# Tracking Auditory Progress in Children with Cochlear Implants

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# Tracking Auditory Progress in Children With Cochlear Implants

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Now that large numbers of children have received implants and published studies document their function, we know much more about how the average child performs in the first year of implant use. It is, therefore, possible to set auditory benchmarks for listening skill development (Tables 1, 2, 3). These benchmarks are based upon average performance and can never be used to predict the exact outcome for a given child. Nonetheless, clinicians should be familiar with the sequence and time course of listening skill development in children with cochlear implants so they can raise a red flag of concern when a child is performing substantially lower than expected.

## 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 the following three groups of children, based upon research findings and clinical experience.[1,3-6]

**These groups are:**

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

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

**GROUP 3:** Children implanted at age five or later who have little or no residual hearing/speech perception skills and 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 wear it full-time within a few weeks of initial stimulation may exhibit insufficient progress and are at high risk of becoming nonusers of their implants.*

## Tracking Auditory Progress in CI Kids

**Note:** A child is credited only for skills in listening-alone conditions.
'Spontaneous' means without prompting or modeling and when not in a listening set.

█ Time post-implant child should demonstrate the skill

**TABLE 1  GROUP 1**
Children implanted at **age four years or earlier**

| SKILL | 1 month | 3 months | 6 months | 9 months | 12 months |
|---|---|---|---|---|---|
| 1. Full-time use of CI | ■ | | | | |
| 2. Changes in spontaneous vocalizations with CI use | | ■ | | | |
| 3. Spontaneously responds to name 25% of time | | ■ | | | |
| 4. Spontaneously responds 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 improvements in language | | | | | |

**TABLE 2  GROUP 2**

Children implanted at **age five years or older** (Some residual hearing, consistent HA use prior to CI, primarily oral)

| SKILL | 1 month | 3 months | 6 months | 9 months | 12 months |
|---|---|---|---|---|---|
| 1. Full-time use of CI | ■ | | | | |
| 2. Understands some words or phrases, closed-set | | ■ | | | |
| 3. Understands many words or phrases, closed-set | | | ■ | | |
| 4. Spontaneously responds 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 | | | | | ■ |

**TABLE 3  GROUP 3**

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 month | 3 months | 6 months | 9 months | 12 months |
|---|---|---|---|---|---|
| 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 (e.g., dead batttery) | | | | ■ | |
| 6. Understands many words or phrases in closed set | | | | | ■ |
| 7. Understands a few things, open-set | | | | | ■ |
| 8. Major improvement in language | | | | | ■ |

## Identifying Red Flags

**Why identify Red Flags?**

The acquisition of listening is a developmental process that involves a sequence of cumulative skills—each subsequent skill depends on the acquisition of earlier skills. For this reason, delays early in listening development often lead to long-term delays, and long-term delays usually lead to lifelong deficits. Clinicians should be familiar with the range of progress in typical children with implants so they are comfortable raising a Red Flag when a child's performance lags behind that of their peers. However, it is important to note that what we term a Red Flag is not a diagnosis of a problem or a statement of permanent disability, but a notice to pay attention to the skill.

**What is considered a Red Flag?**

Based on the auditory benchmarks provided on the previous page, a Red Flag is a delay in a particular skill of three months or more. It is important to remember that raising a Red Flag is an expression of mild concern. The number of Red Flags raised is based on the length of the delay and the number of skills delayed. Therefore, the greater the number of skills that are delayed at an interval, the more substantial the concern.

## What do we do about Red Flags?

There is little value in raising a Red Flag for a listening skill unless we can suggest ways to monitor and improve that skill.

Remember that a clinical Red Flag is not a diagnosis of a problem but an indication that increased attention needs to be given to a specific skill area. Below is a table that provides you with tips on how to respond to Red Flags.

### Responding to Red Flags

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

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