

**The following is a transcript of the virtual learning opportunity “Unilateral Hearing Loss in Children” that took place on June 4, 2019 in Virginia. The transcript was provided to Virginia Hands & Voices by Virginia Relay. Call moderator was Terese Urban. Presenter was Dr. Ann Marie Tharpe.**

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| We'd like to test the remote conference captioning before we begin. Ah, there we go. All right. We've got everything ready. We'll give it another five minutes. For those who have joined us, if you could just please be patient. Thanks for joining early. We're going to wait until noon to get started here. Gosh, it's so quiet, I should have set up some music to be played while we're waiting. Thanks, everyone, for joining us. If you could just give us a few more minutes, we're going to wait until everyone has the opportunity to join us. To everyone who is just dialing or joining us, thank you. You won't hear anything right now but you've come to the right spot so we're going to give it a couple more minutes until we get started. And if you can please make sure that you're microphones are muted, and you can also turn your video features off. Hi, everyone, this is Teri Urban with Virginia Hands and Voices. If you for joining us. If you could go ahead and mute your microphone, please, and turn your video off, that can all be done at the bottom of the screen. You'll see there's a little tool bar at the bottom of the Zoom platform and you can choose mute or start/stop video. And we'll go ahead and get started shortly here. All right. This is Teri. We can hear someone in the background. If everyone joining us, if you can make sure to mute your microphone on Zoom, or on your phone, regardless of how you're calling in, that would be wonderful. Just so we can eliminate any background noise. And if we can just go ahead and double check to make sure everyone has their microphone muted, that would be wonderful. We're picking up some background noise. All right. Well, it is 12:01 so I am going to go ahead and get started. Good afternoon, everyone. Thank you so much for joining us. We know how busy everyone can get, especially at this time of year when the school year winds down and so we appreciate you taking the time to spend the afternoon with us today as we meet via Zoom. If everyone can go ahead and just take a minute and make sure that their phones are muted, we're still hearing some children in the background, which is wonderful. But, if we can just go ahead and make sure that your phone is muted, I see there's someone who has joined us via phone, and your microphone is not muted. If you could please go ahead and mute it. I think that was it. Perfect. All right. So, let me just -- oh. We can just make sure to get everything muted. That would be wonderful. We can still hear some background noise and I don't believe we have the capability to -- if everyone can please go ahead and mute their phones or their computers, we're hearing an announcement in the background right now. (it will begin on June 17th.) All right. Whoever S there's something talking in the background saying that something is going to begin on June 7th or 8th. Can we make sure to get all the microphones muted and the phones muted, please. All right. There we go. Thank you. All right. So, let's keep moving on. So, let me just take a quick moment and introduce myself. My name is Teri urban, I am the Chair of Virginia Hands and Voices and I'm also the parent of three children. My oldest daughter is nine years old and profoundly deaf and I am joining today from outside of the Richmond area. We also have Dr. Anne Marie Tharpe, who is joining us this afternoon, and she is calling in from Nashville, Tennessee, and I will introduce her in just a moment. So, this is the first time we're using Zoom to b present a virtual learning opportunity. It seems to be going smooth. We know that we have the remote conference captioning that's writing as well. For those who are using the Zoom platform for the first time, you'll see that we have an interpreter doing video relay interpreting and you have the ability to move that box to see the interpreter and move it on your screen. For the folks that are utilizing the remote conference captioning, that has to be opened up in a separate window. We can just make sure that we have all of the microphones muted, if you're dialing from a phone, if your phone is muted, that would be wonderful. So, for those who aren't familiar with our organization, welcome. Virginia is a Hands and Voices, I'm sorry, Virginia hours is a nonprofit, parent-driven organization and we are dedicated to supporting children who are deaf and hard-of-hearing. What really makes us unique is that we're unbiased about communication choices, and believe that the choice a family makes is the right choice. So, we strive to provide resources to families and professionals across Virginia, and this is one example how we accomplish that. So, with that, I am now pleased to introduce Dr. Anne Marie Tharpe, who is the provider and Chair of speech and sciences at Vanderbilt University in Tennessee. We have the -- and expertise with unilateral hearing loss in children would be a wonderful topic to discuss here in Virginia. So, Dr. Tharpe, we are honored to have you present to our audience this morning. Thank you very much for joining us. Everyone should be able to see the slide show that we will go ahead and do our presentation off of, and with that, I am going to mute my microphone and turn it over to you, Dr. Tharpe. >> ANNE MARIE THARPE: Great. Thank you for that introduction. I'm very happy to be with you today, happy to be with Virginia Hands and Voices and I'm very appreciative of the invitation. This topic of unilateral hearing loss in children is one that I have been working on for several decades now, started early in my career. And it has become popular, again. So, it was popular at the time when we started looking at this many decades ago and it has had a renewed interest in this area. And in fact, I'll let you know I was in a meeting a couple of weeks ago in Germany and we were talking about the terminology, unilateral hearing loss in children, and thought, this is, we really could just call it unilateral hearing in children, which might be a more apropos term for this type of hearing. >> Hold on, Dr. Tharpe. This is Terry. I don't mean to interrupt but we have lost your slide show. >> ANNE MARIE THARPE: Okay. Well, it's still here in front of me. I don't believe anything has changed. Was it up and then stopped while I was speaking. I didn't touch anything while I was talking. Let me -- I'm just going to forward, do you see the next slide or is everything done? >> Never mind. We've got it up. I'm sorry. >> ANNE MARIE THARPE: Great. No problem. This is the schedule, if you will, my agenda for this morning or this afternoon in your case. I'm going to provide a little bit of background on this topic, talk about the outcomes that we have seen for children with unilateral hearing and the current management options and then a little bit about what work still needs to be done moving forward. So, for the background, just so we are all on the same page, and understand what is meant by unilateral hearing loss, for those of you who can read audio grams, which is probably most of you at this point, you will see on the left hand side that there is normal hearing in the left ear represented by the blue marks and then there is just a little bit of loss in the high pitches for the right here but if you look at the right audiogram, you'll see that there is a severe hearing loss for the right ear in this case and yet, both of these individuals with this type of hearing would be considered as having a unilateral hearing loss. So, my point here is that it is mostly about the configuration of the loss, as opposed to the degree of the hearing loss that defines it as a unilateral hearing loss. Now, more b recently, if someone has a more significant hearing loss in one ear, such that it is considered nonfunctional. That has been referred to as single-sided deafness, there's also been a term lately, LUHU, which is limited usable hearing unilaterally as well. So, as you can tell already, in the first few minutes of this presentation, we are still wrestling with how to talk about this type of hearing loss. So, when we talk about limited usable hearing in one ear, we're talking about either profound hearing loss, permanent hearing loss, or an ear that has very poor word recognition or understanding so it doesn't matter how significant the actual audiogram looks, it's more about word recognition. And then sometimes, there is simply a marked intolerance for amplified sound. In other words, they have some hearing loss. Perhaps they are trying to use the hearing aid but they cannot tolerate the amplified sound. Any of those characteristics would be referred to as unaidable hearing in that ear. And that becomes important as our conversation continues this afternoon. So, let's look at the prevalence of unilateral hearing loss in children. As you can see here, in infancy, we are talking less than one infant per 1,000 have, are diagnosed with unilateral hearing loss. But, by the time children reach school age, we're looking at three to six per win hundred and then by adolescence, 14 per 100. So, you can easily see the growth in the prevalence of unilateral hearing loss over time and thus, I think this, again, is a good example of why we want to continue to monitor the hearing of infants and young children over time, with we will see the cause, we have no risk factors in somewhere around 50 percent of children with unilateral hearing loss. And those are recent numbers. In other words, we have not gained an understanding of the causative factors of unilateral hearing loss. There are no specific 59 that are associated with this type of loss. Now, what we do know is that in children who have a profound hearing loss in one ear, we find what is referred to as cochlear nerve deficiency in between 25 to 50 percent of the cases of profound s unilateral loss. We'll have cochlear deficiency. This is important when we consider the types of management strategies because that child has this type of nerve deficiency, they would not be a candidate for a cochlear implant, for example, or really any other hearing technologies that try to capture and make use of any residual hearing in that ear. We also can see that enlarged vestibular aqueduct is responsible for around 23 percent of unilateral hearing loss. For those of you who are not professional in the field, this really just refers to a cochlear abnormality in the structure and that's about 25 percent. Now, if we look more closely at enlarged vestibular aqueduct, we have some interesting findings and I know this is a complicated slide so let me pull the information that I think is of most interest for you out of that slide. >> And Dr. Tharpe, this is Teri. I'm sorry, I don't mean to interrupt but I forgot to mention, we do have a chat box in this application. If anyone has questions during the presentation, if you could just go ahead and enter them in the chat box, you can get to that at the bottom by clicking on the chat icon and I'll go ahead and monitor that throughout the presentation. I'm sorry, please continue. >> That's great. Thank you. So, of the children who have severe to profound unilateral hearing loss and who received X-rays, radiology, to look at their ears, 41 percent have abnormal temporal bone anatomy. Most of the time, the most frequent abnormal temporal bone anatomy was enlarged vestibular aqeuduct and it was most common that enlarged vestibular Aqueduct would occur in both ears, not just one. So, even though there was hearing loss in only one ear, these children had this abnormality in both ears. So, for those who had this enlarged vestibular aqueduct in one ear, it was very common, more than 50 percent would progress to having hearing loss in both ears. So, the point here, of course, is that when we see children who have a unilateral hearing loss, we want to be sure to continue to monitor this children even if it's a profound loss and we think, it's already profound. What is there to monitor. Well, because we want to continue to monitor the normal hearing here to ensure that it is not also getting a hearing loss over time. So, let's look quickly at the educational outcomes and psychological outcomes for these children with unilateral loss. And I'm going to take us back. Many of you are not old enough to remember in 1970s textbook in audiology, but I am, and there was a quote in one of these very early editions of this book, which was widely used in the training of pediatric audiologists, and the quote, as you see here, is audiologists and otolaryngologists are not usually concerned over such deafness other than to identify its etiology or its cause and assure the parents that there will be no handicap. That was our understanding at that time. I am not insulting these authors. They were fine professionals. That is what all of us bled at the time and as a student, that is what I learned. However, we also knew that there were advantages to having hearing in both ears. That is not by accident that individuals have hearing in both ears. There is an advantage to that. One is that we are able to determine the direction which a sound is coming by having hearing in both ears, so, sound coming from one side is going to be a bit louder to that ear where the sound is coming from than to the opposite ear. And it's also going to get to that ear. Sound will get to that ear closer to the sound faster than it gets to the opposite ear and those cues let us know where a sound is coming from. So, not having hearing in both ears can be a safety issue for young children. For example, when they are learning to cross the street, so children with loss in one ear need to be a little extra careful, if you will, before crossing, and look both ways and then look back again one more quick time before crossing to be very safe. We also know that having two ears will help us when listening in the presence of background noise. Having two ears allows us to concentrate on the voice that we want to hear. If one only has one ear, then both the background noise and the desired signal go to just one ear and it's harder for us to separate the background noise from the desired voice. So, one of the very early findings that we saw when we were looking at unilateral hearing loss in children back in the 1980s was that identification of unilateral hearing loss primarily occurred at five to six years of age or later. And that was because children weren't getting their hearing screened until they were entrepreneuring school age. Of course, now, we have newborn hearing screening, and we would expect that that change would occur with the screening, and now we see that 43 percent of children with unilateral hearing loss today are identified prior to six months of age. So, that's very good, of course, it's not 100 percent because as I mentioned earlier, some of these children don't get their hearing loss until an older age. Now, we also thought that because these children are being identified earlier, that might help us in terms of educational outcomes that now that we know about the problems associated with unilateral hearing loss earlier, preferably in the newborn period, we can provide intervention that would result in good outcomes. However, what we have found is that the academic difficulties experienced by children with unilateral hearing loss are about the same today as they were back in the 1980s when we first found out about this. So, remember the textbook told us there won't be a problem with unilateral hearing loss. Just be sure to provide the child with 11ial classroom seating and they'll be just fine, but, in fact, that was not the case then and it is not the case now. We are still finding that about 50 percent of children with unilateral hearing loss have academic difficulty. Some of them require grade repetition and of course that varies from school to school, depending on the philosophy of the school about holding children back a grade. But, we also know that about 13 percent have individualized education plans because of some academic or speech and language problem. So, in total, around 50 percent with these academic difficulties. And we can imagine how difficult listening in a classroom setting can be. In today's classrooms, they are much more interactive than they used to be, with children breaking up into different work groups and so different discussions going on at one time and recall what I said about the advantages of having two ears being able to better hear background noise. This type of classroom, as you can imagine, can be very challenging for these children. But, it's not just school age children who might be having difficulties, although that's what we thought some time ago. Now we know that also unilateral hearing loss in infants and toddlers can impact their speech and language development. This study by Leeu showed us that the average age for the first word was around 12 to 13 months and that is within normal limits. However, the average age for putting two words together in an utterance was delayed to almost two years of age. Additionally, Kishon-Rabin did a study and found that 41 percent of faints with unilateral hearing loss showed delays in their preverbal delays. So, this is a problem that's happening very early in childhood even before children get into a classroom setting. Another study that I found to be very compelling is this study by Lieu and they were looking at school-age children between six and 12 years of age with unilateral hearing loss. There were 148 of them. And they looked at their oral skills, spoken language skills, and their written language skills, and they found that the children with unilateral hearing loss had poor language comprehension and expression overall than their normal hearing siblings. This is an especially powerful study because they controlled for the variations across families in terms of what the language in a family household might be because they use these children siblings as part of the control group. Then we also know that it's not just the type of hearing loss that impacts the inner ear, also children have permanent reduction loss similar to those who have cochlear hearing loss and in this study by Kesser and colleagues, again, they found close to 50 percent of children, 50 to 60 percent required extra academic help and speech and language intervention. So, back in 2005, we were quite concerned about this issue of unilateral hearing loss. That was a time that we said, okay, there have been several studies, we know there are problems with these children and the Center for Disease control and Marion Downs Hearing Center pulled together a group of experts for a couple of days for us to talk, present our research and look at whether or not we were doing our best to identify, assess, and intervene with these children. So, that was a big step and you can still go to the website on the bottom of this slide to access the proceedings. You can download those for free from the CDC so you can see what we were thinking back in 2005. However, since then, we still haven't been able to figure out why these children are having trouble. We didn't know then and we do not know now exactly why these children were having difficulty and what to do about it. So, I'm going to talk with you about a topic that has become more current, has gained more attention recently, and that has to do with listening effort and fatigue. There is growing evidence that children with hearing loss have to exert more effort to listen and when they exert more effort to listen, it causes fatigue. This is in all children with hearing loss. Right now, I'm not just talking about children with unilateral loss. There are several studies that have come out that have shown that children are exerting more listening effort. There are studies here in the United States, and these involve not only measuring listening efforts, experimentally, but also involve doing questionnaires with children to measure their fatigue and they report whether or not they have more fatigue than children with normal hearing. There are a number of studies that have been done, including those here at Vanderbilt but also have come out overseas in Europe. So, this topic is gaining more attention lately. Now, listening effort, as I've described, involves the attention required to understand speech. Now, very simply, if we assume that we only can exert so much effort. We've got a limited amount of effort that we can use. If we are asked to do two things at one time, it is reasonable to expect that the second thing we have to do is going to be more difficult to someone who doesn't have to exert energy. In other words, if you're asking with hearing loss to listen to the teacher and that's harder, then it's going to be even more hard for this child to exert effort around all of the other things that they are doing like having to pay attention to what their fellow students are saying, having to think about or use their cognitive skills, what's going on for a question, perhaps, that they are being asked, and it also depends on how difficult it is to listen. So, if the classroom acoustics are poor. If there are chairs that are scraping across the floor. If there are cars outside of the classroom. That can also make it such that they have to attend harder than their normal hearing peers. And then, of course, as I mentioned, this can lead to frat egg. Now, there's not an accepted definition for fatigue. We all know about physical fatigue. If we go out and try to run 5 miles, we're going to be fatigued at the end. But, there is also mental fatigue where we just get tired. Many of us have had to close a textbook because we're worn out, we have to take a break, go back, get a cup of coffee, and look at it again. Fatigue can also be subjective, as I mentioned. Perhaps someone is just reporting. I feel tired when I have to listen over a long period of time. Or there can be objective measures of fatigue. There is something in our saliva and in our blood called cortisol that increases when we are fatigued so that would be an objective measure of fatigue. And when we have ongoing severe fatigue, then that results in inattention, poor concentration, distractibility, et cetera. Which might be contributing to the difficulty that these children are having in school. That would make, I think, sense, to say that perhaps fatigue is one of the factors that could be contributing to the academic difficulties of these children. Now, originally, the studies on fatigue were isolated to looking at adults with hearing loss so I want to share with you first those results. So, this is a study with hearing loss in two ears of adults. And what I wanted to point out to you is that in this study, there was no association between the degree of hearing loss that an individual had and the amount of fatigue that that individual reported. There was, however, a strong relationship between how much difficulty an individual reported having in terms of their hearing and their fatigue level that they reported. In other words, if they felt, if the individual felt they had a lot of difficulty hearing with a higher level of fatigue but not the actual degree of hearing loss. So, this group, Hornsby and his colleagues wanted to look at reports of fatigue in children, so they took potential children with hearing loss and this was children who had hearing loss in both ears and they matched them with children who had normal hearing. And then, they had them rate their levels of fatigue on this particular tool called the Peds QL multidimensional fatigue scale. They all had normal hearing but they did have different levels of language ability. This is what they found. As you can see, there is more fatigue indicated on the vertical axis and then on the horizontal axis in different areas they could rate their fatigue in terms of rest or cognitive fatigue overall. What we're seeing is that children with hearing loss reported significantly more fatigue than their normal hearing peers in this study. Now, why is this important? Well, the fatigue scores reported were greater than those reported by children who had cancer, rheumatoid arthritis, diabetes, and obesity. So, that's a large amount of fatigue reported by these children. Now, similarly to the adult findings that I just reported to you, there was no association in these children between their fatigue ratings, what they reported as having in terms of fatigue, and their degree of hearing loss. So, it didn't matter if they had a mild hearing loss, or a severe hearing loss. They equally reported fatigue across those levels of hearing loss. So, that was of great interest to us. Now, I mentioned to you that these children did have different language abilities, and so, if we looked at the language abilities of these children as compared to their cognitive fatigue ratings, we did find a significant finding here. So, the poorer their language, the greater their level of fatigue. Again. The poorer their language, the greater their reporting of fatigue. And we assume that that is because, as we know, if we don't hear something perfectly clearly, we often can fill in the gaps because we have a good sense of language because we know what makes sense to fill in the gaps but if they have poor language, they are not able to do that. That is one of the factors that contribute to their fatigue. So, having found that the degree of hearing loss was not related to fatigue, we wanted to look at it. If they have normal hearing in one ear, what is their perception of fatigue. And this study was conducted by Bess and colleagues, it hasn't been published yet, but they found three interesting findings. They had adults with unilateral hearing loss, and they reported equivalent amounts of fatigue as allot adults who have hearing loss in both ears. So, the black bars here are adults with hearing loss in two ears. The lighter bar are adults who have unilateral hearing loss and as you can see, there is not much difference in their fatigue score. Then, they had parents rate on behalf of their children how much fatigue they thought the children had and as you can see in this middle graph, the parents of children with unilateral loss and with bilateral loss reported almost equal amounts of fatigue. And on the bilateral, you can see that children with hearing loss themselves were compared to bilateral and reported almost equal amounts of fatigue so again, children with unilateral hearing loss have more fatigue than normal hearing individuals and it is equivalent to individuals with hearing loss in both ears. So, what we are trying to do now that we have found that fatigue seems to be an issue for these children is that Bess and his colleagues are creating a scale or a test, if you will, that helps us assess how much fatigue children experience. This is not published yet but I just wanted to let you know that the team here at Vanderbilt is working hard to try to create this tool that would be helpful for parents and teachers and other interventionists in terms of helping children who have fatigue and once we can identify those children, then we will be able to take the next step of saying, okay, what do we do with these children in the classroom setting? Perhaps they need to have more breaks at school, that kind of thing. So, let's talk about the management of these children. So, there are several hearing technology options for children with unilateral hearing loss. If their ear is not unaidable, as we defined earlier, then they may be able to use a traditional hearing aid on their unilateral loss. They can use a contra lateral signal or cross-hearing aid. This is a hearing aid where a microphone is placed on the poor ear and the signal crosses over to a normal hearing ear so they can pick it up. Then there is a remote microphone system that is better known as an FM system or more currently now, DM systems. And these systems are commonly used for children with hearing loss in school settings and can also be used for children with unilateral hearing loss and now there are places that are implanting children with unilateral hearing loss using cochlear implants. So, there's a big question, which one is right for which child. Well, Cincinnati children's hospital came out with this chart where they were recommending that if a child has severe to profound hearing loss, they should first try an FM system because that severe to profound loss is probably not aidable. In other words, it would not benefit from a traditional hearing aid and then they can consider and talk to the patient or the parents about using a hearing aid but the first thing they want to do is get an FM on it. If the hearing loss is mild to moderately severe, then a hearing aid is something to be considered, first and foremost. And then they should consider the use of an FM system in a classroom setting that could be coupled to their hearing aid. So, there are a lot of considerations for which type of device to use for these children. So, degree of hearing loss is one of the considerations. Is the ear aidable as we have previously defined. What is the history of this child hearing. Do they have ear infections or what they call otitis media with effusion. If that is the case, we might want to be more aggressive with the use of technology because if they have a lot of ear infections, that means that the normal hearing ear might have reduced hearing from time to time because of the infection. So, that is another consideration. What about the environment the child is in? Are they in daycare where it's very noisy. Are they at school where perhaps a teacher could use a microphone and directly communicate with the child or are they in a child home environment. What about the communication factors? Is the family ready to accept hearing technology? Are they concerned about their child development? Are they seeing any problems with their child? And then the child factors individually, what is the developmental status of the child. And is the child staying at home in their parents' arms much of the day because they are not yet walking, that kind of thing? Or are they older children who already are demonstrating speech and language problems or academic difficulties. So, all of these need to be considered when making decisions about technology use for these children. An especially difficult factor is that mothers of children with mild hearing loss, and that includes unilateral loss, often report that it's hard for them to accept the I had o of a child with this mild loss needing amplification because their child seems to respond to many sounds with or without amplification so they don't see the obvious benefit. And so despite the fact that these children are at risk, if a parent cannot see a problem, it's very difficult for them to be convinced that a child needs further assistance. Excuse me. I needed to cough for a second. Okay. So moving forward. In 2017, one of the hearing technology companies, Phonak sponsored a conference on unilateral hearing loss in Philadelphia. Recall that the last big conference on unilateral loss was in 2005, so, this was long overdue. These are the individuals who were involved in that conference. You will see here, a prominent member of Hands and Voices was on this committee so we were happy to have hearing input as well as input from audiologists and other professionals around the world. We are hoping that our consensus paper that came out of this meeting will be published in the near future. But, following the conference, we took into account all of the research that was present over the time of the conference, and we put together this practice parameter or guideline for how we should assess and manage unilateral hearing loss and children. These are the various topics that we considered so we wanted to know the best Waugh to identify and manage and assess these children. We also wanted to know, what are the medical tests that should be done for children who have unilateral hearing loss. Recall that I mentioned to you that some of these children have abnormal cochlea. Their anatomy is not normal so we want to be sure to know that because that can impact decisions about management, as I said earlier. And then we had an entire section on technology, and why someone might select one particular technology over another. There was a section on information counseling for families. We are also going to pull out that section and expand it in a separate publication that will be helpful for family. It is designed to b an interpretation, if you will, of the larger consensus document that has worded specifically to help families make their way through this process and then we have a section on our priorities for research, in other words, what is left that he wanted to know. So I just want to share quickly with you an overall algorithm of what we came up with. You see here that it is quite large p again. And again, I am going to pull out the key factors for you. We want to know from the very beginning, what is the cause of the hearing loss. Do we know what the cause is? If we don't know what the cause is, then they need to see a physician to go through the various tests that we think is important. We also know that there's a balance issue. Are there concerns about that? If so, we want to be sure they receive an appropriate assessment in that area. Are there hearing, learning, or speech and language concerns. Now, of course, we've already said we know there are hearing concerns, but what I'm referring to here is more functional hearing problems. Are there problems that the family has identified, or a school has identified, where children are having difficulty in their listening environments? And if so, there are a series of functional hearing assessments that can be done to help. If they are having academic problems, there are a series of hearing academic screenings that can be done. For example, the sifter is a test you might be familiar with. Or a preschool sifter. And we list all of those tools that can be used within that document. Are there speech and language concerns? If so, we, an audiologist can do a screening and if there are problems identified, then they should be seen a by speech and language pathologist who can better define what those problems are, it is in that context we want to consider the available hearing technologies that might be helpful. So, what I've defined for you in terms of, are individuals eligible for technologies, then we start thinking, individually, again, what are the tools or what are the options available in terms of technology. So, again, the hearing aid or a cross device, a remote microphone system or a cochlear implant. So, is the ear aidable? Is the child able to handle a cross-hearing aid? Because with a cross-hearing aid, remember that the sound from the poorer ear is being routed over to the good ear. That means they don't want to be sitting in a place where there's a lot of noise going to their poorer side because it's going to be routed to their better ear so that requires a child to be somewhat sophisticated in terms of managing that hearing technology. And again, what is the child's listening environment? Do they need a remote microphone system? And if a cochlear implant is being considered, do they have cochlear nerve deficiency because if they do, a cochlear implant is not the best option for this child. So what do we know? We know that a significant number of children with permanent unilateral hearing loss have difficulty in academic settings, in laboratories, when we conduct studies. We know that parents and teachers have reported these difficulties, and we know that children themselves have reported these difficulties. But, what is it that distinguishes these children from these children. What is it about certain children that have difficulty that is different from those children who do not have difficulty? In other words, what are the contributing stressors? Is it the listening condition that they are in? Is it listening effort or fatigue? Is it a lack of early or aggressive intervention? Is it that their amplification or their hearing technology is not effective? Is it that those children who have difficulty also have ear infections, recurrent ear infections, that reduce their hearing even more. Is there a problem because of having hearing loss in one ear, is there a problem with the development of the brain networks that involve our learning and our language together or is it a problem with the cause of the hearing loss? So, for example, children who have hearing loss because of cytamegalovir us. CMV is a very common infection afterbirth. It is more uncommon if they are infected congenitally or because their mother was infected and then they are they are affected at birth. Children who are affected with CMV at birth can also have numerous problems outside of just hearing. They can have hearing problems and neurological problems so maybe it's the etiology, we don't know. How do we figure that out? Well, there is there are a lot of things we need to learn and as I mentioned, the document that we hope will be published soon has prioritized research. We want to know more about these children with unilateral hearing loss and when these reports are made, we want to know, are there differences based on gender? Is there a difference based on which ear, the right ear or the left ear, has hearing loss? Is there a, is the age of diagnosis a factor, etiology. There is a lot of work to be done. We don't have all the answers. We don't know, today, when we identify a baby with unilateral hearing loss, whether that is a baby who will be very successful in school, who will have good language, or if it is a child who will have difficulty and will struggle. And that, in my world, is the biggest question that we need to answer today. So, I thank you for your attention. And I'd look forward to addressing any questions that you might have. >> Well, that was wonderful. This is Teri Urban. Thank you, Dr. Tharpe, for such a wonderful presentation. I'm sure everyone understands now why we felt compelled to share this data. So, let's open up for questions. We have a few already. If anybody has any other questions, you can do so by clicking on the icon at the bottom of the Zoom platform. The first one is going back to word recognition score. How do we apply those percentages through the classroom setting. >> ANNE MARIE THARPE: It is difficult. So, I think what you're asking about is, do we know in a classroom setting what a child's speech perception might be? In terms of a percentage? Is that the question? >> Yes, that's the question. >> ANNE MARIE THARPE: Okay. So the reason that's difficult is because the classroom settings are so fluid. In other words, a child's understanding of words is going to change if they are farther away from the speaker or if there is more noise from the classroom. But, one thing I can tell you is that if a child's word recognition is very par when they are getting a hearing test, then it's not going to be better than that in a classroom. So, for example, if a child under earphones in a sound booth in quiet understands 50 percent of the words that are being spoken. They will not hear better than 50 percent, and they are likely to hear worse when noise and distance is added in the classroom. >> Wonderful. All right, thank you. We have another question. And it says, when you talk about unilateral hearing loss in children having academic difficulty, do you mean children who are unaided? Are you referring to children who are unaided? >> ANNE MARIE THARPE: That's a great question. I am referring to both. So, one thing that we know is that we can improve listening for children with any type of hearing loss. And we do that obviously by using a hearing aid or using an FM system. We can improve their hearing. But, what we have found is that even when we improve their hearing, we are not improving the academic outcomes on average. That's not to say that an individual child once we put an FM on it that their academic performance won't improve, it might. But, on average, children's academic performance has not improved with technology. >> Okay. Thank you. We've got two more questions and about five more minutes. Next question is, can you recommend a few functional hearing assessments? >> ANNE MARIE THARPE: There are a couple. For young children, ELF is a good tool. There is the preschool sifter, SIFTER. There's also a sifter for school age children. And those last two, the preschool and school-age sifter are tools that are completed by teachers. The ELF is completed by a parent. There's the, let's see, the functional listening assessment. That was developed by Cheryl Decandi Johnson. And those are a few. Once this tool comes out that I mentioned to you that is coming out, the consensus statement from the conference, we will list that in that document so I hope that will be available soon. >> Okay. Wonderful. Looks like we've got two more questions and they're both really good so hopefully we can get to them. The next one is, can you expound on the last slide about connectivity between brain networks involved in EFD cognition language, comprehension, et cetera. >> ANNE MARIE THARPE: Yes. So, we know that our brain connections are made because they are stimulated. And, if they are not, if our brain is not stimulated by what it's supposed to be stimulated by, then other areas of the brain take over. So, let me try to simplify that. If an individual is blind, there are, or, back up. Sorry. In a brain, a normal brain, there are areas that are designated for vision and for hearing and for tactile stimulation and other things. So, we know those areas of the brain are dedicated real estate for those functions. But, if, for example, someone is blind, then that real estate just sits there for a little while and it's not being stimulated because the individual is blind, and so, there is not any activity. So, the neighboring areas of the brain see that real estate sitting there not being used. And they say, we can use that. So, hearing might take over part of that vision portion of the brain. And that's why sometimes we say people who are blind can use their hearing so much better than someone else, or someone who is deaf seems to use their brain. So, is there something about that that can impact the overall function of the brain in such a way that it impacts their learning and cognitive skills and their executive function. I hope that was clearer. >> Okay. Great and another question here. Someone is alluding to the fact that finding someone who is a professional with a good knowledge base about pediatric loss can be a challenge in itself, but, do you think in the future there will be more focus in these areas in education of professionals before they begin practicing? >> ANNE MARIE THARPE: Well, I sure hope so. (laughter). I've been working in this area for a long time, and I hope that the word is getting out that this is an important topic. One thing that I have been working on and others have now been working on is training speech language pathologists, educators, and audiologists together as an interdisciplinary group so that they can communicate better and work better in better partnership. So, in our graduate program here at Vanderbilt, we have a specialty training in hearing loss. In pediatric hearing loss, and we train all three of those disciplines together. Since we started doing that, I know a number of other Universities have done that and have, in fact, contacted me and said, can we see your curricula. I am happy to share my curricula with others. I want all Universities to do something like this. And if I may say, I see that someone just commented and I agree with it that ENTs also need to be included in this training. I agree 100 percent. We also here at Vanderbilt have our ENTs right next door and we do communicate well together and try to train them together. I do a lot of talks for otalaryngologists as well and I know my colleagues do. But I also agree that the ENTs need to be better educated on this topic. >> All right. Wonderful. Well, we are two minutes past the hour, so, that concludes our virtual learning opportunity today. I just want to thank you again, Dr. Tharpe, so much for sharing your expertise with us. That was wonderful. This is the second time I've seen your presentation and I just can't say enough good things about it. I'd also like to thank civic -- for providing the video relay interpreting today and then the Virginia Department for the Deaf and Hard of Hearing and Virginia Relay for providing the remote conference captioning through Hamilton Relay. Thanks to these two agencies, we were able to make this call accessible to all. And lastly, thank you to everyone who has joined us today across the Commonwealth and supporting Virginia Hands and Voices. We look forward to connecting with you again soon. Thanks, everyone, and I did put this in the chat box but we will, we have recorded this presentation and within the next couple of days, we will work on getting it uploaded to our website so it will live there, and it can be viewed at your leisure. Thanks for joining us and have a great afternoon. (Session was concluded at 12:03 PM CT)  |  |