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AMERICAN COCHLEAR IMPLANT ALLIANCE

The Roles of Audiologists and Dispensers Working with Hearing Aid Users in Cochlear Implant Candidacy, in partnership with American Cochlear Implant Alliance

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Bilingual Audiologist

ABA-Cochlear Implant Specialty Certificate

Moderator: Donna Sorkin, MA, Executive Director, American Cochlear Implant Alliance

Five Part Series on Adult Assessments in Hearing Healthcare

- Adult Assessments: Working Across the Continuum
- Roles of Audiologists and Dispensers Working with Hearing Aid Users on CI Candidacy
- Utility of the New CI Quality of Life Instruments to Personalize and Improve CI Care
- Adult Perceptions of Hearing Status and Options: Professionals Facilitating a Life-Long Hearing Journey
- Optimizing Outcomes in Hearing Technology: Hearing Aids and Implantable Devices



Why another organization in hearing health?

- Membership organization focused on cochlear implantation and access to care
- Members are audiologists, physicians, speech pathologists, educators and others on CI teams + consumers/parents, advocates, hearing aid specialists
- Website designed for those in and out of CI
- Highly collaborative with other organizations

Welcome your involvement!

www.acialliance.org

<https://www.facebook.com/ACIALLIANCE.ORG/>

Twitter@acialliance



American Cochlear Implant Alliance

- Mission: Advance access to the gift of hearing provided by cochlear implantation through research, advocacy and awareness
- Address factors contributing to underutilization of cochlear implants
- Improve awareness regarding candidacy and outcomes

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Founder & Instructor Audiology
En Español

Bilingual Audiologist

American Board of Audiology
Certifications

- Cochlear Implants
- Audiology Preceptor



Disclosures

- **Presenter Disclosure:** Financial: Alejandra Ullauri is the owner of Audiology En Español. She receives royalties from her book Audiology Services in Diverse Communities. She received an honorarium for this presentation. Non-financial: Alejandra Ullauri has no relevant non-financial relationships to disclose.
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Learning Outcomes

After this course, participants will be able to:

- Describe what continuum of care involves when providing hearing services to adults at risk or living with hearing loss.
- Describe screening tools available to identify potential cochlear implant candidates.
- List the key aspects of the audiological cochlear implant evaluation and describe the specific audiological assessment tools which are part of the cochlear implant test battery.

Agenda

- Scope of practice
- Continuum of care
- Hearing loss as a chronic condition
- Hearing aids outcomes validation
- Monitoring outcomes overtime
- CI screening tools & referral pathways
- CI assessment in the private practice

Abbreviations

- Hearing Aids (HA)
- Cochlear Implants (CI)
- **Hearing Handicap for the Elderly (HHIE)**
- **Abbreviated Profile of Hearing Aid Benefit (APHAB)**
- **Client Oriented Scale of Improvement (COSI)**
- Speech, Spatial and Qualities of Hearing scale (SSQ-12)

Hearing is important across the life course

[World report on hearing. Geneva: World Health Organization; 2021.](#)
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Hearing Care Professionals (Non-Physicians)

Audiologists

Hearing Aid
Dispensers

Scope of Practice



Audiologists - Scope of Practice

- Audiologists' academic degree, clinical training, and license to practice and/or professional credential qualifies them to provide a comprehensive array of professional services to persons with impairment of auditory and vestibular function, and to the prevention of impairments associated with them.

Audiologists - Scope of Practice

- Audiologists identify, assess, diagnose, and treat individuals with impairment of either peripheral or central auditory and/or vestibular function, and strive to prevent such impairments.

Hearing Aid Dispensers – Scope of practice

Hearing Aid Dispensers licensure qualifies them to provide HA related services to adults including:

- Conducting and interpreting hearing tests for the purpose of fitting HAs
- Prescribing, selecting, and fitting hearing instruments and assistive devices, including electroacoustic targets and programming parameters
- Assessing hearing instrument efficacy using appropriate fitting **verification** methodology, including available fitting **validation** methods.
- Initiating referrals for medical evaluations

Hearing Care Professionals Working with HA Users

Audiologists

Hearing Aid
Dispensers

AUDIOLOGIST	TEST	HEARING AID DISPENSER
Yes	Hearing Test	Yes
Yes	HA Selection	Yes
Yes	HA Fitting	Yes
Yes	HA Verification	Yes
Yes	HA Validation **	Yes
Yes	**Subjective	Yes
Depends on the practice set up	**Objective	Depends on the practice set up
Yes	CI Screening	Yes
Yes	CI Assessment	No

Continuum of Care in Hearing Health



Continuum of Care

1

Prevention

2

Early
Identification

3

Care &
Rehabilitation

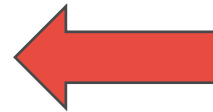
Continuum of Care

- Continuum of care is at the core of the Standards of Practice for Audiologists.
- The standards consider that audiologists evaluate, diagnose, and treat a diverse population **across the life span** through the practice of culturally sensitive patient and family–centered care.
- The standards require that audiologists continually evaluate and improve care through assessment of **outcomes**.

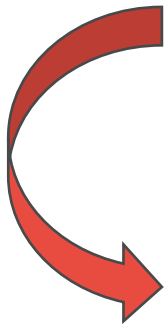
(American Academy of Audiology)



Measure
outcomes



Monitor
overtime



Improve care by
evaluating outcomes

Why is so important to
provide continuum of care?



Hearing loss is a chronic condition



Chronic Conditions

A chronic condition is defined as a condition that lasts 12 months or longer and meets one or both of the following tests:

- a) it places limitations on self-care, independent living, and social interactions;
- b) it results in the need for ongoing intervention with medical products, services, and special equipment.

([AHRQ](#))

Treatment Options



Medical Management

- Surgical treatment
- Pharmacological treatment

Non-implantable Hearing Aids

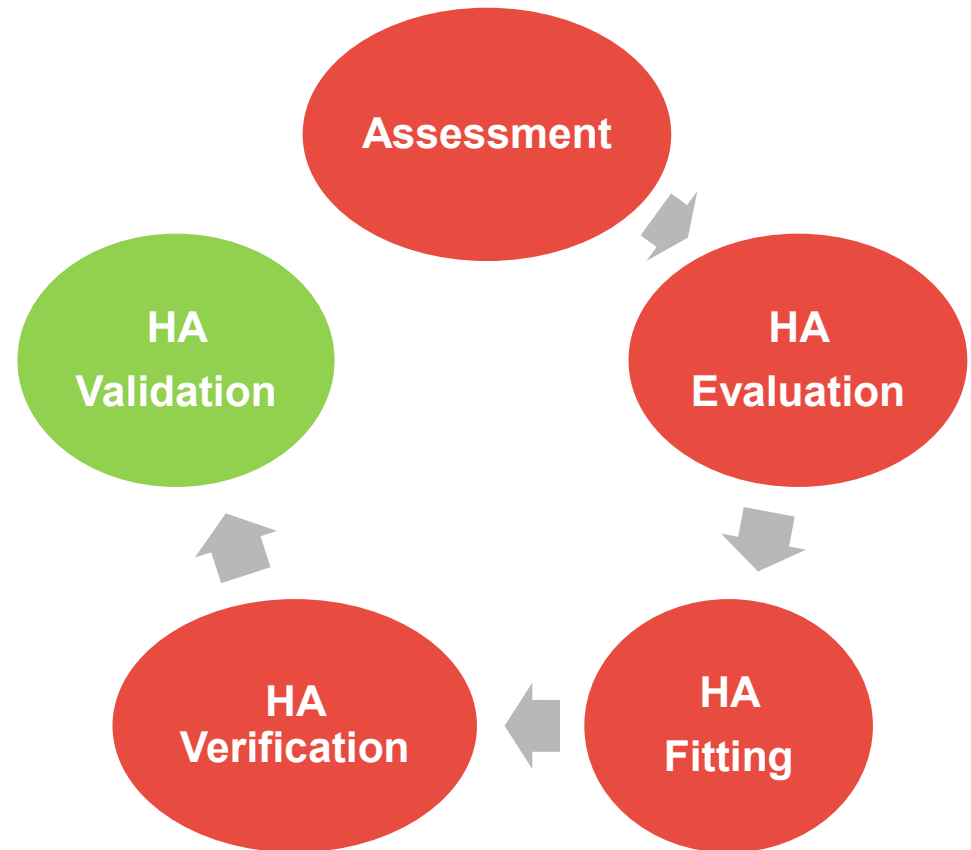
- OTC hearing aids
- **Prescription hearing aids**

Implantable Hearing Devices

- **Cochlear Implants**
- Bone Anchored Hearing Implants
- Bone Conduction Hearing Implants

Hearing Aids

- HA validation measures hearing aid **benefit**.



Hearing Aid Validation

1. Objective Measures
 - Speech Perception Testing
2. Subjective Measures
 - Questionnaires



Validation Measures

Objective

Speech-In-Noise

- QUICK SIN
- BKB-SIN
- HINT
- CUNY

Subjective

- HHI-A
- HHI-E
- APHAB
- COSI
- SSQ-12

[British Society of Audiology, 2019](#)

Validation Measures

Objective

- QUICK SIN
- BKB-SIN
- HINT
- CUNY
- Az Bio Sentences

Subjective

- HHI-A
- HHI-E
- APHAB
- COSI
- SSQ-12

Objective Validation Measures Help:

- To demonstrate difficulty reported by the patient
- To counsel expectations
- To look at technology or rehabilitative options

[British Society of Audiology, 2019](#)

Objective Validation Measures

- Sound booth with speaker
- Recorded materials presented through a speaker
 - 1 meter between speaker and patient



Validation Measures

- Unfortunately, Speech-In-Noise testing is not commonly used:
- [Parmar et al., 2022](#):
- Sample ($N = 306$) of HHPs from the public (64%) and private (36%) sectors in the United Kingdom
- Speech testing at the hearing aid fitting or follow-up appointment was conducted:
 - 56.5% of the time in private practice (Always, often, sometimes)
 - 26.5% in public sector

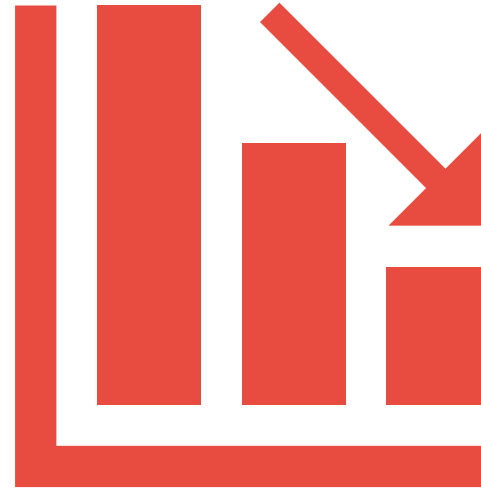
Validation Measures

Unfortunately, Speech-In-Noise testing is not commonly used:

[Clark, Huff, & Earl \(2017\):](#)

- **15% Always**
- **14% Often**
- **17% Sometimes**
- 39% Seldom
- 16% never

Monitor Benefit Overtime



Monitoring Benefit Overtime

1. **Objective Measures:** Speech Perception Testing
2. **Subjective Measures:** Questionnaires

Monitoring Benefit Overtime

Objective Measures

- QUICK SIN
- HINT
- CUNY
- BKB-SIN
- **AZ BIO Sentences**

Subjective Measures

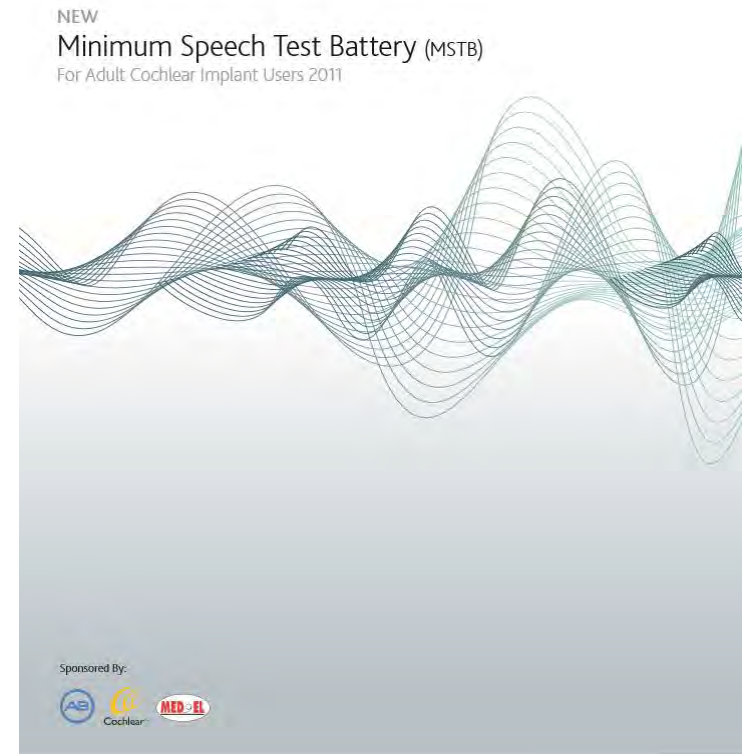
- HHI-A
- HHI-E
- APHAB
- COSI
- SSQ-12

Az Bio Sentences

- Percentage score
- Easy to track results (%) overtime
- Part of the CI test battery pre and post implantation

Cochlear Implant Assessment

- Minimum Speech Test Battery
 - Az Bio Sentences
 - In-Quiet
 - In-Noise
 - CNC Word List
 - BKB Sentences



Speech Perception Test Battery

- Minimum Speech Test Battery

- ~~Az Bio Sentences~~

- In-Quiet

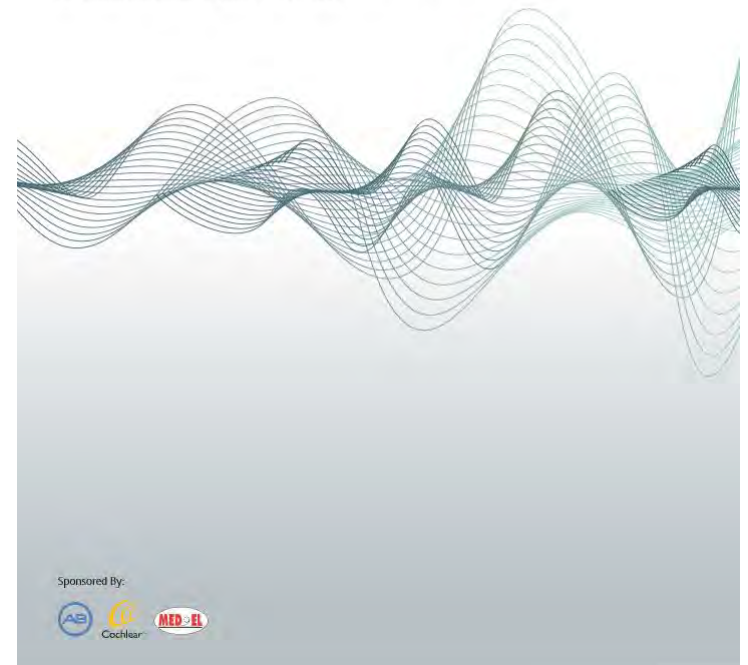
- In-Noise

- CNC Word List

- BKB Sentences

- Prentiss et al. 2020

NEW
Minimum Speech Test Battery (MSTB)
For Adult Cochlear Implant Users 2011

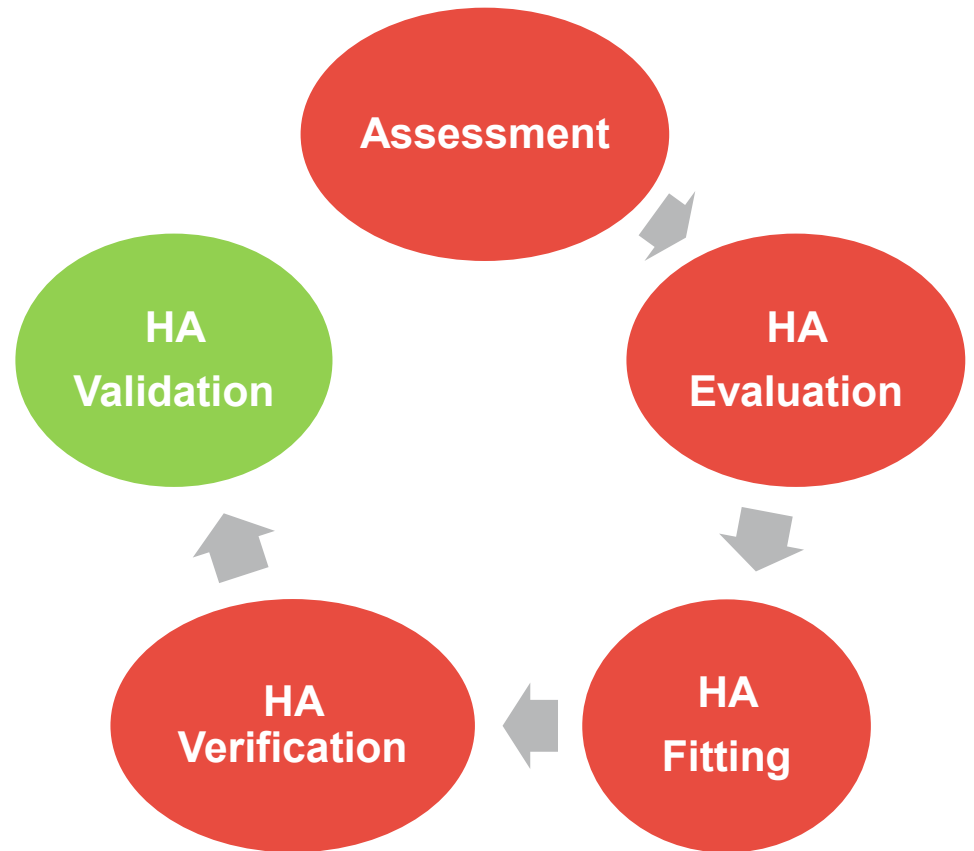


Az Bio Sentences

Multiple CI candidacy screening tools and prediction models have been developed by correlating audiometric PTA, WRS, to Az Bio sentence scores in the CI evaluation

- [Reddy et al., 2022](#)
- [Ngombu et al., 2021](#)
- [Zwolan et al., 2020](#)
- [Hunter & Tolisano, 2020](#)

Az Bio sentences
provide me with
smooth transition
from hearing aid
validation to cochlear
implant assessment



Example: Bilateral Hearing Aid User

- Female
- 65 yrs old
- Mild dementia
- 1yr post HA fitting.
- RE WR 85%, LE WR 75%

Condition	New HAs 1 mth.	HAs 1 yr.
Az Bio In Noise 5 dB SNR	89%	89%



Example: Bilateral Hearing Aid User

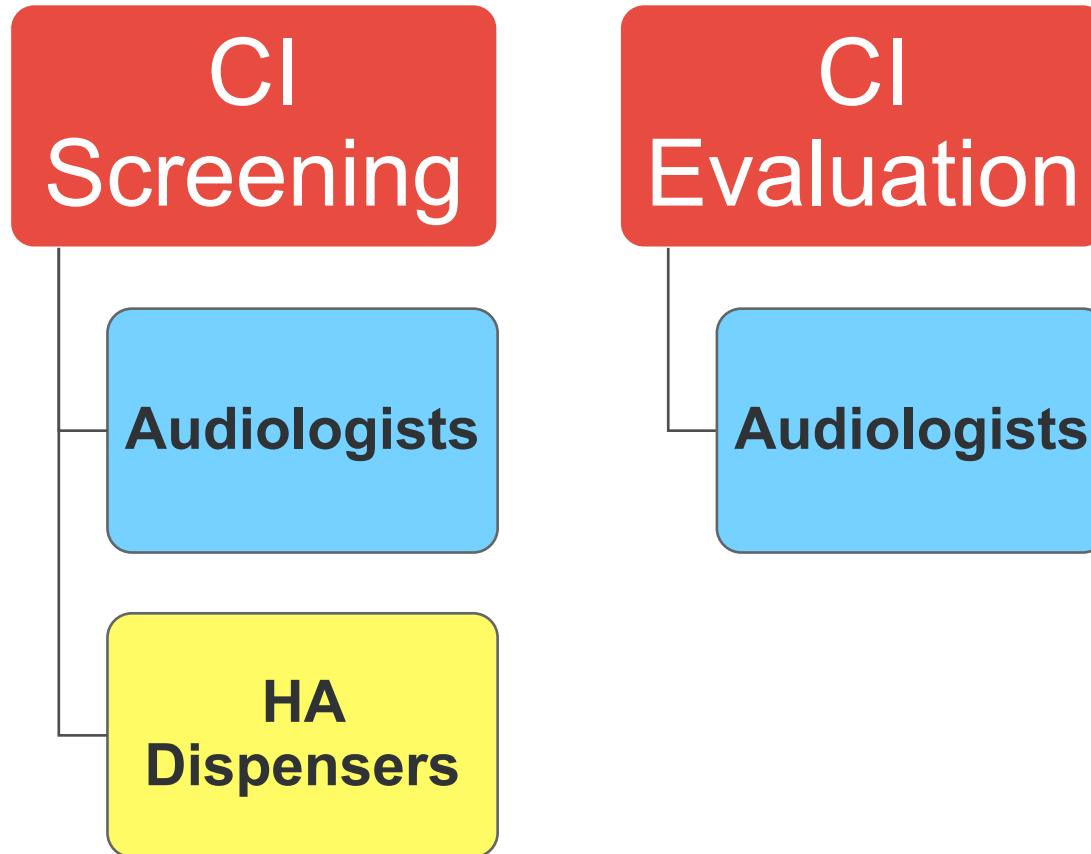
- Female
- 84 yrs old
- Experienced HA user
- Reports hearing deterioration
- RE WR 85%, LE WR 75% deterioration)

Condition	New HAs 1 mth.	HAs 1 yr.	Has F/Up
Az Bio In Noise 5 SNR	82%	60%	72%



Outcome measurement tools are crucial for assessing the validity of hearing rehabilitation services.

Tao et al. 2022



CI screening tools & referral pathways



External Validation of Cochlear Implant Screening Tools Demonstrates Modest Generalizability (2022)

The screening tool proposed by Zwolan et al. (2020) demonstrated the best overall performance for traditional (sensitivity, 62%; specificity, 75%)

60/60 Referral Guidelines

- 60/60 Guideline for referring adults for a **traditional** cochlear implant candidacy evaluation
- Traditional criteria refers to a bilateral moderate to profound SNHL
- These guidelines excludes those with asymmetric hearing loss (AHL), single-sided deafness (SSD), or those who receive a recommendation for a CI off-label.

60/60 Referral Guidelines

Refer if patient has:

- A best ear unaided monosyllabic word score less than or equal to 60% correct
- And an unaided PTA (500-1000-2000 Hz) in their better ear of 60 dBHL or greater

60/60 Referral Guidelines

During the development of this tool, scientist found that:

- 95% of patients who met traditional indications for a cochlear implant (n ¼ 250) had a PTA of greater than or equal to 60 dB
- 92% had a better ear unaided monosyllabic word score that was less than or equal to 60%.
- The toll had a 96% detection rate and a 34% false-positive rate for identifying adults who would meet traditional indications for a CI

CI assessment in the private practice



Testing materials & room set-up:

- Sound booth with speaker
- Audiometer + CD player
- MSTB CD and scoring sheets
- Sound level meter
- Calculator

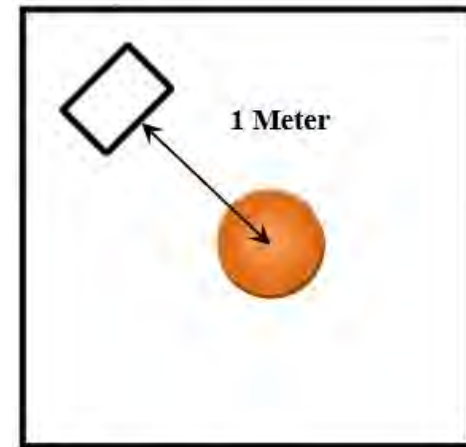


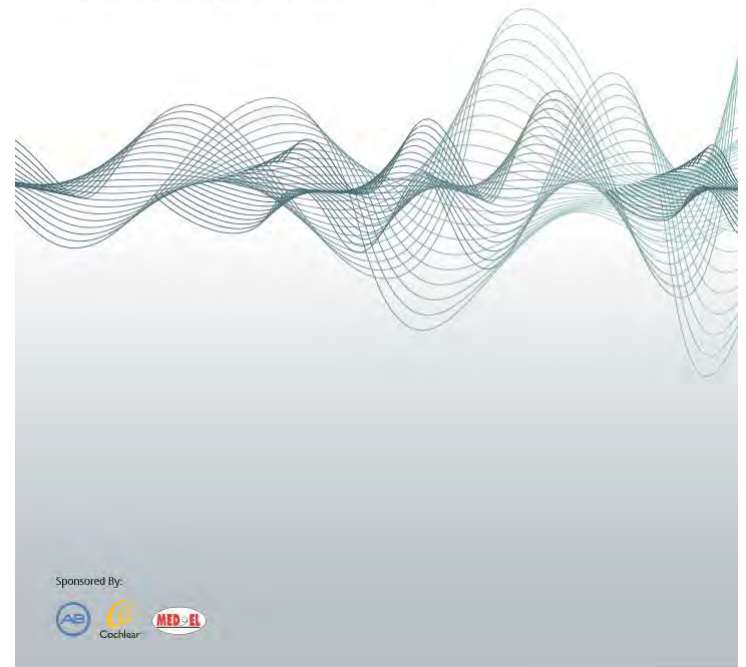
Figure 1. Sound-field test set up.

Minimum Speech Test Battery

(FREE)

- Az Bio Sentences
 - In-Quiet
 - In-Noise
- CNC Word List
- BKB Sentences

NEW
Minimum Speech Test Battery (MSTB)
For Adult Cochlear Implant Users 2011



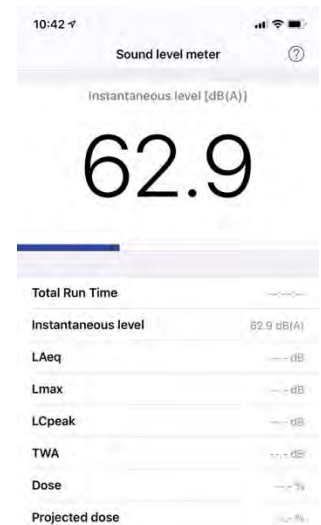
Calibration and Testing Levels

Calibration:

- The input in the dial
- The speaker output in dBA
*60 dBA is ____dBHL in the dial

Testing levels:

- In-Quiet: 60 dBA
- In-Noise: +5dB SNR, +10 dB SNR, 0 dB SNR



CI Assessment in Private Practice

Preoperatively

- Conditions: LE, RE, both ears:
 - CNC (in quiet)
 - AzBio Sentences (in quiet and noise)
 - Speech & noise at 0° to azimuth



[Minimum Reporting Standards for Adult Cochlear Implantation](#)

CI Assessment in Private Practice

Preoperatively

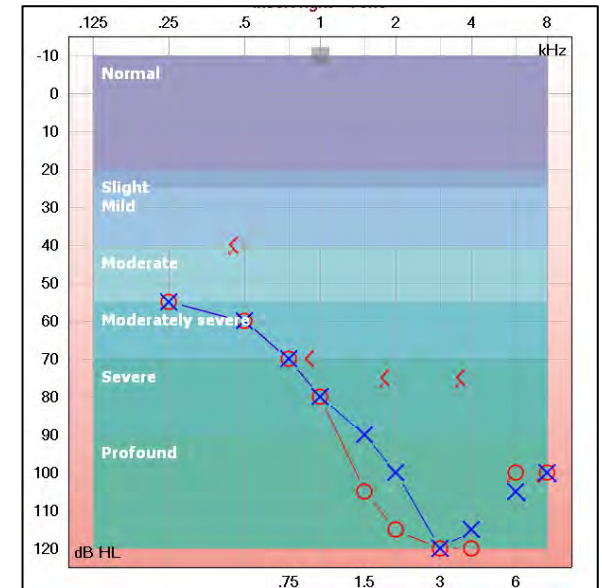
- Conditions: LE, RE, both ears:
 - CNC (in quiet)
 - AzBio Sentences (in quiet and noise)
 - Speech & noise at 0° to azimuth

Postoperatively

- Conditions: Implanted ear, contralateral ear, and both ears/binaural:
 - CNC (in quiet)
 - AzBio Sentences (in quiet and noise)
 - Speech & noise at 0° to azimuth

Bilateral Hearing Aid User

- Female
- 28 yrs old
- Experienced HA user
- Hearing aid upgrade
- RE WR 55%, LE WR 45%
- Potential CI candidate



Test	Old HAs	New HAs	3 Ms	6 Ms	3 yrs
Az Bio Sentences In-Quiet 60 dBA	55%	86%	--	--	--
Az Bio Sentences In-Noise 5 SNR	45%	71%	74%	82%	82%

AzBio Sentence Test
List 1
MSTB CD – Track 01
(Channel 1 = Speech, Channel 2 = Noise)



Sentence	Text	Poss	Score
1	I could hear another conversation through the cordless phone.	9	3
2	She relied on him for transportation.	6	4
3	He was an ordinary person who did extraordinary things.	9	7
4	How long has this been going on?	7	7
5	His class was on Saturday.	5	5
6	She was entitled to a bit of luxury occasionally.	9	8
7	The vacation was cancelled on account of weather.	8	6
8	The salon is not open on Mondays.	7	3
9	She had a way to justify any of her wrongdoing.	10	6
10	I feel sorry for my brother.	6	6
11	On numerous occasions they left early.	6	4
12	In private she let her hair down.	7	5
13	A mother always has something better to do.	8	4
14	You should be used to taking money from ladies.	9	7
15	Who would lie about cancer for attention?	7	5
16	Hang the air freshener from your rearview mirror.	8	6
17	You can use your computer to make greeting cards.	9	6
18	I guess you know what you're doing.	7	7
19	You must live in a gingerbread house!	7	4
20	The cat was born with six toes.	7	7

Words Correct

110

Words Possible

151

Percent Correct

72.8



Monosyllabic Word Test Key (CNC, List 1)

MSTB CD

Track 09 (Channel 1)

Score all words for a beginning consonant sound, a nucleus (vowel) sound and an ending consonant sound.
(Total phoneme count per word = 3. Phonemes must be in the appropriate order.)

Practice Items		1. DUCK				2. BOMB				3. JUNE			
Test Items	Whole Word Response (Optional)	# Correct Phonemes				# Correct Phonemes				# Correct Phonemes			
		0	1	2	3								
1. GOOSE		☐	☐	☐	☒	26. WRECK	<u>wretch</u>	☐	☐	☒	☐	☐	☐
2. NAME		☐	☐	☐	☐	27. ROUT	<u>loud</u>	☐	☐	☒	☐	☐	☐
3. SHORE	<u>chore</u>	☐	☐	☒	☐	28. BOAT	<u>bow</u>	☐	☐	☒	☐	☐	☐
4. BEAN	<u>bin</u>	☐	☐	☒	☐	29. RIPE	<u>lie</u>	☐	☒	☐	☐	☐	☐
5. MERGE		☐	☐	☐	☒	30. WHEEL	<u>feel</u>	☐	☐	☒	☐	☐	☐
6. DITCH		☐	☐	☐	☒	31. DEAD		☐	☐	☐	☐	☒	☐
7. SUN	<u>some</u>	☐	☐	☒	☐	32. SOB		☐	☐	☐	☐	☐	☒
8. TOUGH		☐	☐	☐	☒	33. MESS		☐	☐	☐	☐	☐	☒
9. SEIZE	<u>size</u>	☐	☐	☒	☐	34. WISH	<u>witch</u>	☐	☐	☒	☐	☐	☐
10. LEASE	<u>least</u>	☐	☐	☒	☐	35. CHORE		☐	☐	☐	☐	☒	☐
11. HOME		☐	☐	☐	☒	36. WOOD		☐	☐	☐	☐	☐	☒
12. JAR		☐	☐	☐	☒	37. KING		☐	☐	☐	☐	☐	☒
13. PAD		☐	☐	☐	☒	38. TOAD	<u>tow</u>	☐	☐	☒	☐	☐	☐
14. FALL	<u>sale</u>	☐	☒	☐	☐	39. CHECK		☐	☐	☐	☐	☒	☐
15. VAN	<u>fan</u>	☐	☐	☒	☐	40. LOOP		☐	☐	☐	☐	☒	☐
16. JUG	<u>jump</u>	☐	☐	☒	☐	41. LAG	<u>nag</u>	☐	☐	☐	☒	☐	☐
17. YEARN	<u>earn</u>	☐	☐	☒	☐	42. SALVE	<u>sang</u>	☐	☐	☐	☒	☐	☐
18. MAKE	<u>mate</u>	☐	☐	☒	☐	43. DIME	<u>time</u>	☐	☐	☐	☒	☐	☐
19. GALE		☐	☐	☐	☒	44. HULL		☐	☐	☐	☐	☒	☐
20. TOOTH	<u>toot</u>	☐	☐	☒	☐	45. THIN	<u>fun</u>	☐	☒	☐	☐	☐	☐
21. PATCH		☐	☐	☐	☐	46. SHIRT		☐	☐	☐	☐	☒	☐
22. BOIL	<u>foil</u>	☐	☐	☒	☐	47. ROSE	<u>hose</u>	☐	☐	☒	☐	☐	☐
23. HATE	<u>gate</u>	☐	☐	☒	☐	48. FIT	<u>sit</u>	☐	☐	☐	☒	☐	☐
24. PICK	<u>sick</u>	☐	☐	☒	☐	49. KITE		☐	☐	☐	☐	☐	☒
25. KNIFE	<u>nice</u>	☐	☐	☒	☐	50. CAPE	<u>kate</u>	☐	☐	☒	☐	☐	☐

Sum of boxes checked for: 0 4 25 20
0 1 2 3

Grand Total:

1 Phoneme Correct: 4 X 1 = 4
2 Phonemes Correct: 25 X 2 = 50
3 Phonemes Correct: 20 X 3 = 60

Words with 3 Phonemes Correct = 20 / 50 Words

Grand Total: 114 / 150 Phonemes

(.20 x 100 = 40% or 2 x 20 = 40%)

(.76 x 100 = 76%)

Reporting Results

Speech Perception Test Battery (92626)

Time:

Test was conducted inside a sound-booth and the patient was positioned at 0 degrees from the speaker.

All tests were conducted in the aided condition with verified devices matched to DSL/NAL-L2 targets using recorded materials.

			Oct 2018 PRE CI	Feb 2019 3 MTH CI	May 2019 6 MTH
TEST	Device	Level	Score	Score	Score
Az Bio Sentences	Bilateral HAs Right HA Left HA	60 dBA			
Az Bio Sentences	Bilateral HAs	+5 dB SNR			
CNC Word CNC Phonemes	Bilateral HAs	60 dBA			
CNC Word CNC Phonemes	Left HA	60 dBA			
CNC Word CNC Phonemes	Right HA	60 dBA			

Comments: _____

Conclusions: _____

Billing and CPT Codes

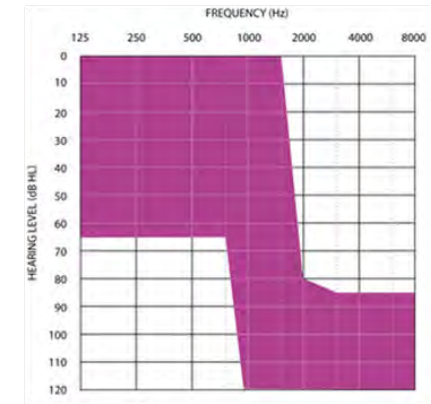
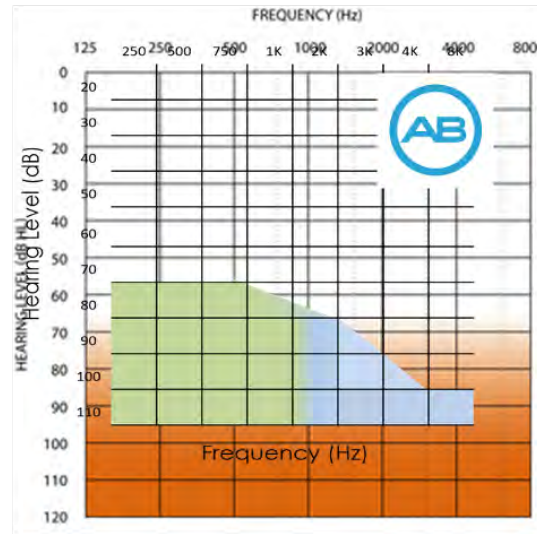
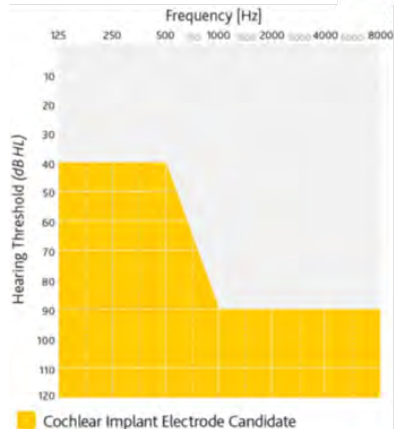
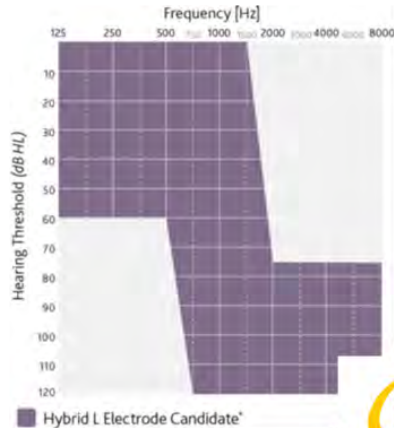
American Medical Association

92626: Evaluation of auditory function for **surgically implanted device(s)** candidacy or post-operative status of a surgically implanted device(s); first hr.

92627: Evaluation of auditory function for surgically implanted device(s), candidacy or post-operative status of a surgically implanted device(s); each additional 15 min.

Audiology Resources, 2019

CI Candidacy



MED-EL

*Best aided condition

CI Candidacy Guidelines

1. Bilateral pre- or post-linguistic, moderate-to-profound SNHL in individuals with limited benefit from amplification defined by test scores of less than or equal to 60% correct in the best-aided listening condition on recorded tests of open-set sentences.
([CMS 2022](#))
2. American Cochlear Implant Alliance Task Force Guidelines for Clinical Assessment and Management of Adult Cochlear Implantation for Single-Sided Deafness
([ACIA, 2022](#))
3. Clinical Practice Guidelines Cochlear Implants
([AAA, 2019](#))

Great resources!

1. [Minimum Reporting Standards for Adult Cochlear Implantation](#) 2018
2. [Audiology Practices in the Preoperative Evaluation and Management of Adult Cochlear Implant Candidates](#) 2020
3. [Cochlear Implant Patient Assessment: Evaluation of Candidacy, Performance, and Outcomes](#) 2020

Referral Pathways



Referral Pathways:

Audiological Management of Adults with severe to profound hearing loss (2020)

- Ensure optimal HA fitting and HAT when appropriate.
- Understand the criteria for CI referrals
- Consider referral for a CI long before HAs fail
 - HAs need not be the only and final option

Guidelines...

- Introduce CIs as a part of a continuum of care that starts with HA use and ultimately progresses to CI use.
- Ensure this conversation starts well before patient reaches criteria levels.
- Refer and encourage patients to seek additional information about CI.

Guidelines...

- Help patients recognize that at the time of a referral they are agreeing only to an assessment and not consenting to implantation.
- Keep the referral pathway simple and clear.
 - Make connections with their local CI centers

Guidelines...

- Audit your performance regarding CI referral
 - Add a section in the notes template for people with severe and profound hearing loss specifically about CI referral.
- Return to this conversation at regular points in the client pathway

The patient experience:

“Patients care about how services are provided rather than what services are provided”

- Trust
- Coordination of care
- Compassion

Thomas Lee

Press Ganey Associates, 2020

Benefits of using validating measures

Patient

- True patient-centered services
- Focus on outcomes & satisfaction
- Enhances the patient's experience

Clinician

- Objective measure to support clinical decisions & recommendations
- Monitoring tool
- Counselling tool

Practice

- New revenue channel
- Differentiator tool
- Enhances the patient's experience

“Contemporary hearing rehabilitation of adults
with acquired hearing loss
is patient-centered and **outcome-driven.**”

Lindsey Jorgensen, 2016

THANK YOU!

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