

NCHAM-Introduction to Evidence-based Hearing Screening and Evaluation Practices for Children Ages 0-5.

>> William Eiserman: This is an audio check for today's webinar. You're in the right place for our webinar that will be starting in about six minutes entitled Introduction to Evidence-based Hearing Screening and Evaluation Practices for Children Ages 0-5.

This webinar is being brought to you by the ECHO, which is the early childhood outreach initiative and I'm just talking to make sure people have a chance to get their volume adjusted to their liking. You'll also notice that there is an Interpreter online with us today whose time and talents we so much appreciate. You can adjust the size of the Interpreter's window by moving the bar between where you see the Powerpoint slide and where you see the video. So, you can adjust the size of those respective screens to your liking.

You'll also see there is a captioning option available as well. So, once again we're going to start at the top of the hour. I am going to repeat myself here several times over the next five minutes as people sign in, so I ask for your patience with my redundancy. We have quite a few people who have registered for today's webinar, well, over 900. And so, we want to give everybody a chance at getting the most out of this experience by having a chance to adjust their volume and screens in a way that is going to work best for them. Terry, can I do a quick audio check in with you?

>> Dr. Foust: How did that sound, William?

>> William Eiserman: I didn't hear anything until just now.

>> William Eiserman: I thought you were playing with me.

>> Dr. Foust: I was trying to use the space bar and found it is not Kansas City.

>> William Eiserman: For those of you who have just signed on. You are in the right place for today's webinar that will be starting in just a few minutes. This webinar is going to be recorded, and what that means in the next couple of days, you will be able to stream it from our websites [infinitehearing.org](http://infinitehearing.org) or [kidshearing.org](http://kidshearing.org). So, if anything disrupts your full attention to us today you'll have a chance to come back and view it in its entirety in the next couple of days. Keep that in mind as well, in case there are people you know who aren't attending live with us today who you think might benefit from what we will be covering. You can direct them to stream it as well.

We have people signing in at a fairly rapid pace right now, so we're going to give it one or two more minutes and then we will get started.

>> William Eiserman: Well, I would like to welcome everybody to today's webinar. My name is Will Iserman from Utah University. You don't need to worry about signing in. You are signed in. You are with us and you are muted. We're going to be opening up a text field toward the end of our presentation today into which you can type any questions that come up for you during our presentation today. Jot down any notes that you have along the way and if we happen to not have answered your questions that will be a good time for you to raise them with us.

I would like to give a shout out to our Interpreter and our Captioner today. These are, as you can see, real-life people who are helping us to provide the most accessible experience for everybody, so we're really thankful for their assistance with us today.

This webinar is being recorded, which means in the next couple of days, it will be available to be streamed on either [infanthearing.org](http://infanthearing.org) or [kidshearing.org](http://kidshearing.org), so if anything disrupts your full participation in today's webinar or if you think of folks that might benefit from the content that we're covering today who aren't attending live, direct them to our websites and we will be talking about those periodically throughout our presentation today. [Kidshearing.org](http://Kidshearing.org). In fact, that's a great thing to jot down right now if you have a piece of paper available, because everything that we're covering today is available there. So, we hope this will ignite your interest in going further and to check out our website when we're done, because there are many practical free resources available there.

We also want to let you know at the end of our webinar today, we're going to be opening up a quick little evaluation link that will also provide you with a way to get a certificate of participation in today's webinar. So, if that's important to you, make sure you hang on at the end and get the link that will be displayed at the end of our webinar to get that certificate generated for you.

So, without any other delays let's go ahead. Once again, I will My name is Will Eiserman and I am the director of the Early Childhood introduce myself. My name is Will Eiserman and I am the director of the Early Childhood H earing Outreach Initiative, as some of you may recognize as ECHO Initiative. It is housed at Utah State, which as the Early Hearing Detection and Intervention National Technical Resourceserves

as the Early Hearing Detection and Intervention National Technical Resource Center, funded through a cooperative agreement with the Maternal and ChildH ealth Bureau. Since 2001, oh, that is more than 20 years, served as a national resource center on early hearing detection andthe ECHO Initiative served as a national resource center on early hearing detection and intervention with a focus on supporting early head start and head start program staff in implementing evidence-based hearing screening andf o l low-up practices, as well as other early providers like early intervention and programs like that. We're delighted to continue to make our other learning opportunities available to staff from Head Start programs asresources and other learning opportunities available to staff from Head Start programs as well as anyone else in the early care and education community who can put these resources to work.

So, you get a quick little shot of me, and I'm joined today by Dr. Terry Foust who is a pediatric audiologies who is a trainer to the ECHO initiative since the very beginning.

>> Dr. Foust: Thank you, William. He and I along with other ECHO team staff, as well as many local collaborators have provided training in nearly every state and it has involved thousands of staff from early head start, head start, American Indian Alaska native and migrant head start and other early care education programs over the 20 years that William mentioned.

We're always encouraged, just like we are today by the huge amount of interest there is in establishing evidence-based hearing screening programs, so children with hearing related needs can be identified and served.

>> William Eiserman: We always like to start here. The work of the ECHO initiative is based on the recognition that each day there are young children who are deaf or just hard of hearing who are being served in early childhood education and health care settings, often without their hearing related needs

being known by anyone. Hearing loss is often called an invisible condition. So, the question is, how can we reliably identify which children have normal hearing and which may not?

>> Dr. Foust: Well, the short answer to that question, William, early care and education providers can be trained to conduct evidence-based hearing screening just like you can see here on your screen in these photos. Now, the ultimate outcome of a hearing screening program is we can identify children who are deaf or hard of hearing who are not been identified previously. So, if we take a look here, the procedure on the left is called Otoacoustic Emissions or OAE hearing screen and that is the recommended screening for children are birth to 3 years of age and it is being recommended for children 3 to 5 years of age as well.

On the right, you will see the Pure Tone Audiometric screening, which has been used to screen children 3 years of age and older, which you will see in early care and education settings or providers using. So, we'll talk about both of these methods today.

>> William Eiserman: Let me give a quick overview of what we want to cover today. While the presentation is not a training per se, our goal is to provide an overview of the big picture of what's involved in implementing evidence-based hearing screening for children across the age spectrum birth to 5 years of age. We're going to start off by giving you an overview of the auditory system or the hearing system, which will help lay a foundation for understanding how the hearing screening methods we're going to be talking about today actually work.

Then we're going to talk about why we screen for hearing loss. What makes it possible for us to be seriously engaged in systemic screening for hearing. Then we will talk about the two methods Terry just mentioned, OAE and Pure Tone Audiometry starting with the overview of the OAE process followed by the Pure Tone Audiometry screening process. Next, we will address the important question, what you want to think about when you're establishing a screening program, what do we do when a child doesn't pass a screening? We'll summarize the follow-up steps that are undertaken when a child doesn't pass a hearing screening on one or both ears. We're going to wrap up by showing you how to access resources that we have able and that are available elsewhere to support the process of developing and maintaining quality evidence-based hearing screening practices. And then we will address any questions you might have.

So, again, jot down questions that come up along the way. Maybe we will have done a good job and we would have anticipated your question and you won't are to raise it after all. If there are things we don't address or you want us to repeat at the end of the webinar, we will open up the Q&A box for us to address those. So, that is where we're headed. You can follow our progression through these topics by referring to the left side of your screen and since this is a recorded webinar, this left side menu can be useful if you return to this and want to navigate to specific portions of our presentation to review it again or to share with others.

Before we launch into our primary content, I want to make sure you all know where to go after today's webinar to get additional resources, information, and access to training.

>> Dr. Foust: William K I interject for just a moment?

>> William Eiserman: Yeah, please.

>> Dr. Foust: One of the things that you all will hear us say several times today is we want to make sure everyone understands is that implementing an evidence-based hearing screening practice is going to be more than just using a designated piece of equipment or a specific method, because in implementing evidence-based practices the recommended equipment or the methods that we're going to be talking about today, they are to be used to a prescribed set of steps under carefully controlled condition, each step is carefully documented in detail. This is, you know what we learned over years, Early Childhood Outreach Initiative, known as the ECHO initiative developed a wide, free range of resources to help you achieve the goal of implementing evidence-based hearing screening. So, our goal is to help you find all of the resources that you're going to need.

>> William Eiserman: Yeah, thanks, Terry. Let's make sure right off the bat you know where to go, why you will go there and what you're going to find. Let's take a look at our website, which is [kidshearing.org](http://kidshearing.org). We invite you to feel free to use all of these implementation tools and certainly, before you sit down to draft a letter to parents about your screening efforts or referral letter or to develop a form for documenting your results, check out what we have at [kidshearing.org](http://kidshearing.org), because you may just find what you're looking for already exists.

Many of the resources that you'll find here on [kidshearing.org](http://kidshearing.org) are the result of various examples, early childhood programs have shared with us that they wanted us to share with you. So, you can be assured others have used the language and the format of many of these resources to achieve the same goals that you have. Also, want to know one of many -- oh, we also want to make sure know where to access training, because we know that is a question that you're going to have. So, be assured we can direct you to a specific location, so you can have the training that you need online. Take time after the webinar to get acquainted with our resources.

This is our landing page for [kidshearing.org](http://kidshearing.org), which provides a wide variety of practical resources. The first part of the page places early childhood screening in the larger context of identifying children who are deaf or hard of hearing expanding the traditional focus on newborn hearing screening to include a focus on identifying hearing loss throughout early childhood. Now, if we scroll down, this is where you'll find all of the practical resources, most relevant to early childhood screening, starting with planning resources.

You'll see under "planning resources" that there are some big picture resources, some handouts about just explaining the rationale. A lot of the information that we go over today, we're going to be encouraging you to have a partner audiologist to be there with you or to train with you or train your staff to give you pointers and they can be invaluable referral network for when children don't pass. There are resources there for finding a local audiologistless. There is available equipment on the market now.

In the next group of resources, you can find where you can access training. It is so much more than just using a piece of equipment or having a piece of equipment that has been designated. You'll want to make sure you get thoroughly trained on the use of that equipment, and you'll notice under this heading there is an access to online training that you can access any time you or your staff need it. We know many of you are needing to know how to get training for hearing screenings, so you can click

on "OAE" or "Pure Tone Audiometry" and you will be taken to a NCHAM non-federally funded website to get that training.

Then if we go on to the next set of resource, this is where you will find a lot of practical resources for getting ready to screen children. Checklists for screening, a reminder of the screening protocol, letters to parents, referral letters for parents and providers, suggestions on how you talk to parents about screening, and screening outcomes, so lots of good resources there for you to check out as well.

And then follow-up resources, we have available a tracking tool and resources for monitoring the quality of your screening program. So, kidshearing.org. If you don't remember anything else from today, remember this website, because that is where you will find this webinar in its recorded format, as well as all of the things we just went over briefly.

So, let's put all of those resources into context, Terry. Let's start by giving an overview of the auditory or hearing system, so everyone has a general idea of what it means to be screening hearing.

>> Dr. Foust: Okay, thank you, William. So, there's are three main parts to the auditory system.

There's the outer ear, the middle ear, and the inner ear or cochlear. When sound enters the outer ear, it causes the eardrum to vibrate, which then moves three small bones in the middle ear. This movement stimulates thousand of tiny sensitive hair cells in that snail-shaped portion of the inner ear called the cochlear. From the inner ear, the sound signal is carried along special nerves to the hearing S'mores brain, and then the individual experience -- hearing sensors of the brain. There can be some exceptions. So, there can be temporary issues like wax blockage or there could be fluid in the middle ear caused by ear infections that we may discover and get addressed during the hearing screening process. The primary hearing screen is the function of the inner ear or the cochlear, which is the snail-shaped portion of the ear that you see here.

Now, in some instance, -- instances, will travel through the outer to the middle ear and when it reaches the cochlear, it it is not transmitted the way it should be to the brain resulting in what we call a sensorineural hearing loss. This condition, sensorineural hearing loss is usually permanent and this is the condition we're screening in our mass screening efforts. This might come as a surprise to you, but it is important to know that sensorineural hearing loss is the most common birth defect in the United States.

>> William Eiserman: Yeah, in fact, about three children in 1,000 are born with a hearing loss, deaf or hard of hearing. Most newborns in the U.S. are screened for hearing loss using evidence-based methods. Most often before even leaving the hospital. But screening at the newborn period isn't enough, because the research suggests that the instances of permanent hearing loss doubles between birth and school age from three in 1,000 at birth that you see here to about six in 1,000 by the time children enter school. Some people think it is more than that.

>> Dr. Foust: Yeah, so as a result of that, we can't only screen for hearing loss at birth. We need to screen throughout early childhood, because hearing loss can occur at any time as a result of illness, physical trauma, or environmental or genetic factors. So, this is often referred to as late onset hearing loss simply meaning it is acquired after the newborn period.

>> William Eiserman: You know, it is commonly understood that language development is at the heart

of cognitive and social-emotional development and school readiness and it drives many of the practices that we see in early childhood settings, certainly frame what is head start is all about. Think about how much emphasis is placed on early childhood development, counting how many words children can produce. Hearing health is at the heart of typical language development. If we're going to be conscientious to early childhood development as part of school readiness, we should be equally conscientious in monitoring hearing throughout that same period. If hearing is compromised then typical language development will be compromised as well and we don't want to wait for a language delay to develop in order for that to trigger the time to check out the status of a child's hearing.

>> Dr. Foust: Yeah, this is exactly why we see so much emphasis being placed on monitoring the status of hearing in younger children. So, programs like head start, which for years have served as models of comprehensive health and education programs for young children and their family, they've required hearing screenings for all of their children even before we had the excellent methods that we now have to do this.

>> William Eiserman: You know, sometimes we use the term "screening" and we neglect to make sure everybody really understands what that means. As an audiologist, Terry, how do you describe what screening is or in this case, what hearing screening is?

>> Dr. Foust: Yeah, that's a good point, William. Screening can be thought of as kind of a sorting process. The sorting process helps 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 that first higher risk group, they're the ones that are followed with additional steps implemented by pediatric audiologist and health care providers to continue to refine that sorting process until we can definitively identify that small group of children that actually have a hearing loss. And to be blunt, we screen, because we simply can't provide a comprehensive audiological evaluation on each and every child.

>> William Eiserman: Screening, followed by appropriate audiological assessment can dramatically improve the outcomes for children who are found to be deaf or hard of hearing. When hearing loss is identified early, we can make sure a child has access to language.

>> Dr. Foust: Yes, and as a result, children who are deaf and hard of hearing or hard of hearing are thriving in ways that used to be aware. By providing allergy screening, you can be part of providing these amazing, life-changing outcomes. We would love for you to take a look at several examples of children with severe to profound hearing loss who had the benefit of early identification and quality intervention. These children are learning, driving and they are communicating.

>> William Eiserman: So, we're going to take a look at two girls here who have severe to profound bilateral hearing loss. They are going to be playing with each other. They have hearing aids that is their mode of assistance to address their hearing loss.

[video with captions]

>> William Eiserman: So, they are talking to you and talking to you and it is wonderful to see how well they communicate for their age given that they are considered deaf. Now, in this next example, the parents of these children have elected to use Sign Language as their mode of communication or their primary mode of communication. Let's see how well they are communicating during a car ride.

And in our next example, these boys are what are called cochlear implants. They will explain that.

[video with captions]

>> William Eiserman: So, those children reminds of our goal. We want to make sure all children have access to language one way or another regardless of whether they have a hearing loss, and the way to achieve that is to be fully committed to quality periodic hearing screening and follow-up.

>> Dr. Foust: Now, as we mentioned a moment ago, OAE and Pure Tone Audiometry are the recommended methods that we're going to be talking about this afternoon. So, the availability of OAE and Pure Tone screening is not subjected to methods used in the past. These are methods such as ringing a bell behind a child's head or depending on a caregiver's perception of a child's hearing. Don't get me wrong, a response to a sound or lack of response can be helpful and we should pay attention to how a children do or do not respond to their environment, but these sorts of observations can be helpful.

>> William Eiserman: This is not yet standard practice, especially for children less than 4 years of age.

>> Dr. Foust: Some parents will say with certainty that their health care provider did perform a hearing screening. Routine examinations of ears by health care providers should not be mistaken as hearing screenings. It is precisely because screening isn't yet happening consistently in that context that programs like yours are so helpful. They are adopting hearing screening practices, because there is an increased recognition of the importance of monitoring hearing and now it is feasible to do this in programs like yours and by people like you.

>> William Eiserman: So, the take-home message is this, unless a child's health or medical records include documentation of ear-specific hearing results and the screening method that was used, we should never assume a hearing screening was completed by someone else, even a health care provider.

>> Dr. Foust: Exactly. Another important point to remember is this, while OAE and Pure Tone screening, while they are highly reliable screening methods, they are not perfect and that means there may be rare conditions that are not identified through these screenings. So, whenever a parent expresses a concern about a child's hearing or language development even if they received and past a hearing screening using one of these methods, that child should be referred for an evaluation from a audiologist.

>> William Eiserman: Before we go on, let me say one more thing about newborn hearing screening results. When children enter programs or a system, especially during the first year of life, always be sure to collect their newborn hearing screening results. If the results are anything other than a pass on both ears, you want to make sure the follow-up evaluations have already occurred and if you don't see evidence of that, you'll want to help the family circle back to their health care provider to accomplish that. And if you're in a program that requires an annual hearing screening, you can use the newborn hearing screening result for the first year of a child's life, but you want to rescreen after that.

Okay, now let's talk about the two hearing screening methods that we're going to be talking about today and that are used during early childhood. If you're responsible for children under 3 years of age,

the recommended method is OAE screening or Otoacoustic Emissions screening, which you see on the left here. If you're responsible for screening children 3 years of age or older, historically Pure Tone Audiometry has been considered the recommended method for this age group. This is that headset screening where the child raises a hand or performs a task each time they hear a sound presented into the earphone. You see this method being used on the right.

>> Dr. Foust: Now, there is growing recognition for a variety of reasons that as common as the Pure Tone method has been, it may not be the most feasible method to use with some of the younger children. The research has shown 20% to 25% of children in the 3 to 5-year-old age group can't be screened with this methodology because they are not developmentally able to follow the directions reliably and that has been our experience as well. In those instance, OAE screening who you would be the preferred method for these children.

>> William Eiserman: At a minimum, if you're establishing evidence-based screening practices for 3 to 5 year olds and considering using Pure Tone screening, you also want to think about and be equipped with OAEs, so that you have a strategy for that 20% to 25% who can't be screened with the Pure Tone method or alternatively, you'll need to have a means for systemically referring all of those children to audiologists who can perform the screening, which to be frank that can be quite changing to accomplish. There aren't that many audiologists and time in their schedules to screen children.

>> Dr. Foust: To simplify things, more and more audiologists are recommending use t use of OAEs uniformly for all children with 3 years and older, because it is for more likely to be a method that is going to work across the board with all children in that 3 to 5 age group that you would be screening and it is equal leafiest.

>> William Eiserman: If you and your program are undecided on which method to use in children 3 to 5 years or older, we encourage you to take a look at a document on our website. I will be showing you where to find that in a moment.

>> Dr. Foust: Let's start with Otoacoustic Emissions or OAE screening, which as we said is the recommended hearing screen method for birth to 3-year-old children. You see that here depicted in these photos. So, if you're serving children birth to 3 OAE is the one and only that is recommended by the American academy of audiology and the American American speech language hearing association or known as ASHA.

>> William Eiserman: The answer to that question is OAE screening. You're not going to find another evidence-based practice that you could defend. So, OAE screening is the most appropriate method to identify young children at risk for permanent hearing loss in at least that birth to 3-year-old range, because it is accurate and it's feasible. It doesn't require a behavioral response from the child like raising a hand or something like that. And that means that we can screen children under 3 years of age. In fact, this screening is used often with newborns. It's quick and it is easy. Most children can be screened in just a minute or two, sometimes in as little as 30 seconds once we've learned, and this is important, how to do the screening well. There is a little bit of a learning curve. It's a flexible tool, and what that means, we can go to where children are to conduct the screening, just like you see in the photo here.

These screeners went to his little place at snack time and screened him while he was already happily participating with his friends at snack time. So, we can screen in a variety of environments including the classroom or the home, and most importantly of all, Terry.

>> Dr. Foust: Yeah, this is the key, it is effective. It is effective in identifying children who may have a mild hearing loss or a loss in one ear, as well as those who have severe bilateral loss or hearing loss in both ears. In addition, contents be helpful in drawing attention to a broader range of hearing health conditions that may need further medical attention. OAE screen canning help to identify children that have a temporary hearing loss that is a result of middle ear infections, although this is not the primary goal of OAE screening, it is an additional benefit of screening with this method.

>> William Eiserman: Take a look for a minute at these photos. These children that you see here are all being screened with the OAE method. Look at all of these different ways they're being screened, these different settings and what they are doing. What do you notice about these photographs? They're not being pulled out of where they would normally be, out into some other environment that is foreign or strange to them. They are being screened in everyday educational or home environment where is children are already happily spending their time. Those folks that you see doing the screenings are often people they already know, teachers, home visitors, health specialists who come in and out of their classrooms for different reasons. It works so well under all of those different circumstances.

>> Dr. Foust: Yeah, in fact, as you all know, the screening is going to work best when children are familiar and comfortable with the adult doing the screening and they can play with a toys, be held or sleep while the screening is being conducted.

>> William Eiserman: Yeah, or even sleep while the screening is being conducted and that offers a whole other set of options. So,ar they, let's walk through how the OAE screening procedure works. Again, folks, this is not a training. We're just giving you an overview, so you have an understanding in general how this works.

>> Dr. Foust: Okay, let's begin. To conduct an OAE screening, we're going to first take a thorough look at the outer ear. The outer part of the ear and we want to make sure there is no visible sign of infection or blockage. And then a small probe on which we placed a disposable cover is placed firmly into the ear canal. The probe delivers a low volume sound stimulus into the ear. The cochlear or the inner snail-shaped portion of the ear, a Cokier responding normally will respond by sending a snag to -- sending a signal to the brain and 30 seconds or so, a result will peer as a pass or refer.

>> William Eiserman: So, you heard that correctly. A human ear responds to sound by producing an emission that we can measure coming back out of the cochlear and can be measured by a tiny microphone in that probe and that is how we get these automated results.

>> Dr. Foust: Exactly. And the nice thing about that is every normal, healthy inner ear produces an emission that we can record in this way.

>> William Eiserman: And that is why we can screen children of so. Different ages under so many different conditions even sleep. Now, let's watch a real-time unedited screening using the OAE method of this little guy. You'll see the actual device here in a moment. She will raise it up and you will get a

sense, but this gives you a sense under ideal circumstances what is involved in conducting an OAE screening.

[video with captions]

>> William Eiserman: So, that celebration means they got a pass.

There you see the handheld device.

So, like many skillful tasks, competent screeners can make it look so easy and it often is easy once you have been trained. To assist screeners to keep all of the steps in mind and all the other training resources that we have available, we have things like a skills checklist, which are all of the steps that you go through in preparing for and in actually completing a screening using the OAE method. It guides the screeners through this process. This is also a nice device or tool to use when evaluating screeners just to maintain quality over time. So, if you're a manager, it can be used as a competency-based observation for those who you are supervising as screenings.

Evidence-based screening is more than using a designated piece of equipment. You have to be trained to use the equipment and have a screening, a follow-up process built around that equipment. But you do need appropriate equipment, so let's talk about this for a moment. You should be aware that OAE equipment is available from several different companies and in models designed specifically for screening by lay individuals such as, most of you are who participating today, and these simpler, less expensive models currently cost around \$3,800.

>> Dr. Foust: There are also other equipment models that can look just like these that are intended for use by audiologists like myself that are designed by diagnostic purpose so, they will go into far more specific testing and these are more complicated and expensive. You don't need or want the more expensive or complicated models. As nonaudiologists, be careful to not purchase more than what you need by getting the simpler and basic models.

>> William Eiserman: In addition to the cost of the equipment, as Terry highlighted, each time you screen a child there is a disposable cover that goes over the probe that goes into the ear, and that cover needs to have a really good snug fit in the child's ear so, they come in a variety of sizes and shapes. You'll need a good selection of those, and they cost between \$1 and \$1.50. Gulp, we know. That is a cost and that needs to be budgeted for. We know from our work with head start, for example, that the cost of equipment and these disposables are considered an allowable expense to incorporate into your budget, so be aware of that.

Now, since you will not always select the proper size probe cover the first time, you could end up using several different probe covers for a given child, and we get better at that overtime, but at first, you'll want to have more than just one on hand for each child. In fact, we recommend you purchase twice as many probe covers as you have children to be screened.

>> Dr. Foust: Yeah, that's a great point. Also, along those lines, you're also going to need adult sized probe covers as well. During your learning process, as well as checking your equipment on a regular basis, you're going to be testing the equipment on your own ears or another adult to make sure it is functioning properly before screening children. So, be sure to get adult-sized probe covers as well.

>> William Eiserman: When you meet with an equipment distributor or salesperson, they may mention

they offer you training and it is important that you understand this training is rarely sufficient to meet all of your training needs.

>> Dr. Foust: Yeah, the training offered by the salesperson is intended to acquaint you with the various functions of the equipment, but they are not going to train you on how to screen young children under a variety of conditions or how to document your results, how to communicate with parents, or what the follow-up protocol should be when a child does not pass and this has been a point of confusion for some people, so we want to make that really clear.

>> William Eiserman: Yeah, we like to make this analogy. A car salesperson at a dealership may train you about the various functions of the car, which can be helpful, but that person is not going to teach you how to drive, parallel park, all of that stuff. It is the same with purchasing hearing screening equipment. You will need another way to learn how to screen, and as we will point out, one way you can do that is to access the online courses through our website, which we will show you today.

>> Dr. Foust: Yeah, so doing that, and then, if you can, having a local audiologist that can then screen alongside you when you're just getting started and can give you helpful pointers that is a great way to be sure to get the training that you need. And this is true whether you need training for OAE screening or the other method that we're going to talk about now, which is Pure Tone Audiometry.

>> William Eiserman: So, let's do that. Let's talk about Pure Tone screening who may be using screening for 3 to 5 year olds. We want you to know this never recommended for children under 3. As we mentioned earlier, Pure Tone screening has traditionally been the most common method used with children 3 to 5 years of age. You probably recognize the Pure Tone method, because you already use it or you probably had your own ears screened this way. In this procedure, musical note-like tones are presented to children through headphones, and children provide a behavioral response, like raising a hand to indicate they have heard the tones. Pure Tone screening gives us a good idea of the functioning of the entire auditory system all the way to the brain with the child showing us with a physical or behavioral indication they perceived the sound. It is a rather affordable method with the screening costing \$800 to \$1,000. The equipment is durable and portable, enabling us to transport it and use in a variety of locations and a wide range of individuals can be trained to perform the Pure Tone screening procedure.

>> Dr. Foust: Now, to conduct Pure Tone screening, we're going to start at the same place with OAEs. We're going to look at the ear to make sure there is no sign of infection or blockage just like we did prior to doing OAE screening.

If the ear appears normal then the screener is going to instruct or condition the child in how to listen for a tone and then respond by raising a hand or placing a toy in a bucket. This step can take some time, because we need to make sure the child is able to reliably complete the screening task. Once the screener has observed that the child reliably responds to sounds just as the screener instructed that is when the actual screening is started.

>> William Eiserman: So, we go through this step, Terry, right, before we actually are screening?

>> Dr. Foust: Absolutely. We need to be sure they are giving us a reliable response before we start

screening. Now, once we start screening, during the screening process, this same listen and respond game is going to be repeated and we're going to repeat it at least twice at three different pitches on each ear. We're going to note the child's response or lack of response after each tone is presented. If the child responds appropriately and consistently to that range of tones presented to each ear then the child passes the screening.

>> William Eiserman: So, the device, Terry doesn't tell us if they passed or not, right?

>> Dr. Foust: Right, as the screener, you will be making the pass or refer decisions based on the observable behavior.

>> William Eiserman: So, let's talk about what makes OAE and Pure Tone a little bit different from each other. Two notable ways they differ is that the process requires children, not only to be cooperative with Pure Tone screening, but to be full participants in the process, following directions and responding reliably. As we mentioned earlier that means completing an initial process that we referred to as conditioning or teaching the children and carefully determining whether or not we're getting reliable responses from them before even attempting to screen.

>> Dr. Foust: Yeah, and then the other difference between Pure Tone and OAE screening is the one that you just identified just a minute ago, and that is the screening itself is not automated like OAE is. Instead, in pure tone screening, as you mentioned, you, the screener, will have to manually step through the presentation of each tone, you're going to do that multiple times for each ear and you're going to be recording each response. Following a specific protocol, you as the screener will determine whether the ear passed or not. With Pure Tone screening there is considerably more potential of screen error to produce inaccurate results, so that's why there's that need then for thorough training and oversight to make sure all of the screeners are -- adhering to the hearing screening protocol.

>> William Eiserman: One of the things that people love about it and why it continues to be preferred by many people is because of the piece where the child the actually telling us they perceive the sound. That is not happening with OAE screening, so nothing is perfect, right. So, Terry, lets walk through this example of the actual screening once we have conditioned a child with the Pure Tone method.

>> Dr. Foust: Yeah, thank you. What you see here on your screen is an example of the actual screening steps that need to be documented for each ear as you screen. So, through the training process, you'll learn all of the steps of the conditioning and the screening process and all of the environmental conditions that need to be monitored and met as you complete a child's screening. Then based on these results, you, as the screener determine if each ear passes or not. The device, as I mentioned, the device itself does not produce the result as the case with screening.

>> William Eiserman: So, you see here, each of those check marks is the result of a screener initiated activity with the child. Every one of those steps. As is true with the OAE method, kidshearing.org provides a set of implementation resources for screening, just like we do with OAE. The elements of the checklist serve as a basis for the training, as well as can be used for monitoring the quality of screening practices in your program, and that is especially important for Pure Tone screening, because of all of the screener initiated steps that we can't forget to do. Frankly, we can sometimes forget to do if we have been doing this for a while.

And one of them is making sure we have a really quiet environment to screen in. With Pure Tone screening, we can't screen just in their classrooms where children are playing. We do have to pull them out into an environment that is relatively silent.

So, we've given you an overview of the two methods, regardless of which method you use, you will eventually have a child that doesn't pass. 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 have to emphasize our screening efforts are only as good as our ability to systematically follow-up when children don't pass the screening on one or both ears. Let me give you a quick walk through of the protocol and you can go on and look at it in more detail on our website after the webinar.

The percentages that we're going to give are birth to 3 years of age. 100% of your children will receive initial screening on both ears. I want to make sure, I don't remember if I just said this or not, this protocol applies to either OAE or Pure Tone, it is the same follow-up protocol. 75% of children will pass on both ears and will not need any further follow-up. However, about 25% will not pass on one or both ears, and that means those children will need a second screening within about two weeks.

>> Dr. Foust: You know the interesting thing is at this point, a good many of the children who didn't pass the first screening, they will pass the second screening. Only about 8% of the total number of children screened will not pass the second screening. These are the children that will need to be referred to a health care provider for a middle ear evaluation.

>> William Eiserman: Yeah, and once -- any middle ear problems have been identified and resolved, we stay in touch with that middle ear provider, that health care provider and get medical clearance to proceed and screen the children one more time. In the third time those children, that 8% would be screened.

>> Dr. Foust: So, now we will screen this, as William said, we will screen this small number of children a third time. We are going to expect less than 1% of the total number of children being screened will have not pass that third screening. So, these children, they are the ones that will be referred to a pediatric audiologist for a full and complete audiologic evaluation.

>> William Eiserman: Some people ask us, can't I refer all children to an audiologist after the first screening? Do you see how many children you would refer to an audiologist versus if you go through this protocol? We do this because audiologists would be overwhelmed and not able to follow up on the children that actually need to be seen by them. So, all there is a small subset of children that will need follow-up screening and referral after the initial screening, we've used this protocol in thousands of early childhood settings and found it is a feasible protocol to implement that is what folks like those of you and in your programs have been telling us. It helps children to get the medical and audiological attention they need, while importantly minimizing unnecessary referrals to health care providers and to audiologists.

>> Dr. Foust: Now, once you are underway with your screening program, check to see if you're getting similar pass and refer percentages as you see here. If you find your pass and refer percentages are significantly different from what we anticipate at any point in this protocol then you might want to seek technical assistance.

>> William Eiserman: This is just another illustration overviewing the screening and follow-up protocol and this is available on our website for you to look at. We really encourage you to look at the protocol while you're in the process of developing your screening activities, if you're starting fresh, because you want to figure out, how are we going to do this part? Who is going to play what roles and how can we stay on top of the follow-up for that small group of children that need to be followed up? Again, just as a reminder, this protocol is used regardless of which screening method you're using OAE or Pure Tone.

>> Dr. Foust: You know there is one important exception to this protocol that is important to point out, and that's something we mentioned at the very beginning. And that is whenever a parent or a caregiver expresses a concern about a child's learning or language development that child should be referred for evaluation for a pediatric audiologist even if they passed a hearing screening. If you recall from what we said earlier, hearing screening methods aren't 100% accurate or perfect, to be on the safe side, when there is an explicit concern about hearing or language, make that direct referral. You can and you ought to still send the child and the referral along. Regardless when a concern about hearing or language development has been raised.

>> William Eiserman: Now, I'm guessing there are some folks on here today that are already screening, and I want to point out, I think Terry, this is one of the most common mistakes we have found over years that people make when they will engaging in early childhood screening. You see there on the bottom of the protocol where it says "the process is complete?" There are two conditions that you want to be aware of to know you're done with a given child. Either they have passed on both ears, one or more of the screening, or they have been referred to an audiologist, but if they're waiting to be rescreened or if they have been referred to a health care provider that's never the end of the road of the screening process. It's not over until they have either passed at least one time on each ear or they have been to an audiologist, and that's just really important to remember. We're kind of in a culture where we think when we make a referral to a health care provider, we're done and we can walk away. That's why we call this is a middle ear consultation to proceed with the next screening, there is always a next step after the referral to the health care provider. So, keep that in mind and make sure that next step is always happening.

So, let's return to our website, kidshearing.org and review again where you're going to find the various resources to support your hearing screening and activities and think about the questions you're going to want to ask us, because we're going to look at the Q&A box to see what we might not have addressed or repeat to help you all out.

We invite you to feel free to use any of our implementation resources here. Our goal in creating all of these resources over the years was basically to have everything that a given program would need in order to implement a full hearing screening and follow-up program. So, once again, you will see here planning resources and you will find general descriptions of the whole process, how OAE works or Pure Tone works. You will find resources for finding a local audiologist and you will find equipment related resources. How do we select equipment? Under the select screening equipment is also where you will find that document I referred to that will help you determine which method to use for children 3

to 5 years of age, OAE or Pure Tone. If you are in that dilemma, look at that.

Remember, too, it is fine to use Pure Tone screening. It's great, but you do have to have a plan for that percentage of children who will not be successfully screened that way, so does that mean you're going to purchase an OAE device as well? Who is going to be trained on that or if you're not able to do that, do you have an audiologist that could screen all of those children? So, planning is an important first step. We always talk about planning before we talk about training.

In the next set of resources is where you will find links to the "learn to screen" online courses for OAE and Pure Tone Audiometry. Have a look at those. In the next set, this is once you're underway with screening, you'll find checklists for getting ready to screen, letters that you will send out to letters introducing your screening program, those are available in English and Spanish. The protocol guides and forms, we have a set of forms for OAE and Pure Tone screening that follow the protocol exactly. You don't have to remember the protocol, what to do after what, if you use these forms. You will be documenting every outcome for each ear that you're screening.

And then there are resources for sharing results, referral letters to parents, health care providers and audiologists, as well as some suggestive scripts, if you will about how to talk to parents about the screening process and how to talk to them about the different results you may be getting along the way.

In the next group of resources, you'll find a tool for tracking a group of children through the screening process. So, not only is it important to document the results of an individual child. If you have 100 children that you're trying to get through that complete screening process, how can you keep track of where each child is to know who you need to get back to, what their next step is? We have a tracking tool there that is designed to help you do that. And we have modules that will help teach you how to use the tracking tool. It is pretty simple, but without that, it isn't simple to keep track of where all of the children are.

And lastly, you'll find a number of other resources that we've developed over the years that are archived on our website. If you're in a head start program, you can also seek additional resources from the health technical assistance center and this is their website, and they have resources that can be useful to you.

So, you may not have ever thought about it like, this but monitoring the status of children's hearing is essential to quality early childhood programs that are committed to language development and school readiness. When children with hearing loss are identified and connected with the intervention resources that they need, they can thrive just like we saw in these examples here. And you can have the satisfaction of knowing that you were a part of them thriving.

So, we hope we have answered many of your questions today. But in case we haven't, let's see what questions you have and remember, in a moment, we will be putting up a link that will go to give us an evaluation of how we did today, as well as will generate a certificate of attendance for your participation in today's webinar if you need that. So, Terry, let's look at some questions here. The first question is always asked, what OAE equipment model do we recommend for birth to 2 1/2-year-old children? You're not going to love our answer, but because we're federally funded, we can't align

ourselves with any particular manufacturer. Be aware on our website, we have included a number of the currently available pieces of equipment, I think all of them, and they have all met criteria for being able to several being used. With that said, we encourage you to when you find equipment manufacturer or distributor, ask to try several different ones before you buy. And see how it works under different conditions. Some of them are more sensitive to noise in the environment or a child that might be a little fidgety than others are. Some of them will be more intuitive to you than they are to somebody else. So, we encourage you to try a couple of them and see for yourself. But this is also where having an audiologist partner comes in hand.

Often they do have a preference. Your local audiologist may have one that they love. Now, make sure we're not talking about what they love for them as diagnostic technician. They most likely can be a little bit more forthcoming than we're permitted to be about that. Terry, anything you want to add to this question?

>> Dr. Foust: Just sometimes people kilometer say, why is some equipment easier than others and it has to do with how the probe and the probe covers are designed and fit that's one of the key areas. Good probe fit is a key to OAE screening, so there are just some differences in how those are designed and how well they fit in an ear canal. William's point to if you can try it out that's my best piece of advice is see if you can get it on loan or a trial period and use it in a variety of environments, so you can, you know, find the one that works best for you.

The second question about working with birth to 3 and their current piece of equipment says requires a completely quiet set on or the result read willing be incomplete, which OAE is allowed to be used in a natural setting? Great question. William and I have screened in snack time, screened in sleep, screened in cars while children are going around the block and we have screened out on the playground and the same thing we just mentioned with good probe fit and good, snug fit and the equipment that has well designed elements and parts and probes function best in your settings.

>> William Eiserman: I would also ask around. If you're working in the head start world, for example, there's an online, oh, man, I'm forgetting the name of it right now. Lenore, if you remember the name of it, you can text me. Our colleague Lenore is on. Or if any of you who is on remember the name. There is an online bulletin board for head start that allows you to share information, give each other, raise questions, give each other advice that would be a great place to post who has equipment that they love, and engage in a dialogue with -- MyPeers. Yeah, it was on the tip of my tongue. MyPeers, if you Google that and I don't think it is restricted to head start people either, so that is a good way to check in with others that are doing that and there are hundreds and hundreds of early head start programs doing OAE screening and you will hear what people like and don't like.

So, the next question is, asking us to repeat the statistics about the changes in incidents that we expect. We see, the research shows about three children in 1,000 are born with a hearing loss or deafness. And by school age, which is around 5 or 6 years of age that doubles or triples the number of children that have a permanent hearing loss. So, that's the statistic. That serves as a rationale for why it is so important to continue to screen throughout early childhood and after that, for all of that matter. It continues to happen. So, that's a good statistic and it is on our website in a handout as well that you

can give to colleagues or to family members in English and in Spanish. So, you can get full buy-in from everybody that this is not just an exercise. This is really important to stay on top of.

One of the reasons why it is so important is because when a child might start to lose their hearing, it isn't necessarily obvious. They might accommodate for it to a point that we're not picking up on it. They are not going to tell us, I don't think I'm hearing very well anymore. So, we have to screen in these ways. So, that's a good statistic to be aware of.

Let's see. Terry, did you find a question you want to address here?

>> Dr. Foust: Yeah, there's one regarding clarification on our protocol. After two unsuccessful OAE screening, not passing, we got refers, I would refer parents back to primary care or primary care provider and not to an audiologist, so kind of a question. That relates to the protocol that William showed. We show that pass and refer dramatically changes from refer one to the second screening, go from 25% down to 8% and again goes down from 8% to 1%, so to avoid over referral and cost and issues with, that we go through two referrals.

>> William Eiserman: let me add something here. The reason why we go to the doctor first is because the most common explanation of them not passing the first two screenings is because there is a middle ear condition that a health care provider can address whether that is wax blockage or fluid or middle ear infection. An audiologist, if they see a middle ear infection, they are not able to prescribe antibiotics or treat it, they will make the referral back to the health care provider. The proper order, the most logical order, it is notes always this case, is to go to the health care provider first and then if they still don't pass, now we ruled out the things that a health care provider can address and if they are still not passing, then we refer to the health care -- to the audiologist. What's that, Terry?

>> Dr. Foust: We eliminate in between step with the visit with the audiologist that they are not quite ready for.

>> William Eiserman: Right, right, exactly. So, is there is a sheet where we can explain the test to parents or guardians? Yes, you will find that in the planning and preparing to screen. You will find information sheets, some colorful info graphics that you can download or just send a link to folks. All on [kidshearing.org](https://kidshearing.org).

For those staff who are new, do you recommend both the manufacturer's equipment training and getting trained elsewhere? You know it's a personal preference. Terry, you can chime in. I think sometimes manufacturers will dive into the nitty gritty and might overwhelm you with the details of the equipment. So, we have a bias to the practical training process that can incorporate an audiologist who can help you. One of the examples that comes up, we offer an intermediate webinar. We did it last week for freedom who are already screening. And one of the things that all of the equipment does, it produces an error message or various error messages if your screening is not going well. While there may be various error messages that come up, the response to the error messages is almost always the same, regardless what it actually says, and that's to go through the process again. And so, you could spend a lot of time with a manufacturer explaining all of these different error messages, but when we do a training with you all or when an audiologist does a training with you all, they are probably going to say, don't worry about what the error message is, but let's get a good probe fit, make

sure the child is sitting still and try again.

Here's somebody that is saying the person who is doing our screening says the equipment needs servicing. How do we go about servicing our OAE device? Terry?

>> Dr. Foust: Two things, quickly, one is where you purchased the much, so if you purchased it and have an equipment representative or company representative, you will contact them and they should be able to service that much for you. If it was purchased from a vendor such as school health then the best bet is to identify the brand and contact them. You can look them up online and you should have an area or state representative that is in charge of that and help you get scheduled for service and get the service that you need. I would try the individual equipment representative if you have one first, if you don't, I would contact the manufacturer and have them find the closest place for that machine to be serviced.

>> William Eiserman: When you look online for vendors for hearing screening equipment, some vendors will be able to sell you a variety of different manufacturers equipment, a variety of different brands if you will. They are the ones that are best positioned to help you look at and try different ones. I would encourage you to go down that route if you want to compare equipment and try them out.

>> Dr. Foust: Represents multiple manufacturers, like William said is your best bet for requesting a loaner to try.

>> William Eiserman: Yep. And we do that all the time. The next question is, can you refer any companies who might sell discounted probe covers? This question brings up a really important point of needing to always use the probe covers that were designed specifically for your brand and model equipment. Terry, talk about that, will you?

>> Dr. Foust: Yeah, thank you. I'm going to apologize, I had a plane going overhead if that noise came through.

>> William Eiserman: No, it didn't.

>> Dr. Foust: Great. Each of the probe covers are specifically designed to fit the probe and work with the machine that you purchased. How they are designed, how they are built, their size and shape are specific to the machine and you will not get accurate results if you use them interchangeably between machines.

>> William Eiserman: Yeah, that is such an important point. You will see those for sale, a variety of different ones. We are bias, by the way to equipment that offers what is called a foam or compressible probe cover, and not all devices offer those, so that is one criteria you may look for when selecting equipment. If you can picture an ear plug that squeezes down and expands in your ear, there are some OAE devices that do just that. What that allows is kind of like a one-size-fits almost every child's ear option by having those kinds of probe covers. So, if you see those with a particular device that might be one for you to consider getting as far as that brand of equipment and give that a try. Again, you can't use those foam probe covers unless they have been designed for use for your specific brand of equipment.

So, let's see. Are there any other questions before we wrap up here? You guys have asked such wonderful questions. We want to encourage you today to when we're done here to find the time to go

to [kidshearing.org](https://kidshearing.org) and take a look at all of the resources that are there. Remember that this webinar has been recorded. I mean, we covered a lot of information today and along the left side of our screen, we had all of the different areas that we were talking about, so if you want to find a Marsette of content, remember -- find a particular set of content, you can go back to OAE or protocol and navigate to that portion of the video of today's webinar. We're going to post the survey now in the chat. This is where you will find a way to give us a little bit of feedback on how we did and at the end, we will generate a certificate of attendance for being part of our webinar today.

Remember to also share this webinar and the resources that we directed you to [kidshearing.org](https://kidshearing.org) with your colleagues who may be of interest -- who may have an interest in this topic, and we hope to see you on future webinars. About three or four times a year, we offer this webinar and we do an intermediate webinar where we review some of this content, but also deal with more details on some of the helpful hints of doing Pure Tone or OAE screening.

A shout out to our Captioner and to our ASL Interpreters today. Thank you so much for helping us to make this as accessible as possible, and thank you to our background crew. Terry, thank you for your help with today's webinar. We appreciate all that you have to share with us each time we do this. So, look for that link now. It's over in the webinar chat field, and we hope to hear from you soon.