

Narrator:

Welcome to Earworm: Dialogues on Hearing Health You Can't Stop Thinking About. Earworm is brought to you by the National Center for Hearing Assessment and Management at Utah State University, known as NCHAM.

Will Eiserman:

I'm Will Eiserman and I'm the associate director of NCHAM, and I'm your host today. During the well-child visits that start within the first several weeks after a baby is born, the pediatrician or other healthcare provider begins to monitor a number of health and developmental concerns, one of which is to check the child's newborn hearing screening result. If a newborn doesn't pass a hearing screening conducted before hospital discharge, or one performed within the first few weeks of life, then referral for audiological evaluation is the next needed step. In most instances, however, children pass the newborn hearing screening. With approximately 98% of all infants in the United States now receiving what is considered universal newborn hearing screening, this provides parents and healthcare providers with an important initial data point on the child's hearing status. In this episode of Earworm, we'll be talking about the ways in which pediatricians or other healthcare providers and actually anyone who is in the life of a child, can and should continue to monitor the hearing status of children throughout the early childhood period, even if the child passed the newborn hearing screening.

Our guest today is Dr. Dylan Chan. Dr. Chan is an associate professor and director of the Children's Communication Center in the Department of Otolaryngology Head and Neck Surgery at the University of California San Francisco. Dr. Chan received his PhD in auditory neuroscience from Rockefeller University and his MD from Weill Medical College of Cornell University. Dr. Chan completed his otolaryngology neck and head surgery residency from Stanford University, followed by a pediatric otolaryngology fellowship at Seattle Children's Hospital. In 2014, Dr. Chan established the University of California San Francisco Children's Communication Center, which is devoted to delivering multidisciplinary care for families of deaf and hard of hearing children, performing community outreach and education, and conducting clinical and translational research projects. By addressing existing shortfalls in care delivery and developing novel interventions, Dr. Chan hopes to significantly impact hearing health in children. So we welcome Dr. Chan. And right off Dr. Chan, I'd like to ask you to set the stage for our conversation today, focusing on the importance of monitoring hearing status throughout the early childhood period and how that can be done.

Dr. Dylan Chan:

Hearing loss is the most common sensory issue in newborn babies, and about one in 500 babies in the United States is born deaf or hard of hearing. So that means with some kind of permanent or long-term hearing loss. When you look at kids by the time they enter kindergarten, around five or six year olds, that incidence roughly doubles. So there are just as many kids who are identified with hearing loss after the newborn period but before kindergarten entry, as there are kids identified as deaf or hard of hearing right at birth.

Will Eiserman:

And that group of children identified after the newborn period are often described as having late onset hearing loss. But you categorize that group a bit more broadly, right?

Dr. Dylan Chan:

I really like to use the more broad term of late identified hearing loss, rather than strictly late onset hearing loss. Late onset means that the hearing loss started at a time other than birth. But really we're talking about kids who were identified with hearing loss after the newborn period. We have a whole system in place for newborn hearing screening with the intention of identifying babies born with hearing loss in that newborn period.

Will Eiserman:

That system is usually referred to as the early hearing detection and intervention or EHDI system for short, and has historically focused on identifying children who are deaf or hard of hearing at birth. And it does indeed do that.

Dr. Dylan Chan:

But in reality, many children are identified late. So there's really three different categories. So one category is children who actually failed their newborn hearing screen, who should have been identified at birth, but for one reason or another were lost to follow up in the early infancy stage. And then they turn up at some point later on when they're two or three with the hearing loss. But really that hearing loss was probably present at birth. So that's one category of late identified hearing loss.

Will Eiserman:

Those children are the ones often thought of as having been lost to follow up from newborn screening.

Dr. Dylan Chan:

Second category is children who never underwent newborn hearing screening, and this is many of our immigrant kids who come from countries that don't have newborn hearing screening programs. So they are identified late, late as in after the newborn period, but they could have had hearing loss from birth as well. And then finally, there is the category of truly late onset hearing loss. So these are children who passed their newborn hearing screens, presumably did not have any hearing differences when at birth, but acquired the hearing loss at some point in the first few years of life.

Will Eiserman:

So we need a way to find children in each of those categories after the newborn period, during early childhood. Now the American Academy of Pediatrics or AAP, has developed a set of guidelines to help pediatricians know what to be looking for across many areas of health and development during the very time limited well-child visits they have with children. The AAP calls these the bright futures guidelines.

Dr. Dylan Chan:

Yeah, so these bright futures guidelines, it's a giant table of all of the things that pediatricians are supposed to be screening for, looking out for, asking for as part of their well-child visits that they do at very specific intervals throughout childhood. So there is a line there for hearing screening. Hearing is supposed to be assessed in some way at every single well-child visit for all the well-child visits up until a child is four years of age. The hearing screening really consists of assessing for risk factors for hearing loss, but there is no requirement or recommendation for objective hearing screening, so actually testing hearing. At age four, that's the first well-child check where a hearing screen, an actual objective hearing test, hearing screen is recommended to be done at the pediatrician's office.

Will Eiserman:

So after the objective hearing screening done at birth, bright Futures at least doesn't specify that healthcare providers conduct another objective screening until age four, even though we know about those categories of children you just mentioned who may have a late onset hearing loss or other reasons for later identification. Any thoughts, Dr. Chan, on why bright futures doesn't include objective hearing screening during these first three years and not until age four?

Dr. Dylan Chan:

I think the main barrier to doing objective screening during that time period is that objective screening is something that has to be learned, that you need equipment for and that you have to have the resource to be able to do it. The alternative, which is understanding the risk factors and knowing when to refer the child for an objective screen or an actual full hearing test, that's something that everybody can do.

Will Eiserman:

Okay. Let's come back to the possibility of doing objective hearing screenings during the birth to three period in a minute, and focus first on what bright futures does recommend regarding monitoring risk factors as an important way of potentially identifying children who are deaf or hard of hearing. How do healthcare providers know what risk factors to monitor?

Dr. Dylan Chan:

Fortunately, the Joint Committee on Infant Hearing-

Will Eiserman:

Known as JCIH.

Dr. Dylan Chan:

... has compiled an official list of risk factors for late onset hearing loss. And these are all things that have been vetted by a multidisciplinary group of experts and are reasons to refer a child for a hearing test. And this can be roughly broken down into three categories. One category are congenital factors, so things that babies are born with that would recommend for them to get a full hearing test, even if they pass the newborn hearing screen. And this includes things like certain kinds of syndromes that are known to be associated with hearing loss, things like down syndrome or craniofacial differences, certain kinds of perinatal infections or experiences like if they were in intensive care for more than five days or if they had a congenital infection with CMV, which is the most common congenital viral infection.

Will Eiserman:

So those are factors that are present at birth, that would be risk factors for late onset hearing loss.

Dr. Dylan Chan:

The second category are things that the child goes through during childhood, so after birth, that put them at risk for hearing loss. Things like exposure to certain drugs, like if they're a cancer patient that receives cisplatin or if they had an accident with a fracture in their temporal bone of their skull. And both of those two things are fairly, they're fairly medical and they're fairly rare. But the third risk factor is really the most important one, and this is the one that everybody who takes care of a child has access to. And this is if the caregiver has concern for the child's hearing, speech, language, or overall development. So if you have a child who is speech delayed, that is a reason to get a hearing test, or if

there's a developmental delay, getting a hearing test is really a clear recommendation from the Joint Committee.

Will Eiserman:

Okay. So you screen for the risk factor, and if you discover the presence of a risk factor, does the child get a hearing screening or a full audiological evaluation?

Dr. Dylan Chan:

So the recommendation from JCIH is that they get a full diagnostic audiologic evaluation that is age appropriate, obviously.

Will Eiserman:

So we're talking about risk factors associated with potential late onset hearing loss. That doesn't mean that the hearing loss would necessarily be present or identifiable the first time the child is tested after the newborn period. So how often does a child with a risk factor need to be tested?

Dr. Dylan Chan:

So it really depends on the risk factor. The JCIH lays this out very clearly, exactly at what age the child should get a hearing evaluation, and there are standard practices by audiologists about how frequently they would monitor the hearing. So certain risk factors have different lengths of time that monitoring would be recommended.

Will Eiserman:

So there's some variability based on each specific risk factor.

Dr. Dylan Chan:

The one thing, like I said, that is very common is caregiver concern for developmental delay or especially speech or language delay. And the recommendation from the Joint Committee is that those children get the hearing test immediately. So once that concern is raised, then they should be immediately referred to an audiologist and then they should get a hearing test.

Will Eiserman:

So I can see that risk factor screening can clearly contribute to identifying some of the children who would be in this broad category of children with later identified hearing loss. But risk factor screening also has some limitations, right?

Dr. Dylan Chan:

So the problem with the risk factor assessment is that it's full of holes. Relying solely on risk factor assessment is not comprehensive and it's not great. I see plenty of families who have a lot of concerns about their child who are fine, and I see a lot of families who have no concerns about their child and their child really does have a lot of stuff going on. And so risk factor assessment, while it is easy to do, doesn't require any equipment, it's very porous and it's not comprehensive. And so it is a safety net, but it's a safety net with a lot of holes. Having a layer of objective hearing screening that can be administered comprehensively and routinely to every kid that comes in, regardless of the risk factor assessment, helps to plug in a lot of those holes.

Will Eiserman:

I'm guessing you've seen examples of when a child was later identified who may have been able to have been identified earlier.

Dr. Dylan Chan:

I'm taking care of a family right now who they have two kids. The older one was identified with hearing loss, I think at around age four because of a pretty significant speech delay. The parent brought up a concern to one of their providers, and it was during cold and flu season, the kid had some fluid behind their eardrums, it was sort of all chalked up to that, and then they were referred to a speech therapist. And then it was about a year later that a hearing test was done, and it turned out that there was significant hearing loss. That kid probably would've been picked up if there had been a otoacoustic emissions screen done at age two or if a hearing test had been ordered immediately after the concern was noted for the significant speech delay. I mean, this is a story that I hear pretty much every week. It's very common.

Will Eiserman:

I imagine it's also not uncommon for a healthcare provider to learn from a parent during a well-child visit that the child is already receiving some sort of extra service or early intervention like speech therapy. Maybe they'd been referred by a daycare or preschool provider, or maybe the parents sought the service out on their own. In those instances, one might assume that the child had received a hearing screening or even an audiological evaluation as a part of initiating a service like speech therapy.

Dr. Dylan Chan:

Yeah, I think it's always folly to assume that something is always going to happen, even though concern for these developmental delays is a recommendation from national guidelines for an immediate referral for a hearing test, but that doesn't happen all the time. It doesn't happen all the time for kids referred into early intervention. It doesn't happen all the time for kids referred to a speech therapist for speech delay. And it's because there isn't a broad awareness that checking for hearing loss is something that should always be done for a child that has concern for speech language or developmental delay. And so it should always be on the radar and should always be done as one of the tests to rule out that as a contributor to these delays.

Will Eiserman:

So you mentioned that healthcare providers or even others who provide services to young children, could be providing otoacoustic emissions or OAE screening, which is actually one of the screening methods used in many newborn hearing screening programs.

Dr. Dylan Chan:

One common misconception is that you can't test hearing in young babies or young children because they can't raise their hand when you ask them to when they hear a beep, because that's how adults have their hearing tested. But at different ages, there are different ways of definitively testing hearing. Yeah, otoacoustic emissions testing is another way of measuring the function of the auditory system without requiring that the child provides a behavioral response. So you can rely on the fact that a functioning inner ear will actually produce its own sounds in response to sounds that you play into it, so that if you can record those sounds, then you can know that the ear is functioning essentially normally.

And so it's another way of detecting that the inner ear is functioning normally without requiring the child to participate in some kind of task.

Will Eiserman:

So in addition to risk factor screening, healthcare providers have the option of incorporating OAE screening into well-child visits without it necessarily overtaking the many things they need to address during those well-child visits.

Dr. Dylan Chan:

That's why otoacoustic emissions hearing screening is actually amazing because it can be done in five minutes or less. It can be done in 30 seconds. And objective hearing screening is something that can be efficiently done in a pediatrician's office, is highly effective. It's very good at identifying children who should be referred for a full audiogram, and it is a very good screening tool.

Will Eiserman:

And this is something that some pediatricians are already doing?

Dr. Dylan Chan:

There are pediatrics practices that do otoacoustic emissions screening as part of their well-child checks, much younger than age four. There are preschool programs that do otoacoustic emissions screening for all of the children in their preschools and childcare programs. So this is something that is feasible and implementable and provides the opportunity to identify many, many more children before any of these speech and language concerns manifest themselves.

Will Eiserman:

So pediatricians don't need to restrict themselves to the bright future guidelines. If they have the capacity to do OAE screenings for children under four years of age, then as you say, they will likely be identifying more children than risk factor screening would get.

Dr. Dylan Chan:

Yeah, the bright futures recommendations, those are considered to be minimums. I mean, these are the real minimum recommendations for what you really should be doing. They're the minimums, and they take into account real pragmatic limitations about what pediatricians can do in limited time and with limited resources. But if you do have the bandwidth, there's certainly better screening that can be done. And you can think of risk factor assessment and objective screening as belt and suspenders for early identification. You are going to identify more children that way.

Will Eiserman:

So Dr. Chan, thank you so much. Parting thoughts?

Dr. Dylan Chan:

We've done all the work and gotten a great newborn hearing screening system in place, and now's the time for us to really work on this next phase of early identification of hearing loss for children. The good news is that there are a lot of eyes on these kids. There are pediatricians, there are preschool teachers, childcare providers, and parents. And there's an opportunity for all of these caregivers for these children

to know what to look out for and to understand what these risk factors are. And then on top of that as an additional layer for the safety net, there are great opportunities for objective hearing screening that many preschools and pediatrics practices are already using, that are easy to use, not expensive, and provide another opportunity to identify these kids.

So we have a lot of opportunities to identify these kids, and our challenge right now is just to get the word out and to implement these more broadly than they already are. And when they're identified, we have a whole host of things that we can do to help support these kids, to help support their access to sound, speech, language, communication, and to really get them set up to thrive.

Will Eiserman:

That was Dr. Dylan Chan. I'm Will Eiserman from the National Center for Hearing Assessment and Management at Utah State University. Check out [earwormpodcast.org](http://earwormpodcast.org) for other episodes of Earworm: Dialogues on Hearing Health You Can't Stop Thinking About.

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Narrator:

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