Cochlear Family

Keeping you supported, connected, inspired

January 2023

Cochlear®

A quick guide to how your Cochlear™ implant works

Do you get asked how your cochlear implant works? Or what is the difference between a cochlear implant and a hearing aid?

It's helpful to understand how your cochlear implant works and to be able to explain it to others, for example, when you meet new people or start a new job.

Jan Janssen, Chief Technology Officer, Cochlear

Understanding the difference between an implant and hearing aid is also useful for spreading awareness among friends, family or loved ones who might benefit from the technology. Particularly if they feel their hearing aids are no longer enough.

In this Q&A, Cochlear's Chief Technology Officer, Jan Janssen, explains in simple terms how a cochlear implant works and why it has been transformational. ▸

Q: What are the differences between a hearing aid and a cochlear implant?

A: Hearing aids mostly compress the sounds and make sounds louder– they typically work well to address the mild to moderate levels of hearing loss, for example, due to the natural ageing process.

Once people suffer from more severe forms of hearing loss, the effectiveness of hearing aids decreases significantly because there is not enough hearing capability left in the inner ear to "push" the sound through in an effective way.

This is where cochlear implants come in, because they bypass the damaged part of the ear (the so called "sensory hair cells") and stimulate the hearing nerve directly with tiny electrical pulses that represent the sound.

Because cochlear implants do not rely on the part of the inner ear that no longer functions properly, they are very effective for people with these forms of hearing loss.

Q: When do cochlear implants become an option?

A: Cochlear implants are an option for the treatment of moderately severe to profound hearing loss. They can be considered when hearing loss has declined beyond the help of hearing aids. Typically this would be for people who have great difficulty following a conversation in a social setting, even when they are wearing their hearing aids. Or also if someone with a hearing aid still has difficulty having a conversation over the phone while they are using their hearing aids.

Q: What makes up a cochlear implant system?

A: Cochlear implant systems have two main parts:

- The actual "cochlear implant", which is a device implanted under the skin and into the inner ear, that wirelessly receives the signals from the "sound processor" and converts this information into tiny electrical pulses. These are then delivered directly to the hearing nerve via an electrode array that is placed in the inner ear.
- An external sound processor that captures sound from the environment, removes background noise and processes the sound in a way that the hearing nerve can interpret it. It sends the processed signal to the implant through a wireless connection. The sound processor also sends power to the implants to function because the implant does not have a battery.

Together, the sound processor and implant bypass the part of the ear that isn't working, sending sound straight to the hearing nerve.

Cochlear implants were the first prosthesis to effectively replace one of the human senses via electrical stimulation.

Q: How do cochlear implants actually work?

A: The tiny electrical stimuli that the cochlear implant delivers to the hearing nerve represents the sound that is captured by the sound processor.

While the representation of the sound via the cochlear implant is not exactly the same compared to natural hearing, the brain is able to learn this new way of receiving sound. Both children and adults can benefit strongly from this technology.

Better hearing can help people regain confidence in social situations, rejoin friends and family, and live a fuller life. For people that fit the indication criteria, cochlear implants may further improve the clarity of sound and enhance your ability to understand conversations, in particular compared to continued use of high power hearing aids.[1-3]

How a cochlear implant works

Achieving your best possible hearing

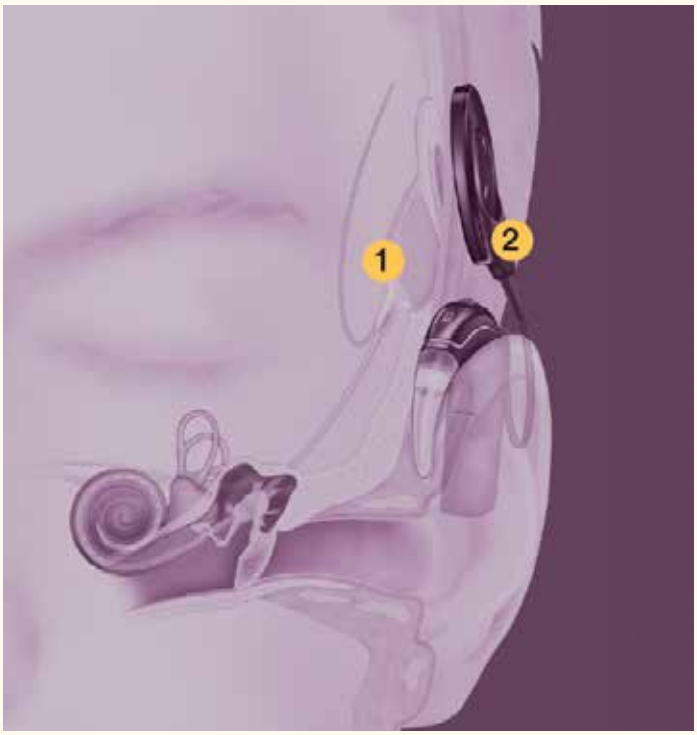
While hearing aids work by amplifying sounds, cochlear implants are different. They bypass the damaged part of the ear and stimulate the hearing nerve directly. This enhances the clarity of sound and improves your ability to understand speech.

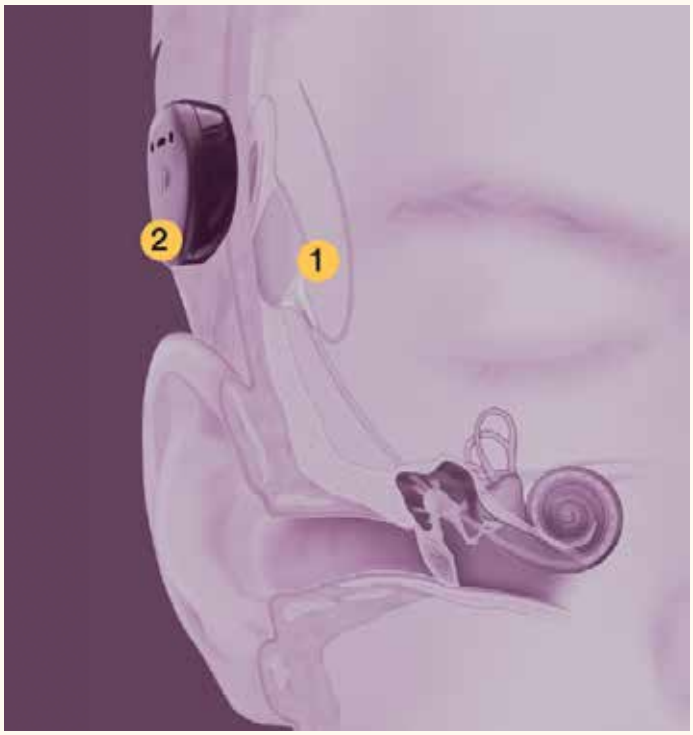
How it works

There are two parts to a cochlear implant system.

1 **The cochlear implant**
The implant is an electronic device that's placed under the skin and into the inner ear to help deliver hearing, along with the sound processor.

2 **The sound processor**
The sound processor sits on your head. There are two types of sound processors, worn either behind-the-ear or off-the-ear. Two microphones pick up sound waves, which are converted into digital information that's transferred to the implant. The hearing nerve then sends this information to the brain to be interpreted as sound.





Q: How have cochlear implants revolutionised hearing loss treatment?

A: When Professor Graeme Clark developed a new way of treating hearing loss via electrical stimulation with a cochlear implant, his invention changed the world. Since then hundreds of thousands of people have experienced life's opportunities through hearing.

The cochlear implant has transformed the field of hearing health. Just 50 years ago, there were no effective treatments for severe to profound hearing loss.

The development of the cochlear implant changed that completely and today most cochlear implant recipients can converse using their mobile phones. The development has been both rapid and remarkable.

Know more

Building self-esteem and confidence

Cassidy, Cochlear™ Nucleus® System recipient.

Becoming a teenager can be a bit of a rollercoaster and feel different for everyone. For you, it may be an exciting time where you feel like something amazing is just around the corner.

It can be a time of hope and possibility, a chance for you to explore the things you are interested in, develop new ideas and opinions and widen your circle of friends. Or, it may feel like you are stepping into a stranger's shoes. Things might feel a little unfamiliar, confusing and not entirely comfortable. It may even feel like a mix of emotions: excitement and happiness, but with a touch of nervousness thrown into the mix. Everyone is different, but that's what makes the world an interesting place.

> "Don't be afraid to step outside your comfort zone."
>
> Cassidy, Cochlear™ Nucleus® System recipient.

As you enter this new phase of your life, there will be some new things you will need to navigate. For example, starting at a new school, how to tackle social media, making new friends and worrying about what the future may look like for you.

But, as a teenager with hearing loss you may have a few extra challenges that your typically hearing peers may not have to work through. Such as, the challenge of dealing with people who don't understand your hearing loss, potential barriers to communication and any misunderstandings that may arise because of those barriers.

At times, you might start to feel like no-one truly understands what you are going through. It is normal to feel this way, even though you may have an amazingly supportive family and circle of friends around you.

The Cochlear Family team want you to know that you aren't alone, there are teenagers with Cochlear implants and Baha® devices from all across the world who understand your perspective. Cassidy, a young recipient from Sydney, Australia shares insights on how you can successfully navigate through your teen years.

Q: Can you please share what your high school experience was like?

Cassidy: I went to my local mainstream high school. It was completely different from primary school and a massive transition for me; bigger school, more students and different teachers and classrooms for each subject. I was really lucky to have a wonderful teaching team which consisted of a year advisor, teachers, learning support teacher and an itinerant support teacher. My itinerant support teacher was with me for 7 hours per week and supported me in the subjects I struggled with the most; English, Maths and Science. In addition to the support I received in class, I had disability provisions for formal exams which gave me extra time and an oral interpreter who would rephrase questions to help me understand. My advice is to find out how your school can support you and what strategies they can put in place to help you get the most out of your education.

Cassidy, Cochlear™ Nucleus® System recipient with Nobel Peace Prize winner Malala Yousafzai

Q: Was there anything your parents and teachers did to make the move from primary to high school smoother?

Cassidy: When my parents told me I was moving to a new high school, I was reluctant to move. I had to work hard to make friends in primary school and felt like I was just beginning to find my place. I was worried this move would mean having to start all over again, I was worried about not fitting in and meeting people who were not understanding of my hearing loss. My parents met with the school principal and year advisor to discuss ways to help make the transition smoother. I also attended a Year 5 Open Day where I got to experience a taste of what high school would be like. There were activities such as food technology and woodwork workshops.

Q: What is your advice to kids or teenagers that may be struggling to make new friends?

Cassidy: [being a teenager] is a time of transition and change which can lead to pressures in friendships. Struggling to make friends can make it hard to enjoy school or focus on schoolwork. Don't keep it to yourself. My advice is to reach out and talk to a school counsellor or year advisor who can help connect you with a buddy – a student in the same grade who may have similar interests or hobbies.

Q: What role do you think social media plays in the lives of teens with hearing loss? Do you have any advice you can share to teens about social media use?

Cassidy: Social media has a lot of pros, especially for a young person with hearing loss. It has made communication more inclusive by making it easier to connect with others. Social media has also given teens with hearing loss a platform to share their story and showcase their capabilities. My tip for social media is to use it as a way to connect with others with hearing loss and know when to step back when you read negative comments. Remember, social media can be a double-edged sword and that there is a fine line between positive and negative social media use. When you start using social media, think about how you want to use it and what you want to get out of it. Try to engage with positive content on topics that interest you.

Q: What is your advice to kids or teenagers searching for the courage to self-advocate and speak about their hearing loss?

Cassidy: It took a while for me to start talking about my hearing loss – it wasn't until I met other people around my age who had a hearing loss too. Meeting others and realising that I wasn't the only one who had issues and challenges was a real turning point for me. I realised that I wasn't alone, there are others with hearing loss who have similar experiences as me. My confidence to talk about my hearing loss and express my needs has grown over time. It stems from a mixture of community connection, having the support of friends and family and having parents that always had my best interests at heart.

So, my piece of advice to other young people still searching for courage to speak about hearing loss is:

1. Connect with other young people who have a hearing loss. They may be better able to understand you and empathise with the way you feel.
2. Don't be afraid to step outside your comfort zone.
3. Be open with friends and family. They are a great place to start when you are starting to build up your confidence to talk about hearing loss.
4. Find a buddy or close friend who understands your hearing loss. They can act as a support person when you don't feel comfortable to share about your hearing loss when asked. Over time, you may find that your buddy/friend doesn't need to step in to answer questions about your hearing loss.

Tips to thrive at school with Kevin and Kaci

Nathania, Cochlear™ Nucleus® System recipient.

School offers an amazing environment for your child to explore the world, make friends, become independent and develop a love of learning.

It's normal for most parents to feel a mix of anxiety and excitement when getting their child ready for school. For parents of children with cochlear implants, you're also considering how to provide your child with any extra support they'll need to for the best possible start to their education.

Nathania, a cochlear implant recipient from Indonesia, knows the challenges of school life with a cochlear implant all too well. Nathania received her cochlear implant when she was four years old after being diagnosed with hearing loss due to meningitis at age two.

Now, she's a graphic designer with her own growing business and has teamed up with Cochlear to create fun and engaging digital workbooks based on her own personal experiences to help parents and children with cochlear implants.

Nathania has completed a Bachelor of Arts, Master of Arts and an MBA. Today she's a co-founder of Guru Bumi, which designs and produces interactive learning tools for children in Indonesia.

Two books are now available for downloading globally: "I Can Hear" and "Kevin's First Day at School" and are designed to help give children the language and confidence to talk about their cochlear implants, make friends and prepare for school.

Featuring engaging activities like connect-the-dots and colouring in, they provide a meaningful resource to help parents, teachers and carers support children.

Nathania, Cochlear™ Nucleus® System recipient.

"I wanted to make a book that would help children feel confident using their cochlear implant and not be ashamed. It's a part of their life."

Nathania, Cochlear™ Nucleus® System recipient.

The first book, “I Can Hear”, is based on Nathania’s experience and hearing journey with her cochlear implant.

“It took a long time for me to adapt and recognise sounds after getting my cochlear implant,” she explains.

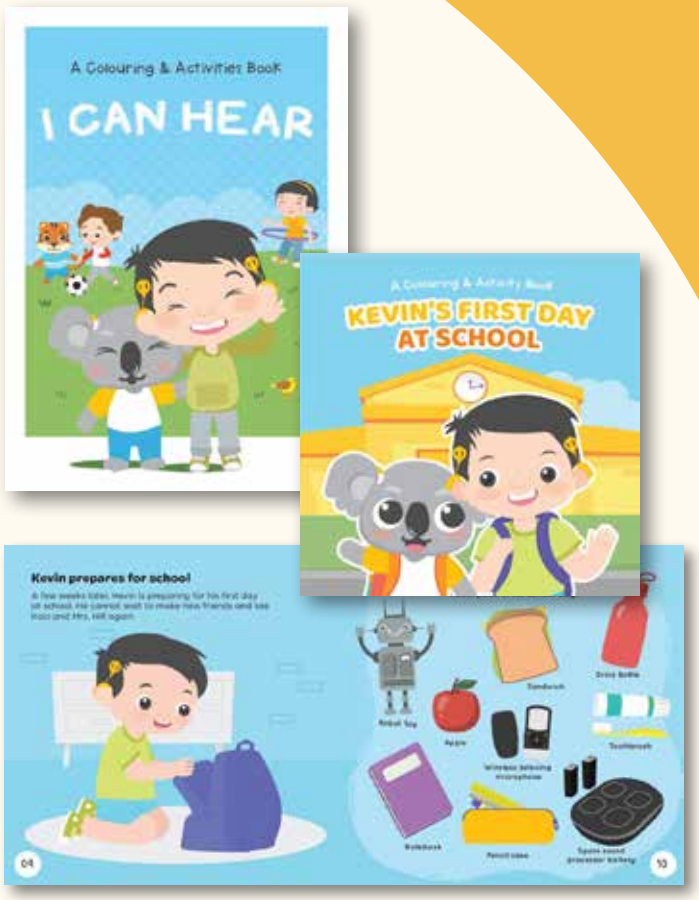
“Through audio-visual therapy and practice, I could recognise voices. However, this took years and it wasn’t instant. So I made an activity book to help children for their hearing journey.”

In “Kevin’s First Day of School” Nathania says she wants to help children and parents with tips on how to cooperate with teacher or facilitators before entering school.

Acting as a guide for parents, the book steps through how to introduce the cochlear implant to the teacher and foster a friendly learning and playing atmosphere for children with cochlear implants.

“I hope this book will encourage children with cochlear implants to be confident in making friends and going to school.”

Education has formed an important part of Nathania’s life.



Tips for parents

What can parents and carers do to help their child advocate for themselves and enjoy starting school? Nathania shares her advice for parents.

- **Be patient:** “It’s a long journey where you will be guiding your children with cochlear implants.”
- **Be consistent with practice and don’t skip therapy:** “Improvements won’t happen instantly, instead focus on your child’s overall development.”
- **Teach your child to be clear, open and confident about their conditions:** “People may not know how to treat us, therefore we have to let them know how to interact with us.”
- **Let your child know it’s crucial they ask for help if they have issues with school:** “The goal is to raise awareness. Sometimes, people are afraid to communicate with us because they don’t know and it is unfamiliar for them. This is our chance to let them know that our disabilities are not the boundary for us to pursue our dream.”

Download and share the Kevin and Kaci books as a learning resource for you, your child as well as their day care, school and friends.

“I Can Hear”

“Kevin’s First Day of School”

Bec, Cochlear™ Nucleus® System recipient.

Discover the difference new technology brings

Being one of 11 people in her family with progressive hearing loss, Bec had been wearing hearing aids since early childhood. In her early 20s, a sudden drop in hearing in left ear meant that hearing aids no longer worked.

With her grandfather and father already having cochlear implants, Bec did not hesitate in choosing Cochlear and then upgrading the device on her right side to a compatible ReSound hearing aid.

"The Nucleus 8 has really helped my confidence in my social life and I can reengage in friendships and with the activities I love," says Bec. "Being connected to my community again … I feel included. I feel like I'm part of something bigger."

Being able to enjoy socialising with friends and reconnecting with her church community has had a huge impact on 29-year-old Bec, a student and disability advocate. Getting a cochlear implant and the latest sound processor technology has meant being able to fully participate in life again.

Now Bec says that she is able to "go out with my friends again, go to a restaurant and cafes again, and participate in church activities, go into noisy environments". One of the features of the Cochlear™ Nucleus® 8 Sound Processor that has made this easier is ForwardFocus which she can manually activate via the Nucleus Smart App on her smartphone or ask her clinician to automate.±

Bec, Cochlear™ Nucleus® System recipient.

"Now that I've got a smaller device, I don't really notice that I'm wearing it anymore. I can wear it for a full day and completely forget about it. It's much more comfortable and never falls off my ear."

Bec, Cochlear™ Nucleus® System recipient.

Returning to her church community is something that getting a cochlear implant has enabled Bec to do. With the Nucleus 8 Sound Processor, Bec is now able to take part in the service as well as enjoy the social gatherings. She is no longer nervous about introducing herself to new people and can confidently move from one listening situation to the next.

"The Nucleus 8 really seamlessly adapts to each environment, so I don't even notice it changing settings," she says. "I've been able to fully participate in my church services. The seamless transitions mean that I can hear really well in the music parts, as well as the sermon and the announcements, and then move into morning tea and still hear really well with the background noise."

Having previously used the Nucleus 7 Sound Processor, Bec has found the Nucleus 8 Sound Processor "much more comfortable."

With music streamed simultaneously to both the Nucleus 8 Sound Processor and her ReSound hearing aid,* Bec is enjoying talking on the phone.

"Direct streaming allows me to stream directly from my phone to my cochlear [implant] and my hearing aid, which has meant that I can hear on the phone and confidently take phone calls again," Bec says. "I love being able to stream from my phone, just being able to listen to music on the train or when I go out for a walk; not having to fiddle around with other devices."

Studying a Diploma of Access Consultancy, Bec does most of her classes online via Zoom. The Nucleus 8 Sound Processor has been really helpful in enabling Bec to fully participate in her online classes.

"I'm not lagging behind all my peers, having to read the captions as often, and so I'm able to participate in group activities. And that's been a real confidence boost during my study," says Bec. "It's still hard, but I can do it, which opens up so many more possibilities."

Bec, Cochlear™ Nucleus® System recipient.

What could a new sound processor mean for you?

Learn more about the Nucleus 8 Sound Processor.

Beatrix, Cochlear™ Nucleus® System recipient.

Young recipients win hearts in Cochlear's Got Talent

"Is your child the next super star?" This is what we asked parents of children with cochlear implants as part of a Facebook competition across eight countries in Asia.

The goal was simple: to help celebrate their child's talents and achievements in "Cochlear's Got Talent" competition in South Korea, India, Pakistan, Singapore, Philippines, Sri Lanka, Malaysia, Vietnam, Thailand and Indonesia. What we didn't anticipate was the overwhelming response: more than 900 entries received which generated a whopping 7 million views on Facebook.

Children were excited and proud to show off their ability to sing, dance, play the piano, recite poetry and rap.

As well as being cute, fun and inspiring, it also helped display the communication skills these amazing kids have accomplished and the benefits of treating hearing loss early.

There's still much work to be done in growing awareness about the importance of early detection and treatment of hearing loss, but this proud group of young recipients are paving the way for others.

With so many inspiring and talented children to choose from, it was difficult to select winners.

One of the grand prize winners was Beatrix, a 9-year-old bilateral Cochlear™ system recipient from Indonesia. Beatrix entered Cochlear's Got Talent on the first day of the competition, singing Frère Jacques while playing along on the piano.

"Everyone deserves to hear the wonderous sounds and use their voice," says Anggy, Beatrix's mother. "The first time Beatrix called me 'Mama', if felt so good. I can't wait for what comes next."

Another grand prize winner, Ji-Woo from South Korea, also played the piano. The entries from South Korea have helped to inspire change, where parents often don't want to reveal that they or their children are have cochlear implants.

But those who entered our competition eagerly showed their talents. **Watch the video to meet the talented finalists and winners.**

"Our children are doing so well, they are fine examples to show other parents," she said.

Overall, Cochlear's Got Talent helped people learn about cochlear implants and feel inspired to learn more. The competition closed with a celebratory grand final award ceremony, with 4,900 views on the Facebook Live event.

Beyond being a competition, it helped build a community forum where parents could share their pride.

"To all of you, don't be afraid to do a hearing test," Anggy said. "I hope everyone who has hearing loss has the same opportunity as my daughter has today."

> "Our children are doing so well, they are fine examples to show other parents."
>
> Mother of Beatrix, Cochlear™ Nucleus® System recipient.

Alerts to stay safe with hearing loss

Removing your sound processors and not being able to hear your environment is a pleasure for some, but for others, it can be disturbing – especially when you go to bed.

When removing your sound processors at night, do you get a restful sleep or do you worry about a fire alarm that you might not hear?

For eight-year-old Eline from Belgium, who uses two Cochlear™ Nucleus® 7 Sound Processors, the worry about not being able to hear a fire alarm causes her to have nightmares.

Eline's father, Sebastian, says there hasn't been any particular incident that has triggered his daughter's fear of not hearing a smoke alarm while asleep, but it's a very real concern for her as she is unable to hear any sound without her sound processors.

"You see it a lot with children of this age," he says, adding that older adults who live alone would typically experience the same concern.

So, how do alert systems work?

Alert systems use other techniques, such as flashing lights, vibrations and lower frequency sounds, as well as loud sounds to let you know something is going on, whether it be a baby crying, a tap left running or a fire. They may also be called signallers or notification devices.

Most alert systems work by sending signals to receivers, which then produce a visual alert (often a flashing light) or a vibrating alert, which may be attached to a pager in your pocket or on your clothing.

To help you relax during the night, some systems offer a bed-shaker function, which will vibrate under your pillow when there's a smoke or fire alarm, and these can be used to wake you up like an alarm clock.

You can place remote receivers around your house so you can receive an alert from any room.

Depending on the system, it may work with your existing alarms and doorbells, so you may not need additional electrical wiring, and as smartphone technology improves, many of these functions can be accessed via your cellphone.

Here are some examples of alerts available

Smartphone sound detection apps

Newer versions of Android™ and Apple cell phones offer alerts from their ‘Accessibility’ menus.

Apple’s iPhone Sound Recognition can distinguish between alarm sounds for fires, smoke, and sirens, but it can also offer day-to-day household alerts, such as running water, appliances, glass breaking, doorbells, door knocks, people shouting or a baby crying.

Notifications are displayed on the phone screen, along with a brief description of the sound detected.

Image source: https://mcmw.abilitynet.org.uk/how-to-use-your-iphone-ipad-or-ipod-touch-to-detect-sounds-in-ios-15

Android Sound Notifications work by sending you a push notification, a flash from your camera light, or by making your phone vibrate.

Sound Notifications can listen for different sounds including: smoke and fire alarms; sirens; baby sounds; dog barking; appliances beeping; and water running.

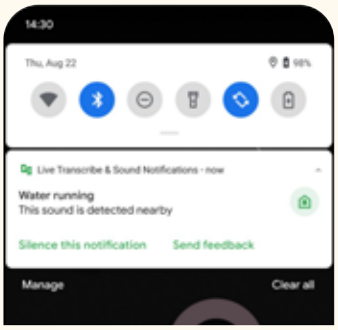


Image source: https://mcmw.abilitynet.org.uk/how-to-use-your-iphoneipad-or-ipod-touch-to-detectsounds-in-ios-15

Smartwatches

Smartwatches can work with your phone, so even if your phone is out of sight you can still receive alerts. Today, there are smartwatch apps, such as SoundWatch, specifically for people with hearing loss

Smoke alarms

Smoke alarm systems may use a strobe light function so you can see as well as hear the alarm, or a vibrating function that you can wear on your clothing or place under your pillow at night.

Doorbell

This will alert you when someone is at the door, and may work with or without an existing doorbell system. If you have a doorbell camera, you can turn on vibrating cellphone notifications when the camera senses motion or someone rings the bell.

Landline phone

You can use a visual alert signaller that flashes a light, vibrates or alerts a pager to let you know someone is ringing. Some signallers plug into the telephone line and electrical outlet; others attach to the side of the telephone.

Baby crying alarms

If you can’t hear regular baby monitors, you can use a portable vibrating pager to let you know when your baby is crying. Some baby monitoring devices analyse a baby’s cry and illuminate a picture to indicate that the baby sounds hungry, bored or tired.

Weather alert

In areas where wild weather can be a problem, you can use a weather alert system. iPhones and Android phones have many options for weather alert apps, and depending on your local area, you may also be able to buy a weather alert radio that can emit a flashing light and/or vibration to warn you of upcoming hazardous conditions.

Share your story with Cochlear Family

Cochlear Family wants to hear from you. Share your story, tips, tricks, advice, ideas and any questions you might have.

Get in touch >

Hear now. And always

As the global leader in implantable hearing solutions, Cochlear is dedicated to helping people with moderate to profound hearing loss experience a life full of hearing. We have provided more than 700,000 implantable devices, helping people of all ages to hear and connect with life's opportunities.

We aim to give people the best lifelong hearing experience and access to innovative future technologies. We have the industry's best clinical, research and support networks.

That's why more people choose Cochlear than any other hearing implant company.

Cochlear Limited 238 Thomson Road #25-06, Novena Square Tower A, Singapore 307684

www.cochlear.com

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Please seek advice from your health professional about treatments for hearing loss. Outcomes may vary, and your health professional will advise you about the factors which could affect your outcome. Always follow the directions for use. Not all products are available in all countries. Please contact your local Cochlear representative for product information.
± ForwardFocus is a clinician-enabled feature that can be user controlled or automated.
*The Nucleus 8 Sound Processor is compatible with Apple and Android devices. For compatibility information and devices visit www.cochlear.com/compatibility and www.resound.com/compatibility

Views expressed are those of the individual. Consult your health professional to determine if you are a candidate for Cochlear technology.
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