Hearing Aids and Implants

Disclaimer

Clinical guidelines are developed and adopted to establish evidence-based clinical criteria for utilization management decisions. Clinical guidelines are applicable according to policy and plan type. The Plan may delegate utilization management decisions of certain services to third parties who may develop and adopt their own clinical criteria.

Coverage of services is subject to the terms, conditions, and limitations of a member's policy, as well as applicable state and federal law. Clinical guidelines are also subject to in-force criteria such as the Centers for Medicare & Medicaid Services (CMS) national coverage determination (NCD) or local coverage determination (LCD) for Medicare Advantage plans. Please refer to the member's policy documents (e.g., Certificate/Evidence of Coverage, Schedule of Benefits, Plan Formulary) or contact the Plan to confirm coverage.

Summary

Plan members who have a hearing impairment may be eligible for a hearing aid depending on their plan. Hearing aids are amplifying devices that help compensate for hearing loss and come in several types. These include devices worn outside the ear or in the ear canal that bring sound more effectively to the eardrum; devices that attach to the bones in the ear to help transmit sound through vibration; and specialized devices that can be implanted in the ear or skull to help sound travel through the ear and reach the brain. Certain hearing aids are not appropriate for all types of hearing impairment, and special hearing tests should be done to determine the degree of hearing loss and assess if a device may be helpful. The device must be prescribed by a licensed physician or audiologist.

Definitions

"Air-conduction (standard wearable) hearing aids" include devices that are placed outside the ear or in the external ear canal, which help amplify sound through the ear canal to the eardrum.

"Bone-anchored hearing aids" (BAHAs) are surgically implanted prosthetic devices that transmit sound through bone to the inner ear, bypassing the external auditory canal and middle ear.

"Cochlear implants" are surgically implanted electronic medical devices that do the work of damaged parts of the inner ear and provide sound signals to the brain. They require an intact auditory nerve to transmit signals to the brainstem.

"Hybrid cochlear implants" are used in individuals with some preserved low frequency hearing. These function by combining a partial cochlear implant with an external hearing aid.

"Auditory brainstem implants" (ABIs) are surgically implanted devices that stimulate the brainstem directly in response to external sounds. These devices are used most often for individuals with a loss of function of the auditory nerve that transmits sound information from the cochlea to the brainstem.

Medical Necessity Criteria for Clinical Review

Indication-Specific Criteria

Air-Conduction (Standard Wearable) Hearing Aids

(Please see the member's plan benefits)

The Plan considers air-conduction (AC) hearing aids from a hearing aid provider medically necessary when ALL of the following criteria are met:

1. BOTH of the following:
    a. A prescription or medical clearance from a licensed provider, with documentation that hearing loss has been medically evaluated AND documentation of a plan for hearing aid testing and fitting with a licensed audiologist; *and*

b. A statement that the member can use the device properly; *and*

2. At least ONE of the following:
    a. Sensorineural hearing loss at a threshold of greater than 30 dB HL at any two frequencies of 500, 1,000, 2,000, 3,000, and 4,000 Hz in the ear(s) to be aided for adult members; *or*
    b. Pure tone average sensorineural threshold measured at frequencies of 500, 1,000, 2,000, 3,000, and 4,000 Hz greater than or equal to 26 dB HL in the ear(s) to be aided for adult members; *or*
    c. BOTH of the following:
        i. Sensorineural hearing loss at a threshold of 25 dB HL or greater at frequency of at least 500 Hz in the ear(s) to be aided for members under the age of majority; *and*
        ii. Medical clearance from a health care provider obtained within 6 months prior to the hearing aid fitting.

<u>Bone-Anchored Hearing Aids</u>

(Please see the member's plan benefits)

The Plan considers bone-anchored hearing aids (BAHAs) from a hearing aid provider medically necessary when ALL of the following criteria are met:

1. Member is age 5 years or older; *and*
    a. Note: Children under the age of 5 may be eligible for a soft headband with a partially or fully-implanted transcutaneous bone conduction hearing aid when other criteria are met.
2. Hearing loss is unilateral or bilateral; *and*
3. Hearing loss is either of the following:
    a. Conductive or mixed (both conductive and sensorineural) without improvement after medical or surgical interventions; *or*
    b. Unilateral pure sensorineural; *and*
4. Use of conventional AC hearing aids have failed or are not appropriate due to:
    a. Congenital or surgically induced malformations (e.g., atresia) of the external ear canal or middle ear; *or*
    b. Chronic external otitis or otitis media; *or*
    c. Tumors of the external canal and/or tympanic cavity; *or*
    d. Dermatitis of the external canal; *or*
    e. Other conditions for which an AC hearing aid is contraindicated; *and*
5. Pure tone average bone conduction hearing threshold measured at 500, 1,000, 2,000, and 3,000 Hz less than or equal to level appropriate for model to be implanted in the affected ear(s) such as thresholds of 45, 55, or 65 dB HL depending on model of device, and the requested device must be FDA-approved; *and*
6. If a bilateral implant is requested, members should meet the audiologic criteria, the device must be FDA-approved, and the member must have symmetrically conductive or mixed hearing loss, defined as:

a. 10 dB average difference between ears measured at 500, 1,000, 2,000, 3,000 and/or 4,000 Hz, or less than a 15 dB difference at individual frequencies; *and*

7. BOTH of the following:
    a. A prescription or medical clearance from a licensed provider, with documentation that hearing loss has been medically evaluated AND documentation of a plan for hearing aid testing and fitting with a licensed audiologist; *and*
    b. A statement that the member can use the device properly.

Cochlear Implants for Severe to Profound Bilateral Sensorineural Hearing Loss

(Please see the member's plan benefits)

The Plan considers cochlear implants for severe to profound bilateral sensorineural hearing loss medically necessary when the device is FDA-approved and ALL of the following criteria are met:

1. For children up to 18 years, whenALL of the following are met:
    a. Severe to profound bilateral sensorineural hearing loss as measured by the unaided pure-tone average threshold that is greater than or equal to 70 dB (severe) (e.g., measured at 500, 1,000, 2,000 Hz, etc.); *and*
    b. ONE of the below:
        i. For severe to profound bilateral sensorineural hearing loss, a 1-month hearing aid trial has been completed by a child with no prior hearing aid experience and with limited benefit, defined as failure to achieve developmentally appropriate auditory milestones on a validated, age-appropriate measure; *or*
        ii. Members with complete or total hearing loss (threshold ≥ 95 dB), or a diagnosis of cochlear ossification, do not require a hearing aid trial; *and*
    c. No medical contraindications to cochlear implantation exist, as documented on MRI or CT scan when applicable, including but not limited to:
        i. Dysfunctional acoustic nerve; *or*
        ii. Cochlear aplasia; *or*
        iii. Complete labyrinthine aplasia; *or*
        iv. Absent cochlear nerve; *or*
        v. Central auditory dysfunction (e.g. cortical deafness); *or*
        vi. Tympanic membrane perforation; *or*
        vii. Active inner or middle ear infection; *and*
    d. Family support and motivation to participate in post-implant rehabilitation; *or*
2. For adults aged 18 years and older, for the initial unilateral cochlear implant, when ALL of the following are met:
    a. Severe or profound bilateral sensorineural hearing loss as measured by the pure-tone average threshold that is greater than or equal to 70 dB (measured at 500, 1,000, 2,000 Hz, etc.); *and*
    b. Limited benefit from binaural hearing aids, defined as "open-set sentence recognition" (e.g., HINT) of 50% or less in the best-aided condition; *and*

c. No medical contraindications to cochlear implantation exist, as documented on MRI or CT scan when applicable, including but not limited to:
    i. Dysfunctional acoustic nerve; *or*
    ii. Cochlear aplasia; *or*
    iii. Complete labyrinthine aplasia; *or*
    iv. Absent cochlear nerve; *or*
    v. Acoustic nerve lesion; *or*
    vi. Central auditory dysfunction (e.g. cortical deafness); *or*
    vii. Tympanic membrane perforation; *or*
    viii. Active inner or middle ear infection; *and*
d. Member is motivated to participate in post-implant rehabilitation; *or*

3. For adults aged 18 years and older, for the second (sequential) cochlear implant,when ALL of the following are met:
    a. Original implant on the opposite side is functioning successfully; *and*
    b. No medical contraindications to cochlear implantation exist for the unimplanted side, as documented on MRI or CT scan when applicable, including but not limited to:
        i. Dysfunctional acoustic nerve; *or*
        ii. Cochlear aplasia; *or*
        iii. Complete labyrinthine aplasia; *or*
        iv. Absent cochlear nerve; *or*
        v. Acoustic nerve lesion; *or*
        vi. Central auditory dysfunction (e.g. cortical deafness); *or*
        vii. Tympanic membrane perforation; *or*
        viii. Active inner or middle ear infection; *and*
    c. There continues to be zero or a minimal benefit from a hearing aid in the unimplanted ear; *and*
4. BOTH of the following:
    a. A prescription or medical clearance from a licensed provider, with documentation that hearing loss has been medically evaluated AND documentation of a plan for implant testing and fitting with a licensed audiologist; *and*
    b. A statement that the member is motivated to participate in post-implant rehabilitation.

<u>Cochlear Implants for Asymmetric Sensorineural Hearing Loss or Severe to Profound Single-Sided Deafness (SSD)/Unilateral Sensorineural Hearing Loss</u>

(Please see the member's plan benefits)

The Plan considers cochlear implants for asymmetric sensorineural hearing loss or severe to profound single-sided deafness (SSD) medically necessary when the device is FDA-approved for the age range and ALL of the following criteria are met:

1. Member has one of the following diagnoses:
    a. Asymmetric sensorineural hearing loss, defined as hearing loss in both ears (threshold ≥ 20 dB) with the level of loss differing between each ear by 15 dB; *or*

b. Unilateral sensorineural hearing loss, single-sided deafness (SSD), defined as hearing that is normal in one ear (threshold < 20 dB) and the other ear has severe, profound, or complete hearing loss (threshold ≥ 70 dB); *and*

2. Member conducts a hearing aid trial:
    a. For children with no prior hearing aid experience, at least a 1-month hearing aid trial has been completed in the ear to be implanted with limited benefit, defined as failure to achieve developmentally appropriate auditory milestones on a validated, age-appropriate measure; *or*
    b. For adults 18 years or older, at least a 1-month hearing aid trial has been completed in the ear to be implanted with limited benefit , defined as "open-set sentence recognition" (e.g., HINT) of 50% or less in the best-aided condition; *and*
3. No medical contraindications to the cochlear implantation exist:
    a. Acoustic nerve lesion; *or*
    b. Dysfunctional acoustic nerve; *or*
    c. Cochlear aplasia; *or*
    d. Complete labyrinthine aplasia; *or*
    e. Absent cochlear nerve; *or*
    f. Central auditory dysfunction (e.g. cortical deafness); *or*
    g. Tympanic membrane perforation; *or*
    h. Active inner or middle ear infection.

<u>Hybrid Cochlear Implants</u>

(Please see the member's plan benefits)

The Plan considers hybrid cochlear implants medically necessary when ALL of the following criteria are met:

1. Member is age 18 years or older; *and*
2. Severe or profound bilateral sensorineural hearing loss of high-frequency sounds in both ears, but can still hear low-frequency sounds with or without a hearing aid; *and*
3. ALL of the following hearing thresholds are met:
    a. Low frequency hearing thresholds of no worse than 60 dB up to and including 500 Hz (averaged over 125, 250, and 500 Hz) in the ear selected for implantation; *and*
    b. Severe to profound mid-to-high frequency hearing loss (threshold average of greater than or equal to 75 dB measured at 2000, 3000, and 4000 Hz) in the ear to be implanted; *and*
    c. Moderately severe to profound mid-to-high frequency hearing loss (threshold average greater than or equal to 60 dB measured at 2000, 3000, and 4000 Hz) in the contralateral ear; *and*
    d. Aided consonant-nucleus-consonant word recognition score from 0% to 60% in the ear to be implanted in the preoperative aided condition; *and*
    e. Aided consonant-nucleus-consonant word recognition score in the contralateral ear will be equal to or better than that of the ear to be implanted but less than 80% correct.

4. Limited benefit from trial of binaural hearing aids; *and*
5. No medical contraindications to the cochlear implantation exist:
    a. Acoustic nerve lesion; *or*
    b. Dysfunctional acoustic nerve; *or*
    c. Cochlear aplasia; *or*
    d. Complete labyrinthine aplasia; *or*
    e. Absent cochlear nerve; *or*
    f. Central auditory dysfunction (e.g. cortical deafness); *or*
    g. Tympanic membrane perforation; *or*
    h. Active inner or middle ear infection; *and*
6. BOTH of the following:
    a. A prescription or medical clearance from a licensed provider, with documentation that hearing loss has been medically evaluated AND documentation of a plan for implant testing and fitting with a licensed audiologist; *and*
    b. A statement that the member is motivated to participate in post-implant rehabilitation.

<u>Auditory Brainstem Implant (ABI)</u>

The Plan considers auditory brainstem implants (ABIs) medically necessary when ALL of the following criteria are met:

1. Member is 12 years of age or older; *and*
2. Diagnosis of neurofibromatosis type 2 with ONE of the following:
    a. At least 70 dB hearing loss due to bilateral functional loss of the auditory nerves; *or*
    b. Planned surgery that is reasonably expected to result in bilateral loss of function of the auditory nerves and complete deafness, where the implant will be placed at the time of surgery; *and*
3. Limited benefit from trial of binaural hearing aids (in cases of an intact auditory nerve(s)); *and*
4. BOTH of the following:
    a. A prescription or medical clearance from a licensed provider, with documentation that hearing loss has been medically evaluated AND documentation of a plan for implant testing and fitting with a licensed audiologist; *and*
    b. A statement that the member is motivated to participate in post-implant rehabilitation.

<u>Additional Medically Necessary Services</u>

1. Comprehensive hearing assessment; *or*
2. Charges for associated fitting and testing; *or*
3. Ear molds and 1 headband per year for bone-anchored hearing implants or bone-conduction hearing aids, if applicable.

Re-implantation, Removal, Replacements, or Upgrades - Implants

The Plan considers re-implantation, removal, replacements, or upgrades for cochlear implants, hybrid cochlear implants, auditory brainstem implants medically necessary when ONE of the following criteria is met:

1. Re-implantation or removal for internal device due to failure or malfunction of device*; or*
2. Replacement for external device or components due to failure or malfunction when the warranty has expired or cannot be repaired*; or*
3. Re-implantation, removal, or replacement needed due to medical complications related to the implant site*; or*
4. An upgrade for devices or components meet medical necessity when BOTH of the following are met:
    a. There is a change in the member's condition and the current device no longer meets the individual's needs or the device is interfering with activities of daily living*; and*
    b. Member meets the criteria for an initial request.

Replacements or Upgrades - Hearing Aids

(Please see the member's plan benefits)

The Plan considers replacements or upgrades for hearing aids (air-conduction or bone-anchored) medically necessary when ONE of the following criteria is met:

1. Replacement for device failure or malfunction when the warranty has expired or cannot be repaired*; or*
2. An upgrade for devices or components meet medical necessity when BOTH of the following are met:
    a. There is a change in the member's condition and the current device no longer meets the individual's needs or the device is interfering with activities of daily living*; and*
    b. Member meets the criteria for an initial request.

Experimental or Investigational / Not Medically Necessary

1. The Plan considers upgrades to hearing aids, external devices, or components for implants NOT medically necessary when the medical necessity criteria are not met, current devices are functional, under warranty, or the request for newer technology is solely based on convenience or a desired model change.
2. The Plan considers the following alternative listening devices NOT medically necessary:
    a. Advanced hearable devices
    b. Smartphone/wireless products
    c. Personal sound amplification products (PSAPs)
3. The Plan considers the use of a bone-anchored hearing aid (BAHA) for bilateral pure sensorineural hearing loss experimental, investigational, or unproven.
4. The Plan considers the following devices t experimental,investigational, or unproven:
    a. Free-floating piezoelectric microphone
    b. Implantable and semi-implantable hearing aids of the middle ear

i. *Rationale: There is limited evidence on the effectiveness and safety of middle ear implants. A meta-analysis found zero randomized studies, and that the general quality of the existing studies was poor and with short-term follow up. Other meta-analyses have largely reflected these findings and the general consensus has been that further long-term data is required.*

c. Intra-oral bone conduction hearing aids (e.g., SoundBite Hearing System)

5. The Plan considers the following auditory brainstem implant (ABI) indications experimental, investigational, or unproven:
    a. Penetrating electrode auditory brainstem implants (PABI)
        i. *Rationale: The evidence for PABI is limited to single institution retrospective experiences and there have been no established data comparing this technique to traditional ABI. Furthermore, this approach has not yet been FDA-approved, limiting application to clinical trial study.*
    b. ABI in children under the age of 12 years old
        i. *Rationale: ABI has not yet been fully evaluated in children under the age of 12, and at the present time is not FDA-approved in that population. There are open clinical trials looking at the use of ABI in this population, however the current data is limited in that it is retrospective or in small case-studies.*
    c. Bilateral use of an auditory brainstem implant
        i. *Rationale: The evidence for bilateral use of auditory brainstem implant is limited. Additional research is needed to demonstrate improvement with second auditory brainstem implants.*

Applicable Billing Codes

Table 1	
CPT/HCPCS codes considered medically necessary if criteria are met:	
Code	*Description*
69501	Transmastoid antrotomy (simple mastoidectomy)
69502	Mastoidectomy; complete
69505	Mastoidectomy; modified radical
69511	Mastoidectomy; radical
69530	Petrous apicectomy including radical mastoidectomy
69535	Resection temporal bone, external approach
69540	Excision aural polyp
69550	Excision aural glomus tumor; transcanal

Table 1	
CPT/HCPCS codes considered medically necessary if criteria are met:	
Code	*Description*
69552	Excision aural glomus tumor; transmastoid
69554	Excision aural glomus tumor; extended (extratemporal)
69601	Revision mastoidectomy; resulting in complete mastoidectomy
69602	Revision mastoidectomy; resulting in modified radical mastoidectomy
69603	Revision mastoidectomy; resulting in radical mastoidectomy
69604	Revision mastoidectomy; resulting in tympanoplasty
69610	Tympanic membrane repair, with or without site preparation of perforation for closure, with or without patch
69620	Myringoplasty (surgery confined to drumhead and donor area)
69631	Tympanoplasty without mastoidectomy (including canalplasty, atticotomy and/or middle ear surgery), initial or revision; without ossicular chain reconstruction
69632	Tympanoplasty without mastoidectomy (including canalplasty, atticotomy and/or middle ear surgery), initial or revision; with ossicular chain reconstruction (eg, postfenestration)
69633	Tympanoplasty without mastoidectomy (including canalplasty, atticotomy and/or middle ear surgery), initial or revision; with ossicular chain reconstruction and synthetic prosthesis (eg, partial ossicular replacement prosthesis [PORP], total ossicular replacement prosthesis [TORP])
69635	Tympanoplasty with antrotomy or mastoidotomy
69636	Tympanoplasty with antrotomy or mastoidotomy (including canalplasty, atticotomy, middle ear surgery, and/or tympanic membrane repair); with ossicular chain reconstruction
69637	Tympanoplasty with antrotomy or mastoidotomy (including canalplasty, atticotomy, middle ear surgery, and/or tympanic membrane repair); with ossicular chain reconstruction and synthetic prosthesis (eg, partial ossicular replacement prosthesis [PORP], total ossicular replacement prosthesis [TORP])
69641	Tympanoplasty with mastoidectomy (including canalplasty, middle ear surgery, tympanic membrane repair); without ossicular chain reconstruction
69642	Tympanoplasty with mastoidectomy (including canalplasty, middle ear surgery, tympanic membrane repair); with ossicular chain reconstruction

Table 1	
CPT/HCPCS codes considered medically necessary if criteria are met:	
Code	*Description*
69643	Tympanoplasty with mastoidectomy (including canalplasty, middle ear surgery, tympanic membrane repair); with intact or reconstructed wall, without ossicular chain reconstruction
69644	Tympanoplasty with mastoidectomy (including canalplasty, middle ear surgery, tympanic membrane repair); with intact or reconstructed canal wall, with ossicular chain reconstruction
69645	Tympanoplasty with mastoidectomy (including canalplasty, middle ear surgery, tympanic membrane repair); radical or complete, without ossicular chain reconstruction
69646	Tympanoplasty with mastoidectomy (including canalplasty, middle ear surgery, tympanic membrane repair); radical or complete, with ossicular chain reconstruction
69650	Stapes mobilization
69660	Stapedectomy or stapedotomy with reestablishment of ossicular continuity, with or without use of foreign material
69661	Stapedectomy or stapedotomy with reestablishment of ossicular continuity, with or without use of foreign material; with footplate drill out
69662	Revision of stapedectomy or stapedotomy
69666	Repair oval window fistula
69667	Repair round window fistula
69670	Mastoid obliteration (separate procedure)
69676	Tympanic neurectomy
69710	Implantation or replacement of electromagnetic bone conduction hearing device in temporal bone
69711	Removal or repair of electromagnetic bone conduction hearing device in temporal bone
69714	Implantation, osseointegrated implant, skull; with percutaneous attachment to external speech processor
69716	Implantation, osseointegrated implant, skull; with magnetic transcutaneous attachment to external speech processor, within the mastoid and/or resulting in removal of less than 100 sq mm surface area of bone deep to the outer cranial cortex

Table 1	
CPT/HCPCS codes considered medically necessary if criteria are met:	
Code	*Description*
69717	Replacement (including removal of existing device), osseointegrated implant, skull; with percutaneous attachment to external speech processor
69719	Replacement (including removal of existing device), osseointegrated implant, skull; with magnetic transcutaneous attachment to external speech processor, within the mastoid and/or involving a bony defect less than 100 sq mm surface area of bone deep to the outer cranial cortex
69726	Removal, entire osseointegrated implant, skull; with percutaneous attachment to external speech processor
69727	Removal, entire osseointegrated implant, skull; with magnetic transcutaneous attachment to external speech processor, within the mastoid and/or involving a bony defect less than 100 sq mm surface area of bone deep to the outer cranial cortex
69728	Removal, entire osseointegrated implant, skull; with magnetic transcutaneous attachment to external speech processor, outside the mastoid and involving a bony defect greater than or equal to 100 sq mm surface area of bone deep to the outer cranial cortex
69729	Implantation, osseointegrated implant, skull; with magnetic transcutaneous attachment to external speech processor, outside of the mastoid and resulting in removal of greater than or equal to 100 sq mm surface area of bone deep to the outer cranial cortex
69730	Replacement (including removal of existing device), osseointegrated implant, skull; with magnetic transcutaneous attachment to external speech processor, outside the mastoid and involving a bony defect greater than or equal to 100 sq mm surface area of bone deep to the outer cranial cortex
69930	Cochlear device implantation, with or without mastoidectomy
92550	Tympanometry and reflex threshold measurements
92551	Screening test, pure tone, air only
92552	Pure tone audiometry (threshold); air only
92553	Pure tone audiometry (threshold); air and bone
92555	Speech audiometry threshold
92556	Speech audiometry threshold; with speech recognition

Table 1	
CPT/HCPCS codes considered medically necessary if criteria are met:	
Code	*Description*
92557	Comprehensive audiometry threshold evaluation and speech recognition
92558	Evoked otoacoustic emissions, screening (qualitative measurement of distortion product or transient evoked otoacoustic emissions), automated analysis
92567	Tympanometry (impedance testing)
92568	Acoustic reflex testing, threshold
92579	Visual reinforcement audiometry (VRA)
92582	Conditioning play audiometry
92583	Select picture audiometry
92584	Electrocochleography
92587	Distortion product evoked otoacoustic emissions; limited evaluation (to confirm the presence or absence of hearing disorder, 3-6 frequencies) or transient evoked otoacoustic emissions, with interpretation and report
92590	Hearing aid examination and selection; monaural
92591	Hearing aid examination and selection; binaural
92592	Hearing aid check; monaural
92593	Hearing aid check; binaural
92594	Electroacoustic evaluation for hearing aid; monaural
92595	Electroacoustic evaluation for hearing aid; binaural
92601	Diagnostic analysis of cochlear implant, patient younger than 7 years of age; with programming
92602	Diagnostic analysis of cochlear implant, patient younger than 7 years of age, subsequent reprogramming
92603	Diagnostic analysis of cochlear implant, age 7 years or older; with programming
92604	Diagnostic analysis of cochlear implant, age 7 years or older; subsequent reprogramming
92626	Evaluation of auditory function for surgically implanted device(s) candidacy or postoperative status of a surgically implanted device(s); first hour

Table 1	
CPT/HCPCS codes considered medically necessary if criteria are met:	
Code	*Description*
92627	Evaluation of auditory function for surgically implanted device(s) candidacy or postoperative status of a surgically implanted device(s); each additional 15 minutes (List separately in addition to code for primary procedure)
92630	Auditory rehabilitation; prelingual hearing loss
92633	Auditory rehabilitation; postlingual hearing loss
92640	Diagnostic analysis with programming of auditory brainstem implant, per hour
92650	Auditory evoked potentials; screening of auditory potential with broadband stimuli, automated analysis
92651	Auditory evoked potentials; for hearing status determination, broadband stimuli, with interpretation and report
L8614	Cochlear device, includes all internal and external components
L8615	Headset/headpiece for use with cochlear implant device, replacement
L8616	Microphone for use with cochlear implant device, replacement
L8617	Transmitting coil for use with cochlear implant device, replacement
L8618	Transmitter cable for use with cochlear implant device or auditory osseointegrated device, replacement
L8619	Cochlear implant external speech processor and controller, integrated system, replacement
L8621	Zinc air battery for use with cochlear implant device and auditory osseointegrated sound processors, replacement, each
L8622	Alkaline battery for use with cochlear implant device, any size, replacement, each
L8623	Lithium ion battery for use with cochlear implant device speech processor, other than ear level, replacement, each
L8624	Lithium ion battery for use with cochlear implant or auditory osseointegrated device speech processor, ear level, replacement, each

Table 1	
CPT/HCPCS codes considered medically necessary if criteria are met:	
Code	*Description*
L8625	External recharging system for battery for use with cochlear implant or auditory osseointegrated device, replacement only, each
L8627	Cochlear implant, external speech processor, component, replacement
L8628	Cochlear implant, external controller component, replacement
L8629	Transmitting coil and cable, integrated, for use with cochlear implant device, replacement
L8690	Auditory osseointegrated device, includes all internal and external components
L8691	Auditory osseointegrated device, external sound processor, replacement
L8692	Auditory osseointegrated device, external sound processor; used without osseointegration, body worn, includes headband or other means of external attachment
L8693	Auditory osseointegrated device, abutment, any length, replacement only
L8694	Auditory osseointegrated device, transducer/actuator, replacement only, each
L8699	Prosthetic implant, not otherwise specified • Due to multiple prosthetic implants represented by this CPT/HCPCS code, specific indications are indicated: • When this code is billed for a hybrid cochlear device, including all internal and external components, it is considered medically necessary
S2235	Implantation of auditory brain stem implant
V5008	Hearing screening
V5010	Assessment for hearing aid
V5011	Fitting/orientation/checking of hearing aid
V5014	Repair/modification of a hearing aid
V5020	Conformity evaluation
V5030	Hearing aid, monaural, body worn, air conduction

Table 1	
CPT/HCPCS codes considered medically necessary if criteria are met:	
Code	*Description*
V5040	Hearing aid, monaural, body worn, bone conduction
V5050	Hearing aid, monaural, in the ear
V5060	Hearing aid, monaural, behind the ear
V5070	Glasses, air conduction
V5080	Glasses, bone conduction
V5090	Dispensing fee, unspecified hearing aid
V5100	Hearing aid, bilateral, body worn
V5110	Dispensing fee, bilateral
V5120	Binaural, body
V5130	Binaural, in the ear
V5140	Binaural, behind the ear
V5150	Binaural, glasses
V5160	Dispensing fee, binaural
V5171	Hearing aid, contralateral routing device, monaural, in the ear (ite)
V5172	Hearing aid, contralateral routing device, monaural, in the canal (itc)
V5181	Hearing aid, contralateral routing device, monaural, behind the ear (bte)
V5190	Hearing aid, contralateral routing, monaural, glasses
V5200	Dispensing fee, contralateral, monaural
V5211	Hearing aid, contralateral routing system, binaural, ite/ite

Table 1	
CPT/HCPCS codes considered medically necessary if criteria are met:	
Code	*Description*
V5212	Hearing aid, contralateral routing system, binaural, ite/itc
V5213	Hearing aid, contralateral routing system, binaural, ite/bte
V5214	Hearing aid, contralateral routing system, binaural, itc/itc
V5215	Hearing aid, contralateral routing system, binaural, itc/bte
V5221	Hearing aid, contralateral routing system, binaural, bte/bte
V5230	Hearing aid, contralateral routing system, binaural, glasses
V5240	Dispensing fee, contralateral routing system, binaural
V5241	Dispensing fee, monaural hearing aid, any type
V5242	Hearing aid, analog, monaural, cic (completely in the ear canal)
V5243	Hearing aid, analog, monaural, itc (in the canal)
V5244	Hearing aid, digitally programmable analog, monaural, cic
V5245	Hearing aid, digitally programmable, analog, monaural, itc
V5246	Hearing aid, digitally programmable analog, monaural, ite (in the ear)
V5247	Hearing aid, digitally programmable analog, monaural, bte (behind the ear)
V5248	Hearing aid, analog, binaural, cic
V5249	Hearing aid, analog, binaural, itc
V5250	Hearing aid, digitally programmable analog, binaural, cic
V5251	Hearing aid, digitally programmable analog, binaural, itc
V5252	Hearing aid, digitally programmable, binaural, ite

Table 1	
CPT/HCPCS codes considered medically necessary if criteria are met:	
Code	*Description*
V5253	Hearing aid, digitally programmable, binaural, bte
V5254	Hearing aid, digital, monaural, cic
V5255	Hearing aid, digital, monaural, itc
V5256	Hearing aid, digital, monaural, ite
V5257	Hearing aid, digital, monaural, bte
V5258	Hearing aid, digital, binaural, cic
V5259	Hearing aid, digital, binaural, itc
V5260	Hearing aid, digital, binaural, ite
V5261	Hearing aid, digital, binaural, bte
V5262	Hearing aid, disposable, any type, monaural
V5263	Hearing aid, disposable, any type, binaural
V5264	Ear mold/insert, not disposable, any type
V5265	Ear mold/insert, disposable, any type
V5266	Battery for use in hearing device
V5267	Hearing aid or assistive listening device/supplies/accessories, not otherwise specified
V5273	Assistive listening device, for use with cochlear implant
V5275	Ear impression, each
V5298	Hearing aid, not otherwise classified
V5299	Hearing service, miscellaneous

Table 2	
ICD-10 codes considered medically necessary with Table 1 codes if criteria are met:	
Code	*Description*
H90.0	Conductive hearing loss, bilateral
H90.11	Conductive hearing loss, unilateral, right ear, with unrestricted hearing on the contralateral side
H90.12	Conductive hearing loss, unilateral, left ear, with unrestricted hearing on the contralateral side
H90.3	Sensorineural hearing loss, bilateral
H90.41	Sensorineural hearing loss, unilateral, right ear, with unrestricted hearing on the contralateral side
H90.42	Sensorineural hearing loss, unilateral, left ear, with unrestricted hearing on the contralateral side
H90.5	Unspecified sensorineural hearing loss
H90.6	Mixed conductive and sensorineural hearing loss, bilateral
H90.71	Mixed conductive and sensorineural hearing loss, unilateral, right ear, with unrestricted hearing on the contralateral side
H90.72	Mixed conductive and sensorineural hearing loss, unilateral, left ear, with unrestricted hearing on the contralateral side
H90.8	Mixed conductive and sensorineural hearing loss, unspecified
H90.A11	Conductive hearing loss, unilateral, right ear with restricted hearing on the contralateral side
H90.A12	Conductive hearing loss, unilateral, left ear with restricted hearing on the contralateral side
H90.A21	Sensorineural hearing loss, unilateral, right ear, with restricted hearing on the contralateral side

Table 2	
ICD-10 codes considered medically necessary with Table 1 codes if criteria are met:	
Code	*Description*
H90.A22	Sensorineural hearing loss, unilateral, left ear, with restricted hearing on the contralateral side
H90.A31	Mixed conductive and sensorineural hearing loss, unilateral, right ear with restricted hearing on the contralateral side
H90.A32	Mixed conductive and sensorineural hearing loss, unilateral, left ear with restricted hearing on the contralateral side
Q16.1	Congenital absence, atresia and stricture of auditory canal (external)
Q85.02	Neurofibromatosis, type 2

Table 3	
CPT/HCPCS codes not considered medically necessary for indications in this guideline:	
Code	*Description*
69799	Unlisted procedure, middle ear
V5298	Hearing aid, not otherwise classified

Table 4	
CPT/HCPCS codes considered experimental, investigational, or unproven:	
Code	*Description*
S2230	Implantation of magnetic component of semi-implantable hearing device on ossicles in middle ear
V5095	Semi-implantable middle ear hearing prosthesis

References

Air-Conduction Hearing Aids

1. American Academy of Audiology. (2023). *Standards of practice for audiology*. https://www.audiology.org/practice-guideline/standards-of-practice-for-audiology/
2. American Academy of Audiology. (2023). *Scope of practice*. https://www.audiology.org/wp-content/uploads/2023/04/Scope-of-Practice_2023.pdf
3. American Academy of Otolaryngology-Head and Neck Surgery. (2021, April 16). AAO16: *Age-related hearing Loss: Audiometric evaluation*. https://www.entnet.org/resource/aao16-age-related-hearing-loss-audiometric-evaluation/
4. American Speech-Language-Hearing Association (n.d.). *Hearing aids for adults*. www.asha.org/Practice-Portal/Professional-Issues/Hearing-Aids-For-Adults/.
5. American Speech-Language-Hearing Association (n.d.). *Hearing aids for children*. www.asha.org/practice-portal/professional-issues/hearing-aids-for-children/.
6. Aural Rehabilitation Clinical Practice Guideline Development Panel, Basura, G., Cienkowski, K., Hamlin, L., Ray, C., Rutherford, C., Stamper, G., Schooling, T., & Ambrose, J. (2023). American Speech-Language-Hearing Association clinical practice guideline on aural rehabilitation for adults with hearing loss. *American Journal of Audiology*, 32(1), 1–51. https://doi.org/10.1044/2022_AJA-21-00252
7. Bower, C., Reilly, B. K., Richerson, J., Hecht, J. L., Hackell, J. M., Almendarez, Y. M., Berhane, A. M., Cantrell, P. E., Kafer, L. M., Latimer, T., Warner, R., Wiskind, R. H., Schafer, K., Skatrud, A., Richerson, J., Abularrage, J. J., Boudreau, A. D. A., Ferguson, E., Magnus, M., . . . Spooner, S. (2023). Hearing assessment in infants, children, and adolescents: Recommendations beyond neonatal screening. *Pediatrics*, 152(3). https://doi.org/10.1542/peds.2023-063288
8. Chandrasekhar, S. S., Tsai Do, B. S., Schwartz, S. R., Bontempo, L. J., Faucett, E. A., Finestone, S. A., ... & Satterfield, L. (2019). Clinical practice guideline: Sudden hearing loss (update). *Otolaryngology–Head and Neck Surgery*, 161(1_suppl), S1-S45.
9. Chen, C. H., Huang, C. Y., Cheng, H. L., Lin, H. H., Chu, Y. C., Chang, C. Y., Lai, Y. H., Wang, M. C., & Cheng, Y. F. (2022). Comparison of personal sound amplification products and conventional hearing aids for patients with hearing loss: A systematic review with meta-analysis. *eClinicalMedicine*, 46, 101378. https://doi.org/10.1016/j.eclinm.2022.101378
10. Cunningham, L. L., & Tucci, D. L. (2017). Hearing loss in adults. *New England Journal of Medicine*, 377(25), 2465–2473. https://doi.org/10.1056/nejmra1616601
11. Ferguson, M. A., Kitterick, P. T., Chong, L. Y., Edmondson-Jones, M., Barker, F., & Hoare, D. J. (2017). Hearing aids for mild to moderate hearing loss in adults. *Cochrane Database of Systematic Reviews*, 9(9), CD012023. https://doi.org/10.1002/14651858.CD012023.pub2
12. Fitzpatrick, E. M., Cologrosso, E., & Sikora, L. (2019). Candidacy for amplification in children with hearing loss: A review of guidelines and recommendations. *American Journal of Audiology*, 28(4), 1025–1045. https://doi.org/10.1044/2019_AJA-19-0061
13. Lieu, J. E. C., Kenna, M., Anne, S., & Davidson, L. (2020). Hearing loss in children. *JAMA*, 324(21), 2195. https://doi.org/10.1001/jama.2020.17647

14. Lin, F. R. (2024). Age-related hearing loss. *New England Journal of Medicine*, 390(16), 1505–1512. https://doi.org/10.1056/nejmcp2306778
15. Maidment, D. W., Barker, A. B., Xia, J., & Ferguson, M. A. (2016). Effectiveness of alternative listening devices to conventional hearing aids for adults with hearing loss: a systematic review protocol. *BMJ Open*, 6(10), e011683. https://doi.org/10.1136/bmjopen-2016-011683
16. Tanna, R. J., Lin, J. W., & De Jesus, O. (2023, August 23). *Sensorineural hearing loss*. StatPearls - NCBI Bookshelf. https://www.ncbi.nlm.nih.gov/books/NBK565860/
17. U.S. Food and Drug Administration (FDA). (2022). CFR - Code of Federal Regulations Title 21, Volume 8. Title 21--Food and Drugs Chapter I--Food and Drug Administration Department of Health and Human Services Subchapter H - Medical Devices. https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/CFRSearch.cfm?fr=801.421
18. Wiseman, K., Sapp, C., Walker, E., & McCreery, R. (2021). Comprehensive audiological management of hearing loss in children, including mild and unilateral hearing loss. *Otolaryngologic Clinics of North America*, 54(6), 1171–1179. https://doi.org/10.1016/j.otc.2021.08.00

Bone-Anchored Hearing Aids

1. American Speech- Language-Hearing Association. (2025). *Guidelines for manual pure-tone threshold audiometry*. https://www.asha.org/policy/gl2005-00014
2. American Academy of Otolaryngology Head & Neck Surgery. (2021, April 21). Position statement: Bone conduction hearing devices. https://www.entnet.org/resource/position-statement-bone-conduction-hearing-devices
3. American Academy of Otolaryngology- Head & Neck Surgery. (2021, March 25). *Position statement: Hearing aids*. https://www.entnet.org/resource/2562/
4. Appachi, S., Specht, J. L., Raol, N., Lieu, J. E. C., Cohen, M. S., Dedhia, K., & Anne, S. (2017). Auditory outcomes with hearing rehabilitation in children with unilateral hearing loss: A systematic review. *Otolaryngology--Head and Neck Surgery*, 157(4), 565–571. https://doi.org/10.1177/0194599817726757
5. Bagatto, M., Gordey, D., Brewster, L., Brown, C., Comeau, M., Douglas, C., El-Naji, R., Fortier, S., Gascon, A., Godovin, J., Ittner, C., Magathan Haluschak, M., Mauro, L., Morgenstein, K., Peterson, J., Scollie, S., Scott, M., & Wollet, A. (2022). Clinical consensus document for fitting non-surgical transcutaneous bone conduction hearing devices to children. *International Journal of Audiology*, 61(7), 531–538. https://doi.org/10.1080/14992027.2021.1939449
6. Ghossaini, S. N., & Roehm, P. C. (2019). Osseointegrated auditory devices: Bone-anchored hearing aid and PONTO. *Otolaryngologic Clinics of North Americ*a, 52(2), 243–251. https://doi.org/10.1016/j.otc.2018.11.005
7. Kruyt, I. J., Bakkum, K. H. E., Caspers, C. J. I., & Hol, M. K. S. (2020). The efficacy of bone-anchored hearing implant surgery in children: A systematic review. *International Journal of Pediatric Otorhinolaryngology*, 132, 109906. https://doi.org/10.1016/j.ijporl.2020.109906

8. Lagerkvist, H., Carvalho, K., Holmberg, M., Petersson, U., Cremers, C., & Hultcrantz, M. (2020). Ten years of experience with the Ponto bone-anchored hearing system-A systematic literature review. *Clinical Otolaryngology*, , 45(5), 667–680. https://doi.org/10.1111/coa.13556
9. Liu, C. C., Livingstone, D., & Yunker, W. K. (2017). The role of bone conduction hearing aids in congenital unilateral hearing loss: A systematic review. *International Journal of Pediatric Otorhinolaryngology*, 94, 45–51. https://doi.org/10.1016/j.ijporl.2017.01.003
10. Osborne, M. S., Child-Hymas, A., Holmberg, M., Thomsen, P., Johansson, M. L., & McDermott, A. L. (2022). Clinical evaluation of a novel laser-ablated titanium implant system for bone anchored hearing systems in a pediatric population and the relationship of resonance frequency analysis with implant survival. *Otology & Neurotology*, 43(2), 219–226. https://doi.org/10.1097/MAO.0000000000003435
11. Ray, J., Wanees, E., Dawoud, M. M., Abu Elnaga, H., & Abdelhafez, T. A. (2023). Evaluating the effectiveness of bone conduction hearing implants in rehabilitation of hearing loss. *European Archives of Oto-Rhino-Laryngology*, 280(9), 3987–3996. https://doi.org/10.1007/s00405-023-07889-y
12. Sanchez-Perez, J., & March, A. R. (2023, April 3). *Osseointegrated bone-conducting hearing protheses*. StatPearls - NCBI Bookshelf. https://www.ncbi.nlm.nih.gov/books/NBK564385/
13. Shaikh, N. (2025). Otitis media in young children. *New England Journal of Medicine*, 392(14), 1418–1426. https://doi.org/10.1056/nejmcp2400531
14. Shannon, C. M., Gutierrez, J. A., 3rd, Nguyen, S. A., Meyer, T. A., & Lambert, P. R. (2023). Comparison of outcomes of surgery versus implantable device for the treatment of hearing loss associated with congenital aural atresia: A systematic review and meta-analysis. O*tology & Neurotolog*y, 44(8), 758–766. https://doi.org/10.1097/MAO.0000000000003950
15. Śliwińska-Kowalska, M., & Zaborowski, K. (2017). WHO environmental noise guidelines for the European region: A systematic review on environmental noise and permanent hearing loss and tinnitus. *International Journal of Environmental Research and Public Health, 14(10), 1139. https://doi.org/10.3390/ijerph14101139*
16. U.S. Food and Drug Administration (FDA). BAHA Cordelle II. Summary of Safety and Effectiveness. 510(k) No. K080363. Rockville, MD: FDA; April 10, 2008.
17. U.S. Food and Drug Administration (FDA). BAHA Intenso. Summary of Safety and Effectiveness. 510(k) No. K081606. Rockville, MD: FDA; August 28, 2008.
18. U.S. Food and Drug Administration (FDA). BAHA BP100. Summary of Safety and Effectiveness. 510(k) No. K090720. Rockville, MD: FDA; June 17, 2009.
19. U.S. Food and Drug Administration (FDA). Cochlear BAHA Attract. 510(k) No. K131240. Silver Spring, MD: FDA; November 7, 2013.
20. U.S. Food and Drug Administration (FDA), Center for Devices and Radiologic Health (CDRH). Cochlear Baha 4 Sound Processor. 510(k) No. K132278. Silver Spring, MD: FDA; September 26, 2013.
21. U.S. Food and Drug Administration (FDA), Center for Devices and Radiologic Health (CDRH). Cochlear Baha 5 Sound Processor. 510(k) No. K142907. Silver Spring, MD: FDA; March 25, 2015.

22. Wazen, J. J., Ortega, C., Nazarian, R., Smith, J., Thompson, J., Jr, & Lange, L. (2021). Expanding the indications for the bone anchored hearing system (BAHS) in patients with single sided deafness. *American Journal of Otolaryngology*, 42(3), 102864. https://doi.org/10.1016/j.amjoto.2020.102864

Cochlear Implants

1. American Academy of Otolaryngology – Head and Neck Surgery (AAO-HNS). (2020). *Position statement: Cochlear implants.* http://www.entnet.org/content/position-statement-cochlear-implants.
2. American Academy of Otolaryngology – Head and Neck Surgery (AAO-HNS). (2021). *Position statement: Pediatric cochlear implantation candidacy.* https://www.entnet.org/resource/position-statement-pediatric-cochlear-implantation-candidacy/
3. American Speech-Language-Hearing Association (n.d.). *Hearing loss in children*. https://www.asha.org/practice-portal/clinical-topics/hearing-loss-in-children/
4. Anne, S., Brown, K. D., Goldberg, D. M., Adunka, O. F., Kenna, M., Chien, W., Teagle, H., Zwolan, T. A., Sydlowski, S. A., Roush, P., & Buchman, C. A. (2021). Pediatric bilateral sensorineural hearing loss: Minimum test battery and referral criteria for cochlear implant candidacy evaluation. *Otolaryngology--Head and Neck Surgery*, 166(3), 405–409. https://doi.org/10.1177/01945998211027352
5. Arras, T., Boudewyns, A., Swinnen, F., Zarowski, A., Philips, B., Desloovere, C., Wouters, J., & van Wieringen, A. (2022). Longitudinal auditory data of children with prelingual single-sided deafness managed with early cochlear implantation. *Scientific Reports*, 12(1), 9376. https://doi.org/10.1038/s41598-022-13247-5
6. Benchetrit, L., Ronner, E. A., Anne, S., & Cohen, M. S. (2021). Cochlear implantation in children with single-sided deafness: A systematic review and meta-analysis. *JAMA Otolaryngology*, 147(1), 58–69. https://doi.org/10.1001/jamaoto.2020.3852
7. Boisvert, I., Reis, M., Au, A., Cowan, R., & Dowell, R. C. (2020). Cochlear implantation outcomes in adults: A scoping review. *PloS One*, 15(5), e0232421. https://doi.org/10.1371/journal.pone.0232421
8. Calvino, M., Sánchez-Cuadrado, I., Gavilán, J., & Lassaletta, L. (2018). Cochlear implant users with otosclerosis: Are hearing and quality of life outcomes worse than in cochlear implant users without otosclerosis? *Audiology and Neurotology*, 23(6), 345–355. https://doi.org/10.1159/000496191
9. Carlson, M. L. (2020). Cochlear implantation in adults. *New England Journal of Medicine*, 382(16), 1531–1542. https://doi.org/10.1056/nejmra1904407
10. Cohen, S. M., & Svirsky, M. A. (2019). Duration of unilateral auditory deprivation is associated with reduced speech perception after cochlear implantation: A single-sided deafness study. *Cochlear Implants International*, 20(2), 51–56. https://doi.org/10.1080/14670100.2018.1550469
11. Cumpston, E., & Chen, P. (2023, July 18). *Implantable hearing devices*. StatPearls - NCBI Bookshelf. https://www.ncbi.nlm.nih.gov/books/NBK578178/

12. Dewyer, N. A., Smith, S., Herrmann, B., Reinshagen, K. L., & Lee, D. J. (2022). Pediatric single-sided deafness: A review of prevalence, radiologic findings, and cochlear implant candidacy. *The Annals of Otology, Rhinology, and Laryngology*, 131(3), 233–238. https://doi.org/10.1177/00034894211019519
13. Deep, N. L., Gordon, S. A., Shapiro, W. H., Waltzman, S. B., Roland, J. T., Jr, & Friedmann, D. R. (2021). Cochlear implantation in children with single-sided deafness. *The Laryngoscope*, 131(1), E271–E277. https://doi.org/10.1002/lary.28561
14. Dillon, M. T., Kocharyan, A., Daher, G. S., Carlson, M. L., Shapiro, W. H., Snapp, H. A., & Firszt, J. B. (2022). American Cochlear Implant Alliance Task Force guidelines for clinical assessment and management of adult cochlear implantation for single-sided deafness. *Ear and Hearing*, 43(6), 1605-1619.
15. Dreyfuss, M., Giat, Y., Veraguth, D., Röösli, C., Huber, A. M., & Laske, R. D. (2021). Cost effectiveness of cochlear implantation in single-sided deafness. *Otology & Neurotology*, 42(8), 1129–1135. https://doi.org/10.1097/MAO.0000000000003135
16. Ehrmann-Mueller, D., Kurz, A., Kuehn, H., Rak, K., Mlynski, R., Hagen, R., & Shehata-Dieler, W. (2020). Usefulness of cochlear implantation in children with single sided deafness. *International Journal of Pediatric Otorhinolaryngology*, 130, 109808. https://doi.org/10.1016/j.ijporl.2019.109808
17. Einger, T. M., Koch, M., Bornitz, M., & Zahnert, T. (2016). Adaptive mechanical stabilization of a free-floating fully implantable hearing aid. *Otology & Neurotology*, 37(9), e377–e383. https://doi.org/10.1097/MAO.0000000000001119
18. Greaver, L., Eskridge, H., & Teagle, H. F. B. (2017). Considerations for pediatric cochlear implant recipients with unilateral or asymmetric hearing loss: Assessment, device fitting, and habilitation. *American Journal of Audiology*, 26(2), 91–98. https://doi.org/10.1044/2016_AJA-16-0051
19. Hayes, Inc. Evidence Analysis Research Brief. Bilateral Cochlear Implantation for Treatment of Bilateral Hearing Loss in Adults. Lansdale, PA. Hayes,Inc.; Jul 24, 2023.
20. Hayes, Inc. Evidence Analysis Research Brief. Cochlear Implants for Children With Unilateral Deafness. Lansdale, PA. Hayes,Inc.; March 2023. https://evidence.hayesinc.com/report/earb.unilateral5558
21. Hayes, Inc. Health Technology Assessment. Cochlear Implantation for Adults With Single-Sided Deafness. Lansdale, PA. Hayes,Inc.; June 2023. https://evidence.hayesinc.com/report/hta.cochlear5513
22. Kraaijenga, V. J. C., Ramakers, G. G. J., Smulders, Y. E., Van Zon, A., Stegeman, I., Smit, A. L., Stokroos, R. J., Hendrice, N., Free, R. H., Maat, B., Frijns, J. H. M., Briaire, J. J., Mylanus, E. a. M., Huinck, W. J., Van Zanten, G. A., & Grolman, W. (2017). Objective and subjective measures of simultaneous vs sequential bilateral cochlear implants in adults. *JAMA Otolaryngology–Head & Neck Surgery*, 143(9), 881. https://doi.org/10.1001/jamaoto.2017.0745
23. Lane, C., Zimmerman, K., Agrawal, S., & Parnes, L. (2020). Cochlear implant failures and reimplantation: A 30-year analysis and literature review. *The Laryngoscope*, 130(3), 782–789. https://doi.org/10.1002/lary.28071

24. Liu, H., Yao, X., Kong, W., Zhang, L., Si, J., Ding, X., ... & Zhao, Y. (2023). Cochlear reimplantation rate and cause: A 22-year, single-center experience, and a meta-analysis and systematic review. *Ear and Hearing*, 44(1), 43-52.
25. Löfvenberg, C., Turunen-Taheri, S., Carlsson, P. I., & Skagerstrand, Å. (2022). Rehabilitation of severe-to-profound hearing loss in adults in Sweden. *Audiology Research*, 12(4), 433–444. https://doi.org/10.3390/audiolres12040044
26. Marx, M., Mosnier, I., Venail, F., Mondain, M., Uziel, A., Bakhos, D., Lescanne, E., N'Guyen, Y., Bernardeschi, D., Sterkers, O., Deguine, O., Lepage, B., Godey, B., Schmerber, S., Bonne, N. X., Vincent, C., & Fraysse, B. (2021). Cochlear implantation and other treatments in single-sided deafness and asymmetric hearing loss: Results of a national multicenter study including a randomized controlled trial. *Audiology & Neuro-Otology*, 26(6), 414–424. https://doi.org/10.1159/000514085
27. McRackan, T. R., Clinkscales, W. B., Ahlstrom, J. B., Nguyen, S. A., & Dubno, J. R. (2018). Factors associated with benefit of active middle ear implants compared to conventional hearing aids. *The Laryngoscope*, 128(9), 2133–2138. https://doi.org/10.1002/lary.27109
28. Messersmith, J. J., Entwisle, L., Warren, S., & Scott, M. (2019). Clinical practice guidelines: Cochlear implants. *Journal of the American Academy of Audiology*, 30(10), 827-844.
29. McKinney S. (2017). Cochlear implantation in children under 12 months of age. *Current Opinion in Otolaryngology & Head and Neck Surgery*, 25(5), 400–404. https://doi.org/10.1097/MOO.0000000000000400
30. Nassiri, A. M., Marinelli, J. P., Lohse, C. M., & Carlson, M. L. (2023). Age and incidence of cochlear implantation in the pediatric population with congenital bilateral profound hearing loss. *Otology & Neurotology*, 44(7), e492–e496. https://doi.org/10.1097/MAO.0000000000003932
31. National Institute for Health and Care Excellence (NICE). (2019). *Cochlear implants for children and adults with severe to profound deafness*. https://www.nice.org.uk/guidance/ta566
32. Oghalai, J. S., Bortfeld, H., Feldman, H. M., Chimalakonda, N., Emery, C., Choi, J. S., & Zhou, S. (2022). Cochlear implants for deaf children with early developmental impairment. *Pediatrics*, 149(6), e2021055459. https://doi.org/10.1542/peds.2021-055459
33. Olusanya, B. O., Davis, A. C., & Hoffman, H. J. (2019). Hearing loss grades and the International Classification of Functioning, Disability and Health. *Bulletin of the World Health Organization*, 97(10), 725–728. https://doi.org/10.2471/BLT.19.230367
34. Park, L. R., Griffin, A. M., Sladen, D. P., Neumann, S., & Young, N. M. (2022). American Cochlear Implant Alliance Task Force guidelines for clinical assessment and management of cochlear implantation in children with single-sided deafness. *Ear and Hearing*, 43(2), 255–267. https://doi.org/10.1097/AUD.0000000000001204
35. Park, L. R., Gagnon, E. B., & Brown, K. D. (2021). The limitations of FDA criteria: Inconsistencies with clinical practice, findings, and adult criteria as a barrier to pediatric implantation. *Seminars in Hearing*, 42(4), 373–380. https://doi.org/10.1055/s-0041-1739370
36. Polonenko, M. J., Gordon, K. A., Cushing, S. L., & Papsin, B. C. (2017). Cortical organization restored by cochlear implantation in young children with single sided deafness. *Scientific Reports*, 7(1), 16900. https://doi.org/10.1038/s41598-017-17129-z

Rubin, R. (2022). Some hearing aids will soon be sold over the counter. *JAMA*, 328(11), 1030. https://doi.org/10.1001/jama.2022.14714

37. Scheperle, R. A., Tejani, V. D., Omtvedt, J. K., Brown, C. J., Abbas, P. J., Hansen, M. R., Gantz, B. J., Oleson, J. J., & Ozanne, M. V. (2017). Delayed changes in auditory status in cochlear implant users with preserved acoustic hearing. *Hearing Research*, 350, 45–57. https://doi.org/10.1016/j.heares.2017.04.005
38. Selleck, A. M., Brown, K. D., & Park, L. R. (2021). Cochlear implantation for unilateral hearing loss. *Otolaryngologic Clinics of North America*, 54(6), 1193–1203. https://doi.org/10.1016/j.otc.2021.07.002
39. Sharma, S. D., Cushing, S. L., Papsin, B. C., & Gordon, K. A. (2020). Hearing and speech benefits of cochlear implantation in children: A review of the literature. *International Journal of Pediatric Otorhinolaryngology*, 133, 109984. https://doi.org/10.1016/j.ijporl.2020.109984
40. Smulders, Y. E., Hendriks, T., Eikelboom, R. H., Stegeman, I., Santa Maria, P. L., Atlas, M. D., & Friedland, P. L. (2017). Predicting sequential cochlear implantation performance: A systematic review. *Audiology & Neuro-Otology*, 22(6), 356–363. https://doi.org/10.1159/000488386
41. Svrakic, M., & Vambutas, A. (2019). Medical and audiological indications for implantable auditory devices. *Otolaryngologic Clinics of North America*, 52(2), 195–210. https://doi.org/10.1016/j.otc.2018.11.001
42. Hempel, J. M., Simon, F., & Müller, J. M. (2018). Extended applications for cochlear implantation. *Advances in Oto-Rhino-Laryngology*, 81, 74–80. https://doi.org/10.1159/000485546
43. Ozdemir S, Tuncer U, Tarkan O, Kiroglu M, Cetik F, Akar F. Factors contributing to limited or non-use in the cochlear implant systems in children: 11 years experience. International Journal of Pediatric Otorhinolaryngology 2013;77(3):407-9.
44. Gantz BJ, Dunn CC, Walker EA, et al. Bilateral cochlear implants in infants: A new approach -- Nucleus Hybrid S12 project. Otol Neurotol. 2010;31(8):1300-1309.
45. Smith, R.J.H., & Gooi, A. (2019). Hearing loss in children: Treatment. *UpToDate*. https://www.uptodate.com/contents/hearing-loss-in-children-treatment
46. Smith, R.J.H., & Gooi, A. (2021). Hearing loss in children: Screening and evaluation. *UpToDate.* https://www.uptodate.com/contents/hearing-loss-in-children-screening-and-evaluation
47. Turton, L., Souza, P., Thibodeau, L., Hickson, L., Gifford, R., Bird, J., Stropahl, M., Gailey, L., Fulton, B., Scarinci, N., Ekberg, K., & Timmer, B. (2020). Guidelines for best practice in the audiological management of adults with severe and profound hearing loss. *Seminars in Hearing*, 41(3), 141–246. https://doi.org/10.1055/s-0040-1714744Aug;41(3):141-246. doi: 10.1055/s-0040-1714744. Epub 2020 Dec 16. PMID: 33364673; PMCID: PMC7744249.
48. U.S. Food and Drug Administration (FDA). *FDA approves first implantable hearing device for adults with a certain kind of hearing loss*. Press Release. Silver Spring, MD: FDA; March 20, 2014. http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm389860.htm
49. U.S. Food and Drug Administration. (2020). *Summary of Safety and Effectiveness Data (SSED): Nucleus 24 Cochlear Implant System* (P970051/S172). https://www.accessdata.fda.gov/cdrh_docs/pdf/P970051S172B.pdf.

50. Varadarajan, V. V., Sydlowski, S. A., Li, M. M., Anne, S., & Adunka, O. F. (2021). Evolving criteria for adult and pediatric cochlear implantation. *Ear, Nose, & Throat Journal*, 100(1), 31–37. https://doi.org/10.1177/0145561320947258
51. Vashishth, A., Fulcheri, A., Prasad, S. C., Bassi, M., Rossi, G., Caruso, A., & Sanna, M. (2017). Cochlear implantation in cochlear ossification: Retrospective review of etiologies, surgical considerations, and auditory outcomes. *Otology & Neurotology*, 39(1), 17–28. https://doi.org/10.1097/mao.0000000000001613
52. Vicente, L. C., Polonenko, M. J., Gordon, K. A., Silva, L. T. D. N., Costa, O. A., & Alvarenga, K. F. (2022). Effects of sequential bilateral cochlear implantation in children: Evidence from speech-evoked cortical potentials and tests of speech perception. *Audiology & Neuro-Otology*, 27(4), 282–296. https://doi.org/10.1159/000521600
53. Warner-Czyz, A. D., Roland, J. T., Thomas, D., Uhler, K., Zombek, L., & Warner-Czyz, A. D. (2022). American Cochlear Implant Alliance Task Force guidelines for determining cochlear implant candidacy in children. *Ear and Hearing*, 43(2), 268–282. https://doi.org/10.1097/aud.0000000000001087
54. Zheng, Y., Swanson, J., Koehnke, J., & Guan, J. (2022). Sound localization of listeners with normal hearing, impaired hearing, hearing aids, bone-anchored hearing instruments, and cochlear implants: a review. *American Journal of Audiology*, 31(3), 819–834. https://doi.org/10.1044/2022_AJA-22-00006
55. Zeitler, D. M., Prentiss, S. M., Sydlowski, S. A., & Dunn, C. C. (2024). American Cochlear Implant Alliance Task Force: Recommendations for determining cochlear implant candidacy in adults. *The Laryngoscope*, 134 Suppl 3(Suppl 3), S1–S14. https://doi.org/10.1002/lary.30879

Auditory Brainstem Implant (ABI)

1. Deep, N., Choudhury, B., & Roland, J. (2019). Auditory brainstem implantation: An overview. *Journal of Neurological Surgery*, 80(02), 203–208. https://doi.org/10.1055/s-0039-1679891
2. Deep, N. L., & Roland, J. T., Jr (2020). Auditory brainstem implantation: Candidacy evaluation, operative technique, and outcomes. *Otolaryngologic Clinics of North America*, 53(1), 103–113. https://doi.org/10.1016/j.otc.2019.09.005
3. Garcia, A., Haleem, A., Poe, S., Gosh, D., Christian Brown, M., Herrmann, B. S., & Lee, D. J. (2024). Auditory brainstem implant outcomes in tumor and nontumor patients: A systematic review. *Otolaryngology--Head and Neck Surgery*, 170(6), 1648–1658. https://doi.org/10.1002/ohn.662
4. Mahboubi, H., Slattery, W. H., 3rd, Mehta, G. U., & Lekovic, G. P. (2020). Options and strategies for hearing restoration in pediatric neurofibromatosis type 2. *Child's Nervous System*, 36(10), 2481–2487. https://doi.org/10.1007/s00381-020-04721-4
5. Noonan, K. Y., Rock, J., Barnard, Z., Lekovic, G. P., Brackmann, D. E., & Wilkinson, E. P. (2020). Bilateral auditory brainstem implants in patients with neurofibromatosis 2. *Otolaryngology*, 165(2), 339–343. https://doi.org/10.1177/0194599820977420

6. Peng, K. A., Lorenz, M. B., Otto, S. R., Brackmann, D. E., & Wilkinson, E. P. (2018). Cochlear implantation and auditory brainstem implantation in neurofibromatosis type 2. *The Laryngoscope*, 128(9), 2163–2169. https://doi.org/10.1002/lary.27181
7. Puram, S. V., Barber, S. R., Kozin, E. D., Shah, P., Remenschneider, A., Herrmann, B. S., Duhaime, A. C., Barker, F. G., 2nd, & Lee, D. J. (2016). Outcomes following pediatric auditory brainstem implant surgery: Early experiences in a North American center. *Otolaryngology--Head and Neck Surgery*, 155(1), 133–138. https://doi.org/10.1177/0194599816637599
8. Schwartz, M. S., & Wilkinson, E. P. (2017). Auditory brainstem implant program development. *The Laryngoscope*, 127(8), 1909–1915. https://doi.org/10.1002/lary.26312
9. Shah, P. V., Kozin, E. D., Kaplan, A. B., & Lee, D. J. (2016). Pediatric auditory brainstem implant surgery: A new option for auditory habilitation in congenital deafness? *Journal of the American Board of Family Medicine*, 29(2), 286–288. https://doi.org/10.3122/jabfm.2016.02.150258
10. Teagle, H. F. B., Henderson, L., He, S., Ewend, M. G., & Buchman, C. A. (2018). Pediatric auditory brainstem implantation: Surgical, electrophysiologic, and behavioral outcomes. *Ear and Hearing*, 39(2), 326–336. https://doi.org/10.1097/AUD.0000000000000501
11. U.S. Food and Drug Administration (FDA), Center for Devices and Radiologic Health (CDRH). Nucleus 24 Auditory Brainstem Implant System. PMA P000015. Silver Spring, MD: FDA; December 20, 2000.
12. Wang, B., Yan, M., Liu, C., Yang, Z., Wang, X., Zhao, F., Wang, Z., Li, P., Wang, Y., Li, S., Liu, G., & Liu, P. (2024). Auditory brainstem implants for hearing rehabilitation in NF2-schwannomatosis: A systematic review and single-arm meta-analysis. *NeuroRehabilitation*, 54(2), 213–225. https://doi.org/10.3233/NRE-230198
13. Wilkinson, E. P., Eisenberg, L. S., Krieger, M. D., Schwartz, M. S., Winter, M., Glater, J. L., Martinez, A. S., Fisher, L. M., Shannon, R. V., & Los Angeles Pediatric ABI Team (2017). Initial results of a safety and feasibility study of auditory brainstem implantation in congenitally deaf children. *Otology & Neurotology*, 38(2), 212–220. https://doi.org/10.1097/MAO.0000000000001287
14. Wong, K., Kozin, E. D., Kanumuri, V. V., Vachicouras, N., Miller, J., Lacour, S., Brown, M. C., & Lee, D. J. (2019). Auditory brainstem implants: Recent progress and future perspectives. *Frontiers in Neuroscience*, 13, 10. https://doi.org/10.3389/fnins.2019.00010

Clinical Guideline Revision / History Information

Original Date: 1/26/2017
Reviewed/Revised: 4/11/2017, 1/18/2018, 2/5/2019, 1/27/2020, 1/21/2021, 12/1/22, 1/26/2022, 1/31/2023, 5/2/2023, 10/19/2023, 11/01/2024, 03/01/2026