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When the Time is Right to Consider Different Hearing Technology for Your Patients

Presenter: Terry Zwolan, PhD; Tracy Murphy, AuD

- Welcome to today's course, "When the time is right to consider different hearing technology for your patients." Presented by doctors Terry Zwolan and Tracy Murphy. This month on "Audiology Online," we're celebrating innovation in the hearing industry with our fourth industry innovation summit. Thank you for joining us today, and we hope to see you in future courses. We'd like to thank our title sponsor CareCredit and all of the companies who are joining us this year. It is now my great pleasure to turn the microphone over to Dr. Zwolan and Murphy. Thank you so much.

- Hi everybody, my name is Tracy Murphy. I am a private practice audiologist in the suburbs of Chicago. I have been practicing for 30 years, but in 2019 became part of the Cochlear provider network, so that I could better serve my patients along the continuum of care of audiology and hearing options. Terry.

- Good morning, Tracy. It's my pleasure to be here presenting with Tracy Murphy. My name is Terry Zwolan and I am director of audiology access and standard of care at Cochlear Americas. Prior to joining Cochlear Americas, I was director of the Cochlear Implant Program at the University of Michigan for 31 years. So Tracy and I are teaming up together to talk to you today about when the time is right to consider different hearing technology for your patients. So we're gonna go ahead and get started here. I'd like to begin by reviewing our learning outcomes. After this course, participants will be able to describe this 60/60 guideline for referring patients for a Cochlear implant candidacy evaluation. We'll be able to list outcomes typically obtained by patients after receiving a Cochlear implant and be able to describe ways to successfully counsel patients, which we know is so important regarding the benefits of participation in a Cochlear implant candidacy evaluation.

So at Cochlear we always start with our mission, which our mission is to help people hear and be heard. We empower people to connect with others and live a full life. We transform the way people understand and treat hearing loss, and that's what we're

focusing on today. And we innovate and bring to market a range of implantable hearing solutions that deliver a lifetime of hearing outcomes. So let's begin. We know that Cochlear implant outcomes have really come a long way over the years, and I like to describe this more recent study by Craig Buchman and colleagues, which I like to describe it because it's a clinical trial that was conducted across several different clinics. So it's not data from just one clinic, and it was a variety of patients.

There were close to 100, there were 96 adults included in the study. And what we see on the left-hand side is we see the Pre Op CNC scores, which was a median of 15%. And post-implant, we see a nice improvement to approximately 61%. If we look at AzBio Sentences, we see similar Pre Op scores. These were in a +10 dB signal to noise ratio. So they weren't hearing very well in noise, a score of 15% on Sentences and those increased to 43%. If we look at our older adults, I like to cite this study because this was used for the Medicare expansion. We know that, recently, a little bit over a year ago, Medicare expanded their indications to include adults who score less than or equal to 60% on Sentences.

Prior to that approval, our Medicare beneficiaries had to score less than 40%. So there was really a disconnect between that group and the FDA indication. So this really leveled the playing field for our Medicare beneficiaries. But importantly, the data from that study shows us that our older patients who many of us are seeing today are performing equally as well. And if we look at the data from that study, we see that, we've got the data broken down into their best aided because many of our patients today are using a hearing aid in their contralateral ear. So we've got some bilateral aided pre-op and some bimodal post-op. So their best aided score pre-op was bilateral hearing aids.

And we see a score from 38% on CNC Words jumping up to 78 and 76% at 6 and 12 months. If we look at just the implanted ear, we're seeing similar improvements to what

we saw on the previous slides. A pre-op score of 16, jumping on up to 62% in that implant alone. If we look at AzBio Sentences in Quiet, so these are a little bit easier than that previous slide, which was in +10 signal to noise ratio. We're seeing great scores in quiet. We're seeing that with using that contralateral hearing aid, patients are scoring 91% in quiet at six months, and in the implant ear alone, they're scoring 79%. So, I really like to demonstrate that our older patients are doing significantly better with implants as well as our younger patients.

So we see from those slides that our patients are doing really well. Part of the problem is though that our utilization rate is low. Less than 10% of adults who qualify for a Cochlear implant actually receive one. And if we consider those recent expansions, so that Medicare expansion, if we consider that we were recently received FDA approval for single-sided deafness, so that led to more candidates and current Cochlear implant utilization rate is estimated to be about 2%. So that means there's a lot of patients out there, who could benefit from a Cochlear implant who are not receiving one. We see that in children that rate is higher, thank goodness, but only about 50% of children who qualify for a Cochlear implant in the United States actually receive one.

So we've got some work to do in both our adult population as well as in our pediatric population. So, hopefully, Tracy and I today can shed some light on this. So why are so few people being referred for implants or being implanted or receiving a Cochlear implant? Well, we know that there's lack of familiarity with the Cochlear implant candidacy guidelines. They've changed a lot lately, just in the last 10 years, there have been four changes in FDA indications. Unfortunately, there's often poor communication between the Cochlear implant clinics and the hearing aid dispensers and diagnostic audiologists. So we're all busy doing our things in our sort of separate silos of care and we feel like the time is right to have better integration amongst our different areas.

We know that there's varied criteria across clinics regarding when to refer and when to recommend a Cochlear implant. So we know that our referers are sometimes confused if they send a patient to clinic A, they might feel pretty confident that that person will be recommended for an implant and if they send them to clinic B, they might not be. And so our referral sources say, "Well, which one's right, clinic A or clinic B?" And importantly we know that most of our primary care physicians or our colleagues do not routinely screen our patients for hearing loss. They might not refer patients for hearing health issues or if a patient does express some difficulties with their hearing, our PCPs don't always know where to send patients if they do have hearing health issues.

So as audiologists, it looks like we need to do some education regarding to our colleagues, regarding hearing health issues, that are impacting all of our patients. So as we begin, let's just review what the adult indications are for Nucleus Cochlear Implants. So the traditional indication is the one up on the top, and that's the subsequent audiogram on the right-hand side over here. So we know that they're intended for use in adults who have bilateral, moderate to profound sensorineural hearing loss and obtained limited benefit from appropriately fit hearing aids. So these indications typically look at the audiogram as well as look at benefit from hearing aids. The Nucleus Hybrid L24 Cochlear implant system really opened up the audiogram to include patients with residual low-frequency hearing sensitivity as well as severe to profound high-frequency sensorineural hearing loss and also who obtain limited benefit from appropriately fit hearing aids.

Both the indications are a little bit different. We'll go into that in just a bit. Recently, single-sided deafness was approved by the FDA for the Nucleus indications, and this is for children as young as five years of age as well as adults, so five years+. The ear to be implanted needs to have a severe to profound sensorineural hearing loss as well as an aided CNC Word score that's less than or equal to 5%. So that audiogram on the right-hand side is typical of the patients we might see with single-sided deafness, who

now can obtain in this patient, in this example, a Cochlear implant in their left ear. And the contralateral ear needs to have normal or near normal hearing defined as a pure-tone average of less than or equal to 30 dB HL.

And one of my favorite things about single-sided deafness is when this became approved by the FDA, it really sends an important signal that we're placing greater emphasis on the ear to be treated and not just upon both of the ears together. So if we're able to provide an implant in an ear, that the contralateral ear has normal hearing, we're making great progress because we're really starting to focus on that ear to be treated. We know from the literature that there are great health benefits of earlier implantation. We know that a shorter duration of severe to profound hearing loss in the implanted ear has been found to be a better predictor of better hearing outcomes. So if we can catch someone early and provide them with a Cochlear implant, they're gonna do better than if they wait for a very long time with a significant hearing loss.

We know that Cochlear implant leads to reduced social isolation. It puts our patients back out, they're communicating with their friends and their family. This leads to improved overall health and improved verbal and memory functions. And we know that better hearing outcomes are correlated with a shorter duration of hearing loss. Our patients do a little bit better if they have some speech understanding before they receive a Cochlear implant and if they have a little bit of residual hearing in the ear that we're treating. So another way to say it is if you're posed with a patient with two audiograms, the one on the right, you'd probably look at that and go, "Oh, this patient looks like a Cochlear implant candidate.

" And we're hoping what you'll see is if you look at the audiogram on the left-hand side, that you'll also say, "Hmm, maybe this patient's a candidate for a Cochlear implant." Because what we see from the literature and from all the researches that has been done is that this patient, if let's say, that is their audiogram today and the one on the

right is their audiogram in 10 years, they're gonna do better with an implant if we catch them sooner. So that patient A on the left will likely do better with an implant than patient B on the right-hand side. I do love this study that's cited here on the bottom by Richard Dowell because he did find out that based on 310 patients, that those who were caught early did better than those who waited until they had a significant drop or loss of all auditory function.

So it's important for us to look at that literature and learn from it. So if we look at how we're evaluating our patients, so we have our standard audiological evaluations and then we have our Cochlear implant evaluations. And in the United States we know that the standard of care for audiometric testing includes determination of thresholds. And we also know that our standard of care is we do unaided word recognition as part of our unaided audiogram. Well, if we look at CI candidacy, we also look at that audiogram, but we oftentimes based on those FDA indications, especially for our traditional patients, we'll base candidacy on aided sentence recognition testing. And we know that our diagnostic audiologists rarely perform aided sentence recognition testing.

So our diagnostic audiologists are really focusing on that audiogram. And so how would they know when to refer when we're using very different measures to determine candidacy than we are just to evaluate hearing. And we would go to meetings and we would talk about the implant program and we would talk about these amazing outcomes that our patients are receiving. And clinicians would come up to us and say, "Okay, so I've got a few patients that might be a candidate, but I'm not really sure. Can you give me pointers as to how to know when to refer a patient for a Cochlear implant?" And I honestly, at first I would say, "Oh, send me their audiogram and I'll be able to take a look and I'll give you feedback."

" And then I thought, "Well, that's not a good thing to say. People don't wanna send in an audiogram. They'd rather feel comfortable about when to refer." So we went back to the clinic and said, "How can we provide better guidance of, to answer that questions when people would ask us, 'how should I know when to refer?'" So what we did is we went back to the clinic and decided to develop the 60/60 guideline, we just started to look at all of our data and we really wanted to determine if routine audiometric measures that our referral sources were performing could be used to differentiate candidates from non-candidates to help them determine who should be referred for a Cochlear implant candidacy evaluation.

So we took the preoperative data for 529 patients who were seen for a Cochlear implant candidacy evaluation over a three year period. And during that time we found that 250 of our patients met traditional candidacy indications, while 279 were determined to be non-candidates. They didn't meet that traditional indication. So we wanted to look at those audiometric measures. So we looked at the unaided thresholds for each year and we know that audiologists are commonly looking at the pure-tone average. So we thought, "Okay, let's look at the pure-tone average and then let's look at that unaided monosyllabic word recognition score for each year and see if that can help us determine when to refer." So some study definitions that are good to clarify, we defined, candidates were defined as someone who had a bilateral, moderate to profound sensorineural hearing loss and who had a best aided sentence score that was less than or equal to 60%.

And that best aided sentence score, we would administer AzBio Sentences in a +10 dB signal to noise ratio with just the right ear aided, just the left ear aided and both ears aided together and which of those was ever the highest score was determined to be their best aided score. We then looked at the audiogram, the pure-tone average of five, one and two for our candidates, for our traditional candidates, the people who met that traditional indication, as well as looked at their unaided monosyllabic word score. So

we're looking at those candidates, we're looking at their unaided audiogram and specifically the pure-tone average and the unaided monosyllabic word score. Now we looked at the referral audiograms that our referral sources sent in and we saw that there were a variety of materials that were used for that unaided word recognition score.

Sometimes they were presented taped, sometimes they were presented live voice, sometimes they used NU6, CNC, CID-W22. And a lot of times they didn't indicate which measure was used. But we decided to accept all of that data because we felt as though it really represented real world, the data that was being used by clinicians in order to make a decision about referring. And as we went through those 500 and some audiograms, we looked at every single one of them, not a single referral audiogram included aided sentence recognition testing. So that showed us that that's right, that they're really not performing that testing. They're sort of sending them to us and we perform that as part of the implant evaluation.

So here I'm putting up an example of an audiogram that came through. So if we look here, we see the pure-tone average is 83 and 80. We see their speech audiometry, but we don't know if it was presented live voice or recorded. We know we see a score of 60% in the left and 20% in the right. And actually for this patient, they brought the audiogram in with them and they were self-referred. Their audiologist was updating their audiogram for new hearing aids. So this really confirmed for us that this guideline was needed to help guide clinicians as to when to refer for a Cochlear implant. So we took the data from all those traditional candidates, which was 250 patients, and we outlined their preoperative unaided better ear pure-tone average.

That's what you see on this slide. So let me explain it a little bit here. It looks a little bit complicated, but it isn't once we break it down. So here we have the cumulative proportion of those 250 traditional candidates. This bar represents anyone that had a

pure-tone average in their better ear. Now I should clarify, we picked the better ear because typically when you're doing best aided and you're comparing right ear, left ear, or both ears together, the better ear is contributing more to that better aided score. So we took the better ear pure-tone average, and 100% of patients had a pure-tone average in their better ear that fell between 30 and 120 decibels. Let me make that a little bit easier to see.

So between 30 and 120, as we narrowed that range, our bars got lower. And what we were interested in seeing was where does 90% of our patients fall? So we see that 95.1% of our patients had a pure-tone average in their better ear that was between 60 and 120 dBs. So we looked at that and we said, "Okay, most of our patients, 95% of them actually have a pure-tone average at least 60 dB." And then over here we have the proportion of patients with various pure-tone averages. So you can see that very few of them had pure-tone average between 30 and 39 or between 40 and 49. But once we jump over to 60 to 69, about 11% and then more as we went on. Next thing we wanted to look at was their unaided word score.

So we did the same thing, we broke it down, but it goes in the opposite direction because with this your word score is gonna be lower and your pure-tone average is likely gonna be higher when you're looking at implant candidates. So here we see that 100% of our traditional candidates had a better ear unaided word score that fell between 0 and 90%. Then if we narrow it down to 0 to 80%, 0 to 70%, again, we wanted to find out where that 90% mark was. And we put the line here and we said "92.3% had a better ear unaided word score that fell between 0 and 60%." We said, "Oh my gosh, that's pretty cool." It was 60 dB and now it's 60%. So that's how we came up with the 60/60.

And then when we looked at the proportion of patients who had various word recognition scores, I wanna bring your attention here. We had 34% in their better ear

who had an unaided word score less than 10%. If we expand that out to less than 20%, 51% of our traditional candidates demonstrated an unaided word score in their better ear. That was less than 20%. Really this clarified for us that we should be seeing these patients sooner because their outcome might be even better. So based on that, we developed the 60/60, which says, "It's good to consider a Cochlear implant evaluation." So this is a referral for an evaluation. It's not a referral for a Cochlear implant, it's a referral for someone to be evaluated for an implant.

And so we recommend that someone should be considered when they have a pure-tone average greater than or equal to 60 dB in their better ear, or when they have a unaided word score that's less than or equal to 60% in the better ear. And of course with these patients we see that they often struggle to hear on the phone, they have difficulty understanding others, they often withdraw from social events and often need others to repeat themselves. Well, we looked at our data, we sent it for publication and it was great, the reviewer sent us back and they said, "We really like this, but we need you to do more analyses." And so some of these analyses were based on the feedback that we got from the reviewers.

And first they said, "we wanna know what your hit and miss rate is. How does it work to differentiate those candidates from non-candidates?" So out of those patients we had 415 patients who had both, the unaided word score as well as the thresholds. Really what we were missing was that unaided word score in some of these patients. But we found out of those 415 patients, the hit rate was 82%. So the 60/60 was accurate for 340 out of those 415 patients. So it accurately delineated between a candidate and a non-candidate. That meant we had a miss rate of about 18%. So 75 out of those 415 patients were not accurately identified. Eight candidates were missed, meaning that they met traditional indications. But based on the 60/60, they might not have been referred.

And 67 non-candidates did meet the 60/60. And we were actually okay with that because we wanted to sort of, we really didn't wanna miss patients. And we thought if we get non-candidates in the door, we can at least make them aware of their potential candidacy down the road. They can learn about this technology and they can consider it down the road if they become candidates. Of those 67 non-candidates, some of them returned the following year and eventually became candidates, which was great 'cause we caught them early, which means that we optimized their outcome. Many of the non-candidates returned to their referring audiologists. Some of them would come in and say, "You know, I'm not sure if I want new hearing aids or not.

So I thought, 'Well, maybe I should see if I'm an implant candidate before I go get new hearing aids.'" So we would confirm to them, "No, you're not an implanted candidate. Yes, you should likely consider new hearing aids." So we were just a step in their process of their decision making. They also wanted us to look further at sensitivity and specificity. And so really sensitivity can be broken down by looking at highlighting this column here. It really just looks at the candidates. And we were pretty sensitive. You saw that we only missed eight candidates. So that left us with a pretty high sensitivity of 96%. So out of those 220, 212 were spot on, but we missed eight.

So our sensitivity was pretty high at 96%. Our specificity was lower. That's because of those 67 non-candidates who met the 60/60. Again, if we wanna referral guideline, we wanted to meet these people, talk to them about potential candidacy down the road. And we did not feel like that was a bad thing. Some of those patients were candidates for studies that were ongoing, that have non-traditional indications. So some of those actually did receive a Cochlear implant. They also wanted us to look at PPV and NPV, positive predictive value, negative predictive value. So basically you just go the other way. And so we're looking at, our PPV was lower, again, because it included those 67 non-candidates, but it means that the 60/60 has 76 probability of meeting traditional indications if a patient meets the 60/60 guideline and our NPV of 94% means there's a

94% probability that a patient will not meet traditional indications if they do not meet the 60/60 guideline.

So once we sent them all that data and looked at it the other way, they agreed to publish our findings and we were pretty excited about the 60/60. And then in 2022, a lot of others have actually looked at referral guidelines. And in 2022 someone contacted me and said, "Hey, Terry, have you seen this publication? It's looking at the 60/60 as well as some other referral guidelines." And my heart skipped a beat because when anybody's looking at your data, it's a little nerve wracking, like, did it do okay, did it hold up? So this group from Washington University looked at data obtained on 248 of their traditional patients and they compared these five different referral guidelines. And I was really excited to see that the 60/60 demonstrated the best overall performance on external validation and that "Lee et al" supported use of the 60/60 guideline.

There've been other studies, "Reddy et al" in 2022 did a response operating characteristics or response operating chars. So they did more of a detailed analysis than what we did in the 60/60. And really what I wanna point out is, they looked at the earphone, the CNC Word scores unaided, like we did. They looked at pure-tone threshold at 1,000 Hz and they also looked at a pure-tone average. And what they found was that based on those response operating characteristics, that 1,000 Hz pure-tone average greater than 50, a three frequency pure-tone average greater than 57 dB. So that's pretty close to 60 and a monosyllabic word score less than 60% can each serve as individual indicators for referral for CI evaluation. So I'm really excited that other investigators are finding similar responses to that of the 60/60.

And then as we go on, there's more recent investigators who say that the 60/60 is too stringent. Some researchers recommend referral when the word recognition score, the unaided score is less than 60% or the pure-tone average is greater than 60 dB in either ear. So not really focusing on the best aided, like the 60/60 did. And we know that such

as single-sided deafness and that clinicians are starting to focus more on the ear to be treated and less on that contralateral hearing and how it contributes. One thing to point out is we mentioned at the beginning that the 60/60 was based on +10 dB signal to noise ratio. And some clinics will utilize +5 signal to noise ratio, which is harder than +10.

And if you're referring to a clinic that's using +five signal to noise ratio, they'll have a higher hit rate and a lower miss rate with the 60/60, because the 60/60 was based on a slightly easier signal to noise ratio of +10 dB. One thing I'd love to point out is, is looking at our data from the 60/60, is we can see that we're comparing sort of apples and oranges when we compare unaided word score and the aided word score. And we see that our candidates and our non-candidates both scored higher in their unaided word score situation than they did in the aided testing that was performed as part of the candidacy evaluation. And I think you're gonna see that in some of the case studies we're gonna show in a minute.

And really it makes perfect sense because patients tend to score higher with unaided testing because we can use a louder presentation level, we're setting it to PB max, oftentimes we're short on time. So unaided word scores are often performed with live voice testing. Where in candidacy evaluations we're presenting materials that are always taped. We're presenting them at a softer level of 60 dB SPL. And so the taped and the software level tends to lead to those lower scores that are used to determine CI candidacy. So I have just a couple of examples here of candidate referrals. We've got this patient, this is that audiogram I showed you at the very beginning. What we see is their pure-tone average meets the 60/60, it's greater than 60 in both the right and the left ear.

Their word score for that right ear is right at that border of 60%, and the left ear is 20%. So it was great that this patient came in for CI candidacy evaluation. One of the

first things I'll point out here is that, we look at those unaided scores of 60% in the left coordinated with a left ear CNC of 24%. So again, we see that lower score in that aided testing. We had 20% in the right and in the right ear they had a CNC score of 8%. But what I'd like to point out is if we look at these scores post-implant, this patient, the right ear was implanted, thinking that we'll go with the poorer ear, so that they can use the hearing in that left ear in a bimodal condition with the Cochlear implant.

And what we have here is this patient jumped from a pre-op score of 8% on CNCs to 82% post-implant one year. We had AzBio scores that clearly met the FDA indication of less than 60%. And look at that score in the left ear, it jumped up to 98% in quiet. And what we have here in noise is a score of 44%, in just the implant alone, but close to 80%, 79% in a bimodal condition. Which tells me this patient can probably now go to a restaurant and carry on a fairly good conversation because they're doing pretty well when they combine the use of that implant with the hearing aid in the contralateral ear. We have this example here, patient number two meets the 60/60.

Again, that left one is borderline because it's at 60, but his discrim meets it in both the right and left ear. So for this patient, what most clinics do is, they'll verify the hearing aids. If they're not meeting targets, they'll then test them. Sometimes we test them using their clinic aid as well as using their own personal aid. And this one's just an example that when we put on bilateral clinic aids, this patient obtained a score of 73% and was not deemed to be a candidate for a Cochlear implant. And when we looked at his personal aids, he was scoring 48%. So this patient was referred back to their dispensing audiologist with a recommendation to consider reprogramming or replacement of hearing aids.

So he met the 60/60, he didn't qualify for an implant but actually in the long run he was better off because he went back and got new hearing aids and hears better. And we've

got this last patient here, who's got a bilateral, moderate to profound sensorineural hearing loss. He meets that 60/60 indication. If we look those unaided word scores again, were higher unaided than they were aided for the pre-op CNC scores with good amplification. But again, what we're seeing is this patient actually received an implant in their right ear first. So these are one year scores for the right ear and three month scores for the left ear. Because he did so well, he came back and wanted that left ear implanted as well.

So the right ear went up from a CNC score of 36% to 92%, that left ear, it's lagging behind a little bit. We're hoping that's gonna catch up 'cause this is three month data. But he went from 26 to 42%. Again, like that previous patient we're seeing when they've got both ears in there, their post-op AzBio in quiet, 97%, which is tremendous. And in +10 signal to noise ratio, he's scoring about 76%. So, what we've seen here is we've got the 60/60 and one of the things I'd like to highlight before I pass it on to Tracy is that the 60/60 is really to be used when you want to consider sending someone from an evaluation. And when I've talked to our referral sources, oftentimes they say they're a little bit worried about sending someone, especially if the clinic is located, you know, a couple of hours drive, they're afraid about sending them and that they're not going to be a candidate.

And what I say to that is, if you're worried about that, blame the 60/60, let them know that there is published data to support that there are guidelines. And that based on their audiogram, based on their unaided word score, that they meet a guideline that's recognized as a potential referral for a Cochlear implant. Doesn't mean that they're definitely going to be a candidate for a Cochlear implant. And even if they're hesitant, they should go for that evaluation, so that they can learn more about it. And if they are a candidate, then they can make an informed decision. But if they're not a candidate, they'll learn about what's the next best step in their hearing journey. And I always think

an informed patient is really an empowered patient and is the type of patient, who can make the best decision about their own care.

So, next I'm gonna pass it on to Tracy and she's gonna cover some of the aspects about counseling these patients. It's easy to tell when someone's a 60/60 candidate, but talking to them about going for an implant evaluation is the hard part. So I'm gonna pass the hard part on to Tracy.

- Thanks Terry. I echo Terry's sentiments and I hope to share some information along the way about how my perspective has changed now that I am working with Cochlear implants compared to when I learned about Cochlear implants about 30 years ago. Back then Cochlear implants were considered the last option, your last resort. And nobody should think of them that way anymore because technology has changed dramatically and we've got a lot of evidence to back that up. The patient journey, we all know about OTCs and hearing aids and assistive listening devices, Cochlear implants make up that last block. And I have seen, since, I've been a Cochlear provider network member, I love that I can take patients to that next level.

We all know these patients, they have hearing aids, they've tried new hearing aids, they continue to function poorly and they trust you. They have a relationship with you and they need your recommendations. So we are all very vital in that process along the way. So we can go to the next slide Terry. So in terms of counseling patients, we all know that change is hard. It's very difficult for patients to progress from one stage to the next in terms of our recommendations. So it's very important that we are confident in what we're recommending and that we counsel patients appropriately. I'm gonna echo Terry's sentiment. Referring a patient for a Cochlear implant evaluation is just that, it isn't saying you're getting a Cochlear implant.

It's knowledge, it's being informed about your options, especially when you're at a point where you're not getting everything you can out of hearing aids. I had a 30-year-old young man come in on Friday and a long time hearing aid user, he is thinking about new hearing aids. His eyes did not leave me one point during that session. He is not been performing well with his hearing aids. And I brought up the notion of a Cochlear implant and his eyes got really wide and the first thing he said, "Well, you know, that surgery." And so I had to talk him off the ledge and say, "You know, we're just, you know, we're looking for information about how you're functioning now."

And so, you know, going to get that evaluation gives you information to really assess how you're functioning with hearing aids and ultimately the decision is yours," while his mom, sitting next to him, going, "Yay, yay, yay, I've been waiting for this." It's a process and everybody progresses along that continuum very differently depending on their support system, their motivation, how much they're struggling and so on. But it's very important that you be confident in your recommendations and emphasize the fact that, you know, we're looking for more information. We can go to the next slide. So, helpful things to say, especially for patients who aren't doing well with their hearing aids. I find it helpful to emphasize, especially if there's nothing else I can do with them that, you know, Cochlear implant might be the next best step.

It is helpful to discuss their goals with them and how their current hearing situation with hearing aids can help meet those goals or how it's hindering them. And we'll show you some resources in a minute and some of the tools that I use to help patients understand that, very, very important to understand and help them understand that Cochlear implant surgery is not brain surgery. And though, they may have questions that I can't answer all of them for them, since I'm not the surgeon. It's important to help them understand that there are answers, even if I don't have them, the surgeon can answer them for them. The surgery is very safe. One of the things I love about working

with Cochlear is that they have a dedicated department that works with insurance companies to get predeterminations and pre-approvals for coverage.

They also help work denied claims and it's a great resource to have. We're all busy seeing our patients and if we have to deal with all the insurance information and getting predeterminations, that makes the job a lot harder. The other thing that Cochlear has that has been very helpful and this 30-year-old young man is gonna do this as well is Cochlear has engagement managers that can not only answer questions for prospective candidates, but they can pair them with a Cochlear implant volunteer, who can describe their process of getting implanted and their experience with someone who's considering implantation. And it's very important, I find it's very helpful when I discuss a Cochlear implant evaluation with these patients, is to focus on what Cochlear implants can provide that their hearing aids are not providing.

And we can go to the next slide. So pertinent to that last bullet point, I love to take a patient's audiogram and show them their unaided threshold. You'll see that in the bottom blue ovals, their aided response with hearing aids. It's great if you have a speech banana or something that can superimpose and show them a lot of times, I would say the vast majority of cases, even in their aided situation, they are not gaining enough access for speech. The Cs on top is similar to an expected result with a Cochlear implant. Now this is focused on audibility, but audibility is one of the largest reasons that we're seeing improved speech recognition and speech perception with Cochlear implants.

And it's a vast difference in terms of how much speech information patients have access to. So I find that people really, their jaws drop when they see how it can be different in terms of how much access to speech they would have with a Cochlear implant. So this is one of the most invaluable ways that I can use to counsel patients and show what's expected with a Cochlear implant. We can go onto the next slide. So

things to avoid. We've already talked about, you know, the whole thing about Cochlear implant being a last resort. I don't think that way anymore. I was guilty as I'm sure many of my colleagues in my own office are guilty of, you know, we don't do Cochlear implants.

I was unaware of how the candidacy criteria have changed over the years. And when I would go to conferences and continuing education events, since I didn't do Cochlear implants, I would skip those sessions 'cause there was always something that was better, you know, or I felt was better suited for me. And I don't think that way anymore. Cochlear implants are a great next step for people and I've gotten to a point where if I have someone, even with moderate to severe loss that hasn't tried hearing aids yet, I will at least mention the continuum of care with Cochlear implants being on the end of it, that you know, even if hearing aids don't work, there are great options with Cochlear implants and they have changed dramatically.

Another thing to avoid, never assume your patient is too old or has too many health issues. I've had a patient who is 98 years old go for a Cochlear implant eval, consult the surgeon and so on. I have the majority of my patient base with Cochlear implants actually are in their 80s and upper 80s. And they do very well, exceeding my expectations for how they might perform with a Cochlear implant, pertinent to a point that Terry made, you don't wanna wait for a Cochlear implant evaluation referral until you can be confident that they're gonna be a candidate. We don't wanna wait until their loss is so significant that they're losing some of their functional skills because they're gonna do better with their rehab and their post-implant exercises.

Outcomes are better when they have more skills and even the implant surgeons will recognize that those patients who have maybe moderate loss in the low to mid frequencies perform the best out of most of the Cochlear implant candidates. Even if they decline an evaluation or a Cochlear implant or to proceed at one point, don't

assume that they're always gonna think that way. I had a patient who came for a Cochlear implant eval, back in 2020. A number of factors, COVID might have been one of them. He decided that he wasn't ready to proceed, he was implanted three years later and he is excelling and doing very well. So a lot of times I will recommend that patients seek an evaluation for a baseline, even if I don't think they're gonna go on.

And sometimes I'm surprised that they do wanna go on. It's great to have that baseline. We have a comparison for a later evaluation and I think sometimes it can shed light on how they're actually performing. So this 30-year-old young man that I just saw is going through with the evaluation, even though I think there's part of him that is a little anxious because he wasn't expecting that recommendation in our appointment. I pointed out to him that coming back for the evaluation will help shed some light on how he's really functioning with his hearing aids and how much he's focusing and using visual information to communicate. Next slide. Okay, so again, even if the patient is not a candidate, that evaluation is a worthwhile step for them to have, we have a baseline information and knowledge is power and not enough people know about Cochlear implants and know about them as a much more viable option than they might've been 10, 20 years ago.

This way, they are not shocked if a couple years down the road I say, "Okay, you know what? I think we need to consider that Cochlear implant." I think we just don't talk about it enough. So, that when it is spoken about, patient's like, "Oh, well, you know, I don't want a Cochlear implant." And I'll say, "Well, why not? What's holding you back from that?" They need your encouragement, they need your knowledge and they need to know what they stand to gain from that implant.

- You know, Tracy, I'm gonna add onto that 'cause I agree 100%. I think one of the things we don't do with our patients is ask them why. And then when we ask them why and we find out the question or the reason, we can at least educate them about, oh,

that's not true. Or if they even ask about a surgeon and like you mentioned, you're not a surgeon. I think a lot of times we're uncomfortable saying, I don't know the answer to that, but I think it's okay, 'cause if I went to my physical therapist and asked them a question and it was a surgical question, I wouldn't expect them to know the answer. But I would love for them to say, "You know what, you should ask your surgeon that.

" And sometimes the only way they can ask the surgical question is by having an appointment with a surgeon and what better way to ask about all the surgical aspects of a Cochlear implant, then have a one-on-one with a surgeon, who can really directly address those questions. So I just love that comment.

- Yep, thank you. I agree 1,000%.

- Alright, I'll go to the next slide.

- We can go on to the next slide, yeah. So the benefits of making a referral for a Cochlear implant eval, it helps them get a baseline of how they're functioning, even if they're not a candidate. Oftentimes, as one of Terry's examples of a patient for candidacy showed that patient was referred back to the audiologist, the hearing aid audiologist to consider new hearing aids. It's great to have that relationship and patients can go back and forth between the referral sources, a lot of times too, I'm sure for that patient and for many patients, the fact that the Cochlear implant, audiologist referred the patient back to their audiologist to consider new hearing aids was a big step and supported the decision to purchase new hearing aids.

Also the vast majority of patients. And we have a slide coming up that will show the benefits of bimodal stimulation, continue to wear a hearing aid in the opposite ear, and there are significant benefits for that as well. So we'll get into that in a minute. Get into it right now. We have well established evidence that a Cochlear implant and hearing aid

results in significantly improved performance, then just a Cochlear implant alone. Studies show that bimodal users have improved sound localization, improved speech perception, both in quiet and noise. And the quality of speech is perceived as better. They are noticing better functional and functioning in real life environments, like social environments, where there's background noise and quality of life in general.

Perception of music has also been rated as an area that with bimodal stimulation, the quality of the music and their perception of the music is significantly improved in a bimodal situation. So, I always recommend that a patient have a hearing aid in the non-implant ear. If they are resistant to purchasing a hearing aid that might be compatible for streaming with that implant. At least they still have a hearing aid in that ear. And I will highlight some of the advantages of a hearing aid that works with the implant for streaming cell phone calls and remote microphones and all that sort of thing. But occasionally there's someone who, you know, they wanna stick with their hearing aid and that's fine, they still have benefits of bimodal hearing.

So, next slide. What can Cochlear implant audiologists do better? We all need to communicate better. So improved communication with referral sources is always a key. It's helpful. It would've been helpful to me before I became a part of the CPN. It would've been real helpful for me to have conversations with the centers that did the implants because I might've been up on referral guidelines and that sort of thing. I would've felt better calling them and asking questions about, you know, "What do I say to them? Or what do you say when you have these patients?" It would've allowed me the ability to counsel my patients better earlier. So Cochlear implant audiologists can help bridge that gap in knowledge and provide a help reinforcement and confidence in how you counsel your patients.

Go to the next slide.

- You know, before we do that, Tracy, I just wanna add in that what happened to me at one of those meetings I was at in Michigan, I had one of our referral sources come up to me and he said, "You know, Terry, I send you patients and I never know what happens with them." And I was mortified. I was like, "Oh my gosh, we're not good at communicating back to you." And so I took that back to our program and I was like, "You know, guys, we're awful." And so we really had to try to improve on that and we found that, you know, the implant audiologists don't mean to, but sometimes we forget, like, the hearing aid audiologists have followed these people for years and they really care about them and the patients care about the hearing aid audiologist.

So that was an oversight that I think we all get busy in our workflow. But that was a real eye-opener for me and it changed how we cared. So I would put that out there that if your referral sources are not letting you know-

- [Tracy] Mm-hmm.

- Tell them, say, "Hey, you know what? You're bad at communicating back. I would like more information and sort of put that out there for them."

- That's a very good point. I agree.

- It put me in my place, so it was an eye opener.

- Yes, and opened up lines of communication. So it's all good.

- Oh, good, that sounds good, we got-

- [Tracy] So that they felt comfortable saying something.

- [Terry] Yes.

- Yep. Okay, what we can all do better is partner together with a Cochlear implant audiologist pertinent to Terry's point, you know, a bidirectional communication is best. We can see how each functions and get information and help our patients best. We are trying to serve our patients in terms of what will help them the best. So having that partnership is invaluable. We need to think of ways that we can work together sooner. The other option that makes it easier for patients is some of the telehealth that we have. Cochlear does have telehealth options that can make follow up for patients easier because a lot of times they are traveling from further distances and it can be hard based on many factors for them to get back for follow up.

So there are a lot of options there and we can all work together to develop a standard of care that will help our patients the best. Okay, next slide, yeah. So there are many resources available and on this slide there are things that I actually use when I counsel patients. I do like to show how their clinic audiogram fits into the guideline to make them eligible for a Cochlear implant evaluation. And I like to show them the flip side of that, the frequently asked questions talks about how the implant works. Show some information about how speech perception and recognition improves with a Cochlear implant and it covers some of the basics. Does insurance cover it? What do I expect?

What does it look like? I also happen to have some samples, that I can show them what the processors look like because everybody has this notion that the Cochlear implants are huge and bulky and they've come such a long way that it's very helpful to show them examples. There's also an article that I think is listed in the resources for this class, the myth busters, truth about common misconceptions in Cochlear implants. I found that a very valuable article to read because it gave me useful information when I would broach the topic of Cochlear implant evaluations to my

patients. It has some of the answers to the questions that they would ask, take time to read it, it's not a long article, but I think it's invaluable.

So those are, I believe, are resources that are available in the class. So in summary, the 60/60 guideline recommends that a patient be considered for a Cochlear implant evaluation where the audiogram shows the PTA of greater than 60 dB HL. And when the word recognition score is less than 60%, I'm gonna just comment on this and say that doesn't mean that's the only time you can refer them. So if you have a patient where their PTA is a little higher than 60 dB or their word rec isn't quite 60% in quiet, if they're struggling with those hearing aids and you have done everything you can to help them meet their goals and they're just not getting there and they're frustrated and there's nothing more you can do, don't be afraid to refer them to that implant audiologist because the testing that is done for implant candidacy is very different and they may very well qualify.

There are also surgeons who self reportedly will implant patients off-label. So there are some other indications where they will be implanted even if they don't fit the common criteria. What you say and do matters immensely. If you counsel a patient, you say, "Well, I think maybe you should consider a Cochlear implant." That's not as powerful to them as, "Listen, you know, here's where you are with your hearing aids. I've done X, Y, and Z, we've gotten you as far as we can. I think it's time to at least get evaluated. We'll establish a baseline for how you're functioning. It may turn out that you're a candidate for a Cochlear implant. It may turn out that you aren't, but I think that we need to consider that next step.

And I'd be doing a disservice to you if I don't acknowledge that and bring that to your attention." Any patients that I've had, even if they haven't proceeded with the CI eval, have been very grateful for my guidance and letting them know the options. I have one lady that I'm just waiting for the day for her to come back and say, "Yep, I'm gonna go

ahead for that Cochlear implant." Not everybody's gonna receive it the same way, but they do value your guidance. They value the relationship you have, and if you're recommending it to them, they know that it's important to consider. So don't underestimate your worth to your patients and how important your recommendations are to them.

- Okay, we are right at the hour. Mary Beth, do you see some questions in there?

- [Mary] Yes, we have one question about the word recognition score. Is the 60% word recognition score based on recorded stimuli, since live word recognition can vary greatly depending on the presenter, such as the talker, et cetera?

- Yeah, it's a great question. And so when we developed the 60/60, we took all comers, we took whatever the referral source sent us. So it's based on real world clinical care, which included a lot of live voice, a lot of different measures. So I think it would be really realistically, based upon whatever you are using in your clinical care and recognizing that when you send them for the implant eval, it will definitely be taped at 60 dB SPL presentation level and their score will likely be lower than what you saw unaided as part of your audiogram. So hopefully that helps.

- [Mary] Thank you.

- Any other questions? Oh, I do see one. There's one question that says, "When would you consider a Cochlear implant for single-sided deafness, rather than a bone conduction, than BAHA?" And I would say that most clinics are looking at the length of deafness in the ear, that's to be treated, as well as anatomical reasons for implantation. If someone has a recent onset of deafness, less than 10 years is what the indication

says, they would be considered an Cochlear implant candidate because that's really the only way you can have truly binaural hearing, is by stimulating each ear separately rather than a contralateral stimulation to the better hearing ear. With that though, if you have someone who has had a long duration of deafness in the single-sided deafness ear, those patients do very, very well with bone conduction treatment.

So it really is patient dependent and one of the strongest factors is anatomy as well as a length of deafness in that ear. Okay, and I think that's probably all we have time for, for questions. If people wanna leave, we could absolutely stay on for an additional minute if we need you to take additional questions. Is that okay Melissa or Mary Beth?

- [Mary] It sure is. I'm gonna go ahead and turn off our recording for now.