a wider range of personal electronic devices where when we first introduced this kind of technology we could only connect to specific Apple devices.

So this is really branching out our ability to be able to connect to a wider range of personal electronic devices with better range and better sound quality. Is Unicast a proprietary term for Starkey? No, it's not. Because we'll talk a little bit about the other term that falls into this, and this is auracast. So Unicast literally just means kind of a one to one connection.

It's what every other manufacturer is also using when they're connecting their devices to their personal electronic devices. I do see another question. Do all hearing aid manufacturers use NFMI for ear to ear? That I am not 100% certain on what other manufacturers are using. I do know Oticon was one of the first to use NFMI technology in their devices, but I am not 100% certain about who else is currently using NFMI technology in their devices.

I just do know that we do still currently use it for cross by cross.

So diving back into Unicast. So again that's just kind of our one on one connection to our personal electronics. But AuraCast or what we also call broadcast. So we have Unicast and Broadcast. Unicast is us connecting one on one.

Broadcast is where we connect one source of audio to multiple different receivers. So think multiple different sets of hearing aids. This is where oracast comes in. Oracast is like the main name that we hear of for broadcast technology. I kind of think of it as the the Q Tip or the Kleenex of tissues.

We generally call all tissue brands Kleenex, no matter what brand we buy. So broadcast is kind of the general term of being able to take one source of audio and be able to stream it to multiple devices. And the main source of this currently is this oracast technology. So it's enabling that direct stream from a wide range of broadcast sources, but to an unlimited number of devices. So to kind of show you the potential of this technology, I'm going to play you a video here that comes from the Bluetooth special interest group that is going to kind of introduce this technology to you.

Welcome to the OraCast experience. OraCast is a new Bluetooth capability that enables an audio transmitter to broadcast to an unlimited number of audio receivers. So a transmitter could be your own smartphone, a tablet or a laptop, or a tv, or even a public address or a public sound system in a venue. Receivers on the other hand, can be Speakers or headphones or earbuds or very importantly, hearing aids. AuraCast is going to create some new, exciting audio experiences that are truly going to help the way that we engage with each other and the world around us here at the Oracast Experience.

We've created a Day in a Life with auracast. So I'm going to ask you to pretend with me that you're going on a trip. You're going to be taking a flight to a conference and then getting there in time to hear the keynote address. And along the way, you're going to get to experience for yourself some of the

ways that you will soon experience Oracast in your everyday life. So let's head to the airport to start our trip.

Trip.

So you have arrived in time to head to the sports bar to have something to eat and to watch the game. The bar has two TVs showing two different games, and the audio is turned off on both TVs so you can watch the game. But unfortunately, you can't listen to the game. Oracast is going to change that. TVs.

Public TVs like these in sports bars or gymnasiums or waiting rooms or transit centers will soon add auracasts so they can broadcast their audio directly into your personal earbuds or hearing device. AuraCast will help unmute our world, creating a more complete watching experience. So if you're ready to try, you can go ahead and select either TV one to listen to the basketball game or TV two to listen to the football game. And if at any point, say, the game you're listening to goes to a commercial or it ends, you can simply switch over and listen to the other game. If you want to, go ahead and try that.

And so if you're ready, it's getting close to your flight, so we can head on over to the gate.

So here at the gate, we actually have two AuraCast experiences. The first showcases how AuraCast will help us share our audio in new and exciting ways. So your colleagues Dave and Lori are currently at the gate. And Dave is watching a movie and Lori is listening to her music. Both of them have AuraCast devices and have invited you to share in their own personal audio experience.

So when you're ready, and if you want to listen to Dave's movie, you can go ahead and select Dave's laptop. Now you'll see that Dave has added a passkey to his Oracle in much the same way that a public WI FI network or a personal WI FI hotspot can be passkey protected. So can Auracast broadcast if you choose to. So a question we get a lot is will we need to wait for laptops with Oracast or phones with

AuraCast in order to experience AuraCast? And the answer is no.

There are dongles like this one currently in development that can be used to plug in to our existing phone or our existing laptop to turn it into an ORACAST transmitter. So there is another ORACAST experience here at the gate.

I don't know about you all, but I know it's always very difficult for me to hear the gate announcements in loud and crowded airports. Soon public address systems like this one in this airport, conference centers or lecture halls or auditoriums will soon add AuraCast to their systems so that you can listen to the same audio coming over the public address directly into your personal earbuds or hearing device. So when you're ready, go ahead and select gate B23 and you should hear the gate announcement directly into your earbuds. As you can imagine, this is very helpful for anyone who's having difficult hearing in loud, crowded spaces. And it is particularly impactful for people with hearing loss who use hearing aids.

And ORACAST will be the next generation assistive listening systems that will bring broader accessibility for everyone and will promote better living through better hearing. Now, you might be wondering, if I'm at the gate watching my movie, will I also be able to receive notifications from the gate? And the answer is yes. We fully expect that you'll be able to subscribe to multiple AuraCast broadcasts and therefore receive notifications while you're watching your movie or listening to your music. All right, you're almost done with your travel, so pretend with me that we have arrived at our destination and we head over to the conference for the keynote address.

This is another showcase that demonstrates how ORACAST will help us hear our best in all of the places that we go. You've arrived a little late. The only seats that are available are in the back where it's a little difficult to hear the lecture coming from the sound system. Luckily, this auditorium has AuraCast and so you will be able to hear the lecture directly into your earbuds. So if you haven't already, go ahead and select the Aerospace Auditorium.

You can also imagine that if this venue offered simultaneous interpretation, ORACAST will be a very effective solution to broadcast the lecture in multiple languages. And this is just some of the ways that you'll soon be able to experience ORACAST in your everyday life.

So you can see there a lot of the possibilities that we're going to have with this technology. So I do see one of the questions here. Where can one purchase a dongle? I know I have looked recently. There's been a couple currently available on Amazon.

They're not as readily available yet because there are not currently a lot of oracast options currently available. So I think we'll start seeing these a lot more come to market. The question is going to be ensuring that we're getting a legitimate one because obviously if we buy off market or off brand dongles, there could still be intermittency or connectivity issues with that. So we're waiting for kind of that official product technology from the Bluetooth special interest group. We're kind of watching that online because from a unicast perspective, think again.

Your, your smartphones, your personal electronics, we are already seeing some of those products come to market. So for example, the newest Samsung devices are using LE Audio, but it's like literally the newest Samsung Galaxy S25 I think it is, and their newest tablets. We also have the newest Samsung televisions that came out, I know they started coming out late last year. Those have the LE Audio capabilities. And we discovered that because one of our sales reps was hosting Thanksgiving dinner at his house.

So obviously when you're hosting a party, he had to get a new television for that party and happened to get one of the newer Samsung televisions and realized that they were picking up his Edge AI hearing aids and he was able to connect directly to his Samsung and have that stream directly to his hearing aids. I know my Dell laptop that I have for work that I've had for a couple of years also can connect to

my Edge AI devices and stream via that LE Audio. So from a unicast perspective, there are already devices on the market that are available. Not a whole lot, but we are starting to see those slowly come to market. But from that oracast or that broadcast perspective, there are very limited transmitters currently available.

So I don't do no AT circuit. We have one of the first oracache transmitters in our big theater where we hold and host our big customer classes. So we actually have one of those very first transmitters. But currently you have to have one of those newer Android phones that has an oracast assistant because there is that intermediary. We need some sort of source to be able to connect our hearing aids to that LE Audio source and that usually is by form of what we call an ORACAST assistant.

And those newest Samsung devices that feature that LE Audio have that oracast assistant onboard their phone by default and so they can use that to link our devices to that ORACAST broadcast channel. There are not a whole lot of other current options for LE Audio. So that is part of the reason why we don't see a lot of those dongles readily available yet. We're expecting. So I see the next question.

When will ORACAST be available universally? I think over the next probably two to five years we're going to see pretty much everything switching over to oracast. So I know, for example, the Minneapolis airport here is currently doing renovations and as part of that renovations, they are replacing their telecoil loop systems with this ORACAST technology. So part of it will be the funding on behalf of our public public spaces or public venues in getting this technology switched over. It's probably going to be quite the fee up front, but they are significantly easier to install than loop systems and obviously are going to have this, this broad connectivity.

So not only will they connect to LE Audio capable hearing aids like our Edge AI devices, but if you've got LE Audio Bluetooth headphones, you'd be able to link into that as well, again through an ORACAST

assistant on your phone. So we're going to start seeing over the next year to two, I would say probably out to five years before we start seeing this readily available in a lot of public venues. But think your favorite pub or a Buffalo Wild Wings where you go to on game night and there's multiple televisions with those different games and you could scan a QR code on a specific television and be able to have that audio stream directly to your hearing aids. We are going to see it becoming readily available over the next couple of years. And so that's where we'll start seeing more of those dongles become more readily available for those older televisions that don't have that, that capability, for example, or being able to plug it into current phones.

So I would say over the next couple of years we'll start seeing that become readily available and we fully expect those systems to be labeled like we see telecoils systems labeled now so that we know where that that technology is available. And we should also start seeing with those ORACAST assistant, we'll be able to pull up a list of all the available broadcasts. So if you do go to an airport, for example, that has this technology, we'd be able to pull up our ORACAST assistant, which I will be honest, will at some point over the next, I would say year be available in our mobile app. We don't currently have it there because there hasn't really been anything available for our patients to connect to, but it will be in our app when there are things readily available for them to connect to. Because we do try to keep our app down to features they can currently use, but they'll be able to pull up and see what available broadcast channels are in their environment.

So it's expected to be quite easy. But from that broadcast perspective it's going to be over the next few years that we'll see that become readily available. But from that unicast perspective, I would say over the next year you're going to see all new technology coming out using this new LE Audio protocol. We fully expect Apple devices to also be capable with that in the next year. I honestly would not be surprised if our app current like Apple 15, the iPhone 15 and 16, if they have the hardware but they're just waiting to push the firmware update that would not surprise me in making that compatible with

Apple devices.

So a lot of possibilities, but we'll see this becoming I think readily available over the next couple of years.

Now obviously we don't expect as your patients are investing in new hearing aids currently, if they still have an Apple phone or current Android phone that are using our current protocols, Asha and Leah too, we still want our devices to be able to be compatible with that. So our Edge AI devices have the hardware and the ability to be able to connect to Apple's Lea 2 protocol, Android's Asha protocol, as well as both the Unicast and the broadcast capabilities of this new Universal LE audio. So Edge AI is a great product because it is forward thinking. It is going to be able to connect to all things elliotio as those become readily available in the market. And like I say, that's our current TV streamer.

We're going to talk about our accessories here in a moment, but our current TV streamer, the Edge TV streamer is an oracast broadcast device as well as just our regular TV accessory, current Windows 11 PCs, some smartphones we're already seeing that come to market. So we do support kind of all of those protocols currently that are available as well as the new ones that are coming now. Again, I throw in a lot of terms and a lot of acronyms at you today. So I've popped in this glossary in the table and again this will be in that we've got this in the deck. So that resource, if you print that off from the comment box, you'll be able to see this glossary.

And it really just kind of breaks down those terms that we have introduced Today with ASHO AuraCast, Bluetooth, Bluetooth Classic versus Bluetooth Low Energy, Elliottio versus Leah UniCast Broadcast. So we've got all those terms listed here for you as well, so that you've got that resource available to you as you're going back out to your clinics. So I want to spend the last little bit talking about, now that we've covered kind of the basics of Bluetooth connectivity, I want to talk a little bit about some of the great options we have to keep our patients connected. We know that accessories do open that door to

enhance communication experiences for our hearing aid wearers. They desire an intuitive and easy to use resource to enhance that sound quality, their streaming, maybe even to provide just discreet hearing aid adjustments.

So from that perspective, we do still offer a great family of accessories. And with our Edge devices, they do feature a new 2.4 GHz antenna that allows it to be compatible with this new Universal LE audio. And because of that, we also needed to introduce some new streaming accessories. So for the Edge AI devices, we have our new starlink Edge accessories. We had introduced originally, last year, our remote control.

Actually, our Remote Control 2.0 has been available. It's one of our accessories that is compatible with both the Genesis and the Edge. We had also introduced our Edge TV streamer last year. But we're excited to join two new accessories to our Edge accessory family, that table microphone and that remote microphone. So a quick hit on our remote control.

This is that simple accessory that is compatible with Edge as well as previous technologies that allows them to simply manage their volume control, change their programs, access several features through that favor button. It's got a lock unlock button on the side of the remote to prevent unintentional changes. And my favorite thing about this remote when we introduced it is that it takes a field replaceable CR2032 kind of pill battery. So it's something that can be changed in the field when needed. That favorite button can be programmed within the fitting software for a variety of functions.

So we can access Edge mode. Plus we can start and stop the tinnitus masker jump to program four. If those features have been programmed into the hearing aid, the default setting is the home button, which is going to restore the hearing aids to that personal program and their default volume setting. This will also stop the stream if they are currently streaming from any of our streaming accessories or their phone. New specifically to Edge AI only is this additional option that if they do a long press to the

program button, that will also set them back to their home or their default settings.

That way we can utilize that favorite button to access Edge mode or to do that broadcast Start Stop, which is going to control our TV streamer and still have the ability to quickly and easily go back to their home default settings. Now, our Edge TV streamer is our first LE Audio capable TV streamer and is also again considered an oracast broadcast device. So it is compatible only with our Edge AI product family, but is 60% smaller than our previous Starlink TV streamer and has that better range because we are using that LE Audio technology and it can be paired to an unlimited number of hearing aids as our TV streamer. So I have utilized this at some of our dinner trainings. I've had 15 people in a room with Edge AI demo devices connected to one TV streamer with seamless connectivity, seamless performance.

So it's a great device and works so simply and so easily and very simple to set up. There's a power button, there's a Bluetooth connectivity button, and then on the bottom is the oracast technology name. So if they do have a device that has a compatible oracast assistant, they can link into our broadcast from this device and be able to stream. So if you do have spouses and one is wearing our Edge AI devices and has our TV streamer and they have a spouse with another manufacturer's devices that are LE Audio capable, they could connect into our oracast broadcast. So it's nice technology there, very simple to use.

We can access this from the accessory screen on our mobile app in our My Starkey, we can start and stop the stream from here. We can also start and stop the stream from that favorite button on that remote or we can set it as a user control on the hearing aids themselves. Either a double tap or a short press or press and hold option for those user controls. We can also adjust that streaming volume from the app itself. We can again sign that as a user control to the hearing aids or when we're actively streaming.

The volume control on the remote control will also adjust that streaming volume as well. So a lot of simple and easy options there. Our two new accessories that we have added to the product family are our table mic and our newest remote mic. So most of you are probably pretty familiar with our table mic as we have had a version of this one previously. It features up to 10 hours of streaming on a single charge and only takes two hours to charge fully.

Again. This does utilize our new LE Audio Bluetooth. So it's got that longer stream range and phenomenal sound quality, which again is one of those benefits of that new LE Audio. We have got simple use for this. So there's just.

You've got those eight directional microphones and each is basically a touchpad. So we can select which microphones we want to listen to by just tapping on those mics. Or if we tap in that center button, it is going to turn it into automatic mode which highlights the front five microphones, helping to reduce any background noise and will automatically follow the key speakers or the dominant speaker from those five microphones. We can also mute it by untapping all of those mics. And as always, this comes with a magnetic lanyard so it can also be utilized as a companion mic.

This device, very simple. As soon as we power it on, it will start streaming to the devices, which makes it very simple. And we can adjust that streaming volume from the mobile app, the onboard controls, the hearing aid user controls, or from that Remote Control 2.0. Now, kind of unique to this Edge TV streamer, we do want to have both the volume buttons and the power button face towards the hearing aid wearer. That ensures that as they're in automatic mode, that those five microphones are pointed in the correct direction.

But then from here we have multiple listening modes. So again, automatic is going to highlight those front five microphones and we'll follow the dominant speaker. We can manually select however many microphones we want. So maybe we want to listen to this person and this person. So we can manually

select those two microphones.

We can put it into omni mode by tapping all eight microphones or mute it by untapping all eight microphones. And no matter which mode we're in, a tap on that center button will take it back to that automatic mode. And as I mentioned, it can always be worn on that magnetic lanyard as a companion mic. Now if they are doing any sort of multi talker events, they go out to dinner a lot, business meetings. That is where we recommend that Edge table microphone.

If they're only looking for that one on one conversation. This is where I recommend our Edge remote microphone. So this is our tiny companion mic. Has up to 10 hours of stream time. Only takes 3 hours to charge fully.

Again, is utilizing that new LE audio antenna so it has that longer stream range and that phenomenal sound quality. It does have simple use cases as well. You'll see those three directional microphones there. We've got the volume up and down buttons which are fabulous because if we're actively streaming, those volume buttons will control the hearing or the streaming volume. And if we're not actively streaming, it is going to control the hearing aid volume.

And if we press and hold those buttons, it will actually change the programs in the hearing aids. So it's kind of a multifunctional device there as well. It has kind of a lock switch on the side. So again we'll start streaming automatically as soon as we power it on. But again, a couple ways to control that volume, either from the remote control, the volume buttons on the side, if we have assigned the volume control to the hearing aid user controls, or from that mobile app.

So a lot of flexibility there, but very simple. Now also from a connectivity perspective, we don't necessarily want patients to have to interact with their technology unless they want to. So that's a really big differentiator with what it means to be automatic. But we also are aware that there are patients that

want that additional control and convenience. And with Edge AI combined with My Starkey, that gives them all of that control that they could want and more.

So our My Starkey app provides that control center for their hearing aids. And we're going to talk about how we can utilize the My Starkey app specifically in terms of their connectivity.

So this My Starkey app is compatible with all styles and technology tiers of that Edge AI and is iOS and Android compatible. And what I do love again with this new universal LE Audio, is that if they're running those, doesn't matter if it's Asha or Apple, sorry, Android or Apple, if they're running this LE Audio, they're going to have that two way audio capabilities. It's going to use our hearing aid mics to pick up their voice and stream it back. Now I have mentioned we've got a number of connectivity options now. So if you have not seen our QR code, I highly recommend you reach out to your sales rep.

They can send you business cards of this QR code because we simply take the patient's phone and scan the QR code and it tells us if we have a compatible device. And it also gives you a link to the correct mobile app. Because we've got MyCirQuey works with Edge and Genesis, our Thrive app works with Evolve and we also have a caregiver app as well. So this QR code makes that figuring out connectivity very simple. We also have a very user friendly My Starkey app.

So this is a quick look at the home screen, but from the Connectivity perspective, one of the most important features there is. In that bottom left hand corner, we can see that wireless icon. And when we tap on this, this is where we can access those controls to our accessories. So we can, once we open that up, you'll see each of the streaming accessories for that TV streamer. You'll see there's that play button, so we can actually start and stop the stream from that TV streamer from this screen.

Again, that table mic and that remote mic, they start streaming automatically as soon as you power them on. But again, we can control the volume for both the stream and the hearing aid mics from this

screen for all three of those accessories. And again, at some point when ORACAST is readily available, we'll be able to see the ORACAST options in this screen as well. Now, while they are, we've kind of changed the location to access those features. It was really just to make it more accessible.

It used to be in the My Hearing tab and now we have made it easily accessible from that home screen. But the functionality of this has not changed. So very easy, you can see to kind of control those devices now from a sound quality perspective. Again, we're expecting significantly better sound quality using that new LE Audio. So we've also introduced a new streaming configuration specifically for the Edge AI devices when utilizing this new streaming protocol.

So with Genesis, we got reports that we were definitely having better sound quality with the streaming that we were using with Genesis, but we got some reports that the volume wasn't the best. So with Edge AI, we introduced a new streaming configuration that has that better sound quality as well as more appropriate volume levels specifically for that streamed input. So when they are actively streaming, when they have initiated that, the home screen of the My Starkey app will automatically be the streamed audio screen, they will still have access to that adjust sound, where they can adjust those equalizer controls. They'll have access to my hearing and the hearing aid volume as well. And this volume slider will change the hearing aid volume only.

So if they want to adjust that streaming volume, they'll adjust that on the applicable volume controls for that streaming accessory. So whether that's the accessory or the smartphone itself. But they also, if they tap on my hearing, they still have those streaming sound options, which is treble boost, bass boost, and overall boost that whatever they select there are going to automatically apply anytime they're in that streaming configuration. So it provides those, those added benefits for those patients that really like to fine tune their streaming sound quality. You also have the ability in the profit software now to navigate to the audio streaming screen from that left flyout menu or from the accessory screen.

And you have as the professional both quick fit and fine tuning controls to specifically adjust that streaming configuration. So if we need to adjust specifically for phone calls or their preferred music, you can do that live in the software. And you also, we're very excited to provide this. You can do a live demo. So from that audio streaming screen you can do start demo mode, you can start playing the audio.

So especially if it's music, they can start playing music from their Spotify or their Apple music and make live changes to that stream sound quality directly from this screen. So it allows you to have that specific control there. And a key part of this again remember, is that Bluetooth connectivity. So after you have paired a device to a specific computer and programmer the first time, every subsequent time those devices are read into that same fitting computer. We don't need to toggle off phone Bluetooth.

It basically has formed a relationship with that fitting computer. So we'll be able to connect right up to it, make whatever changes we need and carry on with that fitting without having to toggle off their phone Bluetooth. So this is how we can do that adjustments from the screen and do that live demo because we do not actually have to toggle off their phone Bluetooth. So a couple of things to just note in the actual profit software that are tools for you in adjusting this. We do have an updated accessory screen.

So it breaks it down into our different categories. Our new streaming accessories with those hearing aid mic options and streaming boost options. We've got the broadcast devices and then other Bluetooth devices, which would be our smartphones, our tablets, our Bluetooth computers are under there as well. And we still have those hearing aid, mic and sound streaming options that we can adjust. And again, I mentioned that ability to adjust the streaming sound quality.

We can access that from here. Again, we do have the accessory pairing tools here, so you know how to pair all of those accessories in the software. But we can again access that audio streaming configuration from the software here and again do that live demo so that we can make the proper

adjustments in those devices. So we do have a lot of tools available to you in the software. We have also updated our user controls as well so that you can ensure that the patient can actually activate the correct user controls.

So if we are giving them streaming controls or broadcast start stop, we can now demo those live in the software as well to ensure that we're giving them the correct user controls that they can actually activate them and then we can make those live adjustments as needed.

So I know that is a lot of information, but we try to ensure that we've got solutions for everybody. So we're excited with Edge AI that we've got the options available to you, especially when it comes to this connection activity side of things and ensuring we've got all of the technology to keep them connected, regardless of how that may be, with their smartphones, with accessories, and with kind of public venues as well. Now, we do have a list of resources listed here, so where we reference some of the information we talked about with the history of this technology. As a quick reminder, we definitely at Starkey want to be a partner with you. We've got great support teams here, some of the most audiologies on staff, audiologists on staff.

We've got some, probably the most audiologists on staff to help support a lot of great sales professionals, customer support, tech support, consumer support, making sure that we've got the resources available to you to support you in your journey. As always, we've got a lot of resources, so if you want more details, you can access those on Starkey Pro with our white paper papers and our quick tips. And with that, I do believe we got most of the questions, but if anything else comes up, please feel free to reach out to us and we're happy to assist again with that. Thank you so very much for joining us today and hope you have a great rest of your day.