



The Role of Hearing on Physical & Cognitive Health

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Introduction



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Financial Disclosures

I have no conflicts of interests to disclose for this presentation.

Housekeeping



We will leave 10-15 minutes at the end of this session for Q&A. Throughout the webinar, you can put your questions into the Q&A/chat functions, and some may be answered in real time.



We will share instructions for claiming Continuing Education (CE) credit at the end of this webinar and via email within 48 hours.



You will receive the recording of this webinar via email within 48 hours



You can also access the webinar slides and recording from the Dementia Care Aware website and YouTube channel.

Dementia Care Aware Program Offerings



Warmline:

1-800-933-1789

A provider support and consultation service that connects primary care teams with Dementia Care Aware experts



Trainings:

- Online Trainings e.g., Cognitive Health Assessment training
- Monthly Webinars
- Podcasts



Interactive Case Conferences:

- UCLA and UCI ECHO (Extension for Community Healthcare Outcome) conferences



Practice change support:

- UCLA Alzheimer's and Dementia Care Program
- Alzheimer's Association Health Systems

Our Training

Welcome!

Welcome to the Dementia Care Aware (DCA) learning management system. This site provides access to the training modules for the DCA program. When you registered, you were automatically enrolled in the "*The Cognitive Health Assessment: The Basics*" course. Select Start in the "The Cognitive Health Assessment: The Basics" block below to begin.



Screening for Dementia: The Cognitive Health Assessment (CHA)

Goal: Screen patients older than age 65 annually (who don't have a pre-existing diagnosis of dementia)

Part 1



Take a Brief Patient History

Part 2



Use Screening Tools

Part 3



Document Care Partner Information

Sign Up for Upcoming Live CHA Trainings

- Dementia Care Aware offers the CHA training as a **free 1-hour live session** multiple times each month.
- Led by Dementia Care Aware partners at the Alzheimer's Association and UC, Irvine.
- Open for anyone who is interested.
- Eligible participants can claim **1 free CE/CME/MOC credit**.



Objectives

1. Understand how age-related hearing loss affects hearing & understanding”
2. Appreciate the importance of hearing & its connection to safety, physical & mental health, and cognition.
3. Become sensitive to the impact of hearing loss on an individual, their family & community, and the healthcare system
4. Be able to utilize strategies to promote effective communication in various settings – home, community, healthcare setting



Prevalence of Hearing Loss (%)

Age	Percent Prevalence
<50	8.8%
50-59	13.3%
60-69	26.8%
70-79	54.6%
80+	81.5%

Goman & Lin. Prevalence of Hearing Loss by Severity in the United States. *Am J Public Health*. 2016; 106:1820–1822. doi:10.2105/AJPH.2016.303299



Hearing



Engagement with Others



Warning



Connection to our Environment

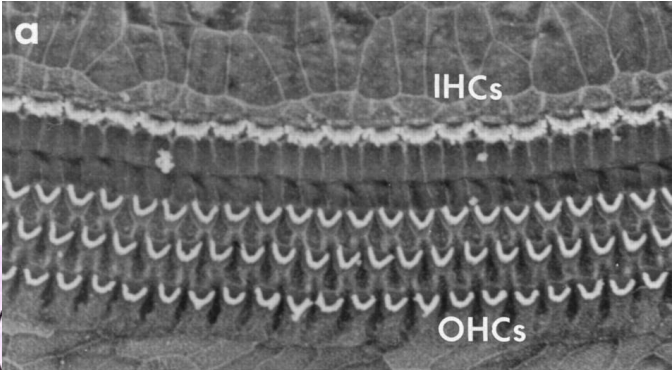
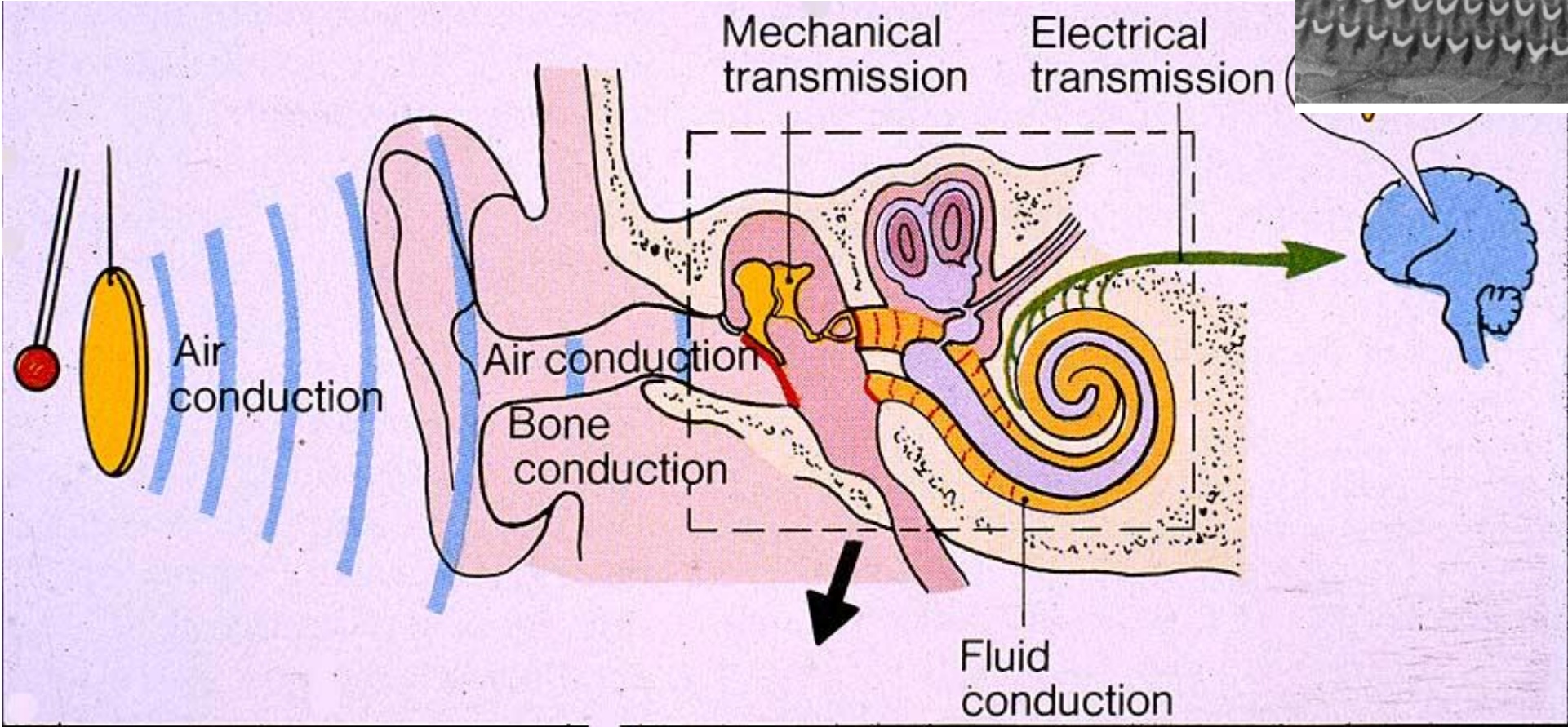


Cognitive Stimulation

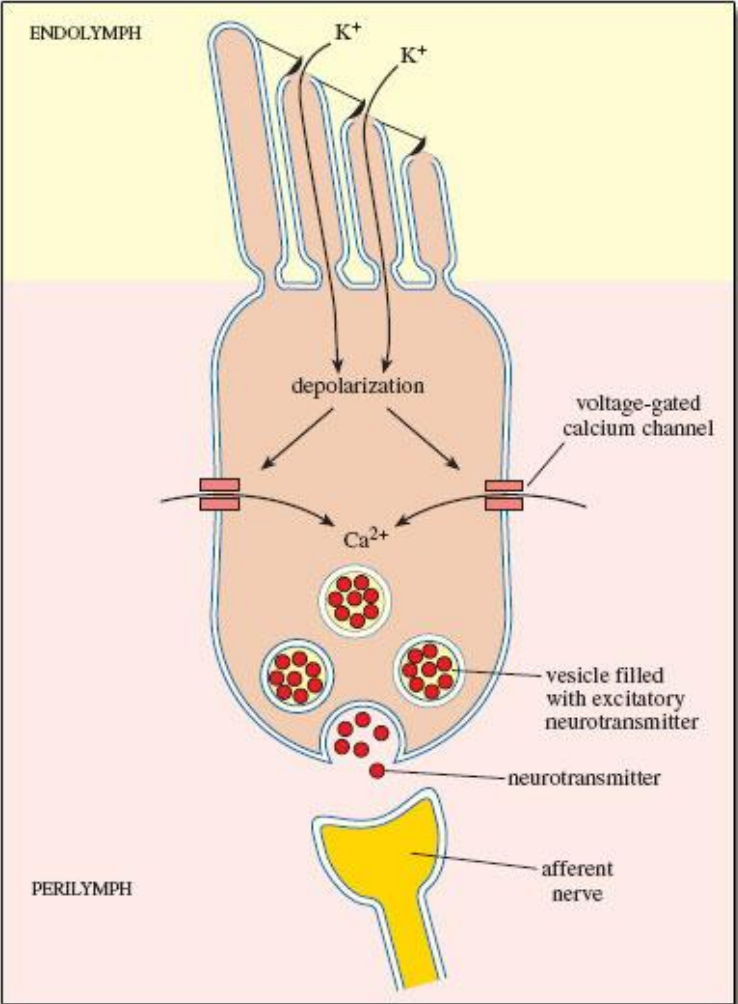


Safe Health Care Communication

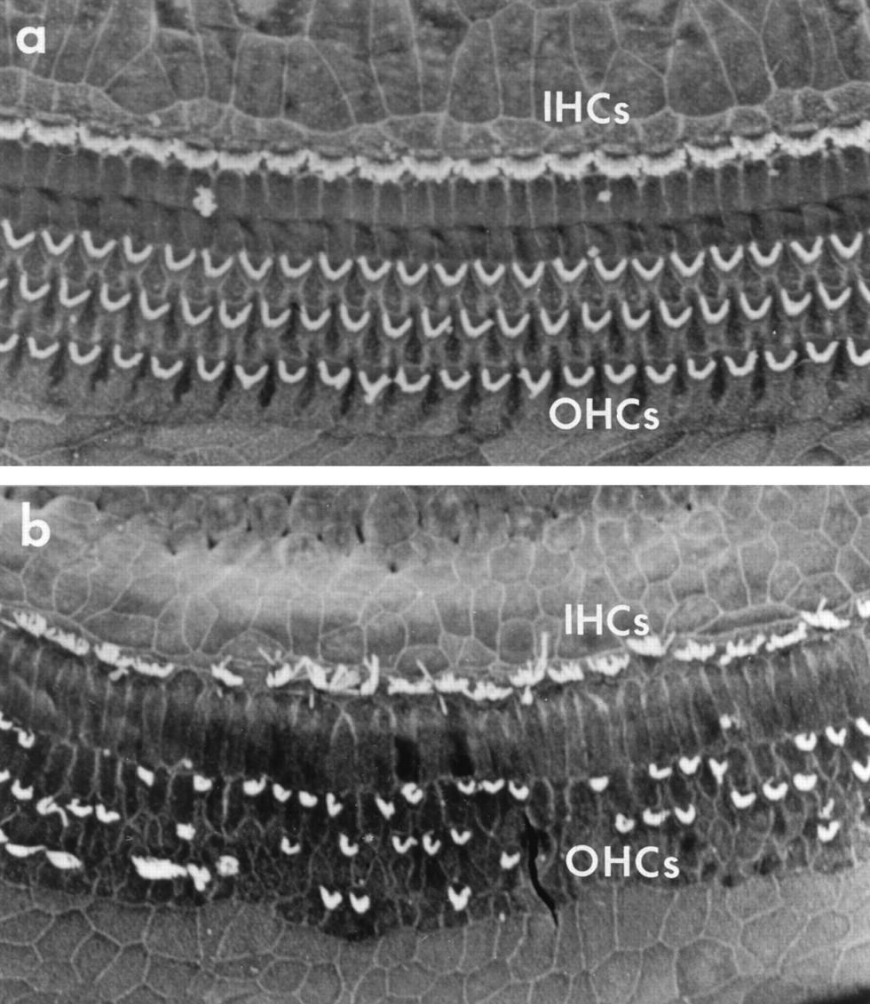
How We Hear & What Changes with Age



Hair Cells



From: <http://mda06xz.webnode.com/mechanism-of-transduction/>



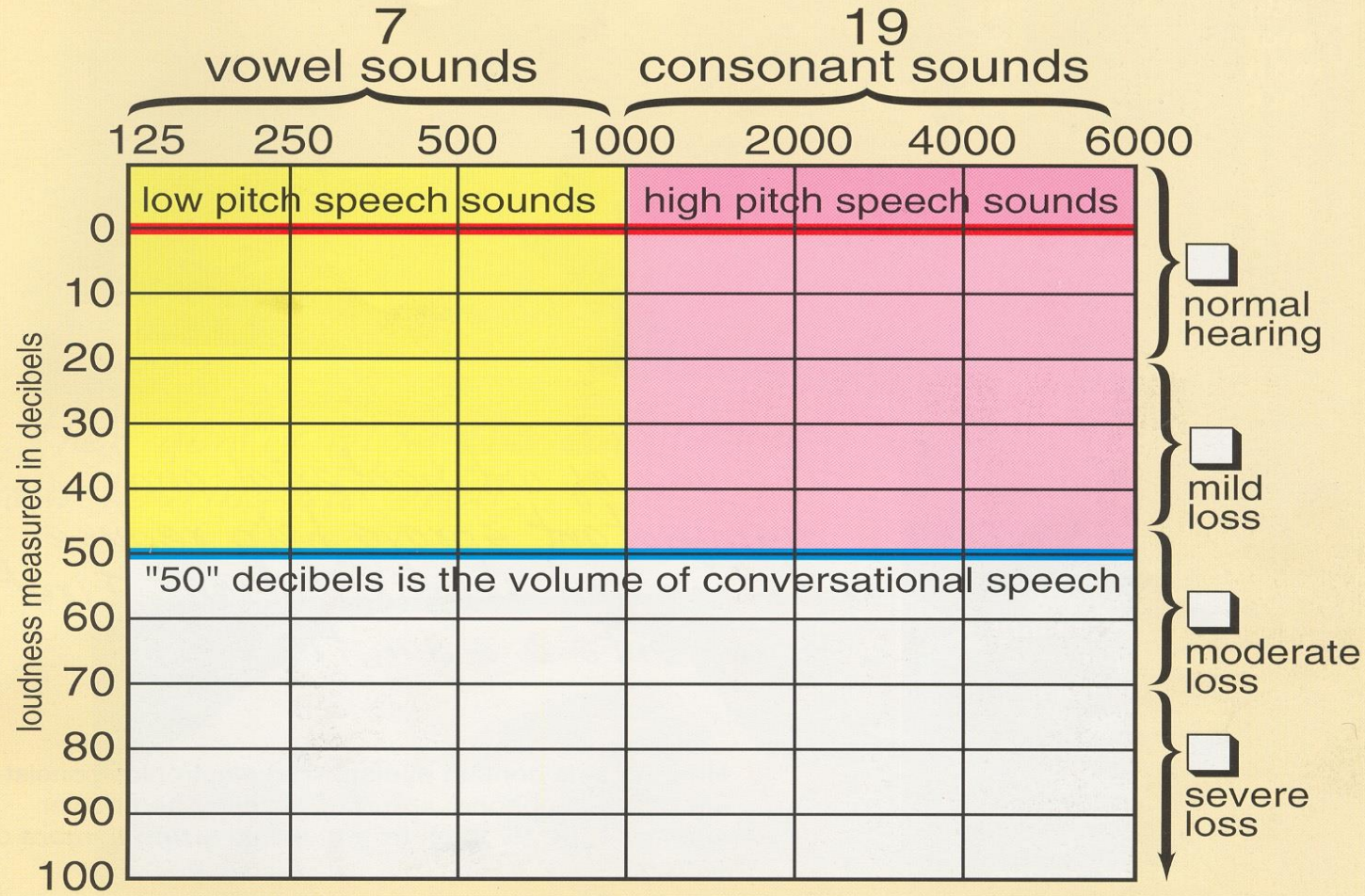
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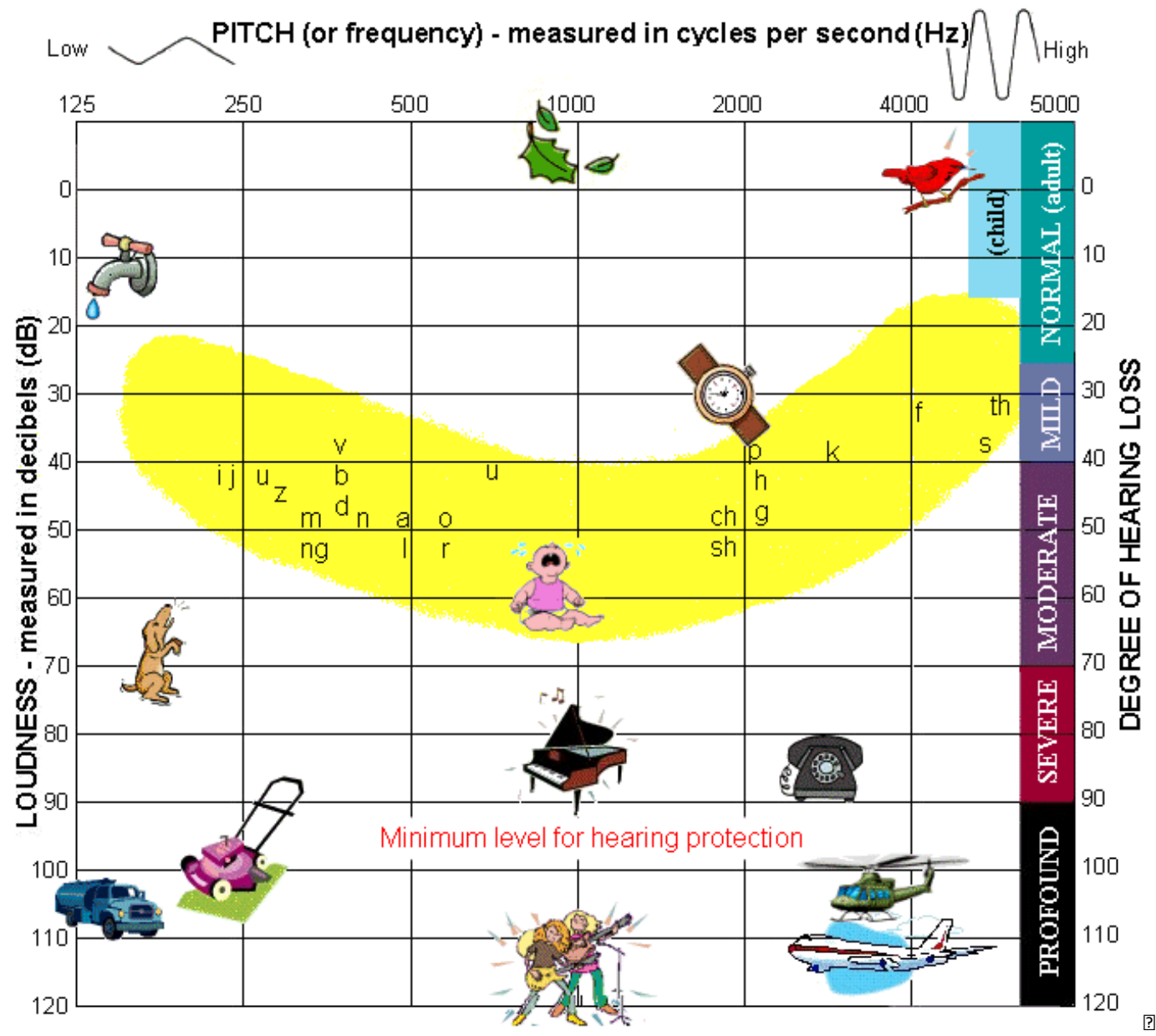
YOUR PURE TONE AUDIOGRAM

This is a graph of your hearing showing the degree of loss in your left and right ears. Your hearing problem has thus been classified in relationship to "normal hearing."

CONDUCTED BY:

The **O** symbol is your right ear;
The **X** symbol is your left ear.



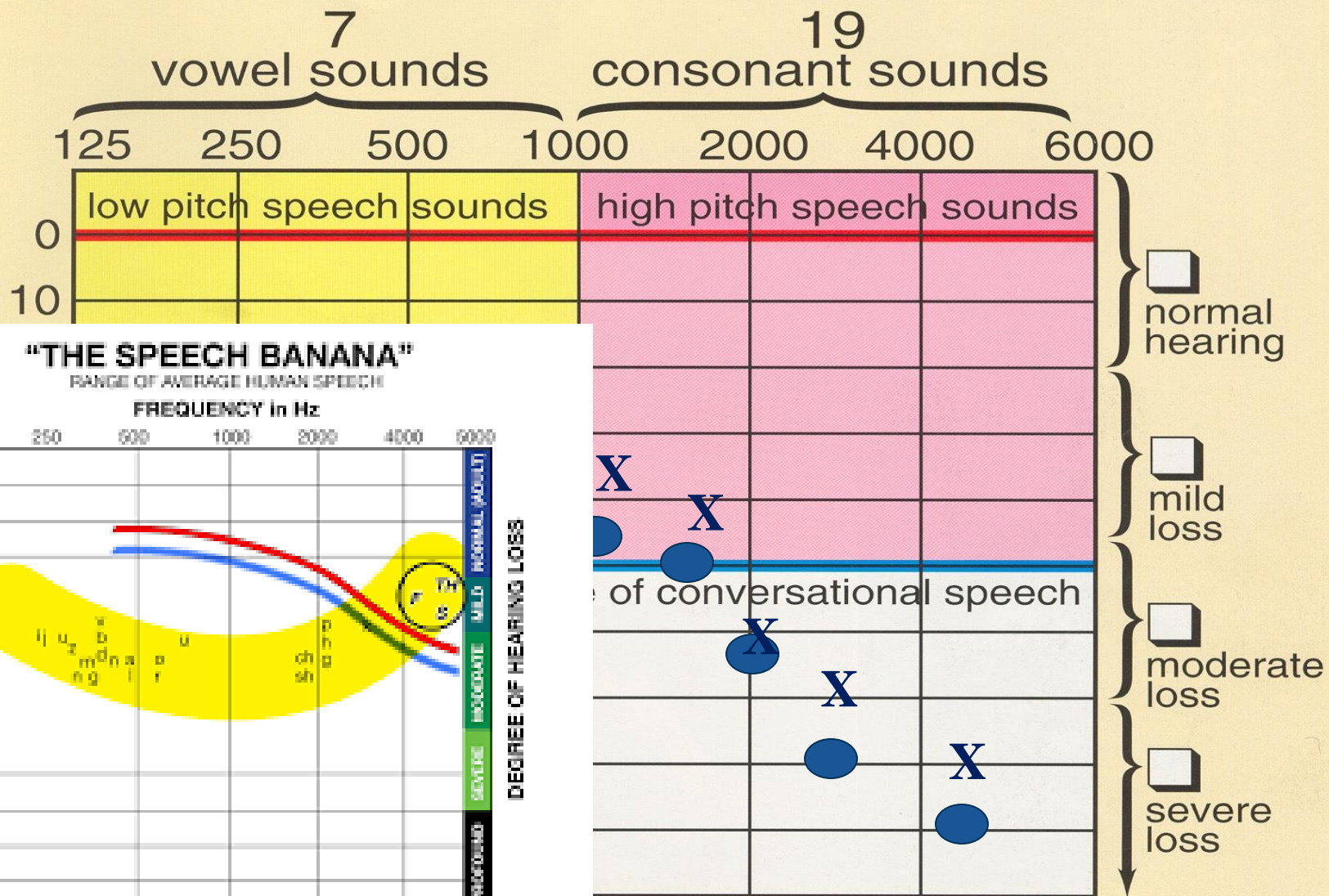


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Age-Related Hearing loss is not like wearing ear plugs!

Hearing loss is a
distortion & muffling of sound,
NOT just a decrease in sound

Nice Weather Isn't It ?

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Nice Weather Isn't It ?

Words Often Misunderstood/Misheard

Rhyming or similar words are often very difficult to distinguish and can be misinterpreted

- Time - Dime
- Cat - Cap
- Bread - Thread
- Pool - Cool
- Dull Boy - Doughboy

Hearing

Depression

Loneliness

Low self esteem



Impaired Relationships

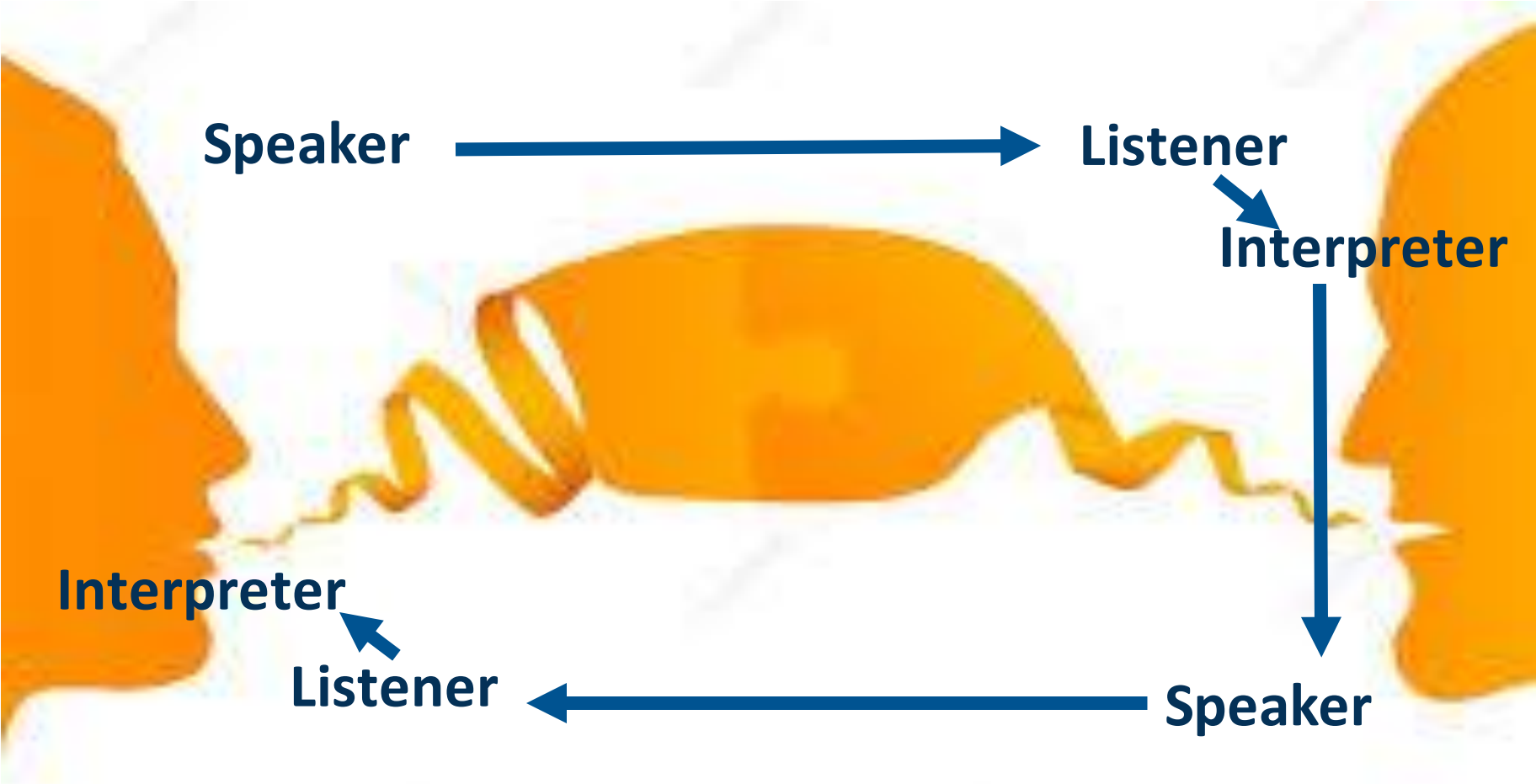
Altered Cognition/
Delirium Risk



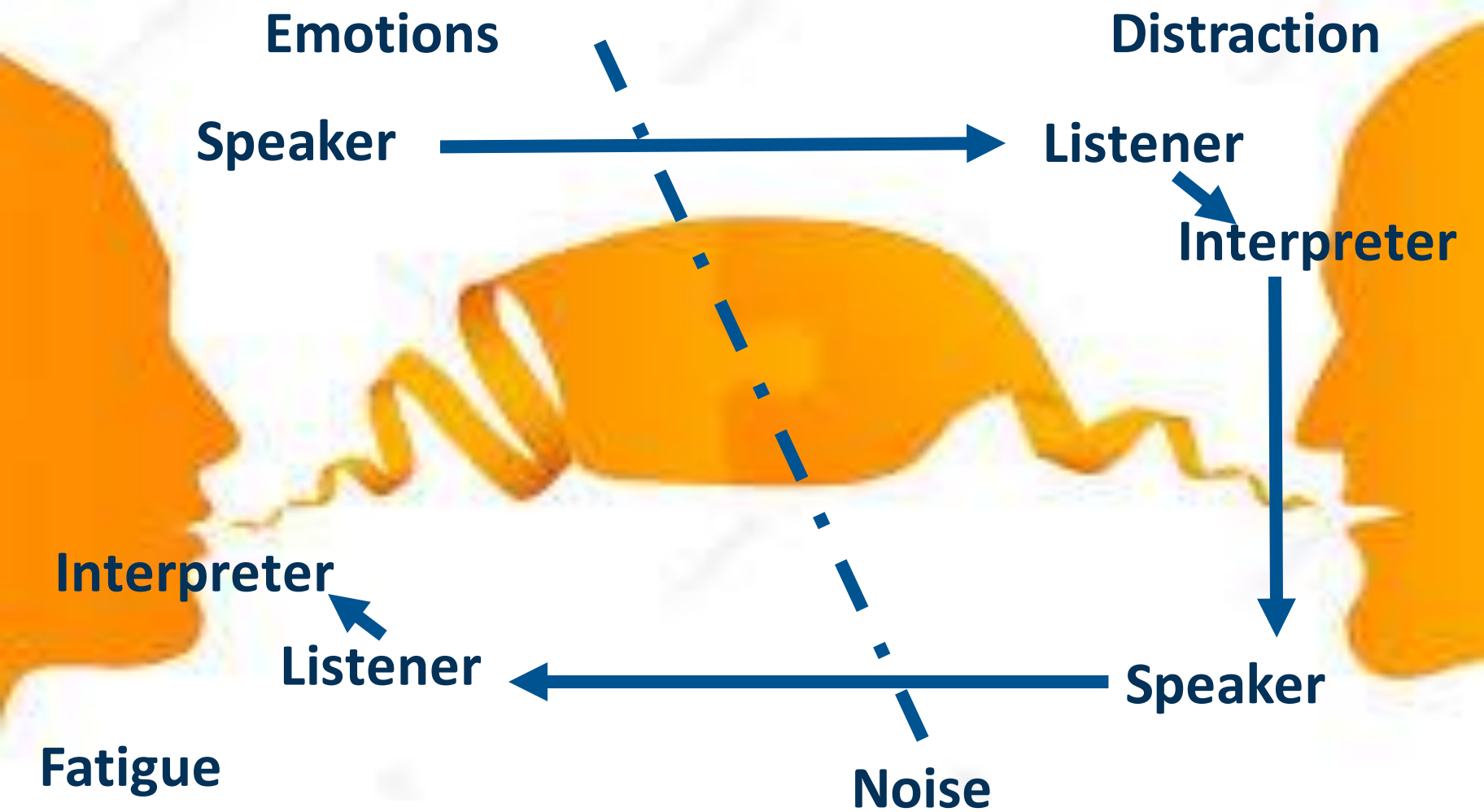
Isolation

Altered Functional Status (Falls)

Communication – A Two Way Street



Communication – A Two Way Street



Masks further muffle sounds

Especially Filter hi frequency 3 – 13dB of potential loss



The Cost of Misunderstanding

"He asked me something and I gave him a completely incorrect answer and then he said, smilingly, 'well you really should have your hearing attended, you know'."

"We were talking about an illness to a family member, and all of the time that the woman was talking, she was smiling. And I assumed that this meant the situation was improving and it turned out it was not, so I was making inappropriate response. I don't think it bothered anyone but me when I finally realized it."

Impact on Perceptions of Others and Relationships

"We'd be having these conversations, and he would never respond. And at first, I took it personally, like I thought he wasn't paying attention to me, or he wasn't listening to me, and I was so offended. And then it took me a long time to catch on that he couldn't hear me."

Perceptions of Others in the Healthcare Setting

- [A] patient can be assumed disoriented if not answering questions correctly. It can be very difficult to assess a patient who cannot hear what you are asking them. (MD)
- Prior to the board (erasable communication board), everyone on the team thought he was demented. He wasn't. Old, sick, frail yes - demented no. (NP)
- An elderly man whom people assumed had dementia; he did not and felt very belittled. (Chaplain)

Wallhagen, MI et al. Hearing Loss: Effect on Hospice and Palliative Care Through the Eyes of Practitioners. Journal of Pain and Symptom Management, 2019



Impact of Hearing Loss on Healthcare Communication and Readmissions

In one study using the Medicare Current Beneficiary Survey, a nationally representative rotating panel survey, those who reported trouble communicating had, on average, **32% greater odds of hospital readmission** (*Chang, JE et al. JAGS 00:1-2, 2018*)

In another study, the qualitative analysis of semi-structured interviews with 100 adults ≥ 60 found 57 reported some degree of HL; higher rates in adults ≥ 80 ; 50% had had audiometric testing; 26% used a HA.

- **43% (n=43) reported having misheard a physician and/or nurse in a primary care or hospital setting.** *Cudmore, V et al. JAMA Otolaryngology-Head & Neck Surgery October 2017 Volume 143, Number 10*

Impact on Person – Having to Self Advocate Constantly

- Having to prepare in advance – checking labs, having notes and questions ready because there is no “brain power” left after working to hear the discussion.
- Constantly having to tell practitioners and other staff that they have difficulty hearing and then keep reminding.
- Missing their name being called or not hearing the number called when at the lab or elsewhere.

Hearing Loss and Incident Dementia

- Baltimore Longitudinal Study of Aging
- Persons with Audiometric testing data
- No dementia at baseline: 1990-94.
- HL= PTA in the better-hearing ear:
 - normal <25 dB [n = 455],
 - mild loss 25-40 dB [n = 125]
 - moderate loss 41-70 dB [n = 53],
 - severe loss >70 dB [n = 6]).

Lin FR, et al. Hearing loss and incident dementia. Arch Neurol. 2011 Feb;68(2):214-20. doi: 10.1001/archneurol.2010.362. PMID: 21320988; PMCID: PMC3277836.

Hearing Loss and Incident Dementia (Con't)

Median follow-up of 11.9 years, **58 cases** of incident **all-cause dementia** were diagnosed of which **37 cases were Alzheimer's Disease**.

Risk of incident **all-cause dementia** increased loglinearly with the severity of baseline HL (1.27 per 10 db loss, 95% CI: 1.06 – 1.50).

Compared to normal hearing, hazard ratio for incident **all-cause dementia** was

- 1.89 for mild hearing loss (95% CI: 1.00 – 3.58),
- 3.00 for moderate hearing loss (95% CI: 1.43 – 6.30), and
- 4.94 for severe hearing loss (95% CI 1.09-22.4)

The risk of incident AD also increased with baseline hearing loss but with a wider confidence interval (1.20 per 10 dB of hearing loss, 95% CI: 0.94 –1.53).

Lin FR., et. alHearing loss and incident dementia. Arch Neurol. 2011 Feb;68(2):214-20. doi: 10.1001/archneurol.2010.362. PMID: 21320988; PMCID: PMC3277836.

Aging and Cognitive Health Evaluation in Elders (ACHIEVE) study

A landmark randomized controlled trial to determine how hearing intervention affects brain health in older adults.

MAIN FOCUS



COGNITIVE
DECLINE

Other Areas



BRAIN
STRUCTURE



MENTAL HEALTH
& WELL-BEING



PHYSICAL
FUNCTION



HEALTH
CARE USE

John Hopkins Website: <https://www.achievestudy.org/about>

Hearing Intervention vs Health Education Control to Reduce Cognitive Decline in Older Adults in the US (ACHIEVE): A Multicenter Randomized Controlled Trial

Adults aged 70-84 with untreated hearing loss and without substantial cognitive impairment at baseline

Recruited from two populations:

- Persons participating in the Atherosclerosis Risk in Communities (ARIC) observational study of cardiovascular health (n=238)
- Newly recruited persons, healthy volunteers (n=739)

Intervention: audiological assessment/counseling and provision of hearing aids

Control: Health Education

Primary Outcome: 3-year change in global cognition standardized factor score from a comprehensive neurocognitive assessment

John Hopkins Website: <https://www.achievestudy.org/key-findings>



ACHIEVE Findings

- Mean age: 76.8 years, 54% female, 88% White
- Mean 4-frequency PTA=39.4 dB; mean MMSE=28.2; mean self-perceived communication impairment (HHI) score=15.3 indicative of mild-to-moderate communication impairment.
- Significant differences between ARIC & de novo cohorts:
- ARIC: more likely to be older; female; Black; have lower education & income, higher rates of diabetes, hypertension & live alone; slightly lower MMSE scores; sig lower global cognition & cognitive domain factor scores
- Primary analysis: no difference between intervention & control
- A sensitivity analysis on the ARIC cohort found a 48% reduction in the cognitive change between intervention and control (intervention= -0.211; control= -0.402); No data on function

John Hopkins Website: <https://www.achievestudy.org/key-findings> Lin, et al. Lancet 2023; 402: 786-97

Common Emotions Related to Hearing Loss: Person with HL

- Frustration & sadness because we can't hear
 - Feeling left out with loss of valued activities
- Sense of loss
 - Decreased meaningful conversations
- Fear about potential loss
 - Significant relationships or work/job
- Feeling “stigmatized” –internalized/projected
- Fatigue related to effortfulness of listening



Common Emotions Related to Hearing Loss: Partner

- Feeling ignored, especially initially
- Frustration related to -
 - Having to repeat & information misunderstood
 - Believing/assuming more is heard and understood than is actually heard and understood
- Loss of a valued relationship
- Effortful of remembering to use effective communication strategies
- Tendency to minimize talking



Impact of Hearing Loss in the Health Care System

- Misunderstandings instructions
- Not able to have time to share your desires regarding treatment plans
- Practitioners not having the time to do a thorough assessment
- Not hearing your name called

Barriers to Hearing Healthcare

- Under-appreciation of the impact of hearing loss on health related and psychological outcomes,
- Denial, stigma, lack of awareness on the part of both the primary care practitioner and individual with hearing loss,
- Lack of screening for hearing loss in primary care or other health care settings,
- Under-utilization of hearing aids and other assistive listening devices, and
- Cost of hearing related care (lack of Medicare and many other insurances coverage)

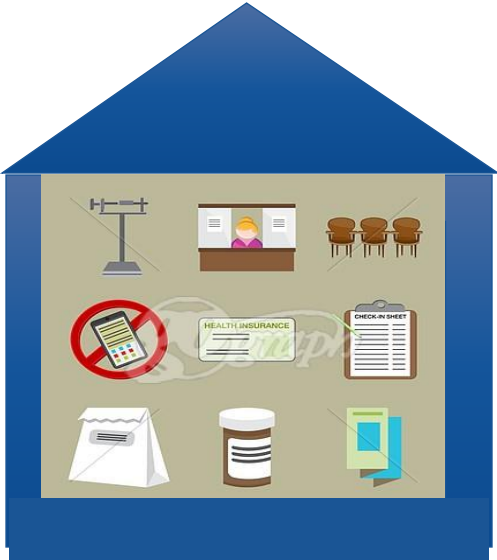
Hearing Healthcare System

Pre-entry → **Entry** → **HHC**

Consumer
/Family



Primary Care
Provider/ENT



Hearing
Healthcare
Specialist





There are things that can help

**Technology
Assistive Listening Devices**





Hearing Aid Costs

- A single unit – average price ranges \$1,200 – 3,500
- Usually not paying for the hearing aid but the “bundled service” that comes with it – follow-up, adjustments, # of return visits
- Don't need the most expensive versions – they keep adding programs and upgrades so last years' models can be great.
- Efforts to “unbundle” services to promote transparency
- Always ask questions and shop around

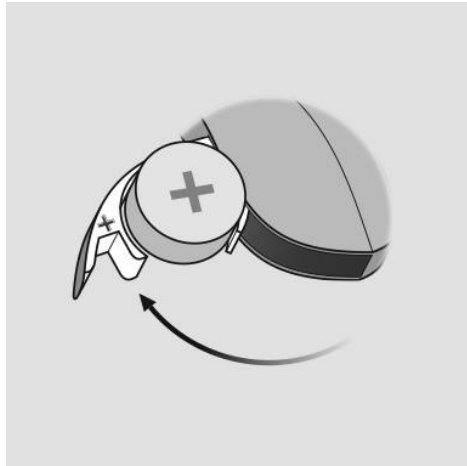


Battery Sizes and Colors

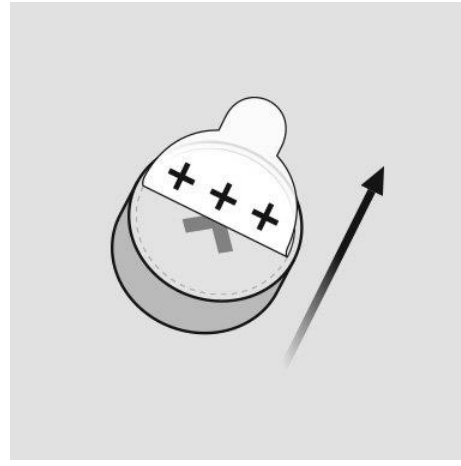


Prices for 60 can range from approximately \$15 - 30

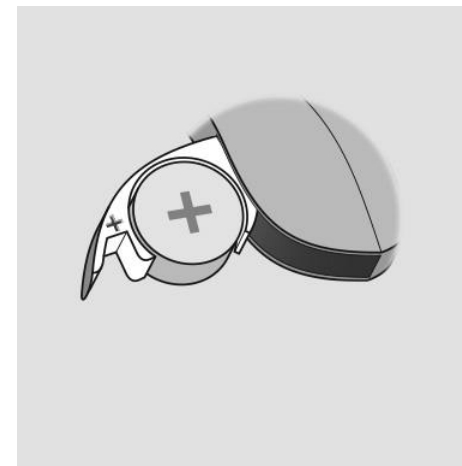
Changing The Battery



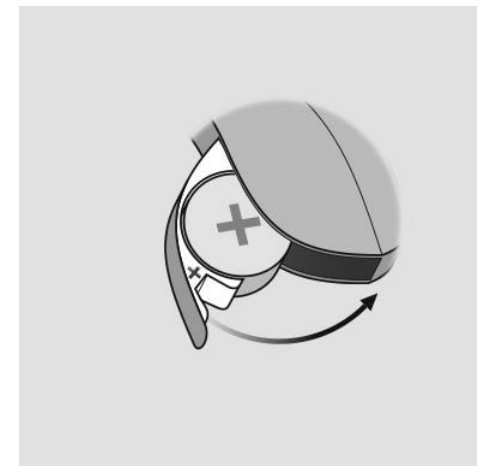
Open battery door &
slide battery out



Remove protective
covering
from new battery



Insert new battery with
+ side up



**Wait 2 minutes
or more**
before closing door

How do hearing aids work ? (Simplified)



Microphone

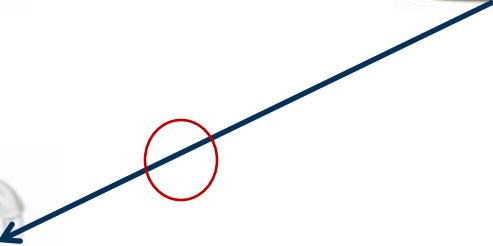
+

Amplifier



+

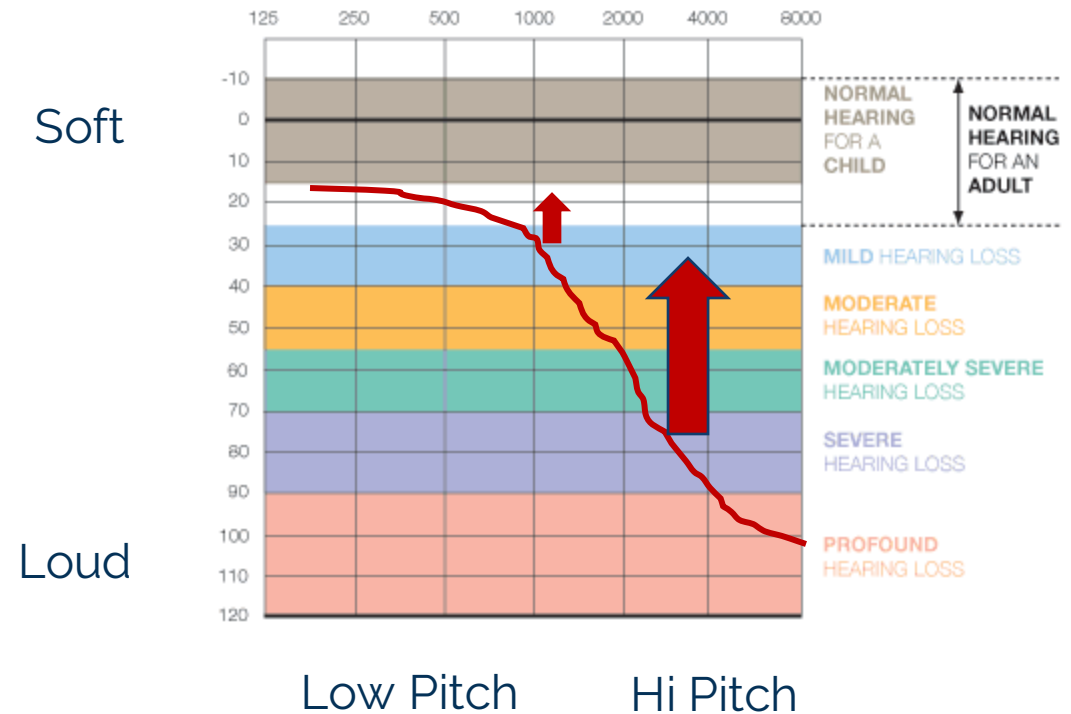
Speaker
(receiver)



What can hearing aids do?

- Make speech easier to hear
- They do not restore normal hearing
- Filter the sounds to “fit” the hearing loss

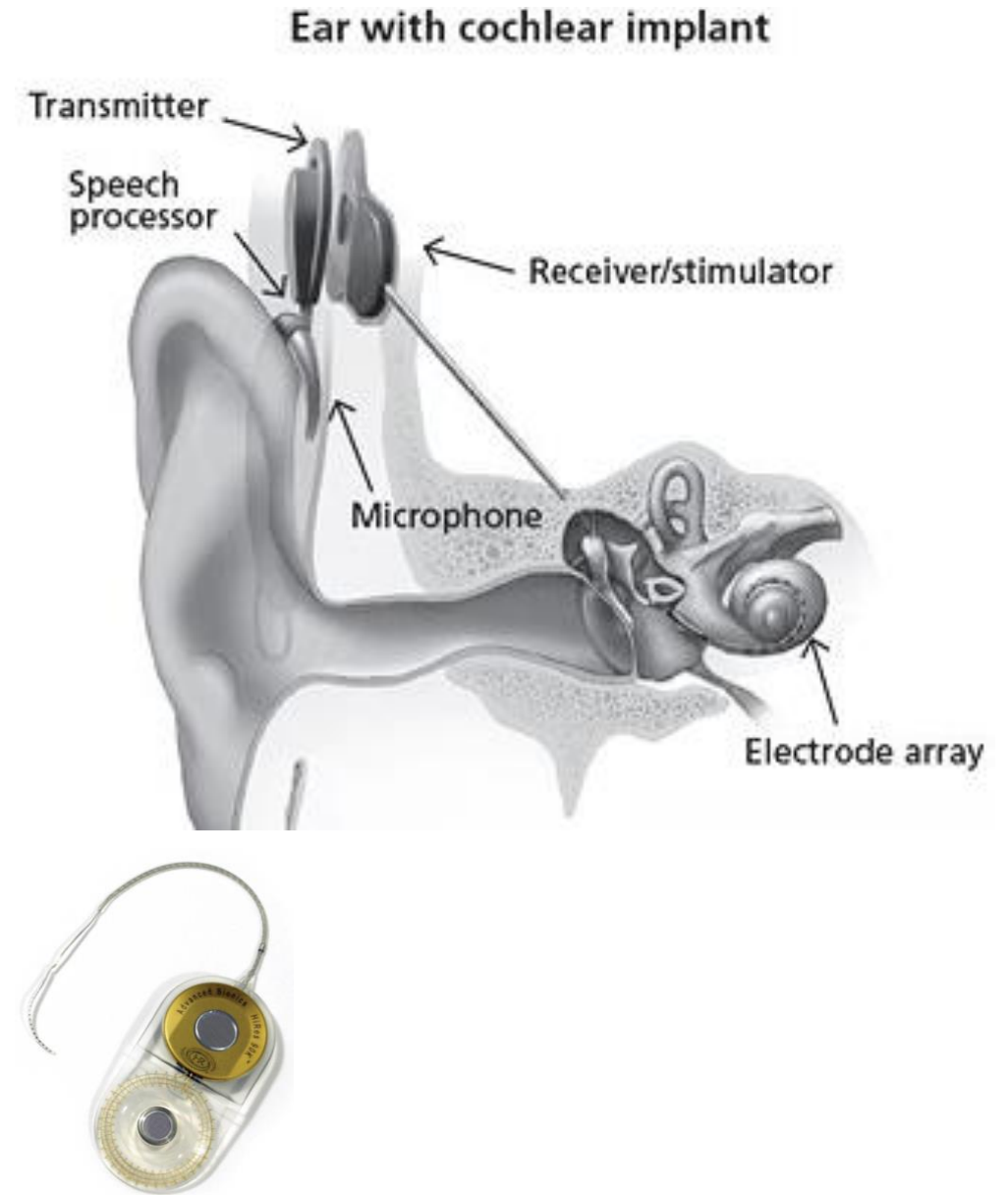
E.g. Bigger boost for high pitched sounds than low pitched sounds when hearing for high pitched sounds is worse



adapted from: http://www.lhh.org/about_hearing_loss/understanding/audiogram.html

Cochlear Implants

- External & internal parts
- Sound waves enter through the microphone & processor converts sound into a digital code that's transmitted across the skin to the internal component.
- Internal component sends sound to the electrodes.
- Electrodes stimulate the hearing nerve.
- The hearing nerve sends signals to the brain to process.



Cochlear Implant vs A Hearing Aid

Hearing Aid	Cochlear Implant
Amplifies incoming sound	Device converts incoming sound into electrical signals that are transmitted to the inner ear.
Relies on the ability of the sensory/hair cells in the inner ear to respond	Bypasses the inner ear sensory hair cells/receptors and stimulates the 8 th cranial acoustic/hearing nerve directly.

Assistive Listening Devices



Special alarm systems



Listening systems



TV listening systems



Amplified Phones



Personal Amplifiers

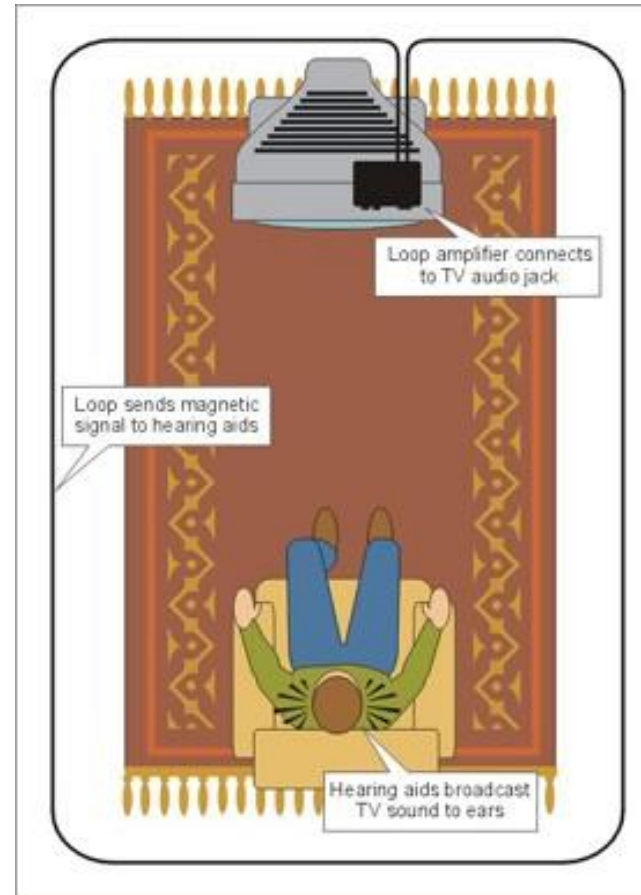
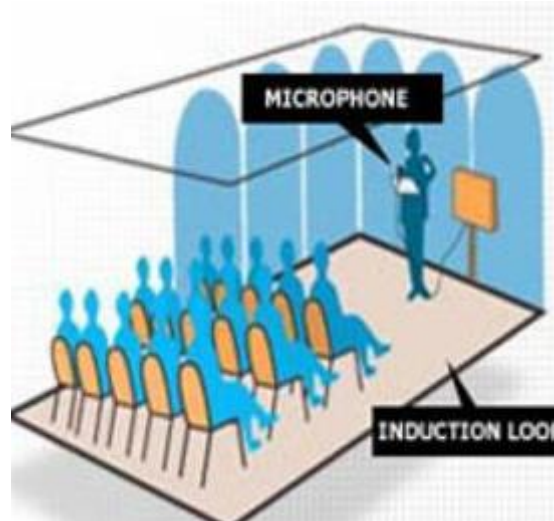


Captioned phones



Voice to Text Apps

Telecoils and Induction Loop Systems

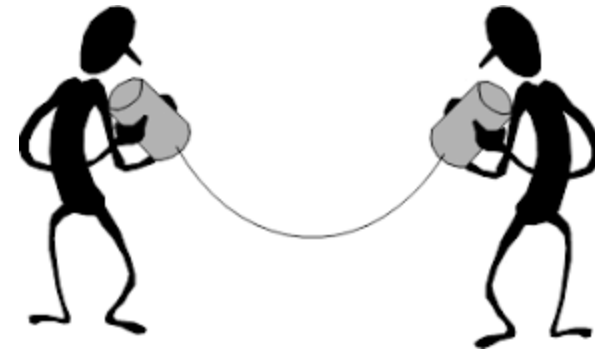


Neck loop

From: Hearingloop.org

So What Strategies Can We Use To Communicate Effectively?

- With Partners/Spouses/Family
- With Friends and Colleagues
- At Work
- In the Health Care Setting



Underpinning Open Communication

- Awareness of the impact of hearing loss
 - Sound simulations on the internet may help
 - Emphasize HL is not a decrease in sound but usually a distortion of sound
 - key frequencies are missing
- Appreciate that HAs and CIs do NOT solve hearing loss – they do NOT correct the underlying problem - they amplify key frequencies/pitches so hearing is less effortful.
- Acknowledge the various surrounding factors that can influence one's ability to hear
- Emphasize the desire to communicate and when you may be too tired to listen well.

Communication Strategies

- Face the person with HL; get their attention
- Make sure lighting is adequate and NOT from behind – the light should be on the speaker's face
- Don't cover your mouth, turn to a computer, or look down when talking
- Speak at a normal rate, lower your pitch slightly, enunciate but don't exaggerate, and don't shout
- If asked to repeat, rephrasing using different words may help

If Someone Gets a Hearing Aid

- They should be comfortable – but...they are **not like reading glasses**; we can't suddenly "hear"
- Takes time to adapt; Brains must re-learn how to listen & hear again, esp. if HL long standing
- Usually have to return several times to the audiologist/hearing specialist to maximize benefit and get HAs 'tuned'
- HAs do not work well in settings with poor acoustics (Hi ceilings; echoey/reverberations)
- Make sure all your questions are answered.





Have more questions? Get answers through our
Warmline @ **1-800-933-1789** or our [support page!](#)



Here are some examples!

What do I prioritize if my patient tests positive for cognitive impairment?

What medications should I avoid if my patient has cognitive complaints?

What cognitive assessment should I use for a Spanish speaking patient experiencing homelessness?

Open your phone camera and scan the QR code to submit questions:



Or visit: www.dementiacareaware.org

Dementia Care Aware on Social Media



Follow us and get updates delivered to your favorite social media channel:

- LinkedIn
- Facebook
- YouTube

How to claim Continuing Medical Education (CME) credit

Step 1. Please complete our evaluation survey using the link provided in the chat and a post-webinar email. Please select the correct link based on the credit type you are claiming.

- For this activity, we provide **CME credits** for MDs, NPs, APPs and PAs including **AAFP** (for family physicians)
- **ABIM MOC** (for internal medicine physicians).
- We also provide **CAMFT credits**, which in the state of California is approved, for Licensed Clinical Social worker, Licensed Professional Clinical Counselor, Marriage and Family Therapist, and Licensed Educational Psychologist

Step 2. Upon completing the evaluation survey, please scan a QR code or link to claim credit directly on the UCSF continuing education portal:

- Use your phone camera to scan a QR code and tap the notification to open the link associated with the CME portal.
- Enter your first name, last name, profession, and claim **1 CE credit** for the webinar