Grand Rounds: Interdisciplinary CI Teams for Optimized Care Plans, in partnership with UChicago Medicine

Presenters: Josh Sevier, AuD, LLM; Shannon Barry, AuD; Ted Imbery, MD; Michelle Havlik, MHS, CCC-SLP, LSLS Cert AVT; Yini Sun, AuD; Katie Swail, AuD

- [Moderator] We are so delighted to welcome for the very first time, wonderful clinicians and physician from the University of Chicago Medicine. I would like to welcome at this time a collaborative team, a cochlear implant team who is a forefront of patient care. And I'll hand the mic over to you, Dr. Sevier.

- Hi everybody. Good morning, good afternoon, good evening, wherever you're deciding to watch this at or what time it is. My name is Dr. Josh Sevier. I am a cochlear implant audiologist and the head of the CI program at the University of Chicago Medicine. Thanks for joining us on this Grand Rounds that we're having today. And we're gonna talk about some of our optimized care planning and how our cochlear implant team functions on a day-to-day basis. I wanna thank audiology online for having us to do something like this. It really means a lot to us and when I say us, I mean all the awesome colleagues that I work with on a day-to-day basis and everything in our department.

If you get to see how excited everybody gets when we do our team meetings or even doing something like this, it really means a lot and I think it shows with everybody's will. Gonna gonna advance through and show you our disclosures. If I can figure out how to click through again. There it goes. These are our disclosures. I'm not gonna go over every single one of them, obviously there is a ton there. It's just 'cause we have so many members of our team that are gonna be speaking during this. We have no financial no non-financial disclosures to give out, but we are getting a donation from AudiologyOnline for our team. I'm gonna go through the learning objectives just a little bit and it's just to kind of give you a feel of what we're going for when we're doing our presentation.

So describing the approaches of an interdisciplinary team and how we incorporate into our workflow and communications of the day-to-day nuances of seeing complex emotional, complex social, and just the different medical histories that go into some of

the patients and how we handle that with our interdisciplinary team. We're gonna identify which disciplines can contribute to a cochlear implant team and what their role for each of those may be. Not every cochlear implant team looks the same and everybody has different roles and every different things that they bring to the team. So we'll go through each one of those in detail, walk through what their day-to-day kinda looks like and show the different flows for that.

And we're also gonna identify the factors and variables for adult and pediatric implant patients the surgical planning, so you'll see complications with things, something that may stand out as being what you may consider a contraindication and how our team navigates that and discusses that whole process. Alright, so the gist of everything that we're gonna be discussing this evening, we're gonna talk about the differences between interdisciplinary and multidisciplinary. They may seem like interchangeable terms, but they actually mean very different things. So we will talk about why we use one over the other and why that's important when it comes to talking about an interdisciplinary team. We're gonna talk about the different components of the CI team, like I mentioned, and the different functions.

There's no standard accepted model of what a typical cochlear implant team looks like, but we're gonna go through and talk about the different components that our team does and doesn't have. But we're also gonna talk about what those other things may be. So if you have some resources that contribute to one versus the other. We're gonna take a deep dive into our program specifically, how we operate, what makes us unique, or how we feel like it makes us unique, and we're gonna go through the different flow of what candidacy looks like and how that whole process works and who is responsible for which of those aspects as we continue to go on. We wanna show you what this looks like in real life too at the end.

So the case studies, we're a big believer in case studies and actual scenarios, so we're gonna walk you through three individual cases as well, diving into the patient's background and step by step how we kind of handled their situation. But bear in mind they are all real scenarios and that if I'm not mistaken, yeah, all three of them have been seen within the last year. So great opportunity to see the interdisciplinary work and action there. Our goal and all of this is just to pull back the curtain and show you what we feel is a streamlined program, just kind of how we function on a day-to-day basis. Things are reviewed and updated all the time.

What you see now may not necessarily be the exact same thing a year from now. It's because we analyze things, we go through and we discuss what works and what doesn't work for the team. And then we have a discussion to sit down and redo our protocols yearly to make sure that that's actually relevant for what we're doing at the time. And we do it for a few different reasons. It's not just for us, it's for the patients too and making sure they're getting the best possible outcomes they can in the scenarios that we provide for them and their care planning. So we constantly have to stay on top of things to make sure that we're giving 'em the best that we can.

We hope that if you're curious about how this all works and you wanna kind of incorporate some of this into your day-to-day practice or maybe give you some new ideas that you hadn't previously considered that you may be able to incorporate into your interdisciplinary team if you already have one. And like I said, there's some aspects based off the resources that you may have that others may not. And you can find a way to incorporate that in if you can, if not, do the best you can with what you have. But this is also for the people and the clinics that are wanting to kind of bring multidisciplinary into their clinics on a day-to-day basis as well.

They may have a style that has worked for them so far, but maybe getting some ideas of how to incorporate other disciplines into an actual team so you can flow off, develop

great care plans and making sure that your patients are getting the best possible outcomes. Every program is different and that's okay. Some teams have things that work and sometimes they don't. And like I said, resources play a big part of that, but we can share ideas and if we can help anybody in their care planning so it helps a patient stay better at the end of the day, that's kind of what does it for us and we consider that a win. So if you would please just hold all of your questions for the end of the presentation, we'd greatly appreciate it.

I'll be moderating our Q&A session when we get done presenting from the team and we'll go through and answer your questions. In between some of those questions, I'm probably going to ask our presenters different questions on top of that to try to expand on certain broader topics that we discussed as we went through. But I will get to each and every one of your questions as long as time allows for us at the very end of this. We really hope that you enjoy this presentation. Thank you so much for attending. We're really proud of our program and we hope you can see that when you listen to it as well. So let's get this party started and I'm going to invite my first colleague presenting tonight is Dr.

Shannon Barry.

- Hello, my name is Shannon Barry. I'm an audiologist here at the University of Chicago and I'll be taking you through the next couple slides, which we'll review, what makes an interdisciplinary team. So what makes an interdisciplinary team? The difference between multidisciplinary and interdisciplinary has to do with collaboration. Interdisciplinary teams involve a coordinated approach with collaboration across disciplines with two or more providers. Listed on the next few slides are several aspects of a successful interdisciplinary team. I'll discuss a few that we feel are essential. First, communication. Over communication in a medical setting is desirable

not only for provider success but also patient safety and best patient outcomes. Clear vision. Our CI team has one goal, best patient outcomes and best practices care.

Flexibility. Sometimes complex cases require flexible schedules and adaptable providers. It's important that the members of the team be reasonably flexible to accommodate the patient and the other team members. Reflection. As providers, we need to ask ourselves, what did the team do well on with this case? What can we improve on? Using both informal and structured reflection for cases, especially those more complex cases is helpful for team members. Shared decision making. Every team member's input is essential for the team decisions. We can't make these medical decisions alone. It requires the expertise of each discipline to build the best health plan for the patient. And in a case coming up, we will expand on what we did in our team when we all didn't totally agree on a care plan for a unique case.

Respecting and understanding roles. It is pivotal that each discipline understand the other scope and how they can contribute to patient care. Each role is essential for best patient outcomes. Here are a few more we'd like to highlight. Team culture. We wanna achieve success in a team environment not just as individual providers, the culture of the workplace needs to facilitate camaraderie. Quality and outcomes of care. How do we measure patient success? How can we ensure best outcomes for the patient? As we all know, in reality, not every case can be measured on the same scale. Best case scenario doesn't always look the same for every patient. We need to define success differently for all cases, which we will also dive into a little bit more in the case studies we have coming up for you.

And finally, leadership. Successful teams require both effective leaders and strong team players. Using different and positive leadership styles in large teams can improve the team culture. Good leaders can look like many different things, but usually have strong self-awareness, adaptability, empathy, and are able to inspire the other team

members. A review by Gleason identified that facilitating factors for interdisciplinary communication are maintaining interprofessional ethos and building positive working relationships. Barriers were noted to be hierarchy and challenging working conditions. How can you combat these barriers with your team? It starts with open communication. It's important that if a provider notes a barrier to their team, they bring it up along with suggested resolutions to the rest of the team.

It's also really important that managers encourage an environment that values innovation and the continued growth of the healthcare providers and team members. Mutual respect and understanding were found to be significantly associated with positive interdisciplinary communication. So who are members of a CI team? Truly anyone who caress for the patient is welcome to be involved and oftentimes are included in care planning. But the primary providers on our CI team here at U Chicago include audiology, ENT, SLP, and social work. What does our interdisciplinary process look like here at U Chicago? We have a shared common goal, best practices, patient-centered care. The goals we create for each patient can be highly individual depending on the circumstances of the case.

We have regularly scheduled team meetings to discuss our patients, both preoperatively going through the candidacy process and post-op plans of care. There are separate meetings for the pediatric and adult teams. This allows a little bit more focus for each of those demographics of patients. During the meetings we discuss each candidate going through the process, each provider on that patient's care team will go through and present them from their point of view with the information relevant to their case discovered during that appointment relevant to their subspecialty. This is done for a couple different reasons. This allows each team member to present their findings. They'll explain why they believe the patient is or is not a candidate for a cochlear implant and why.

It also allows for team members to express concerns that they might have about a patient, that may preclude them from undergoing cochlear implantation. On our team, everyone isn't equal. No one outranks another and everyone must feel comfortable for their patient moving through the surgical process before it can actually take place. Every member of that care team has a vote. The meetings also allow us to create care plans for their postoperative care. Even after the surgery, the patients will still be discussed in the meetings. Of course, we wanna track their progress. Are there any sounds that SLP has found the patient to be struggling with in their progress? Are there patterns from this or findings from audiology appointments that would warrant maybe more frequency specific programming change to improve their auditory access?

For children, how well are they doing in school? Have we been in touch with their educational audiologist or hearing itinerant to make sure that they have everything needed for them to succeed academically? This includes information from IEPs or any other plan that may set out recommendations for accessories or other alternative modes of communication. From a social work perspective, are there things happening in their lives that is preventing them from being successful? This may include school, but also from a home socioeconomic standpoint as well. If we find they aren't using their devices at home or elsewhere, we wanna know why, and if they're not gonna be as successful with the device as they could in their life and how can we help translate that into their appointments and the support we can offer to the patient and their family outside the hospital as well.

From a surgical standpoint, are there any anatomy considerations we need to factor in to help us counsel on adequate expectations with device performance? Are there pain, dizziness, or other symptoms that have developed since the use of the device started? We discuss all of this in detail to make sure all of the providers are on the same page for their care, but to also have other perspectives of the team to see that they can provide ideas or suggestions to help optimize performance. It's always great to have a

second set of eyes on a case and with a team of different perspective, it helps us develop our best plans to optimize patient outcomes. Another simple, but we all feel this is very important factor for our team is the proximity of our clinics as well.

Our clinics are all in the same wing of the hospital. Most are actually on the same hallways, which allows for really structured communication time as well as lots of incidental sharing of information. We often see patients back to back with one another or even have co-treat appointments. Sometimes Dr. Imbery just poke his head in the booth if he's passing by. This also helps facilitate comradery and strong working relationships. We will also see our CI patients in outpatient clinics in the suburbs. And for those appointments we utilize secure communication, Epic Chat, encrypted email to coordinate with other providers across the clinic locations. All the members of our team have a collaborative and flexible mindset which allows everyone to feel respected and valued as they contribute to the best practices patient care.

It's essential that all the providers understand what each discipline contributes to the patient care and respect, how utilizing each provider's skillset can lead to best patient outcomes. So on that note, I'm gonna hand the discussion over to my colleague Dr. Sun. Thank you so much for joining us.

- Hello everyone. My name is Yini Sun. I'm one of the audiologists at the University of Chicago Medical Center. I work with mostly adult patients with hearing and vestibular concerns as well as as those who use cochlear implants. So for this slide I'm going to continue the discussion of the factors that help us succeed as a ID team. So one unique aspect of our center is our clinical education program that focuses on cultivating the teamwork mindset. We offer interprofessional clerkship rotations for our medical students and also first year residents. They will be assigned to different providers throughout the week and they will observe appointments in audiology, speech, and also ENT. The goals of those rotations are for students and interns to

participate in interprofessional team communication and also to gain a deeper appreciation of the unique contribution that each team member brings.

In addition, audiology students and externs receive trainings from the speech team to better understand the oral rehabilitation process for CI patients. These trainings really benefit our counseling for those patients as we can better prepare them for the process and also we can better manage their expectations. And finally, we have a very strong inpatient audiology team that performs hearing screenings and diagnostics. They have been tremendously helpful in identifying patients who need audiology and ENT care after their discharge and they're very good at communicating those cases to the team so we can ensure the continuity of care. Now I'm going to briefly go over our protocol appointment flow. What we are looking at right now is the protocol for adult CI process at our center from initial candidacy evaluation to the ongoing follow-up visit post implantation.

I'd like to point out that this protocol is in place to ensure best care for our patients, but sometimes depending on patient's individual needs, we do shift this timeline which allows the team to provide patient-centered care. So for most cases, the patient will start their cochlear implant journey by meeting with one of the audiologists to complete candidacy evaluation and discuss realistic expectations. If they're audiologically eligible for a CI, they will meet with the surgeon to complete preoperative medical examination. Upon medical clearance, the surgery will be scheduled at the earliest available time and then about one to two weeks after surgery, patient will follow up with the surgeon and the audiologist on the same day for cochlear activation.

For routine audiology visits and programming sessions, we generally follow the timeline of two weeks, one month, three months, six months, and then annually post activation. For all rehabilitation therapy patients usually complete the initial assessment at least two weeks post activation and then they will meet with our speech therapist about

every two to three months or as needed during the first year. For our pediatric patients, the appointment flow slightly differs. As opposed to following up with speech after implantation, patients will actually complete speech evaluation as a part of the candidacy process. So the goal is to determine baseline aided performance with hearing aids in their listening and spoken language development so that we can see whether the patient has sufficient aided benefit to meet their fullest potential.

If not, a cochlear implant should be considered. Completing the speech evaluation before the surgery also determines additional etiologies or diagnoses that are contributing to the language delay so that appropriate upside referrals could be made to address these concerns. It will also help the families to be consult on what they should expect and the outcomes with the CIs as well as appropriate communication approaches. Now I'm going to discuss a little bit about what audiology contributes to the team. Audiologists play a crucial role in each step of the patient's CI journey and also in our team-oriented approach of care. Audiologists are usually the first ones to identify potential CI candidates out of patients who come in for hearing and vestibular testing.

And we are usually the first ones to start the education for patient and their family members. To help patients decide if they want to pursue candidacy evaluation, we provide an introduction of how a CI works, the protocol follow up schedule and the providers involved in this process. We also discuss what the patient should expect in terms of the amount of oral rehabilitation work in order to achieve their optimal outcome. We then connect the patient with a surgeon to start the evaluation process and also connect them with the recipient support teams of our cochlear implant companies for any manufacturer specific questions. If the patient meets the candidacy criteria and if they have selected the company they want to work with, we will proceed to order the devices based on their communication needs and goals.

During the surgery, one of the audiologists will also go into the OR for intraoperative impedances and ECAP measurements. Those measurements offer insights into the status and placement of the electrodes for the internal device. For device management, audiologists will activate the implant and discuss use of the processors and the accessory devices. We provide patients with educational materials, resources, and also access to support groups where they can connect with other CI recipients and share their experiences. We help CI users adapt to their new hearing experience and make any necessary lifestyle adjustments as a part of the ongoing care, especially if the patient is transitioning from a world of deafness to a world of hearing. Routine follow-up appointments with an audiologist are crucial to patient's long-term success.

During those follow-up visits, we will verify the functional status of the processors and hearing aids and we'll may make any adjustments for programming or mapping to optimize the recipient's hearing experience based on their feedback. We monitor patient's performance in several dimensions such as objective measures, aided threshold detection, speech recognition, language development, and also quality of life outcomes. Regular outcome monitoring does not only track patient's rehabilitation progress, it also help us to detect any malfunctioning or failure of the external or internal devices. And in that case, the audiologist will coordinate device replacement and/or the X implant re-implant process. Long-term implant users will become eligible for processor upgrades along the way. So we keep them up to date with any advancements in the CI technology and help them with the upgrade process.

And finally, we keep very close communication with the other team members and specialties to work together towards the successful outcomes for our patients. Now I'm going to hand it over to my colleague Dr. Imbery to go over surgeon's contribution to the team.

- Alright, hello everyone. I am Ted. Imbery. I'm a neurotologist at the University of Chicago here and I've been with the group for a little over four years. I'm really excited to be a part of the team here. Very passionate about cochlear implant surgery. One of the favorite things that I get to do every week. So as a surgeon, my role might seem pretty obvious, but I'm gonna see patients that are oftentimes referred to me from audiology and other ENTs. As part of the workup, I'm gonna perform a detailed otologic history as you see in the photo there and do another relevant head and neck exam and review medical and surgical history. Typically, patients are going to get some form of imaging, oftentimes a CT or MRI to assess the cochlea and temporal bone anatomy.

We present candidates at our team meetings. We have monthly adult team meetings and we have pediatric team meetings every two weeks and we sort of discuss their case and candidacy and review if other interventions are needed such as neuropsychiatric evaluations, other medical clearance. Obviously I'm gonna counsel the patient about surgical risks and from a surgical perspective the surgeries become quite refined and it honestly, even for a patient that is old and fairly frail and seemingly sick, the surgery can still be done safely with appropriate medical clearances. It's very rare that we would have to potentially not implant someone because they're unhealthy. So it's very rare that we would have to potentially refuse a patient because of other medical contraindications.

I'm gonna also talk about the expected rehabilitation afterwards and in many cases I will help sort of work with the audiologist to select a device, particularly an electrode and things like certain anatomic considerations if there's significant residual hearing that is hoped to be preserved. Those kind of things will guide our decision making for certain electrodes as part of their evaluation. So obviously, I get to put the implant in. I love doing cochlear implant surgery and it's really become a refined surgery as I said, and it can be done in about an hour and an hour and a half. And almost all the time I do

this as an outpatient. So again, the patient would come in for surgery and then go home a few hours afterwards in recovery.

And it's very rare that we would need to admit a patient and keep 'em for a night. For adults, oftentimes we're doing sort of unilateral implantation, for children certainly for candidates we're gonna try to do bilateral simultaneous. You see a representative intraop x-ray here that shows the electrode in the cochlea. So you know from a surgical perspective, once the implant is in, oftentimes we might shoot an intraop image to just kind of confirm our placement. Gives us in the patient a little peace of mind that everything is in where it needs to be. As mentioned before by Dr. Barry, and Dr. Sun, the audiologist will also participate intraoperatively to do impedance measurements and other measurements such as NRI or NRT.

After they go home, the recovery is fairly straightforward. They have a small incision behind their ear that they'll keep dry for about two weeks and they'll come back and have the bandages removed at that visit. And typically we'll do activation on the same day. I think more and more we're realizing that you don't need to wait three, four weeks or longer to do activation and even some centers are pushing that even further and doing activation within a few days or week after surgery. But here we typically do about two weeks. After that post-op visit with me and their activation, the majority of the followup will transition to the audiology and speech and language pathology provider.

I typically will see patients back on an annual basis or obviously as needed for issues. And as Dr. Barry mentioned, the one benefit of sort of being all sort of physically close in proximity on campus here is that I can sometimes just sort of pop in. I'll see one of my patients in the waiting room or see that they're coming in and I'll just sort of stop over in the audiology booth or in the clinic there and just sort of say hello and just kind of check in on their progress. But again, we have a lot of sort of crosstalk and

communication and I'm always sort of abreast of how my patients are doing even if I'm not physically seeing them on a regular basis.

As a surgeon, I'll be responsible for helping with the evaluation of patients who may have existing implants that may be having some performance issue or other possible complication. And as part of the workup for a device failure, whether that's sort of a presumed soft or heart failure, obviously an ear examination is gonna be performed and typically imaging as well. And below there we see just a couple representative images of some sort of unfortunate surgical complications where the electrode array was inserted incorrectly and ended up in one of the semi-circular canals. So one of the reasons that I also will oftentimes do imaging intraoperatively to make sure that we don't have any of these issues that are detected later.

But again, for patients that have performance issues or other potential complications, I'll help evaluate them and oftentimes get imaging to kind of assess the integrity and placement of the device. So that's a sort of a brief summary of what I contribute as a surgeon on the team. And I'm gonna transition over to Michelle Havlik, one of our speech and language pathologists.

- Hello. So my name is Michelle Havlik, and I am a speech language pathologist and auditory verbal therapist on the cochlear implant team. I've worked with our team since 2009 and do oral rehabilitation with our adults and children's with hearing loss. So when you think of speech language pathology services, what comes to mind? Likely evaluation and treatment. And of course that is a large part of our role here on the hearing loss team. But what does that look like in the context of hearing loss in adults and children and how does that work compliment the audiologist programming visits for example? So that's what I'll be trying to help cover with you today. So pediatric evaluations, first, what do they look like?

During our hearing loss team meetings, newly identified hearing loss patients are referred to speech and we typically see them after a fitting with hearing aids and also when they are considered for cochlear implant candidacy track. We use a combination of standardized assessments and informal measures and questionnaires depending on the age, the developmental needs and hearing history of the child. We identify if there are functional listening or spoken language deficits or maybe any other diagnosis contributing to these delays compared always to their chronological age and also their hearing age. Once this evaluation is completed, results are presented at our CI meeting to aid in the candidacy discussion process. With regard to pediatric treatment, that frequency can vary as well depending on how supported they are in therapy in their community, whether through their local school or early intervention services.

Minimally all children are seen quarterly, their first year for diagnostic therapy visits to ensure that they're developing at an expected pace given their particular hearing history and age, and to give specific auditory skill feedback to the audiologist to aid in mapping. Then we would provide annual reevaluations for the first few years to ensure that the child is making at least a year's gain in a year's time if that's an appropriate expectation or at least meeting their fullest potential if they have other things going on. Some children are seen on a regular basis if they do not have access to adequate oral rehab services in our community. And as mentioned, we also will see children short-term for therapy to train specific skills to help them be more reliable in testing for audiology.

In contrast, adult evaluations utilize more of an informal measure, including a very in-depth interview with the patient and hopefully their frequent communication partner to identify what exactly is being impacted in their activities of daily living. 'Cause let's be honest, we pursue surgery because we want an impact on our quality of life and our ability to complete day-to-day activities. So we use these interviews paired with functional auditory assessments and questionnaires to identify a baseline and that is

used to track progress, give feedback to audiology, develop a home oral rehab program, and develop goals for treatment. Typically with adults, this is done post CI activation, but we will do it preoperatively if the team has identified that this patient's complex, has concerns with cognition, for example, or is needing further counseling on appropriate expectations.

For adult treatment in this setting, I describe myself as part cheerleader and part personal trainer. As adults can improve independently using their home oral rehab program, however, often we all benefit from motivation to keep on track and also there's an element of accountability to keep up with their oral rehab programs during these visits. So frequency can depend on, sometimes I'll see a patient once or twice, others are seen on a monthly basis, either in person or over video for six months. And the focus of treatment is on auditory training, education, counseling, and also dynamic assessment. So what does that look like? So beyond evaluation and treatment, we provide education, counseling, co-treat with audiology and coaching as part of our visits.

And unlike what I assume most audiologists, speech pathologists often have the luxury of longer appointment times that can be dedicated to the education and counseling piece. Frequently we have adult patients that are initially confused about what they've been referred to speech therapy, but when we focus on their individual concerns and tailor their goals to a functional outcome important to their lifestyle, we see much more buy-in to the whole process and impact on their quality of life. And it's also an opportunity for us to reinforce again the talking points that audiology and ENT have already included in their counseling just for repetition for emphasis. So rather than giving them just a general list of ideas for listening practice, like listen to these audio books and move on and sending them on their way, we really try to use this time to create a customized program specific to what's important to them that's been identified in these evaluations.

So we cover a variety of education and counseling topics that are typical like outcomes and expectations, but we'll also review educational plans to ensure appropriate classroom placement, go over practical things like strategies and accommodations and modifications related to activities of daily living, educating on communication models, therapeutic approaches and outcomes depending on what the family chooses. As Dr. Sun mentioned, we also have our center provides lectures and opportunities for observations to students, new hires and residents to encourage a spirit of collaboration and a true understanding of what all professionals can contribute to patient's care. So one last important point is that I think what's really important and unique to our program is this close collaboration that we have with audiology and speech.

For adults and children, we update the treating audiologist on speech perception errors in therapy, we use speech acoustics to aid audiology and programming individualized to their particular needs. It's been exciting to see how that translates and how closely we've communicated and improved their speech perception skills as a result. And we have seen hard to test patients for short-term therapy to target a particular testing skill they need to learn to be more reliable reporters in the booth for our audiologists. And then we'll schedule a co-treat to aid in getting reliable testing once the child is competent in therapy with that skill. And lastly, patient and parent coaching is fundamental to all our sessions that may look like coaching families on listening and spoken language strategies to carry over into daily routines, or working with adult patients on how to implement strategies into role-playing activities for challenging situations they face.

However, we sometimes encounter patients that struggle for other reasons and that's when we pull in our fabulous social worker to help identify and remove any barriers to service and support. So this next slide really focuses on what a social worker contributes to the team. Here's a summary of what the typical roles and skills they

bring, including identifying what the needs are, connecting with community resources, helping clients adjust to changes and challenges and assessing patients' needs and situations to help them determine what goals are really useful to them. Particularly to our center, our social worker sits in on our meetings, provides updates, really advocates for these families, identifies their needs, communicates with outside providers, helps connect patients with resources and really does her best to remove barriers to equal access to hearing loss care.

So now that we've given you an overview of the roles of our team members and the roadmap for the care that our patients receive, we will now review three challenging case studies and what each team member found and their role in the patient's care. So I'll turn it over now to Dr. Imbery to review our first case study to see this collaboration in action.

- Alright, hello again. So I'm gonna kick off the case discussion with this first case set. I'm gonna affectionately title ear pods. So this is a pediatric patient who at his visits would refer to his cochlear implant processor as an ear pod. So we've all been very involved in his care and I think this case certainly speaks to the fact that it really does take a village in some cases. So from a surgical perspective there's some unique aspects about this patient and some things that we had to do a little bit differently and take into consideration. And then we'll see sort of at the end in particular the special role that our team social worker has played just to kind of help with his care because he is very medically complex.

So this is a now seven year old male who has an unfortunate complicated history of tuberculosis meningitis. So not too often that you see an otherwise young and healthy child get tuberculosis, let alone get tuberculosis meningitis. So he initially was diagnosed when he was about four years old and some of his presenting symptoms were quite severe with significant headache and altered mental status, and he was

actually found to have hydrocephalus which is essentially sort of excess fluid swelling around the brain. And so he needed a shunt placed to help address that. So a shunt, a ventricular peritoneal shunt functions to help sort of take off some of that extra brain and spinal fluid and literally diverted somewhere else typically to the abdominal cavity.

So he initially had that and he was obviously then treated or initiated on treatment for his underlying meningitis. When we initially saw him around the time of his diagnosis, his hearing testing was normal. Unfortunately, he had some breaks in his care and was lost to follow-up for about a year and a half. When he came back, you see his audiogram demonstrated profound hearing loss in the right ear and a mild to moderate hearing loss in the left ear. The testing was somewhat unreliable so we ended up performing a sedated APR and that actually then confirmed profound sensory neural hearing loss bilaterally. So we also got imaging and imaging, in this case MRI demonstrated a tuberculoma on the left cerebellopontine angle.

So a tuberculoma is simply just a conglomeration of sort of the bacteria and in many ways it actually, if there's inadequate treatment, it sort of almost congeals and collects and can continue to grow and potentially result in mass effect on some of the nearby structures. So we'll have a slide coming up that kind of shows a a representative picture of that. The other thing I want to point out is that meningitis, when we think about a child who has meningitis and obviously hearing loss, we get worried about cochlear ossification and there's not a lot really about tuberculosis meningitis, certainly the risk of cochlear ossification is much higher for bacterial like pneumococcal meningitis. And so in those cases, particularly if there's profound hearing loss in that setting of pneumococcal meningitis, we're gonna perform an implant very quickly before potential for complete ossification.

In this case, again there's not a ton of literature about this but this seems like the risk for ossification is a little bit lower. At least this initial imaging that we had didn't

demonstrate any inflammation or signs of that in the cochlea. So we obviously had a complex patient here with unfortunate tuberculosis diagnosis and so obviously with profound hearing loss we talked to the family about the option of cochlear implantation for his hearing rehabilitation and that was something that they were interested in. Prior to this diagnosis when he was four, he was otherwise normal and healthy, had normal speech and language development. So we had an interdisciplinary discussion regarding the option of cochlear implantation in the setting of ongoing treatment for his tuberculosis as well as some of the other issues namely the need to potentially monitor this tuberculoma near the brainstem on the left side and how that would potentially play into his implantation.

So obviously our team of audiologists speech, and language pathologists, social work sort of met and then we also included discussions with infectious disease colleagues as well as his his neurologist who were following him. This slide is highlighting preoperative speech evaluation and so obviously and for our pediatric patients they will have a preoperative evaluation and the standardized speech and language functional audition evaluation revealed that he had severe receptive and expressive language delays and informal speech assessment judged that his speech skills were mild to moderately delayed compared to his similar age hearing peers. When he was in the bilaterally aided condition, he demonstrated limited to no functional benefit from his hearing aids and had very limited auditory detection to loud speech sound.

So again, sort of just illustrating that he would geometrically be a candidate for a cochlear implant. So there's a couple things that are unique about this case in this setting. A child with a shunt, so this is a representative X-ray just showing some of the apparatus of a shunt. You can see that there is sort of the actual shunt tubing into one of the ventricles and there is sort of that darker white area that is where the shunt has a programmable valve and then the actual shunt tubing where the fluid is actually being diverted, it actually courses behind the ear in the region of the mastoid. And so it's very

common for shunts to have tubing that go kind of in the postauricular region, ultimately down through the neck and into the abdominal cavity.

That would obviously pose some potential to be in the way for a cochlear implant surgery. So there are some potential need to adjust your soft tissue work for the implant and the magnet. The other thing to consider is that with the newer generation programmable shunt valves, they also employ a magnet and with cochlear implants or some magnet as well. And so if there is a potential for interference between the magnets if they're in close proximity. And the FDA actually did release a warning about this a few years ago. And so I think there's more awareness about this and certainly again, adjustments can be made to accommodate the shunt tubing and also the placement of the shunt valve.

There's not a hard and fast recommendation about this, but if you look at some of the available studies on this, if you adjust your placement of the implant magnet to be about two to three centimeters away from the programmable valve, you will hopefully not run into any issues affecting that. So those are some unique considerations that we had just from the sort of simple surgical aspect as well. We had a long discussion about how do we monitor this left brainstem tuberculoma. So this is a representative axial slice of an MRI scan. And just to orient you, in case if you haven't looked at these, the bottom of the head is at the bottom of the screen and the sort of the bridge of the nose and eyes are at the top just kind of looking up.

This is a horizontal slice, every few millimeters or so, there's a horizontal slice in this series and the left ear is actually on the right. And so you can almost imagine that the legs are coming out at us and we're looking up at the patient from below. Circled in red is sort of indistinct, but you can kind of see these areas where there's a little bit of enhancement. So this is actually the tuberculoma. So this is at the cerebellopontine angle, which is sort of the junction at the brainstem where the cochlear vestibular nerve

bundle is coming out of the inner ear canal. And certainly with a lesion on the left side, if we place an implant on that left side, there's potential for artifact that may affect the surveillance of that.

There's a lot of literature looking at sort of the need and sort of the nuances of imaging surveillance and implants in patients that have acoustic neuromas. This is often dealt with in patients that have neurofibromatosis type two. And so you can also make adjustments to magnet positioning, potentially even implant without the magnet to avoid that. You could also do CT scans, but regardless there's gonna be some artifact potentially from either a CT or MRI that may affect the monitoring of lesions in this area. So some additional adjustments might need to be made. So we talked with the infectious disease team and sort of after we had a couple scans that monitored the tuberculoma that wasn't getting bigger, the infectious disease physicians as well as his neurology and neurosurgical team felt comfortable with him moving forward with the cochlear implant.

And we ultimately decided to move forward with just the right cochlear implant just to sort of have it away on the opposite side. Surgery itself was uncomplicated, and again, from a soft tissue perspective we had to make some slight adjustments to the positioning of the incision to avoid damaging shunt tubing. In cases where you're operating in and around shunts, it's always also a good option to have your neurosurgical colleagues available. In some cases they can either, if it's really in the way, they can sort of preoperatively adjust the shunt tubing and run it maybe more posteriorly or God forbid if the tubing is injured intraoperatively it's fairly easy but they can sort of fix that if needed.

But ultimately we didn't have to make too many adjustments to the positioning based on the tubing and we positioned the magnet in a way that it was thought to be away from the programmable shunt valve. He went home postoperatively and had no issues

with the sort of the acute recovery period. And when we saw the patient back and he was with his grandmother reported that his listening skills since activation had greatly improved and he was able to answer basic questions in a quiet setting and it was noted that he had become more social as well. And on this next slide here, this is just sort of a summary of his postoperative speech evaluation. With the implant, he now has enough language to formerly test articulation and expressive vocabulary and overall syntax.

His performance on receptive vocabulary testing showed improvement from an age equivalent of less than one year to four years, five months in just eight months time since implantation. He's now presenting with consistent monosyllable identification in close sets and follows two critical element directions using the CI alone. He does have significant delays when compared with his same age hearing peers, but has made tremendous gains across all domains into eight months since his cochlear implant of activation. And this is also in spite of continued sort of ongoing medical setbacks which we'll discuss. So he many, many months later developed difficulty walking and he had workup and additional imaging of the spinal cord, which showed tuberculosis involvement in the lower spinal cord, which was causing cord compression and swelling and leading to the lower extremity weakness.

And so he had some initial surgery to kind of confirm and decompress the spinal cord and required extensive inpatient and then outpatient rehabilitation to get his strength back. And as sort of lingering issues from the surgery and that recovery, he's had issues with anemia and unfortunately malnutrition and he still requires a wheelchair for most of his ambulation. As we'll see here, given some of the ongoing issues with his complicated medical care, we really wanted to highlight the role of our social worker that help address these needs and provide to care coordination with other providers. So this slide just indicates some of the roles that the speech and language pathologist

and social worker played and the SOP helped initially contact the school case manager teacher and also met with staff to help secure supplemental security income benefits.

They're educated, empowered the mother on the IEP process and what to advocate for. They also helped educate important communication modalities and therapeutic approaches that the family could choose from. They also helped complete formal and informal assessments of language audition and speech and offered to attend school meetings to address the school and team concerns with school attendance and follow-up care at the university. They've also worked to continue to help coordinate appointment care and have also provided monitoring of his ongoing case. There has been, given his malnutrition, there was some concern about medical neglect and getting adequate nutrition. And so the Department of Child and Family Services, DCFS has been involved due to the concern of neglect and other missed appointments.

And so social work began contacting the patient's mother to help remind them with appointments and inquired about other barriers for attending these appointments and also working to help arrange transportation. So this is really a challenging case from so many aspects and simply from a medical perspective, it's very unusual to see a young otherwise healthy child get tuberculosis and get meningitis and lose hearing from this. And this was an otherwise normal healthy child with normal speech and language development who became suddenly profoundly deaf. After we obtained imaging and kind of consulted with the team, which also included in this case neurology, neurosurgery, and infectious disease, we had a long sort of discussion and came to the conclusion that it was ultimately safe and reasonable to proceed with implanting his right ear first.

Again, we wanted to continue to have a better monitoring of the left cerebellopontine angle tuberculoma. And our hope was at some point to be able to implant the left ear. But given his issues with rehab from his spinal cord involvement and rehab, it's just

sort of been put off and the hope is in the future that will be an option for him. Social work has really worked diligently behind the scenes to help ensure that barriers were removed and provide as much possible potential for success just given all the steps that are involved in his care. They work to help sort of coordinate the care amongst these disciplines and in many cases we try to do same day appointments for multiple providers just to help provide a more consistent treatment plan.

He's made significant strides in auditory speech access despite his ongoing medical issues with the the weakness, anemia, and malnutrition. And there's been some other social aspects at home with the concern for neglect and he's had multiple admissions for failure to thrive and we've been working with DCFS to make sure that he's in a safe environment and our social worker has been very important as sort of being a main liaison for that. And while each discipline on the team has really worked to provide optimal outcomes, I really can't speak highly, really can't over understate the amount of work that the social workers provided to just kind of help move things along and just coordinate things as he's gone forward.

It really not only helps with team visits, but just in the general day-to-day life of the patient. So we're gonna transition to our second case. And to do so, I'm going to introduce Dr. Katie Swail and I'll let her take it from there.

- There we go. Hello everyone. I believe I'm the last one you haven't met yet. Hello, I'm Katie Swail. I'm a pediatric audiologist here on the team working with obviously cochlear implants as well as diagnostics, hearing aids, and vestibular evaluations. For that I see both pediatrics and adults. So the second case here is the case of a patient who was interested in cochlear implantation, but her candidacy was complicated by her history of mental health issues, her social background, we'll call her patient 911 for her multiple calls to emergency services. So this patient presents as a 20 year old female hearing aid user requesting a cochlear implant evaluation. She was initially

diagnosed in 2006 when she was a young child and started hearing aid use shortly after that.

There's a pattern of lost to follow up and poor data logging throughout her history with us. For example, she was first seen in 2006 but then lost until 2012, then seen for a few visits and then lost until 2016. Over the years, multiple CI evaluations have been done, but this intermittent lost to follow-up precluded surgery from ever being scheduled. So I met her earlier this year with her mother requesting a cochlear implant evaluation hoping for some increased sound awareness. It's important to talk about her language first. She uses American sign language as her primary language, but she's had minimal support in this modality. So from school she was placed in a deaf and hard of hearing classroom that used total communication.

So she was well supported in that way. But from a social standpoint, from a family standpoint, her mother never learned sign language. So she has minimal communication in that way. Her and her mother communicate best through text messaging and part of what brought them in in 2023 was hoping for some increased sound awareness, some music perception, and since she's no longer in school, she's not seeing her friends that she's signing with every day and wanting some increased sound awareness with just the world at large. So you can see in her audiogram on the right here, profound hearing lost bilaterally. If we were just to look at the audiogram, she's a clear candidate, but we need to do some aided testing as well.

We started with an aided AzBio, which when bignarlary aided she had 0%, but we also wanted to be sure that language was not a potential barrier in this component. So we also did aided detection, which you can see on the bottom right. This is again, bignarlary aided in her best aided condition. She's hearing within that moderately severe range, this is not adequate access to sound in order for audition, in order to communicate. So again, based just on paper, she should be a clear cut cochlear

implant candidate, but we always have to assess our patients for more than just their hearing. So she also met with our speech language pathologist for an evaluation and in this way our speech evaluation based mostly on her age as well as her language was more of an informal evaluation, but I would like to quote a few portions of this assessment.

Specifically, patient reported that it is always hard for her to hear or understand when she's talking with only one other person. So not even considering talking in groups, talking in background noise. And patient reported that she almost never feels like she hears better with her hearing aids on. So she is very clearly able to demonstrate a lack of benefit from her amplification. Her mom also indicated some concern for those social supports I talked about earlier with those communication concerns, not being around her friends, not having people to talk to very often she had some concerns for her isolation there. We're very lucky that one of our SLPs here is fluent in a SAL and was able to do this evaluation that way and clearly communicate both with the patient and her mom without the need of an additional interpreter, as well as being able to speak to some of the cultural nuances of these language barriers.

Our SLP also referred to social work, as with the last case, also true here that social work played a really pivotal role in care coordination and collaboration with the rest of the team. She also did an extensive appointment just to talk about these realistic expectations about what outcomes could potentially look like. So for example, for this patient having a clear speech understanding is a very much unrealistic expectation, but having some sound awareness, maybe some music perception could be more realistic expectations. What makes this particular case complicated or so challenging is the patient's mental health concerns. There's a significant history of family trauma and this patient is also a victim of physical and sexual assault. She's also been identified as the aggressor in some of these calls.

To be more specific. In the past two years, she's been admitted to the emergency department 10 times for behavioral concerns or mental health events, and often presents with symptoms of different diagnosis codes, but all including bipolar disorder, depression, suicidal gesture, delusions and hallucinations, schizophrenia, and aggressive behavior towards others. So this in particular led to great concern among the team for both her safety but also for the safety of people around her. And we dedicated an entire meeting to discussing her candidacy and our team could not come to a consensus among ourselves. So we had to look elsewhere for additional resources, which we were able to find through our ethics committee here at the hospital. So we are lucky to have them, Clean Center for Clinical Medical Ethics, which started here in 1981.

They offer fellowships for both residents and nurses, but the committee includes attendings, residents, and nurses from across the medical campus as well as ancillary staff, support staff, attorneys, again from departments all across the hospital. So we were able to briefly summarize the case similar to what I've summarized for you so far. We've also discussed and reviewed relevant research and fielded a lot of questions about this case. So ideally, we would expect that implantation would increase her access to sound in order to provide safety cues, sound awareness, and ultimately improve her quality of life. On the other hand, the concern was this new access to sound would not improve her quality of life and may even trigger a mental health event, particularly the history of schizophrenia and hallucinations were particularly concerning.

Ultimately, the recommendation of the panel was to insist on a psych evaluation prior to implantation with planned for continued treatment throughout the implantation process. We also had a discussion about utilizing a capital D deaf provider or a provider who signs for these mental health services in order to have someone who understands the cultural components of this case, but also can understand maybe her frustrations with communication. This patient was seen by an outside mental health

center for insurance reasons we were not able to coordinate care in-house, but we were able to coordinate it with a nearby center, but we were unable to secure long-term care or psychiatric support. She has since been admitted for a longer term psych stay, but we plan to continue to follow this patient and her hearing aid use.

Luckily, since this meeting, we've also been able to secure some mental health resources that include providers who sign. So to review this was a patient with profound sensory neural hearing loss interested in cochlear implantation, but her evaluation was complicated by her social history and mental health concerns without established care in place. The CI team utilized our interdisciplinary care for our full evaluation, both with audiology speech as well as going outside of our team and utilizing our hospital ethics committee for additional perspective. We also were able to expand our network to include more local mental health resources as well as signing mental health resources that are not local, but are able to do some telehealth services for our patients.

So to wrap it up, I will hand it back to Michelle for our final case study.

- [Michelle] Okay, everyone, we're in the home stretch here with our last case study. The next patient is a 49 year old female who presented with sudden sensory neural hearing loss of unknown etiology to our clinic. She did not have any risk factors for hearing loss in her history and so we're calling her patient COVID since she presented with multiple covid infections before and during her care. And this combined with some other factors we're gonna consider made for a complex and rather unexpected trajectory after her hearing progressed to a bilateral profound sensory neural hearing loss, The patient initially reported contracting severe cases of COVID twice in 2020. In July, 2021 during a flight, she noticed unilateral tinnitus with progression to bilateral tinnitus over four weeks.

So this moved her to go to an ENT in October of 2021. And during that ENT clinic audio testing was completed and revealed a mild to moderate sensory neural hearing loss in her right ear and a mild to moderately severe sensory neural hearing loss in her left ear. But at that point when she was presenting with a 100% speech discrimination at that time. So she was fitted with hearing aids bilaterally soon after and was doing okay. And then in December contracted COVID again, noting that her right hearing suddenly and completely was lost during this covid illness. She now presented with a profound sensory neural hearing loss in her right ear while the left ear remained stable. So you can see her progression in the loss in the audiograms on the right side of this slide.

She was seen again by Dr. Imbery who treated her with a series of high dose steroid injections and an oral steroid taper over a few visits without notable improvement with her hearing. Thus an MRI was ordered, which was found to be unremarkable and found no retro cochlear pathology. So with no improvement, she trialed a bicross with no perceived auditory benefit. So then a cochlear implant evaluation was completed in March of 2022, which revealed her speech perception on her right ear was at 0% in quiet on the AzBio. So ultimately she was identified as a cochlear implant candidate and underwent cochlear implant surgery of her right ear in June of 2022. Of note, through all of this, the patient continued working as a healthcare worker and was masking was still a requirement for patients and staff due to COVID-19 guidelines.

She reported getting some benefit from her CI and was wearing it all waking hours. However, in August she noted a further decline in her hearing in her left aided ear and was no longer getting benefit from her hearing aid. An audiology visit revealed a now profound hearing loss on her left ear, which was a significant decrease from her last test with a word recognition of 16% as could be seen on this audiogram. So she was understandably distressed by the impact this was now having on her work performance and social life. So she scheduled an oral rehab evaluation, which was

completed in late August, and we began monthly oral rehab video visits. In the meantime, her hearing in her right ear continued to progress.

In September, her speech perception was 70%, in January of 2023, her speech perception on AzBio with her right alone was 89%. However, her left at that point had declined to 0% speech perception. So at that visit, a left cochlear implant was recommended and impedance testing of the right at that time was okay, except for a short of electrodes nine and 10. So those electrodes were deactivated, but at that point there were no other changes in performance observed or reported. She underwent left cochlear implant surgery in March and was activated in April of this year, and then things got a lot more complicated. So in April, 2023, she completed an audiology visit for her right CI check and at that visit she reported to audiology a sudden decline in her performance.

She felt that she only had very soft sound from her right ear. There was poor loudness growth found during the visit. She had reported that she had undergone a bout of illness soon after her left CI surgery and noted this change in performance soon after. Despite exhaustive mapping attempts by her audiologist, she could not hear anything more than a barely audible whisper level sound from her right implant and integrity testing completed with a Cochlear America rep present revealed open impedances and considering the lack of benefit and the sharp decline, ENT and audiology discussed and recommended revision. So an EXPLAN reimplant suspecting a soft failure that had occurred in her right CI. So she underwent that revision in June of 2023.

Interestingly, the explanted device was sent to Cochlear America for analysis and the device analysis report revealed as quoted here that there were short circuit electrodes during testing of the device. And so further analysis revealed these shorts were caused by physical contact of the electrode wire bundle to the electrode ring causing insulation damage. So in fact, there was a hard failure documented. The structural issue was not

revealed in integrity testing in our office. So it really shows the value of the collaboration between ENT and audiology and making the decision to EXPLAN this device in light of her sudden drop in performance and lack of improvement despite all these mapping changes. However, the saga continues since her right CI revision, she has not yet met her original implant benchmark in speech perception and has continued in slow progress with speech perception in right and left CIs, which has resulted in us having many conversations over what could be contributing to her slow progress.

To give you an example, her most recent audiology testing revealed that her AzBio in her right in quiet was 35%. And if you'll recall, in her original right implant, her best score was 89%. And in her left a left ear CI AzBio and quiet was 10%. So she's reporting it to the right CI to now be sufficiently loud but still robotic and the left is perceived as very high pitch despite all these mapping efforts and our very patients audiologist has made many changes in frequent reprogramming because she's presenting with changes in impedances bilaterally, which could put her out of compliance. And so these reprogramming with audiology put her back into compliance frequently. So as you can imagine, this journey has negatively impacted her quality of life and ability to navigate family and work life.

And this is represented in this following slides of the regression in her activities of daily living and functional auditory skills documented in our oral rehab treatments. If you'll recall, the first evaluation was completed after her left ear had begun to decline, but her right ear really was presenting with functional benefits. I'm sorry, I forgot to turn the slide here. Really her results were not surprising at that time with her original right implant. She was demonstrating good benefit from it at the time with some mild needs in the frequencies from two to 4,000 hertz that was shared with audiology to aid with programming, but she really was identifying the ling, had some close set word perception, and was happy with it at the time.

So treatments at that time focused on auditory training and role playing different situations, helping her with use of strategies for activities of daily living accessories, we talked about alerting devices, environmental modifications, gave her apps for closed captioning in difficult situations. But as you can see on this slide, her main concerns were related to not being able to lip read, phone communication, noise and groups, which would not be surprising this soon after activation. However, in contrast, after this whole change in her that the revision and the activation of her next implant on her left ear, this marked decline in perceived functional auditory benefit from both CIs. So at this point now, she isn't presenting with really close set identification.

She's having trouble with pattern perception in right versus left ear alone. And as you would imagine, you can see here now, she reports severely impaired quality of life, activities of daily living, and is now on short-term disability. During our therapy visits, she's revealed another COVID infection happened in July soon after her reactivation, and that she's going through menopause and receiving treatments for that. So this information was shared with the team and you can imagine that going from a hearing family to a person with a profound sensory neural hearing loss bilaterally now on disability in less than a two years time is very distressing. And during our sessions, she revealed that she's dealing with increased anxiety and depression.

So our team connected her with resources for mental health and also she wanted some connections with free a SL courses due to her change in communication effectiveness at this time. And as a result, we shifted gears with her oral rehab treatment plan. We've adjusted the focus to more of a counseling and support and talking through accommodations, modifications to her environment to help her navigate life with her husband and teen daughter given her poor speech perception at this time, which is a contrast to our earlier goals of just refining her really good speech perception skills with that one implant. So wrapping up here, it's hard to identify exactly what variables we're

contributing to this trajectory yet the running theme in our visits was that she was reporting menopause treatments for that, multiple covid infections in addition to this heart failure.

So this prompted us to review the literature that's out there, discuss it as a team to see what would be influencing her outcomes. And while we can't say definitively, there are some limited articles that touch on how hormone irregularity can result in impedance fluctuations, Some studies related to COVID and sensory neural hearing loss and even CI failure are outlined in these next slides. But for the sake of time, we won't go into the details of that. But these articles are fully cited at the end of our slides here that should be available to you. So to summarize, this really has been a challenging case for a variety of reasons. I keep forgetting to put these slides up.

Sorry guys. So to summarize, this patient continues to have changes in impedances, so needs frequent reprogramming with audiology. So a big takeaway for anyone treating patients with hormonal changes or COVID infection history is to frequently monitor them by audiology to adjust for these changes given the anecdotal experiences we've had and the limited studies that are out there. We also see here an example of good communication with ENT, speech, and audiology in an effort to provide individualized and supportive care to the patient. And it's this one said to be continued, we have another co-treat planned and we're hoping that we can help stabilize this patient further. So now I'll turn it over to Dr. Sun to summarize the takeaways from these case studies and presentation.

- [Sun] All right, thank you so much, Michelle. So our team hope you to take away a few things from this presentation. So first, let me change the slides really quick. Alright. First ID team provides comprehensive plan of care for patients, which really facilitate

their rehabilitation process to reach their best outcomes. Regular team meetings are effective way for updates on cases and idea sharing to aid in patient's care. But besides that, you can also use real-time chat features on Epic or staff messages, emails. Just remember that communication will never be too much for ID teams. Over communication actually makes sure that all providers are on the same page when it comes to each case. ID team do not look all the same.

The amount of available resources may vary across centers and practices, and we have to work with what we have. If you have limited resources, it's important to think outside the box to provide comprehensive care for patients. And most importantly, don't be afraid to ask for help from your teammates or even colleagues from the other centers. Thank you so much everyone for attending this presentation. Here is the full list of team members of our CI program and here our references on these two pages. And we are open to any questions or comments.

- So if anybody has any questions, comments, you can please throw 'em in the chat. They'll be more than happy. Oh, that definitely works. I know we talk like crazy. All right. Yeah, so it definitely takes a village to put this all together. It's not just an audiology thing, it's not just a speech language pathology surgeon, it takes a lot of different disciplines to make this all work effectively. Really happy with what we've accomplished here. And like I said, it's continuously improving streamlined program as we keep going. And we know that we're really fortunate in having some of the resources that we have that others don't. I thought having a social worker was a very common thing until very recently, and I cannot express how much she does for our team.

I know we've brought it up several times during this presentation, but she goes to bat for folks, checks on people every single day. And if you could have a social worker on your team, it's incredible. But just trying to bring it all together and make sure that

we're all listening to each other is a very valuable tool to have and making sure that nobody outranks each other when it comes to the decisions. It really brings the morale of the team together and we know that we're all contributing to a common goal. So we're really thankful that you join us on this whole process. Be more than happy to include our email address on the posting after it goes up.

You feel free to contact us with any questions you may have. And yeah, thank yo for joining us today.

- [Moderator] Thank you so much. Dr. Sevier. I'll see if there's any other comments or questions come through here in the last moment. But I'd like to take this time on behalf of AudiologyOnline to thank all of you for your time and your expertise. I know that the Grand Round series is a very special one for AHO. We put it on every year, and this is the reason why we are so delighted to hear what's going around the US, and you all are really truly at the forefront of CI care for all our patients. And really all of the comments I have been coming through is just thank you so much. We really appreciate the presentation. Here's another one that says teamwork equals dream work.

So I just wanna thank you all for spending an hour and a half with us and we hope that everyone on AHO has enjoyed this presentation and can take this back to your own clinic. I'm gonna apply it. So that'll conclude today's presentation. And farewell everyone. Thank you.

- Thank you so much. Thanks for having us.