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From Remote Mics & Telecoils to LE Audio & Auracast: Accessibility for All and The Evolution of Wireless Technologies in Hearing Aids - Part 2: Accessibility & Candidacy

Presenters: Juliette Sterkens, AuD, Brian Taylor, AuD

Thank you, Melissa. Great to be with you. This is part two of our wireless technologies and hearing aids course. Part one was looking at the nuts and bolts of the various types of technologies. Today we're going to talk about accessibility and candidacy.

I'm Brian Taylor and joining me today who's going to be the first presenter is Juliet Sturkins. But before I turn it over to Juliet, just a couple of housekeeping matters. You see several bullet points on the slides around the risks and benefits of the courses here. You can go ahead and look at that at your convenience. Here are the three learning outcomes and here are my disclosures.

I am the senior director of Audiology for WS Audiology and hold an appointment at the University of Wisconsin Madison and Stevens Point. That's a combined AUD program. I'm the editor of Audiology Practices and also editor at large for this week in Hearing. I'm going to go ahead now and turn it over to Juliet. Thanks very much, Brian.

And I am Juliet Sturkens. I retired from private practice, moved here from the Netherlands many moons ago. In 2012, I became a consultant with the Hearing Loss association of America. I'm known as the hearing loop advocate. But really what I am about is about good hearing access for our patients.

Do lots of lectures to students, to consumers and to audiologists. And the products and equipment that I'm showing in the slides are just used for illustration. If you have any questions, I'll provide my email at the end of the presentation so you can always contact me. And now, So today's agenda, we're going to be talking accessibility. And for me that means the law.

And then Brian is going to take over and talk more about candidacy issues. And these are some questions that I'm just going to put in your heads. I'm not going to answer these. I really don't have the answers. But these are some things that I think we all should be pondering, be concerned about for our patients as we move forward with assistive technology and as Auracast becomes more and more

available in our communities.

Of course, the big question that I hear from consumers is why didn't my audiologist tell me about telecoils? Why didn't my audiologist tell me that I have a right for good accessibility in the the it can make such a huge difference. And if patients don't hear it from you, how are they going to hear it from? Right. But I'm also very much aware that audiologists are under huge time constraints in the office.

Time is limited. You have to cover A boatload of stuff. And that means if your time is limited, how are we going to do this? How are we going to educate our patients about this? And so first things first, the ada, the Americans with Disabilities Act.

And the act is very direct. It says where audible communication is integral to the use of the space and a PA system is in use, an assistive listening system shall be provided. Not maybe, could be, possibly, but shall be provided. And it shall always be provided in courtrooms. But there is a third condition, and that condition is a lot less known among providers and can sometimes be confusing.

In entities where there is no public address system, a consumer may still request that effective communication be provided. And that may mean a hearing loop at a service counter providing braille, providing interpretation, or an American Sign Language interpreter. And so where are assistive listening systems required? I think I could better ask you where are they not required? They're going to be required in theaters and in auditoriums and in classrooms and in playhouses.

Just thousands of locations that fall under the ada.

But then there's other locations where effective communication can maybe be requested or can be requested by your clients. It could be on a cruise or a funeral home or in a gymnasium when they're doing yoga classes or at a registration desk in hotels where there's a lot of reverberation and where

they're going to have trouble hearing. So what type of assistive listening systems are offered now?

There's four directly mentioned in the ada, and those are number one, hearing loops, number two, RF or frequency modulation, usually kind of called FM systems, infrared systems. The fourth system is direct wired equipment, and I have never seen a direct wired equipment ever.

But I am aware that they used to be offered in some houses of worship. And then there are two other assistive listening systems, Audio over Wi Fi and AuraCast streamed assistive listening system, kind of Auracast ALS for short. And currently it's really too soon to say if ORACAST and the installations will meet the ada. And one contributing factor to that is that the international standards aren't expected until late 2027.

Now, if you really want to dive into this on the center for Hearing Access, there is a compare, a three page comparison guide. But in the screenshot that we took from that guide, you can see the different assistive listening systems at the top. Direct wired is not shown in this graph. And then here are how people with hearing loss interact with these systems and whether these systems require the use of a smartphone or an app. If they meet the ADA standard.

We're very Much aware that that hearing loops FM and infrared meet the ADA standard. Audio over wi fi systems as far as we know do not meet the ADA standard. And Auracast used as an assistive listening system is under investigation and the law is very specific. It states that systems must be hearing aid compatible. Now, hearing aid compatibility can be done either in a loop just straight from the telecoil.

It's called direct hearing aid compatible or it can be done through the use of a neck loop. And frequently these audio over wi fi systems, no assistive devices or no receivers are provided and as such they don't meet the letter of the law. Now a huge issue with audio over WI fi is the latency for people who are hard of hearing. Acceptable latencies. And I have an audio sample coming up in just a couple of slides.

If the latency is below 30 or 40 milliseconds for an assistive listening system it's considered acceptable. And loops a feminine infrared systems have no trouble meeting that requirements requirement. Audio over WI fi latencies have been measured as exceeding 200 milliseconds and oracast. We hear varying reports but really the jury is still out as to what type of latency will be involved with AuraCast Systems. So a quick overview of the listening systems hearing loops.

The big advantage, Nobody needs to know that you're using it, that you just turned on your telecoil so there's no outing of your disability. Don't have to go to a service desk to pick anything up. There's an international standard that specifies that the hearing loop needs to meet strong magnetic signals that the telecoil can pick up. But there's always a but. Telecoils are susceptible to EMI interference and we'll talk about that in a little bit as well.

But I can tell you that hearing loop installers who are trained that's the first thing they're going to check is there EMI in the building? And I just want to alert you to the fact that the Washington National Cathedral just last month had a hearing loop installed and it was added to their FM system. So they offer neck loop device or they offer listening devices with headphones for people who don't have hearing aids but people with telecoils will just be able to click on hearing loops can be installed in taxi cabs. And Madrid last year mandated that their taxis be fully compliant and accessible for people who are hard of hearing. Now how everybody can use a hearing loop if there's only a hearing loop offered.

Option one is with a T coil Turn your T coil on, you're literally picking up the signal from the hearing loop. If you don't have a T coil but you have the telecoil in an accessory, you can use the accessory to hear in the hearing loop. But another but there's always some challenges with these accessories. You got to remember to bring them, you got to remember to charge them. It's a little techie to make sure that it's on.

Takes extra steps to connect. And it certainly can be stressful for consumers who aren't very techy. And then option B, for users who have hearing aids but no telecoil, or for people who don't wear any hearing aids at all, they have to go and pick up and borrow a hearing loop receiver with headphones from the facility. Or they can plug in their own wired headphones or earbuds. For FM technology, it requires every user, hearing aid users, and non hearing aid users to pick up and borrow equipment.

It certainly outs the disability. You gotta go find a place where these devices are being offered. But FM systems are the most common assistive listening system offered in this country. However, sometimes, especially when an FM system is installed on a temporary basis. This is a photo of a large conference where the FM transmitter was plugged into the sound mixing board.

The audio engineer didn't really know how loud to set the audio or the audio out volume was set too low and the neck loop didn't provide a strong enough signal. And of course, again, we have the issue of EMI interference. And there are different frequencies used for these FM and IRF systems.

The third system, infrared assistive listening, and that uses direct line of sight. That means that the transmitter has to be positioned usually kind of high up, so that anybody in the audience will be in direct line of sight. But if you're sitting behind a very tall person in the theater, that can certainly be an issue. These systems are most frequently found in courtrooms and theaters where in the dark these systems can work. These systems will not work in bright rooms with a lot of windows.

And the way these systems are made hearing aid compatible, mandated under the law, is to have neck loops connected to the receivers that are offered. But again, the telecoils can be susceptible to emi. And because infrared systems are installed in places where no one has checked the EMI beforehand, that means that there can be EMI in that room that no one is aware of until the user puts a neck loop around their neck and turns on their telecoil.

So how anyone or everyone can use an FM or infrared systems if they wear hearing aids with a telecoil. Again, this is mandated under the law. The receivers must. Some of the receivers must come equipped with a neckloop and the consumer has to borrow a receiver with a neckloop and turn on the telecoil in their hearing device. Now, a word of caution.

If the neck loops were added later on, kind of as an afterthought, because someone said I need a neck loop to make it work with my cochlear implant or with my hearing aid. Sometimes aftermarket neck loops were purchased by a venue and then the neck loops are not strong enough and do not provide a good signal for the user. For people without hearing aids or users or people without hearing aids, they pick up a receiver, they either get issued headphones, an ear shell or earbuds, and they can use the FM system or the infrared system that way. A word about neck loops. If the neck loop is hung very tight around the neck of a user, the telecoil may be directly above the neck and that is exactly where the magnetic signal is horizontal and thus a little bit weaker for a vertical telecoil to pick up.

Now, that problem can be alleviated by draping the neck loop wider around the neck or under a collar of a shirt or a sport jacket. And if the neck loops do not provide a strong signal, the neck loop can be hung over the ear. Doesn't look very charming, but it may work in a pinch. And it's one way for patients to cope when the facility has an FM or an infrared system where the neck loop doesn't provide a very strong signal. A word about emi.

EMI is all around us, by the way, and it either happens naturally or it's man made because there are problems in the building with electrical wires. Now, EMI has nothing to do with the assistive listening system per se, but when a user turns the telecoil on, they're going to hear it as a buzz or a hum. And so EMI isn't only an issue for rooms with hearing loops, but for any assistive listening system where the user has to use their telecoil in order to be able to use the system. That means that in the future, when venues are being assessed for an assistive listening system, and now I'm really referring to ORACAST

systems. ORACAST systems are going to be made hearing aid compatible through the use of neck loops for the foreseeable future.

That means EMI needs to be measured prior to the ORACAST system being installed.

I already mentioned a little bit earlier about the system number five and six, audio over Wi-Fi and AuraCast systems. And the biggest issues with these systems are audio delay. And audio delay causes really significant listening challenges for people with hearing aids, especially if their hearing aids are open, because they will hear not only the sound from the listening device that may be delayed, but they will hear the audio occurring in the facility direct in their ear. Generally, for assistive listening, it is thought that minimal latency anywhere between 10 and 20 milliseconds is really anything worse is not acceptable for people who use hearing aids. And I have an audio clip here that demonstrates a 47 millisecond delay.

And I want you to keep in mind that audio over Wi-Fi can cause delays of 100 and 200 milliseconds.

And the second group that we followed was a group of boys from Boston's poorest neighborhood, boys who were chosen for the study specifically because they were from some of the most troubled and disadvantaged families in the Boston of the 1930s.

So I'm going to, by the way, that demonstration of the audio clip with 47 seconds, you hear a distinct echo in that demonstration, and that's only 47 milliseconds. So the fifth system, audio over Wi-Fi, many manufacturers of this type of technology claim that they are in compliance with the ADA, but it may not provide an equal experience under the Americans with Disabilities Act. Now, audio over Wi-Fi systems can work quite well in places where the audio is off. So think of a TV in sports bars or in a fitness center where you use an app and you can tune in to TV1 or 2 and 3. But as soon as the audio is live in the room, there can be a huge issue.

The latency is an issue. There is no universality as far as the apps are concerned. It really doesn't allow the consumer to use the audio coming in through the hearing aid and then being able to also keep their ambient microphone on so they can converse with people to the left and to the right. It's very complex for users. I've used it a couple of times.

You must download the app. I got kicked off a couple of times in poor WI Fi. And it certainly leaves out a lot of people who are not tech. And like I mentioned earlier, it's questionable whether it meets the ADA standard. And that brings me to AuraCast.

The full technical name is AuraCast Broadcast audio used as part of an assistive listening system. And this is how AuraCast is envisioned to be used. You walk into a room, you bring your own wireless earbuds you have your hearing aids boned anchored device or your cochlear implant. Most likely you will have to use an intermediary device such as a smartphone or a smartwatch. Or on the earbuds there may be a way of the little charging box that you can select the right audio stream.

But just to show you, because I'm sure you've seen some of the news releases, the Sydney Opera house got an AuraCast system installed and it was transformative, a new experience. But behind the scenes everybody who attended was offered either a smartphone and wireless earbuds or headphones and an AuraCast listener. And all these devices were pre programmed and uniform. So the that the people who were in attendance were given a very good smooth demonstration. But for those of you who've been involved with manufacture rollouts of new products, there are always unforeseen glitches.

So how oracast will most likely be used in the foreseeable future is that if few people at the moment use hearing AIDS that are AuraCast compatible, then most users must borrow an OraCast receiver with a headphone or a neckloop from the venue. And thus initially AuraCast is going to function like an FM system. That means that there will be people with wireless earbuds and hearing aids and hearing

devices that are compatible, but there will also be users that have telecoils in their hearing aids or in their cochlear implants that have to pick up an oracast receiver. Or if they don't have any hearing aids or they have hearing aids without telecoils, they may have to use earphones.

How everyone can use AuraCast is that for those users who don't have built in oracast but they have a telecoil, they need to pick up a neckloop receiver. For users who don't have oracast and don't have telecoils or don't have hearing aids yet they have to pick up a receiver either with headphones or option number C. It's bring your own device that is not mandated under the ADA. But if you have AuraCast compatible wireless earbuds or earphones, you'll be able to pick up the Oracast broadcast with these AuraCast compatible wireless devices. And of course last but not least for hearing instruments and cochlear implants with built in AuraCast, you use your smartphone or your intermediary device to select the oracast stream. Switch to that stream and the audio will stream direct into the hearing aid or into the cochlear implant.

Why, in the opinion of a lot of advocates, should we wait for the assistive listening standards? Is that there's a lot of issues that are not yet resolved. ORACAST is not an assistive listening system in itself, it's only part of it. We don't know what kind of interference, susceptibility there's going to be, how the latent will pan out in the end. We need studies, we need documentation that truly works for a large number of people.

There are use cases where an ORACAST solution has not been worked out. Think of pharmacy counters for example, or in schools where students can't use smartphones. Advocates have been lobbying very hard to see automatic gain control AGC on all transmitters to give a good experience to the users. We need lots of studies. We foresee glitches in the beginning and really the whole rollout of an ORACAST ecosystem has only just begun.

And to get back to the ada, this is not just about assistive listening systems, but also about effective communication. And that means a lot of places are required as per the law to provide auxiliary aids and services. And that could be note takers. It could be captioning, it could be captioning on your smartphone, which is really a way that you can be more accessible or your communication is going to be more accessible for somebody who relies on captioning. But these are some things to consider as you ponder how accessible your individual practices are.

Now there are portable FM systems that can be used and they're certainly being used in places that provide tours where groups are moving in different areas and where there are no PA systems in use. And of course there are portable hearing loops and they're good for a one time kind of on the fly needs for small meetings. They have limitations. They only provide a very small magnetic field in front of that hearing loop device, kind of a bubble. So placement is important.

Use of the microphone right here on the table is important because the microphone is built into that device. It still doesn't let you help, doesn't help you hear a person at the end of the table. You would need a microphone with a cord, with an extension cord. They're permanent, but they're counter hearing loops and places. These counter hearing loops are appearing in more places such as hearing care offices at pharmacies as well as counter service desks at hotels.

And if you are concerned that having a loop in your office doesn't meet the hip HIPAA law, there is a one page beautiful handout on the center for Hearing Access. If you Google HIPAA in the search function, that will pop right up. It does meet the HIPAA law.

So. And that brings me really to action for accessibility. How are we as an audiology, as audiologists, as an audiology community, take action for accessibility. Accessibility. And the change is going to start with us.

It's going to start with you in your office. And the first recommendation I can make is that you have to make sure that your patients are equipped with devices that aren't just AuraCast ready, but are also still legacy assistive listening systems compatible. We call them ADA access ready hearing aids, hearing aids with telecoils and with oracast. And of course, it's really the easiest for you if you have a means to demonstrate the different kinds of technologies. And that may mean installing a loop in your office.

It could be in your waiting room, in the ceiling or underneath the carpeting. It can be a portable hearing loop on a service desk or on your desk in your treatment room. But it can also be a pocket talker with an extension cord and a neckloop where you explain that the extension cord in the real world is going to be a wireless. There's not going to be a wire. But it lets you document how distance affects your patient's hearing and how using a hearing loop or using assistive listening can really benefit your patients.

And of course, you want to have an oracast transmitter in your office as well, either connected to your computer so that you can play a YouTube video. I highly recommend that if you're going to use some type of video from the web, that you pick a video that doesn't have a lot of background noise just to make it easier for your patients to tune in to the voice. And then my third bullet point, demo, demo, demo hearing is believing. I literally took every one of my patients into the waiting room, turned on the tv, had the TV play at a quiet but audible level, and then I would tell them, turn your hearing aids to telecoil. And it was, it never failed.

My patients would stand there going, going, oh, I can hear that. And the wife or the husband would stand there going, can you hear that? Oh, yes, it sounds really clear. Sounds right in my ears. You're going to have that experience with oracast.

You will have that experience with hearing loops. And then essentially I would give my patients a list. And in this case, I think it's going to be important that you provide a list where there are hearing loops in

your community, where they still use FM with neck loops and where There now are ORACAST installations. And literally tell your patients, I want you to go to First English Lutheran Church. But, but, but I'm not Lutheran.

Like you don't care. I want you to try this technology before you come back and see me for your next appointment. And that also means that you as the provider need to check these systems, habitually use these systems yourself so that you know how well they work, where the glitches are, and that you can help your patients as you guide them into using assistive listening technologies. And then of course, it means educating our patients with materials and ideas. Ideally, and I realize that some of these materials don't exist yet, but ideally with materials from your suppliers that explain how the telecoil works in their hearing aid and that you can circle on a page what they have to do, how Auracast is going to work, that you circle on the page in the booklet or on a handout how they're going to be able to tune into oracast.

That you make this a part of your oral rehab class classes. If you offer group lessons or group classes in your office and that you explain that this is part of their rights. They have a right to a reasonable accommodation in places that use assistive technology. And what I did in my office, I kept a list. I literally made a list of places where my patients said they had trouble hearing, where they wanted to hear better.

It was theaters, it was the high school auditorium, it was in retirement communities, there are meeting rooms. And then I listed with their permission that this was a place that they wanted to hear better. So within a year I knew essentially who wanted to hear where. And that allowed me to bring interested parties, especially in houses of worship. I was able to bring patients together who then then could go to a minister and say, we have nothing in our church to help us hear better.

I've tried it at first English. I think we need to have an ORACAST system installed and you want to put the bug basically in your patient's ears. And I believe that ORACAST installations can very quickly increase if. If the hearing aid and the cochlear implant manufacturers provide clear instructional and patient focused information. We need media, we need videos, we need some handouts that explain that there are a number of different systems out there and how to connect to these different systems.

And every hearing loop benefits a future Auracast installation. And every ORACAST installation installation benefits the already existing hearing loop installations. If you are in a situation where you can donate or nudge your patients to pay towards a new system. Make sure that those systems always include receivers and neck loops and that you definitely want to be working with reputable installers that are experienced in installing assistive listening systems. And then a couple words of advice because it worked for me when I started doing hearing loop work in my community.

I got out of the office, I talked to the Lions, I did lectures for the Kiwanis and the Rotary and the senior center, basically lectured on how to hear everywhere. In my case it was how to hear in the car, how to get in the loop. But in this case it could be here everywhere with assistive listening technology. And you may want to start a local or a CAST initiative with other local providers. This is where we really have to be working together because I'm convinced that without your and our every audiologist and hearing instrument specialist active support or a CAST will not happen.

Brian, I'm here. Thanks. Julie, the floor is yours. Thank you. That was extremely informative.

I. I thought it was especially helpful that you mentioned how telecoils are still going to be an integral part of ORACAST over the next several years as ORACAST gains traction. So thank you for all of that. I'm going to go ahead and shift gears and instead of talking about technology and accessibility, I want to talk more broadly about candidacy issues around how we might select and triage patients when it comes to using networked communication devices. That term I used last week. And I first want to

acknowledge that when you're in the clinic.

I think it's an age old challenge that's associated with all wireless technologies. And that is, as you all know, there are incredibly large individual differences as far as how much somebody might need instruction, how much their uptake of these different types. Of.

Course, there's a lot of different factors here. Their adaptation rates for wireless technologies really vary depending on how familiar they might be with apps that are on their phone, how comfortable they might be using their smartphone, and then individual issues related to cognitive ability, dexterity, willingness to learn new things, you know, around motivation, daily activity levels, their own individual listening demands, other health problems that might take priority. And this notion of complexity, which is a fact, is really the balance of increased workload, trying to learn something new, incorporate a new task into treating a condition, and their capacity to learn those new things and embrace those new strategies that may be needed as they grow older. And we'll talk a little bit more at the end of my presentation here about complexity and how that factors into use of wireless technologies for the individual. Anyway, what I want to get into are who is a candidate for wireless technologies and these network communication devices?

How might you be able to determine wireless technology candidacy during a routine hearing aid evaluation appointment or even a follow up appointment, and how to optimize outcomes with these wireless technologies and network communication devices in your clinic? So again, I want to set aside the individual wireless technology, be it telecoils or a cast, whatever it might be, and think more broadly about how we can incorporate these wireless technologies into network communication ecosystems. And as I mentioned last week, I think doing that requires a shift in thinking of these technologies as an afterthought or an act add on after the fitting to more of a must have networked device. And remember that we've moved away from this accessory area sort of choose one is an

afterthought to these network ecosystems where we have combinations of different devices that are at our fingertips and the smartphone and the hearing aid really are the hub of that network communication ecosystem. I also want you to want to recall the slide.

I think this kind of shows a lot of things that are happening with these wireless technologies. And to remind you that telecoils and oracast are really over the next several years are going to be sitting side by side in a redundant, future oriented sort of a way as and I love the phrase from HLL Hearing Loss association of America. They say that telecoils and oracasts are better together. And that's that redundancy that I'm talking about that's so important today. Let's look at this first question.

Who is a wireless technology candidate? Some of you might know and be aware of the Audiology Practice Standards Association. I would encourage, if you don't know about them, to Google them. They have a website. It's an outstanding organization that's devoted to best practice standards.

And one of their hearing aid fitting standards is related right directly to wireless technologies that they really need to be considered for all of our patients. And I think what that really tells me is that during your hearing aid evaluation or whatever you call that intake process, the discovery process, where we're trying to learn that with the the listening demands and the needs of our individual patient might be that it's really important to start with a structured needs assess assessment that asks a lot about these different situations where wireless technologies would be so important. And Juliet did an outstanding job already of talking about how these technologies fit into some of these different situations that you see listed here on the slide. But of course, along with that, I think it's important that whoever the Patient might be whatever their needs might specific needs or places for better communication might be that you have to collaborate on a plan plan that incorporates face to face communication, group communication on their phone alerting and media. And of course I think the best tool to do that is an open ended worksheet.

The cozy of course is very popular. But another one that I think has another level of detail that you should consider is the one I mentioned last week that bears repeating again and that's the telegram. And the reason I love the telegram so much is because it does get into the details of how a person hears pre fitting in all of those situations and then you can go ahead and evaluate their ability to hear and communicate in those situations post fitting notice. It has the one to five scale. It has ratings for a number of different situations that you see listed across the top there.

And I think anytime you sit down face to face with a patient and you have to go through this exercise that does add a level of precision and detail that is often not appreciated by our patients until you actually do the process. Of course a couple other considerations would be hand dexterity, tech literacy and so of course it's important to ask about some of the some of the things you see listed here. I'll go into details on this in a moment and then part of that rating would be to ask the patient on a 1 to 5 scale scale how they might be doing. I think anytime you can have patients rate on a self report scale, it gives you an idea of how difficult the problem might be from their perspective. Cognitive load, listening effort and fatigue are some other factors that I think we need to consider with respect to wireless technologies.

Patients with greater levels of listening for fatigue I think in challenging situations are more likely to benefit from wireless technology. I'm pleased to report that the Vanderbilt Fatigue Scale for adults only 10 questions that you see listed here I think is a very efficient way to see how much of a problem listening effort and fatigue might be. If you're getting reports on one or more of these questions related to fatigue, that's three or four on the scale. That would be an indication that maybe wireless technology needs to be considered to help reduce those listening effort and fatigue issues.

In addition to listening effort and fatigue, I think we all know the importance of trying to improve the signal to noise ratio. We talked about this last week during part one. Here's some data from Stan

Stanford Ear Institute on the Quicksin and you see on this chart the lower the number as you go from 0 to 15 to 25, the worse the person's ability to hear and understand and noise might be. You see people with normal hearing, conductive, mixed and sensorineural hearing losses. And sort of as a rule of thumb, you see that dark horizontal red line that I placed on the slide.

If the score is below that red line, that score should be that red lines at about an SNR loss of 7. As a general rule, I think those patients really need to be aware that wireless technologies are going to be beneficial to the patient. Now, that doesn't mean if the score is higher than that they're not going to be beneficial. But I think just looking objectively at their SNR loss, if it's seven or worse, those are patients that would benefit from it. And the reason I say that is because we all know that the best directional systems on a hearing aid are really no better than improve the signal to noise ratio than five or six in the best case scenario.

But in addition to just looking objectively at this and also loss, there are patients out there that might be in situations where they have high listening demands or high expectations. And these might be individuals that have really good SNR scores. On the quicksand, for example, I try to illustrate this on with the red rectangle. If the signal to noise ratio is a highly adverse negative sign. 7 Everybody tends to struggle in those situations, even people with normal hearing.

And with good wireless technologies, there's a real chance that you're going to improve the SNR beyond what a person with normal hearing might do. And of course, during the case history you might find listening demands are high, expectations might be high, SNR scores might be in the normal range and they still would be a good candidate for wireless technologies because of those demands and expectations. Expectations. That brings me to triaging. In the perfect world, we would offer wireless technology to all of our patients.

But because of some of the challenges I mentioned before, I think it's important to kind of triage or at least prioritize who you're going to talk about wireless technology with earlier and maybe who you might delay that conversation with and maybe bring it in even several months from now. I believe that there are three sort of patient categories around wireless technologies that we can kind of better understand during our interview process. One category are what I'll call competent and confident wireless technology users. The second category are coachable wireless technology users. And then the third would be people that would be, for whatever reason, non users of wireless technology technology.

Now, how do you figure out which category a patient best fits into and the way that you do that is by asking these questions. These questions. I'll just read the questions and then I'll show you the scoring system for each of the questions. The first question. And again, you could ask these questions.

You could put this on a handout and have the patient do that themselves. It's really up to you. But question question number one, it's important for me, the patient, to use my hearing aids with my smartphone. Second question, it's important for my hearing aids to connect my smartphone to in order for me to listen to music, podcasts or to talk on the phone. Number three, it's important for my hearing aids to connect directly to my TV or laptop.

And number four, it's important for my hearing aids to connect to a piano. Public listening type of a system like an auditorium theory or live theater, whatever it might be. And then there's five possible choices for each of those four questions. Very important for me. Important, unimportant.

Very unimportant. Or tell me more about this option or I'm unsure and need more information.

And those are the first four questions. And then I would add these three. Now, this comes from an article that was published last a year and a half ago now by some British researchers, some of you might be familiar with Mel Ferguson in the uk. And these questions get at the patient's sort of view of

their own competency and confidence with respect to smartphone use. And the reason we pick out smartphones here is because they're so integral to so many of these other wireless technologies.

In a way they sort of act as along in combination with the hearing aids as the hub of the, of the communication ecosystem, the network communication ecosystem. And you can see the first question here around competency and confidence is how would you rate your skill level using a smartphone? And you got three possibilities. The patient can choose from Never used, beginner or novice or competent. Use it every day in a seamless sort of a way.

And then question number two is, how confident are you in using a smartphone? Not confident at all. Depends on the task. Or I am confident. The point here is you can take these 6 questions, the 4 from the previous slide and the 2 on this slide, and you can use their answers to kind of shape and determine what bucket or category the patient might be in.

And I'll give you an example what I mean here. So in these, this little chart you see the where category. And in the first we have the where category. Here is the first category being competent and competent wireless technology users. You see the results of the four.

The first four Questions they answered important or very important for one or more of those first four questions questions and then the second four, the second two questions which are around digital literacy. Ferguson and her colleagues labeled that the DL2Q the two questions around digital literacy. For somebody to be in the competent and competent category, they have to answer those two questions as they are competent and competent, that they're independent and they're quite competent or confident in their, in their skills. Anyway. If you get those ratings on those combination of those six questions, the next steps would be to move immediately into setting goals and to involve wireless technologies in your treatment plan because these patients find it to be important and they should be independent in their ability to embrace and use that technology from a software.

Essentially they get going. Then we have the coachable category. Now you see that I've added this another column here on my spreadsheet. For somebody to be deemed coachable wireless technology users, they would rate the four questions around importance surrounding the smartphone integrated with some of those other wireless technologies on the first four questions as important, important or very important for at least one or more of those first four questions. But the results of the DL questions, the digital literacy questions, they're going to say that they never used or rate themselves as a novice or a beginner and that they're not very competent or it depends on the task.

These are individuals, I would say, rather than move directly into incorporating wireless technologies, now you have some information that tells you that they're going to need additional personalized instruction and guidance on how to better integrate their smartphone into their network communication ecosystem. Ecosystem. So what they're basically telling you to be in the coachable category is yes, this is important to me. I think that this is going to be helpful, but I'm going to need some additional instruction because I either lack confidence or my skill level is not where it really needs to be. That's the coachable category.

And based on my experience, probably well over 80% of your patients are going to be in one of these two categories. But of course there's that third category where for whatever reason, maybe it's cognitive decline, maybe it's they just don't get out very much. Whatever it might be, there's about 10 or 15% of your patients that probably fall into this third category where you're just not going to talk about wireless technologies because there's too many other things going on. But maybe down the road, and this is the importance of course of follow up care, maybe six months or a year from now, you might find that things change. That's why it's important during follow up visits that might happen once every three to six months that you re ask these six questions to see if anything has indeed changed with the patient.

So in addition to triaging and trying to put your patients into one of those three wireless technology categories, I think it's also important to have some tactics based on if the patient has low confidence or low competence. Because competence is really around skills and competence is really around self belief or empowerment. So for example, if you find that the patient is really lacking confidence and your job really is to empower that patient and how do you empower that patient? It might be using testimonials from other wearers who have successfully incorporated streaming into their hearing aids, or the use of loop system or telecoils. It could be reframing the use of smartphone, integrating hearing aids as a tool that promotes better engagement.

Showing that the smartphone and the use of apps and how they connect with your phone might be something that kind of boosts their confidence level because they have more control. Or it may be positive framing, encouraging self monitoring of streaming successes, discussing success with their audiologist. In other words, you know, identifying positive moments that involve the smartphone, the telecoil, even Auracast, and really using that as leverage to use those systems more often. On the other hand, if you find that you need to improve their skills, that's where it's really the nitty gritty of just sitting down and trying to boost their ability to incorporate the smartphone, incorporate the telecoil into day to day use. It might be as simple as having the patient practice those skills in front of you so that they, you know, from repetition are able to improve them.

My point here is that when you take the time to triage using those six questions, the way that you follow up can be quite different depending on what category the patient might be in. The last thing that I want to talk about before I wrap it up here is patient complexity. There's been a lot of important work done here in my home in Minneapolis at the University of Minnesota about trying to better understand some of the dimensions of patient complexity. And there's some work here that's been done by a professor by the name of Nathan Ship that looks at patient complexity. I think in a really important way.

He breaks patient complexity down into these two dimensions that are sort of in tension with each other, workload and capacity. And what we mean by workload is really the burden of treatment. And the reason I bring this up in this Particular lecture is because not only do hearing aids create the burden of treatment learning how to use them, but smartphones and all of these other wireless technologies we've talked about do it even more. We're putting a lot of burden on our patient to learn all of these new things. And whenever we add to the workload, we have to be thinking about the capacity the patient might have to learn, learn or embrace those new things.

And capacity is really the burden of condition. It's their ability to carry out the task that we ask them. And of course, the older a person gets, the more chronic medical conditions they might have, the less their capacity. So our job is always to offset the workload by trying to boost their capacity. Breaking up the appointments into smaller chunks over time, using remote technology to connect with the patient for an appointment and break it down at even smaller chunks so that they learn these things and we don't overwhelm because in so many cases with hearing aids and wireless technologies, we're asking patients to increase their workload without really thinking about their capacity to embrace those new things.

Things I've actually come up with what I call a patient complexity checklist. This is something that you could use during any appointment to better understand that. And you see the domains there on the left side, their memory, their cognitive ability, their physical condition, their psychological condition. And you see there's a question that corresponds with each of those domains that helps you understand, understand. Is this a high complex situation or more a low complex.

The higher the complexity, the more that we more time and energy may have to spend with our patients. Anyway, those are some things to consider during your hearing aid evaluation and your follow up appointments with respect to wireless technologies. I just wanted to wrap up here just some

considerations and, and my conclusions. Bluetooth and Telegot tools, I think better together.

Redundancy, at least today and over the next decade is the key to accessibility.

I think with respect to oracast, we don't want to over promise. I think we should be conservative and still be optimistic. You know, that technology is only going to become more popular, but we're still a ways away before it's everywhere. I think it's important to be a pillar in your community. You know these things like hearing loops and oracast are not going to happen without our direct involvement in the community.

I think it's important to try to triage your patients with the six questions rather than, you know, do the same with every single patient. You can be a little bit more nuanced as far as treatment and follow up when you ask those six questions and put your patients in those three categories that I talked talked about. And along with that, you could use the complexity checklist to identify potential roadblocks around workload and capacity that will lead to better wireless technology success with your patients. And I'm going to go ahead and turn it over to Juliet to kind of wrap up with these four questions that she asked at the very beginning. Yes.

And you know, as you were discussing, all of this hearing is believing is really what came down to my whole advocacy at the time with loops. And it isn't just about loops. It's, I think as audiologists, we need to be asking, would you like to hear better in church? As opposed to saying, do you want to use wireless technologies? Because they really.

We don't know what it means. Yeah, but having that technology available in the office.

And I had patients who, I didn't expect that they would want to try the hearing loop, but once they could hear the minister lick his lips in church. Now, that may not sound important to you, Brian, but it was to them. Right. And you. And it just blew them away.

And then they became more open to additional technologies. So don't totally overwhelm them. Pick one facility, maybe even have a workshop in a senior center with your patients to demonstrate the new oracast system to kind of let everybody muck through it. But once they figure out that it helps them hear better, they'll go, ah, if I do this, I'm going to be rewarded. Right?

But yeah, in the end, you know, audiologists have lots of dilemmas, and I like that you emphasize the fact that we need to equip our patients for success and that means they need to have the telecoil built in. It's like buying a car and going back to the dealer saying, where are the headlights? And the. And the dealer tells you, well, you want to drive the car in the dark? Well, yeah, I want to drive my hearing aids in the dark.

Right. So set them up for success and have both technologies built in. Personally, I'm a huge proponent of simple push button access, and I hope that that doesn't go by the wayside because I think for some patients that's needed. But you know, these questions, I wish I had all the answers. Why audiologists don't tell their patients they have to consider a lot of things.

And my encouragement is make sure you include everything so that you can address it once they've become familiar with their devices. And then of course, refer your patients to websites where there's good information and hopefully the manufacturers will step up with simple, easy to use videos that demonstrate how this can be done. There's so much to cover. We could probably fill another hour. Brian, maybe we should in the future, right?

2026, my calendar is open. All right. And so I've answered one or two questions online. I don't know if you see any questions, Melissa, that we're going over time as it is. But if there is anybody who has a question here and wants to reach out to me, by all means do.

And I will forward any questions to Brian if I think it concerns hearing aid technology specific specifically. Sounds good. So I guess that's a wrap. Juliet, thank you, Melissa. Thank you to the audience.

And Juliet, it's always a pleasure to collaborate with you on any project. Thanks for asking me. Yeah, sure. Anytime.