I think we should go ahead though and get started. We want to welcome you all to today's webinar entitled introduction to evidence-based hearing screening and evaluation practices for children ages zero-five.

My name is William Eiserman. I'm delighted to be here with you today, I am the director of the early childhood hearing outreach initiative at Utah State University which is housed within the national center for hearing assessment and management. The echo initiative has served as National Technical Resource Center since before 2001. With our initial of a priority being to support evidence-based hearing screening and follow-up practices in head start and early head start settings. But then it expanded beyond that to include supporting our part C and early intervention programs from visiting programs. Hospital based or healthcare centered programs, not hospital based. And now even more into the school age realm, we had a lot of experience all across the country, nearly every state providing training and technical support.

Before I introduce my co-presenter today I want to give you a quick overview we will not be monitoring the chat field while we are presenting, we are going to talk about the content today, once we complete the remarks we'll open a Q&A field for you to raise your questions or share your thoughts with us that way. So, keep it in mind. Today's webinar is being recorded. So, if anything distracts you from full attention today, know that you can come back and access the webinar tomorrow or in a few days actually. Also, listen to it with others who may benefit from the material

that we cover today.

Shout out of gratitude to the interpreters X to our captioner today. Those are real live people helping us to be as accessible as we can be right now. So that we really appreciate your availability, skills and talents to offer the services for us.

Let's move forward. I am joined today by Dr. Terry Faust who is a colleague and good friend of mine and Terry pediatric audiologist speech language pathologist who has served as consultant and trainer with the echo initiative and beside me approximate our small team since it the very beginning in the early 2,000, so Terry thanks for being here once again with me.

>>>: Thank you, I appreciate that introduction. As William has said, we are thrilled to be with you this afternoon. And Willy, and I, along with other team staff as many collaborators and across the country we provide training as the said, almost nearly every state with thousands of staff from all kinds of settings from early HeadStart and American Indian, and Alaska and native Head Start programs; many other early care and education programs over the years. As William said, you know, as people were signing on and the number participants--we are encouraged just as we are today by the huge amount of interest, there is evidence-based hearing based on screening programs children with related needs that can be served.

>>>: I will turn off my mug, and I think Terry will do the same--turn off the camera. And the work of the echo initiative is based on the recognition that each day there are young children who are deaf or hard-of-hearing being served in early childhood

education and healthcare settings often without their related needs being known, hearing loss is referred to as the invisible disability or the invisible condition. So, the question is how can we rely on identifying which children have what we would call normal hearing? Which may not?

>>>: William, the short answer to that question is really that early care and education providers just like you can be trained to conduct evidence-based hearing screening just like you see depicted and we can identify children, who are deaf and hard-of-hearing, that have not been identified previously.

So, if you look at your screen the procedure on the left, that's and, and otoacoustic emission and you will see the, right, hearing screening that's historically been the most common screening method for children three-years of age or older. Which you will still see many care and education providers using. So, we're going to talk about both of these methods today.

>>>: So let me give you a quick overview of what we want to cover today. This presentation is not a training, per se, our goal is to provide an overview of the big picture of what is involved in implementing evidence-based hearing screening for children across the age spectrum of birth to five, years of age and beyond that. We're going to start by giving you an overview of the auditory system or hearing system. Which will help lay a foundation for understanding how the hearing screening methods work that we're going to be talking about today. We are going to talk about why we screening for hearing loss, what makes it even possible for us to

be seriously engaged in systematic screening for hearing? Then we'll talk about the two methods Terry just mentioned, OAE screening and Pure Tone audiometry screening.

Pure tone, next we'll address the important question of what do we do next when a child doesn't pass a screening? So, you have just a general idea of what those follow-up steps need to be when a child doesn't pass a screening on one or both ears. I will wrap up by showing you how to access resources to support the process of developing and maintaining your hearing screening program. Addressing any questions that you might have. Well open up a screen for Q&A at the end, but we'll not be monitoring the chat while we are presenting, we want to stay focused on the content that we have prepared for you today.

Now, if you are already well informed about OAE and pure tone screening, that you are already engaged in it, that you hopefully have received training in that, yesterday we did an advanced webinar that is recorded and will be appearing on the website in which we went into much more detail than we will today. Of course you are welcome to stay on for today, but if you are more of an advanced learner, we encourage you to go check out yesterday's webinar. Benefit from some of the content we covered there as well.

So, that's where we are headed and you can follow our progression through the topics by referring to the left side of the screen, and since this is a recorded webinar, this left side menu can be useful in the future if you are return to this recording and want

to navigate forward to specific portion of our presentation to review again or to share with others. So, before we launch into our content today, I want to make sure that you all know where to go after today's webinar. To get additional resources and information and access to training.

>>>: William, can I just interject for a second?

>>>: Yes, while you are talking about resources and information, and access to training, I want to mention to everyone that one of the things that you will hear us say today is, we really want to make sure that all of us understand that implementing evidence-based hearing screening practices is much more than just using the designated piece of equipment or specific method.

So, implement and evidence-based practice that recommended equipment or methods that we'll be talking about today, they need to be used according to a prescribed set of steps. Under carefully controlled conditions each step of which is carefully documented in detail, that's going to be true whether you are using OAE or pure tone audiometry screening--so over the years the echo initiative, and we developed these training materials that William is talking about. There is a wide free range of resources to help you to achieve the goal of implements evidence-based hearing screening that I was talking bookwork one of the goals today is to help you find all of that information and the resource that you need.

>>>: Thanks, Terry. Let's make sure right off the bat that you know where to go

and why you will go here and what you will find. Let's take a look at the website, which is Kidshearing.org. You see it on your screen there, we invite to feel free to use all the tools before I sit down to compose a letter to parents about screening or developing a referral letter or forms for documenting your results, check out what we already have here. Our goal over the last 20 plus years was to create as many of those things as we could just so that people like you wouldn't have to make those things up from scratch. Many of the resources you will find here are the result of various examples early childhood programs shared with us, so you can be assured that others have used the language and format of many of these resources to achieve the same goals that you probably have. You will also know that we know that many of you want to know how you can access training. So, be assured that we can direct you to a specific location where you can get online training whenever you need it. So, let me give you a quick look at the resource but again take time after the webinar to get acquainted with what you will find on Kidshearing.org, this is the landing page for Kidshearing.org, where you will find resources and the first page places early childhood screening and the larger context of newborn screening, if we scroll down, we'll see a set of resources here that cover the whole spectrum of developing, implementing and maintaining a evidence-based screening program. The first set of resources are all about planning. You will find big picture information there. Information about how to find an audiologist to refer to or to get help with your program. You will find information about screening equipment there. In the next

section, that's where you will find information about training. Both for OAE and pure tone.

In the next section, you will find information about screening resources. These are the really practical resources to help you prepare for training or screening, letters you might send out the protocol for follow-up forms for documenting your screening outcomes. Then in the next section you will find information about how to track groups of children through the screening and follow-up process. And how to monitor the overall quality of your screening resources.

So, spend some time at Kidshearing.org and know that really all of the content that we are covering today can be accessed there. Including this actual presentation. Because it will be recorded and posted there.

So, let's put all of these resources into the context. Let's start by giving you a quick overview of the auditory or hearing system. Terry, why don't you walk us through this?

>>>: Yes, thank you, William. So there are three main part. auditory system. We have the outer ear, the middle ear and the inner ear or the cochlea, that's the snail shaped portions that you see here on your screen. So, when sound enters the outer ear, it causes the eardrum to vibrate. Which then moves the three small little bones in the middle ear. This movement stimulates thousands of tiny sensitive hair cells in the snail shaped portion of the inner ear called the cochlea. From the inner ear that sound signal is carried along special information to the hearing centers of the brain.

That's when the individual experiences the sensation that we call sound. So, while this is how the auditory system typically functions, there can be some exceptions. So there can be things such as temporary issues like a wax blockage or there can be fluid in the middle ear caused by ear infections that we may discover and get addressed during a hearing screening process but the primary target of a hearing screen is the functioning of that inner ear or cochlea, the snail shaped portions of the ear. So, in some instances then the sound will travel through the outer and the middle ear, but when it reaches the cochlea and the signal is not transmit through the brain, that's a sensorineural hearing loss. This condition is usually permanent. This is the primary condition for which we are screening in the mask screening efforts. It may come as a surprise to you, it's an important fact for you to, that sensorineural hearing loss is the most common birth defect in the United States.

>>>: Yes, in fact, about three children in a thousand, are born with a permanent hearing loss. Deaf or hard-of-hearing -- most newborns in the U.S. are now screened for hearing loss, and use evidence-based methods, most before even leaving the hospital. But screening at the newborn, as beneficial as that is, isn't enough. And the reason why, is because research suggests that the incidence of permanent hearing loss actually doubles between birth and school age from that three in thousand at birth to about six in a thousand by the time children enter school.

So, to illustrate this again, that's a pretty steep increase. And we need to continue to monitor hearing during that Critical Period in the child's life. But not even then,

because even after they start school, look at the prevalence of hearing screening and how it continues to rapidly go up over time.

So, being educated and the champion for monitoring and hearing status throughout childhood is a really valuable role to play and to know that incidence continues to rise and rise and rise.

So, with that then….

>>>: We can't only screen for hearing loss at birth we need to screen throughout these early childhood years because hearing loss as William said it can occur at any time, it can occur as the result of illness, and it can occur because of physical trauma, or environmental or genetic factors. This kind of hearing loss is often referred to as late onset hearing loss that means that it's acquired after the newborn period.

>>>: It's commonly understood that language development is the heart of cognitive and social, emotional development, and school readiness; we talk about that in the early childhood world. This drives many of the practices that we see in early childhood and health and education settings. Think about how much emphasis is always placed on early language development, counting the word children can produce. That's something that you see across cultures all around the world. It's also important to note that hearing health is y it heart of typical language development, that if we're going to promoting language development as part of the two things like school readiness, and mental health and socialization, and we need to be equally conscientious about monitoring the hearing throughout this period, if

hearing compromise, and then language will be as well, we don't want to wait for a language delay to become obvious to then discover that the child has a hearing loss.
>>>: Yes, William this is exactly why we see some of the emphasis being placed on monitoring the status of hearing in young children. Programs like HeadStart which for years has served as model of comprehensive health and educational programs for young children and their family. They required hearing screenings for all of their children, even before we had the excellent methods, we have now to do this.
>>>: Sometimes we use the term screening and we already have today and we neglected to make sure that everyone really understands what this actually means. As an audiologist, Terry, how would you describe what screen I go, or in this case, hearing screening is?
>>>: That's a really good point, William. So, let's think of screening as kind of a sorting process. So, we screen to sort it helps to us separate the children who are at risk of having a condition from those who are far less likely to have that condition. So those in the first high higher risk group are then followed with additional steps. In this case, implemented by pediatric audiologist and healthcare provider to continue to refine that sorting process until we identified that small group of children with the hearing loss. I guess to be up front or blunt we screen because we simply can't provide a comprehensive full diagnostic audit logic evaluation on each and every child.
>>>: This can dramatically improve option outcomes for children who are deaf and

hard-of-hearing. When hearing loss is identified early, we can make sure a child has access to language.

>>>: Yeah, you know as a result then, children who are deaf and hard-of-hearing are really thriving in ways that used to be rare, by providing hearing screening you get to be part of that process part of creating these amazing and life changing outcomes. So, let's take a look at several examples with children with severe to profound hearing loss, who have the benefits of quality intervention and you will see, these children are learning and they are thriving and most importantly, they are communicating.

>>>: So, these two girls are both deaf. They both have hearing aids in both ears. Listen to how they are communicating, I think they are about four-years old or something like that. (video captioned).

>>>: Here's another example the family of these children have elected to use, American Sign Language as these children primary mode of communication. Equally rich and deep in their ability to communicate which is the key here. In this last example these boys are both deaf and they wear Cochlear Implant, a technology some of you were aware of. Let's hear them communicate.

(video captioned).

>>>: So those kids, are of the reason --

Those kids are the reasons, remind us of our goal we want to make sure that all children have language access, one way or another, regarding, regardless of whether

they have a hearing loss. While these children are examples of children who have more profound deafness, we care as much about children with mild or moderate hearing loss because even mild hearing loss or hearing loss in only one ear, can have a directed impact on a child's academic achievement, socialization, emotional health, all of that. All degrees of hearing loss are equal in terms of the importance of needing to be identified.

>>>: As we mentioned you know a little bit earlier here, OAE -- pure tone audiometry are recommended methods that we'll talk about. An important point is the availability of OAE and pure tone screening, it's no longer to rely on subjective methods that have been used in the past, this and these, ringing a bell behind the child's head or depending solely on caregivers' perception of hearing. Now, don't get me wrong, observation of a child response to sound especially the lack of response, can be helpful. We should pay attention to how children do or do not respond to their environment. But these sorts of observations do not constitute a hearing screening because they are far too crude and unreliable frankly, we can do so much better because of the current available technology.

>>>: It's always important to note that although some healthcare providers have adopted evidence-based hearing screening in their practices, and well child visits, this really is not yet standard practice, they have so many things they have to cover in such a shorted period of time. Hearing screenings are generally not being incorporated for children under four-years of age.

>>>: I think many of you may have had the experience, some parents report their the healthcare provider did perform a hearing screening, but I think we have to really understand that this and -- I can't really emphasis it enough, that retune execution of ears by healthcare provider we should not assume or mistake those as hearing screenings it's really precisely because of the screening is not yet happening consistently in that context that programs like yours are adopting are hearing screening practices because there is this increased recognition of the importance of monitoring hearing it's now feasible to do it in programs like yours and by people like you.

>>>: Some parents rightfully so will tell us well they looked in my child's ear like you see in the picture on the right but that's not a hearing screening, we want to make sure that we don't assume ever that a hearing screening has been done. So, the take home message here is that unless a child's health or medical records include the documentary of ear specific hearing screening results and the method that was used, we cannot assume a hearing screening completed.

>>>: OAE, and pure tone, they are not perfect, that means there can be some rare conditions that are not identified through these screenings. So when parents express concern about a child's hearing or language development, even if they received and passed a hearing screening using one of the methods--if they continue to be concerned the child should be referred for an evaluation from an audiologist.

>>>: I have to say one more thing about the medical records. One thing that you

might see in the medical record is a newborn hearing screening result. Like when the child enters the practice, if you are working with them, and really young children you might see a notation of the hearing screening results. You want to collect that information you want to make sure that especially during the first year of life, that they, any follow-up occurs if a child didn't pass on one or both ears. If you don't see evidence of that, you want to help the family circle back to the healthcare provider to accomplish that. If you are in a program that requires an annual hearing screening or if you are in schools, you don't want to use the newborn hearing screening result after the first year. Because remember what we pointed out earlier on, 20 minutes ago? Hearing status can change. They may have passed last year, but that doesn't really have any bearing on what we know today. That's why periodic screening throughout childhood, actually throughout our lives, is a good thing. Especially in childhood, let's talk about the screening methods that are being used in childhood, if you are responsible for children who are under three-years of age--the categorical recommended method is otoacoustic, and OAE screening. Which is here on the left, if you are responsible for screening children three-years of age or older, as I mentioned historically, pure tone audiometry, has been considered for this age group, this is the headset on the right where the child has a headset on and they raise a hand or perform a specific task each time they hear a sound that's presented through the earphone. That's the one you see on the right here.

>>>: I want to add, William there is growing recognition for variety of reasons that

as common as the pure tone method had been it maybe not be the most feasible method to use with younger children. research has shown that 20-25% of children in that three-five age group can't be screened with this methodology because they just aren't developmentally able to follow the direction reliably, that's our experience as well. In these instances, this screening becomes the preferred method for these children OAE.

>>>: At a minimum if you are establishing evidence-based for three-year older and say older if you are considering using pure tone audiometry screening as the first or primary method you are also going to need to be equipped and prepared to do OAE on the 20, 25% who can't be screened with pure tone. Or, alternatively, you could systematically refer most of those children to an audiologist that can perform the screening, I think that would make you pretty unpopular with the audiologist if you were sending that many children to them to be screened. So, Terry, what do we do?

>>>: Yeah, really to simplify things I think there are more and more of us audiologist recommending the use of OAE uniformly with all children three-years of age and older, we're doing it because it's quicker than pure tone, to learn to do, and actually implement, it's far more likely to be a method that will work across the board with all the in that age group, and it's equally as effective.

>>>: But there are a lot of butts and caveats here, some states or counties or school districts have actual regulations on the books that sometimes are kind of old. But they do require pure tone screening for children three-five and on up. A lot of those

regulations were created before OAE were even in existence. So you want to make sure that you find out what those regulation are and are participant in conversations about maximizing the potential of current technology and being really thoughtful and intentional abouts methods are being used, if you or your document, we want you to check out a document that compares OAE screening and pure tone screening for this older age group of children, people can have an honest discussion about what the advantages and disadvantages are to each method and so that we're not just simply blindly going forward with what used to make sense and are informed by current research and best practices information.

>>>: Okay. Thank you, William. So now let's go ahead and start with otoacoustic screening, which is the recommended hearing screening method for birth three three-year old, and you will see this method being depicted in all of pictures, and if you are serving kids, it is and this is recommended by the American academy of audiologist and the, and American speech language association as Asha.

>>>: Terry, I have got to jump in here on the screen, everybody take a look at the photos there are four of them. What do you notice about where these children are being screened, it's are what's happening here. They are being screened right where they would be spending their time. They haven't been pulled out into the hallway into sterile room, this--this is one of the advancing of OAE screening, particularly, for the younger population. That might really react to changing their setting that they are in.

So OAE screening is the most appropriate method to identify young children at risk for permanent hearing loss because it's accurate, and it's feasible in that it doesn't require a behavioral response from the child. Which means it allows us to screen children under three-years of age before they are exceedingly fluent, they can even be children that don't speak the language of the screener. Because they don't have to communicate anyway to have the screening completed. It's quick and easy, most children can be screened in just a minute or two. Sometimes as little as 30 seconds per ear. And some people react when they say that, you know, it's like any skill. You have to develop the skill to be able to do it that quickly. But it can be learned. If you notice this picture, this child is sleeping while they are being screened. Yes. You can do it then.

So flexibility, as I pointed out a minute ago, we can go into a variety of environments including the classroom, the home and healthcare settings, if it's a child arrives at the pre-school or day care center sleeping in the back of their parent car, you can slip in alongside them and get hearing screaming done, that's a technique maybe they have tried to do it in other settings and the child was a little resistance.

>>>: This is Terry, I have been known to jump in the car and take a ride around the block, with mom and child while we screened. You can do that while they are sleeping. I want to jump in here, William, as we talk about OAE, and really one of the most important things by the, it's effective in identifying children that have may

have a mild hearing loss or loss in just one ear as well as those that have a severe bilateral loss.

>>>: It's important to note as children age, our the likelihood of finding a child who is profoundly deaf goes down, that probably would have been noticed in other ways, those child with mild or moderate hearing loss are the ones that increasing are identified as they grow and age. So, we're able to identify all kinds of hearing loss with both of the methods that we are talking about today.

>>>: Yes, absolutely. And then, some of cases where we identify a mild or moderate loss, we monitor that, in many ways it's progressive and will eventually lead to a severe or profound hearing loss.

>>>: Now Terry you made a point earlier the primary thing we are screening for is permanent hearing loss. But you also mentioned that we might identify things like wax blockage or fluid in the ear the child won't pass as a result of those, how does that factor into all of this?

>>>: Yeah, OAE screening what you are doing can be helpful in drawing attention to a broader range of hearing health conditions that might need further medical attention. So, OAE screening can help identify children who might have a temporary conductive hearing loss as a result of middle ear infections while this isn't the primary of OAE screening it's definitely an additional benefit of screening with this method.

>>>: An important thing to remember about that, if that's a part of your hearing

screening you identify a temporary hearing loss, like a wax blockage or infection or something like that. Which causes a temporary hearing loss decline. That is not the end of the road in this the screening, we still want to know whether the inner ear is functioning or not. That's something we repeat over and over again as we engage in training and more in-depth discussion about this. So once again, take a look at this picture and imagine the flexibility that this represents. In being able to accomplish hearing screening with a wide variety of children and different stages of development in different settings that you might need to go and administrator screenings to. [MULTIPLE SPEAKERS]

>>>: Go ahead.

>>>: Sorry. I didn't mean to say that if we look at the pictures here, in fact, the screening works best when children are familiar and they're comfortable with the adult doing the screening. Where they can play with the toy be held or sleep while it's being conducted.

>>>: You know what that means? Anybody who is good at working with children can learn to do OAE screening, it's harder to teach people to be really effective with children. That's harder to teach. But for all of you who already have that tuition and the skills for working with children of ages and abilities we can teach you how to do OAE screening and you can play an amazing role in their lives.

>>>: Sorry to interrupt, but I would say through our experience, we absolutely become your biggest fans those of you that work in these settings, we just found you

to be wonderful screeners.

>>>: So, Terry, walk us through an OAE screening procedure, so people can have an idea of what that is like.

>>>: Yes, so first of all, to conduct an OAE screening we'll take a thorough look at the outer part of the ear, open that up and look in there. We want to make sure there is no visible sign of infection or blockage. After we have done that we place a small probe on which a disposal cover has been placed then we insert that into the ear canal, and that probe is going to deliver a low volume stimulus sound into the ear, that inner snail shaped portion of the ear, that's functioning normally, will respond to the sound by seasoning the signal on to the system to the brain, all at the same time producing an acoustic emission that emission is analyze by the screening unit. Then the problem 30 seconds or so, the result will appear as pass. Or as a refer. Now every normal inner ear produces an emission record in this way.

>>>: You heard Terry correctly; our ears actually send a sound back out of the ear. When sound comes into the ear-- like an echo. That's what gets measured by the OAE screening procedure. So, that's a pretty cool thing that was discovered really not that long ago. So that's something some of you have probably never known before. So, let's take a quick look at an actual Realtime screening of a little guy here. Being screened you will see the device a little bit into the video on which the screener on the right is pushing a button after she enters that probe, this is not edited and you can see how quickly that can go.

>>>: Are you ready?

>>>: Here we go.

(video captioned).

>>>: That means they got a result; it's a pass result. It's really nice to have a helper if you can engage in with another adult.

You did it. So, yeah, that makes it look easy. Again, with some time practice and training it can be. So, like so many skills, you know, it does require some practice and training. So to assist with all of that, in in addition to the training and materials that are available we have other things on our website like the screening skills checklist which essentially to walk through all the steps to make sure you are not skipping anything, can be used to monitor one another, as you are screening want to go monitor the quality of your implementation process. You know, Terry made a really important point at the beginning today that implementing evidence-based screening is more than just using a designated piece of equipment or method. You really do need to be trained to use that equipment and to have a screening and follow-up process built around the uses of that equipment. But, you do need appropriate equipment. So, let's talk about that for just a minute. You should be aware that OAE equipment is available from several different companies. And we're at a university, we are not selling equipment, we are selling ideas, we're not really selling I shouldn't use that word. We're just trying to promote best practice. So, there are different models that are out there that are available, the ones for people

that are not audiologist are currently around $4,800. I know there is a gulp there. That's a costly investment. Terry, what do you want to say about that?
[LAUGHTER]
>>>: Thank you for talking about, you know screening that's great for us as lay screeners, there is other equipment model that are intended for use by audiologist like myself that we're going to use for diagnostic purposes and they are more complicated and more and I have. You don't need or want to pay for that additional expense or for those complicated model as non-audiologist, we want you to be careful not purchase more than you need by just getting the simple model the screeners.
>>>: In addition to the cost of the equipment itself, every time you screen a child, there is that disposal cover that also needs to be purchased. They can also be costly; they are like a dollar or $1.50 each. So you will always want to select an appropriate size for each ear, so you have to budget for those, as well as budget for about 150% of the number of children that you will be screening because some of, you will have, try and they won't work. Right off the bat, because you will need a different size.
>>>: Yes. [MULTIPLE SPEAKERS]
>>>: Go ahead, William, sorry.
>>>: I was going to say you want to get adult sized covers--you always want--you will need to learn with the equipment and you want to test the equipment on

yourself, Terry, on a regular basis.

>>>: Absolutely. That was exactly what I was going to say as you will be testing equipment on your own ear or another adult to make sure it's functioning properly before you screen children, so you want to be sure to get some adult sides probes.

>>>: When you meet with an equipment distributor or salesperson, it's really great if they let you try a couple of pieces of equipment, because everybody has their preferences, some of them actually work better in a noisier environment than others. So, you want to have a chance to try that out. It's also important even though equipment distributer will be, salespeople will mention they can offer training, rarely the actual training that you need, an equipment salesperson, they are like a car person, they show you the buttons, but they'll not teach you how to screen. Just like a car salesman isn't going to teach you how to drive or how to parallel park.

>>>: It's exactly the same with purchasing hearing screening equipment. You will need another way to learn how to screen. So, one way is to access the online course through the website that will be showing you in a minute.

>>>: Those are -- on the screen right now are one of the resources you will find on our website. Which points out the different brands of equipment. So, be aware of we don't promote any particular ones but ones we have on there --

Have met basic levels of feasibility for the setting that you work in. So take a look at the equipment section on our website. For this information. And for criteria to use when selecting equipment. Excuse me. Now we're going to transition the

conversation over to pure tone screening now. Before I change the slide, I want to point out that a couple of pieces of equipment actually can be used for both pure tone audiometry and OAE screening. One piece of equipment that does both. I think the one on the right there, yes cost the same for both functions, as the other devices that just do OAE, if you're screening older children are really wanting to do pure tone audiometry, you might want to check out the usability of one of the these devices that does both.

Have a look at the resources on our website.

So, let's talk about pure tone screening now. For those of you that are using this, note that this is never recommended for children under three. As we mentioned, pure tone has traditionally been the commonly used method for children, three-five and older. But, we know that even with the three and four-year-olds it can be difficult, it certainly work with younger children. You probably recognized this method though, because you have already used it or you probably have had your own hearing screening this way. In this procedure, musical notes like tones are presented to children through headphones. The children provide a behavioral response like raising hands or maybe they are going to be told to drop a toy in a bucket. To indicate they heard the tones. Pure tone screening is great. In that it gives us a good idea of the functioning of the entire auditory system. In fact, all the way to the brain, with the child showing physical or behavioral indication that they perceive the sound. It's relatively affordable, and an audiometer is less expensive, being around

a thousand dollars. The equipment is durable and enables us to easily transport and use it in a variety of locations. But generally, those locations have to be silent locations. This is the big difference what you can do with OAE, nevertheless the wide range of individuals can do pure tone screening, though it's a little bit, maybe not even just a little bit more complicated to implement. Terry, tell us how pure tone screening works.

>>>: Yeah, so we're going to start the exactly the same way for OAE, we're going to first take a look at the ear to make sure there is no visible sign of infection or blockage. If that ear appears normal, then you as the screener you will instruct or condition the child in how to listen for a tone and respond by raising a hand or placing a toy in a bucket or some play tasks, this step can take some time because we need it make sure that the child is able to make sure to complete the screening task. Once the screeners observed, you have seen that child reliably, and that's when the screening has started. During the screening process--

>>>: Terry, before you go on, that conditioning process, how long does that take usually? How long should we like plan for that?

>>>: It shouldn't take too long; part of the screening needs to be efficient and quick. So, we should be able to condition them really, you know, within five minutes or so.

>>>: If it takes longer then we have to have that back up plan like the OAE.

>>>: Exactly yeah.

>>>: Sorry to interpret.

>>>: No. Once we go to the, condition, they are responding to the sound then during the screening process, this listen and respond game is repeated at least, at three different pitches on each ear, we'll note the child response or their lack of response after each tone is presented if the child response appropriately and consistently to the range of tones presented to each ear, then the child passes the screening.

>>>: Two notable ways that pure tone screening differs from OAE. The process requires children not only to be cooperative but to be full participants in the process following directions and responding reliably and continuing to do that throughout the whole procedure. As we mentioned, this means completing the initial process we refer to as conditioning or teaching the child and then the screener has to carefully determine whether they are getting reliable response from the child before even attempting to do the actual quote, unquote, casino.

>>>: Then the other difference between pure tone and OAE screening is that the screening for pure tone is not automatic like OAE, and pure tone the screener will step through the presentation of each tone, multiple times and record each response. Then following specific protocol, using the screener will determine whether the ear has passed or not. You can see with pure tone screening, there is considerably more room or potential for screen error to produce inaccurate results so that's why there is this real need for thorough training and oversight, we can make sure that all screeners are adhering to the screening protocol.

>>>: That makes me think that if there are groups of screeners that are giving in a program or school, we have to make sure that everything is doing it the same way. Following exactly the same steps. That comply with what evidence-based practice is.

>>>: Exactly. Let's actually, even as we step through this, I think you will, this will step us through the protocol, you will see the need for training and standardization. So, this right here is an example of actual screening steps that must be documented for each ear as you screen. So through the training process, you will learn all of the steps of the conditioning and the screening process then all of the environmental conditions that need to be monitored and met as you complete a child's screening, then based on the results you as the screener will determine if each pass or not the, the device itself, won't produce the adult as is the case with OAE screening.

>>>: Each time you see a check mark, which corresponds with an actual step, the screener is manually doing it with the child in order to complete the screening. So, every one of these is a specific set of steps. So that's a lot of steps. I don't want to be, I don't want to discourage you, it's just an important thing to know this is not an automated process you need to know which each of those steps involve and why. So, as true for the OAE method, Kidshearing.org provides a set of implementation resources for pure tone screening as well. We have the screening skills checklist list. All of the elements that really serve as the basis for thorough training as well as for monitoring the quality of your screening practices.

So, we've given you an overview of the two methods, regardless of which method you use, you will eventually have a child who doesn't pass the screening. So, what then? In order to be evidence-based, your screening process has to include a follow-up protocol for when children don't pass. We want to emphasis, our screening efforts are really only as valuable as is our ability to systematically follow-up on children that don't pass the screening, we don't want to screen a bunch of children, we need to really have a solid full plan for when children don't pass on one or both ears so, just so that you have general idea of what that follow-up process should look like, let's take a look at this. This is on our website. So, you know, don't feel like you have to get this all right now.

The percentage that I'll talk about here relates to children -- in the birth to three age range, we expect some of the percentages would be probably higher meaning that you have less children to follow-up on. With children or older. That's only because they are less likely to have those chronic ear infections that can slow down the process. So, let's look at the protocol, we're going to screen 100% of the children, initially with OAE or pure tone on both ears. We expect about 75% will pass. On both ears. Will not need any further follow-up. Let's say you're screening a hundred children you have 25 maybe that won't pass. In one or both ears. Those children will then need to be screened a second time within about two-weeks.

>>>: You know the interesting thing at this point the many of the children, that

didn't pass, they pass the second screening it's 8% of the total number of children screened that won't pass the second screening, these are the children that need to be referred to healthcare provider for a middle ear evaluation.

>>>: This is an important point, when you talk about follow-up, people can get overwhelmed. Out of a hundred children, you have got eight now that you are probably going to be referring to a healthcare provider and following to find out what happened when you refer them. Once a middle ear problem has been resolved and you have communicated with the healthcare provider and know that they believe that the ear system is healthy and clear, you will screen those eight children one more time.

>>>: Now, we expect it's going to be less than one percent of the total number of children being screened that won't pass the third screening. So, these are the children that will be referred to a pediatric audiologist for audiological evaluation.

>>>: Although a small subset of children will need a follow-up referral further screening after the initial screening, we have overseen thousands of early childhood programs settings where this protocol has been followed, it started off even more complicated than this, we found this protocol is the most feasible, it's feasible partly because we are not over referring children to audiologists like right after the first screening. We're not over-referring people to healthcare providers, but we are getting the children to the healthcare provider and to the audiologists who really need to be there. Then, we're seeing the identification rate being exactly what we

expected. Which would be about 3, three out of a thousand with a permanent hearing loss. So, you could have a screening program that you are operating for quite some time before a child is identified with a permanent hearing loss. But eventually you will. This is another illustration of that same protocol that you will find on our website. We don't have to go into it again here. But Terry, there is an exception to the protocol, can you tell us about that in.

>>>: We hit on a little bit earlier, but there is, the exception to the protocol is an important one to point out, it's whenever a parent or caregiver expresses concern about a child hearing or their language development even if they passed the screening, that child should be referred for an evaluation from a peed pediatric audiologist & hearing screening methods are not 100% accurate or perfect to be on the safe side, whenever there is a concern about hearing or language, make a be direct referral. Of course, you can and ought to still screen the child send that result along but make the referral regardless of when a concern about hearing or language development has risen or persist.

>>>: One of the early findings in the work that we are doing over the last 20 plus years, that we have continued to see, there are number of children who may be enrolled for speech therapy, or other interventions who have not had their hearing tested. Though that seems so obvious to us, that why would you engage in implementing speech therapy without knowing if the child hearing is typical. That does not always happen. So we want to make sure not only that we identify hearing

loss, but that the children aren't being misdiagnosed with other conditions. Another scenario, a child this is particularly true with really young children, not so much with older ones. Because you have got more time. A child maybe on the autism spectrum and a child who may have severe to profound hearing loss, early on in life, may present very similarly. So, we've had experience with children that had been identified on the spectrum. But they did not have their hearing evaluated only to find out later that maybe they weren't on the spectrum at all, but that they had a profound hearing loss. By incorporating a hearing screening, screening monitoring protocol, program, into our educational and health practices, you're tightening up all kinds of identification and diagnostic processes, both those that lead to the identification of children with hearing loss as well as make sure that other identification are diagnosis have adequately considered hearing as component. So, our website. It's Kidshearing.org. Let me just review again where you will find some of the things we talked about today. This is our website, landing page. That first section of resources are the big picture resources. You will find links here to find a local audiologist and pediatric audiologist and information about equipment there, in the next group, this is where you will find links -- to our training. Online training opportunities there.

In the next group you will find resources that are really the ones about implementing screening practices. What do I need to prepare for a screening day? We have got a checklist there to help you just plan yourself. We have got the protocol guides and

are forms the protocol that we just went over you will find that all right there. And forms that totally correspond responding to the protocol that allows you to follow along in the steps when a child doesn't pass. In either, or both, you don't have to remember the steps; the forms do that for you. We have letters in English and in Spanish. For parents as well as to healthcare providers, when a child needs to be referred or a result needs to be shared. We even have scripts there, just suggestions on which you as a screener should and should not be saying at different points in the screening and follow-up process. Then the last group is about tracking groups of children through the screening process so that you can stay on top of the small subset of children that need those follow-up steps and that you are able to monitor the quality of your implementation. If you are in HeadStart there are other resources available on the web for your hearing screening practices that you may want to check out, you will find links to that on our website as well.

You may not have ever thought of this quite like this. But monitoring the status of a child hearing or group of children's hearing is actually central to quality early care and education programs. That are committed to language development and school readiness, mental health, socialization and all of the good stuff that we want children to be getting as they are supported in their growth and development. When children with hearing loss are identified and connected with the intervention resource they need, they can thrive just like any other child they should. You can have the satisfaction of knowing that you are a part of that outcome. Think about these

examples that we saw earlier, these children you see on your screen there, they are thriving and they are going to succeed and their hearing loss does not need to be a barrier. That's the whole idea. So, we'll open up the Q&A field now. And if you have questions or comments that you would like to make, we would love to have a chance to address them. Let me make sure that I can open my screen here. One of the questions, Terry, are there any other screening methods that would satisfy requirements to do periodic screening of younger children other than OAE or pure tone?

>>>: Yeah, thank you. For that question. The quick answer is no, there is not. It's really just these two methods that provide, you know evidence-based hearing screening that meet the criteria to do so, no it's just the two of these.

>>>: Let's see, I don't see any other questions yet.

>>>: There we go.

[LAUGHTER]

>>>: You have a recommended draft protocol for DP OAE screening? Currently I use two-five thousand hertz screenings. So this is somebody who is more experienced, every. y that's already under way in screening asking about the protocol that is actually functioning inside the, inside the box of the OAE device itself.

>>>: Just looking at that, this is thank you for that question. And the looks like default that you are using is appropriate.

>>>: The website has been updated just a couple of days ago, but it's all of the

information is still there. We reordered a couple of things, but if you are having trouble finding anything just use the contact us button there I will get your email directly. And I can help you find what you need if you are looking for something in particular. I mean this change happened right before and after we had prepared today's slides. The next question is rescreening every four-six-weeks or every two-weeks?

>>>: We're not suggesting every four-six-weeks. We're suggesting if a child doesn't pass, on one or both ears -- let me get over the protocol here. If they don't pass the first screening on one or both ears, we wait two-weeks to screen them again. The reason why we do that, is A we don't want to send all of those children that 25% to a healthcare provider. The reason why, is because some of the children might have had wax that comes out on its own you can screen effectively after that. Or if they had fluid in their ears, it would dissipate or dry up in the interim. We try to screen them within about two-weeks. Terry, do you want to add anything to that?

>>>: No, other than the two-week period is one that we found sufficient for say course of antibiotic and that fluid can stay in there for a little--while that's a recommendation for two-weeks--I saw a question, just rolled off, but it was about earwax. Saying that they seem to have a fair number of children that, that make a difficult to screen due to earwax, if we had any suggestions. There were two things that come to mind, even if I see some earwax in there, I will try to screen, I have often found that the probe will actually pull out enough wax that I'm able to get a

screening on --

Change the cover and put in a new one to be able to get the screening done. Another thing that you can do is try to even though there are some wax open that canal up a little bit, so I will pull and maybe massage that canal a little bit with my thumb and try to open it up, and then, try to screen so that some of the stickiness of that wax will let that ear canal open up to get that screening done, I know that can be frustrating.

>>>: So, the neck question and mind you some of these from people that are clearly already doing some screening which is great. But I want to encourage those of you who are already engaged to check out the recording of the webinar that was done yesterday. February 25th. Because we went into some greater details about some of the sorts of things. So, this participant is asking -- we are told to--they are talking about pure tone screening. We were told to do screening at 25-decibels and asking why are we recommending 20 instead?

>>>: It's because 20DB is the actual; the excepted screening range to be able to screen for normal hearing sensitivity using the pure tone method. I believe that the five DB increment was raised just to account for help some of the screeners account for the thing of background noise, we can't keep raising the level just to overcome the background noise. But I believe that will was the reason because of the variety of environments that were screening in. They had made the decision to allow that five decibels of variability.

>>>: The next question is about those of you who were seeking funding, writing grants for purchasing OAE equipment and supplies. Of course, we're eager to help you with that process, we have a grant proposal that we wrote and that you are invited to use copy and paste and send off--adapt to however it fits your needs that's on the planning resources page on our website.

We know that having to sit down and write a description of OAE screening and why you are doing it, etc., is a burden. So, we figured why not just write this for folks you can use it and submit it and we found that local charitable organizations particularly clubs likely I don't know-- or other clubs--both of them have a hearing thrust to their priorities. That may speak to what you want. To get them to fund for you. Check out those resources on our website, if we can be of further assistance by all means contact us through the website.

>>>: If I could interject there. I appreciate this question because I personally have had quite a bit of success, the various local foundations they loved to fund this and the equipment. So, most of them feel like for the amount of funding to buy the equipment to -- applied broadly, in effect, a large number of children you are screening, has been very positive. So, I would encourage you to do that.

>>>: The next question is for new staff, just starting to use the OAE screening method, is there a training that you would recommend them to do before they, before they get started? I would say, yes, absolutely. That goes for both OAE and pure tone. There are a variety of ways you can get training. But you want to make sure

that you are getting standardized evidence-based training. We have through our website and you see where on our website right there, links to online training which is available in a sort of on demand way. That are covers all of the basis. Provides you with a certificate of completion. We recommend people get trained every year. It will take a couple of hours to complete. There are some practices activities incorporated into that. It's a great way to make sure that your skills haven't wandered off a little bit. There are always things that we can do when we get quotes, up quote--that may not be quite right. So, getting a refresher on a regular basis is a good idea. You want to add anything about training?

>>>: I think it helps you to keep your annual training, helps that quality of control, it alleviates any drift from best practice. So, I would encourage and I find myself it's really great to just be reminded and ensuring that the quality of the program is -- what it needs to be. I do see a question here about a child that came up as a referred, one ear struggles with allergies and issues with ENT situation. Decided to wait for the upcoming appointment, turns out his hearing is great, I think he handled that appropriately, you were already in the follow-up situation with the ENT and I'm assuming or it looks like -- those concerns with the ear were communicated. Then, it sounds like the ENT during that visit his hearing was checked. The point here to make is we want to ensure that we can get results that the actual hearing test or screening was depleted as mentioned earlier. But thank you for that follow-up.

>>>: We have a question from an audiologist who's asking how do I add my practice

to the list of available audiologists in my area? I'm so glad that you asked that. Couple of things that you can do, one is to reach out to the state's Early Hearing Detection & Intervention. Program, and let them--they are a clearinghouse for folks. The link to that is on our website, where it says, find an audiologist, do you see that in the first group? You will find your local or state -- newborn screening program there, you can inquire with them for that purpose, there is also EDHI pals and online audiologist that provide different functions it's free to use for anybody, you can enroll your program or your center or yourself as an individual there. It's again one of the resources we direct people to. In looking for an audiologist for different purposes. So I hope and I guess, lastly, you could reach out to local programs directly whether or not that's early HeadStart programs, head start programs, part C early intervention or school district and let them know about your availability. If is there an informed hearing screening that could be completed prior to form hearing screening, by asking questions about a child's hearing ability such as the response to environmental sounds and the child's environment. Has he had high fevers, has he had recurrent ear infections, Terry?

>>>: In fact, I am wondering, William, is it Ed for you to go back to the slide that addressed that. But, the quick answer yes there are questions narrows typically various forms of parent questionnaire that will look at observations around a child's hearing--that doesn't constitute a screening. I would never want to replace an objective screening with one of those questionnaires, the questionnaires should be a

supplement to the screening but never take precedent over the screening. If we are here on this slide here, this is where just the questionnaire would be considered a subjective method, and you have caregiver perception that you see there, that does not constitute an objective screening. So, we can use it as a supplement too, but we would never want it to be considered the screening.

>>>: We are quickly approaching the bottom of the hour. We'll answer a couple of more questions, for those that need to run off, in the chat there is a link about to appear. That will take you to short, very short evaluation of us. That once you have completed that, it will also generate a certificate of attendance for today's webinar. So if that's useful to you, to have that certificate, be sure to do the evaluation before you take off, of course we want everybody to do the evaluation we want to know how we've done, we are trying to improve ourselves. And anticipating your needs and questions. So we would love your feedback on today and you can also contact us with your feedback through our website. I don't think we're going to be able to get through all the questions, unfortunately. Let's see if we can do one or two more, if there is something else we can do for you, feel free to get in touch with us.

Does the child need a parent consent for the test to be conducted? I would say in most instance that would be an absolute yes. Some programs have incorporated those consents in a sort of universal way. When children enter the program, they list all of the things that like the head start we'll be doing and hearing screening is one of

many. Whereas other settings may have a unique individual consent form. That needs to be signed for hearing screening. We have some on our website, the letter to parents explaining the screening procedure. You are welcome to copy and paste into a consent form that explains both the screening, the rationale for it and what the follow-up would be if the child doesn't pass. Terry, do you see one more question that we should answer?

>>>: Is it a hearing issue when a child is mute what is the best hearing test to use in this case? It very likely could be a hearing issue. When a child is mute. And, because of --

In this case, I would my mind would automatically go to the probably using an otoacoustic emission to screen the hearing, I'm not complicating any interpretation in pure tone by miss reading non-verbal communication. So that's where I would go, I would use otoacoustic emissions in that case.

>>>: In looking at your question, they are all great.

>>>: They are great.

>>>: Really great questions that are part of completing comprehensive training, we are trying to introduce you to this, but we want you to complete thorough comprehensive training. Again that is available through a link to our website, we can't encourage that enough, because of the time that you are spending doing screening, that you are actually doing it correctly; not making any critical mistakes. So, I think we'll end on that--thank you again to our interpreters and to our captioner

today. Terry, to you, for your back-up support and all of you for the time and energy that you put into so many different things. To support the ongoing development and health of the children in your purview.
We know that hearing screening for most of is one tiny little part of your daily lives. But getting this right can really make a life changing difference for children. Because as you can imagine, if you have an unidentified hearing loss and you are struggling, that's kind of stuff that can linger for a long period of time if not forever. So, if we can prevent that and provide children with the supports that they need, then you will change their lives, with that, thank you, everybody and I hope you have a pleasant remainder of your day and remember, this webinar has been recorded. We'll be posting this on the website in the next couple of days. As well as the one from yesterday. So, take a look and take a look at the website. Get in touch if we can be of any further assistance. Thanks.