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Well, good day, everyone. My name is Will Eiserman, and I want to welcome you to today's webinar entitled improving hearing screening practices for children 3 to 5 years of age, brought to you by the ECHO Initiative, or the Early Childhood Hearing Outreach Initiative at Utah State University. The ECHO Initiative is funded by the office of Head Start through an intra-agency agreement with the maternal and child health bureau, primarily to serve early Head Start and Head Start programs as a national resource center on Early Hearing Detection and Intervention. We've been doing this work since about 2001 and have worked with hundreds of early Head Start and Head Start grantees and delegates in nearly every state, and, um, we're excited to be expanding our scope to include a focus on 3 to 5 year old populations. Um, so, um, we're, um, that will be our focus today.

I'm joined today by Dr. Terry Foust, who is a pediatric audiologist and a speech-language pathologist. Terry, do you want to say hello?

>> SPEAKER: Hello, everyone. It's a pleasure to be with you, and hopefully, um, you'll enjoy this webinar.

>> SPEAKER: Thanks, Terry. We always like to start at the same place when we talk about early hearing screening. With this recognition, that each day, there are young children who are deaf or hard of hearing being served in early childhood settings, like the ones that you work in, the question is how do we know who they are? Hearing loss is an invisible condition, so how can we reliably identify which children have normal hearing and which may not? And the short answer to that question is that, um, individuals like yourselves can be trained to conduct evidence-based hearing screening. Screening is the first step in the process of identifying a disability, such as a hearing loss, and screening processes, whether for hearing or other areas of development, look at general indicators commonly associated with conditions of concern. Since no screening method is 100 percent effective in identifying possible areas of concern, we always like to point out that parent or caregiver concern always

overrides a passing screening result, no matter what screening method is used. So, it's just a good place to begin, that any conversation about screening should always begin with a recognition that screening methods aren't perfect, and whenever a parent or caregiver expresses a concern, children should be referred for a more thorough evaluation, and that's even true with the highly reliable hearing screening methods that we're going to be talking about today.

Now, the purpose of today's webinar is to highlight the importance of quality hearing screening practices for all children and to provide you with some concrete recommendations for ensuring quality hearing screening and follow-up practices in your programs. Now, whether you're new to hearing screening or have conducted screenings before, our goal is to help you know the specific elements that you'll need to be formally trained on to ensure quality, and our focus of a lot of today's discussion is going to be on the method referred to as pure tone screening, but we're also going to be talking about a second method, OAE screening, and we know that you're probably familiar with both of those. Some of you are already using one or, um, either of these approaches, um, and we'll be expanding upon that whole,

um, decision-making process about what method to use. Our hope is that after this webinar, you'll have the information you need to identify a local pediatric audiologist who will then provide you with some formal training and technical assistance, so that you and your staff can establish and maintain the highest quality evidence-based hearing screening practices possible, and we'll be going over some of these items. We'll be talking about the importance of periodic screening, screening guidelines, recommended methods, the follow-up protocol, a teach-me checklist for pure tone screening, so that you know what you need to be trained on, and some of the various resources that are available on kidshearing.org that will help you, regardless of which methodology you use.

As I said, today, we're going to be spending some time talking about two different screening methods that are currently being used with 3 to 5 year olds in Head Start settings; pure tone screening, which has traditionally been the method of choice for this population, this is the method you're likely familiar with that uses headphones and has a child raise their hand or provide some other behavioral indicator when they hear a sound that's presented in one of their ears.

We'll then talk about otoacoustic emissions, or OAE screening, which some of you may be familiar with, and some of you are using. Um, as, um, which happens to be the most commonly recommended method for children birth to 3 years of age, um, and which we're increasingly seeing audiologists recommending for 3 to 5 year olds. So, we're going to talk about both of these, and the decision on what method to use in Head Start settings should be made in close consultation with your health services advisory committee, and hopefully with input from a local pediatric audiologist. Today, our intention is to help you understand what the use of both of these methods entails in terms of training, as well as in the daily use of these methods.

We'll cover some of the pros and cons of each method that will help you in these considerations, and we'll also spend a minute reviewing the screening and follow-up protocol, which, incidentally, is essentially the same steps that you would follow regardless of which method you elect to use. This is our landing page at kidshearing.org, where we, um, offer a variety of instructional and implementation resources for both pure tone and OAE methods, and, so, if you, um, let me turn on my arrow here, if you come over, right here, you'll

see a document you can click on for considerations in selecting a screening method for 3 to 5 year olds, that's a document you'll definitely want to download. You'll also see over, under the today's webinar heading, on this page, on our actual webinar page over to the left, you'll see a files pod there with a downloadable file, that's this document. So, if you want to download it at the end of today's webinar, that's an easy way to go grab that. Over here on our website, you'll see under get started and implement, two different screening methods, OAEs and pure tone. When you click on one of these, it'll open up a page of video tutorials and other implementation resources, really, everything you need to go through in learning about, developing your skills and implementing that particular method of hearing screening for the population that you serve.

So, and we're going to show you more about that, but let's first make sure that we're all on the same page about why periodic screening throughout early childhood is so important. Excuse me. My apologies, I'm going to need to sip some water throughout today's webinar as I have a little, um, rumbly throat today. We're going to talk about why early childhood is so important, starting at birth, and why we're seeing more

and more programs like the ones that you're apart of focusing on the quality of their hearing screening practices. You recognize this photo, most likely, you know, and as close as we might look, we can't see a hearing loss, not at birth, and not even as children get older, and yet permanent hearing loss is the most common birth defect in the United States. Most newborns are now screened at, um, at birth for hearing loss, but not every baby gets this screening, and babies that don't pass the screening require further evaluation, but some are lost to follow-up and don't receive it. In fact, it's estimated that between 35 to 50 percent of the children who don't pass their newborn screening are not being documented as having received the follow-up testing that they need.

Children in Head Start are likely to be in that group of children who do not receive the necessary follow-up from newborn hearing screening, so those are two of the reasons why periodic screening throughout early childhood is needed. Not every baby is screened at birth, but most are, and some babies are lost to follow-up after screening, but there's another reason why we want to continue to screen. Even when babies pass the newborn screening or get the follow-up that they need,

it's important to continue to screen throughout early childhood, because hearing loss can actually occur at anytime in a child's life as a result of illness, physical trauma, or environmental or genetic factors. In fact, the research suggests that the incidence of permanent hearing loss actually doubles between birth and school age, from about 3 in 1,000 at birth to about 6 in 1,000 by the time children enter school, and that is during this critical time, that children are in programs like Head Start, when they're developing language at a rapid rate, and it's why the requirements in Head Start to do hearing screening are so important, and why children who are in Head Start are so fortunate to be in a program that has a commitment to their language and to monitoring hearing.

Language is something that we talk a lot about in early childhood. I'm sure you all do, it's a regular topic of discussion. It's commonly understood that language is at the heart of cognitive and social emotional development and school readiness. This drives many of the practices that we see in early childhood and Head Start settings. It's also important to note that hearing health is at the heart of typical language development and that if we're going to be conscientious about

promoting language development as a part of our commitment to school readiness, we should be equally conscientious about monitoring the status of hearing throughout this critical language learning period. When a hearing loss is identified early, this can significantly minimize, if not eliminate altogether the delays that have historically been associated with hearing loss. As a result of early identification and access to the various communication options and interventions that are available, children who are deaf or hard of hearing are now thriving in ways that used to be rare, and your hearing screening efforts are part of what makes that possible. The availability of pure tone and OAE screening means that it's no longer appropriate for us to rely on subjective methods, so let's talk about what those are. Subjective methods are things like ringing a bell behind a child's head or depending solely on a caregiver's perceptions of a child's hearing. Excuse me.

Newborn hearing screening results, which are valid at the time of screening, um, are important to collect, we definitely want to see every program collect their newborn hearing screening results, um, but we want to recognize that those results are only valid about the

child's hearing status at the time the screening was done. So, we don't want to rely on those screenings for more than six months, or maybe a year at most, even when children have passed. This screening is only valid at the time of that screening. So, you don't want to just rely on that as your screening method for children who are entering the program at 3 years of age. Those results are too old. Although some healthcare providers are, in fact, incorporating hearing screening into well child visits, this really is not yet a standard practice. Routine examinations of ears does occur, but this shouldn't be mistaken as a hearing screening, and we know that that can come as somewhat of a disappointment to you and other professionals and parents who are really hoping that, somehow, hearing is, in fact, being incorporated into well child visits, but it's precisely because this isn't yet happening in that context that programs like yours are taking this on and why Head Start has maintained and ramped up its commitment to evidence-based hearing screening practices as a part of its requirement, and although some healthcare providers do, in fact, incorporate hearing screening into well child visits, um, we just don't want to, um, we just don't want you to assume that that's done.

So, unless you have documentation of ear-specific results and the method that was used from the healthcare provider, you should never assume that a pure tone or OAE screening was completed, and those are really the only two evidence-based screening methods that you would, um, want to see for this age group that you're looking at. Hearing screening, followed by appropriate audiological assessment and early intervention, as I said, can dramatically improve the outcomes and options for children who are deaf or hard of hearing. When a hearing loss is identified early, we see amazing, amazing results. So, the Head Start performance standards provide the key to identifying which children, um, may have, um, a hearing loss and which may not, and, so, the importance of evidence-based has really been highlighted now, and pure tone screening and OAE screening are both considered evidence-based methods, and the performance standards also require that any abnormal or non-passing hearing screening results are followed up with an evaluation by a licensed or certified professional. In this case, that would be an audiologist or a healthcare provider along the way, and, so, you want to make sure that you have those follow-up steps built into your hearing screening plan. Now, while the

Head Start performance standards don't specify methods, as I mentioned earlier, pure tone screening has traditionally been the most common method used with children 3 to 5 years of age and is definitely considered one of the evidence-based methods. Let's take a quick look at what pure tone screening looks like, and then Terry, our pediatric audiologist, is going to walk through this process in a more detailed manner. So, let's just watch this for just a minute.

>> SPEAKER: We first take a look at the ear to make sure there is no visible sign of infection or blockage. If the ear appears normal, the screener then instructs or conditions -- video out --

>> SPEAKER: I realize that the video is stuttering a bit. I'm going to let it buffer ahead for just a moment and see if, um, if that helps us stream it better. I'm going to try again right now, and if not, it's just an illustration, so we can move forward, but let me try it again.

>> SPEAKER: With pure tone screening, we first take a look at the ear to make sure there is no visible sign of infection or blockage. If the ear appears normal, the screener then instructs or conditions the child how to listen for a tone and then respond by raising a hand

or placing a toy in a bucket. Once the screener has observed --

>> SPEAKER: Well, that video has a little problem. This is the first time we've attempted to show it during a webinar, and, um, my apologies for that. We'll come back to it in a moment, but for now, we're going to proceed with, um, having Terry take us through what is involved with pure tone screening. Terry, again, is a pediatric audiologist and speech-language pathologist. Terry?

>> SPEAKER: Thank you, William. So, as we're wanting to show you in that video, um, the important point is that when we're preparing for pure tone screening, the screener first needs to instruct or to condition the child in how they listen or how to listen for a tone and then respond by raising a hand or placing a toy in a bucket. This is, um, absolutely essential. It's a really key, um, key ability that we need to have. If the child cannot be adequately conditioned or prepared to reliably respond to tones when they're presented, then the child will need to be screened using the OAE method, or they'll need to be referred directly to an audiologist. We'll discuss this a little bit more in just a moment, but once the screener is confident that the child does, in fact, understand the game as determined

by providing the appropriate behavioral response every time the sound is presented, the real screening then starts. So, we teach, condition, and then we, um, start the screening. During the actual screening, then this listen and respond game is repeated several times at three different pitches, or frequencies, with the screener noting, um, the child's response or their non-response to every presentation. If the child responds appropriately and is consistent, um, their response is consistent to the range of tones presented to each ear, that is when the child passes the screening. If not, then the child will need to be rescreened, and then if he or she still doesn't pass, then they would be referred for an evaluation or an assessment, usually starting with a medical evaluation of the middle ear, which is the most common explanation for why a child doesn't pass the screening. I'm going to turn it back to you, William.

>> SPEAKER: Thank you. So, pure tone screening requires those doing the screening to complete multiple steps; to teach children a task prior to completing the screening, to determine whether the child is reliably performing that task, to control the conditions during the screening and to manually step through a screening

of hearing at different pitches, and then recording the screening outcome. It's critical that anyone performing pure tone screening be thoroughly trained, and that the parameters of screening be maintained in a standardized way for all children. Pure tone screening is not an automated screening and therefore does require attention to a variety of details that need to be conducted properly in order for the screening to be considered valid and, in essence, evidence-based. The teach me checklist for pure tone screening, which you see here and which is on our website, um, was designed as a tool that you could give to a local pediatric audiologist who is willing to provide that formal training to you, and we can't underscore enough the importance of getting this training. The checklist includes, um, helpful links from our website that will help you to identify local pediatric audiologists who may be able to assist you in this training and who can, um, potentially play a role on your health services advisory committee as well.

We're going to walk you through the steps of doing pure tone screening, so that, um, you would, um, on the various steps that you need to be trained on. Before we go any further, it's important that we state that as a federally-funded initiative, even though you're

going to see various equipment up here, we're not endorsing any particular brand of equipment, so any pictures that you see are simply for illustrative purposes, not as an endorsement. Um, we refer you to your audiologist to help you when you're selecting equipment. One thing to ask yourself, when you think about methodology for hearing screening, is what exactly is it that makes a particular method evidence-based? Is it just that you are using a particular type of equipment, whether that's pure tone or OAE? Is it that you have a standardized procedure to use that equipment? Is it that you have a protocol for documentation and follow-up that you're using? Is it that you have a standardized means of training everyone who is using that method? Well, the answer is that evidence-based requires all of those things, not just that you're using a particular kind of a device or a particular method. It's so much more than that, and that's why we are emphasizing the importance of quality training. So, Terry's going to give us an overview so that you have a sense of all of the elements of that quality training that will fold into implementing evidence-based practice. All right, so, Terry, I'll hand it back to you.

>> SPEAKER: Great. Thank you. Again, just to

preface, this is just a quick overview, there's a lot of specifics in each of these elements, but today, we would just like to give you a quick overview so that you can get a sense of all of the elements that are in a quality training. So, to get started, pure tone screening is done using a portable audiometer, and those were the pictures of the equipment that you just saw on the, here, um, on the screen, and they are all similar, yet their operations can be a little bit different, and, so, um, being familiar with that audiometer is crucial. Okay, to begin with, it's important to understand the essential elements of pure tone screening, and this includes two important terms. The first term is hertz, which means the pitch or the frequency of the tone that the child will hear. So, you can think of these as being, like, different musical notes. In your screening, you'll be using three different notes; a low note, a middle, and a high note. So, we're going to screen the low, middle and a high pitch. Another term is decibels, which simply means the loudness or the volume of the tones that are being presented to the child. So, decibel is just a word for the loudness or the volume. The actual screening is intended to see if a child can hear a quiet, 20-decibel, or dB, tone. So, that's a quiet tone,

but as you prepare children, you're going to be using louder volume so that you can teach, condition and prepare them for the actual screening, and then when we screen, we go to that tone.

Now, screening audiometers might have a choice of the type of tones to be presented. This just simply means that the tone could be presented, um, in a couple different ways, such as it can be a continuous tone, so it just goes, beep, or it's pulse, so it's beep, beep, beep, or it's a warble tone that might vary just a little bit, and your partner audiologist should show you how to use, um, those various tones, a pulse or warble tone, if you have that option. We like those tones, because they're a bit easier to detect at soft levels. So, beyond these two terms, it's also important to note, both for the operation of equipment, and also for documenting the results, that it's clear that the right and the left refers to the child's right and left ears, which could be opposite of your view of the child or how you're sitting, again, just depending where you are in relationship to the child. Now, when you go through the teach me checklist that William just showed us with your partner audiologist, the first activity there is going to be to select and purchase equipment, and then determining

the schedule for screening children. So, after you do that, you will then prepare for screening, and preparing for pure tone screening requires that you identify a quiet environment where you can control the noise levels in that environment. Your audiologist partner will help you to know how you can measure the current level of noise, all that background and ambient noise in a given environment, using a sound meter or a sound meter smart app on your phone.

This really is essential in determining whether that given setting is suitable for you to be able to complete the pure tone screening, and what, if anything, you'll need to do to maintain the quiet for the duration of the screening. Just before we move on, I want to just say, this is really important, because it's never appropriate for you to change or increase the volume level of the audiometer as a result of having increased environmental noise or background noise. Um, you know, we mention this just because it's a critical mistake that we've heard people make who have not had adequate training. So, again, just to emphasize, under no circumstances do you ever change the volume level of the audiometer to accommodate for environmental or background noise that could be disrupted your screening

process. Okay, so, to continue with the training process then, use your teach me checklist, um, using your teach me checklist, your partner audiologist will also show you how to position yourself as a screener in relationship to the child you'll be screening. This is actually really important, because they're going to help you identify ways that a child might see and respond to any visual cues, um, that you're unaware of. You may be unaware that you're providing, rather than the auditory cues that are associated with, um, with the screening. Um, now, excuse me just one moment. There we go. I apologize, I just had, um, a problem with my computer here.

So, um, it's really, as we're talking about positioning, it's really easy for screeners to be aware that they may have compromised the validity of their screening process, simply by having a child noticing, um, noticing one way or the other that the screener has presented that sound. They might see your hand move, or maybe your head inadvertently nods when you present a sound to which they should then respond, so proper training, um, will include how to position yourself with respect to, um, reflective surfaces, for example, so they don't see a reflection in a window, mirrors or other

objects that could inadvertently visually cue, um, the child being screened and then would invalidate your screening. Also, during the training, you'll be taught what to say and when throughout the screening procedure, and then, finally, your audiologist partner will help you to identify and arrange the supplies that you're going to need, including toys and documentation forms, so that you can complete the entire process. Now, during the, um, during the training process, your partner audiologist should acquaint you with the function of different switches and the buttons on the computer, or, um, on the equipment, so that you can manipulate and go through the screening, um, without, you need to be very familiar, so that that process is automatic and you can really tend to screening the child. You'll have them teach you how to test the equipment by screening yourself.

That's a step that you want to complete every time you conduct a screening, so that you make sure the equipment's working properly, and then, of course, you also want to, um, to have clear instructions for what to do if the equipment is malfunctioning. Okay, then the next item on your teach me checklist, so, again, we're going to follow that teach me checklist right down,

and that's, um, how to do a visual inspection of the ear. So, that's the first thing that we attempted to show in the video, and that's to determine, help you determine whether you should continue with your screening process. So, your partner audiologist will teach you how to look for real, um, obvious wax blockages, for example, that might need to be addressed prior to the screening, or perhaps an active infection that you can see some drainage from the ear or other concerns that would warrant you postponing your screening or making an immediate referral to a healthcare provider. The next critical step is to learn how to prepare or condition the child for the screening activity. So, during your training, your partner audiologist should demonstrate the activities you can use with children of different ages, so you can teach them how to respond to the sounds they will hear. So, some people will attempt to teach children the screening game in groups. While they may do that in groups, we do encourage you to do it one-on-one, especially for children 3 to 4 years of age, those younger children.

So, for younger children, you will usually start without using the headphones, just teach them to perform the desired response whenever a specific sound occurs,

and then you provide them with reinforcement when the child responds correctly, and then change the volume to make sure they understand the importance of responding, no matter how loud the sound is, and then once they can reliably follow those instructions, then you'll practice the listen and respond game using the headphones. Your audiologist partner will first show you how to appropriately position the headphones on the ears, being sure that the correct earphone is on the correct ear, so we want to ensure that the right is on the right, the left is on the left, and that the earphones have a good seal around the ear so that they fit snugly. So, um, William?

>> SPEAKER: Yeah, so, we hope that you're seeing that the skills that you're developing, um, start off first with just selecting and, um, preparing the environment in which the screening will take place, and then doing a visual inspection and starting forward. Now, the next step is going to be preparing that child and actually doing the conditioning. Now, just as an aside, this isn't a training, our goal is to help you understand what needs to be included in a training and recognizing that this is a fairly complex set of skills your screeners need to develop. So, keep that in mind

as Terry proceeds walking through the process. Terry? Speakspook thank you, William. Again, as you were saying that, I was thinking just, you know, in the context of this webinar, how fast we go over these various steps, and I think that does just illustrate, um, you know, the importance of really good training. Let's go forward and do an overview of the conditioning process that your partner audiologist will demonstrate and then teach you to complete, and, um, the information that we're giving you, again, like William said, it's not intended to provide training, but we do want to go over these key elements, um, so that you can see what you'll need to learn. So, your training is going to show you how to first use the equipment to present the 2,000-hertz tone at a 60 dB volume level, which is considerably louder than the actual level we'll use when we're screening the child's hearing. 60 dB, you can think of as the equivalent of, um, moderately loud speech.

So, we're going to be training at that 60 dB level. At this volume level, we want to watch for the desired behavioral response, um, from the child, to make sure the child knows how to complete the task. So, if you do not get a behavioral response, then you're going to return to the conditioning activities until you're once

again confident that the child can perform the task. Now, in some cases, the child may not respond even at this higher level, in which case then, you'll conduct an OAE screening instead, or you'll make a referral to an audiologist. If the child does provide the appropriate response that we want, then present the next tone at a 40 dB level, so we're going to go a little quieter, and again, watch for that child's response. If after multiple attempts, the child does not respond to your conditioning exercise, then use the OAE method, or making a direct referral may be in order, because you're not able to complete that screening. It's really important to note that the research shows, and this reflects my own experience as well, that about 20 to 25 percent of children in the 3 to 5 year age range will not be able to be successfully conditioned or taught the appropriate listening, um, and response game, and therefore can't be screened using the pure tone method, simply because they aren't developmentally able to do this yet.

So, for these children, you'll need to be prepared with an alternative, which, um, I think as we have mentioned, is to be prepared to do an OAE screening, or to refer to an audiologist. Now, keep in mind that

referring 25 percent of your children to an audiologist may not be feasible given the availability of pediatric audiologists, so this is an important consideration when electing to use pure tone screening. Now, but if the child does respond to your conditioning as you hope, then you'll be ready to conduct the actual screening. So, you're going to present the pitch now at 20 dB, that quiet whisper level. This 20 dB tone is the volume level that we're actually targeting in a pure tone screening and where you'll document the child's response or their non-response, um, to this level. So, all previous presentation of tones were practices for this moment. Now, again, if the child does not respond to the louder tones consistently used during the conditioning phase, then we either conduct an OAE screening, or we make a direct referral to an audiologist. Okay, now, once we're confident that the child's been prepared or conditioned for the task, then we conduct the actual screening. So, your audiologist partner will explain that the goal of pure tone screening is to test the child's hearing at three pitches, like we mentioned before, we're going to have a lower, a middle and a higher pitch, so we're going to screen at 2,000, 4,000 and 1,000-hertz, and we're going to do it in that order.

Now, we're going to do it all at the volume level of 20 dB, and then we're going to record the final results. So, to pass the hearing screening overall, this is a key point, um, to pass the hearing screening overall, the child must pass the screening of each pitch on both ears. So, let's walk through this with a little more detail to give you a better idea of what you're going to need to be, um, attentive to training on. Okay, so, we're going to start by presenting the 2,000-hertz, remember, we're going to go in that specific order, so we're going to start with 2,000-hertz at the 20 dB level in the right ear. Your audiologist partner will explain that no matter what you observe, the first time you present the 2,000-hertz pitch at 20 dB, you'll always need to present the pitch again and watch for and record the response as a reliability check. I hope that makes sense, that even though we might get an appropriate response the first time, we're going to do it again and make sure it's consistent and reliable. In fact, for each of the three pitches we'll be screening for, the child needs to provide the behavioral response at least two times out of four attempts in order to pass at that pitch.

So, there, you can see that green check that appeared, that's an example of where a child responded

two times out of three, so we would consider that a pass for that pitch. It's important to note that for each pitch on a given ear, the child can have no more than four chances to respond at the 20 dB level. So now that we've completed the mid range pitch screening at 2,000-hertz, we're now going to go to the higher pitch of 4,000-hertz, and we're going to repeat that process. There. Okay, so, you've just seen that again, and in this case, the child responded two times of four attempts, so when that, so when the screening at that pitch is completed, now we're going to repeat the process at 1,000-hertz, and then after that, the entire process will then be repeated on the left ear. Okay, there you go. So, a child, like I said before, only passes the overall screening, hearing screening, if he or she passes on every pitch. So, sorry, I had another little computer problem. So, your audiologist partner's going to walk you through this very carefully until you and your staff clearly understand. They'll also help you to understand how to determine if a child's not adequately producing reliable responses and whether you need to attempt the pure tone screening on another day or to go ahead and conduct OAE screening instead.

Um, keep in mind that in order to implement

evidence-based hearing screening, it's really more than simply using the proper device. What makes pure tone screening evidence-based is how that device is used, so in other words, following this screening protocol. In becoming a skilled and effective screener, it's important to have a good opportunity to observe someone, an expert, performing the pure tone screening process, and then a chance for you to get expert feedback on your own skill set, along with all the helpful hints about child management that they can provide you. Your audiologist partner should be able to observe your behaviors as you practice screening so they can caution you about anything that you may be inadvertently or not aware of that you're doing that could provide subtle cues to the child. So, using the teach me checklist, your audiologist partner will explain the pass and fail criteria for the pure tone screening that we've gone through. Now, let's look at another possible example of a child's screening outcomes. So, in this case, you can see, um, looking here, that the child did not pass the overall screening. Why is that? It's because there are two pitches on which she did not respond to the minimum of two out of four attempts. So, even though they passed on two other, um, two other pitches in the left and two other in the right,

they need to pass all three, okay? So, there will likely be some children who do not pass the overall screening as part of your training, and as part of your training, you and your staff are going to need to develop a clear understanding of what to do when a child does not pass.

>> SPEAKER: Thanks, Terry. So, let me show you where you'll find the video tutorial modules for you and your audiologists to use as you prepare for this kind of training that Terry just reviewed. So, on our website, you'll go over here to pure tone, and you'll click on that, and you'll see this page here, which has a series of 11 video modules that will walk you through the entire process. Having an audiologist help you with that and then to look at all of the resources over here, which include documentation forms, protocol follow-up guides, referral letters, etc., um, you'll be able to have a full practice developed for evidence-based pure tone screening. Under planning tools, you'll find the pure tone screening considerations, which is that document that I mentioned before. If you're weighing whether you do OAEs or pure tone, this is a great place to do, to look at that. So, I'm going to just briefly touch upon OAE screening. Terry mentioned that OAE screening is another option. Now, OAE screening, if

you're not familiar with it, is an automated screening, which you see being implemented here, it doesn't require children to give a behavioral response, we can screen children just a few hours of, um, of age, all the way up through children who are 5 years old or even older, um, and because we're able to screen them so young, it allows us to screen children who have a different language than ourselves, who are developmentally not prepared to do what pure tone screening requires.

So, we know at a very minimum, about 20 to 25 percent of the children in the 3 to 5 age group will most likely need to be screened with OAEs, unless they can easily be referred to an audiologist, which may or may not be feasible for you and your program. Because of that, some programs are electing to use OAEs uniformly for 3 to 5 year olds instead of pure tone, and we just recommend that if you're in the process of considering methodology, you consult with an audiologist and your health services advisory committee and look at the document about those considerations on our website as you make our methodological choice. The screening procedure for OAEs is basically to do a visual inspection. I'm going to go through this very quickly. Um, there are lots of resources on our website, and we've done

many webinars about this, so if you need more information about this, go and explore what we have there, but basically, you do a visual inspection, you insert a probe into the child's ear, which sends a sound into the ear, that sound travels all the way into the cochlea, that inner, um, snail-shaped portion of the ear right here, and that snail-shaped portion of the ear actually sends a sound out of the ear, which is a surprise to many people that it's measured by a microphone in the probe that you've placed in the ear and measures that output, and that output is what the screening is picking up. Every normal, healthy, functioning ear should be able to pick up that otoacoustic emission or output.

So, that's what allows us to screen these children so young. Excuse me. OAE screening still requires training, but it's not as complicated as doing pure tone screening. So, that's one of the factors that you may want to consider as you, um, evaluate which method to use with your 3 to 5 year olds. Once you've performed that screening, it gives you an automatic response, pass or refer. You don't have to go through a protocol of documenting each sound level, decibel level and manipulating it the way you do with pure tone screening, so this is an automated procedure. So, I'm going to move

forward and just mention that the follow-up protocol that is used for OAEs and for pure tone is essentially the same, and it's basically one rule to remember, and that's either the ear passes, the child passes on both ears, or the child has been referred to an audiologist. On our website, you'll find a protocol that demonstrates the screen, rescreen, referral for middle ear consultation, and then on to an audiologist protocol that is recommended, um, that will be a part of your training process, and it's also really important to underscore that the quality of hearing screening implementation is only as good as our ability to implement the steps that are necessary when a child doesn't pass. So, having a good grasp of what your follow-up steps are going to be, in this case, we are recommending that a child who doesn't pass the first screening you implement get screened a second time, within two weeks, before any referrals are made. If the child still doesn't pass, then we would refer the child to a healthcare provider for a middle ear evaluation, and then rescreen that child again, and if the child still doesn't pass, then we would refer the child to an audiologist.

So, on kidshearing.org, you can find more information about this protocol, both in video and print

format, so, um, we encourage you to have a look at that as you move forward as well. We're going to open up the floor for some questions here, but I'm just going to highlight some of the differences between pure tone and OAE screening, just for you to notice. One is automated, the other is not. OAEs are automated, pure tone is not, but you see that OAEs are more expensive than pure tone equipment. OAEs, however, can be done in a natural environment, where children are already playing and sleeping or active, whereas pure tone screening requires you to control the environment, to measure the sound level, and to maintain that throughout the screening. OAEs can be done on all levels of development, all age groups, where pure tones require children to be able to follow directions and to reliably follow the instructions. OAEs can, um, reliably, um, complete on nearly every child, very few can't be tested, whereas we estimate 20 to 25 percent of the 3 to 5 year olds won't be able to do pure tone screening. Um, and an audiological referral is needed if an OAE can't be done, whereas if a pure tone can't be done, an OAE or an audiological referral would be the next step.

So, these things are expanded upon in that considerations document, which is over on the left part

of your screen for download, and I'll also show it to you right here. It's found right here on our website, so you can evaluate your options there. So, um, and this is what that document looks like. So, I'm going to open up our floor to your questions now. I know that was a lot of information for you to consider as you think about methodology for 3 to 5 year olds. Um, there's been a historical pressure around pure tone screening, which is totally understandable, but with all of the success that we've seen of doing OAE screening, there's more and more people considering that option as well, so it's nice to have a choice and to be able to weigh those choices in a reasonable way using the criteria that we've helped spell out in those documents. So, um, the webinar that you are participating in here is being recorded and will be posted on kidshearing.org within the next couple of days, so if you need to review any of this again, um, or share it with anybody that wasn't able to participate, that would be the best way to do that. We have a question here. Um, is it possible that a child would pass OAE, but threshold hearing is at 40 or 50 dB, and although they pass the threshold, may still be missing a lot of language? Terry?

>> SPEAKER: That's a really great question, and,

um, no, that should not be possible, to pass the OAE, but yet have elevated, so, let me backup. By that question, when it says threshold hearing is at 40 or 50 dB, that would mean that they did not pass the pure tone screening, that the sound had to be louder than our screening levels, and the question is would they pass an OAE, but fail the pure tone because of elevated, or the sounds had to be louder. OAE screening is very sensitive down to the same screening levels that pure tone are, and, so, they, um, should not pass an OAE if they don't pass the pure tone screening.

>> SPEAKER: The next question is how do you get assistance to find a local audiologist in your area to help train? And do they have to present a training certificate? So, um, you'll have to check with your state around, um, any qualifications that might be required, but there are a couple of resources that are your go-to resources in your particular state, and if you go on our website, you'll find on here, let me see if I can show you. It's going to take me a minute to get there. So, on our website, there is a find an audiologist tab, and there, you'll find a, um, a directory of your state Early Hearing Detection and Intervention Program, or your newborn hearing screening program that knows where

audiologists are throughout your state. You can contact them to find an audiologist or two to begin with. You might want to also talk to members of your health services advisory committee or your part C or part D title fund programs to find who are the audiologists in your immediate area who can provide some support around that. Um, and then it would be up to those audiologists about whether they provide certificates for training or not. Um, the next question is we use a screening where the child points to a picture of what they heard. Is that considered pure tone screening? Terry?

>> SPEAKER: Yeah, that's really a great question. That particular method was developed more by the manufacturers of those particular pieces of equipment, um, with, um, well, let me, the simple answer to that is that it is not considered a pure tone screening, it's a different method, and, so, it's not, but it's not consistent with the accepted pure tone screening methods and procedures used and/or endorsed by our professional associations and that most of the research and literature is based upon. So, um, no, that's not a true pure tone screening. the next question is --

>> SPEAKER: Here's the next question, Terry. We've been told pure tone screening is more reliable

than OAEs. Is that true?

>> SPEAKER: Right. So, if we talk about reliability, um, both procedures have very similar reliability. Um, we talk about, um, consistency, reliability and accuracy in terms of sensitivity and specificity, but both procedures match up with very high sensitivity and specificity, and, um, so, OAE screening is every bit, um, as reliable, or more so, if you take into account the, um, that 20 percent of kids that may not be able to be screened with pure tone.

>> SPEAKER: And if they're meaning reliable not so much in scientific terms, but just as a legitimate screening, the additional benefit that one can get from doing a pure tone screening is it actually, um, is looking at a child's comprehension of sound, that the brain actually perceives the sound, and the child is able to respond. So, for rare conditions that might be, um, in that realm, you do get something more from pure tone screening, right, Terry?

>> SPEAKER: Um, yes, you might. You know, um, you might be able to, um, to get that in some of those very rare conditions, but overall, with, um, the majority of children, the vast majority, um, both are, OAE is every bit as reliable.

>> SPEAKER: Yep, and that's why more and more people are using OAEs, because they can screen all of their children, whereas with the pure tones, they're not able to screen as many successfully. Um, we are at the top of the hour, but we will go ahead and answer a few more questions. Know that we are always available to be contacted through our website, if you need to ask any other, um, questions of us. Um, the next question is I can check one ear, and it will, um, it will provide a fail, and then 3 seconds later, I will receive a pass. How is this so? This sounds like a question pertaining to OAE screening.

>> SPEAKER: Yeah, I was thinking the same, but it sounds like it, um, pertains to OAE screening. You know, it's hard to answer without seeing, um, you know, how that screening is being provided. You know, is it that there's background noise and the machine stalls or it fails, and then, um, it continues to test when conditions may change and it's quieter, um, and you can get a pass, and it could be, um, the child is chewing, talking, sucking, and when they're quiet, then the machine will average and give a pass. So, there are probably a lot of conditions where that can happen, and it's usually due to factors that we can try to improve as the screener,

such as our probe insertion or child management or managing other external factors. So, I know that's a general answer, but part of the specificity, or being able to specifically answer it, we might need to, um, see how that's happening.

>> SPEAKER: Um, one or two more questions, and then we'll wrap it up here. The next is does the audiologist have to be present at screenings? And, no, they don't. I mean, it's always nice, right, but if we could have audiologists doing all of our screenings, that would be wonderful, but we don't have that luxury, and, so, getting, the next best thing is to be trained really well by an audiologist, have them observe some of your initial screenings, and then maybe even periodically thereafter, but they do not need to be present for every screening. Terry, anything you want to add to that?

>> SPEAKER: No. Absolutely. Um, you know, we have, um, you know, the precedent for, um, being able to do, um, you know, screenings and reach the majority of children is that, um, they are adequately and can be appropriately conducted with lay screeners, and the audiologists do not need to be present, um, but it is why we endorse, um, adequate and good training, so that, um, those screenings happen appropriately.

>> SPEAKER: Several of you have asked about getting power point slides from today's webinar. We encourage you to go and, um, do a couple of things, if you need any further information, which we hope you'll be interested in. One would be to look at the recorded version, which we will mail, e-mail out to you once, um, we have it loaded up on to our website, and then to go on to kidshearing.org, click on pure tone or OAE, whichever you're interested in, and look at the modules that are there. They're two to three minutes in length each. As you progress through the process, see if that and the other print information there doesn't help you address the informational needs that you have. We're going to wrap it up for now. Please feel free to get in touch with us again if we can support you any further in your training or implementation. Thank you to our captioner today for your services, for our background TA folks, and Terry, thank you for your participation today. Good luck, everyone.

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