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Audiological Testing with Adults with Severe to Profound Hearing Loss, in partnership with RIT/National Technical Institute for the Deaf

Presenters: Erin Pickett, AuD, CCC-A/SLP, Vanessa Murphy, AuD, CCC-A

Hello, everyone, and welcome to today's webinar Audiological Testing for Adults with Severe to Profound Hearing Loss. This is presented in partnership with RIT, National Technical Institute for the Deaf. We are so pleased to welcome with us two wonderful presenters, Dr. Erin Pickett and Dr. Vanessa Murphy. And at this time, I will hand things over to you. All right, hello, everyone.

Hope we're doing good today. So thank you so much for that lovely introduction. Kimberly. My name is Vanessa Murphy, as she said, and I'm working today with Aaron Pickett. Hello, everyone.

And we are from the Rochester Institute of Technology, National Technical Institute for the Deaf, also known as RIT, NTID.

All right, I'll introduce myself in a little more detail. I started off my career actually as a biochemistry major at Smith College. Decided I wanted to be a speech language pathologist. So I attended the University of Maryland, College park, got my master's in speech pathology, worked for a few years in speech pathology. Realize I really should have been an audiologist.

So I went back to University of Maryland after a few years and earned my Doctor of Audiology, came to NTID for my fourth year and have stayed ever since. I've been here now 12 years.

All right, so I'll also give a little bit more about my background. I started off at Columbus State Community College, got two associate's degrees from Columbus State. Most notably, I got my American Sign Language Interpreting degree, and then I worked as a professional American Sign Language interpreter until my third year of grad school. So I did my undergrad again with those two associate's degrees, moved on to the Ohio State University to complete my undergrad in Speech and Hearing science, and then went to noac, which is the Northeast Ohio AUD Consortium, that's a partnership between Akron University, Cleveland Clinic and Kent State University, and got my Doctor of

Audiology degree. And I also was lucky enough to do my externship here at NTID.

And if you include my externship year, I've been here for three years.

These are our disclosures, These are the limitations and risks for today's course, and here are the learning outcomes for today.

So a little bit more about RIT, NTID. NTID is under the umbrella of RIT. So we're one of the nine colleges here at RIT, and we are established in 1965 by Congress with a main goal of providing secondary to deaf and hard of hearing students. So that is why we were created a little bit about the student population. So this is based on 930 deaf and hard of hearing students.

According to Enrollment. And as you can see based off of these graphs, these pie charts, the listening and technology use as well as communication modes both have a really wide range within them. So some of our students may wear hearing aids, some of our students might have a hearing aid and a CI, some might wear cochlear implants, and some might not use technology at all. And just as variable as the technology use is, so are the communication modes. So some students might use spoken language only or American Sign Language only, some might use a combination of both.

And then there is other there as well. So we do have a lot of variability there in technology use and communication modalities.

So a little bit about the audiologists and speech language pathologists here. There are seven audiologists and six speech language pathologists and we are all fluent in American Sign Language. And we are ready to prioRITize each each student and match that variety of communication modes and their needs. Now, we do have both an audiology clinic and speech language center on campus that is fully functional. And again, our primary mission is to serve this population and provide that secondary

education for deaf and hard of hearing students.

Now, while we do provide services to alumni and older adults through our Osher Lifelong Learning Institute, we're not going to focus on that for the scope of this presentation. We're going to focus on congenital deafness and the adult population rather than the older population, although we do also provide services to them as well.

So I won't bore you by reading through this slide, but we do run a full service clinic here on campus. And here's just a sample of the services that we provide. We are really excited to be partnering with continued today for this course. And we'll also have brochures available as handouts if you're interested in learning more about us.

So as I said, our main mission is to provide services for deaf and hard of hearing students here on campus. We do see a very large number of the severe to profound degree of hearing loss. We'll focus on students, alumni, faculty and staff. Again, the adult population in that range. And as a result of seeing such large, large numbers of this population, we have gathered the experience both from Dr. Pickett and myself, as well as all of the other audiologists who have worked here, so cumulatively, decades of experience in order to create this presentation for you today.

And we've developed some of those procedures and protocols that we've found to be successful that might also be useful for other audiologists who are working with this population as well. So for the scope of this presentation, again I mentioned we're going to be focusing on congenital or prelingual deafness and we will take you through an appointment with a new client named Ed Continú.

So first we'll go over what we do for pre appointment.

Of course, when you get a new client, you're going to review the chart and it's really important that before they even arrive to your clinic, you're investigating the type of communication that they use. So setting up successful communication before they even arrive to your clinic, a way that you can do that is by adding a question on your intake form and planning for that person to have access if it's needed. It is required by law under the ADA to take into consideration the most effective mode of communication for a client and that responsibility falls to the clinic. So if you have a client who is deaf or hard of hearing and uses spoken language and does not sign, then of course a sign language interpreter is not going to be an appropriate, you know, communication aid for that person. But if you do have somebody who is a deaf or hard of hearing client who comes in and does rely on an American Sign Language interpreter, then then that would be an appropriate communication aid for that individual.

And the goal here is that they're able to communicate as effectively as, you know, someone who identifies as a hearing person and uses spoken language to communicate would be able to.

So what are communication aids? I have a few examples here. Those include ASL interpreting, as I mentioned, video remote interpreting as well. If you have other questions, I really could talk about this for hours as Dr. Pickett is very familiar with my background in interpreting. But if you're curious, there is another course that I presented called Working with American Sign Language Interpreters and that course number is listed there if you are interested.

I really walk through the full scope of how to work with an ASL interpreter and I will also have the do's and don'ts of working with interpreters attached to this presentation. Just as a resource, it's a really nice quick guide. Another example would be captioning or speech to text apps. And I'll also do another plug for a presentation done by a colleague of mine, Bonnie Bastian. She's a speech language pathologist and she does a really lovely presentation on apps for access that's listed there as well.

And then of course you have wRITten materials, notetakers and visual aids which the more visual aids that you can include throughout these appointments, the better.

Okay, now we'll move into during the appointment and we'll go through the case history. We do still ask the general case history questions, but there are some things that we highlight more.

Just as an example, this is what our history form looks like. This is standard. We use it for all of our clients. And as I said over the next few slides, we'll, we'll talk a little bit more about what we discuss in, in depth with this population than, than we.

Okay, so we'll dive into technology use first. So we've had the patient arrive to the appointment and of course beforehand we figured out their communication needs and now they're here for the case history. So finding out what kind of devices they're using, whether that's hearing aids, cochlear implants, you know, bimodal, or if they have some kind of bone anchored hearing aid or osseointegrated device, the time that they started using technology and any periods of discontinued or intermittent use. And why, especially with this population, you know, there might be more likelihood of discontinued or intermittent use. For example, if they start off going to, you know, a mainstream school where they're around a lot of hearing peers and then they transfer to a deaf school and they're in an all signing environment potentially, you know, they, they might take off their technology while they're in that signing environment, which of course, as we know, could impact the way that they're listening and the way that, you know, they're using their technology.

And we also want to be really specific with their listening goals because those listening goals will guide our testing, our programming, really the, the full appointment. Another thing to be mindful of with this population is that it is really important to give this population a lot of autonomy. And of course we want to do that with other clients too. But you know, an emphasis on sensitivity here and we'll, we'll touch on this again later. But if you have a deaf or hard of hearing person, you know, long standing bilateral

profound sensorineural hearing loss, then likely they've spent a great portion of their lives in audiology appointments and in the booths as a child and there's a little bit less autonomy there.

So we really want to make sure we're giving that to them in adulthood. And then we have this example here where, you know, you might have a deaf client who relies on visual communication and, and maybe doesn't speak so much. So they might decide to use their hearing aids once a month to have access to their environment and that's really what they're using that hearing aid for.

Here are some examples of real listening goals we've heard here at RIT NTID with this population. So we have clients who have wanted to hear their dog barking, a baby crying. They want to be able to monitor their own voice. They want to enjoy their video games, be able to distinguish consonants, be aware of sounds happening in the car, whether that's, you know, hearing road noise or hearing a child in the backseat, which is difficult, as we know, want to hear hearing family during the holidays and listening to music as well. These are again, real examples of things that we've heard here at NTID for listen goals.

And then something that we focus on here as well is their history of language use and their preferences, because this can also inform how they're using their technology and, and guide programming as well. So are they using completely American Sign Language only? You know, maybe they're, they're more dependent on visual modes of communication, or are they using English or another spoken language? Are using some combination of ASL and spoken language? Does it depend on the situation?

Are they using their hearing aid and their CI when they're at work and then, you know, taking it off at home? Or, you know, more commonly what we see here is, you know, they might take their device off when they're here at NTID in a more signing environment and then when they get home. As we know, 90% of deaf kiddos are born to hearing parents. So getting a little bit of that family history, you know, so

if they have hearing family, they're going to take those hearing aids and want to put them on when they're communicating with their hearing family. So when they're relying on those hearing aids can, can help guide programming as well, of course.

And then for students, we also get a little bit more into education history. So of course, with our, our faculty staff, it's less imperative for us to, to dig that deep into their education history and it's quite time consuming. So the reason that we ask this for our, our college students is because we can get more of a peek into how they're using the technology here at NTID. So, you know, getting that education of were they going to an all deaf school? That might tell us, okay, that means that they were likely using American Sign Language or were they in a mainstream program?

So, you know, they're likely more in a hearing environment where they're relying more on spoken language for communication. And getting their supports as well that they used can also inform what they might still be using to be successful in college. So if they were using an ASL interpreter when they were in mainstream education, then it's likely that they're also going to want that same support while they're here in college. And again, this just gives us more information about the whole picture of the whole student. So, you know, are they using their hearing aids in the classroom?

Maybe when we want to give them a lecture program, all of these kinds of things.

And oh, let me back up a little bit. Also, if they used an FM system, then, you know, of course, that's another support captioning all of those things too.

Okay, so now we'll dig into Ed continuous history. I don't know if you notice anything fun about that name.

So Mr. Ed Continu is 21 years old. He is a junior here at RIT NTID. Oh, and before I get into this too much, so we pulled a lot of information for this case. It is based on a real case before we dive too deeply. So Ed prefers ASL to communicate, but he does use English with hearing peers.

He has a long standing history of severe to profound sensorineural hearing loss since birth in both years. He does have a family history of hearing loss. His mom is deaf and his dad is hard of hearing. He was identified at 3 months old and he was fit with hearing aids at that age.

He attended mainstream school with a deaf program and did receive speech services. He's currently wearing Phonak Sky Marvel 90 UPBTES from 2020. And he is a consistent hearing aid user.

He uses an ASL interpreter in his classes here at RIT NTID. And he has listening goals of wanting to be able to communicate with hearing peers in the classroom, to be able to communicate with his peers after graduation in his workplace, and to be able to hear video games and listen to music. So just as a review, we have that the history of when he was identified and fit with hearing aids, that family history of hearing loss is there, his communication mode is there.

Then his education history is here as well, along with the supports that he used.

We don't have any information that suggests he was an intermittent user. He's a consistent hearing aid user and we have the supports that he used as well as his listening goals. Just as a review for the things that we really highlight.

Okay, now we'll get into the assessment portion. Of course, otoscopy is pretty standard. I'm not going to bore you with that. Your audiologist, you know what you're doing. So the only thing that we try to do, if there's enough time, is something to consider when students are transitioning into college is that this is often the first time that they are taking ownership of their own healthcare rather than their parents or

caregivers.

So our students often enjoy being able to see video otoscopy. It's a way to add more of a more visuals into the appointment and really involve them more in in their care so they can see and know what's going on. So oftentimes we try to do that if we can.

So emittance we do tympanometry as usual. And of course, with this population, we would expect absent acoustic reflexes.

Here are Ed's results. I won't bore you with these. It's kind of the same thing as what we reviewed on the last slide. So he has clear canals, type A temps. And as we expect, with severe to profound hearing loss, he does not have present reflexes.

Okay, and we'll get into the booth testing.

So I included a picture here just so you can see what the setup would look like with an ASL interpreter. I had a colleague take this picture. Thank you so much. Dr. Rebecca Jackson. Shout out to her.

So if I was interpreting an audiology appointment, having both perspectives as an audiologist and a previous professional interpreter, this is where I would prefer to sit if I was interpreting an audiologist appointment. Now, I do think it's important to keep in mind that not every interpreter is going to have experienced audiology appointments. So they might need a little bit of, you know, navigating this at first. And there's going to be some negotiation between the interpreter and the deaf person is figuring out the best place to sit. But what's most important is that the deaf person can see the interpreter.

So they can see each other signing. And the interpreter and the hearing healthcare provider or the audiologists can hear each other because the interpreter is going to be interpreting what the the deaf

person is saying. And there are some caveats to that, but we'll get into that for testing. And I will hand it over to Dr. Aaron Pickett in just a moment. And the last thing I want to emphasize here is that really, visuals are very important for deaf or hard of hearing patients who rely on sign language.

So it's important to have them face during testing. Again, you want them to be able to see the interpreter. They might be relying on speech, reading the interpreter while they're interpreting. And also with this population, we do tend to give more opportunities for breaks in the booth. So we might say, you know, do you, do you need a break just to give them that more autonomy over testing.

Okay, and now I will go ahead and hand it over to Dr. Aaron Pickett. It. Okay. Thank you, Dr. Vanessa Murphy. So now we're still in the booth and we're starting our pure tone audiometry testing.

First, I want to mention it's not on the slide, but you know, make sure you're using super oral headphones instead of inserts if you can. As we know, especially in the higher frequencies, those super aural headphones can go up to higher. For example, at least on our audiometers, with inserts we can only get to 90 at 8, but with our headphones we can get up to 100 and that affects a few of those frequencies. Another thing we tend to do is especially if we know the audiogram ahead of time and can see, you know, oftentimes in this population, 500 Hz is a little more audible to them than 1000 Hz. So we actually might start our testing at 500 instead of the typical 1000 Hz.

We'd also encourage you to consider testing all the way down to 125 hertz. This just gives additional information that we don't always have. It actually is useful sometimes for hearing aid programming. Some of the hearing aid manufacturer, web or software actually can program down to 125Hz.

Also, if the person is considering a cochlear implant, it's important for their, you know, pre implant data also to monitor any residual hearing they may have pre and post surgery. If they're going to be using acoustic stimulation in that implant ear afterward, it's important for that. Also if they're going to go

bimodal and use a hearing aid on the other side again for helping to program that hearing aid, since that hearing aid is really going to be most useful for low frequencies on the opposite ear.

And then when we do bone conduction, again, you're quite familiar with this process. You're going to expect vibrotactyl in the lows and possibly no responses in the high frequencies. So we often with this population explain to them, you know, about hearing it versus feeling it. It can be difficult to really distinguish those. So we use a couple of strategies.

We all have sort of our own ways of doing it. I typically say, you know, press the button if you're hearing it. If you're actually hearing a beep, press the button. If you're only feeling it and not hearing it, you know, you don't have to press the button. You can also make this sign, which means feeling, letting me know you're feeling it.

I will also often ask them, like, are you feeling it, hearing it? Which one?

Another way, Dr. Murphy likes to say, if you're hearing it, use a clicker. If you're feeling it, raise your hand. If you're not sure, raise both hands. And if you forget these instructions, just tell me. But it can be, especially in those low frequencies, hard to distinguish between the hearing and the feeling.

So with Ed, we tested his hearing, and you can see here, especially from 250 to 8,000, he has a typical, what we consider a corner audiogram here. Severe to profound hearing loss with vibrotactile bone in the lows and no responses in the highs. But then when we tested 125 hertz, I was quite surprised when I saw this. When I tested him, he actually had hearing in the normal to borderline mild hearing loss range at 125Hz. And as a hearing aid user, that's important for, you know, programming his hearing aids at that.

At that frequency.

So once we finish our booth, our pure tones, we switch to speech testing. And before we get into the nitty gRITty, we wanted to tell you a little bit about our philosophy with speech testing with this population, because there's such a variety of how much they're listening to speech and how much they're using speech. So with testing speech, our philosophy really is we want to document what they can do, not only what they cannot. So, for example, you know, maybe we do a word test with this population and we get zero percent.

We want to go beyond that and see is there something, is there a test we can find in there to find what they can do and see how they're functioning in their everyday life. We want to avoid floor and ceiling effects. So by doing, you know, just that word test and getting 0%, obviously we're at the floor. We have a variety of assessments we use. Also, a big thing is we want to create an affirming experience for them.

You know, sometimes they don't have great memories of all the booth testing they did in the past and working with speech and speech pathologists and all of that. Sometimes not everybody, but sometimes they don't have a great. Don't have great memories, great experiences. So we want to make sure, you know, we're giving them an affirming experience with us. We might even take time to discuss the goals of the speech testing with them.

So we're not just starting a bunch of speech tests, but when we say, here's some reasons why we're doing this and some possible goals we have found in our clinic, one is maybe we need to go ahead and do a word test, Maybe for ssi, they're applying for supplemental SecuRITy Income and they need to have that on their audiogram. Maybe they just gotten new hearing aids. And we're trying to verify the hearing aid. Fitting to do some speech testing. Maybe we'll do some sentences for that.

Let's say we're doing oral rehab with them. They just got a CI, or they've been using hearing aids but want to get some listening practice in. We want to track their progress. So we do pre and post testing sometimes too. We want to look and see about their speech reading abilities.

And how are the hearing aids or cochlear implants, how are they helping or not helping with speech reading? So we might discuss this with them and say, hey, these are the very, you know, whatever the reasons are why we want to go ahead and do the speech testing. And then we may even go so far as to ask their permission to do the speech testing. So this again is looking at cultural sensitivity just to say, hey, you know, if it's okay with you, or do you mind if we go ahead and do the speech testing? You know, again, for these reasons?

Okay. So we tend to start with SAT or srts, so speech awareness threshold or speech detection threshold, or if we can get it, you know, a speech reception threshold. So we kind of have these three that we'll choose from depending on the situation. So in SAT or sdt, we use typically recorded spondees for that.

Sometimes if we suspect someone could maybe do an srt, but maybe a regular one with too wide a field of words would be too difficult. We'll do what we call a six select srt. So we'll choose a smaller closed set of six spondees. We'll give them the choices in wRITing. Like you can see here, we've chosen six words we might use.

We still tend to use recorded, but we might use monitored live voice if we feel that's more appropriate. And then with this closed set test, clients could point to the word on the list that we give. Or for using an interpreter, the client could sign the word that you're saying, and the interpreter could voice or, you know, interpret to the audiologist what they're saying. So for example, the client or the audiologist plays the word birthday, the client signs birthday, the interpreter tells the audiologist birthday. And that's pretty easy given a closed set, and both the interpreter and the client can see the words.

And then beyond that, we could use a regular srt. And we do provide a wRITten list of the words for familiarization.

Now, with these three which do you start with? Right. We don't have a lot of time, you know, especially in our appointments. And where are we going to start? We certainly don't.

We don't want to go through all three or anything. You know, this is really just a reliability test. Right? So we're not necessarily gaining a ton of information, so we don't want to spend a long time on this. But some things you can consider are the client's audiological history and their past results.

You know, looking back at the record review, what's been done before, how they're communicating with you during the appointment. Are they really signing only and using the interpreter? Are they speech reading? Are they using sentences and don't necessarily need to speech read? That gives you a clue of, you know, where you can start.

Looking back at their communication preferences and history and then their goals. Looking at all this together might give you a sense, oh, they use speech on an everyday basis. We can do a regular SRT or they never use speech. I'll start with the sat or, you know, I think, I think we can try six selection.

So we went ahead and did this testing with ed. What I considered when I started the testing was, okay, so I know he can and does communicate with spoken language, but he does prefer to use ASL. So started with an SAT because that's what had been done before. And his SATs were 65dB HL in his right ear and 75 in his left. And then I went ahead and did a six select SRT and he got 90 in the right and 95 in the left.

Okay, so that was SAT srt. Next is testing MCL and ucl. So most comfortable levels and uncomfortable levels. Now, traditional methods can be somewhat difficult with this population. And when I say traditional, I mean the typical bracketing that we might use.

You know, where we might say, here's a level. Is it clear and comfortable for you? If I was talking at this level for a while, yada yada, you might compare 5 decibels up, 5 decibels down. You know, compare 1 versus 2. Which do you prefer?

This can be tough because in this population they do typically have a narrow dynamic range. You know, SRT could be 70 and their upper range is 100. So, you know, a small dynamic range. They may not also have very reliable loudness perception.

They might, as things get louder, they might not notice or so it might be tough to do, to do regular protocol with this. But it's still important to do MCL UCL testing. You still want to find that mcl. If you're going to do more speech testing, it can help with your hearing aid programming, you know, for example, do you discover their UCL is even lower than you would have expected it? And sometimes you just have to do it.

I know. Here, you know, if we want to call something a complete audiological evaluation, according to our state laws, we have to include an mcl, for example, or maybe for billing purposes, you need to do an MCL or UCL or complete evaluation.

So we have developed a method here that we found works pretty well that we wanted to share with you.

So we use loudness scaling with a running speech stimulus. We use the rainbow passage, if you remember that oldie but goodie. And this rating scale we use is from a number one to a number seven,

where number one is very soft, up to four is that MCL or that comfortable level. And up to seven, which is where it's uncomfortably loud and the client would not want it any louder. So we use this continuous running speech.

So we just set the rainbow passage running and we'll start off at a very soft level. And then we present the speech. We ask the client to tell us what number it is for them based on this rating scale. They have a wRITten version in front of them. And here they tend to sign the numbers to us so we know what number they're saying.

You could have them, you know, paper where they hold it up and they're pointing to the number for you, or you can have the interpreter interpret if you're using an interpreter. So we'll start off at a level down near their SAT or srt. You could even use this method to find that if you didn't already get it. And we'll go up in either two or four db steps, depending on how, you know, how wider dynamic range is. Kind of where we're starting in this case with Ed, I went up in 4 DB steps.

So you can see here on this chart, on the left I did his right ear, and on the right we've got his left ear and his right ear. I started, you know, each of them around his SAT. So I started at 64, went up in 4 DB steps and had him wRITe for me with each level up what number it was for him. Now we tend to do a practice first that's what that P is in that gray shaded area. Because this can be, you know, something new to them.

And we find often we do it first time, they rate things pretty high. And then when we do it again to repeat it as sort of the real Test the numbers do come down a bit because they've, they're used to it. So we did a practice with him and then the real one. So you can see under the number one for his right ear, he rated. The numbers we're most concerned about are four and seven.

Four is the MCL, seven is the UCL, so four. He rated 92 and 96 as fours. We would take 94 as his MCL. And when he got to 100, he still was only at five or six. So we didn't even get to number seven for him.

So I wrote with our 100 plus, so it was above 100 for his left ear. A little bit smaller dynamic range. I started at 76. Once we got to 100, we just finally hit his MCL. So again, we didn't even get to the UCL for his left ear.

So once we've gotten mcl, ucl. If we want to continue on with some speech testing with the idea in mind, we want to have some success here, have the client experience some success. We might start with a closed set. And the closed set we use is the four choice spondy test, an oldie but goodie. You can still find it in the minimal auditory capabilities battery, which is still available.

And the fourth choice has three recorded lists. So if you know if you're going to repeat it over time, you have at least three lists to choose from. And the way it works is the speaker will say ready and then the test item. And the client has four test items to choose from. So in this case the speaker said ready.

Eardrum. And then the client circles eardrum on their paper.

We'll tend to do this test for someone who maybe they can't do a regular srt, but they could do the six select. We suspect they maybe can't do open set speech testing, but we do want to do something they're going to be successful on. And this is a nice test because it relies more on vowel recognition than consonant recognition. And we do know that this population tends to have stronger vowel perception than consonant perception. So if they get around 25, 30%, we consider that chance they really didn't understand any of the words.

And we'll say that they have, you know, basically no close set speech perception. If they get 80% or greater, then we that gives us a clue like, oh, maybe they could actually do some sentence recognition.

So we might move on to sentence recognition. If they get in between chance and 80%, we'll tend to label that as they have some or some limited closed set. Speech recognition.

And if it's below the 80%, we typically won't go on to any other speech testing if it's not warranted or needed.

So with Ed, we did the four choice at his mcl. Well, actually, I think I went ahead and just did it at 100, you know, equipment limits in each ear. And in his right ear he got 100% or 20 out of 20. There's 20 items on the 4 choice. And then in his left ear he got 17 out of 20 or 85%.

So at this point we'd be thinking for him maybe some sentence testing he could be successful at.

So speaking of sentence testing, we do have a few in our toolkit that we pull from. And this is our list that we use typically in a order of easier to harder. So cid everyday sentences, which are also in that minimal auditory capabilities tab. These are everyday sentences. Some of them are pretty short, like this example.

Here we go. Some of them are a little bit longer, but they're meant to be fairly familiar. Next then, is hint we're talking about. There's the hint sentences presented in quiet. And these are, you know, a little bit less every day.

Still a lot of context, though. For example, the cat jumped over the fence. And then the hardest we consider is the azbio sentences. As you probably know, these have two female and two male talkers. They tend to speak somewhat quickly or at least at a more natural rate than some other tests.

So one example is she wanted to follow in his footsteps. And just to be clear, for our testing, we do typically use the GSI suite version AZ bio sentences, which are separate from the ones that are more

for CI testing.

So a note about if you're using an interpreter during your speech testing, if you remember I had said with that closed set speech testing, the six select SRT or even the four choice, you know, the four toys. The client is circling. But the client can point to the word or the interpreter can voice or interpret the word for the audiologist. And again, you'd provide the interpreter and the client with the word list so they know what they're working from. But when you're doing open set word and sentence testing, you don't want to use the interpreter for that.

Instead, have the client wRITE their answers if, if their speech, if they don't talk or their speech isn't, you know, you're worried a little bit about intelligibility and making sure you're getting all the words. Instruct them to wRITE word for word what they're hearing. If they hear A sentence, and in their mind, they kind of put it into ASL and then wRITE it down. They might be using ASL grammar instead of English grammar, and that could affect the scoring. So you want to make sure they wRITE word for word.

And you don't want to use your interpreter because of this nature of the test. An open set word or sentence, the client could sign the sentence or the word and the interpreter interprets it correctly and tells you. But a one sign could have multiple meanings in English. So they could choose the wrong meaning if it's a single word or with a sentence. They may give a sentence that's correct in terms of the meaning of what the original sentence was, but it might not use all the exact same words.

So that. That could give some incorrect scores, even though maybe the client heard every single word. Exactly. So again, having them wRITE that down if they're not going to use speech is a better way to go for OpenSet. And then.

Erin, do you mind if I pop in for just a second? Not at all. Great. So, just as Erin said, I wanted to show you an example of a sign that has multiple different meanings, which, again, is another reason why you

wouldn't want to have the interpreter interpret an open set test like this, because you need the exact word. So this sign could mean insurance.

It could also mean infection. And of course, when you have an interpretation where you have context so you're going to have a full sentence, likely the interpreter will know. But with this, you know, it's. It's potentially just one word or, you know, there's less context. So this is one of the reasons why you would, like, like Dr. Pickett said, have the client wRITe down what they're hearing.

Thank you.

Some other thoughts we had about sentence testing. Possibly your equipment limits are below the client's mcl. So what do you do if you suspect they might have some sentence recognition? Well, go ahead and do some ADA testing. Have them put on their hearing aids or their CI and see what they can do.

Also, sometimes recorded speech. Well, we know recorded speech is more difficult than monitored live voice can be. So maybe switch to monitored live voice if that may get a little more information.

Sometimes the students we see, they tell us, you know, their audiologist always just did monitor live voice with them, and we try to use recorded more often so that we can be more standardized and compare across time, and they'll tell us, wow, that that was a lot harder, or maybe they scored poorer than they have in the past using recorded. So then we might jump to monitor live Voice just a little bit to be able to see.

Okay, was this easier? Does it match better what you've done in the past? And then also consider testing with visual cues. You know, the, these clients, as we know, our clients are walking around typically using both their vision and their hearing to understand speech. So some of these clients, they may have limited or even no auditory only speech recognition, but you put in visual cues and now

they're actually understanding a lot of speech.

So if you want to add in some visual cues, you can use monitored live voice through the booth window if you want to control better the level of your voice. Or you can just sit down face to face with them using and just speak the sentences or words sometimes in that case, we actually have handheld sound level meters that we'll use and hold up so we can make sure when we're presenting sentences, we're doing it at a. Or words, we're doing it at a consistent level. And then also if we're going to go ahead and do add in some speech reading, you can consider comparing three different conditions. The auditory only, the auditory plus visual, and then the visual only or speech reading only, for example, have them take off their hearing aids and you can get a lot of information that way.

For example, Here is some testing I've actually done with some of my students. A couple cases where we added visual cues or actually compared those three different conditions I just mentioned. So this first case, and neither of these are ED or the person ED was based on, these are other students we tested with the CID everyday sentences and the listening only condition. And this person had a CI. They got zero percent, couldn't understand any of the words, which is their CI.

Then we did speech reading only. So took the CI off, just watched. And this is actually a computer, a video on a computer screen. They got 58%. Then we had them put their CI back on.

Now they're listening and speech reading, 72%. So now we know, okay, so at least with everyday sentences in a quiet environment, staring at a computer screen, they are, you know, doing pretty well and maybe hopefully in their everyday life, listening and speech reading together, they're able to communicate. And we know that they're pretty good speech readers, but the CI is giving them a boost. Second case, case two, also cid, everyday sentences, the same setup. This person uses a hearing aid with the listening only with the hearing aid.

Again, zero percent, not getting anything with just the hearing aid. Now we go to look at speech reading only, getting 64%. Put that hearing aid back on. Still at 60% so the hearing aid really isn't benefiting them in terms of understanding speech. However, they may have other goals that it's meeting for them.

And just to let you know, we actually have this test still the NTID Speech Reading Test. It is available through auditech. It is CD a little old school, but on it there are videos of all these CID sentences. If you think 10 lists, 8 to 10 lists that again you can compare over time or at least be able to do those three conditions more than once, like pre post. So that is available.

And to let you know about ed's results, did some word testing just to do it because we had to 0% w22s hint also 0%. This was unaided over headphones.

Even with the hint sentences we attempted, he wasn't getting anything. So then when he put his hearing aids on, we did CID everyday sentences. @ a typical conversational level, he actually got 26% of the words right. And this was listening only. So here we finally got some information of oh, he is able to understand some words with just his hearing aids, with his hearing aids, without speech reading.

And we've talked a lot about sentence testing because we do actually rarely end up doing word testing, e.g. w22s with this population. But there are some exceptions. One is if they have excellent sentence recognition, we may go on and go ahead and try words. If it's someone who does have a reliance on spoken language communication we've seen in the past, we're testing has been done with them, you know, we'll go ahead and do word testing or again if it's required, like it's proof of deafness, they need to have the word testing done, we'll go ahead and do that.

So for Ed, what might we want to do next with him? Well, when I did those CID everyday sentences it was audio only. But now I want to know how does he do with speech reading? I suspect actually he does pretty well with speech reading. And especially if he puts that that those hearing aids together with

speech reading, I bet he does very well and I'd like to know that's how he functions in the real world a lot of the time, especially in class or at work.

Also now I did some testing with hearing AIDS, got 26% if in a few. Well, hopefully soon he'll get some new hearing aids. Now we can verify their settings with some speech testing. Can we get around that similar 26%. Maybe it'll get better.

And again, why do we do any sort of speech testing? One reason we like to do it is to track over time. You know, are they maintaining their speech recognition as we'd expect, or does something happen, something go on that causes it to decrease? So now we do have a way for him of tracking his speech recognition over time, whereas if we hadn't tried those sentences, we wouldn't have had that information.

Okay, that is all about Ed and the testing we completed for him. I'm going to turn things back to Vanessa to sum up what we've talked about today.

All right? So first things first. I know we. We talked about a lot of different types of testing today, and we want to recognize that clinic time is limited, so we're going to have to prioRITize. Of course, we do often prioRITize the four choice spondee test because we want to see if there are some chances for, you know, success with a test like that and then getting that information for where that will guide us to next.

And we do also take into consideration the client's goals. So if you have somebody who comes in and they say, I want to hear my baby crying, maybe they have a corner audiogram and they haven't used hearing aids before, then more than likely we're not going to prioRITize speech testing for that individual in particular. Just as an example.

Okay, so what we've gone over in this presentation is it is important to use the supraoral headphones as a transducer because as we know, we get a little bit more oomph from the supraoral headphones. Testing 125Hz. That information might surprise you and can give you more information about making sure you pick a hearing aid that goes down to 125Hz, as well as programming at that frequency. And also with booth testing, starting at a lower frequency tone, because we know these hearing losses are typically sloping. So making sure you're starting at a level that is a little bit easier to hear.

And then Dr. Pickett discussed loudness scaling for MCL UCL using, you know, going in those two 4dB steps to get a little bit more information with that limited dynamic range that we know the severe to profound population typically has, then moving on to closed speech recognition testing. Like we said, we tend to prioritize the four choice Bundy test that really can give us a lot of information about, you know, okay, if they do really well on the 4 choice Bundy, then we can move on to sentence testing, or maybe they score Chance on the 4 Choice Bundy test, then we know we're not going to get more information from trying sentence testing, testing necessarily, or if we do, we want to start with a really easy sentence test like the CID, everyday sentences. And then as Dr. Pickett talked about, doing those sentence testing with all of those different conditions where you're doing listening only, visual only, and then both together can really tell you what exactly they're getting from each of those conditions and really where they're going to gain that benefit. So whether or not they, they are getting that benefit from the hearing aid or not and gives you more information about how well they're doing in a real world setting. Because of course in the booth we're testing auditory only, but in the real world, you know, there's those, you know, those communication strategies, they're going to be relying on speech reading to, to help aid in communication.

So those visual cues are really important. So this is that summary there of those testing tips. And this is a really lovely article that Dr. Pickett found. It's a resource for you. We would be remiss if we didn't give it a shout out here.

And there's an article called Guidelines for best practice in the audiology. Audiologic management of adults for this population is available on the ASHA website, though it does focus on acquired hearing loss rather than we discussed, you know, congenital or prelingual.

Also you can use these, these measures that we talked about and these strategies to verify the hearing aid, NCI programming for aided testing. You know, of course, you know, if you're looking for an MCL aided, then you would want it to be generally close to average conversational level, those kinds of things. Things. And then one last plug for another colleague of mine, Dr. Rebecca Jackson. If you're interested in more information on measures of success with the severe to profound population, please refer to the continued course measuring what matters success with hearing aids and cochlear implants for adults with the severe to profound.

With severe to profound hearing loss.

All right. And that is all we had for you today. Thank you so much for your attention and for attending this course to learn more about this population. I hope we were able to share some, some helpful testing tips. Yes, I'll just chime in.

Thank you. We were really happy to share kind of things we do and hope that you find it useful.

Well, thank you both so much. We really appreciate what a wonderful presentation this was today. It's so informative. For those of you looking for credit for the course, don't forget to take your exam at the conclusion of this course. Again, we want to thank RIT and the National Technical Institute for the Deaf for their partnership with Audiology Online.

This concludes today's course. We hope everyone has a great rest of your day.

