

# Monitoring Communication Progress in Early Intervention

*Amy McConkey Robbins*

## Introduction

It is widely agreed that the purpose of identifying hearing loss through Universal Newborn Hearing Screening (UNHS) is not just to “know early” but also to “act early.” By acting early, the chances are increased of preventing the detrimental delays in speech and language acquisition that typically occur as a result of childhood hearing loss (HL). From such a standpoint, the ultimate goal of early identification of HL is the child’s achievement of communicative competence. For this goal to be reached, pediatric audiologists and early interventionists require tools that many of them currently do not have. Specifically, we identify three challenges facing hearing health care professionals:

1. Audiologists should have a mandate to make a compelling case to parents about the direct relationship between full-time use of amplification and a child’s spoken language progress.
2. An easy-to-use system should be available to audiologists that provides suggestions to parents about ways to stimulate their child’s communication development from the earliest points after diagnosis. Given the many demands already placed upon audiologists’ time during patient visits, such a system can only be successful if it is: a) short in length; b) self-explanatory; and c) accompanied by a written document that parents may take home with them.
3. Early Interventionists require a data-based, systematic way to identify children who are not making adequate progress in the first year of cochlear implant (CI) use.

The purpose of this paper is to present two tools to help address the challenges listed above. The first tool is a three-stage program for audiologists to use with parents of newly-identified babies. The second tool is the Red Flags procedure, designed for use by early interventionists or audiologists. The Red Flags are auditory milestones based upon published data that allow clinicians to monitor children’s progress in the first year of CI use. This tool enables clinicians to identify children whose listening progress is slower than expected and to intervene using a variety of techniques. The rationale for such a system is that identifying and treating delays early gives us the best chance of closing a gap between chronological and language age.

## Two Tools for Clinical Use by Audiologists and Early Interventionists

### Tool 1. A Three-Stage Program for Audiologists to Use with Parents

In the early days and weeks after a baby’s HL is identified, the audiologist may be the parents’ sole contact person with knowledge of their child’s disability. Parents therefore rely heavily on their audiologist as their primary source of support and information. Audiologists usually concentrate on the important tasks of verifying the degree of HL and the fitting of hearing aids (HA) as early as possible. Yet audiologists have the potential to play an equally important role, that of guiding parents to establish a foundation that fosters communication development in their child with HL. If this foundation is established convincingly, the subsequent stages of early intervention and educational progress may be dramatically more effective. Likewise, clinical experience suggests that when parents fail to understand the direct connection between the con-

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sistent, full-time use of HAs and the role they, the parents, play in fostering communication progress, the speech and language achievement of even early-identified babies may be negatively impacted. The program outlined below was originally described in Robbins (2002).

The scope of this Three-Stage program is limited to the days, weeks and months immediately following diagnosis of hearing loss in infants and toddlers. This period may span only a few weeks or may last up to six months. The six-month time frame is used here because by six-month post-diagnosis, the vast majority of families will be enrolled in an ongoing communication intervention program. Once an intervention program is in place, the source of most of the family's guidance about communication typically transfers from the audiologist to the speech-language pathologist, deaf educator or other early interventionist.

There are three stages that occur within the post-diagnostic period. Phase I begins on the day of diagnosis and lasts until the first fitting of HAs (often loaners). Phase II encompasses the early weeks after the initial fitting of amplification. Phase III begins after HA adjustment and continues until the time a communication intervention program is fully in place. The audiologist's role in providing advice related to communication differs at each of the three phases, primarily because what parents require and are able to process changes over time. Therefore, separate suggestions are given for each phase.

### *Phase I: From Diagnosis to Fitting of HAs*

For many parents, this first stage is characterized by shock and grief, and a sense of being overwhelmed. Caution is advised in supplying too much technical information during Phase I when parents require time to absorb the news and react emotionally. If audiologists are unsure about how to respond to parents' emotional reactions in Phase I, they may inadvertently utilize the counter-productive "technical jargon" or "hit and run" approaches (Hersch and Amon 1973) with families. Experience and parent feedback suggests that these approaches often leave families feeling lost and powerless to effect change in their child with HL.

Though all families are different and must be treated as such, many parents have reported that sitting and waiting for upcoming appointments, after knowing their child had a HL, created a sense of helplessness and even depression. These parents have said they wished they had been given something to do; that they wanted above all to feel they were taking some action to help their child and

not just waiting for the next appointment. For such families, it seems important to give them some tasks on which to focus so they feel empowered to have a positive effect on their child's communication. Receiving this news from the audiologist is critical. What parents often bemoan later is the fact that the audiologist dealt with the HAs, but told the family that a speech-language pathologist or other therapist would advise them about communication. This may be discouraging to parents, because the gap between first meeting with the audiologist and the actual onset of therapy services may be several months. *Importantly, if the audiologist treats the HAs as a domain separate from communication, families may not make the connection that the full-time use of amplification is the foundation of auditory and spoken language progress.*

Parents have a potent influence on their child's progress. Studies and clinical experience support the notion that the parents are primary change agents in their child's communicative competence and overall development (Moeller 2000; Dunst 2001). Parents are more likely to retain information if it is presented in both oral and written forms. It is suggested that audiologists accompany their verbal discussion of the communication goals with a printed sheet that reviews this information. A handout version of the goals at each of the three stages was created by Martilla (2007) and is available on-line at: [http://www.aea9.k12.ia.us/en/programs\\_and\\_services/special\\_education/audiology/journey\\_with\\_hearing\\_loss/](http://www.aea9.k12.ia.us/en/programs_and_services/special_education/audiology/journey_with_hearing_loss/). Reprints of Martilla's parent handouts for Stages I, II and III appear in figures 1, 2, and 3, respectively. Though it may seem self-evident to hearing health-care professionals that HAs and communication development are inextricably linked, data and clinical experience suggest that parents do not, unfortunately, see that link as automatically as is thought. Audiologists play a powerful role when they support parents in Phase I by saying, "There are three important things you can do at home right away that will be helpful to your child's communication. You should start doing these things as soon as you feel ready. You don't need to wait until your child has HAs." The following ideas are then shared with parents (see figure 1):

- 1) Continue to talk to your child, no matter what the degree of HL is. Talk close to your baby's face and use animated expressions and gestures. If your child is not hearing every word you say, there is still benefit from the loving bond you are forming through your eye contact, gentle touch, and communication turn-taking. Use your voice just as you would with any other baby, singing songs, doing finger plays and reciting nursery rhymes.
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- 2) Begin a journal about your experiences with your child's HL. Let this journal be whatever is most helpful to you. You may write down observations about your child's behavior, speech or listening responses, but you may also want just to express your own emotions, your family's reactions, and so on. Though you may not realize it now, this journal will someday be an archive that you will look back on, perhaps with your child. You'll marvel at the progress all of you have made.
- 3) Contact the John Tracy Clinic (800-522-4582 or [www.johntracyclinic.org](http://www.johntracyclinic.org)) to inquire about their home correspondence course for parents of children with HL. Through this program, you will be sent video and written lessons to work on at home with your child. After completing each lesson and returning it to the clinic, you will receive personal feedback and another lesson. Audiologists should use sensitivity in suggesting the John Tracy program to families, particularly if they



### The Journey with Hearing Loss

#### Lifetime Goals

**Be confident! You can and will master what you need to know about raising a child with hearing loss.**

**Have high expectations! Your child can and will achieve much if you expect that he or she can do much.**

**Develop autonomy and responsibility! Your child can and will grow up to be an independent and responsible person.**

**Here are three things you can do right now to reach these lifetime goals.**

1. **Continue to talk to your child.** Speak close to your child's face and use plenty of facial expression.
2. **Write down your thoughts and feelings in your journal.** You can also write down any questions you might have for the audiologist or teacher so you can remember to ask them.
3. **Sign up for the home instruction class through the John Tracy Clinic.** (800/522-4582 or [www.johntracyclinic.org](http://www.johntracyclinic.org))

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From Empowering Parents to Help Their Newly Diagnosed Child Gain Communication Skills, *The Hearing Journal*, November, 2002.

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<http://www.aea9.k12.ia.us/05/audiosub.php>

**Figure 1:** Handout to use during Phase I with families of newly-diagnosed babies.



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**Develop autonomy and responsibility! Your child can and will grow up to be an independent and responsible person.**

**Here are four things you can do right now to reach these lifetime goals.**

1. **Use the hearing aid calendar to record when your child is wearing the hearing aids.** You can record your child's responses to sound, any equipment problems or questions you have for the teacher or audiologist.
2. **Use your child's name with a purpose.** It's important for your child to know his name. Make sure you are calling your child's name for a reason, not just to see her response to her name.
3. **Help your child become aware of important sounds in your home.** Use a hand-to-ear response at home when sounds occur. When you hear something your child should attend to, say "I hear that!" and put your hand to your ear.
4. **Pay attention to the sounds your child is making.** As your child learns how to use sound, she will become more aware of how to use her voice to get

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**Figure 2:** Handout to use during Phase II with families of newly-diagnosed babies.

feel it is premature to do so at this stage. However, the author has found that, because there may be a lengthy delay between diagnosis of HL and onset of intervention, some parents report that the Tracy correspondence course was a life saver for them, allowing them to feel connected to others who are familiar with a disability that the parents are just beginning to understand. In addition, the underlying message in the correspondence course lessons is one of optimism, thereby sending a message to parents that they have the power to in-

fluence their child's communication in both the short- and long-term.

### *Phase II: Initial Fitting of HAs*

A new focus presents itself at Phase II because parents now must learn about HAs, how to work toward full-time use of them, and how to observe changes in their child's listening and speech behaviors. Professional standards dictate that we approach each family about

the importance of full-time HA use with sensitivity to their unique situation and coping skills. However, data from Moeller (see Chapter 1 in this volume) reveal that some parents of early-identified babies struggle to achieve full-time HA use, even over an extended period of time. In fact, when the children in the Moeller study were 24 to 28 months of age, only 5 of 14 early-identified children had achieved use of HAs during all waking hours. If these data are representative of the larger group of children with hearing loss, this is a discouraging trend. However, it remains unknown whether audiologists are explicitly making a connection for families early and often, as in, "Your baby's brain needs full-time HA use if the brain's auditory centers are to develop fully." Some families may be given this information repeatedly, provided with appropriate support and techniques and still elect not to insist on full-time hearing aid use. But, if families have never been told, gently but bluntly, that listening development depends on the baby having consistent and dependable auditory input all day long, how do we expect them to figure this out?

Therefore, at Phase II (see figure 2), our first communication advice to parents is really an equipment issue, and involves the child's eventual use of HAs during all waking hours. It may be that professionals do not have an adequate array of resources to help them support families in working toward the goal of full-time HA use. Such resources might include the following: 1) Printed or video materials discussing HA adjustment issues unique to infants and toddlers. Excellent parent-friendly printed suggestions are found in the first several lessons of the "Listen Around the Clock" section of Rossi's (2003) parent-infant program. Rossi gives many practical examples of how a baby benefits from full-time device use, and emphasizes that a baby's listening development is jeopardized if full-time use is not established; 2) Samples of products designed specifically for HA adjustment by babies, such as Critter Clips, Huggies and certain styles of bonnets or caps; 3) A dedicated weekly hearing aid calendar on which parents record the number of hours of HA aid use each day, as well as any pertinent information such as equipment problems, the child's resistance to putting HAs on, or pulling them out. Parents may also note whenever their child responds to sounds, and the nature of the response, such as a startle, cessation of activity, or eye widening. Some families find it useful to fax the audiologist the HA use calendar at the end of each week to ensure they complete it. Families should bring the calendar to audiological appointments to discuss HA use and problems; 4) Discussion of

baby seats that are conducive to HA use. For example, the Bumbo seat ([www.bumbobabyseat.com](http://www.bumbobabyseat.com)) fully supports an infant's trunk and upper body without any padding across the back of the head. This contrasts to most infant seats or high chairs where the baby's head rests back on a surface, often causing the HAs to move out of position or to be pulled out by the baby; 5) An invaluable source of support is advice from other families, as they are able to share real-life tips about things that worked for their baby. As an aside, some families have reported that this parent-to-parent sharing is an advantage of center- rather than home-based early intervention. That is, inexperienced parents have the opportunity for regular face-to-face contact with other parents who may share experiences and demonstrate techniques that have been successful with their babies.

The other three goals at Phase II deal with more traditional communication issues. The audiologist may introduce these Phase II goals by saying, "Your follow-through with the first three communication goals has been excellent. Let's continue to do those things at home. Now that Susie has HAs, there are some other important things you can do at home to promote her communication." The audiologist may outline the following:

- 1) Having your child learn his or her name is very important. Refer to your child by name often. When face-to-face with your child, you can say, "Hi, Natasha... there's Natasha... I love you, Natasha", focusing clearly on your child. Typically babies recognize their own name before they are one year of age (Locke 1993), so we want to establish this skill as soon as possible in babies with HL. Remember that if you call your child's name, always have a purpose or response. If you call your child's name just for the pleasure of seeing him alert but don't give any feedback or attention, you may inadvertently extinguish the child's response. Note that some further suggestions for working on name recognition may be found in Robbins (1998) and Zara (1998).
- 2) Use the hands-to-ears response at home when sounds happen. As soon as the sound occurs, point to your ear, use a surprised expression and say, "I hear that!" This draws the child's immediate attention to listening and helps the baby learn that sound is something to pay attention to.
- 3) If your child is wearing HAs full-time and benefiting from them, we would expect to hear changes in the sounds he makes. In fact, changes in vocalization sometimes are a better indicator of device benefit in



babies than are auditory responses. Listen to the sounds your child makes with his HAs on. Can you distinguish a fussy cry from a painful cry from a hungry cry? Does your baby use mostly vowels or consonants when making sounds? Does he squeal or scream? Does it ever seem that your baby is imitating another's speech or "singing" along to music? Are there any sounds that will quiet or comfort your baby? Make careful notes in your journal about these changes, as your observations will be invaluable to the audiologist in determining HA benefit and selection.

### *Phase III: From Hearing Aid Adjustment to Formal Communication Intervention*

At Phase III (see figure 3), the audiologist may introduce home communication goals by saying, "I'm impressed with how well Johnny is adjusting to HAs. That is because you have been firm and consistent with him. Tell me about situations where you're still having trouble keeping his HAs on. Now that he is learning to listen, there are some additional things you can work on at home. Keep doing the things we've already talked about because they are still important. But, I also want you to add three more goals." The audiologist may then describe the following:

- 1) Imitate your child's vocalizations back to him, as soon as he says them. Try to mimic the same intonation pattern and sounds that he uses. With his HAs, it's likely that Johnny can perceive all or some of your speech. By repeating back what he says, you are reinforcing his "talking" and will make him vocalize even more. In addition, babies learn early about communication turn-taking, and Johnny will enjoy "talking", then waiting his turn while you talk, and so on. It's also fun to talk back to your child as if his vocalizations really mean something. If your child says, "Eeee daaa eee", you can say, "Yes, you see a doggie", even if your child is young and not speaking yet. Studies have suggested that parents who credit their child with speaking may actually accelerate communication progress.
- 2) Encourage an anticipatory response to sound in your child. Use songs, nursery rhymes and finger plays with your child, regardless of his age. With his HAs, we hope he is hearing the rhythm, melody and, eventually, the words. Now we want to develop an anticipatory response from your child. This

means that your child anticipates what comes next just through hearing and shows excitement. For example, if you've played "How big is the baby? Soooo big!" face-to-face with your child, try initiating the game from behind him when he can't see you. Notice whether, just through hearing, your child anticipates the game and raises his arms when you ask, "How big is the baby?". This indicates he is attaching meaning to what he hears through his HAs and is a very encouraging sign of listening development. Similarly, if you rock and clap whenever music is playing, watch whether your child might start doing this on his own when music starts, without your initiating it.

- 3) Select three common sounds in your home that you will help your baby learn. Often, the first three sounds are things like knocking on a door, the telephone ringing and the dog barking. However, you may want to choose other sounds in your home that are more common and relevant than the ones listed above. The important thing to remember is that, for these early environmental sounds, they should be clearly audible and occur frequently throughout the day. In addition, it is particularly helpful if the adult has some control over the target sound. That way, for example, you can decide how many times you want to knock on the door. Babies are more likely to listen to a sound that occurs and stops, such as a telephone ring, rather than a sound that goes on continually, such as a fan. Present the target sounds repeatedly to your child, use the hands-to-ears response, and label the sound. "Johnny, I hear the doggie. Listen (pause). Do you hear the doggie? The doggie says 'woof-woof'." You might take your child directly to the sound source. This activity at Phase III is an extension of the earlier Hands-to-Ears suggestion at Phase II because we are now labeling and identifying the sound, rather than just drawing the child's attention to it.

Parents continue to have powerful influence over their child's communication development long after Stage III when they are enrolled in an on-going intervention program. Moeller, Schow and Whitaker (2007) cite statistics from Dunst (2001) that two hours per week in therapy make up only two percent of a normal-hearing toddler's waking hours, whereas everyday activities such as diapering and feeding occur at least 2,000 times before the first birthday. This statistic is a convincing statement about the power of families to influence, positively or negatively, their child's communication after

HA fitting. Parents who take advantage of only ten interactions each waking hour of a child's day will have provided more than 36,000 teachable moments between ages 1 and 2 years (Moeller et al. 2007). Consider the lost opportunity if the child is not wearing amplification during these interactions. If this is case, are audiologists and other hearing health care professionals emphasizing this fact to parents repeatedly? We might review again the issue mentioned at the beginning of this article about the goal of early identification of HL. Why do

we fit hearing aids on babies? This author would argue that it is to foster the development of communication, rather than just so that babies may hear.

Audiologists may offer realistic optimism to families that has a lasting effect on the attitude and coping skills of parents. Moeller and Condon (1998) have noted that most of the decisions parents are required to make after diagnosis relate to communication mode, amplification and educational choices. They suggest that professionals reinforce that the most important decision parents



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**Develop autonomy and responsibility! Your child can and will grow up to be an independent and responsible person.**

**Here are three things you can do right now to reach these lifetime goals.**

1. **Imitate the sounds your child makes.** Babies and young children enjoy playing with sounds and they love to use them to communicate to you.
2. **Help your child put meaning to sound.** For example, if you've been playing "How Big is (your child's name)? SOOO Big!" with your child face-to-face, try to get the same response from your child standing behind him.
3. **Choose a few sounds in your home that will help your child learn.** Many children love to hear the telephone ring, the dog bark, or someone knocking at the door. When you hear one of those sounds, make a big deal about it.

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**Figure 3:** Handout to use during Phase III with families of newly-diagnosed babies.

## Tracking Auditory Progress in Children With CIs

What are the auditory benchmarks for average progress in CI children during the first year of implant use? Auditory benchmarks have been established independently for three groups of children, based upon research findings and clinical experience.<sup>1,3-6</sup>

These groups are:

**GROUP 1:** Children implanted in the preschool years (age four or earlier).

**GROUP 2:** Children implanted at age five or later with some residual hearing/speech perception skills who have consistently worn hearing aids and who communicate primarily through speech.

**GROUP 3:** Children implanted at age five or later with little or no residual hearing/speech perception skills who are highly dependent on sign (and other visual cues) for language learning.

The benchmarks shown for each of the three groups in Tables 1, 2, and 3 are based on data collected and reported by the investigators cited above.

\*Note that full-time implant use is an unconditional prerequisite to auditory development. If a child is not wearing the implant during all waking hours—at home, school, and other activities, these benchmarks are not applicable. *Children who fail to bond to their device and to wear it full-time within a few weeks of initial stimulation may exhibit insufficient progress and are at high risk of becoming non-users of their implants.*

<b>Tracking Auditory Progress in CI Kids</b>					
Note: Child is credited only for skills in listening-alone condition. Spontaneous means without prompting or modeling, and when not in a listening set.					
<div style="display: inline-block; width: 20px; height: 10px; background-color: #cccccc; margin-right: 5px;"></div> Time post-implant child should demonstrate the skill					
<b>Table 1 GROUP 1:</b> Children implanted at age four years or earlier					
Skill	1 mo.	3 mos.	6 mos.	9 mos.	12 mos.
1. Full time use of CI					
2. Changes in spontaneous vocalizations with CI use					
3. Spontaneously alerts to name 25% of time					
4. Spontaneously alerts to name 50% of time					
5. Spontaneously alerts to a few environmental sounds					
6. Performance in audio booth consistent with what is reported at home					
7. Evidence of deriving meaning from many speech and environmental sounds					
8. Major improvement in language					
<b>Table 2 GROUP 2:</b> Children implanted at age five years or older (Some residual hearing, consistent HA use prior to CI, primarily oral)					
Skill	1 mo.	3 mos.	6 mos.	9 mos.	12 mos.
1. Full time use of CI					
2. Understands some words or phrases closed set					
3. Understands many words or phrases closed set					
4. Spontaneously alerts to name 50% of time					
5. Understands familiar phrases in everyday situations when listening auditory alone					
6. Spontaneous recognition of own name versus names of others					
7. Knows meaning of some environmental or speech signals when heard auditory only					
8. Major improvement in language					
<b>Table 3 GROUP 3:</b> Children implanted at age five years or older (Limited or no residual hearing, limited or no HA use, heavily rely on visual cues or signs)					
Skill	1 mo.	3 mos.	6 mos.	9 mos.	12 mos.
1. Full time use of CI					
2. Begins to discriminate patterns of speech (syllable number, stress, length, etc.)					
3. Understands some words in closed set					
4. Begins to spontaneously respond to name					
5. Reports when device is not working (i.e., dead battery)					
6. Understands many words or phrases in closed set					
7. Understands a few things open-set					
8. Major improvement in language					

**Figure 4:** Red flag Matrix for monitoring listening progress in the first year of CI use. (Reprinted with permission, Robbins (2005). Clinical red flags for slow progress in children with cochlear implants. Loud and Clear, Issue 1. Valencia, CA: Advanced Bionics.



will make are not these technical ones, but rather: 1) the decision to have high expectations for their child; 2) the decision to give the child autonomy and responsibility; and 3) the decision to be confident in their ability to parent a child with a hearing loss. These decisions are critical enough that Martilla (2007) has included them at the top of each of the handouts to remind families that they are capable of handling the difficult but rewarding task of raising their deaf or hard of hearing baby.

### *Tool II. The Red Flag Procedure for Identifying Slow Progress in Children with Cochlear Implants*

A second tool for monitoring progress in young children is the Clinical Red Flag Procedure (Robbins 2005), a matrix of auditory benchmarks that has been established to identify children who are progressing at a slower-than-expected rate. These benchmarks are based upon research and clinical findings (Waltzman and Cohen 1999; McClatchie and Therres 2003; Robbins, Koch, Osberger, Phillips and Kishon-Rabin 2004; Osberger, Zimmerman-Phillips, Barker and Geier 1999) that document the listening skills achieved by the average CI child during the first year of device use (see figure 4). Three different groups of CI children reflect different pre-implant characteristics and show different

patterns of skill achievement. This matrix may be used by a clinician or teacher to monitor the broad progress of children during the first year of CI use, when rapid learning is typically observed. The purpose of identifying slower-progressing children is not to label a child or diagnose a serious problem. Rather, the purpose of the Red Flag is to draw attention to an area of development that may be of concern. In other words, raising a Red Flag regarding a certain skill should be interpreted to mean, "Pay attention to this." The rationale for keeping track of progress is that, while there is room for individual variation in learning, auditory skills develop in a cumulative fashion. The mastery of one step is needed before the next step may be achieved. Thus, short-term delays in listening development often lead to long-term delays. Long-term delays, in turn, may limit the child's academic and life-long potential, an outcome that is clearly undesirable.

There is limited value in identifying children who are progressing at a slower-than-expected rate unless clinicians have a plan to monitor and address areas of concern. For this reason, suggestions have been generated so that clinicians take steps toward isolating the source of the problem and intervening to address the child's individual needs. See Robbins (in press) for a detailed description of one- and two-flag responses to slow progress and clinical examples that highlight their im-

HOW TO RESPOND TO <b>ONE RAISED RED FLAG</b>	HOW TO RESPOND TO <b>TWO RAISED RED FLAGS</b>
<input checked="" type="checkbox"/> Share ideas with child's parent	<input checked="" type="checkbox"/> Share concern with child's parent
<input checked="" type="checkbox"/> Confirm child wears CI all waking hours	<input checked="" type="checkbox"/> Confirm child wears CI during all waking hours
<input checked="" type="checkbox"/> Contact CI Center regarding possible equipment/programming changes	<input checked="" type="checkbox"/> Contact CI Center regarding equipment/programming changes
<input checked="" type="checkbox"/> Assess that home/school environment creates a need for child to use the skill	<input checked="" type="checkbox"/> Utilize any 1-flag response
<input checked="" type="checkbox"/> Verify that prerequisites to a skill are adequately established	<input checked="" type="checkbox"/> Change in teaching methods/techniques
<input checked="" type="checkbox"/> Break down skill into smaller steps, and teach those steps	<input checked="" type="checkbox"/> Add sensory modality
<input checked="" type="checkbox"/> Use different materials/teach the skill in another way	<input checked="" type="checkbox"/> Consult with a colleague for new ideas
<input checked="" type="checkbox"/> Increase the intensity of training toward the skill	<input checked="" type="checkbox"/> Refer for learning profile testing
<input checked="" type="checkbox"/> Write plan of action/check every month for three months	<input checked="" type="checkbox"/> Refer to specialists to rule out additional disabilities

**Figure 5:** Possible responses to One- and Two-flag concerns for children wearing cochlear implants. Reprinted with permission: Robbins, AM. Clinical red flags for slow progress in children with cochlear implants. In Loud and Clear, Issue 1 (2005). Valencia: Advanced Bionics.

plementation. Figure 5 gives examples of actions clinicians may take in response to mild delays (one red flag) and to more severe delays (two red flags).

### *Full Time CI Use*

When a child's progress with the CI is slower than expected, lack of full-time use of the device should be considered a possible cause, just as it is with HA use. One of the first red-flag responses is to query the parents about CI use. The way a clinician questions parents about this is critical to receiving accurate information. If parents are asked, "She's wearing her CI during all waking hours, isn't she?", parents will be reluctant to say "no". The clinician has already indicated the desired response and families are less likely to reveal difficulties they may be having. If, on the other hand, the clinician says, "Janie's progress with her CI isn't as rapid as some other children and we want to figure out why so we can speed her learning. Some children don't adjust as well to wearing their CI as others do. Would you describe Janie's daily routine and tell me when she does and doesn't wear the CI?" Often, clinicians assume that the child who wears the CI all day at school is automatically wearing it at home. In fact, some families have trouble achieving CI compliance in the evenings or on weekends, even though the child wears the device without resistance at preschool or in therapy. If it is discovered that full-time CI use is still problematic, families must be made aware of the importance of solving this issue, understanding that the clinician will support them. It is incumbent upon the audiologist to explain that, without full-time CI use during all waking hours, except sleeping or in water, other listening or speaking goals may be difficult or impossible to achieve. That is, full-time CI use, just like full-time HA use, is the foundation for spoken language progress. For some families, the inability to achieve full-time device use at home is but one symptom of a broader pattern wherein parents are experiencing behavior problems and non-compliance on a larger scale. In these cases, families may need a referral to a professional specializing in behavior management issues.

### *Implant Equipment Programming and Team Work*

Readers will note that one of the responses listed to both mild (one-flag) and substantial (two-flag) concerns is "Contact CI Center regarding possible equipment/programming changes." The functioning of the CI is always

considered a potential area needing attention because it provides the child access to the listening world. Interventionists should be familiar with the basic steps on proper use and troubleshooting of the sound processor. However, if a child is not meeting expected auditory benchmarks, interventionists should contact the implant audiologist to discuss their concerns, sharing information about which skills the child has not attained. In these cases, it is typical for the child to be seen by the programming audiologist to double-check equipment and programming. A team approach becomes important at this stage, particularly if the audiologist finds no problems with the device. It is helpful if the audiologist reinforces the message of "communication progress is linked to device use", perhaps by saying, "Johnny's CI seems to be programmed and functioning very well. However, given that his listening skills seem to be slower than other children, it is important for you to continue to work with your clinician to understand more fully his learning style and potential. It is important for us to identify the source of Johnny's slow progress so that we can teach him more effectively."

### **The Widening Gap between Technology and Service to Families**

This chapter has reviewed two tools that may be useful to audiologists and early interventionists following the diagnosis of HL in babies. For all the superb technology that has been developed and implemented, there remain substantial challenges to realizing the full potential of "acting early", as was mentioned at the beginning of this article. While programs are in place to identify babies at the earliest possible time, the reality is that many families are not benefiting from early identification in the ways professionals had envisioned. There is a sobering set of challenges that face families who try to secure for their children with hearing loss the services they need and that, in fact, the law mandates. In the words of Palmer (2004), a tragic gap has developed, at least in some places, between the use of technology to identify a baby's hearing loss, and our ability to provide qualified, experienced clinicians to educate parents on the connection between amplification and spoken language, to advise families on how to achieve full-time hearing aid use, and to conduct early intervention consistent with what we know to be best practice. Closing this gap should be of high priority to those of us who serve families of children with hearing loss.

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