



# **Strategic Global Application of Core Competencies in Audiology**

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# Core Competencies

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- **Common definition across all healthcare services:**
  - ***The ability to perform a skill or skills to a specific standard on competency***
  - ***Apply the appropriate knowledge and attitudes to achieve optimal job performance***
  - ***A continuous approach to learning includes pre-service education, in-service training, and continuing professional education.***

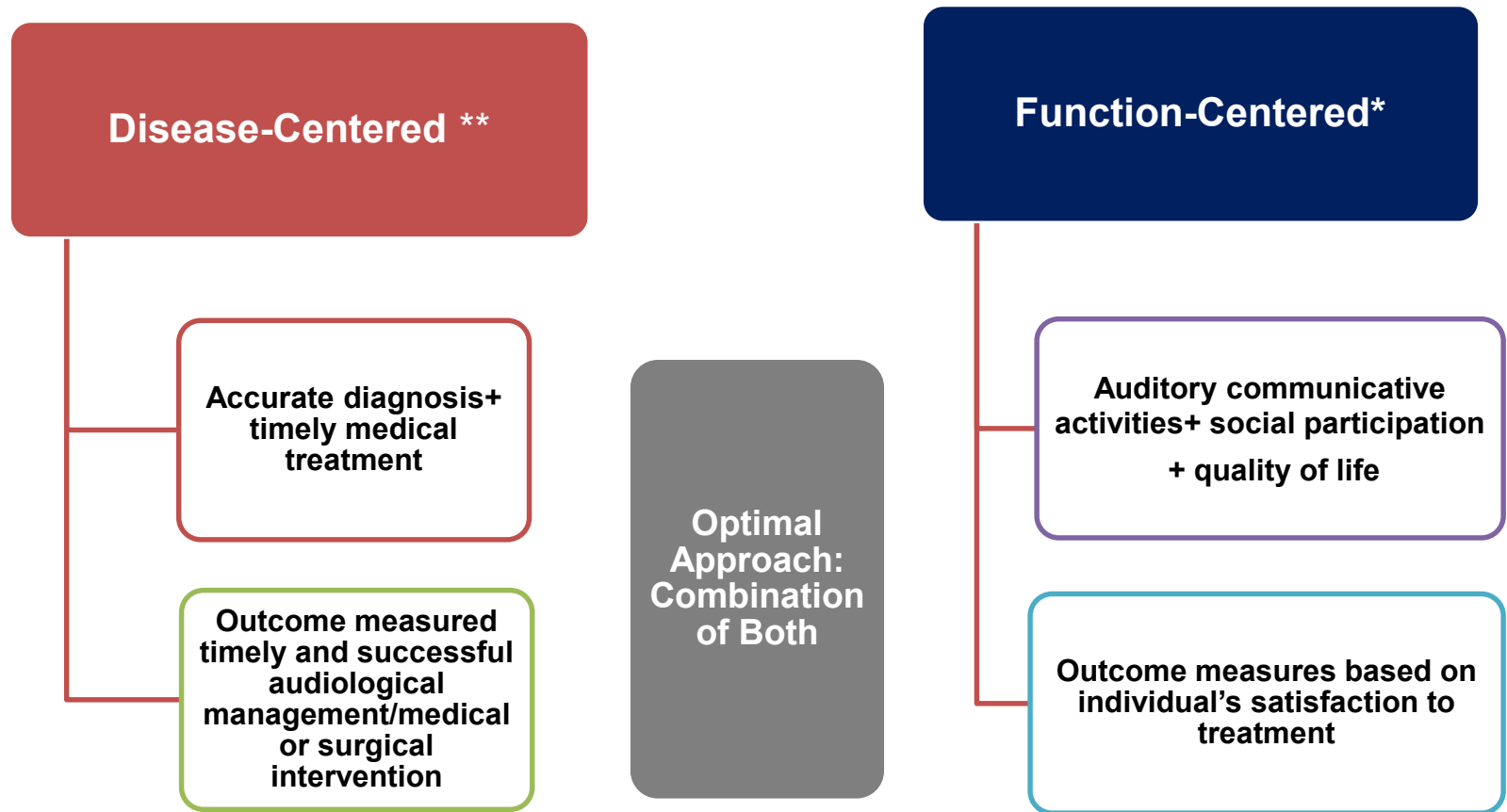
# Core Competencies in Hearing Healthcare Delivery

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- **Goal: Maximize hearing impaired individual's hearing and communication abilities**
- ***Required skills based on Standards of Practice\****
  - **Audiologists should be capable of**
    - ◆ **Providing systematic and comprehensive assessment of an individual's hearing and communication difficulties**
    - ◆ **Evaluating an individual's hearing loss and treatment needs**
    - ◆ **Providing appropriate treatment/management directions to include**
      - **Appropriate referral based on findings**
      - **Auditory rehabilitation, and counseling**
      - **Minimizing the psychosocial and quality-of-life consequences of permanent hearing loss.**

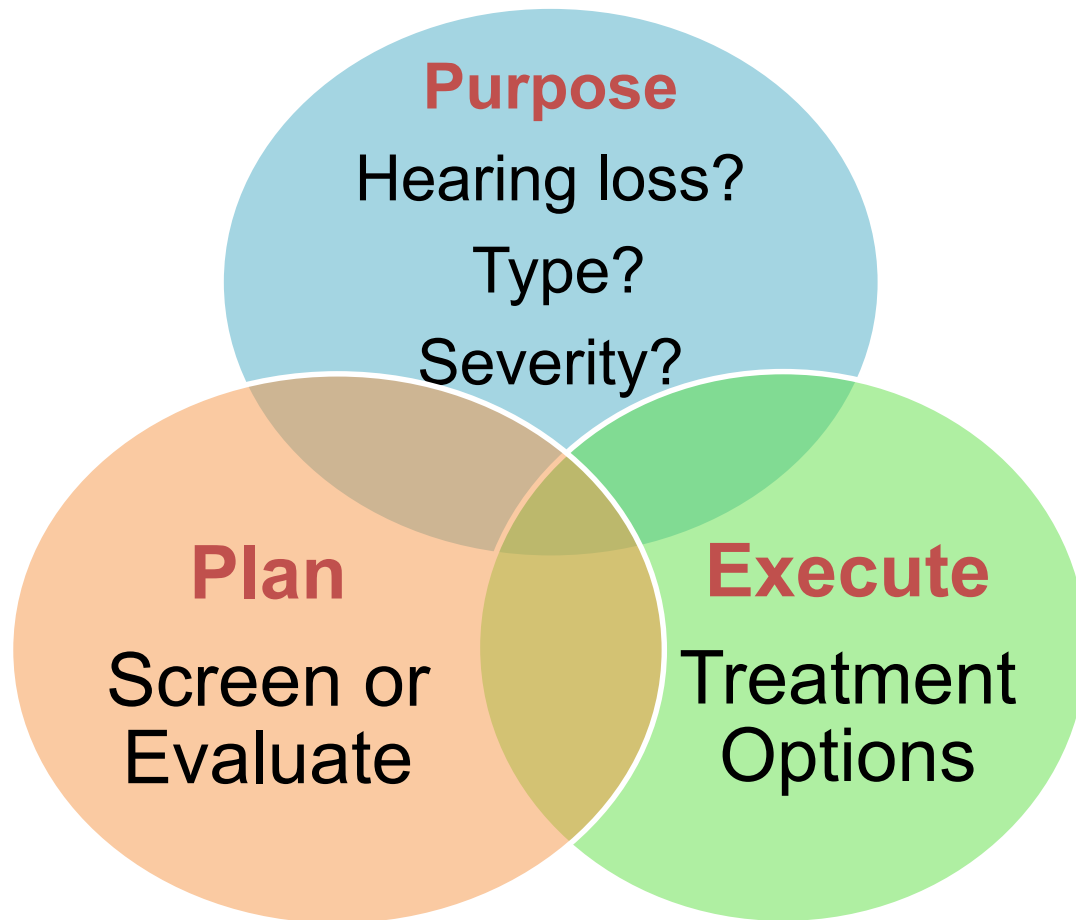
*\* recommended by ASHA & AAA*

# Classification of Hearing Care Services



# Hearing Care Services

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# Comprehensive Assessment of Hearing and Communication

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## ■ Pragmatic model based on competencies

- Case history
- Screening
- Evaluation
- Treatment and management
- Appropriate referral

# Case History

## Audiologist /Practitioner Led

- Traditional medical model
- Professional assumes the 'expert' role
- Focuses on symptoms and problems
- Less focus on patient's communication needs

## Patient-Centered

- Common ground from which patient/client and practitioner can work together
- Two experts-
  - ◆ Patient is expert on his/her communication needs
  - ◆ Audiologist is expert in the science and treatment of hearing loss

***NOTE: Three-fold increase in client satisfaction and compliance was observed***

[https://idainstitute.com/tools/self\\_development/get\\_started/patient\\_journey/](https://idainstitute.com/tools/self_development/get_started/patient_journey/)

# Path to (near) Perfect Screening Program

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- **Ultimate Goal: All participants yield a correct and reliable result in the first test.**
  - ◆ **All of the people who have a positive test result really have the disorder (a “true positive” result).**
  - ◆ **There are no positive test results in people who do not have the disorder (no “false positive” results).**
  - ◆ **All of the people who have a negative test result do not have the disorder (a “true negative” result)**
  - ◆ **People who have the disorder do not have a negative test result (no “false negative” results).**

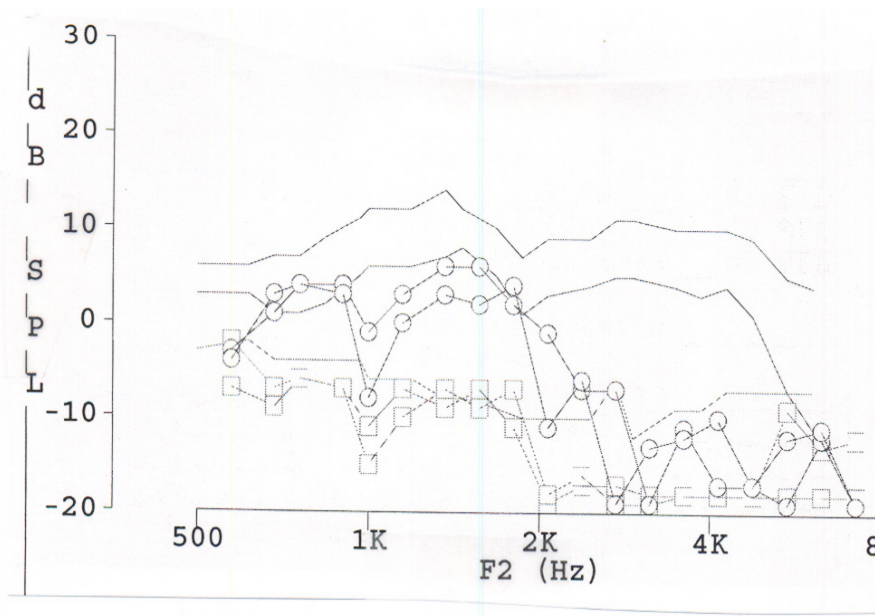
Reference: <https://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0072602/>



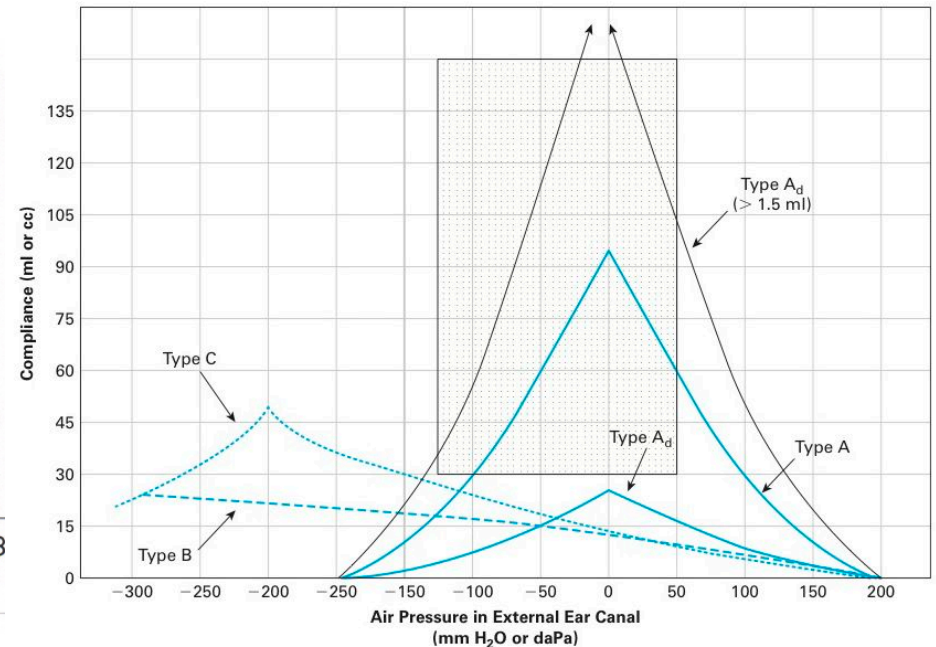
# Screening For Auditory Disorders

Select the most sensitive screening test for the target disorder

## OAEs for Cochlear Disorders



## Tympanometry for Middle Ear Disorders



# Screening For Middle Ear Disorder

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- **All of the people who have a positive test result have ME disorder (this is called a “true positive” result). OAEs and tympanometry generally meet this criterion.**
- **There are no positive test results in people who do not have a ME disorder (no “false positive” results) Tympanometry generally meets this criterion.**
- **All of the people who have a negative test result do not have a ME disorder (they would have a “true negative” result) OAEs and tympanometry generally meet this criterion.**
- **People who have a ME disorder would not have a negative test result (there would not be any “false negative” results). OAEs and tympanometry generally meet this criterion.**

# Incorporating -*Jugaad*

***Oxford English Dictionary definition of Jugaad:***

***Hindi Word: A flexible approach to problem-solving that uses limited resources in an innovative way.***



# How Can We Do More With Less?

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- **Identify constraints– *Sound booth and/or professional experts***
- **Develop variations without reducing accuracy, e.g., *Objective auditory assessments***
- ***Utilize tools currently available***
  - ◆ ***Case history screening: Does not need a sound booth***
  - ◆ ***Otoscopy: Does not need a sound booth***
  - ◆ ***Automated audiometry: Does not need a sound booth***
  - ◆ ***Tympanometry: Does not need a sound booth***
  - ◆ ***OAE recording: Does not need a sound booth***
  - ◆ ***Field professional, Nurses, Medical assistants, Hearing care technicians can be trained to perform these tests***

# Hearing Evaluation

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- **Objective of the evaluation**
  - **Detect auditory dysfunction**
  - **Identify degree, configuration and type of hearing loss**
  - **Assess impact on communication**
- **Traditional “Gold Standards”**
  - **Pure tone air & bone conduction audiometry: Limitations**
    - ◆ **Sound treated booth**
    - ◆ **Expensive equipment**
    - ◆ **Calibration uncertainty**
    - ◆ **Insensitivity to auditory dysfunction**
    - ◆ **Poor relation to communication impairment**
  - **Speech audiometry in quiet**
  - **Aural immittance measures**

# Pure Tone Audiometry ... Not a Gold Standard

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- **Accurate calibration is crucial**
- **Measurement uncertainty from earphones placement**
- **Ear canal differences in the patients**
- **Inadequate sample of hearing thresholds, 8 frequencies/19,980 frequencies = 0.0000000025%)**
- **Insensitive to cochlear dysfunction**
- **Affected by multiple listening variables, e.g.,**
  - **Young age**
  - **Cognitive status (e.g., attention, memory, processing speed)**
  - **Motivation**
  - **Language**
- **Too simple: not a test of “hearing” or listening ability**
- **Poor relationship with hearing handicap and communication**

# Alternative Options

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- **Prediction of hearing loss without an audiogram**
  - **Can you potentially predict the degree of loss hearing loss from a self-test questionnaire?**
- **Automated smart phone based applications**
- **Self-test questionnaires**
  - **Starting point**
  - **To provide a rapid understanding of the person's hearing status.**

# Internet-Based Technologies

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- **Current revolution in health-care delivery has contributed to advances in hearing-care delivery**
- **87% of global population have access to mobile telephones**
- **Consumers will have direct access to potentially**
  - **Self-screen and identify**
  - **Self-diagnose**
  - **Self fit hearing aids**
  - **Access rehabilitation services**



# Predicting Hearing Levels Without an Audiogram

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## ■ Garrison & Bochner of NTID

- Developed computer application to predict audiogram using speech based material
- Simple 5 minute self-administered screening sentences via laptop computer or mobile devices
- Testing uses adaptive strategies and each of the stimulus sentence is contingent upon earlier response
- Researchers combined the scores with age
- Derived pseudo audiogram using statistical methods
- Comparisons with conventional audiogram found 94% agreement

# Pure Tone Threshold Estimation?

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*Masalski et al*



- **Compared conventional pure tone thresholds with calibrated mobile device**
- **Result:**
  - ◆ **Demonstrated high compatibility with pure-tone audiometry**
  - ◆ **Potential application in hearing monitoring**
  - ◆ **Screening tests**
  - ◆ **Epidemiological examinations on a large scale.**

# Modern Technologies: General

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- **Inevitable consequence of information technology**
- **Computers, cell phones & internet have facilitated advances in technology based services and products**
  - **Mobile-based hearing screening/measurement options**
  - **Smartphone app technologies for calibration and hearing aid fittings**
  - **Offline and internet-based platforms for auditory training and rehabilitation**

# Modern Technologies: Automation in Diagnostic Audiology

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- **Automated audiometry**
  - Pure tone audiometry: Air conduction
  - Pure tone audiometry: Bone conduction
  - Speech audiometry
- **Automated analysis in objective audiometry**
  - OAEs
  - Tympanometry (gradient)
  - Acoustic reflex detection
  - Auditory brainstem response
  - Auditory steady state response
  - Cortical auditory evoked response

# Facts to Findings:

***Mark Twain: Get your facts first, and then you can distort them as much as you please.***

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- **Does your assessment identify if the individual has a hearing loss as result of a disease process that requires medical care?**
  - If so, do you have the appropriate network to refer the individual for medical care?
- **Can you confidently estimate the magnitude of hearing loss?**
  - Is the magnitude of function consistent with that observed during case history intake?
- **If there is a disconnect between the magnitude of the hearing loss and the hearing concerns of the individual?**
  - If so are you equipped to deal with this type of problem?

# Facts to Findings

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- **If the diagnosis is consistent with presenting case history ...**
  - **Are you equipped to provide hearing assistance technologies and rehabilitation?**
  - **If the diagnosis requires cochlear implants, are you part of a team within which you can make an appropriate referral or do you have the professional network to make the referral?**
- **If the type and degree of loss is not familiar to you ...**
  - **Do you have a network of professionals (e.g., audiologists, otolaryngologists, neurologists) who may be able to assist you with managing the individual?**

# Cautions!

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- **Do the tests have the potential to misdiagnose?**
- **Do the professionals possess educational competencies based on Standards of Care?**
- **Do the professionals understand the limitations of technology?**
- **Is the approach ...**
  - **Cost-effective**
  - **Financially sustainable**
  - **Safe**
  - **Evidence based**
- **Is the ultimate goal best possible patient care?**

# Let's Find the Right Match!





# Resources & References

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תודה  
Dankie Gracias  
Спасибо شكراً  
Köszönjük Merci Takk  
Grazie Dziękujemy Terima kasih  
Děkujeme Vielen Dank Paldies  
Kiitos Täname teid 谢谢  
**Thank You** Tak  
感謝您 Obrigado Teşekkür Ederiz  
Σας ευχαριστούμε 감사합니다  
Bedankt Děkujeme vám  
ありがとうございます  
Tack