



**MEDICAL TREATMENT**

# EARLY HEARING DETECTION AND INTERVENTION (EHDI)

## EARLY INTERVENTION SERVICES (Birth-School Years)

### Medical

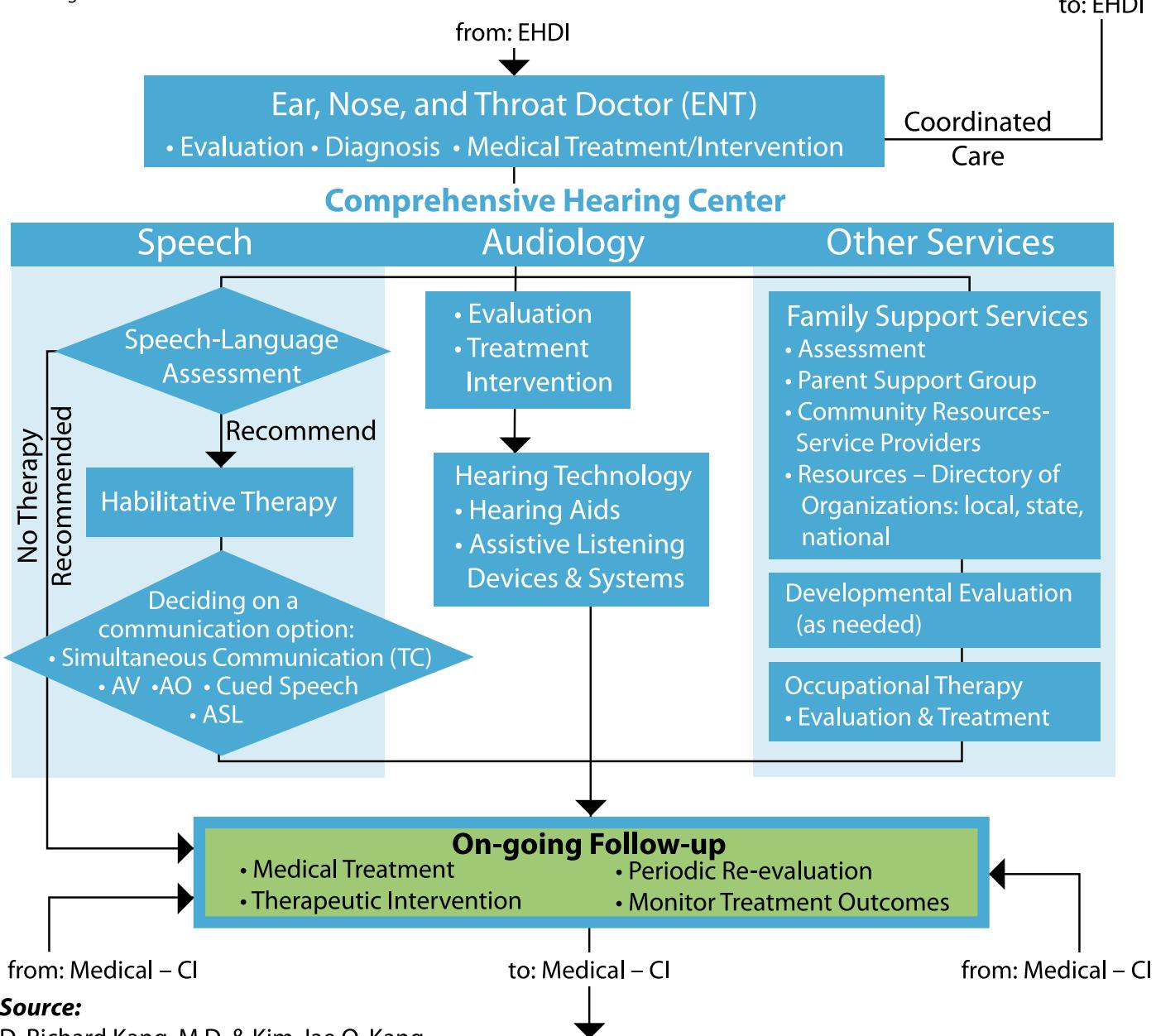
#### Acronym Key:

**ALDS**- Assistive Listening Devices and Systems  
**AO**- Auditory Oral (Communication Modality)  
**ASL**- American Sign Language  
**AV**- Auditory Verbal (Communication Modality)  
**BEIS**- Bureau of Early Intervention Services- under ODH  
**CI**- Cochlear Implant  
**EI**- Early Intervention  
**ENT**- Ear, Nose, and Throat Doctor (Otolaryngology)  
**HMG**- Help Me Grow- under ODH  
**IDEA**- Individuals with Disabilities Education Act  
 Part B- (3 to 21 years) Special Education Federal Funding  
 Part C- (Birth to 3 years) Early Intervention Federal Funding

**IEP**- Individualized Educational Plan  
**IFSP**- Individualized Family Service Plan  
**LEA**- Local Education Agency  
**ODE**- Ohio Department of Education  
**ODH**- Ohio Department of Health  
**RIHP**- Regional Infant Hearing Program- under ODH  
**Section 504 Plan**- of Rehabilitation Act of 1973- Civil Rights Law, protects children with disabilities from discrimination  
**TC**- Total Communication  
**UNHS**- Universal Newborn Hearing Screening

#### Color Key

-  **ODH**
-  **Medical**
-  **Medical - CI**
-  **Education – ODH & ODE**



#### Source:

D. Richard Kang, M.D. & Kim-Jae O. Kang



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## **Amplification and Hearing Technology**

Now that your child has been diagnosed with a hearing loss, it is important that you learn and understand all the treatment options. This will allow you to make an informed decision and make a plan of action that can optimize your child's hearing.

*Note: Conductive hearing loss is generally reversed (cured) by surgery, medicine, or natural resolution. Sensorineural hearing loss is permanent and at this time, there is no cure or medical treatment.*

Infants and children with hearing loss can achieve better access to hearing with amplification and/or other hearing technology options. Below is a list of hearing technology options your ENT doctor and audiologist will recommend for your child.

## **Hearing Technology**

The following four basic types of hearing technology are available for infants and children:

1. **Hearing Aids**
2. **Implantable Hearing Aids**
  - Baha® Device
3. **Cochlear Implants**
4. **Assistive Listening Devices and Systems (ALDS)**
  - Frequency Modulation Systems
  - Personal FM Systems
  - Sound Field Systems

## **Hearing Aids**

A hearing aid is a small electronic device that makes sound louder. It has three basic parts, including a power source:

- **Microphone(s)** – receives sound, converts the sound wave to electrical impulses and sends them to an
- **Amplifier** – increases the power of the impulses and sends them to the
- **Receiver** – which changes the impulses back into sound waves and redirects the amplified sound into the ear

"WHEN YOU DECIDE TO AMPLIFY YOUR CHILD, IT IS NECESSARY TO INTERVIEW THE HEARING TEAMS WHO WILL BE WORKING WITH YOUR FAMILY. THIS INCLUDES THE ENT, AUDIOLOGISTS, AND SLP THERAPISTS. YOUR BASIC PHILOSOPHIES MUST BE THE SAME. THIS IS A TEAM THAT YOU WILL BE WORKING WITH FOR A LONG TIME, SO IT HAS TO BE A GOOD FIT."

For more information on hearing aids, see the following:  
My Baby's Hearing website: <http://www.babyhearing.org/HearingAmplification/AidChoices/work.asp>

Hearing Aids 101 website:  
<http://www.hearingaids101.com/childrens-hearing-aids.aspx>

### **Types of Electronics**

Most hearing aids are now programmable. The audiologist will hook the hearing aid up to a computer and changes the way the hearing aid responds to sound. The following information is taken from BEGINNINGS.

There are three main types of programmable hearing aid technology:

- **Analog** – is considered basic technology and offers limited adjustment capability. It is the LEAST expensive and the least flexible. Analog hearing aids are able to provide more loudness (power) than digital hearing aids.
- **Digital Programmable** – is considered “middle grade” technology. Digitally programmable units are actually analog technology, but the sound capabilities of the hearing aid are adjusted digitally by a computer in the audiologist’s office.
- **Digital** – is the most sophisticated hearing aid technology. Digital technology gives the audiologist maximum control over sound quality and sound processing characteristics. Experience has shown that digital instruments outperform digitally programmable and analog hearing aids. Digitals are not perfect, but they are very good. They are also the MOST expensive.



BTE Hearing Aids in Different Colors

Digitally programmable and digital aids use programmable settings and adjustments so that very specific fittings can be made for a child’s individual hearing loss and their varied listening environments.

Programmable aids are especially appropriate for very young children and when progressive or fluctuating losses are diagnosed or suspected. The programmable aid provides the audiologist ultimate flexibility in terms of programming for changes in hearing. While this increased flexibility improves the fitting process and patient benefit, it also means higher costs for equipment.

Technological advances in the electronics of programmable hearing aids are occurring continuously. Speak with your child's audiologist to determine the hearing aid technology that is most appropriate for your child.

For more information see BEGINNINGS websites:

[http://www.ncbeginnings.org/index.php?option=com\\_content&view=article&id=81&Itemid=205](http://www.ncbeginnings.org/index.php?option=com_content&view=article&id=81&Itemid=205)

Hearing Aids 101 website:

<http://www.hearingaids101.com/childrens-hearing-aids.aspx>

A list of Hearing Aid Manufacturers is provided later in this section of the parent's guide.

### **Styles of Hearing Aids**

There are three basic styles of hearing aids:

- **BTE (Behind the Ear)** – consists of an earmold which fits into the ear canal and most of the outer ear. It is connected by a short plastic tube to an aid that goes behind the ear. Most commonly used by children.
- **ITE (In the Ear)** – the entire hearing aid fits inside the outer ear.
- **ITC (In the Canal)** – the entire hearing aid fits completely inside the ear canal.

*Note: ITE or ITC are not recommended for children under 16 years of age due to the safety and changes of a young child's ear canal.*

For more information on the different styles of hearing aids, see NIDCD website: <http://www.nidcd.nih.gov/health/hearing/hearingaid.htm#1>



Child wearing Behind-The-Ear (BTE) Hearing Aid

### **Behind-The-Ear (BTE) Hearing Aids for Children**

According to The American Speech-Language-Hearing Association (ASHA) children are usually fit with a behind-the-ear (**BTE**) style hearing aid for the following reasons:

- It accommodates various earmold types.
- The earmold detaches and can be easily remade as the child grows.
- The earmold can be easily handled and cleaned.

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Oticon BTE Hearing Aids with FM receiver

- Controls are visible and easily checked and adjusted by parents
- It has a wide variety of gains (increases in sound volume) and frequency responses.
- It can be made with direct audio input, so it can be used with other listening devices.
- It can be made with a telecoil, which allows them to talk on the phone.
- It is relatively sturdy.

Another benefit of the BTE is that a loaner can be used, so if it has to be sent for repair, your child is never without amplification. Hearing aids should be worn whenever the child is awake. BTE hearing aids are worn behind the ear and connect to an earmold inside the ear. The earmolds are made of soft plastic and are custom fitted to the child's ears. As a child grows his or her ears will change and new earmolds will need to be made. The BTE hearing aids and earmolds come in skin color as well as many other colors.

Your audiologist will give you instructions on:

- **Care of the BTE Hearing Aids** – Keep the hearing aids clean, dry, and properly working. Your audiologist will give you a care kit for your child's hearing aid and a trouble shooting handout that will help you determine if the hearing aid is functioning normally. For more suggestions, see below under "Proper Maintenance and Care of Hearing Aids" from CDC.
- **Whistling Sounds** – When a baby or a child outgrows their earmolds, it becomes too small and a whistling sound may occur. If the hearing aid continues to whistle after you have adjusted the earmold, you will need to make an appointment with the audiologist. New earmolds may be needed.
- **Listening Through the Hearing Aids** – The audiologist may give you a small stethoscope or listening tube to listen to the hearing aid. This is done by placing the earmold into the tube of the stethoscope. Your audiologist will teach you how to listen to the hearing aid and determine if it is working correctly or if the aid needs to be looked at by the audiologist.
- **Batteries** – Hearing aids need batteries in order to function. They need to be tested each morning to make

sure that they are properly working. Because batteries are poisonous if eaten, most hearing aids have a lock on the battery door. Your audiologist will teach you how to unlock the battery door to test the battery and to replace dead batteries.

The following helpful information "Keeping Your Baby Safe" and "Keeping the Hearing Aids on Your Baby" are from the Centers for Disease Control and Prevention (CDC). Your audiologist will go over all aspects of your child's hearing aid.

### **Keeping Your Baby Safe**

Batteries are very dangerous if swallowed. Hearing aids for infants and young children can come with a battery door lock. This lock keeps babies or young children from removing the battery. If your child's hearing aid has a lock, the audiologist will show you how to use it.

- Never let your baby or young child play with batteries. The batteries are small and can be swallowed.
- Hearing aids, earmolds, and batteries should never be put in the mouth. Infants and children can choke on them.
- If any one of these are swallowed, get your child medical care immediately by calling your doctor or taking your child to an emergency department.



This information is from CDC website:

[http://www.cdc.gov/ncbddd/ehdi/CDROM/hearing\\_loss/hearing\\_aids\\_pr.html](http://www.cdc.gov/ncbddd/ehdi/CDROM/hearing_loss/hearing_aids_pr.html)

### **Keeping Hearing Aids on Your Baby**

Babies and young children sometimes take out their hearing aids, play with them, give them to pets, or put them in their mouth. Sometimes the hearing aids fall out and the baby doesn't know to pick them up. This can be very frustrating for parents. Ask your baby's audiologist for ideas about how to keep hearing aids on your child. Here are a few ideas. Your audiologist may have others:

- **Plastic rings** – these can be used to keep hearing aids on a child's ear. There are two loops which fit around the hearing aid and are connected to a larger loop which fits around the outer part of the ear.
- **Attach to clothing** – a cord can be attached to the hearing aid and then clipped to your child's clothing.

- **Shorter earhooks** – an earhook is the part of the hearing aid that connects the hearing aid to the earmold. Shorter earhooks can make the hearing aid fit better and the hearing aids stay in place better.
- **Double sided tape** (wig tape) – this tape can be attached to the back of your child's ear and to the hearing aid. You will need to change this tape often. Your baby's audiologist can show you how to use the tape.

For additional helpful information, see *APPENDIX G – "How Can I Help My Baby Adjust to Wearing Hearing Aids? Practical Tips"*, from My Baby's Hearing or from their website:  
<http://www.babyhearing.org/HearingAmplification/AidChoices/AdjustHearingAids.pdf>

### **Proper Maintenance and Care of Hearing Aids**

NIDCD provides these suggestions to extend the life of your child's hearing aid: Make it a habit to:

- Keep hearing aids away from heat and moisture
- Clean hearing aids as instructed. Earwax, sweat, and ear drainage can damage a hearing aid.
- Turn off hearing aids when they are not in use.
- Replace dead batteries immediately.
- Keep replacement batteries and small aids away from children and pets.



See the National Institute on Deafness and Other Communication Disorders website: <http://www.nidcd.nih.gov/health/hearing/hearingaid.htm#1>

### **Hearing Aid Manufacturers**

For further information see websites below for a list of hearing aid manufacturers that make hearing aids for children:

Oticon: [www.oticon.com](http://www.oticon.com)  
Phonak: [www.phonak.com](http://www.phonak.com)  
Siemens: [www.siemens.com](http://www.siemens.com)  
Starkey: [www.starkey.com](http://www.starkey.com)  
Sonic Innovation: <http://us.sonici.com/>  
Unitron: [www.unitronhearing.us](http://www.unitronhearing.us)  
Widex: [www.widex.com](http://www.widex.com)

## **Implantable Hearing Aids**

Presently, the Baha® device is the only implantable hearing aid available for children.

### **Baha® Device**

Baha® device is a type of bone conduction hearing aid that is surgically implanted. Sound vibrations are converted to vibration of the skull which in turn causes movement of the inner ear fluid. The sound bypasses the outer and middle ear. Unlike the traditional bone conduction aid which vibrates the skull through the skin, there is a small fixture that is surgically implanted directly on the skull.

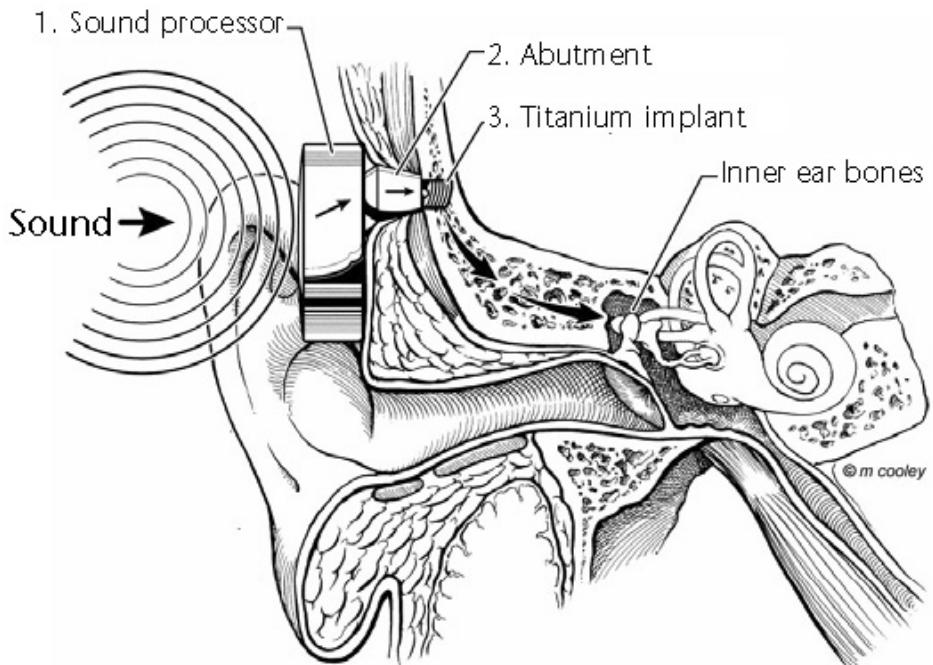
Baha® device is often recommended for children with:

- chronically infected and draining ear that does not allow for wearing of traditional hearing aids,
- congenitally malformed outer and middle ear that cannot be safely corrected surgically and
- for some unilateral hearing loss.

The Baha® has 3 parts:

1. **Titanium implant** (also called a “fixture” or “screw”) – during surgery this is placed in the skull bone behind the ear.
2. **Abutment** – this part is connected to the titanium implant outside the skull.
3. **Sound processor** – this part clips onto the abutment, so that sound is sent by vibrations to the inner ear.

In United States, the implant is not used on children younger than 5 years of age. Children under 5 years of age can use a “Baha® Softband” where the amplification piece is worn externally (without implant) to the skin on the head with use of a head band.



Baha® Softband

Your child's Ear, Nose, and Throat (ENT) surgeon and the audiologist may recommend the Baha® device, *if it is medically appropriate for your child's diagnosis and medical condition.*

For more detail information on the "Baha® Device for Hearing", see APPENDIX H, from Nationwide Children's Hospital – Department of Otolaryngology.

See the following website from Cochlear Americas on the Baha® for children: <http://products.cochlearamericas.com/baha/baha-system-and-accessories/baha-children>

### **Cochlear Implant**

See below, under "What is a Cochlear Implant?"

### **Assistive Listening Devices and Systems (ALDS)**

ALDS is not a hearing aid. It is a device that improves hearing in difficult listening situations by placing the microphone closer to the sound source. It improves the quality of amplified sound; speech or music. They help filter out background noise, reduce the listening distance, and echo that can make listening difficult. The most commonly used devices with children are the Frequency Modulation System which includes the Personal FM System and Sound Field System. FM systems can be used with hearing aids, implantable devices, and cochlear implants.

## **Frequency Modulation System**

**Personal FM Systems** – consist of:

- **Transmitter** – person talking (teacher) wears the FM transmitter
- **Receiver** – is worn by each student. It may be worn with earphones in each student's ear or may be attached to the child's personal hearing device.

## **Sound Field Systems**

- The teacher speaks into a microphone that amplifies their voice through the speakers placed in the classroom.
- sound field system does not require the listener to wear a receiver.

Children with hearing loss can benefit greatly with these assistive listening devices, Personal FM Systems and Sound Field Systems in their school. For further explanation on FM and Sound Field Systems see *Section IX. Education Services, under Assistive Technology*.

See also "FM Systems" in APPENDIX I – from Nationwide Children's Hospital – Department of Audiology

For more information on specific FM products that "My Baby's Hearing" recommends see websites:

Phonak: <http://www.phonak.com/us/b2c/en/products/fm.html>

Phonic Ear®: [www.phonicear.com](http://www.phonicear.com)

AVR Sonovation: <http://www.avrsono.com>

(Click on Products, Logicom XP)

Also see website: Oticon: <http://www.oticonchildren.com/children/com/AmigoFM/index.htm>

There are additional devices that may be useful for a child to hear better, such as:

- telephone devices
- television devices
- alerting devices (flashing or vibrating)
- TTY (text telephone or teletypewriter)
- Portable sound amplifiers

To learn more about FM and Sound Field Systems and additional devices, speak with your child's audiologist.

See CDC website: [http://www.cdc.gov/ncbddd/ehdi/CDROM/hearing\\_loss/assistive\\_devices.html](http://www.cdc.gov/ncbddd/ehdi/CDROM/hearing_loss/assistive_devices.html)

My Baby's Hearing website:

<http://www.babyhearing.org/HearingAmplification/AidChoices/FMSystem.asp>

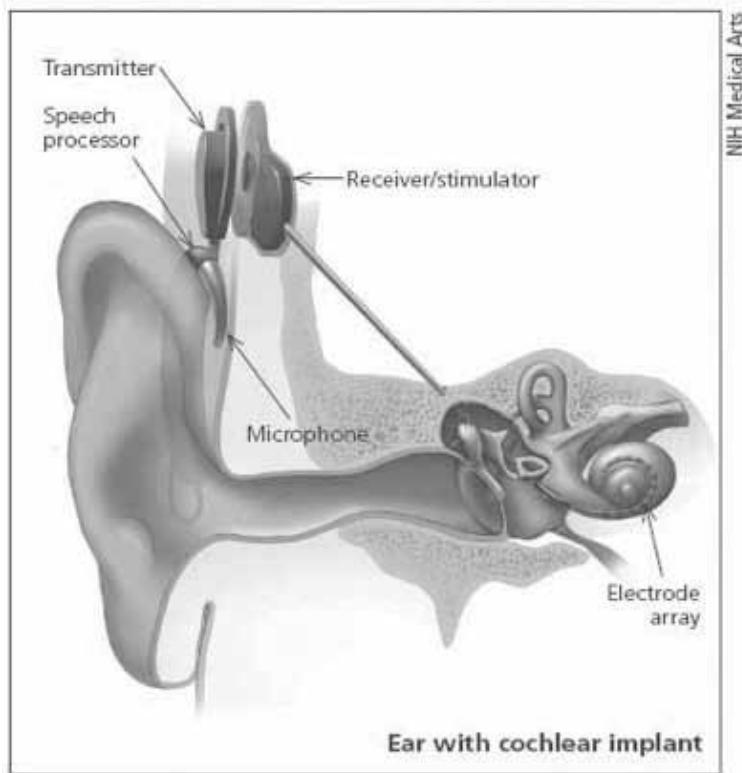
<http://www.babyhearing.org/HearingAmplification/AidChoices/assistive.asp>

BEGINNINGS website:

[http://www.ncbeginnings.org/index.php?option=com\\_content&view=article&id=93&Itemid=201](http://www.ncbeginnings.org/index.php?option=com_content&view=article&id=93&Itemid=201)

### **What is a Cochlear Implant?**

A cochlear implant (CI) is an electronic device that takes sound from the environment and converts it into electrical impulses to stimulate the auditory nerve (hearing nerve) within the inner ear. It replaces the functions of the ear, outer, middle ear as well as the cochlea (inner ear). It is surgically implanted inside the ear by a cochlear implant surgeon. The cochlear implant has an internal (surgically implanted) part which includes the receiver/stimulator and an external (worn outside the body) part that includes: transmitter, speech processor, and microphone.



Source: NIDCD. Reprinted with permission.

## How Does It Work?

Cochlear Implants are different from hearing aids. Hearing aids amplify sounds (make sounds louder) while cochlear implants bypass all the parts of the ear and directly stimulate the auditory nerve.

- **Microphone** – picks up sound from the environment
- **Speech Processor** – takes the sound and “codes” it into electrical pulses
- **Receiver/stimulator** – sends the electrical pulses to the electrodes in the cochlea

The electrical pulses sent to the electrodes in the cochlea are then picked up by the auditory nerve that sends it to the brain.

Cochlear implant “hearing” is different from normal hearing and takes time to learn or relearn hearing. Implants do not restore normal hearing. They can help children or adults diagnosed with severe to profound deafness, who get little or no benefit from hearing aids.

(Further explanation below – “Criteria for Cochlear Implantation”)



A child with a cochlear implant showing an artist's diagram of the internal components of the CI.

## Who Is a Candidate For a Cochlear Implant?

“According to the Food and Drug Administration (FDA), as of April 2009 data, approximately 188,000 people worldwide have received implants. In the United States, roughly 41,500 adults and nearly 25,500 children have received them.” (From National Institute on Deafness and Other Communication Disorders)

Cochlear implants are presently approved by the Food and Drug Administration (FDA) since 2000, for children 12 months of age and older.

### Criteria for Cochlear Implantation (all must be met):

- Severity of Hearing Loss
  1. 12- 18 months of age: profound, sensorineural hearing loss of 90 decibels (dBHL) or greater in both ears.
  2. 18 months of age and older: severe-to-profound, sensorineural hearing loss of 70 decibels (dBHL) or greater in both ears.
- No benefit from appropriate use of hearing aids.
- It is recommended that a child has a trial run of hearing aids for 3-6 months before they are considered for implant candidacy. Except in meningitis cases in which a shorter hearing aid trial may be recommended or waived

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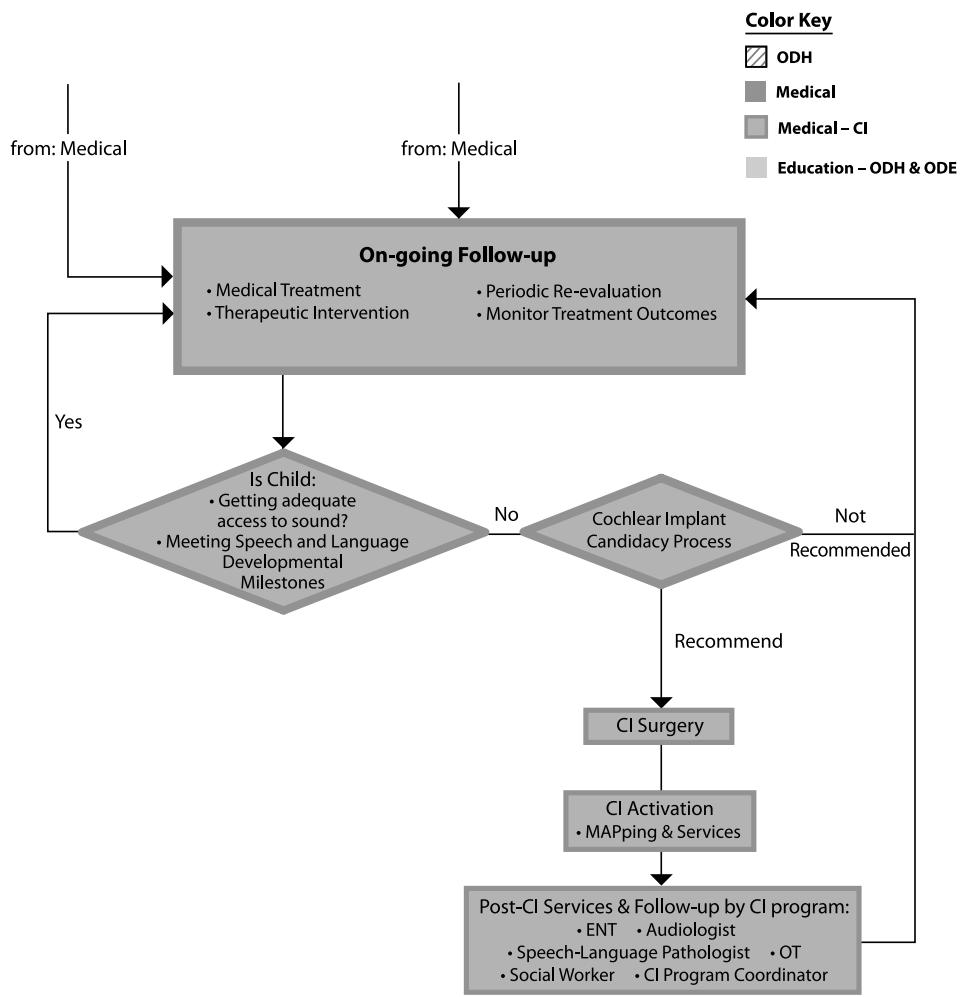
and implantation may be done prior to the child reaching 12 months of age before bone growth fills the cochlea.

- No medical conditions such as absence of the auditory nerve, medical conditions, or developmental delays that severely limit participation in aural habilitation, and active middle ear infections.
- Child should be in an early intervention program where the emphasis is on the development of auditory (listening) and speaking skills.
- Motivated and supportive family that has realistic expectations in the child's performance with the cochlear implant.

Unilateral vs. Bilateral – Speak with your child's Ear, Nose, and Throat (ENT) cochlear implant surgeon and the audiologist. The implant surgeon can make recommendations that are specific to your child's diagnosis and medical condition.

## EARLY HEARING DETECTION AND INTERVENTION (EHDI) EARLY INTERVENTION SERVICES (Birth-School Years)

### Medical – Cochlear Implant



**Source:**

D. Richard Kang, M.D. & Kim-Jae O. Kang

### The Cochlear Implant Candidacy Process

This brochure information is taken from Nationwide Children's Hospital – Department of Otolaryngology – Cochlear Implant Program.

The multidisciplinary Cochlear Implant Team evaluates and provides comprehensive care and support to cochlear implant candidate children and their families. The Cochlear Implant Program is designed to help your child optimize his or her hearing needs.

### The Team of Professionals

- Evaluates the child's candidacy for the cochlear implant surgery
- Assesses the child's hearing, health background, speech and language skills, cognitive abilities, family support system, early intervention and/or school setting
- Establishes a baseline foundation of the child's skills

The **Hearing Clinic** is designed to provide a comprehensive evaluation and consultation for the child and family. The cochlear implant candidacy process is initiated at a Hearing Clinic visit. Members of the Cochlear Implant Team may be present to initiate their evaluation.

(To learn more about the Hearing Clinic visit, see *APPENDIX J – “Your Hearing Clinic Visit”*, from Nationwide Children’s Hospital – Department of Otolaryngology – Hearing Clinic/Center.)

### Evaluation Process

The following evaluations are needed in order to complete the candidacy process:

#### Medical Evaluation

The cochlear implant surgeon will obtain a complete medical (health) history including a family history. The surgeon will also perform a complete head and neck examination with focus on ears and craniofacial features. In addition, a CT scan and/or MRI of the ears or head will be ordered. Other exams that may be ordered may include genetic or other blood tests, EKG (electro cardiogram), and an eye exam. This is done in order to assess the cause of the hearing loss and find any other health problems that may impact cochlear implant surgery.

#### Audiological (Hearing) Evaluation

During the hearing aid trial, the audiologist will test your child's hearing levels with his or her hearing aids on. The audiologist will review your child's past audiological records and assess how your child is adjusting to his or her hearing aids. All this information will help determine if your child needs cochlear implant(s). The audiologist will provide education about cochlear implant(s) during the evaluation. Models of the cochlear implant systems are used in counseling the families.

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### **Speech & Language Evaluation**

With your child's hearing aids on, speaking and understanding (expressive/receptive language), verbal/signing and understanding, pronunciation, listening, and oral-motor skills will be assessed by the speech language pathologist. This is done prior to getting a cochlear implant. This evaluation will determine current speech/language levels and assess whether a cochlear implant could benefit your child. This information will help in tracking progress once the child receives cochlear implant(s).

### **Developmental Evaluation (as needed)**

The psychologist evaluates factors that may affect your child's development and potential success after a cochlear implant. Depending on your child's age, the evaluation may include brief one-on-one testing of your child's visual learning and development. The psychologist will discuss your child's history, family history, concerns with your child's development/behavior, and your expectations for a cochlear implant. Family strengths and challenges regarding the candidacy process, support resources, child and family expectations for a cochlear implant, and education are all discussed.

### **Social Work Consultation**

The social worker assesses child and family functioning before surgery. Family strengths and challenges regarding the candidacy process, support resources, child and family expectations for a cochlear implant, and education are all discussed. The social worker can act as an advocate for you and your child and offer emotional support throughout the cochlear implant process.

### **Occupational Therapy Evaluation**

The occupational therapist will assess your child's balance and motor abilities and sensory responsiveness to touch and movement. The occupational therapist will also assist the team in providing education about how to help your child wear his or her hearing aid(s) and/or cochlear implant(s).

### **Educational/Therapy Consultation**

The team will consult with your child's teachers, speech language pathologists, and early intervention specialists (i.e., Help Me Grow and Regional Infant Hearing Program),

depending on your child's age. Routine communication between the educational program and the Cochlear Implant Team is vital for post-implant success.

### **Hearing and Cochlear Implant Program Coordinator**

The program coordinator will assist you in coordinating the evaluation dates and will act as your contact person throughout the candidacy process. The coordinator's role is to help make the cochlear implant candidacy process as streamlined as possible for you and your child.

### **Summary of the Cochlear Implant Candidacy Process:**

1. Complete evaluations.
2. Cochlear Implant Team meets to review recommendations.
3. Cochlear Implant Team decision: The cochlear implant surgeon or the Hearing Program coordinator will call you to share the team's decision with you.
4. If approved for surgery, you will need to contact your insurance company and obtain pre-authorization.
5. The surgery scheduler will contact you to set up a surgery date.
6. Surgery
7. On-going habilitation

To see the entire brochure, see *APPENDIX K – “The Cochlear Implant Candidacy Process”*, from Nationwide Children’s Hospital – Department of Otolaryngology – Cochlear Implant Program. Brochure can also be downloaded from the Nationwide Children’s Hospital, Department of Otolaryngology website:  
<http://www.nationwidechildrens.org/ear-nose-throat>  
Click on “Preparing Your Child for Cochlear Implant” under PDFs.



### **Your Child Has Been Recommended For a Cochlear Implant**

Your child has gone through the cochlear implant evaluation process and has been approved as a cochlear implant(s) candidate by the Cochlear Implant Team. As parent(s), you have made an informed decision to have your child undergo this surgical procedure. If your child has not had the pneumococcal vaccination (Prevnar®), you should ask your primary care doctor to provide the immunization for your child. This recommendation comes from Department of Health and Human Services – Centers for Disease Central and Prevention (CDC).

For more information on the pneumococcal vaccination from CDC, see website:  
<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5141a5.htm>

### **Surgery**

Your child is scheduled for surgery and you may have concerns and questions regarding your child's surgery at the hospital. Many hospitals offer tours of their Surgery Center.

For more information on Nationwide Children's Hospital Surgery Center and Surgery Unit, see website:

<http://www.nationwidechildrens.org/surgery-guide> under "Surgery Tours", click on surgery guide, to download a copy of a surgery parent packet.

"ANYTIME SOMEONE WE LOVE GOES INTO SURGERY, IT'S SCARY. BUT, YOU KNOW YOU'VE MADE THIS DECISION WITH YOUR CHILD'S BEST INTEREST IN MIND."

### **Cochlear Implant (CI) Surgery**

The CI surgery is usually done as an outpatient procedure, but occasionally it may require an over night stay in the hospital. The surgical incisions heal in 3 to 5 weeks and children resume their normal activities within a day or two after surgery.

### **What to Expect From Surgery**

#### **Pre Surgery**

The Pre-Operative nurse will ask questions and go over your child's pre-operation instructions to be followed the day before surgery. It is understandable that this is a scary time for parents. This may be the first time your child is going through surgery. You may feel worried, fearful and tearful. It is common to have second thoughts. It's a good idea to have supportive family members and friends to talk with at this time. Their support will reassure you that you as parents have chosen the appropriate treatment for your child. Try to get a good night sleep, for surgery day may feel like the longest day of your life.

#### **Day of Surgery**

Your child will require general anesthesia for the implant surgery. The operating room or medical staff may update parents during the surgery. Once surgery is complete, your child will be going to recovery where the nurses will monitor your child. Your implant surgeon will speak with you to discuss your child's surgery. Before your child



"THE DAY OF OUR CHILD'S SURGERY, WE WERE NERVOUS, MAINLY OF THE UNKNOWN."

is discharged, verbal and written instructions will be discussed and given to you for your child's post-surgery care. Your CI audiologist will also give you some information concerning the cochlear implant and follow-up appointments.

### **Post Surgery**

Your implant surgeon will send your child home with specific written instructions such as: incision care, signs to look for in case of infection, and medication instructions. If there are any concerns or problems, you will be given a contact phone number on the Post-Operative (Post-Op) instructions. Your child will have an appointment in about one week to be seen by your implant surgeon. The surgeon will examine the implant site.

At home, your child will be resting and will need time to recover. Don't be surprised if your child gets back to being their usual self within a few days. Many parents are quite amazed to see their child bounce back so quickly!

"THE DAY OF ACTIVATION WAS  
FILLED WITH EXCITEMENT  
AND FEAR."

### **Cochlear Implant Activation**

Approximately 3-4 weeks after implant surgery, the cochlear implant is activated or turned on by an audiologist that is trained in MAPping cochlear implants. These few weeks allow the swelling to go down and the incision to heal completely before the audiologist does the first fitting and programming (MAPping). The audiologist will provide the external components: transmitter and speech processor parts for your child during this visit and the speech processor will be programmed at this time.

"YOU WAIT ANXIOUSLY  
FOR THE ACTIVATION  
APPOINTMENT. AND YOU  
HOLD YOUR BREATH WHEN  
YOUR CHILD HEARS FOR THE  
FIRST TIME. YOU SMILE AND  
CRY AT THE SAME TIME."

Parents will be given the following instructions on their child's cochlear implant:

- basic function
- appropriate use and features
- proper care and maintenance
- basic troubleshooting on the device

Your audiologist will provide you a cochlear implant appointment scheduling timeline, to program the CI during the first year of your child's implantation. Cochlear implant(s) MAPping is unique to each child. Continued routine CI follow-up will be needed throughout your child's life.

(To see a sample timeline of CI appointment schedule, see APPENDIX L – “Post CI Road Map – Bimodal Users (CI & Hearing Aid)”, from Nationwide Children’s Hospital – Department of Audiology.)

## Expectations of Your Child

### The Day of CI Activation

Children have various behavioral reactions during their first implant activation visit. Some children have a surprised or startled look on their face and may turn to their parents for reassurance. Do not be worried if your child cries at first. Your child is not in pain, this may be the first time they are “hearing” and experiencing sound.

While you are holding your child, reassure them by talking and smiling to them to make them feel safe. There will be many visits to the CI MAPping audiologist and eventually your child will become more comfortable during future visits.

“OUR SON CRIED AT HIS ACTIVATION APPOINTMENT AND SO MANY PEOPLE SAID THAT IS SO SAD. BUT WE KNEW HE COULD HEAR AND THAT WAS WONDERFUL.”

### When They Come Home After CI Activation

You may find that your child seems exhausted during the first weeks of activation and may require more rest. Remember this is a new experience for your child and “hearing” for your child’s brain is new. The brain is learning to make neuro pathways and connections and is adjusting to this new sensory process.

## Post Cochlear Implant Services and Follow-up

### Cochlear Implant Program Available Services:

- ENT implant surgeon
  - 1. Medical evaluations
  - 2. Treatment as needed
- Audiologist
  - 1. Hearing evaluations
  - 2. Cochlear implant MAPping and services
- Speech-Language Pathologist
  - 1. Assessments to determine speech and language development
  - 2. Habilitative therapy to promote oral language development
- Occupational Therapist
  - 1. Assessment for balance
  - 2. Treatment as needed



## MEDICAL TREATMENT

- Social Worker
  - 1. Support services
  - 2. Parent support group
- CI Program Coordinator
  - 1. Coordination and assistance for your child's CI services
  - 2. Consultation with early intervention service providers, therapists, and teachers

### Cochlear Implant Manufacturers

The following manufacturers have informative and interactive websites:

Advanced Bionics	<a href="http://www.AdvancedBionics.com">www.AdvancedBionics.com</a>
Cochlear America	<a href="http://www.CochlearAmericas.com">www.CochlearAmericas.com</a>
MED-EL Corporation	<a href="http://www.medel.com">www.medel.com</a>

### Follow-up Medical Services for Hearing Aids and Cochlear Implants

The following services are on-going for your child:

- Audiological Care – hearing evaluations and assistive technology devices maintenance; hearing aids, Baha® devices, and/or cochlear implant(s) MAPping/ services
- ENT doctor – follow-up appointments with medical evaluations and treatments as appropriate