Promoting Interventional Audiology in Multidisciplinary Practice

Recorded March 10, 2023

Presenter: Lori Zitelli, AuD

- It's my pleasure to introduce to you a friend of AudiologyOnline and as well as a guest editor for this series, Dr. Kim Cavitt. Dr. Kim Cavitt is gonna tell you a little bit about the series and as well as introduce Dr. Zitelli. Over to you, Dr. Cavitt.

- Thank you, Christy, and thank you to AudiologyOnline for this series. This series is really about out of the box thinking and different directions and approaches to audiology evaluation and management. So first today is Lori Zitelli. She joined UPMC as an audiologist in 2012. She became managing audiologist in 2021. She received her clinical doctrine in audiology from the University of Pittsburgh. She's a part-time lab instructor at the University of Pittsburgh and teaches a clinical procedures lab for first year AuD students. Her special interests include amplification, tinnitus, decreased sound tolerance evaluation and treatment, clinical education, clinical research, and interventional audiology. She's an active fellow of the American Academy of Audiology. And for me, at my heart, I am an audiology nerd and I'm enthralled by out-of-the-box thinkers, especially when their approaches are consistently backed by science.

I started reading Dr. Zitelli's work and attending any presentation she gave at national professional meetings. I was immediately a fan girl. Her innovative ideas and approaches get at the heart of an individual's need to effectively communicate, especially in healthcare settings, and to illustrate the potential benefits to their healthcare outcomes and quality of life. She's leading the charge in interventional ideology and has created or helped create programs and care delivery models that ensure that effective auditory communication is available to those within her hospital system. I'm always excited to read her next article, view her next poster or listen to her next presentation. Dr. Zitelli is an innovator and a trailblazer, and represents the best of the next generation of translational researchers and professional leaders. I'm honored to have her as part of this innovation series. Please welcome Dr. Lori Zitelli, doctor of audiology, from the University of Pittsburgh Hearing Research Center.

- Thank you so much for that introduction. I remember meeting you for the first time. It was after the OTC panel at AAA several years ago, and you came up to me and you said, "I'm Kim Cavitt," and I said, "I know exactly who you are. Are you kidding?" So there was mutual fangirling happening. So thank you for that introduction. I'm really happy to be here today to talk a little bit about what we do at UPMC and at the University of Pittsburgh. And it's my hope that this presentation will get you thinking about some creative ways that you can become more involved in the provision of interventional audiology services. And hopefully you can take away some tips that you think might be useful for you.

Okay, so for my disclosures here. I'm employed by the University of Pittsburgh, UPMC, Cranberry Hearing & Balance, and Treble Health. I am receiving an honorarium for today's presentation. I'm a trustee of the American Academy of Audiology Foundation and a member and volunteer of AAA and ASHA. Okay, so I am hoping that this presentation gets people thinking about how they can be involved in this area, and there are a lot of ways that people could do that. So some of our learning objectives for today are related to describing the negative effects of untreated hearing loss in healthcare and other settings, outlining the critical components of an interventional audiology program, and listing three or more settings where interventional audiology services can be implemented.

So here's our roadmap for today. We're gonna start with a little bit of background information related to hearing loss in healthcare outcomes that I think is just kind of handy to have in your pocket as you think about interacting with other providers in multidisciplinary clinics outside of the audiology bubble. And then we'll move into some literature surrounding the concept of interventional audiology itself. I'll share some practical tips that we've kind of picked up along the way that I think have helped us to streamline our process and refine it. And then finally, I'll share some real world

examples that highlight how we actually implement these services for our patients. So starting with some basics related to hearing loss in healthcare.

There are a lot of risks that are associated with untreated hearing loss. And when we say untreated hearing loss, we mean people who have hearing loss who are not doing anything about it, not wearing hearing aids or any sort of technology or device or strategies to mitigate it. So these risks that people experience can be divided into short-term and long-term problems. And actually many of them can overlap and fall into kind of both categories. So for short-term risks, we can identify problems like poor adherence to treatment outcomes or the increased likelihood of experiencing an adverse event or an accidental injury or higher levels of dissatisfaction with healthcare and provider communication, things like that.

Over the long term, we think about things like being vulnerable to the effects of depression and social isolation, things like experiencing higher risks for cognitive decline, mortality, more likely to fall, things like that. And then in the middle section where they kind of interlap, there's been some more recent research that's been really interesting linking untreated hearing loss to increased rates of hospitalization, healthcare use, caregiver burden, poorer overall health, higher levels of medical expenditures in excess of billions of dollars and higher rates of readmission. So these are all things that have big implications related to the whole healthcare system in general. So, hopefully, it goes without saying that identifying hearing loss is important, and under treatment is costly for the patient and their family and the healthcare system as a whole.

So these are just some examples of studies that link untreated hearing loss to poor healthcare outcomes. And there's actually probably many, many more that we haven't even thought to look at yet. There was a study recently that talked about how only a quarter of studies looking at communication between patients and providers even think

about hearing loss. So there's this whole kind of black hole of areas that we haven't even touched yet. So I just mentioned a whole bunch of problems that we've been able to identify as issues related to untreated hearing loss in healthcare, but there are a few studies that I wanna highlight specifically very briefly. These came from the 2023, 2020, I'm sorry, 2013, 2014 era, where I think people were really starting to think about these kind of things and look at these topics.

And since then, there have been a lot of studies that have really expanded on a lot of these things. But taking these five studies as a whole, I think they really suggest that age-related hearing loss, especially when it's untreated, has implications that are well beyond just basic communication. So this kind of stuff is good to have in your pocket as you're interacting with physicians, surgeons, other healthcare providers that are managing some of these multi-disciplinary clinics because these are the kind of things that resonate with them. Also talking about medical expenditures and things like that that I briefly mentioned before. So these are just ways to talk about how untreated hearing loss can really permeate all of the areas of healthcare, including the things that they do that they may not realize can be linked to healthcare.

So Dr. Frank Lin and his colleagues back in 2013 published a study focusing on cognitive decline. They followed almost 2000 adults between the ages of 70 and 94, 12 years, to determine whether hearing loss was independently associated with cognitive decline. So the results that they found from this study indicated that there were poorer scores on the cognition tests, and compared to those with normal hearing, the individuals with hearing loss at baseline were at an increased risk for cognitive impairment of 24%. They also found that people with hearing loss declined at a faster rate than those without. And a 25-dB HL hearing level or hearing loss, borderline loss, was equal to seven years of cognitive decline. Another study published a year later looked at their relationship between hearing and vision impairments and mortality from all-cause and cardiovascular disease.

So all-cause mortality is related to the annual number of deaths in any given age group. So in this study, there were almost 5,000 patients that were 67 or older, and they were placed into one of three categories, vision-only impairment, hearing-only or dual sensory. The takeaways were that there was a significantly increased mortality rate for all-cause and cardiovascular disease for both hearing loss groups, especially among men. So in these groups, there was a recommendation to think about regular hearing assessment and rehabilitation appointments and screenings kind of at earlier ages to try to catch these things at an earlier time point to try to promote long-term overall better health. Same year, another study was looking at age-related hearing loss and social isolation, and whether things like age, gender, hearing aid use were able to moderate that.

So in this study, the results found that especially women in this age range were more likely to alter their lifestyle due to hearing loss and were more likely to become socially isolated. Same year, again, 2014 was a big year for these studies. So, again, another study estimating the prevalence of depression among adults with hearing loss. These were data from the NHANES study that were used here. So what they found was that the prevalence of depression increased as hearing loss became worse, except among those who self-reported as deaf. So among the people over the age of 70, there was, especially women, there was a significant association between moderate hearing loss and depression. And lastly, from this era, brain volume changes.

So this is something that's measurable with imaging studies. So the researchers found that the individuals in this study with hearing loss did have accelerated brain volume declines, primarily confirmed or confined to the right temporal lobe. So these findings indicate that peripheral hearing loss is associated with accelerated brain atrophy, especially in the areas concentrated on the right temporal lobe. So there are other studies that focus specifically on the presence of hearing loss existing as a

comorbidity, as a comorbid condition to supporting similar conclusions. So we know hearing loss, for example, has been linked to type two diabetes, smoking, depression, greater risk of cognitive decline, as I said. And I think as you're thinking of these things kind of as a whole, ultimately the bottom line is that untreated hearing loss is not a benign condition.

Having a clinically significant hearing loss, even though that specific problem might not be bothersome to someone, really puts them at risk for other health problems and puts a heavy burden on their family members and community. So given these findings, some people have recommended that everyone over the age of 50 should have a baseline hearing screening and that patients in other populations such as those with depression, cardiovascular disease, diabetes, dementia, should have their hearing screened annually. So given all the information that we've just been talking about, it will hopefully not be surprising to you to hear that hearing loss is being recognized as a public health crisis. So if you wait until you're in your 60s, 70s, 80s to get a hearing aid or hearing aids, you've probably had a fair amount of your time of your life with untreated hearing loss.

So this means you've spent all these years of your life living with a communication disorder, at risk for depression, sufferings from some degree of social isolation, with reduced employment opportunities, et cetera, et cetera. Hearing loss is noted to be the third largest cause of global years living with a disability, recently in 2019, this was reported, and the leading cause of global years living with a disability for people over the age of 70. It's also cited as the third most common chronic physical condition after arthritis and heart disease. So to sum up, hearing loss poses very significant threats in the following areas. A lot of people consider it to be a disability. It interferes with people's ability to treated for other conditions and puts them at risks for things.

And we know that some emerging research links untreated hearing loss to accelerating other disabilities. So, again, age-related hearing loss really should be considered a public health issue. I'm assuming that most of you will be familiar with what has come to be known as the Lancet Report. So in this report, there were a bunch of experts on dementia who were sharing their results of their review and research related to dementia. And what they concluded was that there's several factors that, when you look at them, might be very important things that people can mitigate or alter earlier in their lifestyles to prevent large amounts of the cases of dementia that we see. So they actually concluded that a close to a third of dementia cases may be preventable.

So they focused on estimating the percentage reduction of new cases of dementia over time if a specific risk factor were completely eliminated. So they found that older adults have the potential to reduce their risk for cognitive decline and possibly forestall the onset a third of cases dementia by promoting earlier education and lifestyle changes that lead to more healthy behavior over time. So managing things like hearing loss and depression, obesity, hypertension, things like that. So going along with the idea that prevention is easier than a cure, they figured there are certain risk factors that, if they could target, could be very cost effective if we do it early enough to end up with different outcomes and fewer dementia outcomes.

So the most prominent modifiable risk factor was hearing loss in this study, and it contributed to 9% of the acceleration or possible onset of cases of dementia. So treating hearing loss is the largest modifiable risk factor for the prevention of dementia. And I think that's something that we can really take away and share with the people that we're trying to convince of our importance in this area. And not just our importance, the importance of thinking about hearing loss in general. So we like this graphic because it helps us to think about the number of people we see who actually need or are a candidate for hearing aids versus the people who actually wear them. So

a lot of healthcare people, providers, and other individuals think that they'll be able to recognize when someone has hearing loss because they'll be wearing a hearing aid.

So obviously, as we know this, is not the case. We estimate that about 60% of people over the age of 65 have hearing loss that's aidable. But in our country, the uptake rate is estimated to be much lower than that, closer to 18, 20%. So if you or other healthcare providers, I'm assuming you're not doing this, other healthcare providers are assuming that people with hearing loss will all wear hearing aids and they'll be easy to identify. They are missing actually the majority of people that they'll want to be targeting. So the more that we think about this in our clinics, the more that we really start to feel like, it's not necessarily that everybody is denying that they have a hearing loss.

Because to deny you have a hearing loss, you have to acknowledge that you have hearing loss. A lot of these people truly do not recognize that they have it. So a lot of times people find ways to compensate for it by limiting their activities or participation in things. So if they're not actually spending any time in challenging situations, they don't know that they have a hearing loss. So if you have a 95 year old woman who lives alone and spends a lot of time reading or watching television, she might have no idea that she has hearing loss if she can just turn up her TV loud enough. So if we think about the fact that only 18% of people in this country who need hearing aids wear them, we think that this might have a lot of the reason to do with why.

So how do you convince someone who doesn't think they have a problem that they need a solution to that problem, and better yet, how do you convince them to pay money out of their own pocket for it? So there's been some really interesting data collected in Pittsburgh, where I live, by my colleague Elaine Mormer. And there was a study where they looked at a group of older hospitalized inpatients and they were comparing a couple of different measures. They asked them, "do you have difficulty

communicating with your care providers?" They looked at their admission records to see if anyone recognized that they had hearing loss during the intake process, and they tested them with pure-tone audiometry.

So what they found is that about 40% or 42% of people in this study who had hearing loss, measured by audiometry, said, "yes, I think I have hearing loss." So only 40% identified as having hearing loss correctly. And then when you look at the records for who was able to identify that they had a hearing loss in terms of the healthcare providers, only 50% were able to recognize them. So we really can't rely solely on either of these measures. When we think about the spectrum of who we see in terms of age, babies all the way up to the oldest old, we generally are very good at identifying hearing loss in babies because we screen many of them, but we expect adults to self-identify.

So this graph I think is really interesting because it shows the disparity between the two. So in a sense, older adults are kind of pre-screened because many of them are expected to have a hearing loss. So it's not a surprise when they do. But a lot of people, because of this, act like it's benign, like it's, oh, it's expected, there's nothing that we need to do about it. So we've become kind of fond of this phrase that we use, "expected but not benign." So it's likely to happen, but we still need to do something about it. So this is one example from our own hospital data that show us how many people likely need our help.

So we looked at the census data from a few years ago and found about 12,000 patients, aged 65 or older, were admitted during this specific fiscal year. So if we look at each age range individually, and we consider what percentage of them are likely to have hearing loss based on the available prevalence data and then what percentage of them are likely to have hearing aids based on the uptake data that we know, we can estimate that about, for example, in the 61 to 70 age bracket, about 37% of people are

likely to have hearing loss, and about 7% of them will probably have hearing aids. And we can do this in each age range, all the way up to 85 plus. So using these data, we can estimate the number of patients in our hospital who are likely to have significant untreated hearing loss, meaning that they probably have hearing aids or hearing loss and don't wear hearing aids.

So in this specific year that we looked at in my hospital, the estimate is almost 6,000 people. between five and six thousand people. So we're delivering a lot of amplifiers to help these people, and I'm gonna talk more about that, but we're not doing 5,000 of them. So there are many, many people that we are missing because we didn't come close to the number of people who probably actually need our help. And I think it's because a lot of people and providers don't recognize when someone does need our help. So there are a few things that we've commonly heard from people, and just kind of to debunk the two most common. I'll be able to tell when they have hearing loss because they have hearing aids.

No, that's absolutely not true. When my patients ask me if they have hearing, when I ask them if they have hearing loss, they'll say yes. No, they probably won't. So if someone comes back at you with this information, you can tell them those things are absolutely not true. So now I wanna shift into talking about interventional medicine and interventional audiology. So the field of interventional medicine is focused on identifying conditions that put people at risk for things at an earlier time point in their life in trying to intervene to provide a treatment before the condition becomes a larger problem. So, for example, an interventional cardiologist would want to identify a specific heart condition that puts someone at risk for something and then treat that condition with diet and exercise and things that are not super invasive before it gets to the point where the patient is in need of open heart surgery.

And this is great when the less invasive treatments are supported by good evidence. So I think that really puts us in a good position to think about what we do because what we do is supported by a lot of evidence. So the idea is that early detection and intervention leads to better outcomes. We know this based on everything we know about children in pediatric hearing loss intervention. So now I think we just need to shift that thinking a little bit and start to apply these same concepts to older adults. So interventional audiology is a term that was coined by Brian Taylor and Richard Tysoe 10 plus years ago. So they define it as managing hearing loss in order to impact other concerns that are primary.

So in these cases, hearing loss is not the patient's primary concern, it's not the healthcare provider's primary concern. In these cases, generally we are not the healthcare provider that's interacting with these people, but the hearing loss is likely to impact whatever is their primary concern if it remains untreated. So let's take a minute to think of all the discreet time points when a person with untreated hearing loss might be affected. Let's say, an example, where the person is in a car accident. There's a car accident, the person has to communicate with the first responders at the scene. If they have hearing loss, that's gonna be more difficult. Then they're gonna get to the emergency room, they're gonna have to talk to the doctors and the intake staff there to explain what happened and how they're feeling and what hurts and what symptoms they're experiencing.

A lot of people, especially recently or within the last couple years, are gonna be wearing masks for infection control, which is gonna interfere with communication. The patient is gonna have to understand their test instructions for the evaluations, answer questions. They're gonna have to understand the diagnosis that they're being given. They're gonna hopefully be participating in the planning of whatever their treatment is. They're gonna be communicating with all of their rehab specialists as they move toward recovery, and communicating with their family and friends and all of the people

in their communities during that. And then lastly, they're gonna be approaching discharge. Then there's a whole new set of issues when you start to think about outpatient care.

So the cycle starts again. They have to schedule an appointment, which means they have to somehow get in contact with the office, they need to get directions to physically get to the clinic, they need to hear their name being called in the waiting room. Someone's gonna ask some questions about what they're doing there today. Someone's gonna give them instructions for an evaluation. Someone's gonna be explaining results. Hopefully they're gonna be able to participate in the plan of whatever their rehabilitation treatment is. We want them to adhere to the plan that we lay out for them, and then they're gonna be communicating with the offices again for follow-up appointments. And that cycle is just gonna perpetuate.

So you can see there are a lot of ways where hearing loss can cause problems, and there are a lot of ways that this process can be derailed if communication is not optimal. Unfortunately, patients historically perceive that healthcare providers don't always have the best attitude about serving people who have disabilities. So these are just some examples here. And we don't need to spend a lot of time on this, but generally, healthcare providers are very focused on providing physical accessibility. People wanna build a ramp, and everybody is always mindful of that kind of thing, but people generally are not thinking as much about communication access. It takes more time. People don't always know what strategies to use in terms of the voice to text options or providing a CirCom interpreter.

A lot of providers don't even think to write things down. So people just don't know what they're supposed to do. And a lot of times they don't know that they're required to do it to be compliant with regulations. So back to interventional audiology or intervening when hearing loss is not the primary concern. Patients who have impactful

hearing loss that's not treated don't receive optimal care, and they can't participate fully in the decisions or fully access their healthcare that's intending to help them improve. So the program of interventional audiology that we have is focusing on impacting hearing loss at a specific moment in time. It's during those interactions with the healthcare providers. So, of course there are long-term effects and plans that we're thinking about as well.

Things that would likely require a more long-term solution and plans, for example, personalized, customized hearing aids. But we're not as focused on that in the moment. So we obviously do refer people for that when they're interested in, if they're candidates. But we think it's really important to differentiate those goals here. So impacting hearing in the healthcare setting to impact other issues related to evaluation and treatment. So there are some patients who may continue to use non-customized solutions and that may meet their needs, but ultimately, we want to move people on a pathway to pursuing customized care whenever we can. So often this starts with identification of someone who has hearing loss using a device, for example, a peace app or a non-custom amplifier, and then putting them on a pathway to receive customized care.

So there are a lot of specific communication challenges that a person may experience in a healthcare setting. For example, they're likely to be feeling unwell or anxious. The provider is likely to be using unfamiliar terminology, noise in the background. The patient may feel rushed, like the provider is trying to move on to other appointments because they likely have a busy schedule. They might not be in a direct line of vision with the healthcare provider if there's an electronic medical record or someone is typing. Hearing loss, vision loss, cognition issues, language barriers, all of these things get in the way of communication. So what can we do about it? Now I wanna move to thinking about some practical tips that hopefully I can share with you and you can think about employing in some different settings.

So what I've done is I've made a flow chart to show you a typical interaction that might occur in one of our multidisciplinary clinics. And these could be tweaked a little bit depending on the setting that you're in or what kind of clinic it is. But this is just an example, and then we can talk a little bit more about some of the specifics. So whoever is providing the care. So it may be a student, it might be an audiology assistant, it might be an extern, it might be an audiologist. Whoever's providing the care is going to make a new best friend. That new best friend is the medical assistant or the patient care tech in the clinic.

And the reason for that is because that person, the MA or the PCT, is gonna be the one rooming the patients. So even though there might not be an audiologist, who's the person who's physically in the clinic, the programs are all being overseen by an audiologist, and I think that's really important. So we're gonna latch onto that PCT or the MA and follow them into the room. We're gonna introduce ourselves to the patient and use a script, something to this effect. Do you think you have any difficulty with your hearing when you're communicating? They might say yes or no. And we find those data interesting, so we record those, but you don't have to. Do they wear hearing aids?

So if they do wear hearing aids, we wanna know if they're working and if they brought them with them. If they're not working, hopefully you have some supplies with you that you can use to fix them in the moment. If they don't wear hearing aids, we screen their hearing. So we have a portable device that I can show you on a later slide. The protocol that we follow in one of our clinics is to screen at these frequencies, at this intensity level. Briefly explain the results. You passed the screening, or if they only miss one, we consider that a pass. So you can say to them, "you pass the hearing screening, have a great day, you don't need to do anything else in this moment."

You can give them a brochure that shows 'em all of your clinics, all of the different services that you provide. Tell them, definitely reach out if you need us. And then you'll make your documentation eventually somewhere, wherever you do that. If they don't pass the hearing screening, so for us, in this clinic, we would consider that missing two or more frequencies. You could say something like, "you didn't pass the screening and communicating easily during your appointments is really important. So to make sure that you can hear everyone well, I'm going to use an amplifier with you. Here, let me show you how it works, let's give this a try." I think that language is important, and we'll come back to that as well.

Putting the amplifier on them and showing them how to operate. We use something that's very simple. Generally people don't struggle to use it. And I think the most important part of what we do is not offering it to them. Because if you offer it to them and say, "do you wanna use something like this?" Especially if there's someone who doesn't think they have hearing loss, they're gonna say no. So if you want people to use these devices, you put it on them and show them how to use it, rather than saying, would you like to use this? That's been our experience, for sure. And then after your interaction with them, you can say something about recommending follow-up care, whatever would be appropriate.

So this is a general flow chart that we use that we modify a little bit based on the clinic. But we try to do a similar thing in each one of our clinic strategy, in our clinic environments. So these are some strategies that we have found over the years that we've been doing this, which is almost 10 years now. it's kind of hard to believe, to be the most effective in these settings. Being the first provider to see each patient. So a lot of times, there's a team of people that are all coming in to see someone. And we found that if you don't make a point to make yourself the first person to see these people, your recommendations are not going to be followed.

Also, for example, if the physical therapist goes in to evaluate them first, they're not gonna know whether they have a hearing loss or not. So they're not gonna be able to make sure that their communication is optimized, and those recommendations might not be followed. So we've been kind of sticklers about that, kind of insisting that we have to be the first person to evaluate their communication abilities and provide any sort of intervention before anyone else from the team even gets in there to interact with them. And that really puts communication at the front of everyone on the team's mind. It's really important to be efficient. If you have a whole afternoon of people, of patients scheduled and you have six people that need to see each one of them, if you spend 20 minutes with this person, your team is gonna be really annoyed with you.

So it's developing ways of doing multiple things at once. So when you're asking them the questions, you're rolling up the earphones to put in their ears or you're putting the headphones on their head or you're turning your equipment on. So as a result of time constraints that are often present in these multidisciplinary situations, I think we need to acknowledge that you're not gonna get a full history on this person, and that's okay in this moment, 'cause that's really not relevant to what your goal is. You wanna determine, do they need hearing help right here and now? And if they do, you wanna provide it. And remember, you're gonna be recommending follow-up care. So there's gonna be an opportunity to do all the rest of the stuff later.

So we want to be quick, unobtrusive. We want the rest of the team me members to value our contributions and not feel like we're kind of getting in their way. Relaying information to your other team members. You need to find a way to do that that's efficient and easy. And I'll show you a couple slides later of the system that we've used, it's color coded, so people don't actually even have to read what the thing says. They can just look at the color and it'll tell them what they need to do. And it makes it easier for them to implement your suggestions. Being aware of your surroundings, and flexible. So that kind of goes back to latching onto whoever's rooming the patient.

It's like kind of knowing who is where and which patient has been seen already and who's in what room. So if you're sitting at your computer typing and waiting for someone to come get you and let you know that the patient is available, it's a pretty good way to miss patients because someone else might see, oh, there's a new patient that's being roomed, I'm just gonna go in and see them real quick. And then before you know it, you've lost your opportunity to see that patient first. So being assertive, promoting yourself, we call it lurking. I always joke with the students, they need to be creepy. Like, they need to be in the hallway knowing exactly who is where and in what room.

And it really does make a difference in the number of people that you can see in a day. And then lastly, promoting adherence to your recommendations by trying to make your recommendations as easy as possible to follow up. So can you help them to schedule that appointment? Can you direct them to the clinic that's closest to their house? Can you, you know, things like that. Scheduling the appointment before they leave the office. So just trying to make it as easy as possible for them to do what you recommend. And these are really some things that we've found to be the most helpful as we've kind of developed these programs. Other considerations. I think sometimes patients are very confused Whenever someone who's related to audiology walks in the room, they'll be like, "I'm here to get my stitches out. I'm not here for my hearing." Or like, "no, no, no, I'm getting surgery for my knee. I don't have hearing loss."

And it's like, you get that enough times and you start to think, "okay, how can I head off this concern at the past without having to have a whole conversation of, oh, I know you're not here for this but this is why we're here." So we've come up with kind of a strategy for this where we say something like, my name is Lori, I'm here from audiology. You're gonna be seeing lots of people today and it's really important that you can communicate with them so that you're able to participate in your care. So to make sure

you can, I'm gonna do a real quick hearing screening before any of the rest of your appointments.

So that kind of lays the baseline of like, I know I'm not why you're here but I'm still gonna do my thing and then I'm gonna pass you on to the next person. You're in the right place, you didn't go to the wrong clinic. Let's do our thing quickly and move you to the rest of your appointments. We wanna be fast, stay out of everybody's way. We want our participation to be seamless and we wanna try to use equipment that is portable. So we're gonna be moving in and out of different rooms. We wanna use something that is easy to carry with us. We don't wanna be having to plug and unplug things, use big bulky carts, be wheeling things around that knock people over or knock equipment over.

Even if you have a small device, if it's powered by an outlet, you have to walk in the room, you have to find the outlet, you have to trip over people and stuff to get there. It's much easier to use something that's small and portable, and we've found that time and time again. So these are some supplies that you'll wanna think of. So you want to bring an otoscope and some specs with you. You might not wanna look in everybody's ear 'cause you might not really feel like you have time for that. And also, honestly, if you look in someone's ear and they're completely impacted with wax, in that moment, all that matters is that they have hearing loss.

You're not gonna take the wax out right then because there are six other people waiting to see them. So it's okay, in our opinion, it's okay to test people like this in these situations as they are, but if someone asks you to look or says they have pain or whatever, it's nice to have the equipment there that you can do that. So this is an example that you see in the top row here in the middle of the screening equipment that we use. And this comes in different options. You can have headphones, you can have

foam inserts, you can have a button that they're pressing or you can have them raise their hand or say yes or whatever protocol that you want to use.

With this specific device, it's nice 'cause you can program it automatically to go to the intensities and the frequencies that you want. It makes it very fast. We also have a bunch of hearing aid troubleshooting supplies that we bring with us. So nippers, earmold, tubing, blower, the tubing stretcher, flyers, wax guards, batteries, things like that. We have a stock of amplifiers. So this is the specific one that we use, but you can use any simple non-custom amplifier. And then also the headphone covers, because generally when we use these devices in the clinic, they stay with the patient for the entire appointment and then they'll be collected by the MA and then we'll put them back in the room with new covers on.

There are some people who decide to purchase them, and we can come back to that. But generally we're always putting covers on so that they're disposable and it's hygienic for people and we're wiping them down between patients. You wanna bring some way to document your results. It's small here, but I have it on another screen. It's the daily log that we use to record who we saw, what the outcome was. And then these are some of our color coded stickers that we use on our shared results. And then lastly, these are just some of the brochures that we have in our clinic that we can provide to people that are focused on hearing aids services or vestibular services, musician services, things like that.

So those are just at the ready and we can hand them out. So for someone who fails the hearing screening, I think it can be easy, especially for our students, to really like hammer home, you need to do this, it's really important. And I think, in this situation, it's important to remember that this really is not why they're there and they probably are dealing with a variety of other things that might be much more pressing. If you got into a car accident and you're trying to learn how to dress yourself again, you might not

wanna go for a hearing test right that minute. And I think that's okay. So acknowledging that as you're making your recommendations for follow-up care, I think is a reasonable thing to do.

It's not something you need to do right this minute, but when you're at the point where you're feeling well enough, this is a step that you'll wanna take. And then, again, providing them with the brochure of the list of clinics and contact information and all of that. So, again, this is just a larger picture that shows you the screening audiometer that we use and an example of screening protocol. I think depending on the settings that you're in, you may wanna take some noise measurements to make sure that the screening frequencies you're using are reasonable based on the ambient levels of noise. We generally choose something around 30-35 dB because if someone fails that screening, it means that they would have what the World Health Organization considers to be a disabling hearing loss, essentially worse than mild.

So using a level that's around that zone generally is a reasonable thing to do for this specific type of activity. And then, again, this is an example of one of the amplifiers that we use. It's got a headset with some earbuds, or you can switch out whatever headset they wanna wear. There's a wheel for volume adjustment, you can turn it on and off that way. There's a battery compartment. This specific device takes a AAA battery that's included. There's a clip which can be nice 'cause they can just wear it on their lapel or pocket and then everybody's hands free. This has been especially nice for the physical therapists we found for our inpatients, who are helping people trying to get up and walk around their rooms.

Nobody has to carry anything, they can just clip it to the pocket, and then the microphone to pick up sound. So this is just one example. I'm sure you all have your own non-custom amplifiers that you like. So going back to communicating the information to other providers. In each of these clinics that we're in, we have a shared

flow sheet that has all of the results. So, for example, on this one, this is from our post-trauma clinic, and we have results from audiology, physical therapy, occupational therapy, speech pathology and nutrition. And then up on top is the results of the evaluation, down at the bottom are the recommendations. So one way that we convey information is using these stickers, and I have that on the next slide as well.

They're color coded, red, yellow, green. And those colors would indicate what the person who sees the flow sheet is supposed to do. But also, if you're interacting face-to-face with someone, I think it's good to think about how you're doing that. So a nutritionist, for example, isn't necessarily going to know what you mean or care if you say he failed the hearing screening at 2,000 and 4,000 hertz and at 1000 and 2000 in the other ear. So big picture, he has a lot of hearing loss, you need to use the amplifier, or he's wearing his hearing aids but you still need to look at him and talk slowly and clearly, things like that. And I think these scripts are very important for the students 'cause a lot of times they wanna give kind of more detail than is needed in these situations.

So this is another clinic that we participate in. And each of our flow sheets is a little bit different 'cause we kind of integrate into whatever they're already using. But essentially, green is go, you passed, yellow is, you have some hearing loss, you should use an amplifier if you're not wearing your hearing aids or if you didn't bring your hearing aids with you, and red is, they failed everything. You need to use an amplifier with this person, and also make sure you're using communication strategies and things like that. So we like the color coding because everyone else in the clinic knows what the colors mean and we don't have to explain every single thing about every single patient to everyone.

It's kind of self-explanatory. So this is the log sheet that we use. We track these data from each of our clinics, and a lot of the AuD students use these data in their research

projects. So, for example, this is our perioperative clinic. We wanna record who we saw, and we wanna ask them if they think they have hearing loss, the outcome of the screening, whether we offered an amplifier and whether they accepted it. So of course you could modify this depending on what data you wanna collect. But we try to ask a lot of similar questions in all of these clinics, and it's been really interesting to see some kind of common themes emerge. So now I wanna give you guys some examples of real life ways that we integrate into some of our clinics.

And I wanna move through this kind of quickly because it's, the process that we follow is very similar in all of the clinics, and I went through that flow sheet to tell you that, but just to give you some ideas of some different settings where these can be applied. So our most recent endeavor is the Center for Perioperative Care. So it's a multidisciplinary prehabilitation, is what they call it, clinic that is aiming to screen and identify people who are at high risk for poor outcomes after surgery. So this clinic first opened in 2016 and we started providing services in 2021. So we have AuD students in this clinic five days a week being overseen by an audiologist. And during the first year that we were there, we saw more than 2000 patients who received hearing screenings in the clinic.

So people can you use amplifiers in these clinics and they're given information for follow-up care. This clinic is really cool actually. They collect a lot of data and they have a risk assessment tool that they use to try to identify potential issues for people before their surgery and then put them on paths to mitigate whatever the risks are before they become serious problems. And this is really important because people who are at high risk account for the majority of the healthcare burden after their surgeries and 70% of post-operative deaths. So this is our newest data set. We are in the process of having our students analyze it as we speak. So hopefully over the next year or two, you're gonna be seeing some posters and publications related to this.

So stay tuned for that. Inpatients in our hospitals across our whole UPMC system, which is growing, the system is growing larger every day, it feels like, they all have access to bedside audiologic care, including diagnostic testing and delivery of non-custom amplifiers. So we call our inpatient program UHEAR. You'll see, we have names for everything. It's kind of not a thing until it has a name. So we always try to come up with clever acronyms. So patients in our healthcare system have had access to non-custom amplifiers since 1998. So we've been around for a long, long time. But really it's not until kind of within the last couple years that providers have really started to take advantage of this service.

So to date, we have had 1,000s of inpatients receive devices that improve communication with their care providers. And now we're supporting every hospital in the system by doing this. So just to give you an idea of over time what has happened. On the screen, you'll see the number of amplifiers that we've dispensed over time in the specific hospital where I work, in the Oakland neighborhood of Pittsburgh. So all the way on the left, 2011, Lori Zitelli was a little baby extern at UPMC, and we delivered, for the entire year, 36 amplifiers. And I'm sure at the time I thought like, "oh man, I'm delivering a lot of amplifiers, I'm running all over the hospital." Then you'll see, in 2014, this is when we first became involved in the post-trauma clinic.

So that was our first endeavor. And you'll see, every year after that, the numbers are steadily rising, and then we hit about 2020, we start to see a pretty big explosion, we think, because of the COVID-19 pandemic. We changed our process around that time where, now we communicate a lot more directly with all of the units in our hospital to make sure that everybody has a stash. So that if you need it, you're not in a situation where you can't get it for your patient immediately. So we have a new system that I'll describe in just a minute. So back to these data that I had previously discussed about the number of patients who likely need hearing help in our hospitals who don't get it.

So this is a call back to the previous slide. So we said, there are probably a significant amount of patients over the age of 65 who need hearing help. This slide shows you, based on the number of amplifiers that we actually dispensed in that year, how many received help. So even though we're dispensing 100s of amplifiers every year, it actually doesn't come close to touching the number of patients that we think probably actually need them who don't have identified hearing loss. So I think we pat ourselves in the back and we think, "oh, we're delivering so many amplifiers, we're doing 100s every year, and, more recently, 1,000s." It's still not enough. So I think there's always more work to be done and this really drives us to keep doing what we're doing.

And I think the longer that we do this, the more likely people are to know that our services exist. The numbers are just getting higher every year. So we're gonna keep working toward that. We also pull our nurses and families and patients after they receive the amplifiers to see if they know how to use it, whether it's helping them. And we can't always get these data. So the black bars here are indicating who was not available. And a lot of times, the family members are not in the room. But when we can get these data, most of the time they say they know how to use it and it's helping. And if they say they don't know how to use it, we can just reins instruct them.

It's pretty simple. Our clinic is attached to the hospital. So I whited out a lot of this, but you can see on the top row there, this is the new approach that we're taking to keeping amplifiers kind of top of mind. So I went through every single hospital unit that we have and found a contact. So this is the charge nurse in this unit, this is the unit coordinator for this unit. I got an email address for all of these people. And every two or three weeks, I send out a blast email, blind copied, just saying, "Hey, if you need amplifiers, let me know." And then I usually get a stream of emails, oh, we could use some on 5G, or we need 10 amplifiers on 9D or whatever.

So then we have this list and we can distribute them. And we are paid by our hospital for each one of these devices. So now we are, and actually something that I think is really important on this chart is that we keep track of where each unit keeps the amplifiers. So if we get a consult from, for example, 7 South and they say, "I need an amplifier," we can look at our spreadsheet and say, "oh, we just delivered a bunch of them. You keep them in the back office in the drawer under the window." And they'll be like, "oh, okay," and then they'll just go get one. So it's much faster for these patients to get them.

They don't have to wait for someone to bring them. So I think this approach is good. It just requires kind of some upfront work and then some consistent being in touch with these people over time. But I think it's been working really well for us. Next, paired up with home health. So these are rehabilitation specialists, like nurses, physical therapists, occupational therapists, speech language pathologists. They're going into people's home and providing these rehabilitative care services. So we've partnered with these group to try to educate the care providers how to recognize hearing loss and then giving them each amplifiers that they can use with these people and also distribute if people decide that they wanna buy them and then also connect them back to us.

So we did a training session with them where we gave them some suggested language. So things like, I'm noticing that you're putting a lot of effort into hearing me, and communication during our sessions is really important. So to make sure that you can hear me during our session, I'm gonna show you how, I'm gonna use this amplifier with you. So kind of similar to the language that we use in our clinics, but it's about their interactions, the nurses, the SLPs, and whatever, so that they can just pull it out and use it with them during their session in their home. So we did follow-up with this group and we found that the majority of patients who were offered the amplifiers from the home health providers did actually accept them.

So about 65%, is what we estimate. And the majority of the providers felt that their communication with the patients was either greatly improved or improved. No one said it got worse. Next, moving to our geriatric outpatient clinics. This has been really fun to be involved with. I was the first audiologist who went over to this clinic. And we've had a couple of different colleagues doing it over time and had a lot of students involved. So it's been really fun to see kinda the evolution. But we have two geriatric outpatient clinics, and in these clinics, the geriatric patients are receiving primary care services from the geriatricians. There's also social work, nurses, psychologists, pharmacists, nurse practitioners, physical therapists. Everybody is integrated into these clinics.

So now my colleague, Dana Ailes, who's really awesome, she is in each of these clinics one day a week providing comprehensive diagnostic and hearing aids services. So we first embedded in these clinics in 2017 and since then have provided care to I think more than 1,000 patients now. So this has been a really fun thing to be a part of. And you'll see here we, they gave us space to keep a lot of our equipment there, which has been really nice, 'cause we don't have to transport it back and forth. You can see we have our earigator there and we have a whole process for earigating ears and doing temps before and after to make sure everything is safe.

There's some hearing aid equipment there, an ultrasonic cleaner, a vacuum, a dremel for modifying ear molds and custom devices. We have Verifyt there. So we do hearing aid fittings and verification and counseling and things like that. We also have some portable audiometry equipment and a laptop that we use for hearing aid programming. So, we can't do everything, but there's quite a lot that we can do in this environment. So it's a similar process here. There's an AuD student who's working with the audiologist completing the screening, and then the results of that screening will determine what other services are gonna be appropriate. So just some quick numbers.

We have provided services to several 100, or I think more than 1,000 unique patients, and many of these patients return for follow-up appointments.

So of the people who have been screened in these clinics, the majority fail, which makes sense because these are all patients who are over the age of 65. And again, the majority who are offered the amplifier or recommended the amplifier, do accept and use it during the appointments. There are many people who are already hearing aid users and the majority of those people do actually wear them to the appointments, which is encouraging. And there are a subset of people who have a known hearing loss who don't need to be screened, but don't wear hearing aids. So those people are always off amplifiers as well. And of course there's always a subset of people who can decline these services if they want to.

We have about 130 patients who have purchased hearing aids from the audiologist in these clinics and 300 plus patients who have purchased amplifiers. So I mentioned that we're not there every day. So a lot of the clinic staff can provide services where they sell the amplifiers on days even when we're not there. So they have a stash of them, they know how to sell them and get them, collect the payment and all of that. So even on days when we're not there, the staff is thinking about this and kind of carrying our mission forward. So that's been really fun to see. We have a head and neck cancer survivorship clinic. So this is focused on consolidating resources for individuals who are managing late and long-term effects of head and neck cancer.

So they make one appointment and they see a whole team of people who are helping them to manage these effects and create a personalized care plan as they go through this process. So this whole team of people, and we acknowledge that once the cancer is gone, their lives don't go back to normal. They're dealing with effects related to swallowing and dry mouth and dental issues and hearing loss and tinnitus and shoulder disability and restriction of movement and things like that. So we are trying to

target all of these issues with this whole team of awesome providers. So just a quote from one of the patients who was wonderful. They were saying, "the idea of this clinic is wonderful. I felt abandoned after my surgery, and then I came away with a better sense that I can care for myself better."

So Dr. Jonas Johnson is the one who has championed this clinic, and he works very close closely with Marcy Nielsen, who's an amazing nurse in our department, to provide care for these patients. And they make a huge difference in these patients' lives. So it's been really fun to be involved with them for this. So a little more than three quarters of the patients seen in the survivorship clinic did not pass the hearing screening. And again, kind of going along with our theme here, only about half of those think that they have hearing loss. So that's kind of in line with what we've been seeing with a lot of our other clinics.

And about a quarter of the patients in the survivorship clinic passed the hearing screening bilaterally. The majority who had an amplifier recommended to them do use it, about 60%. And again, that's right in line with a lot of our other clinics. And about 40% declined. So, again, the challenge of promoting better adherence. I think this is something that we need to continue to think about. What's the best way to do this? We can see that the, and based on what follow up records we can see, which is not everybody. Patients travel quite a distance for this specialized care. So we don't know if there are people who are doing these things at other clinics, but a lot of people who we recommend having hearing tests don't do it within our system.

So we need to think a little bit more about how we can make this easier for people so that they actually have better opportunities to do it. We know that people in our Head & Neck Cancer Survivorship Clinic have tinnitus at a rate that's about double of what we see in the general population of our country. And that makes a lot of sense with what we know about chemo and radiation and things like that. And again, back to the

accuracy of self-perceived hearing loss, it's about 55% of the people who think they have hearing loss who actually don't pass the hearing screening. So, again, those numbers are falling right in line there. Post-trauma clinic, it was our first foray.

It's special to me. These are people who are discharged from our trauma unit at Presbyterian Hospital, and we kind of acknowledged that discharge process is difficult. They're getting a lot of information. So we say, "we wanna bring you back in a couple weeks to make sure that you have a solid plan for what you need to do." So we work with a bunch of different rehab specialists to do this, and Ben Reynolds is the PA that really headed this clinic up. So, again, with the number of, I'm sorry that's a little bit hard to read, but it says, "post-trauma clinic patients who can't pass a 25-dB screening," it's a much higher number in the post-trauma, about double.

So similar to what we saw with the survivorship patients with tinnitus. This is a much younger patient population. It's a lot of people in car accidents or we see a lot of ATV accidents, work-related incidents, things like that. So most of these patients in the trauma clinic pass the hearing screening overall. But if you look at the 65 and older group and under 65 group, it's really two very different stories. So over 65, most of them do not pass the hearing screening. And under 65, most of them do. So that seems to be a reasonable cutoff as we've been thinking about this in different locations. Senior living facilities is a whole program that I have nothing to do with, but I support kind of peripherally.

We have some really amazing audiologists and assistants that we call communication facilitators. And our program is called HearCARE. And this is a really awesome program that's been providing services to patients in, or residents, I always say patients, I need to rethink about this, in UPMC senior facilities kind of using different models. So the HearCARE program right now is a PCORI funded program where our director, Katherine Palmer, by the way, none of this will be possible without her. She is the one

that comes up with all of these ideas and then we kind of figure out how to do them. But she's the brain child behind all of this. So Dr. Palmer has this large PCORI grant where she's comparing a model of care with an audiologist that goes to these facilities a certain amount of times per month.

And another model that we call an Engage Model where there's a trained communication facilitator who's going twice a week. So they're measuring satisfaction, hearing related quality of life measurements, and they're also measuring staff satisfaction and family burden. So there's a lot of different ways that they're trying to measure these outcomes based on these two different models of care provision. So Amanda Cassidy is one of the audiologists who is in these facilities. This is just an example of a sign that we made so that people know when to expect her in that facility, like, the first Monday of the month or whatever, and what she looks like, how to get a hold of her. And then the Engage Model is related to using trained assistance.

So who the, Cate Dymowski, is who you see in the picture here. She's one of our awesome communication facilitators, fixing a hearing aid outside of a residence room in one of the facilities. So two different ways to do it. And Dr. Palmer is working on trying to figure out how to best do this for us in these senior facilities. So that's been a really fun project to see as well. And they're collecting a lot of data that I think will be really interesting. So those are the things that we're currently doing and I feel like I talked really fast, we had a lot of things to get through. We're in a lot of areas and I think, of course, we can never be satisfied with what we're doing.

So we're always thinking of new ways, new reasons, new methods of reaching out to people. But I really think the longer we do this, the more people will be aware of what we're doing. And we're seeing more interest in our services. People are reaching out to us to ask for things. And it's been really rewarding over the last 10 years to see the growth of all of these programs. So to sum up, I think, when we think about the

necessary components to justify screening recommendations for a certain condition, we need to know, one, that the condition is prevalent and bad things happen if you don't do anything about it, which we've definitely seen in our data related to hearing loss and untreated healthcare.

We need to know that this condition is not identified without some kind of measurement. And we definitely know that because people don't realize that they have hearing loss, and healthcare providers do not recognize it as well. There needs to be a pathway to action if the condition is identified. So we act in the moment, we provide mitigating services that help them to communicate, and then we put 'em on a pathway of pursuing customized care if they want to. And then I think this last step is an interesting and difficult question. So right now, we screen people manually and we want to think about some sort of way to identify these people that's cost effective, efficient, reasonable, affordable, all of these things.

I think we're not quite there yet. So I think there are a lot of people who are trying to think about different technology that we can implement to do this, ways that we can teach other people to be doing this and thinking about it. So I think we're getting there, but we're not quite all the way there yet. So time will tell what really the best way to do that is. So hopefully I've been giving you information that will help you to think about how you can do this in different settings. And patients who are having surgery, cancer survivors in the geriatric population, really anyone can benefit from these services and can benefit from us doing this.

So I think our take home as audiologists is that we are the ones who have to be thinking about this and advocating for it, and hopefully other healthcare providers along the way will realize the importance of communication. So thank you very, very much for this opportunity. It's really fun to talk about all the stuff that we do. And I have a references slide if anyone is interested. I'm sure you're all gonna run out and read all

of these. So that is there for you in the handout if you're interested. And I don't know if we have time for questions or if there are any, but if we do, I would be glad to address them. Thank you, everyone.

- Thank you. And if anyone has any questions they would like to add to the Q&A section, there are a few. First, is there any third party health plan or reimbursement or coverage involved in any aspect of this program?

- So the screenings themselves that we do are not billed to insurance or billed to the patient. We collect a lot of money from the amplifiers and from the hearing aid services and actually the hospital I mentioned for the inpatient, specifically the hospital, we have a contract with the hospital, so they pay us for all of those. And then all of the people who do come to us for follow-up care get generally diagnostic testing. They, a lot of times, need help with tinnitus or they purchase devices. So there's not a charge or a cost for the screening, but we kind of make up a lot of that on the backend.

- Great, and then when you institute a new clinic or a new program, do you come in and train those staff in the beginning of what your role is and what's gonna happen? Is there a training aspect?

- Yes, there definitely is. And I tend to be the one that's involved in that a lot of times just because we've done this in so many different clinics now. So it's a lot about, actually a lot of the information that we talked about today, helping people to realize, oh, hearing loss is really important, no matter why they're here or what they're doing. And a lot of these people have never thought about it before. So when you explain it, it makes perfect sense to them. And generally they're very open to it. It's just a matter of kind of making them aware of it. So we connect with these people. We usually have several meetings before we start this up.

The first day is always a learning process, but once you figure out the flow in the clinic, it's kind of the same process over and over again. So it becomes very easy, very quick. And it's important to get buy-in from the people who are in the clinic, and I think most of the time we're very successful with that.

- Right. So I assume that a lot of people in your hospital system or your health system know about these programs and maybe you haven't set up a clinic, but can anybody within your healthcare system at any time reach out to your clinics, to I guess the parent clinic for interventional to come and screen someone, to bring an amplifier? Is that something that is available, that a floor nurse or that maybe a clinic you're not involved with or a clinic that you haven't engaged completely with yet, can they still reach out and access your services?

- Yes, absolutely. So we have a consult system where any of the providers that are working with the inpatients can put in a consult through the electronic medical record system and then we get a notification. So we are aware of that instantaneously. We also have had a lot of clinics reach out to us and say, "Hey, can we keep 10 amplifiers in our cupboard?" And we say, "of course." And then we help them get the headphone covers. And then if people wanna purchase them, we help them to figure out how to connect with us to do that. So we've had a lot of clinics reach out to us. And then over time, you just kind of meet people and you say like, "Hey, we have these services available, do you think that would be something that would be of interest to you?" And that's just kind of how word spreads.

- And then I'm gonna ask two Kim Cavitt questions 'cause I'm completely intrigued by this. If I was in my old life, I'd be all over this. Do you ever use, in clinics that you can't reach everyone physically to do an acoustic screening, do you ever use an inventory in the place of that?

- Yeah, we definitely, yeah, so we have this tablet that, it's a tear off pad of HHIA screener. And then on the back, there's a list of all of our clinics. And we do distribute that to a lot of the offices in our healthcare system. I can't say that every office has it, but I know we have those available and are happy to distribute to anyone who wants them.

- And then my final question, you have the amplifiers, which are awesome, I love it. Have you ever thought about accessing the patient's own cell phone and using any amplification, and then you're just supplying a headphone instead of a separate amplifier?

- Yeah, so it's funny you asked that. We have been focusing a lot on trying to teach people how to use their cell phones as a device that can actually help them to do a lot of things, captioning, hearing the TV through that app, I forget what it's called, alerting systems, things like that. We have this whole handout that we go through with people. And it's fun to watch people realize like, oh, this device that I already have can do all of these things. In these clinics that we're in, where we're trying to be real quick, we use the same device with everyone just so that it's fast. And all the providers already recognize it and know how to use it. But when we see patients for follow-up care, we do go through a lot of those things with them.

- That's awesome, thank you, Dr. Zitelli, so much.

- This has been fun. Thank you.

- Thank you so much, and thanks to everyone who was here. We hope you'll join us, join us for the remainder of the series or go back and see last week's presentation as well. But thank you so much. Thanks to AudiologyOnline and everyone for joining us today.