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EDHI Conference

03.20.18

12:15 ET

Outcomes from COACHing: Implementation of a Statewide Audiologic Protocol

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>> Good morning. How is everyone? I'm Gina Hounam, I'm one of the three presenters for this morning's session and I'm going to introduce to you our group project called COACH, the coalition of Ohio audiologists and Children's Hospitals the three of us representing the Children's Hospital part of that. The other fun thing about our name, COACH, our goal in our project work is to coach other audiologists and professionals through formal and informal presentation and trainings across our state of Ohio. So just to understand our audience a little bit better can I see a show of hands of how many audiologists we have in the room? Excellent! That's wonderful, okay, great. How about any early intervention professionals? Excellent. Students? Excellent, this is great, what a great mix and any parents or other people I forgot? Wonderful. Okay, great, thank you. So this is the group of people that I have the privilege to work with on this project. These are the main stakeholders of this group but you will learn if a minute that we have worked with so many people across our state because you can't accomplish the level of work that we have without working with every partner that's available to you. I'll share more of that in a minute. So our group came together interestingly enough at the 2014 EDHI annual meeting. During our state stake holder meeting we talked about the outcomes in Ohio and how we weren't really at 100%, so what opportunities did we have to work together and make a difference. Some of our conversations just really focused on in that session if we're all trying to do these things independently in our own children's hospitals or clinics or own state EDHI program what would happen if we all tried working together and move the needle on the resources we have. So when thinking about the need that we could most impact obviously we know that newborn screening works so we see the trends as that program was implemented more and more babies up to close to 98% in our state are screened. But we do know and I don't think this is unique to the state of Ohio that the loss of follow‑up is the need that we wanted to focus on in our state.

When we started meeting as the COACH group in 2014 one of the first things we did was talk to other Children's Hospitals and reached out further to any audiologists we could gain access to either through an in‑person meeting or phone meeting and is asked them what they thought were the contributions in our own clinics that led to that loss to follow‑up and what we kept coming back to was lost to diagnose. So these are infants that come into the center for testing but leave without the answers they came in for. So for whatever reason they're not getting the diagnosis that they came in for and then being lost to the program. Already.

So as we continued with the discussions with audiologists across the state we came up with lots of reasons that infants were leaving our centers without a diagnosis and a few of them are listed here but perhaps some of you know of reasons for your own clinics that this is happening, children that come in and leave without a diagnosis. As we had these discussions we thought maybe there is a way to develop a protocol for our entire state so that all audiologists felt comfortable and confident completing a quick and efficient and effective diagnostic process so that we could move that needle and help infants get diagnosed in a timely way.

So before I get any further, I just want wanted to share a true story that helps drive our project. This is Johnny's journey. This is a story that I think might sound familiar to a lot of you. Johnny ‑‑ before I start, one caveat in the state of Ohio, the rule dictates that infants receive their newborn screening at the birth hospital before discharge. If they refer that first screening they receive a second screening at the hospital. If they refer that second screening then they're referred for a diagnostic evaluation. That is the recommendation within our state. So Johnny initially referred bilaterally his universal newborn screening in both ears and he did have risk factors that would indicate a risk for hearing loss. He did follow up by three months and received diagnostic testing, however, due to his sleep state, so not being completely awake and still, results were unable to be determined. The clinic he initially arrived at decided to complete a repeat OAE screening and Johnny was then discharged with no follow‑up. At 14 months he came to our hospital with hearing loss and behavioral issues. So hearing loss was not confirmed or ruled out so he received a sedated ABR in which a sensorineural hearing loss was presented bilaterally. This is an example of our work and I'm sure this is something you guys are familiar with. Stories like Johnny's ‑‑ and this is a timeline, I don't expect you to read every stage of our progress. But this started in 2014 and it shows our work across the years with as I mentioned, the ultimate goal being the state wide protocol that our audiologists could use and adopt to help with Johnny's story and others. The two take‑aways that I want you to get are first success happens over time not overnight. So if you're looking to make a change in your own state in any way be patient and understand that you have to keep pushing this forward and every small little step is pretty big in the big picture. Number two, it definitely takes a village. So as I mentioned, there is a small group of us who have this idea following a state stakeholders' meeting but it wouldn't be probable if we didn't involve all of these people in the lower right‑hand corner. So all of the children's hospitals across the state and all of the audiologists who are outside of Children's Hospitals across our state and we included physicians, we had to partner with the Department of Health and the state EDHI program, that's critical to success and we had other physicians, lots of parents, lots of revisions, lots of feedback.

So I think that's really important. In 2017 we were successful in finalizing a protocol, going through the entire process and it was adopted by both our state Department of Health, our EDHI program and our UNHS subcommittee and we have been training on that protocol throughout the state. This is a brief glimpse, it's several pages long, the total document. I think what's important is we reviewed many state, national, international protocols to develop the one that we landed on. Our goal really was to make it as user friendly as possible so that would encourage adoption across the state.

Our state department does track diagnostic report ago cross our state and I'm happy to report that their feedback is that they have seen a positive increase in diagnostic reporting such as tone burst ABR versus just click information, diagnostic OEs and tympanometry so things that could help with the cross‑check principle or getting a better picture of middle ear status and other things that would be important to the full picture. That's history about our group. Where we started and where we are. I'm going to turn it over to my colleagues who are going to share with you some changes at our individual hospitals that we saw as a result of implementing this protocol.

>>URSULA FINDIEN: Hello, I'm Ursula Findien, I'm a research audiologist at nationwide Children's Hospital, I joined the staff in 2016 and I have a little less than 15 years as a clinical audiologist opinion I happen to be one of those crazy people who went back for my Ph.D. after my masters so how I approach things and our staff approaches things at nationwide children's is we start with a question, what question are we trying to answer, what is the purpose of an infant assessment and when I ask this question of audiologists, and students, I get the answer that we want to make sure baby has normal hearing or see in the baby has a hearing loss. I would propose these are answers to the question but this isn't the question we're trying to ask and answer.

What we are trying to ask is, is hearing optimal for speech and long wage development? That's different than finding out the status of the hearing. The status of the hearing is the answer but this is the question. In order to establish the answer to this question what we really need to do is have frequency‑specific information and we also need to have valid and reliable results. That was the impetus for this approach of making a standardized protocol across the state. The way our hospital implemented this protocol is we took a hard look at our existing protocol in 2015 and identified areas that were in need of change in order to facilitate getting frequency‑specific information in an efficient manner, as well as getting valid and reliable results. Specifically to feed the cross‑check principle of getting multiple, clinical pieces of information that tells us the answer to that question that we're seeking to answer.

We made three clinical practice changes during 2015 and starting in 2016. We changed our protocol, the equipment we were using and we changed the way we were scheduling infants. In terms of equipment, historical we have used conventional signal processing with our ABR machines and we changed our fleet of ABR machines to use weighting averaging because we were finding that we were getting more information in a more time efficient way in each appointment we were having with infants.

In terms of scheduling, we introduced a rather late change in this process, where historically we had the policy that as the child is referred to our infant program, that we schedule them one month out for a number of different reasons. None of which were evidenced based. In August of if we want 16 we changed our approach and said if a child is called in and needs to have an infant assessment they are given the next available appointment. That could mean that children were evaluated within seven to ten days of initial referral.

Lastly, we changed our protocol. Our protocol does mirror what we did with the COACH initiative. Prior to 2016 I call our program click prioritized. We started with a click response for ABR and I should mention that our protocol includes 1,000 tympanometry, and we would get a click in one year, if there was an elevated response we would get a bone click and evidence tells us an infant sleeps about 46 minutes and you can get six ABR response so if there is a hearing loss present we were not getting to those frequency‑specific responses and in our data we saw that we needed multiple tests to finalize the picture and answer the question for our infants. So in 2016, we changed to a tone burst prioritized ABR protocol that is supported by COACH protocol, we start with 2,000 Hertz, if it's elevated we try to get the type of hearing loss right away but then we continue with tone bursts stimuli as long as there is no concern for auditory neuropathy, if we see that on the stimulus we go right to click. We flipped our protocol to prioritize this frequency‑specific information.

So when we looked at data between 2015 and 2016 we saw 800 infants in this time period and when I broke out the group between kids who eventually were diagnosed with normal hearing versus those with permanent hearing loss we were able to decrease the age at diagnosis by about a month for kids who had normal hearing and by a month and a half for kids who ended up having permanent hearing loss. That's a clinically significant finding in terms of getting a child to have that answer for the child and the family and being able to move that child through the 1‑3‑6 process more expeditiously.

Then we looked at the mean age at fitting hearing aids if the family chose that as their option of intervention and what we were able to do is decrease the mean age of fitting by four months which is, again, is a lot of time in an infant's life. This data forfeiting includes all types of hearing aids and amplification so this includes kids who received Bahas and we found we were able with these clinical practice to move our kids through the 1‑3‑6 program much faster than we previously had been. With the preliminary analysis of what we had done, scheduling was actually the predictor that came up as being the most predictive of eventual age of diagnosis or earlier age of diagnosis. I mentioned to you when we did a scheduling change we actually only did that in August of 20 '60s teen so it was only the last third of that second year of the study period and when we did a separate analysis to see if there was a significant difference between September and December versus the first part of the year, there was no significant difference in scheduling in terms of age at first or initial evaluation within that year but there was a difference between 2015 and 2016. What that means is our specific schedule change didn't actually make the difference because kids were already being scheduled earlier in 2016, than 2015 before we made that change.

So we're still working on the end analysis of this but what this suggests is that these things are interrelated. We were able to do less ABRs or fewer ABRs per child in 2016 than 2015 because we were getting the answer more quickly and that opened up schedule opportunities for new referrals. So even though the regression analysis points to schedule or the age at initial ABR for the predictor for how quickly they're diagnosed, it actually is a combination of these things that we have to tease out or may not be able to be teased out because of the fact that this is clinical data. I'm going to pass it to Dr. Lisa Hunter who is going to review information from Cincinnati Children's.

>>LISA HUNTER: Good morning, everyone, thank you for being here. I'm going to talk about the efforts that we made at Cincinnati Children's Hospital and that we shared with our colleagues around the state about what was working and wasn't working and I want to acknowledge our staffer. My position at Children's is as director of research so I'm not seeing babies every day but I have almost a 30‑year history of getting to do that so it's fun to work with audiologists who I consider to be the experts especially in terms of how things are changing in our current world. So we challenged each other as a staff to look at how well we were doing back in 2011 when we kind of started this journey even before we got together as a group to see if we were meeting the goals. What we could do to make sure we weren't a barrier to children receiving intervention in a timely manner.

So in 2011 Kelly Baroch who is an incredible audiologist who heads up our NICU program worked with our specialty staff in diagnostic audiology for infants and some fourth year students who were fantastic and helped us review 764 charts. We were looking at whether or not the ABR was complete at the initial evaluation, because we wanted to find out what are some of the factors that were causing the ABRs to be incomplete. We supported that sleep state was a big part of that and our baseline data showed that 26% of infants dent get a complete ABR, this wasn't looking at the cross‑check it was looking at the ABR itself which was to get frequency‑specific threshold information in both ears.

Then bony conduction when it was indicated. So that's 200 babies, a lot of babies. What alarmed us is that we saw that despite every effort to get these babies back, more than half of them with the incomplete evaluation at the first ABR didn't comeback. They were lost to diagnosis. So we started scratching our heads, why weren't parents coming back? That was 104 babies annually and Windows 10 many of those would have hearing loss and need intervention. What we found out by interviewing parents and talking with them is that they didn't feel their questions were being answered. They were pushed in and out too quickly. As soon as we saw ‑‑ it was usually a middle ear issue going on they were told we're going to get you over to ENT which was, well, the right thing to do and the audiologist wanted to save money as opposed to doing an incomplete assessment and bringing them back later we often are trying to protect our patients and save money but unfortunately at the expense of getting a more complete answer that we could provide more counselling about. So our goals very much like what's been articulated already is that our goals were to answer the questions, establish a baseline for monitoring. So if we didn't know if there was a conductive hearing loss if we stopped too soon we couldn't give that information to the physicians in order to initiate treatment and we couldn't give that information to the parents. The parents had been through two screenings, a diagnosis, they feel like no one is giving them the answer and of course our end goal is detections of hearing loss as quickly as reasonable. We're not going to rush it and get an inaccurate result but as quickly as reasonable to get that goal done for every infant. So we continued this process. We put in some really significant changes. We were looking at our ABR technology. It was time to change it so we looked at new technology and actually similar to nation Wide we looked at what would help us manage sleep state better through the waiting process so we were able to get good quality ABRs it wasn't sleeping perfectly. Audiologists don't like change because we're people right? And people don't like change. We got lots of push back, we have lots of information to share if you want to talk with us are afterwards I think from both of our centers about how you manage that change. Kelly Baroch was good at helping infants get to sleep, audiologists are not experts at helping babies get to sleep so we can get our protocols done, once we become moms and dads, maybe, but we formed a staff and a lot of it was the basis for COACH but it wasn't what ended up being COACH, and we got lots of feedback so it turned out not to be what was our protocol and we got information from other countries to help inform us and make it evidenced based. So we revised protocols, did anesthesia time studies and we found out we were able to decrease our time which was a big deal because we didn't focus on the things that don't matter like doing 2,000 clicks above threshold. There were lots of common sense things we were able to manage and bring down our incomplete ABRs to 5% by 2017. So the training was around getting the best sleep state, measuring background noise, finding out where can we cutout things that are not helping us to get to threshold more quickly and spending our time close to threshold. That was a big part of it. Training people in bone conduction ABR, this is a hard thing to do, finding out if we have the right people on the team. Sometimes you need to shift who is doing the ABR assessments. One of those things that's important is to not have so many people doing fewer assessments but to have fewer people who are doing lots of assessments so they become more expert at it. Then a big part of this was being open to being accountable to ourselves so we kept doing random checks of how people were doing, problem solving, where were the problems in an on going way. So I also have a case that I wanted to share. It was a hard case because this was a child who had a typical sort of situation or scenario that we grapple with all the time in audiologist and that can explain sometimes how we don't get to the diagnosis sooner but this little girl referred bilateral was a well baby without risk factors but when she was seen by an outside facility she had a mild to moderate hearing loss and bone conduction was not done but tempenometr is was done and OME, and she had follow‑up by three months of age but was brought back two months later for monitoring, couldn't get to sleep for testing and she was seen at six months of age for follow‑up, and received bilateral PE tubes to deal with the ongoing middle ear issues and had a sed indicated ABR so it's hard to find fault, these are the right things that were done but we have to ask ourselves are we waiting too long in between these monitoring visits so by the time the child gets treatment they've had several months of hearing loss in both ears. With post‑op monitoring she was tested in sound field they found moderate to several hearing loss and it showed open tubes so this was a point there should have been questions, why was this going on, OAEs, absent so she was fit with binaural hearing aids so nobody determined what kind of hearing loss do we have here? The parents then reported consistent rejection of hearing aids. So she came in for a second screening at nine months of age, had a sedated ABR that was full and found to have normal hearing with robust DPA's, so it's hard to know what was going on but this was a child that had prolonged middle ear disease who recovered but it was hard to get to that point. I bring this case in to say even if we have a pretty full protocol we still are going to struggle with these cases that are prolonged. I think we need to be more assertive about making sure that children are getting back sooner for more complete evaluations and not waiting too long in between.

So some of the action steps that we would like to think about and would like to encourage is to go to your own EDHI state program and know your own statistics, especially around the lost to diagnosis piece. So the children that make it into see audiology but don't get a diagnosis. This is an area I don't think we have had enough discussion about, revisit your protocol, look at your data, is there data that you're routinely missing, is there more training of staff needed? Get into a dialogue with staff to help them to be part of it. We found that to be the biggest success in our own hospital and state wide is if we get into a dialogue rather than controlling and say you must do this. Know your outcomes, think about where you can improve and set goals and know who the key stakeholders are in your area. A lot of times we aren't visiting hospitals to talk about what we are doing, helping them to see why referral is so important in a timely manner and working with, of course, the physicians and early interventionists in our area so we all feel part of the same team even if we are not working in the same place. So out of this we put together ‑‑ we collaborated on a three‑day training session for audiologists in our state last year but it was open and we had people from other states come in and we recorded everything so those recordings are available. We had really wonderful speakers nationally as well as local people and if you go to the top website you can log in as a user for free, and you can take advantage of all of the trainings that we have recorded here and there are pre and post test assessments that you can take and so we really want to encourage people to do this. We're trying to encourage all audiologists in Ohio to do the training but we want to make it open to other states as well. Our next steps are really to work with audiologists who will like to put together a behavioral testing protocol, amplification, this goes on and on and on. We're really thrilled and very ‑‑ we feel fulfilled to be part of this collaborative process and we want to open it up for any questions if we have time. Or please come and see us or feel free to reach out by email and thank you so much for being here!   
(Applause.)

>> AUDIENCE MEMBER: (Away from mic.)

>>LISA HUNTER: Fortunately we like each other so I think one of the big keys is to work with people that you enjoy being around. Columbus is in the center of the state so we usually met in columbus and we met at least I think about every couple of months and we were trying to draw in people from other places to come and meet with us and give us their thoughts about the protocols. We bought our own lunch ‑‑ we were not funded to do this. So we kind of did it because we really enjoyed it but that was what it took for us. We also scheduled conference calls so rather than always meeting in person we did conference calls and sent out surveys to people around the state to get their views if they weren't able to be there in person. You can do a lot electronically.

>> AUDIENCE MEMBER: Did you change the protocol of how ‑‑ you said the middle ear issue was a big issue for diagnosis. Did you do any changes about that?

>>LISA HUNTER: We have been trying to encourage our ENTs to act more quickly because they're seeing how long these children are going before we finally get the answer for them so they are acting to do potentially tubes sooner so by two to three months if this child is not clearing up by two to three months they are taking actions sooner. There is a wonderful article that came out of the Netherlands that's recommend that go, if a child is not improved by two to three months it's probably time to take action.

>> AUDIENCE MEMBER: (Away from mic.)

>>LISA HUNTER: Our expectation is that you will get a full ABR and sometimes it ends up permanent conductive and if we get fluid and we think it's going to clear up, sometimes we are wrong. It's a child that needs to be assessed and if there isn't a sign of active fluid they need to have scans, they need to have other, you know, so assess the hearing loss. We're assessing hearing loss not anything else.

>> AUDIENCE MEMBER: Are you doing confirmatory ABRs?

>>LISA HUNTER: We are doing confirmatory ABRs. This has been a point of contention because it can increase the time before a hearing aid is fit but what we tried to do is shorten the time so we fast track them and get them in for that confirmatory ABR so we're not dealing with sedation and other issues and meeting guidelines more quickly. Usually ‑‑ even if you get a complete assessment there are holes and gaps that you need to fill in with that second. So we will generally repeat something and then we can go into a full assessment if things have changed, either progressed or gotten better and then we can fill in the gaps and get the information to move on more quickly.

>> AUDIENCE MEMBER: (Away from mic.)

>>LISA HUNTER: Right it was an outside facility where the child was fit with hearing aids so we rye moved the hearing aids once the documentation of normal hearing and that child is being monitored because they're at high risk for on going issues.

>> AUDIENCE MEMBER: (Away from mic.)

>>LISA HUNTER: I don't know who paid for the hearing aids, whether it was the parent ‑‑ we have in Ohio resources for children to be fit with hearing aids through the state so we have a state fund. I don't know if that ‑‑ I'm sorry, I don't know the particulars on the finances.

>> AUDIENCE MEMBER: Did you guys get new ABR equipment and if you did how did you manage funding in.

>>LISA HUNTER: Did you want to answer this?

>>URSULA FINDIEN: To be clear we did not go from what we had to an entire new fleet in one year so it was ‑‑ we tried to get one, tried to get a second one and over the course of probably two years we were able to replace them all but we did actively use this data with people at the pay grades higher than mine to share with them what we can do if we had better equipment and how ‑‑ I mean, I think at our hospital we're lucky enough if you can advocate for better outcomes you can typically get what you need.

>>GINA HOUNAM: The experience was similar for us, it was time as our old equipment needed to be replaced, we did a test of change, people liked it and we eventually changed it over within a couple of years as well.

>> This is the interpreter, we have to leave for another session.

>>URSULA FINDIEN: Thank you, everyone.

(End of presentation.)

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