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CHILDREN'S COCHLEAR  
IMPLANT CENTER AT UNC

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# Welcome

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Welcome to The Children's Cochlear Implant Center at UNC. Our center is part of the UNC-Chapel Hill School of Medicine's Department of Otolaryngology.

Our team includes Ear, Nose, and Throat surgeons, audiologists, and speech-language therapists. Your child was referred to our clinic because they may benefit from a cochlear implant. Our team will test your child's hearing and give you the information you need to decide if a cochlear implant is right for them. If you have questions, please call!

We look forward to getting to know you and your child.

[Find us and other families on social media!](#)

		
<u><a href="#">The Children's Cochlear Implant Center at UNC</a></u>	<u><a href="#">@UNCPedSCIs</a></u>	<u><a href="#">The Children's Cochlear Implant Center at UNC</a></u>

Please visit our website for at [www.ChildrensCICenter.com](#)

5501 Fortune's Ridge Dr., Suite A, Durham, NC 27713

Phone: (919) 419-1449 \* Fax: (919) 419-1399

# Contact Us

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## Clinic Numbers

919-419-1449 (office)  
919-419-1399 (fax)

## Administrative Staff

### **Lori Parker**

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### **Ronisha McCartney**

*Administrative Coordinator*  
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## Audiologists

### **Lisa R Park, AuD, CCC-A**

Associate Processor  
Division Chief

### **Erika B Gagnon, AuD, CCC-A**

Assistant Professor  
Clinic Manager, Audiology

### **Melissa Anderson, AuD, CCC-A**

Assistant Professor

### **Dakota Sharp, AuD, CCC-A**

Assistant Professor

### **Jennifer S. Woodard, AuD, CCC-A**

Assistant Professor

## Speech Language Pathologists

### **Lillian Henderson, MSP, CCC-SLP, LSLS**

**Cert.AVT**  
*Assistant Professor*  
*Clinic Manager, Speech*

### **Sandra Hancock, MS, CCC-SLP, LSLS**

**Cert. AVT**  
*Assistant Professor*

### **Sarah Spencer, MS, CCC-SLP, LSLS**

**Cert.AVT**  
*Clinical Instructor*

### **Erin M Thompson, MS, CCC-SLP, LSLS**

**Cert.AVT**  
*Assistant Professor*

## Family Care Coordinator

### **Natalie Giduz, MSW, LCSWA**

[Natalie.giduz2@unchealth.unc.edu](mailto:Natalie.giduz2@unchealth.unc.edu)

### **Contact us through MyChart**

[www.myunchart.com](http://www.myunchart.com)

## CCCDP Grant Program

Our state funded grant program helps provide financial assistance for families of children with hearing loss. For more information, contact: [cccdpgrant@unchealth.unc.edu](mailto:cccdpgrant@unchealth.unc.edu)

Or apply here:

<https://www.med.unc.edu/earandhearing/cccdpgrant/>

Surgeons:

**Kevin D. Brown, MD, PhD**

*Distinguished Professor  
Executive Director*

**Lauren Leeper, MD**

*Associate Professor  
Medical Administrative Director*

**A Morgan Selleck, MD**

*Assistant Professor  
Medical Administrative Director*

**Matthew Dedmon, MD, PhD**

*Assistant Professor*

**Nicholas Thompson, MD**

*Assistant Professor*

**Carlton J Zdanski, MD**

*Distinguished Professor*

**Surgery Scheduling and  
Insurance**

**For Drs Brown, Selleck, Thompson, and  
Dedmon:**

Natasha Britto  
984-974-1912

**For Drs. Leeper and Zdanski**

Michelle Handy  
984-974-1625

**ENT Clinic Numbers**

984-974-6484  
984-974-3499

**ENT Patient Communication  
Line**

(for surgery or ENT questions)  
984-974-3409

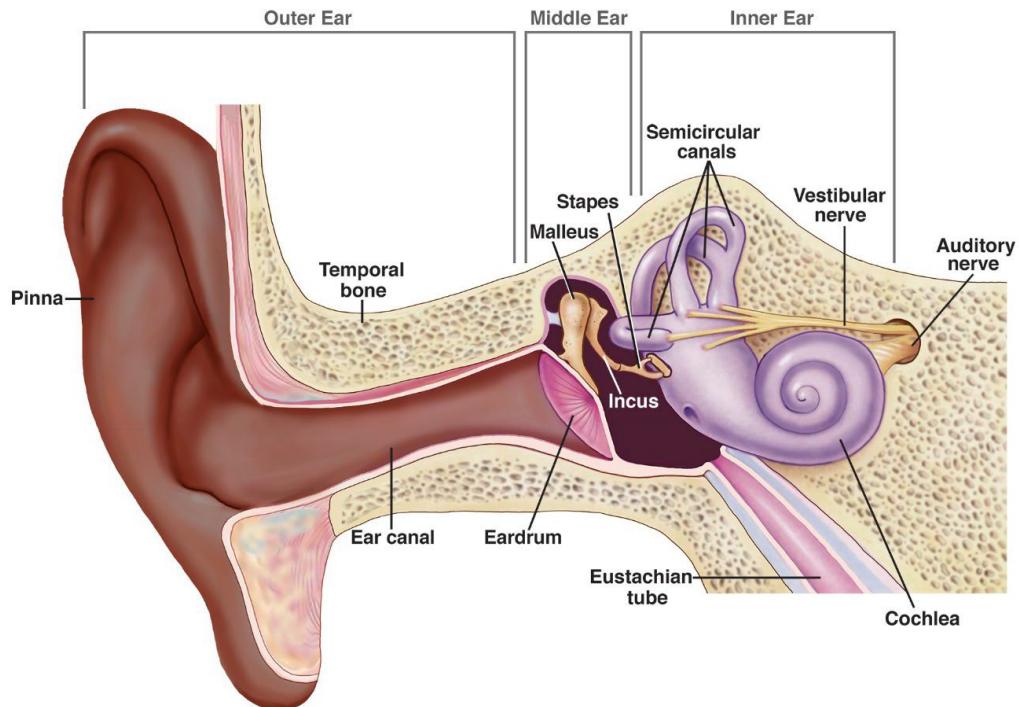
**Financial Counseling, UNC  
Health**

866-704-5286  
984-974-3425

**Radiology UNC Health**

984-974-1884

# How the Ear Works



## Outer Ear:

This is the part of the ear you can see. It also includes the ear canal and the eardrum. The outer ear's job is to collect sound. The sound travels through the ear canal and hits the eardrum, which starts to move or vibrate.

## Middle Ear:

This part is behind the eardrum. It has three tiny bones. These bones connect the eardrum to the inner ear. When the eardrum moves from sound, it makes the tiny bones move too.

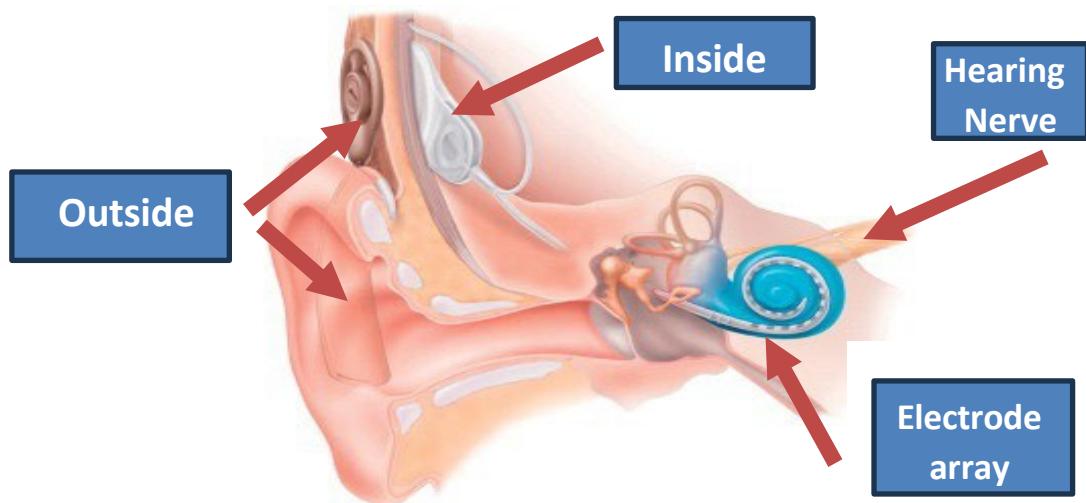
## Inner Ear:

The inner ear has a part called the cochlea, which looks like a snail shell. It's filled with fluid and tiny sensors called hair cells. When the bones in the middle ear move, they shake the fluid in the cochlea. This bends the hair cells and creates signals that travel along the hearing nerve to the brain.

## Cochlear Nerve Deficiency:

Some people have a condition called cochlear nerve deficiency (CND), which means their hearing nerve is not fully formed. For these people, a cochlear implant may not help very much with learning to talk.

# How A Cochlear Implant Works



A **cochlear implant (CI)** has two main parts. One part is worn on the outside of the ear, and the other part is placed inside the ear during surgery. The end of the part inside the ear has something called an **electrode array**, which goes into the cochlea to help send sound to the hearing nerve.

## Outside Parts (Transmitter):

The **microphone** picks up sounds from around you.

The **speech processor** turns those sounds into a digital signal.

The signal is sent through a cable to a small piece called the **coil**.

## Inside Parts (Receiver):

The signal travels through the skin from the coil to the **implant** inside the head.

The implant changes the signal into an **electric signal**.

## Electrode Array:

This electric signal goes to the **electrode array** inside the cochlea.

The electrode array sends the sound signal to the **hearing nerve**, which carries it to the brain.

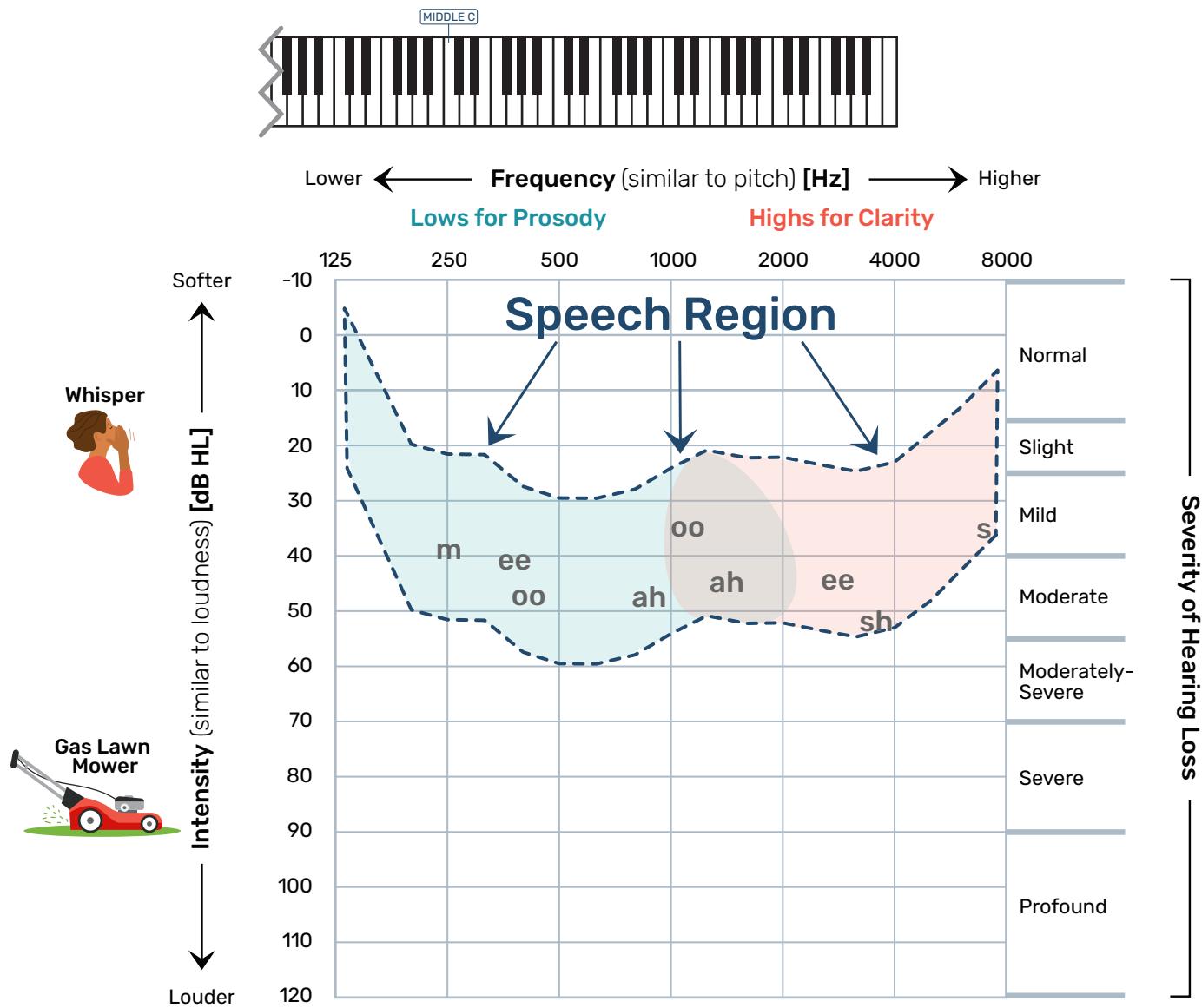
## Hearing Nerve:

The hearing nerve sends the signal to the brain.

The brain understands this signal as sound.

# Familiar Sounds Audiogram

This audiogram shows the speech region of any person speaking approximately 3 feet away from the listener (60 dB SPL). Example speech sounds, from an adult female, are also included.



## What's Prosody?

Prosody is the melody-like aspect of speech that helps convey meaning and emotion. It refers to the pitch, loudness, and timing patterns of speech. The low-frequency portion of the speech region is very important for prosody.

## What's Clarity?

The clarity of speech refers to how well a listener recognizes what is being said. The high-frequency portion of the speech region is very important for speech clarity.



Learn more about the audiogram with the eBook. Download it at [HearingFirst.org/Audiogram](http://HearingFirst.org/Audiogram)



## Who Can Get a Cochlear Implant?

Cochlear implants are for people who have a lot of trouble hearing, even when they use a good hearing aid. A cochlear implant might help if hearing aids don't make speech clear enough to understand. To get the best results, the device needs to be worn every day. Some children may not hear well even with a cochlear implant if their inner ear or hearing nerve didn't develop the right way.

## FDA Guidelines:

A child may be able to get a cochlear implant if they:

- ⌚ Are at least 9 months old
- ⌚ Have severe or profound hearing loss\*\*
- ⌚ Are not improving in speech or language with a hearing aid
- ⌚ Are healthy enough for surgery
- ⌚ Have a family willing to use the implant full-time and attend speech therapy
- ⌚ Are at least 5 years old and have hearing loss in just one ear

**Note:** New research shows that some children outside these guidelines can still benefit from a cochlear implant. Every child is different. We will look at each case and talk with your insurance company if needed.

## Steps to Getting a Cochlear Implant:

Your child will have a few appointments with our hearing (audiology) team. We'll test how well they hear with and without their hearing aids. You'll meet with a doctor to talk about surgery and learn what's causing the hearing loss. Your child will have pictures taken of their ears (MRI or CT scan). A speech and language test will also be done to see how your child is doing with talking and understanding. Then, we'll talk about what therapy could help.



# Before Surgery

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## Important Information Before Cochlear Implant (CI) Surgery

- ⌚ Someone from the surgery team will call you to tell you what day and time to come in before the surgery. Please make sure we have your correct phone number.
- ⌚ At least 2 weeks before surgery, call the ENT Financial Office at (984) 974-4086 to make sure your insurance has approved the surgery.
- ⌚ The day before surgery, our team will call you to confirm the exact time for the surgery.
- ⌚ If your child gets sick (like a cold, stomach bug, flu symptoms, or fever) within 3 days of surgery, call the ENT office at (984) 974-6484 right away.
- ⌚ Do not give your child aspirin or medicines with aspirin for 2 weeks before surgery. Aspirin can cause more bleeding.
- ⌚ No food after midnight the night before surgery. Your child can only have small sips of clear liquids (like water or apple juice) the morning of surgery.
- ⌚ CI surgery usually takes 3 to 4 hours. Most kids go home the same day, but parents should be ready to stay overnight just in case.
- ⌚ Your child will wear hospital clothes during surgery. Bring comfy clothes for them to wear home. A shirt that buttons or zips in the front is best because the bandage will be too big for a regular pull-over shirt.
- ⌚ A nurse will show you how to take care of the bandage at home. Keep the area clean and dry until the doctor takes off the bandage. This usually happens 2 weeks after surgery.
- ⌚ If you're worried about the stitches, call the ENT office at (984) 974-6484.
- ⌚ About 2 weeks after surgery, we will turn on the CI. This happens at the same visit as your follow-up with the ENT doctor. Your child can still wear a hearing aid in their other ear.

# Risks of CI Surgery

Before surgery, your child's surgeon will talk to you about possible risks. Some of these may include:

## Risks from the CI surgery:

- ⌚ Losing any hearing that's still there (but the CI is meant to improve hearing)
- ⌚ Higher chance of getting meningitis (a serious infection around the brain)
- ⌚ Unwanted facial movements (this can happen in people with different inner ear shapes)
- ⌚ Swelling near the implant
- ⌚ Sore, red, or damaged skin around the implant — this might need more treatment, another surgery, or even removing the implant
- ⌚ The electrode (part of the implant) may slip out of place
- ⌚ The surgery might not work as planned
- ⌚ The implant parts might stop working and need to be replaced
- ⌚ The CI might not work the right way, or your child might hear strange or too-loud sounds — in that case, another surgery might be needed

## Other risks that can happen with any ear surgery:

- ⌚ Soreness where the implant goes in
- ⌚ Neck pain
- ⌚ Numbness or loss of feeling in the face
- ⌚ Changes in taste
- ⌚ Fluid from the brain leaking (called a spinal fluid leak)
- ⌚ Feeling dizzy
- ⌚ Ringing in the ears (called tinnitus)
- ⌚ Bleeding, fluid build-up, or infection where the surgery was done
- ⌚ Skin rash

## General surgery risks:

- ⌚ Pain, scarring, bleeding, or infection
- ⌚ Reactions to the anesthesia (the medicine that helps your child sleep during surgery), which can affect the heart, lungs, kidneys, liver, or brain

# Meningitis Vaccination Information

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**Bacterial meningitis** (say: *bak-teer-ee-al men-in-ji-tis*) is a serious infection of the brain and the fluid around the brain. It can make people very sick. People with cochlear implants (CIs) have a higher chance of getting this infection, but the risk is still small. To help stay safe, **children and adults with CIs should get certain vaccines.**

There are vaccines that protect against the bacteria that cause meningitis. These shots help the body fight off infections.

## CCIC Vaccine Rules for Implant Candidates:

- ⌚ **Children under 5 years old** should get the same pneumococcal vaccines (**PCV20**) on the correct schedule for their age. They should also get the **H flu vaccine** based on the right schedule for their age.
- ⌚ **Children 2 through 18 years old** who did **NOT** get a PCV20 vaccine must get one dose of **either PCV20 or PPSV23.**

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More information is available for the Centers for Disease Control website

<https://www.cdc.gov/vaccines/vpd/mening/public/dis-cochlear-faq-gen.html>

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## Follow-Up Care:

Even with vaccines, meningitis can still happen. That's why it's important to **see a doctor right away** if a child or adult with a cochlear implant has:

- ⌚ **An ear infection**
- ⌚ **A fever with no known cause**
- ⌚ **Fluid leaking** from the ear or a watery fluid coming from the nose
- ⌚ **Strange symptoms** in the ear with the implant

Infections should be treated quickly to keep them from spreading and causing meningitis. If something doesn't seem right, have the ear checked by a **specialist (ENT or otologist).**

# What to Expect on Activation Day

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## After surgery:

- ⌚ The stitches will heal in about **2 weeks**. After that, you'll come back to our office to **turn on the cochlear implant** and program it. This is called **mapping**.
- ⌚ The **first map** is just the beginning. Your child will need **several maps** to help them hear their best. These will be made during your first few visits.

## What Happens at the First Mapping Visit (About 2 Hours):

- ⌚ We will fit the **outside parts** of the sound processor.
- ⌚ We will create a **comfortable map** that works for your child. You'll get more maps to take home.
- ⌚ We'll explain **how the device works** and how to take care of it.
- ⌚ We'll also finish **registration** and any needed **paperwork**.

## During Mapping:

- ⌚ The cochlear implant is connected to a **computer**.
- ⌚ The implant inside the ear is tested with **soft sounds** your child can't hear.
- ⌚ **Older kids** may be asked to **raise their hand** when they hear a sound.
- ⌚ **Younger kids** may **play a game** when they hear a sound.  
Parents help by watching for signs that their child is hearing—like looking around, smiling, or stopping what they're doing.
- ⌚ Every child is different. Some may cry, smile, or not react at all. That's okay!

## Sharing the Big Moment:

We know this first activation is a special time you may want to share with family. We're happy to **take a video** or **set up a video call** so loved ones can be part of it.

Please **limit the number of adults** who come in person. Our programming rooms are small, and we want to keep things calm and comfortable for your child.



## Success Starts with Eyes Open, Ears On!

Cochlear implants work best when children wear them all day while they are awake. The magnets inside and outside the head must connect for the implant to work.

**If the magnet falls off, your child will not hear anything.**

### CI Retention Solutions Hairclips

Search: [ciretentionsolutions.com](http://ciretentionsolutions.com)



### Double-Sided Tape



### Corded Shirt Clip

Visit [etsy.com](http://etsy.com) and search “The BeBop Shop”



## Headbands

[hearinghenry.com](http://hearinghenry.com)



Visit [etsy.com](https://www.etsy.com), search  
“Ear Suspenders”

## Pilot Caps

Visit [etsy.com](https://www.etsy.com), search “Anchor  
your Hearing”



Every child is different. What works for one might not work for another. Your audiologist will help you find the best option for your child's age and needs. Finding the right way to keep the device in place may take a few tries.

## Expectations

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Cochlear implants help children hear sounds and speech in their everyday life. But even with the implant, they are still deaf when the processor is off. Learning to listen takes time and patience.

- ② Most children will not understand speech right away. That's normal.
- ② Kids without hearing loss usually take a year to learn to speak. So children with CIs need lots of time and practice too.
- ② The more your child hears, the more they learn. Talk and read to your child every day.
- ② Speech therapists can help you teach your child language.
- ② Your child must wear the processor all day, every day.
- ② Be patient—it takes time to hear, understand, and then speak.

# Activation and Mapping Schedule

On the day we turn on the CI (called Activation Day), your child will get four programs on the device. The first program (P1) is the softest. Your child should wear P1 for the first 2–3 days, then move to P2, then P3, and finally P4—changing every few days.

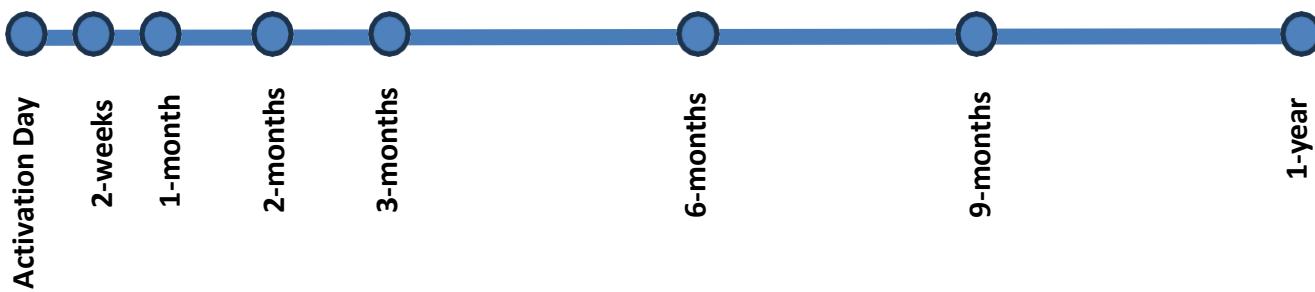
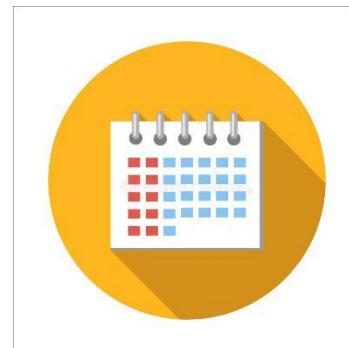
First Year Appointment Plan:

- ⌚ **Activation Day** – Turn on the CI (2 weeks after surgery)
- ⌚ **2-week visit** – New louder programs
- ⌚ **1-month** – First hearing test with CI
- ⌚ **2-month** – Another hearing test and adjustments
- ⌚ **3-month** – More testing and check-in on progress
- ⌚ **6-month** – Same as 3-month
- ⌚ **9-month** – May be skipped if everything is going well
- ⌚ **1-year** – Hearing and speech test

Speech-language testing will also happen during the first few years to check your child's growth.

After the first year:

- ⌚ Kids under 10 come back every 6 months.
- ⌚ Kids 10+ come back once a year.
- ⌚ Come in sooner if you notice changes in hearing or problems with the device.



## Device Information

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Cochlear implants have inside and outside parts. The pieces may look different depending on the brand. All approved brands work well.

We will give you booklets with info about each one. Your surgeon doctor might recommend one based on your child's inner ear shape.



(800) 483-3123  
[cochlear.com](http://cochlear.com)

(919) 572-2222  
[medel.com](http://medel.com)

(877) 829-0026  
[advancedbionics.com](http://advancedbionics.com)

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### Warranties:

- ⌚ Internal implant: 10 years
- ⌚ Speech processor: 5 years
- ⌚ Batteries and chargers: 1 year

You get one free replacement per ear if the processor is lost or badly damaged (like chewed by a pet).

### **After the warranty:**

- ⌚ You may be able to buy an extended warranty.
- ⌚ Some home insurance covers lost processors.
- ⌚ Medicaid often helps with repairs. Private insurance varies.
- ⌚ You can also look into the CCCDP Grant Program if you qualify.

You'll get two full sets of equipment—this means always having a backup. Bring both to appointments.

### How Long Will the Implant Last?

The inside part is made to last a long time, but we don't know if it will last forever. It could stop working from age or a hard hit to the head. Make sure your child wears a helmet during biking or sports.

The whole CI system costs around \$70,000, but most is covered by insurance. You may have to pay for some parts once the warranty ends.

## Communication Options

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Some children may have different goals. The CI is a tool that helps with hearing. Some children need to use or their families choose to use different ways to communicate. These include:

- Spoken language
- Cued Speech (hand signs that help with lipreading)
- Sign Language
- Devices for children who have delays or trouble learning to talk

We will help you find the best way to help your child grow and learn that matches your goals.

## Support for families

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**BEGINNINGS of NC:** a non-profit group to help parents. They give information, support, resources and referrals, without bias to parents to meet the different needs of children with hearing loss. Services are free to parents in the state of North Carolina, supporting a child's needs from birth through age 21.  
<http://www.ncbegin.org>

**HITCH-UP:** a family-based support group for parents and family of children who are Deaf or Hard of Hearing. <http://www.nchitchup.org>

**Alexander Graham Bell Association for the Deaf and Hard of Hearing:** a group providing information and support for people and families who choose spoken language. [www.agbell.org](http://www.agbell.org)

**Communication Services for the Deaf/Hard of Hearing:** A local organization that provides ASL classes (8-week sessions). Classes are offered in-person or live-online (2-hour sessions). [www.csdhh.org](http://www.csdhh.org)

# Frequently Asked Questions

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## What is a cochlear implant?

A CI is a device placed in the ear during surgery to help someone who is deaf hear sound.

## When were CIs first used?

CIs were first approved for adults in 1985 and for kids in 1990.

## Who can get a CI?

Children and adults who meet the rules and are healthy enough for surgery.

## Is surgery hard?

Surgery takes 2–3 hours. Most kids go home the same day. The doctor places a device under the skin behind the ear and a wire into the cochlea.

## Is it like normal hearing?

No, it's different. It's electric hearing. Your brain needs time to learn the new sounds.

## Should my child get one CI or two?

Hearing with two ears is best. We'll help you decide what's right.

## Can the CI be removed or replaced?

Yes, if needed. Most children hear well again after a replacement.

## Should the CI be worn at night?

No. Take it off at night and let the skin rest. Charge the batteries and store the processor in a dry box.

## Can my child wear it while playing?

Yes, but use helmets for safety. Avoid rough sports. Ask how to waterproof your child's device.

## Still Have Questions?

Contact your provider through My UNC Chart.



Thanks for choosing UNC and  
the Children's Cochlear  
Implant Center at UNC!

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