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NAVIGATING PEDIATRIC AUDIOLOGY WITH 1 3 6.

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>> DR. HANNA SAWHER: Ok. Thank you for joining us for this last EHDI talk. We're really excited to see all of you here today. My name ‑‑ wait. That's ok. Hi.

Ok. Awesome. I was just thanking them for coming today and for joining us for this last talk.

My name is Hanna Sawher, a Doctor of Audiology at Children's Hospital of Wisconsin. I'm also the with the Universal Newborn Hearing Screening program at the hospital. With me today is Brooke Flesher, a doctoral extern at Children's Hospital, graduates in May. She's also our Universal Newborn Hearing Screening Program Coordinator. So she works closely with me.

This presentation will elaborate on some of the changes that we made that have had ‑‑ results in a significant improvement on our program meaning the overall JCIH 1‑3‑6 benchmarks.

Here's the general outline. If you would like to request our slides, feel free to follow with me after. We have no financial or non‑financial information to disclose today.

We just wanted to include some key terms. As you know, if you're not in audiology, we can talk in lingo like any field. The main one I want to refer to is the Children's Hospital of Wisconsin, CHW. It's a long title and that's where we're from, so we say it a lot in this presentation. But we'll just say CHW.

On this next slide, I want you to look down where it says Wisconsin EHDI Tracking Referral and Coordination. That's called WE‑TRAC. And WE‑TRAC, it's our electronic database and our system that we work with our state. That's how we get a lot of our babies, whether they passed or referred Newborn Hearing Screening and whether they're sent to us at Children's Hospital. So it's a big part of our program so we'll be referencing it throughout the presentation.

So those learning objectives, what you saw in your packets. We just want to make sure that we understand those 1‑3‑6 benchmarks and how they're applied to our program in specific case examples. You'll be able to evaluate a hospital‑based EHDI program and some of the barriers that we found in meeting the 1‑3‑6 and then develop some strategies. And we'll share the strategies that we've had and management ways for more effective programs. And just so more people know about EHDI within the hospital system itself.

Like I mentioned, we did a quality improvement project allowing for an in‑depth look at our current state so specifically 1‑3‑6 benchmarks within our organization, our walls. So this presentation is going to explore how that program structure changed and how we use implementation of the new program structure, advocacy and education and how that's really improved dramatically the time of diagnosis as well as the time of intervention.

Another mean point we'll talk about is our inpatient program and how we really started to elaborate and expand upon the collaboration with inpatient providers.

We're then going to look at some case studies. We'll look at three. And examine the audiologic need, better care coordination, and follow‑up for at risk babies within our CHW system.

Why we exist. I think we all thought that. We're here. We're rounding out the EHDI conference. But the reason why we do what we do is for the children and their families. We know that childhood hearing loss is one of the most common birth defects, one to three per 1,000 with an increase in two to four per 100 for NICU survivors. So CHW has a very extensive NICU as well as a PICU, cardiac floors, and infectious disease unit. So all of which have audiologic collaboration in varying degrees and all of which that collaboration is actually administered and controlled by a Newborn Hearing Screening program. So we get the most amount of babies referred to us. We have the biggest NICU PICU, cardiac floor in the state.

We are finding that when we were educating others within our system, within our own hospital walls, since audiology lives in an outpatient world and an inpatient world it can get very confusing for other providers, especially when we're connected to a medical college. So we have a lot of people coming in and out that might not know what audiology is or what the benchmarks are. So we created a vision. It's essentially that our kids will be the healthiest kids in the nation.

Then we decided, ok, we need to create a mission for our program. And it's called HEAR, helping children Hear their best, Education, Advocacy and then Research. So HEAR stands for an EHDI system that involves the family, medical providers, early interventionists, community partners and education allies. We work with all of these people, lovely, lovely people in our EHDI system, to make sure our program is well-rounded and not just from one view. We believe it's our duty to provide families with options for care, tools for advocacy, and the research to provide our best care possible.

So then what were our goals? By now we know the goals. Right? So the one‑month hearing screen and then by 3 months of age that they have the diagnostics, six months of intervention.

I want to focus on the first bullet point there. 100% of newborns are screened for hearing difference before discharged at CHW. This is really important to us as that was something that we were examining that why is it that babies that were seen inpatient versus outpatient had a difference in their hearing screening results, meaning the time that actually was completed. We'll go in more detail in a moment.

So how do we get these things accomplished? There's many different moving pieces to our day‑to‑day. Something I just wanted to bring up was the Center for Disease Control Prevention, CDC, recognized a successful program must have an easy and secure way to follow all babies who are screened, whether they're screened with us or with anyone else.

How do we accomplish this? So I mentioned we have the biggest NICU. We have a very extensive -- a lot of kids with complex medical needs as well as four locations of CARE closer to home. So different locations not just the main campus clinic.

We do that in three ways. The first way is what we brought up on like the third slide, so the WE‑TRAC database. This database is run by the state and then managed by us within our own hospital system. We have an outpatient queue and an inpatient queue meaning all babies that are recommended ‑‑ that their recommended next step would be the second screen while they are still inpatient other they already know that they are being referred to us from an outside facility and, there they need to follow up outpatient. Another way we do it is through or own medical records system. And then we have our own database, our UNH database. And it mimics and directly copies the WE‑TRAC database. We do that or for our own reasons because we feel in order for us to improve and to continue to improve and educate that we need to make sure we're tracking everything.

So now Brooke will talk a little bit more in a moment about program changes. But I just wanted to say that education has been first and foremost for us, working with community partners, for instance, our lovely nurses in the office. There is an audience right now who works very closely with us on a day‑to‑day basis from the State Department. But direct audiologic supervision of each case.

In the past we had 15 years of an amazing program at CHW. But in June when we took this over and started to make a little bit of waves, we noticed that we were losing a lot of kids and how do we know what's happening if we don't directly supervise each case. So we've been doing that as well as NICU results are sent directly to our program, to myself and to Brooke.

So the Newborn Hearing Screening program right now, the team consists of two of us. And we do this on top of our full case clinic load. So on top of seeing all of our patients we do this over lunch, we do this after clinic. But we really felt in order for us to show the importance in the hospital system, we had to be able to show results.

Another thing is we also educated all of our ABR scheduling team. And we really wanted to let them know the importance of the 1‑3‑6. What we were running into is that they were saying, oh, they had fluid, we'll see them back in six months. They already missed something else. Then we were finding out they were never even diagnosed with fluid. The referring hospital just said that they had it or they referred to because they have it. I think this is something common that a lot of us hear now and then. But we wanted to make sure that our scheduling team, that we're getting this first initial glance at a child, was able to appropriately refer to us in field and ask those appropriate questions.

A final thing is central scheduling for those babies that need that second screen. We wanted to make sure that they were able to tell mom and dad how to prep that baby appropriately. So they weren't, you know, arriving at having just that napped in the car all the way to see us. Especially because we get babies from all over state. So we make sure they come hungry and they come very sleepy.

The final thing is we really worked hard on interdepartmental education trainings. This has taken a lot of our time. We felt we had to work from the ground up to build an appropriate framework.

So a big way that we've done that is we've educated all of our nurses in the NICU. So we had to train them. They've been trained before which is fantastic but now we created even more and an extra framework for them, so a video that explicitly go over everything they need to know how to use the equipment and what to say to families in each and every different situation as well as a direct contact so they now have a direct contact where if they have questions, they know how to page me and reach me and so far it's been very successful.

Another way that we've done this is through our PICU. So not every child are in the NICU. There's different situations and different times kids will be in and out of you are system. So really educating all of the floors and not just our NICU staff.

Otolaryngology has been huge and an important collaboration for us. We found in our system, Otology, while it's a doctoral level education, it's been hard for us to come in to those complex medical care situations and express what we do. So having that partnership has been awesome and helped us to fit kids needing our 1‑3‑6 as we'll show in a second.

So now Brooke will talk about just some background on what is a pass at CHW.

>> BROOKE FLESHER: Before we jump into more details in how we track the babies, we just wanted to make a clear definition of what a pass Newborn Hearing Screening is at CHW. In our standards it's either A, ABR in both ears, Algo3i, and this is what the nurses in the NICU complete, or an ABR click screening at 35dB HL in each ear via the Interacoustic Eclipse system. That is what we will do when there is a diagnostic referral made from a NICU nurse.

>> [Inaudible; off mic]

>> BROOKE FLESHER: Can everyone see her over there? Yeah?

Ok.

So, as Dr. Sawher said, we do follow inpatient and outpatient separately. Our outpatient program is outlined here on this screen. Keep in mind that this is just a highlighted path that we have. There is a lot of background work that goes into coming to these boxes.

So we'll start off by looking up at our three different databases that Dr. Sawher had previously mentioned. And if they have a follow‑up appointment scheduled, we will connect with the family and continue on through that appointment. If they do not have a follow‑up appointment scheduled, we will contact the family up to three times. After that if we are unable to contact the family, we refer to Wisconsin Sound Beginnings for a loss to follow up prevention efforts. And if they are willing to schedule, we'll do an ABR if needed or we'll have central scheduling provide them with information and we'll see them as an audiology outpatient to which we'll either find normal hearing or we'll find a hearing loss. When we find normal hearing, we will essentially close the case from our three databases, a temporary close, and then when we diagnose a hearing loss, we will refer them on to Birth to 3 for referral and then also follow‑up appointments.

So this is kind of the flow of our outpatient diagram and how we track our outpatients. Dr. Sawher is now going to go through the inpatient flow.

>> DR. HANNA SAWHER: So I know this is a lot and there's arrows going everywhere. This is just a day in the life. Right? Especially I'm sure a lot of you have experienced testing babies and diagnosing children. And this is what happens in working with families within a system. So many moving parts.

So like I mentioned before, we were noticing in our program that these babies that were inpatient versus outpatient had different outcomes. So what's going on? Why was that? Why were they not meeting?

Some of the main things that we need to think about is medical complexity. Right? So sometimes they're just not healthy enough or they're just born too early or their canals are little and are collapsing, we're not able to get our tests. But in an ideal world I want to look at this flow sheet. So keep in mind that many things are going on behind the scenes and pagers are going off and messages are being sent to try to make this happen.

So first we check all three databases those databases are super important. We're constantly looking at them all day, every day.

Let's go all the way to the side where it says “hearing screen was comleted.” So say we're in the NICU. The NICU team was able to screen appropriately at 1 month past. They went into our databases. We still mark all three of those things.

Once the NICU nurse puts in the results, they send to our team. This is excellent. It's been a huge improvement and we got an EPIC build to make that happen. I'd love to talk about that because it's amazing for audiology and us to get more into the inpatient world.

So let's say that we looked. This baby is way passed when they were supposed to be due. What's going on? This is also common. And then we find out, we consult the medical team, and the medical team says, yes, this baby is healthy enough. So we ask them to please place a consult to us.

If the consult is placed appropriately, then we end up going up ourselves and do a different type of screening than the nurse would do. If they pass, we enter it. If they don't, we then help coordinate the diagnostic ABR, all by Brooke and myself. Normal hearing, enter it in the three places, you're done.

If they are then diagnosed with definite or hard of hearing, then we are sending that referral to BRSA3 [phonetic] and let our state know what's going on. So we keep everything updated because we really want to make sure that all parties involved are aware of this baby. As specialists, we're not the medical care home. And so we really put a lot of importance in the pediatrician and the follow‑up and our community partners.

So what happened with all of those program changes? This is exciting. This is my favorite slide. Because it just proves that the sleepless nights were worth it.

In June we started this. You can see we had a lot of babies that were not meeting our 1‑3‑6. It was not happening. Right? Like I said, we had an amazing foundation and a lot of years but putting in some of those change it seemed to have an effect. And our community partners expressed that as well.

So we can see that babies have ‑‑ are now getting what he this need. And now we just need to think about sustainability.

So a little bit further into some cases. You can kind of see what happened before, how we intervened, and then one that went beautifully. Brooke will elaborate further.

>> BROOKE FLESHER: Ok. So in the interest of time we're going to jump ahead to our case studies here. As Dr. Sawher said, we're going to go through two cases that really stood out to us and showed us the need for a revamp of our Newborn Hearing Screening program and then one case that we're extremely proud of area and everything went flawlessly.

We'll start off by one that kind of ignited this change. So this patient was born at 31 weeks, had a 7‑month NICU stay and had congenital syphilis. There's also some other medical complications listed for this patient. Why we wanted to follow them with congenital syphilis is because it can present before the age of 2 but it can also present beyond the age of 2. So we just really wanted to keep a really close eye on this patient.

And you can see that audiology history, she was transferred to our NICU from a different hospital. And an audiology consult was placed over the weekend. And the baby was discharged that same weekend that the consult was placed. Unfortunately at this point in time we do not have audiologists staffed over the weekends as we're trying to get this program up and running. So this was a baby that did not have a Newborn Hearing Screening. Outpatient follow‑up was recommended. However, it was never followed up with.

So a few days later one of the audiologists contacted mom regarding the recommendations for a Newborn Hearing Screening and the need for an ABR. So it was scheduled to have an ABR in July which the family no‑showed. It was scheduled in December for which the family no‑showed. And it was scheduled to have an ABR in February to which the family no‑showed. So at this point we have been calling mom and calling mom and sending her all of these different resources that we have. We decided to send it on to social work at CHW as they have other resource that they can provide the family with. And then we also made our nurse, Susan, aware through Wisconsin Sound Beginnings for loss to follow up prevention efforts.

So barriers to care with this case. The Newborn Hearing Screening was not completed. This baby is at in this point almost 2 years old and has never had a hearing screening. And this was something in our NICU for an extended period of time. Also, she no‑showed multiple appointments.

And victory that we had ‑‑ we didn't give up on this baby. Once we had identified and implemented this new program, we were able to enlist other assistance.

Dr. Sawher is going to show you one more case that really ignited our change.

>> DR. HANNA SAWHER: In June we were looking through the kids that were still in our queue and we saw this baby. So you can see NICU stay of four months, charge syndrome, and bilateral microtia Type 2, or microtia. You can see right down there. As well as some chronic lung disease, global developmental delay. So very medically complex kiddo. When I ended up finding this case, they were then discharged so we lost them.

Charges we can see, very medically complex. We see a lot of these kiddos at Children's Hospital of Wisconsin. So it's important follow‑up is done.

Let's talk about what happened with audiologic history. This baby never received the screening which to me was really surprising and really got to my heart because how is that possible. Where were the gaps and what was going on? They were sent to the outpatient clinic. We were just told that, well, he's in foster care and that is what it is. So to us that just wasn't acceptable. We had to figure out what to do next. So we ended up working with social work and contacting a judge and getting the necessary information and approvals that we needed to in order to get this baby treatment and evaluations.

Eventually the baby had a sedated ABR at 19 months, fit with unilateral amplification via a language device and has a fitting with me next week for bilateral amplification. Very exciting and we're really happy about this but we don't want this gap to ever occur again.

Barriers, the child was in foster care. We needed a judge to help us. Inpatient education. I really went up there with an open heart and open mind on what could we learn from each other. And that's really proven to be helpful and effective.

Victories is, we were able to fit this baby with a loaner BAHA through Sound of Hope, which is a lovely family that donates for this reason. So we just made sure that even though this gap existed that it stopped right there and that we provided them with care.

Now Brooke is going to talk about one that we're really excited about and something that's going off.

>> BROOKE FLESHER: Ok. So this is one of our babies that was diagnosed with Treacher Collins, bilateral microtia, Grade 3 for both ears, some facial commonalities you'll see with Treacher Collins, and then this is just the spectrum of microtia. So starting with one being the least severe and four the most severe, our patient has Grade 3 for both ears.

So audiologic history, an inpatient natural sleep ABR when they were 21 days old which was a great success in itself. And we found that he had a maximum conductive hearing loss in both ears as we could have guessed. And at 35 days old he was fit with a unilateral BAHA through the Sound of Hope, as Dr. Sawher mentioned that nonprofit. And then we were also able to complete inpatient hearing aid follow‑up appointments while he was inpatient. And then we were actually also able to complete a hearing aid consultation appointment while he was inpatient, so he was able to have his family with him and he was able to choose his own device.

So he is scheduled for a bilateral BAHA fitting in the next few weeks. And this was a really, really great success for our team.

So barriers to the CARE, this 1‑3‑6 guideline for this patient would not have been able to be met if we didn't have an Inpatient Diagnostic Fitting and Consultation Program and then also education of the inpatient providers. This case is similar to the one Dr. Sawher just shared. And if someone from the inpatient team would have noticed an abnormality in the ears and said we can't do a hearing screening and waited until he was out of the NICU, this would have been a very different outcome for this patient.

So this is a really exciting step for CHW. So where we are right now, the progress we're making, we're continuing to educate medical residents as they come through the program. We are completing multiple interdepartmental presentations. We are also training NICU staff on ABRs and appropriate follow‑up, recommendations, and so far since that last case we have fit three patients with BAHAs while they have been inpatient, making ‑‑ having us meet that 1‑3‑6 guideline.

So this is just a start for our program. But we're really excited for the future to come. And we're looking to fit more traditional BTEs as well for our patients that have a longer NICU stay.

All right.

>> DR. HANNA SAWHER: So, I'll take 30 seconds if that's ok. Our research directions. Once again, we're enlisting a statistician to help us with our 1‑3‑6. So we want to give you like exact numbers and that's in the works and something very exciting.

The other part is we're partnering with different departments. So the Herma Heart Institute to identify what is the prevalence of children with cardiac anomalies within our system that actually don't pass their Newborn Hearing Screening. Only one other study has been done on this, done by [Indiscernible]. So we're trying to see what is the actual prevalence, what's going on with these kids, are they meeting recommendations, are they meeting guidelines, what's happening next.

The last thing, what is the medication exposure in children with cardiac anomalies? This is another thing that went hand-in-hand with the data we have from 2013 until last year. So we're excited to talk about that.

Any questions?

>> With your daily workflow, how much time would you say you devote to this?

>> DR. HANNA SAWHER: That's a great question. It is going to depend. So since we are the team, when we come back it's going to be a lot on top of our daily thing. I would say like an hour to two hours a day. But it also depends on which babies are coming in and out. Some days I know, as our nurses in the audience can elaborate on, are a lot more hectic than others. But I would say roughly one to two hours I try to budget myself. I'm typically working through lunch and then staying a little bit after. Also these meetings and the extra education of every resident coming through the hospital now we're also doing and all the nurses. So it can add up but really developing a committee and a team has helped us.

>> [Inaudible; off mic]

>> DR. HANNA SAWHER: Does that include the testing? Is that what you said? The test time for inpatient floors I've been able to identify some really experienced pediatric otologists that if we're not able to get up there ourselves, that we're able to book time and get them up there. That's something that we covered ourselves, though. We don't have anyone that does that for us.

Yes?

>> Two questions. Are you just focusing on NICUs right now? Are you doing well babies that refer?

>> DR. HANNA SAWHER: We do every baby, well babies, NICU babies, cardiac babies, infectious disease, all of them.

>> And then second question. So you work closely with ENT and that collaboration. What happens if a baby is referred newborn screening, good levels on the ABR, normal hearing ABR and then two years later he's diagnosed with a hearing loss? So because of fluid or he went through the ENT loop? Would you keep track of that baby? Would you collaborate, make sure ENT is giving you information?

>> DR. HANNA SAWHER: So the baby passed their Newborn Hearing Screening?

>> Baby referred Newborn Hearing Screening. Then baby had normal levels on ABR two months later. So he went back and it was normal with the ABR and then two years later he was diagnosed with a hearing loss.

>> DR. HANNA SAWHER: I don't believe ‑‑ any baby that refers is in our system. And we would be keeping that data. As far as ‑‑

>> If he passes ‑‑

>> DR. HANNA SAWHER: If he passed an ABR, we wouldn't be tracking that baby because they passed their ABR. Meaning that they had normal hearing so we don't know when that hearing loss occurred, if it was genetic, if it was something else. That's a great question, though. Like I said, our ENTs work really closely with us as well as with our providers outside, too. So we have a lot of EI providers as well that we communicate with on a weekly basis. Good question.

>> Thank you. Anymore questions, if you can make sure ‑‑

>> DR. HANNA SAWHER: Thank you so much. Thank you.

[Applause]