Live captioner standing by.
All of a sudden my mouse went dead on my Mac. And I was working around that charging it while you were speaking and I'm unplugging it.

>> For those who have signed on early you are in the right place in today's webinar, introduction to evidence-based hearing screening and eevaluation practices for children ages birth to five. We appreciate you signing on early. We will start at the top of the hour which is in about 15 minutes.
>> Hi, again. I wanted to make sure for those of you who have signed on early you know you are in the right place for today's webinar. And have a chance to get your volume adjusted to your liking. So I'm going to talk for a little bit here for that purpose. Today's webinar is entitled introduction to evidence based hearing screening and evaluation practices for children ages birth to five.
You will see that there are a few things we are making available today to help increase the accessibility of our webinar. You will see that there is a video screen from which you will be able to view an interpreter. And we really appreciate. And we also have a captioning option. So if you click on the live transcript option on your screen, you will be able to view that as well if that is helpful to you.
You can adjust the size of those specific screens by finding the vertical bar and moving it left or to the right and you will see how it changes the size of the power point slide and the video when you do that. So that's up to you.
We will be starting at the top of the hour in about five minutes.
I will check in and do another audio check like this in about two or three minutes.
For those of you who have signed on early we are glad to see you here for today's webinar that we will be starting in about three or four minutes from now. We have people signing in at a fairly rapid speed right now so we want to give everybody a chance to transition from what they were doing a few minutes ago and get settled for a learning opportunity here.
Today's webinar is entitled introduction to evidence based hearing screening and evaluation practices for children ages birth to five years.
Today's webinar like all of our webinars is going to be recorded and what that means is that you will be able to view it and stream it again on our website, Kidshearing.org, and infant hearing.org in the next couple of days. So give us a couple of days to get it processed and then it will be available to stream again. And that's good to know in case there are portions of what we have to say today that you want to review another time, if there are slides you would like to look at again. Or if there are people that aren't attending with us live that you think may benefit from the material that we are going to be covering today. So keep that in mind. And it stays on our website permanently. Know this is an Evergreen resource that will remain on our website.
You will find other webinars there as well. So you can always go and have a look at our website and what you might find there.
We will be starting here in just a few minutes. We had quite a lot of people register for today's webinar over 800 folks which is great and so we want to give people a chance to transition over to doing this with us today.
Terry, can I check in with you and make sure that you are available to speak and be on screen with me for a minute?
>> Yes, hi. Good morning or afternoon.

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>> It's all over the board. So thank you.
We will start here in a minute or two. So you are in the right place for today's webinar which is entitled, introduction to evidence based hearing screening and evaluation practices for children ages birth to five.
We should go ahead and get started. I would like to welcome everybody today to our webinar entitled introduction to evidence based hearing screening and evaluation practices for children ages birth to five. Before we get started, I just want to give a shout out to a few of our support people today. We've got an ASL interpreter on with us today who we really appreciate being available to help us make this webinar more accessible. And we also have a captioner available today as well. So to view the captioning, you can click on live transcript on your screen and then you will be able to move it around and position it in a way that you like. You can also adjust the size of the PowerPoint screen versus the captioning or the video window to your liking as well by locating the vertical line between the PowerPoint and the video screens and then moving it either to the right or left, however you want to do that is totally up to what works best for you.
I also want to let you know that today's webinar is being recorded. In about two days after we process it, it will be posted on our websites, infanthearing.org, and Kidshearing.org, where it will be available permanently to stream. So if there is something that you want to come back to that we covered today and you want to review it again, that is how you can do that. You can go back and look at a slide or listen to a description again. And also keep in mind if there are any people that aren't attending live with us today whom you think might benefit from the content that we are covering and make sure they know to go to Kidshearing.org after today's webinar and they can stream it as well.
As I said, it's a permanent post. So if any time throughout the year, a review of what we are talking about today would be helpful, you know it always lives there.
My name is William Eiserman and I'm the director of the early childhood early outreach initiative known as the ECHO initiative at Utah State University. The ECHO initiative is housed within the National Center for Hearing assessment and management known as NCHAM at Utah State and we also serve as the early hearing detection and intervention national technical resource center which is funded through a cooperative agreement with the Maternal and Child Health Bureau, MCHB.
Starting in 2001 and for about 20 years the ECHO initiative served formally as a National Resource Center on early hearing detection with a focus on supporting Early Head Start and Head Start program staff in implementing evidence based hearing screening and follow-up practices. I think we met a number of you during those years. We are delighted to be able to continue to make our resources and our learning opportunities like this one and others that you will find on our website available to staff from Head Start programs and early intervention programs. And really, to anyone from early care and education settings who can put these resources to use.
So we are delighted to be able to be here. I also want to introduce my colleague and good friend Terry Foust whom you see on the screen there. Terry is a pediatric audiologist and a speech language pathologist who has worked with the ECHO initiative since its very beginning. So I'm going to turn off my video now. You can look at us on the slide for one more minute and then we are going to allow you to focus on our much prettier slides.
Terry, thanks for being with us.
>> Thank you, William. As William has said, he and I along with many other ECHO team staff as well as local collaborators, we've provided training in nearly every state with thousands of staff from Early Head Start, Head Start, American Indian and Alaska native programs and migrant Head Start

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programs as well as many other early care and education programs over that 20 years he mentioned. And we are always encouraged just like we are today by the huge amount of interest that there is in establishing evidence based hearing screening programs so that children with hearing related needs can be identified and served.
>> The work of the ECHO initiative is based on the recognition that each day young children who are Deaf or hard-of-hearing are already being served in early childhood education and health care settings. Often without their hearing related needs being known. We often hear that hearing loss is thought of as an invisible condition. So the question for all of us is how can we reliably identify which children have normal hearing, and which may not.

>> The short Anne to that question really is that early care and education providers can be trained to conduct evidence based hearing screening which is depicted in these photos here on this screen. The ultimate outcome of a hearing screening program is that we can identify children who are Deaf or hard of hearing who have not been identified previously. So if you look on the left of your screen, the procedure on the left is called otoacoustic emissions or OAE hearing screening which is the recommended method for children birth to three years of age and increasingly recommended for children three to five years of age as well.
On the right you will see the procedure Pure Tone audiometry hearing screening which is historically been the most commonly used screening method for children three years of age and older. What you will still see in many early care and education providers and settings using. We are going to be talking about both of these methods today.
>> And before we go any further, one of the great things about using Zoom is that there is an interactive potential here. We are going to try to present everything first, and then we will open up for questions. So if you have a thought, a question or a comment, jot it down on a piece of paper and then if we don't address it, we will open up the floor and then we will invite you to submit those in the Q&A box.
Terry and I are not going to be monitoring the Q&A balk while we are also presenting today. It's just a little too hard. So thanks for cooperating with us in that way.
So let me give you a quick overview of what we want to cover today. While this presentation and please understand this is not a training per se. Our goal is to provide an overview of the big pictures of what's involved in implementing evidence based hearing screening for children across the age spectrum, birth to five. We will start by giving you an overview of the auditory system or the hearing system which will help lay a foundation for the understanding of how the hearing screening methods that we are going to be talking about today actually work. We are going to talk about why we screen for hearing loss. What even makes it possible for us to be seriously engaged in systematic screening for hearing, particularly with really young children.
We are then going to talk about the two methods that Terry just mentioned, OAE and Pure Tone audiometry starting with an overview of the OAE screening process followed by an overview of the puritan audiometric or audiometry screening process.
Next, we are going to address the important question, so what do we do next when a child doesn't pass a screening? We are going to summarize the follow-up steps that are undertaken when a child doesn't pass a hearing screening on one or both ears. And then we will wrap up by showing you how to access resources, to support the process of developing and maintaining your hearing screening program, your personal individual skills, and then we will answer whatever questions you might have.

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So that's where we are headed. You can follow the progression through our topics by referring to the left side of the screen and since this is a recorded webinar, this left side menu that you see here can be useful if you return to this place and want to navigate to specific portions of our presentation today to review again or to share with others. You can find yourplace in our presentation that way.
Before we launch into our content today, I want to make sure that you all know where to go after today's webinar and get additional resources, information, and even access to training.
>> William, let me interject for just a moment. One of the things I wanted to mention that one of the things you will hear us say several times today and that we really want to make sure everyone understands is that implementing an evidence based hearing screening or hearing screening practices, it's more than just using a designated piece of equipment or a specific method to implement evidence based practices, you know, the recommends equipment or methods we will be talking about today need to be used according to a prescribed set of steps under carefully controlled conditions. Each step of which is carefully documented in detail.
This is going to be true whether you are using OAE screening or Pure Tone audiometry screening. I mention this because over the years the early childhood outreach initiative known as the ECHO initiative that we mentioned in our prior work, we've really developed a wide free range of resources to help you achieve the goal of implementing an evidence based hearing screening program.
So our goal for today is to primarily help you find all of the information, the resources that you will need to be able to do so.
>> Thanks, Terry. I'm glad you mentioned that.
So let's make sure right off the bad that you know where to go and why you will go there and what you will find. Let's take a look at our website. Kidshearing.org, and we invite you to feel free to use all of these implementation resources and certainly before you sit down to write a letter to parents about your screening efforts or develop a referral form or letter for documenting your results, check out what's already here. Our goal in collaboration with many, many head start and early Head Start and other early care programs was to develop resources that everybody ultimately needs. And to make them available for everybody to use, adapt, do whatever with. And have them on our website.
So many of the resources you will find here are the results of all of that input so you can be assured that others have used the language and the format of many of these resources to achieve the same goals that you have. We also know that many of you want to know about how you can access training. So be assured we can direct you to a specific location where you can get the training that you need.
So let me give you a quick look at our website. This is our landing page right here for Kidshearing.org which provides a wide variety of practical resources and tools to help you implement hearing screening with young children. 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 focus of newborn hearing screening to include a focus on identifying hearing loss throughout early childhood. And if we scroll down, this is where you will find all of the practical resources most relevant to early childhood screening starting with planning resources.
So you will see the planning resources here and this is where you will get information about the purpose of screening. A lot of the information that we are talking about here today if you are in a program and will be referencing this in a minute that serves children three to five and you are trying to decide what screening method to use, whether it should be OAE or pure Pure Tone, there is an important document there that you can look at that compares the two methods and some of the considerations that you would want to make and discuss with your team or your health services

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advisory committee if you are in a Head Start program.
There are resources there for finding a local pediatric audiologist which is one of the most valuable partners you could have in developing your screening program. They can help you not only with selecting equipment, maybe with some of your training needs, but they are a valuable resource along the way if you have children that you just can't figure out a way to screen or when you have children that don't pass the screening. So having a pediatric audiologist or two or three that you know to contact is really helpful.
And then the last thing under planning resources is screening equipment information. So we don't recommend a particular brand of equipment, but we do provide an array of what the options are out there and how to contact them so that you can -- and some criteria for looking at different equipment.
In the next category, once you really got your planning steps completed, this is the point where it makes sense to seek training. And as we said for nearly 20 years, the ECHO initiative was funded to provide in-person and virtual comprehensive training in evidence based hearing screening with providers all over the country. That complete training process is now available any time you or your staff need it. We've got it on line and we know that many of you are needing to know how to get training for hearing screening.
When you click on this section of our website, it will take you to a place where you can access our non-federally funded website, learn to screen.org. And this website is where you can access comprehensive training designed to prepare anybody in the early childhood area to learn to screen using evidence based hearing screening methods, both OAE as well as Pure Tone.
The on-line training available can be done any time at any pace. So it should meet the needs of just about anyone needing a quality comprehensive training on OAE or Pure Tone audiometry. So we encourage you to check that out after the webinar.
The next area of our website is screening resources. And this is where you will find a lot of practical tools. Things like how to prepare for a day of screening. Having a check list to follow. The resources that you need to have on hand. It also provides the protocol guide and forms which gives you the step by step process for following up when children don't pass, and forms for documenting your screening outcomes in a way that matches step by step the recommended protocol.
Then there is some resources for sharing your results. Letters in English and Spanish you can send to parents or to health care providers or audiologists. And we even have a page of scripts on what to say to parents at different points in the follow-up process when children either pass or don't pass.
In the next group of resources we have follow-up resources and this is where you will find a tracking tool that is available for helping you track a group of children through the entire screening process so that you're sure to get everybody and you don't lose track of anybody who didn't pass who needs follow-up. And then some tools for monitoring the quality of your screening program including screening skills check list for both methods that we are talking about today as well as in the archives a bunch of other resources you will want to look at.
Make a note of Kidshearing.org. If you don't remember anything after our presentation today, remember that because you will find all of the resources that we are talking about today including a recording of this webinar at our website. Make a note of that.
So let's put all of those resources into context. We are going to start by giving you a quick overview of the auditory or hearing system. Terry, do you want to do this part? >> Yes, thank you. To begin with as you can see there are three main parts to the auditory system. We have the outer ear, the middle ear, and the inner ear or cochlea. Now when sound enters the outer ear it causes the eardrum to vibrate

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which moves three small bones in the middle ear. This movement stimulates thousands of tiny sensitive hair cells in the nail shaped portion of the inner ear called the cochlea. And from that inner ear, the sound signal is carried along special nerves to the hearing centers of the brain. And then the individual experiences this sensation that we call sound.
While this is how the auditory system typically functions, there can be some exceptions. There can be temporary issues like 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 condition of hearing screening is the functioning of that inner ear or cochlea, that snail shaped portion of the ear.
Now in some instances the sound travels through the outer and the middle ear but when it reaches the cochlea, the signal is not transmitted up the system through the brain resulting in what we call a sensorineural hearing loss.
This condition is usually permanent. And this is actually the primary condition for which we are screening in mass screening efforts. Now might come as a surprise to you, but it's an important fact for you to know that sensorineural hearing loss is actually the most common birth defect in the United States.
>> Yeah, in fact, about three children in 1,000 are born with a hearing loss, deaf or hard-of-hearing. Now most newborns in the U.S. are now screened for hearing loss using evidence based methods. Most before even leaving the hospital. But screening at the newborn period isn't enough. Research suggests that the incidence of permanent hearing loss actually doubles between birth and school age from that three in a thousand at birth to about six in a thousand by the time children enter school.

>> So as you can see from 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. It can occur as a result of illness. It can occur as a result of physical trauma or environmental or genetic factors.
So this is referred to as late on set hearing loss. Meaning that it's acquired after the newborn period.
>> And it's commonly understood that language development is at the heart of cognitive and social emotional development and school readiness. Language, that awareness of the importance of language drives many of the practices we see in early childhood settings. Think about how much emphasis is always placed on early language development. It's a cultural thing for most people around the world that will notice when a child starts expressing language, we count the words they can produce. We know what their first word is. But you know, it's also important to note that hearing health is at the heart of typical language development. And that if we are going to be conscientious about promoting language development as a part of our commitment to school readiness, we should be equally conscientious about monitoring the status of hearing throughout this period. If hearing is compromised, then typical language development will ultimately be compromised as well.
We don't want to wait for a language delay to discover that the child has a hearing loss even a mild hearing loss.
>> This is really why we see so much emphasis being placed on monitoring the status of hearing in young children. Programs like Head Start which for years have served as models of comprehensive health and education programs for young children and their families, they required hearing screening for all of their children, even before we had the excellent methods that we now have to do this.
>> You know sometimes we use a term like screening and we neglect to make sure that everyone really understands what it really means. As an audiologist, Terry, how do you describe what screening

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is? Or in this case hearing screening is? >> Yeah, thank you, William. This is really I think an important point. Screening can be thought of as kind of a sorting process. A sorting process that helps us separate the children who are at risk of having a condition from those who are far less likely to have the condition. So those in that first higher risk group are then followed with additional steps, implemented by pediatric audiologists and health care providers to continue to refine that sorting process until we definitively identify that small group of children that actually have hearing loss.
And to be blunt, we screen because we simply can't provide a full comprehensive diagnostic audiological evaluation on each and every child.
>> So screening followed by appropriate audiological assessment and early intervention when indicated can dramatically improve options and outcomes for children who are deaf or hard-of-hearing. When hearing loss is identified early, we can make sure a child has language access. >> So as a result then, children who are deaf or hard-of-hearing, they are thriving in ways that used to be rare. And providing hearing screening, croucan be part of creating these really amazing and live changing outcomes. Let's take a moment to have a look at several examples of children with severe to profound hearing loss who have had the benefits of early identification and quality intervention.
These children as you will see are learning, thriving and communicating
>> These two little girls are both deaf. They have hearing aids. And they are three and a half years old. And listen to their language.

>> In this next example, these two children are also deaf, have severe to profound hearing loss, and their family has elected to use sign language as their primary mode of communication, but they have language. It's just sign language. And watch their fluency as they drive in the car with their family and discuss the things they are seeing.

>> In this last example, these two boys are also deaf and they are using a technology -- called cochlear implants. Yet another example of different ways that an identified child is supported in accessing language.

>> So those children remind us, all of us, of our goal here. We want to make sure that all children have access to language one way or another regardless of whether they have a hearing loss and to have that access as soon as possible, minimizing any disruptions. The way to achieve that is to be able to fully be committed to providing periodic hearing screening.
>> You know as we mentioned a moment ago, OAE and Pure Tone audiometry are the recommended methods we are going to be talking about today. The available of OAE and Pure Tone screening really means that it's no longer appropriate to rely solely on subjective methods that have been used in the past and these subjective methods are things such as ringing a bell behind a child's head. Or depending solely on care giver's perceptions of a child's hearing.
Don't get me wrong. Observations of a child's response to sound, especially the lack of response can really be helpful and 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 simply really they are just far too crude and unreliable. Frankly, we can do so much better than that because of our current available technology.
>> Yeah, and it's also important to note that although some health care providers have incorporated evidence based hearing screening into well child visits, this isn't really standard practice yet, especially

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for children under four years of age.
>> Yeah, that's right. In fact, some parents may rrp with a lot of certain -- may report with a lot of certainty that their health care provider did perform a hearing screening. I think we need to understand this and I feel like I can't emphasize it enough as an audiologist, routine examinations of earring by health care providers should not be mistaken as hearing screenings. It's actually precisely because this screening isn't yet happening consistently in that context that programs like yours are adopting hearing screening practices because there is obviously an increased recognition of the importance of monitoring hearing and now feasible to do this in programs like yours and by people like you.
>> So the take home message is this. Unless a child's health record or medical record includes documentation of ear specific hearing screening results and the screening method used, we should never assume a hearing screening was completed and completed in a timely way, meaning within the last six to 12 months.
>> Yeah, and you know William, another important point to remember is this. It's while OAE and Pure Tone screening are highly reliable screening methods, but they are not perfect. And that means that there may be some 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 passed a hearing screening using one of these methods, that child should be referred for an evaluation from an audiologist.
>> Before we go on, let me say one more thing about newborn hearing screening results. When children enter your program or system, especially during the first year of life, always be sure to collect share newborn hearing screening results. If the results are anything other than the pass on both ears, you want to make sure to follow-up evaluations occurred and if you don't see that, you will want to help the family circle back to their health care provider to accomplish that.
If you are 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 would want to rescreen after that.
So now let's talk about the two hearing screening methods that are used during early childhood. If you are responsible for children who are under three years of age, the recommended method is categorically OAE screening which you see here on the left. If you are responsible for screening children three years of age or older, as we said earlier, Pure Tone audiometry has historically been considered the recommended method for this age group.
This is that headset screening where the child raises a hand or performs another task each time they hear a sound that is presented into one of the ear phones. So you see this method here on the left
>> I just wanted to interject here that there is growing recognition that for a variety of reasons as common as the Pure Tone method has been, it may not always be the most feasible method to use with some of these younger children. The research has shown that about 20 to 25% in that three to five age group can't be screened with this methodology and that's because they just aren't developmentally able to follow the directions reliably. And that's really been our experience as well.
In those instances, OAE screening is the preferred method for these children
>> So what that means is at a minimum if you are establishing evidence based practices for three to five-year-olds, and if you are considering using the Pure Tone screening method, you will also need to be equipped and prepared to do OAEs on that 20 to 25% who can't be screened with the Pure Tone method. Alternatively, you will need to have a means for somehow systematically referring all of those children to audiologists who can perform the screening and frankly that could be kind of challenging because there really aren't that many audiologists who have that much time availability to be screening

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20 to 25% of your children. That's one of those considerations you will have to make when deciding OAEs versus Pure Tone for the three to five-year-olds.
>> You know, William, to simplify things, more and more audiologists are recommending the use of OAEs uniformly with all children three to five years of age and older. And that's because of those things you mentioned. It's quicker than Pure Tone screening both to learn to do and actually implement. And it's far more likely to be a method that will work across the board with all children in that three to five age group that you would be screening. And it's equally as effective.
>> And as I said, if you or your program are undecided about the method for children in the three years and older group, we encourage you to carefully review a document that we have on our website that compares OAE screening and Pure Tone screening for this population so you go to Kidshearing.org and look under big picture resources and you will find it right there.
>> Let's start with otoacoustic emissions or OAE screening. We said it's the recommended hearing screening method for birth to three-year-old children. You should be seeing this on the photos on your screen right here.
Now if you are serving children birth to three, again, OAE is the one and only evidence based recommended method recommended by the American academy Academy of Audiology and the American Speech Language & Hearing Association also known as ASHA.
>> OAE screening is the most appropriate method to identify young children at risk for permanent hearing loss because it's accurate and it's easy and quick, most children can be screened in just a minute or two. Sometimes in as little as 30 seconds per ear. It's a flexible tool that can be used in a variety of environments and including classrooms or the home or health care settings.
>> Most important of all it is effective in identifying the children who have a mild hearing loss or loss in just one ear as well as those who have a severe bilateral loss. In addition, it can be helpful in drawing attention to a broader range of hearing health conditions that may need further medical attention. OAE screening can help to identify children who have a temporary hearing loss as a result of middle ear infections. Although this is not the primary goal of OAE hearing screening, it's definitely an additional benefit of screening with this method.
>> Take a look at these pictures for a minute. And what do you notice about this? These children you see here are all being screened with the OAE method and they are being screened in environments where they are already hanging out. They aren't being pulled out into an environment that is foreign or strange to them. They are being screened in every day educational or home environments where the children are already happily spending their time. And those adults, those people that are doing the screening are often people they already know. They are teachers or home visitors or health specialists. That familiarity piece of the environment and the who is doing screening makes an enormous difference on the efficiency of being able to do OAE screening.
>> In fact, screening works best when children are familiar and are comfortable with the adult that's doing the screening. And where they can play with the toy or they can be held or even sleep while the screening is being conducted.
>> You just heard it. Sleep. We can actually screen them while they are asleep. And that is a huge boon, especially for some of the little ones that may be reluctant about being screened.
Terry, walk us through how OAE screening actually works.
>> Yes. So to conduct an OAE screening, you can see here on your screen where we are first going to take a thorough look at the outer part of the ear to make sure that there is no visible signs of infection or blockage.

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After that, a small probe on which we've placed a disposable cover that probe is then inserted into the ear canal and then that probe delivers a low volume sound stimulus into the ear. Now a cochlea or that inner snail shaped portion of the ear, a cochlea that is functioning normally will respond to this sound by sending a signal to the brain while also at the same time producing an acoustic emission. And it's this emission that is analyzed by the screening unit and in approximately 30 seconds or so the result will appear as either a pass or a refer.
Now every normal healthy inner ear produces an emission that can be recorded in this way.
>> So this is a quick review of how the screening actually works. This is a realtime video. Non-edited of a child being screened using the OAE method and, well, just watch and see. Keep in mind, this little boy is very well behaved. He adds to the ease of this. But if you learned how to console and distract a child effectively, this is how it ought to go.

The probe has placed in the ear and the screening pushed the button start it.
>> And that clapping means she got a result meaning a pass or a refer. A pass or refer appeared on her screen and they are ready to do the other ear.
There you see the device.
Like so many skillful tasks, competent screeners can indeed make it look easy. And it often is easy. Once you have been trained and you had some practice. To assist screeners in keeping all of the steps of the screening process in mind, as I mentioned earlier, we have a skills check list for OAE screening on our website, on Kidshearing.org. This check list guides the screener through the OAE screening process. This check list is helpful if you are a new screener or an experienced screener needing a refresher or if you are a manager, it can be a used as a competency based observation tool for those that you are supervising. So you will find that on our website under monitoring quality.
As we've emphasized Terry pointed this out a moment ago, evidence based screening is more than using a designated piece of equipment. You have to be trained to use that equipment and have a screening and follow-up process built around that equipment. But you do need appropriate equipment. So let's talk about this for a minute. You should be aware that OAE equipment is available from several different companies and are always changing. And in models designs specifically for screening by lay individuals like most of you, there are simpler and less expensive models and that's what you would want a basic OAE piece of equipment which currently costs around $3,800.

>> Just want to note there are also other equipment models intended for use by audiologists like myself that are designed for diagnostic purposes. And these are more complicated and more expensive. My point here is that you don't need or want those more expensive or complicated models. As non-audiologists, I just want to be sure that we are careful not to purchase more than you need by getting the simpler models.
>> And having an audiologist help you in the equipment selection process is great, but make sure they know they are picking equipment for you and not for them because all of the bells and whistles they need you don't need. Make sure you are checking them on that if they are helping you.
In addition to the cost of the equipment itself, each time you screen a child, there is a disposable cover that goes over the probe that needs to be inserted into the ear canal. And those covers come in a variety of sizes to ensure that they are really snug. You will need a good selection of those and you are not going to like this. But they cost between $1 and $1.50 each. You can use them multiple times on one child, but only on one child.

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You will not always select the proper size the first time especially when you are beginning. So we always recommend you purchase twice as many probe covers as you have children to be screened.
>> You will need adult sized probe covers as well because during your learning process as well as on the regular basis, you are going to be testing the equipment on your own ears or another adult to make sure that it's functioning properly before screening children.
>> So let's talk about training for a minute. When you meet with an equipment distributor or sales person, they very well may mention that they can offer you training. And it's important for you to know that this training is rarely sufficient to meet the actual training needs that you have, right, Terry?
>> Yeah, this is really a good point, William, and thank you for bringing it up. The training offered by the sales person it's really 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, communicate with parents or what the follow-up protocol should be when a child doesn't pass. I think this is a point of confusion for some people so I want to make that clear.
>> In fact, we like to make the analogy, like, a car sales person at the dealership may train you about the various functions of the car, which can be helpful, you know the buttons and what they do and screens and all of that. But they are not going to teach you how to drive. And it's the same or parallel park. It's the same with purchasing hearing screening equipment. You will need another way to learn how to screen and as we point out, one way is to access the on-line courses on our website which we will show you in a moment.
>> Yeah, so accessing those courses and then if you can having a local audiologist who can then screen alongside you when you are just getting started and they can give you helpful pointers. That's a great way to ensure that you get the training you need.
I think this is true whether you need training for OAE screening or the other method we will talk about now which is Pure Tone audiometry
>> So let's talk about Pure Tone screening for those who are considering this or maybe already using it with three to five-year-olds. Note that this method is never recommended for children under three. As we mentioned earlier, Pure Tone screening has traditionally been the most common method used with three to five-year-olds. You probably recognize the method either because you used it or because you had your own hearing screened this way. In this procedure, musical note-like tones are presented to children through head phones. And children provide a behavioral response like raising a hand to indicate that they heard the tone.
Pure Tone scening gives us a good idea of the functioning of the entire auditory system actually all the way to the brain with the child showing a physical or behavioral indication that they perceive the sound. It's a relatively affordable method with the screening equipment costing between 800 to about $1,000. The equipment is durable and portable and enabling us to easily transport and use it in a variety locations and a wide range of individuals can be trained to perform the Pure Tone procedure.
>> So let's talk about that. So to conduct a Pure Tone screening, just like we did with OAE, we are going to take a look at the ear to make sure there is no visible sign of infection or blockage. Then if the ear appears normal, then the screener is going to instruct or condition the child in how to listen to a tone and provide a response such as raising a hand or placing a toy in a bucket.
Now this step can take some time so we are sure that the child is able to be reliable. They can reliably complete the screening task. Once the screener is observed that child reliably responds to sounds prevented, just as the screener instructed, that's when the actual screening is started.
Now during the screening process itself, this listen and respond game is repeated at least twice at

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three different pitches on each ear. And then you will be noting the child's response or lack of response after each tone is presented. If the child responds appropriately and consistently to the range of tones presented to each ear, then the child passes the screening.

>> Now two especially notable ways that Pure Tone screening differs from OAE screening, is that the process requires children not only to be cooperative but really to be full participants in the process following directions and then responding reliably.

As we mentioned, this means completing an initial process that we refer to as conditioning or teaching the children and then carefully determining whether you are getting reliable responses from them before attempting to even do the official screening.

>> Now another difference between Pure Tone and OAE screening is that the screening itself is not automated as OAE is. So instead in Pure Tone screening you as the screener have to manually step through the presentation of the tones each tone multiple times for each ear and be recording each response. And then following a very specific protocol, you as the screener will determine whether the ear passed or not.

So at you can see with Pure Tone screening there is considerably more potential for screener error to produce inaccurate results. And that's really the reason that there is such a need for thorough training and oversight because we want to make sure all screeners are adhering to the prescribed screening protocol.

Now on your screen you will see an example, this 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 will learn all of the steps of the conditioning and the screening process and then about all of the environmental conditions that need to be monitored and met as you complete a child's screening. Based on these results, this screener will determine if each ear passes or not. The device itself won't produce that result as is the case with OAE screening.

>> As is true of the OAE method I mentioned before, we have a set of resources to support those of you who would be doing Pure Tone screening. Similar to the screening skills check list for OAE that you will find on the website, with very a screening skills check list for Pure Tone screening. The elements of the check lists serve as the basis for a thorough training as well as for monitoring the quality of screening practices on your own. So you should acquaint yourselves with these and pull them out and maybe just keep this check list with your equipment as a regular reminder of all of the steps that you need to go through and to make sure that you just aren't somehow developing a bad habit along the way which is so easily done, especially with Pure Tone screening because it isn't automated.

We given you an overview of the two methods. Regardless of which methods you use, you will eventually have a child who 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. And we have to emphasize our screening efforts are only as good as our ability to systematically follow up on children who don't pass the screening on one or both ears.

Let me give you a quick walk through of the protocol and then we can go look at a little more closely at it on our website after the webinar.

The percentages we are going to give you here come from our data on over 10,000 children birth to three years of age on whom OAE screening was used. The stats were about to give you are related to that scenario. We expect children in the three to five age range to have better pass rates because they tend to have fewer ear infections which can sometimes cause a child not to pass initially and they are

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easier to screen because they are just more cooperative.
So let's look at the protocol. 100% of your children will receive an initial OAE screening on both ears. And we expect about 75% will pass on both ears. And will not need any further follow-up. However, about 25% will not pass on one or both ears the first time they are screened. And we will need a second screening within two weeks. >> Now in the interesting thing at this point is that a good many of the children who didn't pass the first screening will pass the second screening. So only about 8% of the total number of children screened will not pass that second screening. And these are the children that need to be referred to a health care provider for middle ear evaluation.
>> The once a middle ear evaluation has been done and any middle ear problems have been resolved, then we give this smaller group of children a third screening.
>> And, yeah, I was going to say, I'm sorry, it's just cool to see how these percentages drop down because we expect that less than 1% of that total number of children being screened will not pass that third screening. And these are the children that will be referred to at pediatric audiologist for that complete audiological evaluation.
>> And so although these stats are specific to our experience with OAE screening, we would expect a similar pairing down over time through this protocol with Pure Tone screening or with OAEs with older children as well. We don't know the exact percentages of what we would see. It would be very similar to this.
So although a small subset of children end up needing follow-up referral and further screening after the initial screenings, we have used this protocol in thousands of early childhood settings and have found that it is a feasible protocol to implement. It helps children get the medical and audiological attention that they need. While minimizing unnecessary referrals to health care providers.
>> One of the things that this is really helpful with is once you are underway with your screening program, you can use this as a chat to see if you are getting similar pass and refer percentages. If you find your pass and refer percentages are significantly different, then we will want -- then we would anticipate at any point in this protocol then you would want to seek some technical assistance.
>> This here is another illustration overviewing the screening and follow-up protocol which is available on our website. So know that all of these resources, we are going through the slides rapidly, but all of this is available there if you look under the heading protocol guides and forms. You will see exactly this. And our forms follow these steps exactly the way they have been sketched out here.
And this is the same protocol regardless of whether you are using OAE or Pure Tone audiometry. Terry, what about another exception? >> Yeah, thank you. This is an important one. It's really whenever a parent or a care giver expresses the concern about a child's hearing or language development, that child should be referred for an evaluation from a pediatric audiologist even if the child passed a hearing screening. And this is true because if you recall were what we said earlier, hearing screening methods, you know, they aren't 100% accurate or perfect. To be on the safe side whenever there is an explicit concern about hearing or language, let's make a direct referral. And of course, you can and probably ought to still screen the child and send that result along, but make the referral regardless when a concern about hearing or language development has been raised.
>> So let's return to our website here for a moment and we will open up and invite you to ask your questions now. So look for the Q&A box and we will start taking those in a moment. But before we do that, let's look again at Kidshearing.org which is our website. And this is where you will find all of those resources in that first group, that's where you will find the planning resources. That very first button, drop down, is big picture resources. That's where you will find the information about comparing OAEs

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and Pure Tone.
In the next group you will see where to find an audiologist help with that. Then there is equipment resources there. Criteria for selecting equipment and some of the currently available known brands of equipment that are available.
In the next group you will find where to access training. Whether it's for OAE or Pure Tone audiometry training that we mentioned.
And then the next group, this is where you will find a bunch of practical resources for check lists for getting ready for a day of screening. The protocol guides and forms which I mentioned. And then how to share the results, letters and English and in Spanish, letters to parents, letters to health care providers, and even some scripts about what to say to parents when children don't pass at different points in the protocol.
Now most of you are screening not just one child but a group of children. And keeping track of where each child is in that follow-up protocol could be a little challenging. This is free you can download this and all of these other forms and resources as well. It is really helpful in being able to know at any given point that each and every child you are responsible for are in their tracking process. Then monitoring program quality is where you will see those check lists to monitor yourself or to monitor other staff members in making sure that each and every recommended step in the screening and follow-up process is being followed.
Then under archives there are a bunch of other resources that we have developed over the years that you are welcome to take a look at including other webinars on various topics related to evidence based hearing screening.
So let's see if any of you have any questions that we can help out with and I didn't mention this earlier but when we are done today, there is -- we are going to post a link in the chat box that you can click on to give us a quick couple of answers to evaluation questions and it will also generate a certificate of participation in today's webinar. So when we wrap up that will be there for you. Be aware that's going to become available.
So the first question that we have here, since this is an introduction to eve based screening, will -- to evidences based screening. Will there be more? Yes, we do this and another webinar at least three or four times a year. We did one yesterday for those folks that are already well underway with screening. And that webinar is being posted also on Kidshearing.org. So if any of you here today are already under way in doing OAE or Pure Tone screening and would like some additional insights about questions that come up once people start to screen, go look at that webinar. It will be dated August 22nd. And then watch for upcoming webinars. We do periodically do intermediate webinars. So great question. And I also encourage you to know that webinars aren't the only way to look for information. Spend a little time looking at our website. We have a lot of helpful hints and frequently asked questions, and, of course, the trainings themselves will address a lot of issues as well.
We often get folks who -- I mean, I'm guilty of this. If I buy a back yard grill, I try to use it without looking at the directions. This is not one of those cases where you really should attempt to teach yourself how to do OAE or Pure Tone screening. You want to get thoroughly trained. If it's not through the on-line training that you can access through our website, then you will want to find a local pediatric audiologist or an experienced screener who has been trained to train. And to deliver that to you. And again, also note that training, you're probably not going to get it from an equipment manufacturer.
So the next question, Terry, and I'm going to invite you to answer this so I can take a sip of water is to clarify. So is it recommended that we use OAE or Pure Tone for ages three to five?

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>> So both methods are great to have. If you have both, that's wonderful. You will be able to have that OAE as a backup to be able to screen those you cannot screen with Pure Tone. The reason that we have made the recommendation for OAE with that older group is because that percentage, that 20 to 25% of kids that you will come across with Pure Tone that you can't successfully screen, you would be able to do that with OAE. So it would be wonderful if you have both with the OAE as a backup. If you can't do that, we would recommend considering the OAE so you can screen all of those children. Remembering our goal is that we just don't want to miss any kids.
>> Yeah. And that really good reminder that the children that are the most difficult to screen may be the very ones who have a hearing loss. And so, you know that is a common consequence, I think, of people who get in the bind where there is a child that can't screen with Pure Tone or it could be with OAE and they may conclude, well, I will just try later. That's really not the right conclusion. If you can't screen them, then they should be referred to an audiologist because they very well may be the ones who have some degree of hearing loss.
So the next question: I'm a school nurse for special education preschool. I have a lot of trouble screening with Pure Tones. We don't have OAE as an option. Any recommendations on play audiometry with Pure Tones that work with students with autism, sensory processing disorders, et cetera?
>> That's a great question. And you are my hero for working in that setting because of how you just need to adjust on the fly for any of the kids that you are serving.
So with Pure Tone audiometry, we, you know, the highest level of function for that task is probably like all of us have been screened, that we have the head phones on and hear the tone and raise our hand. That's the highest level. And then we modify that down and as you know for the level of the child that we are working with. And so if we can't do it a hand raise, we condition to a toy that might have some types of response with it. We could put a toy in a bucket or a puzzle block piece in a puzzle.
If we can't do that, sometimes we do give me five. If we can't do that, sometimes with children that might be on the autism spectrum we have had where we can turn iPad on and off. And we find a repetitive type of thing that they fixate on and only allow it to happen as a response.
So it's hard to give a specific because we accommodate to each individual child. So I applaud your ability to work with these kids and your attention to their needs. It may be that the bottom line that some days as we refer them out for a diagnostic evaluation with an audiologist because you simply may not be able to get the screening complete.
>> Let's talk for just a minute about the fact that you don't currently have the OAE as an option. We wouldn't want to just assume that is always off the table. So we do have the resources on our website that you may be able to share with some of your decision makers. Cost is obviously always going to be an issue in order to take on OAE screening. There is an upfront cost for the equipment and for the disposables. Be aware that there are some funding sources for these sorts of things. One of which is the Lion's Club or Sertoma. Those are both and that Sertoma with an s-e-r-t-o-m-a. Both are service clubs that exist in many, many parts of the country and many communities. And they have an existing commitment to hearing and blindness -- vision. They may be willing to make an outright equipment purchase or a grant for you to make that equipment purchase.
A lot of those kinds of clubs like to have something very concrete like we are going to buy hearing screening equipment and supplies for this school or this school district. So we encourage you to look at that. If you look at some -- on our website under previous materials and resources, you will find a grant template that we've written for folks just like you to download and it's the actual proposal that you

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can adapt and submit to potentially get funded for your screening equipment.
We encourage you to campaign for having all of the screening options that you think you need.
So the next question we have and maybe it's the last one if we don't have any others: So do you continue to use OAEs for kiddos over age five? Terry?
>> Yes, they have their utility and it just depends on the individual child and their ability to participate in the screening. OAEs have really useful utility almost through the entire age spectrum.
>> One of the reasons that people will argue for Pure Tone screening is because that child is telling us they heard it. They heard the sound. So OAEs don't do that part. They don't -- they aren't telling us that child actually perceived sound, understood it as sound and then are responding to it as a sort of stimuli connected to a response. So that's an additional step that Pure Tone screening does that OAEs don't and that is probably the one of the strongest arguments that people will give to switching over to Pure Tone as you get older.
Did I get that right, Terry?
>> Yes, absolutely. What we are really looking for is where we cannot get a reliable response to Pure Tone as you just mentioned. Then we want to look at something objective so that we know that it's there and we balance the two of these so we ensure that no children are missed.
>> So I don't see any more questions. So I just want to thank everybody and note that in the chat field here in just a moment you're going to see a link to a evaluation and that will give us a little feedback on today's webinar as well as provide you with a way to generate a certificate of completion or participation in today's webinar. I want to thank Terry, of course, and thank you to our interpreters and our captioner today for helping us make this as a more accessible learning opportunity.
Gunner, are you able to post that link for us? I'm hoping that will come up here in a moment. There we go. Thank you. And thank you to all of you for all that you do and I know it's so far beyond just monitoring hearing screening. That you find a place to seriously consider monitoring hearing screening, hearing status in all of your interfaces with children, recognizing that our commitment to children and their growth and development, their language access is central to our overall overarching goals. Remember these groups of children that you see on your screen here whose lives are changed because they -- their hearing loss was identified. And you can play a role in identifying these kinds of children and helping their families access the support and services that they need so that their children can be just as vibrant communicators and thrive in everywhere that this group of children does.
Thank you, everybody.

Remember, go to Kidshearing.org and find all of the resources that you need.

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