Transcript for Audiology 101 Webinar, September 10, 2013

Speaker: My name is Shelby Atwood. I'm the audiologist for the Oregon Early Hearing Detection and Intervention Program or the OEHDI program. We'll be using the acronym quite a bit, so might as well define it early. And with me today I have Heather Durham who's an audiologist at the Oregon Health and Science University and the consulting audiologist for the Oregon OEHDI program and we'll be presenting a talk today called Audiology 101 and give you the basics, the need-to-know information about hearing healthcare for children. Um, we want this to be an effective tool for all of you so if there are questions, feel free to enter them into the chat box or the question box and we'll try and get to them as we go or at the end, if we have time. Anything we don't cover we can, um, send out to the group afterward as well with that I'll turn it over to Heather.

Next Speaker: Good morning everyone. As Shelby said my name's Heather Durham. I'm a pediatric audiologist at OHSU or, um, we have two clinics up there. I'm also with EDRC which is the child development and rehabilitation center for **** Audiology Clinic. Um, thank you for taking time out of your busy schedules to attend this. Hopefully we'll give you some good information. Um, we have a lot to cover so I think we can go ahead and get started. I thought I would start with some fun facts. This is kind of a common sight for all of us. Did you know that a baby's cry is louder than a car horn? I think many mothers would definitely agree with that and knew that fact. **** Def Leppard. Did you know that sitting in front of a speaker at a rock concert can begin to damage hearing in seven and a half minutes? I'm definitely in **** hearing aids. I thought this was an interesting fact. I did not know this. During World War I ferrets were kept on the Eiffel Tower in Paris because of their keen sense of hearing. They warned people of enemy aircraft long before humans could hear it. I thought that was a cool fact. So why is hearing important? The development of spoken language is dependent on hearing. The basis for cognitive and social development is language and learning in a mainstream classroom is dependent on hearing and listening. So how much hearing loss is significant? Good question. Any type and/or degree of hearing loss that reduces the intelligibility of speech to a level inadequate for accurate perception of sound, interpretation of sound and learning. So what that means is a mild hearing loss for a child that might have some intellectual disability or developmental delay might have a more significant impact on a child that has, that is more typically developing. Typically developing kids can kind of, um, fill in some missing information whereas a child with some developmental disability may not be able to do that and fall farther behind. So the prevalence of hearing loss. We know that one to three per thousand babies out of the well-baby units will be born with hearing loss. Out of our neonatal intensive care units, an additional two to four per hundred and somewhere during childhood, an addition two to a thousand will acquire a hearing loss. So that could be due to head trauma; that could be due to illnesses; that could be due to a progressive hearing loss. It's estimated that 1.2 million children have hearing loss. I'm gonna let Shelby, uh, describe this one.

Next Speaker: And so one of the reasons we screen for hearing loss at **** is that it's one of the most common congenital conditions and we have the ability to do it very easily with all babies. So as you can see here, we've got some common things that we can identify at birth and compared to hearing loss they are a lot less common. So a little bit about OEHDI, um, we follow the national OEHDI Guidelines of 1, 3, 6 and that refers to one screen by one month of age. And so usually for hospitals in Oregon; that happens within a couple days but they are mandated if they have a certain number of births to complete that whole process by one month. Uh, babies that don't pass this screening need to have their hearing loss diagnosed by three months of age and those diagnosed need to be fit with amplification and enrolled in early intervention by six months of age. So part of the OEHDI program is tracking that these goals are being met by our whole state and following up with families that are having difficulty doing so.

Next Speaker: Yeah, each state has their OEHDI program and just to kind of, uh, brag on our own team here, we have one of the strongest reporting and tracking programs in the nation and I've been to a couple of conferences and I think we just, we're awesome. They have a great staff here and they've done a great job **** our system. So I thought we'd review a little bit of the anatomy of the ear. This is what my life revolves around every day. So you have the outer ear, the **** and then you have the ear canal. At the end of the ear canal is a piece of skin called the ear drum. The ear drum is a mobile piece of skin that helps transmit sound but it also acts as a barrier to, uh, fluid like when you're swimming or in the bath tub and also acts as a barrier to bugs or dirt. On the other side of the piece of skin in that little pink pocket area are three little bones. They're called the **** the **** or most of us learned in in school as the hammer, the anvil and the stirrup. At the bottom of that pink pocket is a little tube that's called a **** tube. That tube is there to equalize pressure and also to drain any type of mucous that might collect in that middle ear space. So if you're driving up the hill in a car or you're flying, your ears feel full when you pop your jaw or chew, the muscles around that **** tube open and it equalizes the pressure on the inside of your ear to match the pressure on the outside. The little bones in that middle ear space move, um, and the last one **** in and out of the cochlea, which is that brown, snail-shaped structure. Inside there we have little sensors. They call them hair cells but they're not really hairs; they're little **** and the best way I describe it to families is it's like having a bunch of piano keys in your ear. Whatever sound comes into the ear strikes that certain key and then the sound is taken up to the brain along the auditory nerve, which is that little rope-like figure that you see on the picture. The little blue part, those little loop-ti-loops, those are the semicircular canal. Those help us with our balance. One tells us that we're going up and down; one tells us that we're going side to side and one tells us that we're going front and back. And all of those work together to help us figure out where we are in space. Okay let's go to the next one.

Next Speaker: Okay in just one second we have a video to kinda show all of that in motion, so we'll just switch over to that real quick.

Next Speaker: We're having a little difficulty so I'm going to give you some more little fun facts while we figure this out. Did you know that crickets have hearing organs in their knees? I thought that was interesting. Male mosquitoes hear with thousands of tiny hairs on their antenna, little blood suckers, figure out where they are. Um.

Next Speaker: Here we go ****

Next Speaker: Okay, here we go.

Next Speaker: Animation will demonstrate how natural hearing works. The outer part of the ear, the **** catches approaching sound waves and follows them down the ear canal. Both the **** and ear canal naturally minimize background noise while selectively amplifying frequencies specific to human speech. As the sound wave reaches the end of the ear canal it causes the **** membrane, commonly referred to as the ear drum, to vibrate and engage the three tiny bones of the **** chain. First the **** then the **** and finally the ****. These tiny bones act as levers, magnifying the vibration picked up from the ear drum on its way to mechanically stimulating the cochlea. The **** transfers the mechanical energy from the vibration to the cochlea by pushing the cochlea's oval window. This causes a wave to travel through the fluid-filled cochlea, stimulating thousands of tiny hair-like cells which send an electrical signal off to the brain for interpretation. The result is your hearing a sound.

Next Speaker: Okay we're working to get back to our main screen here. So another little fun fact for everyone, the **** are the smallest bones in the body. If you put all of them together, they would fit on a penny. The little pink, little ear pocket space that we referred to in, on a picture of the ear, that is about the size of an M&M and the cochlea, which is that snail-shaped structure, is about the size of a pencil eraser. So all together, we have a very, very small parts that helps with something that's very, very important. Um, the last screen that Shelby just, um, went through, when you guys print these out, process of hearing, so that just kind of explains the video that you saw. There, there's different types of hearing loss and here's another picture of the ear and we've divided it kind of in two parts. Okay, conductive, so conductive hearing loss affects the outer or middle ear. So conductive hearing loss can be a big, um, **** in that your canal that's preventing sound from going into the ear. Conductive hearing loss can be that you're missing the ear or the ear canal itself and it's causing hearing loss. You can also have conductive hearing loss due to malformation of those tiny little ****, those little bones in the middle ear space. Or you can also have fluid that's behind the ear drum and that's the most common with children that we see in clinic is that they have fluid back behind the ear drum. And that's a temporary kind of loss. That's usually treated with tubes in the ears and we'll show you a picture of that later. Then we have sensory loss. So most of you have probably heard the term sensory neuro. We've kind of divided, um, that, that type of hearing loss in two in, in audiology but we still do use the term sensory neuro. Sensory means that there's something that has happened with the cochlea, either it didn't form properly, the little hair cells aren't present or perhaps they're not even working well. Um, and that is a permanent type of hearing loss. And that's what a cochlear implant **** we'll show you a picture of that too. And then we have a neuro loss and so this type of loss has really been on the radar more for audiologists, I'd say in the last eight to ten years. And that's a hearing loss where pretty much everything up to the cochlea works fine but there's something going on with the auditory nerve; either it's absent or it's not completely formed or perhaps the transmission up the auditory nerve is not happening correctly. And then we can have the possibility of mixed hearing loss. So you may have something where there's a permanent hearing loss, something with the cochlea but then that child may also have say fluid in the ears or some of our children that are missing the outer portion of their ear, they have a conductive loss and on the inside, the cochlea is also malformed and so they have what's called a mixed hearing loss. Then we have degrees of hearing loss. We have unilateral or bilateral, so that just means one or both ears. We have different degrees being slight, mild, moderate, moderately severe, severe **** uh and they're listed in the order of severity from low to high and we're gonna take a look at an audiogram here in a second. And then we have symmetrical or asymmetrical. So hearing loss is either the same on both sides or you have one ear that might be hearing normal and the other hear has hearing loss or both have hearing loss and one side just has more loss than the other. So this is an audiogram and this is how we graph out hearing. The numbers across the top represent different sounds or pitches, frequencies. The way I like to describe it is it's laid out like a piano so if you're sitting in front of the keys right now, off to your left-hand side would be your low tones, your **** and as you go across the graph, you have a higher number and those are your high pitches, so on a piano that would be more of your tink, tink, tink. That's the sound. Off to the left of the graph is your volume or how loud the sounds are. The **** usually softest sounds we usually test and 120 is usually the loudest. So just like on your stereo, the higher the number, the louder the sound. And then we've divided the graph into different degrees of hearing loss. Let me back up a second. The way we graph that hearing is we play a sound. If the child hears it, they indicate that they hear it. We turn it down. If they hear it again, we turn it down. If they don't hear it then we turn it up and we play back and forth with how soft it is that they can hear sound. Once we have the softest level we indicate it on the graph with an X or an O and that's what those are on the graph. So those X's and O's help us know where the child's hearing is. So up in that white region where the X's and O's are right now, that's the normal hearing region. So that child heard all of the sounds perfectly. The pink or the yellow region is the mild hearing loss. Then you see moderate. Moderate is actually, um, this graph should be broken up into moderate, moderately severe, so 40 to 55 would be moderate, 55 to 70 would be moderately severe and then severe **** so a child that's considered deaf would be somebody that those X's and O's would fall ****. So Shelby's gonna, um, give us an example of hearing loss.

Next Speaker: Yeah, so, um, as you can see off to the, um, side of the graph is, uh, one of the audiograms and we've got a hearing loss **** there with some **** sounds. Um, this is an example of mild to moderate hearing loss. So not too severe, um, fairly common hearing loss **** everything in that gray, shaded range is un – inaudible to this child without any, uh, amplification on. So as you can see they're missing quite a bit of the, each sound, which would make it a little bit hard to learn language, as you might imagine. So for this child, they'll hear this and what that says is it's time to go, let's put on our coats. So if, you know, some families may, when they're beginning to suspect that their child has a hearing problem, you know, recognize that they're not following directions very well and it's because they're only able to get certain **** and so oftentimes giving **** you like pointing so if you were pointing at the coat or pointing at the door, they might get a little bit of the information and fill it in, um, but kids especially because they don't have a language foundation, hearing loss is especially significant. So here's another example and that is go get your shoes. So that kind of, you know, oh, et, or oos; that might be easy to fill in because that's, you're probably only gonna point to the shoes and that probably only follows that particular pattern that, in that circumstance. So they might trick you into thinking that they can hear all of those sounds but really they can't. I've got some **** for hearing loss so we may come back to you later, um, it will be available in your **** so you can check 'em out on your own time. Usually they're all **** kind of get an idea how **** how hearing loss might sound to **** um, with different degrees of hearing loss. Um, a couple of the etiologies of hearing loss; there are those that are present at birth or congenital and those that happen after birth or acquired and we discussed the prevalence of those earlier that, you know, those that are present at birth is about one to three in a thousand for the well babies and then, um, that increases tenfold by **** acquired hearing losses after that. And to kind of walk you through some common, um, causes of hearing loss, we've got hearing loss off to the side and that's about 50 percent are caused by environmental factors and 50 percent are caused by genetic factors and it goes on forth after that and I've highlighted a couple common ones for kids and that **** which is **** and then also that 80 percent of the genetic **** which means that there is no family history or no obvious family history of hearing loss and so those are often the kids that are a surprise that they have hearing loss for parents that have normal hearing.

Next Speaker: And I think one thing to add is most hearing impaired children are born to hearing parents and so that's why it is a surprise. Um, so before newborn hearing screening, the average age of identification was 18 months and older. And a lot of times it had to do with observations that the parents were making in that they weren't following directions, like Shelby was saying or, um, their speech was starting to sound a little different or perhaps they just weren't responding to **** in their environment and it's, it's more when parents can see the hearing loss with hearing being an invisible, uh, disability, it's really hard, I think it's a hard concept to wrap your head around until you see a behavior that kinda coincides with it like not startling to someone banging a spoon on a pot or a pan or startling when there's a dog bark or a firecracker. And then oftentimes unilateral and mild losses are often undetected. My brother in particular, has for lack of a better way of saying it, a dead ear on the right side and his wasn't detected until he was 11. But development, speech and language was on time, there **** issues of reading and writing. You know, my parents would question sometimes was he being disobedient, did he just not hear? **** my brother, he was disobedient but, um, yeah so unilateral and mild losses are really the hardest ones for, for parents and for providers a lot of times to pick up on. So for the State of Oregon, we've passed legislation. Not every state has a law requiring newborn hearing screenings but the State of Oregon does. So in July of 2000 and then again in 2004 when we kind of amended the, the bill, um, or the law, it required that all hospitals with more than 200 live births must provide hearing screening within one month of the birth. Babies can be screened OAE and/or AABR and we'll tell you what those two different **** are in just a moment. The required, the hospitals are required to report the results to parents, also report the results to OEHDI, refer for additional testing if they need to refer or if they have risk factors and then mandatory reporting from diagnostic centers so once they do make it in for diagnostic testing, the audiologist, um, has to report that. That's an important piece to the entire tracking loop that we didn't think about in the 2000 legislation but we certainly put it in the 2004. Okay the newborn hearing screening, there's two different technologies that are used. There's **** omission and what we do is we place a soft little probe in the ear and it plays a sound. The sound travels in through the ear canal, through the middle ear space into the cochlea and stimulates those little hair cells and then we look to see if the ear gives us a natural response back or like an echo back. The ear does it naturally, um, and there's a little microphone on the probe that picks up that response so this goes into the cochlea and back out. Now the number one reason why babies don't pass the hearing screening is there's fluid in that little ear space that hasn't drained yet or they could have **** or that mucous that babies are covered in when they're born is still in the ear canal. Um, however, the hearing screening test cannot tell us why a baby doesn't pass the hearing screening, it just means we need them to come back for more testing. And then we have the automated auditory **** response test. I always tell parents it sounds a lot more invasive than what it really is. What we do is we place sensors on the forehead, the back of the neck and one on the shoulder and then those cute little red and blue things over the baby's ears, those are some little, what we call ear muffins that play a soft clicking sound; sounds like ****. When the hearing nerve, or when the auditory nerve hears it, it sends off an electrical response that is picked up by those sensors. The sensors then carry it to the computer where the computer works its magic, analyzes the data and give the baby a pass or a refer. So it's just a very basic test. Um, and for this one, it only requires the transmission of sound into the ear but it goes beyond the cochlea and up the auditory nerve. And the reason that one is important is, um, babies that are in the neonatal intensive care unit, they are more at risk of having issues with that auditory nerve. So everything might work well up to the cochlea but that nerve, for whatever reason, isn't functioning properly. So all babies in the NICU are getting AABR whereas in the healthy population, the hospitals have the option of doing an OAE or an AABR. And one's not necessarily better than the other, they both have their pros and cons but there are reasons why we would do a certain test in one population and not the other. So why do we screen for hearing loss at birth? We've kind of touched on some of that but the biggest thing is development. There was a study published back in 1998 and this kinda just rocked the audiology world and, um, this study looked at the receptive and expressive language development and 150 deaf and hard of hearing children in the same early intervention program. This was in Colorado?

Next Speaker: Mm hmm.

Next Speaker: I think it was; Colorado has an awesome intervention program. Um, what they found is with diagnosis and intervention by six months of age, they, the children had significantly better receptive, expressive language skills, social skills, vocabulary, speech, literacy, compared to children diagnosed after six months of age. So it affects a lot of development. They also ma – uh, showed that there was no difference after six months of age whether you provided an intervention at seven to twelve months versus twenty-five months, there was still a delay and there wasn't a **** compared to those that had, um, received **** uh, intervention by six months of age. So the take away language input within the first six months of age is critical.

Next Speaker: I wanted to give you guys some data about Oregon, um, this is finalized data from 2011. Um, at the top of this chart we've got total births and it's about 45,000. Then the first split is between those that were screened and those not screened. So we, we screened 96.5 percent of the babies in Oregon last year, which is great, um, but I highlighted the not screened to identify that that's a, a problem area that's, you know, about 1,500 babies that, um, didn't have a hearing test done and I've separated out some categories. A lot of the babies in the unknown category are ones that were born in small hospitals, birth centers or home birth so aren't mandated to get a screening done. Um, we go back over to the other side, the screened population. It got **** so as you can see a small percent of babies will refer on the hearing test, about 3 percent and then those go on to either be diagnosed and have hearing loss, um, they, um, they also receive testing and confirm that they have normal hearing and that's, at the moment, the majority other than the category that is considered loss. And so these are families that have not made it for the next step so they didn't pass the newborn screening but have not made it to audiology and so we can assume that all of those babies are fine but we would like to **** assume that they may have hearing loss and need to be followed up and that's what a lot of the energy at the OEHDI program is spent tracking and encouraging those families to get the next **** testing to either confirm hearing loss or confirm normal hearing.

Next Speaker: What we suspect though with that last number, um, is some, that number may be a little bit lower, it's just that the diagnostic audiologists or some of the facilities have not reported back on those children and so they go into a lost, a lost category.

Next Speaker: And then those that have hearing loss are then referred for early intervention and we've, um, been pretty good about that. We got 72 percent that are enrolled out of that group of kids with hearing loss. Um, we have some that are not enrolled in the other category and those are, um, infants or children that have moved, um, declined services or are deceased and then we also have another loss category at this stage, um, it's only about 13 children but we are also tracking those people, so as you can see those, um, highlighted, highlighted areas here, um, are what we were trying to target. Um, so as Heather mentioned, these are a few reasons for, um, parents to not follow up with care either at the diagnostic stage or the early intervention stage and it's that they don't see that there's a hearing loss, as we mentioned it can be a little bit deceiving, um, you know kids are smart and they adapt and can get by, um, for a while but if we don't see them within the first six months or first three years, um, we've, uh, lost the opportunity to do as much benefit as we can. Um, we also have some pushback from primary care physicians and ENTs about misinformation about what needs to happen during those first three years **** and then also some typical, um, barriers to care like transportation, insurance, distance from diagnostic centers, finances, childcare, et cetera.

Next Speaker: Nothing chaps an audiologist worse than when there's not the support from the primary care or the medical home. We kind of expect the parents, you know, not to see it or see it as a, uh, a big need in terms, in some circumstances but having that medical support in that, that, um, push from the primary care provider medical home is really important.

Next Speaker: Um, and then we wanted to highlight some additional hearing screenings that happen during childhood so at well-child visits **** due to language development as well as, um, hearing tests once the child's old enough to participate in those actively. Um, **** to monitor the medical home, home and the education system and then starting in preschool or kindergarten they'll start getting school-based hearing screening. However that's a big gap between newborn screening and the childhood screening so like we said, we're trying to capitalize on that early brain development, um, so we can make sure that these kids stay on target with their normal hearing peers.

Next Speaker: Okay so that moves us on into the diagnosis of hearing loss. If we're going too fast, please let us know. Um, since we don't have an, really an audience to talk to, we're just kind of doing it as we go, so let us know if we're going too fast. **** okay so who should be referred for an audiological evaluation? Infants and children who do not pass the hearing screening. That can be early intervention, Head Start, um, doctor's office. Infants and children at risk for late onset hearing loss. We have a list of risk factors later that we're going to show you. Um, infants and children who's speech, language or auditory development is a concern. And so at least in the Portland Metro area and I think also with early intervention a consistent pattern is if any child had a speech and language concern, they're immediately referred for a hearing evaluation. It doesn't always happen but we do need to make sure that hearing loss isn't impacting their development. Okay so goals for the audiologic evaluation. We want to rule out hearing loss or rule in hearing loss and if it's present, we want to determine the degree, the type and the configuration. The configuration kind of refers to those X's and O's on the graph. Sometimes you can have some sounds that you hear really well and other sounds that you don't, so the configuration also helps in the programming of the hearing aid. And then we also wanna make sure that we test each ear separately. One of the big things for newborn hearing screening follow-up is child will refer one ear, they go into a facility and the facility will only test that ear that was reported as a fail. Well normally when you're testing a baby, you're looking at a mirror image, so my right hand is touching down on the baby's left ear, so it's really common for people testing babies to assume that the ear they're testing is the right when in fact it's the baby's left. So each time a baby comes in, it's really important that every, every ear, there's two, each ear is tested. Okay so we wanna talk about the most common test that we use for babies in certain age groups. Now this is referring to children that are referring to children that are developmentally zero to six months. So use, this is usually babies but we do have some older children that are still within that developmental range. Again the two common tests that we use are OAEs and then an auditory brain and response so that's more diagnostic than the AABR that we use for screening and you can see on this little baby with the ABR, there's some little stickers that are behind the ear and on the forehead. We **** more stickers. The **** what's really nice about it is it's quick, it's noninvasive, the babies can be awake, they can be asleep, they can be completed on kids of any age, often used in Head Start programs, doctors' offices, any age. We even use them on adults. Um, it gives a good indication of how the cochlea is working, that snail-shaped structure and how those little hairs are functioning and really in the vast majority of children, if they have a normal cochlea or normal OAEs they usually have normal hearing. It's a very small population that don't. This is a picture of what an OAE looks like on our graph. So on the left hand side we have one that's normal and on the right, abnormal. So what we're looking at is we put a sound in, we get a response back. We put a different sound in, get a response back. So all of those dots or open circles on the left graph that are up above the green line; that means the cochlea has **** a healthy response to a bunch of different sounds. The graph on the right hand side, all of those dots are down below the green line so this is a cochlea that is not functioning well and, um, the child does in fact have hearing loss. Okay so an ABR, so a lot of times when, especially when I've had to call and help **** community health nurse, it's getting children in for ABRs. We need a lot of help in this area because the diagnostic centers are, um, predominantly are in the Portland Metro area and so it's hard for families to make it in and then families need some help and assistance in figuring out how to get up here. ABR is a test that we use for infants and children who can't – oh we have a question, hang on. I'm gonna go back to the OAE. What does the line below **** oh the, um, okay let me go back. So I'm not sure I quite understand the question. But, um, the little triangles that are below the green line, that's a noise **** so that's noise that's coming from the baby that could be sucking, breathing, um, what you want is a large gap between the triangle and the dot. That means that the ear is giving a stronger response or giving back a louder sound than what the baby's making. So those are, that's **** positive things there, there's a good gap there too. I hope that's what you're asking. Thank you, good question. Okay so with the ABR, um, for children who can't provide reliable information through behavioral testing so these are not only babies but this can also be children with autism, children with developmental delays like Down's Syndrome, cerebral palsy, um, **** unable to, to test in other ways. We can do ABRs through natural **** and sedation. Natural sleep, it's usually completed within the first six months of age and then once they're older because nap patterns are difficult and a lot of times because families are traveling a distance, the baby sleeps the entire car ride and then is wide awake and does not wanna sleep for our ABRs. Okay so this is the setup. So you see these little sensors or electrodes that are placed on the baby. Um, and then we place these little insert earphones into the ears that play different sounds and then the electrodes pick up the response from the auditory nerve and that generates a series of unique wave forms that the audiologists look at and we compare it to data to make sure it's normal and this is what it looks like. So, uh, Shelby had mentioned that parents indicate that they **** with a bunch of squiggly lines. Well that's pretty accurate. This is a page of squiggly lines. On the left side of the graph you see a bunch of squiggly lines and you see the Roman numerals one, three and five. Those are different landmarks that the sound is hitting, um, from the cochlea to the brain stem. And the, you'll see that **** off to the right of that five, it says LI and 80 decibels so that's how loud we are. When we're loud we get these nice, big waves and the one we're tracking is the Roman numeral five. The next one down on the graph is green and that one's at 50 decibels. You can see that wave five is still there but it's smaller and it shifted a little bit to the right and then the bottom one says 20 decibels and is considerably smaller and it shifted even more to the right. Once we hit 20, we know that the child has normal hearing. If we lose or the brainwave disappears before 20 then we know the child has hearing loss. So that's what the graph to the right of your screen is demonstrating. We have a child who at 90 decibels, all we have is this tiny little wave five and then at 80 we think we have something that's **** and then at 70 it's disappeared, so that child would be in severe hearing loss range. So that's what we're tracking and we do this same tracking with numerous sounds so this is just with one sound. Okay so more fun facts. Here we go. We do actually do ABRs on animals because in order to make sure they're purebred, um, they have to have normal hearing and deafness in Dalmatians in particular is really common and so they oftentimes are getting ABRs. I thought this was interesting. Cat ears have 32 muscles in each ear and they can turn each ear independently. Never sneak up on a cat. Okay so this takes us to kids that are within the six months to two and a half to three years developmentally. This is called visual reinforcement audiometry. The way this is set up is the child sits up on the parent's lap or in a high chair, sounds are presented through a speaker and then the child, if they turn and look in response to the sound, there's an animal that lights off to, lights up off to the side. Um, we're gonna be seeing a video here in just a second. The responses need to be time locked meaning the sound comes on, the child turns and then they get a reward. Kids are good at cheating. You're gonna see it in the video. Once they know something's gonna light up off to the side, they start to anticipate whether there's a sound or not so the audiologists really have to pick up on timing cues that the baby is demonstrating and I'm hoping you guys can hear the sound on this video. I'm not sure if you can hear the warble.

Next Speaker: **** cheating now even though the sounds not on.

Next Speaker: She's cheating.

Next Speaker: **** with the bubbles here. The sound was just presented, she turned and looked.

Next Speaker: Put up a cartoon this time.

Next Speaker: See now she's cheatin' again. And she's cheatin', no sound. The sound again, there she goes. So, um, kids can really trick out, trick audiologists and it's really important that you have; that your kids are seeing people that see a lot of kids, um, because they can fool ya.

It's easy to do even after years of experience, they can still fool ya. And then we have kids that are developmentally three to five years of age. This is called conditioned **** audiometry and I actually use this on kids that are older than five years. Um, I have teenagers that I'll even do this with and they're developmentally, or typically developing, it just kind of keeps them engaged in the task. So what they do is they're conditioned to when they hear a sound, they do some kind of action. So placing a peg in a board or throwing a ball in a bucket or putting a ring on a peg. Those are common ones and it helps keep them engaged 'cause they're keeping their little busy bodies busy. That's kind of just more of what I said. Pegs are real common, common, uh, toy. And then we have a little video to demonstrate that. This little boy is very enthusiastic and so is the ****

Next Speaker: That was a good one.

Next Speaker: ****

Next Speaker: Right, right, wait.

Next Speaker: He can't, he can't hit the shovel until he hears it. Waiting, waiting.

Next Speaker: Yes.

Next Speaker: So for this little boy, this is really fun for him ****

Next Speaker: ****

Next Speaker: ****

Next Speaker: They get really excited. It's kinda fun 'cause you, you know, you get to get goofy with your kids every day. There's not many jobs where you get to do that. We're getting back to our screen here. Okay and then after the age of five, most kids can use more conventional audiometry where they can push a button or raise their hand. It's usually something that we see done more in the schools. Excuse me. Or even in the clinics too, but. So examination of the ear, this is a first **** review and we'll take a look at a kid's ear. Some of you have made, or may have heard of the term, excuse me, **** and usually what that means is there's something that's missing or smaller. So for this child, the ear is considerably smaller and he doesn't have an ear canal. In the case of children like this, most oftentimes the outside isn't there to work for them but the inside works fine, meaning the cochlea works just fine. And then the, the picture off to, just off to the right, you know, I don't know that it looks overly malformed but there's a flattened part of the **** at the top. It's usually a bit more curled. Sometimes you'll see that, um, with different genetic conditions and then sometimes it's just the way the kids' ears are formed. But the ears are always looked at whenever they're looking at other, um, symptoms or, not symptoms, features perhaps in diagnosing some kind of a genetic syndrome. So **** this child is actually being very compliant ****. These are some common sighting **** these are some common sightings that we see. So off the left is a normal looking ear drum and off to the right, this is what a tube looks like. So the ENT puts in the tube at the bottom part of the ear drum and that tube drains out fluid from the middle ear space so those kids that have chronic ear infections, it allows their ears to just kind of drain instead of causing ear drums to bulge and cause them **** or even for the ear drum to rupture. So these are some common sightings that we have. Everyone cringes when they see the wax. It's part of it. If I looked up your nose, I'd probably see a bugger so it's not a big deal. Um, just off to the right is a perforated ear drum so that can happen from Q-tips; that can happen from a tube that has come out of the ear and the ear drum hasn't, um, healed yet. That can also be from an ear infection and the ear drum ruptured, so there's lots of reasons why you should have a hole in your ear drum and yes we do have Q-tips get shoved through the ear drum so we don't recommend Q-tips. Here we go. Ears are self-cleaning. We create the wax and then we have little **** or hairs that pushes the wax out of the ear. Everyone gets grossed out by the wax. Not a big deal, get your finger in there, scoop it out. That's the best way to do it. No Q-tips . What you end up doing is pushing that wax further in until you sometimes build up a wall and what we've had happen too is someone in the process of cleaning their ear is startled by a family member or a door gets opened and that Q-tip, that Q-tip gets shoved down the ear canal and, um, hits the ear drum, which is really painful and if it goes too far, it can actually mess up the way those bones work in the middle ear space and you can have a permanent hearing loss. No Q-tips, please. Another test that we do is ****. Some of you may have heard this referred to as the puff of air test. Um, the graph to the right is a mountain. We love mountains. Mountains are a good sign. What we do is we place a probe in the child's ear and there's a pressure change or what we call a puff. It's not really a puff of air but that's the easiest way to describe it and it looks to see if that ear drum is moving and it can tell us if there's fluid or not. If the ear drum doesn't move we know there's fluid. If it does move, then we know that everything is working just fine. It can also tell us if the tubes are working because that pressure change or that puff will go through the hole in the tube and this is what it looks like. **** so off to the left hand side you see this pretty little mountain. That means the puff of air hit the ear drum, the ear drum moved in then came back out. Middle ear space is hunky dory. Off to the right you have a flat line. What that means is the air hit the ear drum and the ear drum didn't go anywhere. So this is a kid that has fluid and is most likely destined for tubes. Now just because you have fluid in your ears doesn't mean that you're always gonna get tubes. There has to be a documented period of time that there's fluid or infection before a surgeon can place tubes. Um, another little fun fact regarding fluid in the ear is children that are exposed to secondhand smoke have a higher incidence of ear infection than children that, that don't and it's estimated that two out of every three children will have at least one ear infection by the time they're a year old. Ear infections are common; it's just when it becomes more chronic that we, um, we want to help take care of that because it basically sounds like you're hearing under water and for speech and language development that's not ****. So this, this is more of an audiologist's reality, screaming babies and kids just kinda not wanting us anywhere near their ears. We have a lot of kids that if they have chronic ear infections and their ears have just been looked at over and over and over again, they just don't want you anywhere near 'em. So we have all kinds of tricks that we pull out of our bag. Bubbles are wonderful. We have light-up toys, oftentimes the parents are more intrigued with the light-up toys than the kids but something that they can touch too, so it kinda keeps their fingers busy while we're doing tests. Again, this is kind of where it's really important and I'd like to express that when kids are going in for hearing tests, little kids in particular, that they're seeing providers that, um, have the experience in working with children of different ages and just have a lot of things up their sleeve to get what they want. I refer to my job as manipulating the manipulator. So after diagnosis, we make referrals to early intervention, pediatric **** and other specialists like genetics or ophthalmologists. There is, um, an organization called Hands and Voices that have **** and what that is, is the parent organization, um, **** parent of children with hearing loss and we can put parents in touch with these guides and the guides are there to just kinda support the families through the diagnostic process, through the fitting process, um, just there for support. I can tell you or give you an idea what it's like to be a parent with hearing loss but I'm not a parent of a child with hearing loss. So it's kinda nice to have that connection. Then we also make referrals to community health nurses. And then we also make referrals for return audiology appointments that can include testing, hearing aid fittings and to the cochlear implant team and I'm gonna pause for just a second because I think **** and I probably didn't catch it. Oh, secondhand smoke affects the hearing. Um, you know, I'm not exactly sure honestly how it, how it affects the hearing. I don't know if inhaling the secondhand smoke causes some inflammation that pinches off the **** tube and so the children just kind of develop ear infections. I honestly, that's a guess. I don't know but I know our, our pediatric ENTS and just documented reports have been that children are at a greater risk of having ear infections if they're exposed to secondhand smoke. I'm sorry I don't have a better answer for that one. And then I'm being handed a written couple of questions here. Oh yes, absolutely. Public health nurses rock. The question was many participating on the call will be the public health nurses who receive our referrals for follow-up and we want to recognize their role in the process. Absolutely. Absolutely, absolutely. Very, very important part. You guys are our connection to our families most oftentimes, making home visits, um, kinda giving us insight on the families that we certainly don't have access to so definitely a, a key role in the whole process for our families and for us. And there was another question, with the one, three, six guidelines; this is a good question. Do we adjust for age for preemies? Yes, because the hearing screening, I'm gonna say yes and no. So with the hearing screening equipment they, let's say a child is born at 26 weeks gestation, our hearing screening equipment can't be used on babies, at the AABR which us used in the NICU which is where the 26-weeker is going to be, um, we cannot use that technology until the baby is at least 34 weeks gestation, so getting closer to typical, I guess age or gestation of when that child would be born. Um, so we do correct for that to kind of, um, yeah, adjust for that, that prematurity. That was a good question. Like for example, I just had a child come in who was born at 26 weeks gestation and her date of, her, um, what am I trying to think of? She was due, her due date was August 7 and I saw her at the very end of August. So really that baby was one month old when in fact if you looked at it just based on her date of birth she looked to be three months of age. And correction factors, just even developmentally for kids that come through our NICU follow-up clinic, there's correction factors used on children up until two years of age. Pediatric ****, um, these are specialists of ears and so they provide medical clearance for hearing aids. Um, they can also order CTs or MRIs so they can take pictures of the insides of the ear to see if there's any malformations. Also to check and make sure the auditory nerve is present. You know a lot of times we'll do MRIs and CTs of the cochleas and we don't see anything wrong with them. We don't have a way to get in to see their tiny little hair cells that are in the cochlea. We don't have anything that's fine resolution so right now the only way to really get into the cochlea is autopsy. We don't wanna do that. Um, we can also provide some genetic testing. The most common is ****. Oh it looks like we have a lot of questions. Keep firing away ladies, gentlemen. That's a long one here, hang on a second. Well from an audio – so the question is, it was mentioned that it is very important to have supportive primary care and medical homes working with audiologists. Can you describe what this ideal relationship would look like? I think it's more of, um, support of, of the family and support of the, just the importance of hearing in general. So identifying or recognizing that the child failed the newborn hearing screening and relaying to the parents the importance of getting in for follow up and then there's also the important relationship, you know, usually if I have a child that I've diagnosed with hearing loss I try and make a phone call to the primary care provider and say this is kinda what I'm thinking, these are referrals that I think would be appropriate for this child and so being able to have that dialog and just kinda be on the same page with them, um, and the vast majority, the vast majority are but we do have some primary care providers that if one ear fails they're like ah, it's just one ear, not too worried about it. Or some will, you know, **** do like a finger snap or a clap and they see a child startle or the baby's back is turned to them and they make a sound and the child turns. Um, yeah okay so the kid can hear a slap and a clap and something else going on in the room but that doesn't necessarily mean that that child can hear the difference between S and F and like some of you may not even hear that on the phone. So those are very subtle differences that wouldn't be picked up with doing some kind of behavioral response like that. And even a unilateral hearing loss would be picked up by snapping and clapping. I hope that answers the question. Good question. So early intervention, **** IDEA, a family-centered, home based and also **** communication **** choices. So audiologists kind of touch on this at diagnosis. It's kind of hard for us to go into this in detail honestly about communication choices at the time of diagnosis. Oftentimes parents, all they've heard is hearing loss, hearing loss, hearing loss and, um, just kind of in a state of wrapping their heads around that rather than **** choices but we do, we do try to discuss it when they come in. You wanna do this one?

Next Speaker: Yeah, so this **** communication spectrum. So, um, families can choose to either have completely auditory communication or completely visual communication or **** along the way and they can make different choices as the child ages and you find out more about what that, what they're like and what they need. Um, children with hearing loss often have difficulty, um, getting 100 percent access through auditory communication alone and as they get older in school, will need a visual support so that could either be sign communication or captioning or note taking, things like that. So all choices, here along this spectrum, can lead to successful language and communication for children and families but it's important to, um, maintain that relationship and dedicate yourself to whatever you choose and be constantly looking out for whether something's not working.

Next Speaker: Okay **** the goal for OEHDI is that the children have hearing aids on and are enrolled in early intervention by six months. The reality is that really hearing aids can be put on children two weeks after they're diagnosed, a week after they're diagnosed. There is no certain age that a hearing aid has to go on. Six months of age I think is not only due to the research study that was, um, talked about earlier but also kind of more of realistic goal, especially for families that have failed the hearing test, the go in for one, a follow-up test that suggests there might be hearing loss and go back in for a diagnostic test and then they have to make a return appointment to go in and be fit with the hearing aids or to see an ENT. So it's hard for families, especially if they live out in rural areas. But the reality is, you can get hearing aids on babies at any age, two weeks of age. I think the youngest baby I've ever diagnosed was at two weeks and he was profound, um, and because the parents had actually been through the process before with an older child, they did have hearing aids on that child at two weeks. So by a month of age, you know, had hearing aids on. They're really cute. Um, oh that's another thing that we also hear is that parents will come back and say oh my primary care provider says that they can't do anything for my child until they're two or until they're three. Not the case, not the case. We can put hearing aids on kids any age. Um, it's important, too, that families start teaching their baby as soon as he or she is born. So, um, even though the child might have hearing loss, it's really important to continue with that communication. We relay so much just in our facial gestures and our body gestures regardless of what the baby's hearing. There's so much more to communication than just our speech. Um, and family involvement is the best predictor for child **** and I say that all the time. Um, circumstances being where perhaps both parents have to work, the child's in daycare. That's not a **** daycare and they're wearing hearing aids so they're not getting a lot of language other than from their peers, versus a child who may have a stay-at-home parent or at least one or perhaps a nanny where they're being read to consistently or just exposed to more language. That involvement is really the best predictor for a child's success. And that's not to say they're all that big of a black and white type situation but I think a lot of times parents kinda have to get over the hearing loss. I think there are some perceptions that a lot of times parents have in their heads about what hearing loss looks like. A lot of times they think of children with multiple disabilities when in fact that's not the case. Um, they, sometimes they just need time to wrap their heads around it. Once they get in there and they start reading and talking to their children and ****. So the, the goal for amplification is to provide children access to sound and to make all speech spectrum audible. Okay hearing aids, again **** can be fit at any age. Um, they're usually appropriate for most degrees of hearing loss, even the children that are deaf, they usually have to go through a period of time that they wear hearing aids. The most common is the behind-the-ear, behind-the-ear style which is what is on the picture, so there's a little loop that goes over the ear and the part that sits behind the ear and then the red part is the part that actually goes into the ear and ear canal. The **** the ear I say. Um, they typically last five to seven years. That's really if the parents are paying attention. We get them flushed down the toilet, they go in the pool, they go in the shower. They get chewed on. So if you can get seven years out of a hearing aid, those parents are rockin' it, that's awesome and it's usually on bigger kids. Um, the ear molds are the parts that need to be replaced frequently. So that red part. That's usually a mushy, silicone kind of, um, material. Each time the kid, I tell the parents, each time the kid kinda goes through or needs a new set of shoes, you're kinda looking at needing to have new ear molds made. So in babies, holy cow if you're fitting a new set of ear **** then you might as well just shoot another impression because their ears grow so fast **** change those out pretty frequently. And the reason we don't do the small hearing aids, lotta reasons why. I hate small hearing aids but for children, they're the most durable. The little ones, each time that child had a growth spurt you'd be sending that entire hearing aid to be remade. They're a choking hazard, batteries don't last as long, they break down with moisture quicker. That's the same for adults too but, um, it's a fraction of the cost to replace ear molds rather than the entire hearing aid. And this is how it's done. It's actually kinda cool. So if you look at the green ear mold with the little cotton swab at the tip, that cotton swab goes into the ear first and what that does is it provides a barrier from the impression material to the ear drum. So that way the impression material doesn't stick to the ear drum. It's not a good thing if it does. And then up at the pictures up above, not the bald head but the next one, you'll see that there is like a little, almost looks like a little shot and what he's doing is, is he is pushing some impression material into the ear and then he's kind of packing it down with his thumb or just readjusting around the edges and then the little boy needs to sit there and wait for it to be in his ear for a while. Once hardened, they pull it out and then voila, we have the green cotton-tipped ear mold impression. That gets sent off to a company which then they make an ear mold which comes back looking like the red thing. It has a hole bored in the middle of it so that sound can travel through it and again **** these can be made on children **** little babies. They're a lot more resistant to it when they're older. Babies are easy and older kids are easy. Anything in between is really hard. Usually involves a wrestling match and a lot of crying. On the part of the audiologist, the parent and the child.

Next Speaker: So here's the same audiogram from earlier with the child with mild to moderate hearing loss, um, but now with the hearing aid which I'm representing with this kind of green shaded region over the gray shaded region, um indicates that, um, amplification or some additional volume is being provided and as you can see, greater volume is provided for the area where there's greater hearing loss and it's trying to capture all of those speech sounds the best it can so that they have access to all of those **** able to detect before. So this time, it's time to go so let's put on our shoes and they actually will hear, it's time to go so let's put on our coat. Oh, I'm sorry. So.

Next Speaker: Okay so Lone Connection hearing aids, I am hoping that everyone is going to be seeing more of these on children. Medicaid or any health plan just, um, agreed, they figured out some contract with the main companies that produce these devices that Oregon Health Plan will pay for it. It is a very expensive device and, um, commercial insurances sometimes don't even pay for it. We're talking about $3,500.00 to $4,000.00 out of pocket for a family and that's at cost. A lot of places there's a markup value. So what's nice about this is the children, like the little boy off to the left, he's missing an ear canal and so for this little boy, there's no way for sound to get in to his ear. But we know the insides of his ears work fine, those little cochleas, those hair cells. So the bone conduction actually sends sound in by vibration and that vibration then stimulates those little hair cells in the cochlea so this kid can hear. Now the little girl, I think she had, um, some issues with the middle ear bones. Though it was the middle ear bones weren't transmitting sound the way it was supposed to and so she also gets a device that bypasses the part that's not working well **** the part that is and again, we're really hoping to get this on a lot of our kids that are on the Oregon Health Plan because the other device that they were giving was like this $400.00 cheap, chintzy, piece of nothin' good hearing aid that doesn't really transmit sounds well, they break down easy and we had one little, not even a little girl, she's 18, she doesn't have any ear canal. She's been using this chintzy device 18 years. She has an allergic reaction consistently to one of the materials on this chintzy device, so she misses school for at least a week at a time when she has these reactions so she's missing out on social, as well as cognitive development and she came in, she Oregon Health Plan and now this child's gonna get one and possibly even two. I put one of these on her to demo and that kid smiled the entire time she was in the department and was just so happy, like I'd given her the moon. So we're really happy that these devices are more accessible to our families. Okay, cochlear implants, there's a lot that goes on with cochlear implants so it's a surgically implanted device and it sends sound into the cochlea by an electrical stimulation so we're kind of using how the cochlea works and the auditory nerve works but doing electrical stimulation rather than through the sound waves. There's definitely more to it than that but it's pretty complicated but it does require a surgery. And these are for, again for the children that are deaf. Children that can get an implant need to be at least 12 months or older, suffering a profound hearing loss and then it's also indicated when oral communication is desired and hearing aids do not provide enough benefit for the child to acquire oral or **** language. So what that means to me are the children that perhaps there's an auditory or the neural losses, so everything up to the cochlea seems to work okay but the auditory nerve is not working well, for those children a lot of times a cochlear implant will make sound easier for them to process and give them better hearing. And the little brown part that you see on the child's head; that's a magnet that is being held up to the head and sound is being picked up by the hearing aid, being sent through that little magnet area. That provides the electrical stimulation the part that is inside the head. Okay so needs after diagnosis. So once you're diagnosed it doesn't end. Um, kids need to come back to confirm the ABR results. If they're babies we need to make sure that we got it right. Um, it's also monitoring for progression because a lot of kids will have a change in their hearing and we need to make sure that the hearing aids are adjusted appropriately to meet their listening needs. Uh, then we also need to make sure the hearing aids are working well and doing what they're supposed to do and then we also want to monitor **** ear disease. So earlier I mentioned that you can have a mixed hearing loss where something's going on with the cochlea but they can also have fluid in their ear. Well now we're not only dealing with one kind of hearing loss that's permanent, the last thing we need is something else affecting sound getting into the ear so we wanna watch for that middle ear fluid and get it treated as soon as possible. So these are some intervention and education options here in the state. We have the State School for the Deaf which is down in Salem. There it is an ASL or American Sign Language, deaf culture focus. We have the regional program which is probably what you all are more familiar with, uh, for the deaf and hard of hearing. So they're public programs, they work with the county in early intervention and neighborhood schools and provide different modes of communication. And then there's also a private auditory, oral or private auditory verbal school and that's Tucker Macson Oral School. That's here in Portland. They, uh, also kind of provide an early intervention program for children not ready to start school. One of the things that you may start hearing about or have already, two big programs, Columbia Regional Program and Northwest Regional Program and not quite Willamette ESD at this point, um, June of next year, supposedly will no longer be providing hearing aids to the children, where they had been providing hearing aids, follow-up, did repairs, new ear mold impressions, all kinds of testing. They're eliminating the vast majority of that for our families. So what that means is hundreds of children that currently access services through them are going to have to go to community providers. The problem with that though, right now a lot of those kids are on Oregon Health Plan and there's really only two or three places in the Portland Metro area that take Oregon Health Plan for hearing aids. So the audiology community right now is kind of in a panic trying to figure out how we're going to be able to meet the needs of these children once they are let loose in June. So we might be calling on you to help us more and more with our kids.

Next Speaker: Um, this slide is just another reinforcement for why, um, getting identified and treated for hearing loss before six months is so important. So there are a couple differences here so as you can see the blue, um, bars represent those that were identified before six months and the red bars are those identified later. And in, uh, every age along the bottom, uh, the blue line is outperforming the red line. So you can already see right there that those kids are performing better. But also the blue line is a lot closer between their chronological age and their language age along the side and so that means that they're, um, a little bit closer to their normal hearing peers and so most kids by five or kindergarten are able to enter a mainstream classroom if they're identified and treated, um, appropriately before six months. So another reinforcement as to why this is so important to get the process moving and these kids followed up with as soon as we can.

Next Speaker: So to kinda hit on, um, what was talked about before, the impact of hearing loss, kinda depends on the age of child when the loss occurred and when diagnosed. So not all kids are gonna be, are gonna present with hearing loss **** birth. There's kids that can present later at two or three or five, seven, ten. A lot of that impact depends on where they are in their development at that age with their diagnosis. Again the severity of the hearing loss, um, mild versus a moderate hearing loss, the configuration, the type of loss, um, the age of intervention and the development, cognition, health of that child. So we do have some children that we know have hearing loss or suspect have hearing loss but have heart conditions or breathing conditions and the hearing loss oftentimes is gonna get pushed off to the side just because those other functions are considerably more important than hearing in the health of that child at that moment. So we do have some children that are delayed in their diagnosis for those reasons. And then also the family attributes, the parents believe it, not believe it. Um, we have hearing loss simulation videos that we can show parents but you know, I think a lot of times if the parent's not wanting to see it, they're not gonna see it and that fully plays into how successful that child is going to be in their hearing, how much of an impact it's gonna be. So we have a question, if you'll give me just a moment. Or maybe we have two. So one of the questions was do clients' use of the cascade have to get services in Portland only? I don't know the answer to that. I think, um, what regional program or school district that child is in or children are in, I am not, I'm not sure. If you could send us an email we can look into that a little bit further. There's certain pockets that don't have audiologists that work with children or will not fit children with hearing aids and so there are some families that do have to travel over to the Portland Metro area for that, which is really unfortunate 'cause that's not exactly and easy trip for anyone. Good question here. Someone's on it. Can you clarify with the regional programs, right now they are only seeing EI kids and not school age for audiology, is that correct? Yep, that's correct. Those kids that are birth to five, those are the children right now that they will provide hearing aids to and hearing aid services. Kids that are five and older, those children have been cut loose from the EI program and those families are having to seek services with community providers. I don't know how many are being provided a list of community providers and again even as an audiologist myself, I don't even know who all is providing these services because this is something that hasn't, hasn't been put on our plate up until June of this, of this year. And those birth to five children are going to be on our plate next year. So we're trying to scramble to figure out what to do. Okay. So in summary, early diagnosis, amplification with advanced technology and intervention leads to improved outcomes. The education of children with hearing loss is switched from a remedial model to a developmental model. And overall, we have come a long way. At the end of this presentation too, we also have some slides with different facts on them for you. I think what I'd like to do is kind of open up the floor. We have not quite 15 minutes, for questions or if you guys have any comments or any information that you would like to be related to the group, feel free. Please type away. And we can also do some hearing loss simulation while people are talking. We can go back to those, back to that slide. While you all are thinking of your in-depth, hard questions for me to answer, for us to answer I'll see if I have any more fun facts. I don't know if this is gonna be a shocker to anyone but the vast majority, 60 percent of people with hearing loss are male. That's not selective, just hearing loss ****. We do have a question here, hang on. Absolutely, we're gonna make the PowerPoint available for people after the presentation. I think it's gonna be, we're gonna post it on the website. I think it's being recorded too so you guys can listen to my lovely voice again and be bored ****. So we have some hearing loss simulations we would like to, oh here we go. Oh risk factors, yes. Did we skip over that? Did we delete it? Okay so yes, there are, children with risk factors that should be monitored. So children that are in the NICU any longer or that's the neonatal intensive care unit, any greater than five days, um, that will catch a lot of children; that's all your preemies, those are kids with, um, chronic health issues that they might born with. Your, um, heart babies, transplant babies. I'm trying to find my slide here.

Next Speaker: **** family history of hearing loss will be on that risk registry.

Next Speaker: Yes, uh, let's see any children with syndromes, any cranial facial issues, so we have, um, **** or just cleft pallet or something called cranium ****, any cranial facial abnormality **** infections so that would be the CNV that Shelby was talking about earlier. And what the recommendation is, is for these children that have these risk factors, they should have another hearing evaluation, even if they pass, within 20, 24 to 30 months of age. That has changed back from the prior recommendations where it used to be that children with risk factors were seen every six months. What they found was it was a big, um, I don't wanna say drain but it was a lot of children going back for audio, audiologic evaluations that weren't showing hearing loss to justify to insurance companies and families and even to the audiologist, the need for that close of monitoring of hearing. I don't know that I'm in favor of waiting until 24 months of age. I think if a baby, especially a premature baby, a family history or CNV, those babies should be monitored much closer like maybe a follow-up evaluation at six months, or at least one at a year just to double check and make sure we didn't miss anything because newborn hearing screenings can miss mild hearing losses. We know this and we wanna catch those hearing losses. Okay, good question. So we have a hearing loss simulation here. Let's do Nancy Pelosi. Okay, so let's do moderate. We're going to present

Next Speaker: ****

Next Speaker: Okay so probably what you heard was a lot of what sounded like Charlie Brown speech ****. That is what a moderate hearing loss sounds like to a child. And this is, this is what it really sounds like.

Next Speaker: This year we took a canoe trip in Canada where we canoed for days with no bridges **** paddling all day watching otters play in the water and sea swallows jumping into the boat.

Next Speaker: It's a big difference. It almost sounded a little raspy I don't know if that's due to our speakers but big difference. We'll play some different sounds too I think. ****

Next Speaker: ****

Next Speaker: That's a conversation in a restaurant between a couple of different people. Um, and this is, and this is what the conversation sounded like ****

Next Speaker: **** you heard **** why not **** everything here is wet and gray.

Next Speaker: So big difference again in what's clear. I mean it's still noisy and it would still be hard to pick out the speech but you need to have good hearing to be able to focus on what they're saying and pick it up. With a moderate hearing loss you wouldn't be able to pick up on it. I have, um, a question here. So one of the questions was, do you know if House Bill 2589 is $4,000.00 per ear or $4,000.00 per person? I have contacted a local rep and they are looking into it but he was not sure. My understanding if we're talking about just general hearing aids and we're talk – I'm not sure what this is referring to. So there's a certain benefit that certain insurances will have so let's say Kaiser for example. They have a hearing aid benefit. So they may pay $4,000.00 per person, so that's to cover the hearing aids. Um, it's usually not $4,000.00 per ear. There's other, uh, insurance companies that they might pay $2,000.00 per ear or $2,000.00 per hearing aid. It just depends on each insurance company and there's always loopholes in that, if we're talking private insurance, you have your copay, your deductible that oftentimes gets **** into that. Um, I don't know, I don't know if this, I don't think this 2589 is the one in regards to the **** and the Medicaid. So I think it's $4,000.00 per person but I, I'll, uh, I'll double check and see. That's a good question. **** okay we're trying to find another hearing loss simulation for our target audience here. The vast majority of people, 65 percent of people with hearing loss are below their retirement age. **** and it says too, that people with hearing loss wait an average of seven years before seeking help and that's being cognizant of it. So kids that aren't even, you know, don't even know they've got hearing loss, seven years is too long. Okay so we have some just environmental sounds with the example of a mild hearing loss, moderate hearing loss and then normal hearing. So here is frog with the moderate hearing loss. Okay, here's a mild hearing loss. And this one's probably gonna rock your ears so you may, if you're wearing headphones, pull them away, no noise damage here. That's a big difference. Okay let's do some birds signing. Or let's do piano. Here's with the moderate hearing loss. Definitely can hear the different sounds ****. That's with the mild hearing loss. Normal and then we're gonna go to a question. A lot more distinct, a lot more crisp, we like it. Okay going to a question. Yes, good question. This says would the Baja be appropriate for a child with ****? Absolutely. That's the largest population of kids that we are actually fitting with a Baja. The Baja stands for bone-anchored hearing, they say apparatus. Bone-anchored hearing aid, that's kind of an easier way of saying it. Um, there's two companies right now. One is through **** and one is through Cochlear. Both of the companies, um, have contracts with Oregon Health Plan but yes **** for sure. We have a little baby coming in next week that's missing both of her ears, so she's a candidate and then we have some children that are just missing one ear and if we know the insides are working well, hey man it's nice to put some sound into that **** ear that's hearing things muffled and give them two ears to hear with instead of just one. We're getting down to our last couple of minutes. If you still have questions, please send them into the OEHDI team and we'll try and get answers back to you as soon as possible. So one of the questions too was for a child that's missing both ears, would they put two bone conduction hearing aids on the child? And yes, I have a little child with Down's Syndrome who's ear canals are really small and he does have two and we put one on each side. That's not always the case. Uh, when you send sound in by vibration, you're actually stimulating both cochleas, they're both snail-shaped structures, um, but what you get with having two and having them placed kinda both, each ear, one on each side, is it gives the child some localization and it kinda helps them filter out perhaps some noise that might be happening on one side and kind of be able to tune in with sound coming in from the other side. Question just came in. Hey, thanks. We have a positive comment. As a new, I hope you don't mind my saying this. As an RN new to home visiting, really appreciate this webinar and especially the risk factors which need monitoring. Our pleasure, absolutely. You guys are a big help to us and we want to connect as much as we can with everyone involved in the care of children. And I think, folks, we are out of time. Thank you again so much for taking the time out of your busy schedules to attend and please, again, send us any questions, comments, ideas for how it could be better. Um, we'll take it all. Thanks again and I hope you all have a wonderful day.

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