2015 Procedures Criteria

Subset: Cochlear Implantation (Pediatric)

Requested Service: Cochlear Implantation (Pediatric)
Age: Age < 18

INSTRUCTIONS: Choose one of the following options and continue to the appropriate section

10. Bilateral cochlear implantation
20. Unilateral cochlear implantation

10. Bilateral cochlear implantation

1. Choose all that apply:

- A) Age ≥ 1 year
- B) Prelingually deafened child
- C) Severe bilateral sensorineural hearing loss
- D) Cochlear patency by CT or MRI
- E) Continued bilateral hearing loss after hearing aid trial
- F) Failed speech or auditory perception testing
- G) Child or caregiver capable of participating in postoperative aural rehabilitation
- H) Other clinical information (add comment)

- If the number of options selected is 7 and option H not selected, then the rule is satisfied; you may stop here (Outpatient)
- No other options lead to the requested service

20. Unilateral cochlear Implantation

1. Choose all that apply:

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☐ 20. Unilateral cochlear implantation *(Continued...)*

☐ A) Age ≥ 1 year\(^{(11)}\)

☐ B) Severe bilateral sensorineural hearing loss\(^{(15, 16, 17)}\)

☐ C) Cochlear patency by CT or MRI\(^{(18)}\)

☐ D) Continued bilateral hearing loss after hearing aid trial\(^{(19)}\)

☐ E) Failed speech or auditory perception testing\(^{(20)}\)

☐ F) Child or caregiver capable of participating in postoperative aural rehabilitation\(^{(21)}\)

☐ G) Other clinical information (add comment)

- If the number of options selected is 6 and option G not selected, then the rule is satisfied; you may stop here *(Outpatient)*
- No other options lead to the requested service
Notes

(1) I/O Setting: Outpatient

(2) **Def:** A cochlear implant is an electronic medical device that is implanted surgically to stimulate auditory nerve fibers in individuals who are severely to profoundly hearing impaired. The internal hardware consists of a receiver coil and an electrode array. The external hardware includes a microphone, sound processor, batteries, and a transmitter coil that is worn by the individual.

(3) The device allows for sound awareness, discrimination of sounds, and may facilitate communication. For optimal use, individual fitting and mapping, auditory rehabilitation (including cochlear device training), and daily practice with the implant is needed. Unilateral cochlear implants significantly improve hearing and quality of life. Bilateral cochlear implants improve localization of sound, better speech comprehension in noisy environments, and quality of life when compared with unilateral implants but may not be cost effective (Gaylor et al., JAMA Otolaryngol Head Neck Surg 2013, 139: 265-72; Lammers et al., Laryngoscope 2011, 121: 2604-9; Raman, et al. Effectiveness of Cochlear Implants in Adults with Sensorineural Hearing Loss. Agency for Healthcare Research and Quality 2011).

(4) FDA guidelines for cochlear implantation in children include prelingually and postlingually deafened children with severe to profound bilateral sensorineural hearing loss who have had limited benefit from conventional hearing aids.

(5) Candidacy for cochlear implantation is evaluated by a multi-disciplinary team including audiologists, surgeons, speech and language pathologists, and mental health professionals. Evaluation should be based on an individual's cognitive level and medical, audiologic, psychosocial, and rehabilitative needs. The patient's age, as well as the etiology, onset, and progression of deafness are important factors to consider when evaluating a patient for cochlear implantation.

(6) The audiologic assessment includes diagnostic hearing tests, hearing-aid evaluation and fitting, and evaluation of speech perception skills. Hearing tests include pure tone audiogram (air and bone conduction), tympanometry, otoacoustic emissions testing, and tests of speech perception and speech audiometry (e.g., word and sentence recognition).

(7) The Joint Committee on Infant Hearing endorses universal newborn hearing screening which detects early hearing loss. Hearing screening is performed at birth or shortly after. Early diagnosis provides the opportunity for early intervention, including the fitting of hearing aids and ongoing assessment for consideration of cochlear implants (American Academy of Pediatrics, Pediatrics 2007; 120(4): 898-921). Children with profound sensorineural hearing loss are at significant risk for speech and language delays that can have a long-term impact on their communication, academic, and social development. Several studies have shown that performing implantation as young as 12 months of age allows the best opportunity for acquisition of these skills (Colletti et al., Int J Pediatr Otorhinolaryngol 2011, 75: 504-9; Kutz et al., Otol Neurotol 2011, 32: 956-61; Niparko et al., JAMA 2010, 303: 1498-506).

(8) The following are examples of relative and absolute contraindications to cochlear implantation (St Martin and Hirsch, Otolaryngol Clin North Am 2008; 41(1): 157-178, vi-vii). :

- Absent cochlear nerve or cochlear development as evidenced by imaging
- Deafness resulting from damage to the acoustic nerve or central auditory pathway
- Active or chronic infections of the middle ear or mastoid cavity
- Tympanic membrane perforation at time of procedure

(9) The presence of disabilities in addition to deafness, such as vision deficits, cognitive impairments, and learning disabilities is not necessarily a contraindication to implantation. Speech and language outcomes may be limited by cognitive deficits, but children may still receive benefit from improved use of language, sound awareness, and increased environmental and social connectedness (Yoon, Curr Opin Pediatr 2011, 23: 346-50). The decision to perform cochlear implantation in these patients is a matter of clinical judgment with special consideration given to the overall benefit and risk for each patient.

(10) InterQual® criteria are derived from the systematic, continuous review and critical appraisal of the most current evidence-based literature and include input from our independent panel of clinical experts. The content is based on a variety of references which are cited at specific criteria points throughout the subset.
The FDA has approved cochlear implants for children with severe to profound bilateral sensorineural hearing loss who are at least one year of age (Cosetti and Waltzman, Expert Rev Med Devices 2011, 8: 389-401). A meta-analysis evaluated cochlear implantation outcomes in children less than one year in regards to auditory perception and speech production. The results showed lack of evidence in these outcome measures for implanted infants. There is a need for longer-term follow-up studies (Vlastarakos et al., Int J Pediatr Otorhinolaryngol 2010, 74: 119-26). Requests for cochlear implantation in a child less than 1 year of age should be assessed based on the inherent surgical risks in the context of physiological advantage for each patient. Early implantation may be indicated if the deafness is due to meningitis, since there is a greater likelihood of ossification of the cochlear duct or entire cochlear labyrinth in these patients.

(12) Def: Prelingual deafness is defined as deafness that occurs before an individual has acquired speech and language skills.

Several studies and systematic reviews have shown benefit in prelingually deafened children who receive simultaneous bilateral cochlear implantation. The benefits include improvement in sound localization, speech perception and understanding, and language development during the critical period of speech and language development (Lovett et al., Arch Dis Child 2010, 95: 107-12; Sparreboom et al., Otol Neurotol 2010, 31: 1062-71; Johnston et al., International Journal of Audiology 2009, 48: 601-17; Ramsden et al., Laryngoscope 2009, 119: 2444-8). If a child is a candidate for bilateral sequential implantation, benefit appears to be gained if the child receives the second implant after a short interval and at as young an age as possible (Sparreboom et al., Otol Neurotol 2010, 31: 1062-71; Graham et al., Cochlear Implants Int 2009, 10: 119-41).

(14) In the postlingually deafened child, the child has acquired speech and language skills prior to the onset of deafness. While simultaneous bilateral cochlear implantation can be performed, it is done less frequently and there is great variability in outcomes. Future studies are necessary to assess the full clinical effectiveness of simultaneous bilateral cochlear implantation in the postlingually deafened child.

(15) Def: Sensorineural hearing loss is hearing loss that results from damage to sensory cells within the cochlea or from acoustic nerve dysfunction.

Sensorineural hearing loss may be congenital or acquired. Acquired causes of hearing loss in children include infection (e.g., rubella, toxoplasmosis, CMV, herpes), drug toxicity, trauma, and autoimmune disease. Acquired hearing loss in adults is often attributed to noise, trauma, ototoxic drugs, presbycusis, or Meniere's disease (Kozak and Grundfast, Otolaryngol Clin North Am 2009; 42(1): 79-85, ix). Conductive hearing loss is hearing loss that results from middle or outer ear abnormalities or disease, obstruction or trauma. Sound transmission is mechanically blocked between the opening of the external ear and the cochlear receptor cells. Cochlear implantation is not used to treat conductive hearing loss (Yoon, Curr Opin Pediatr 2011, 23: 346-50).

Some patients present with a mixed hearing loss, which is a conductive hearing loss that occurs in combination with a sensorineural hearing loss. These patients should not be excluded from cochlear implant assessment if they present with hearing loss in the severe to profound range.

High-resolution CT or MRI is obtained to evaluate patients prior to cochlear implantation. The imaging tests can establish the patency of the cochlea, identify any abnormalities of the inner ear structure that may impact the surgical insertion of electrodes, and aid in surgical planning and patient counseling. Cohort studies with pediatric patients confirm that CT is most appropriate for evaluating bony abnormalities, while MRI is better for soft tissue evaluation (Young et al., Radiographics 2014, 34: E133-49; Parry et al., Otol Neurotol 2005, 26: 976-82).

Prior to consideration for cochlear implantation, patients should undergo a hearing aid trial to determine if adequate benefit is received with the hearing aids. When there is little or no improvement of hearing loss with hearing aids, a cochlear implant could be considered.

Functional hearing (speech and auditory perception) in children is assessed through the development and maintenance of speech, language, communication, and listening skills that are appropriate for the age, developmental stage, and cognitive ability of the child (National Institute for Health and Clinical Excellence (NICE), Cochlear implants for children and adults with severe to profound deafness 2009 [cited Jun 2011]). By using tests that are appropriate for the age and language level of the child, the child's progress can be measured over time.
To ensure maximum benefit following cochlear implantation, patients should undergo an extensive aural rehabilitation program to provide appropriate programming and use of the cochlear implant. Patients and caregivers must be counseled extensively on realistic expectations of cochlear implants. Patients should be evaluated for their willingness and motivation to undergo an extended rehabilitation program, and an assessment of their family and caregiver support systems and environment should be performed.
ICD-9 (circle all that apply): 389.10, 389.11, 389.12, 389.14, 389.18, Other_________
CPT® (circle all that apply): 69930, 92601, 92602, 92603, 92604, Other_________
HCPCS (circle all that apply): L8614, L8619, L8627, L8628, Other_________