31 Years of Senior Advocacy

WASHINGTON STATE Senior Citizens' Lobby

Hearing Loss and Aging

(If you'd stop mumbling, I would hear *just fine!*)

Juliëtte Sterkens, AuD - Audiologist
Hearing Loss Association of America

HLAA
Hearing Loss Association of America

DISCLOSURES

Logopediste - Hoensbroek , the Netherlands

Masters degree in Audiology - Univ of Wisconsin at Oshkosh

Doctor of Audiology – Arizona School of Health Sciences

Retired from private practice in Oshkosh WI after 25+ years

Consultant to the Hearing Loss Association of America since 2012

Thanks to grant funding from the
Carol and David Myers Foundation

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What's needed to hear in a loop?

hearing aid or cochlear implant with a telecoil

Loop Listener with headphones

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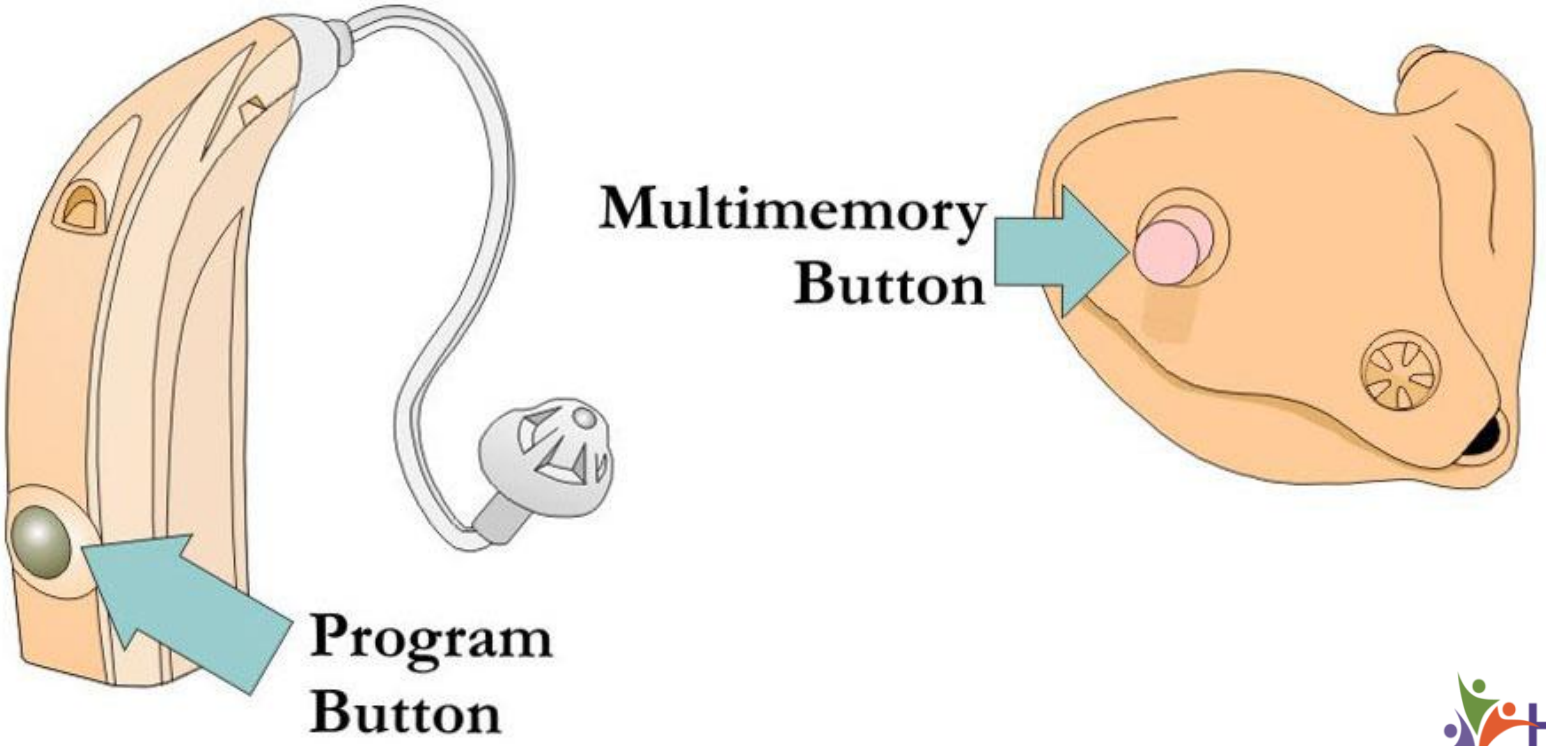
How do you know if your hearing aid has a telecoil? Look for a button



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GET IN THE HEARING LOOP
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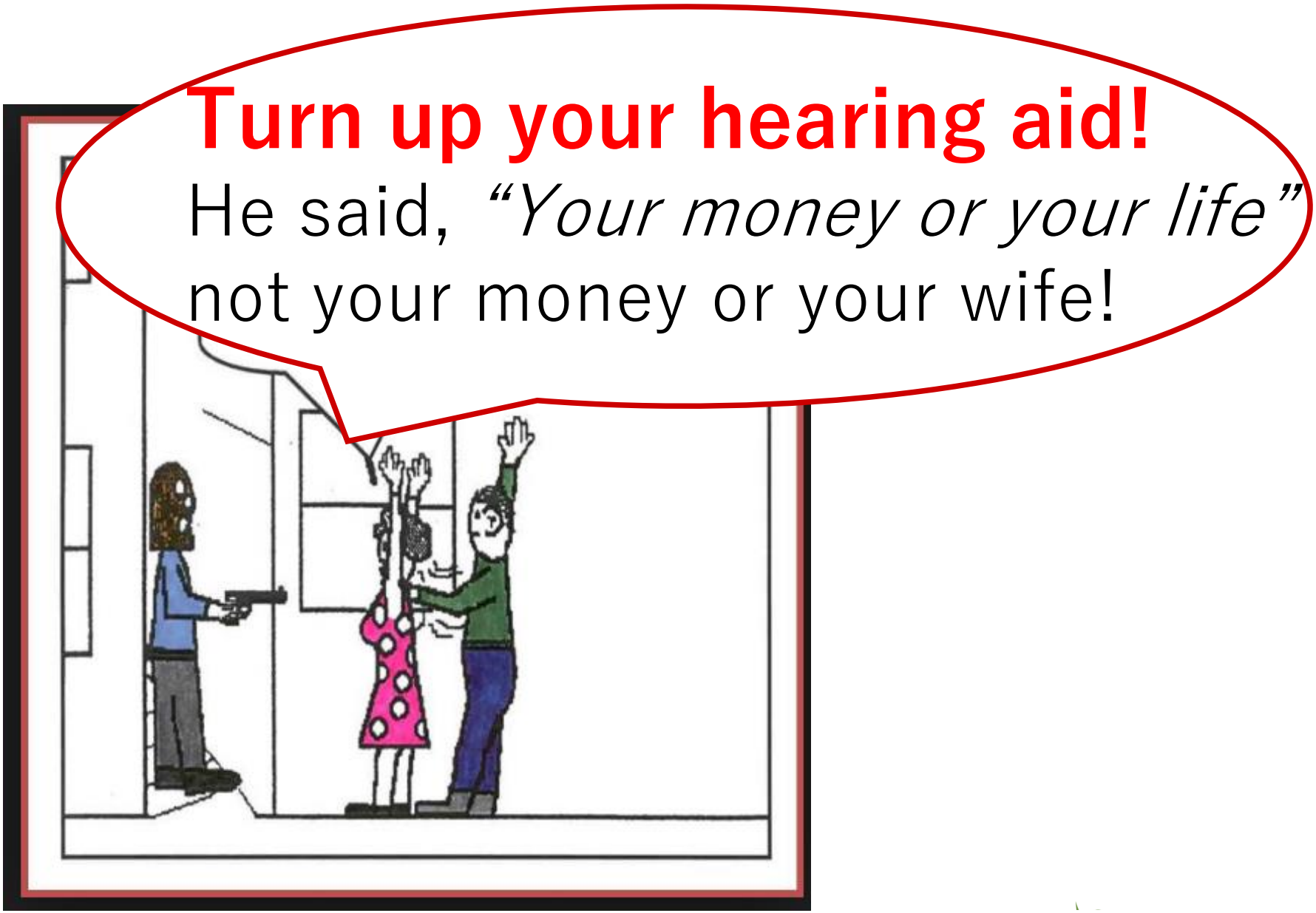


Hearing loss and benefits of hearing aids are misunderstood

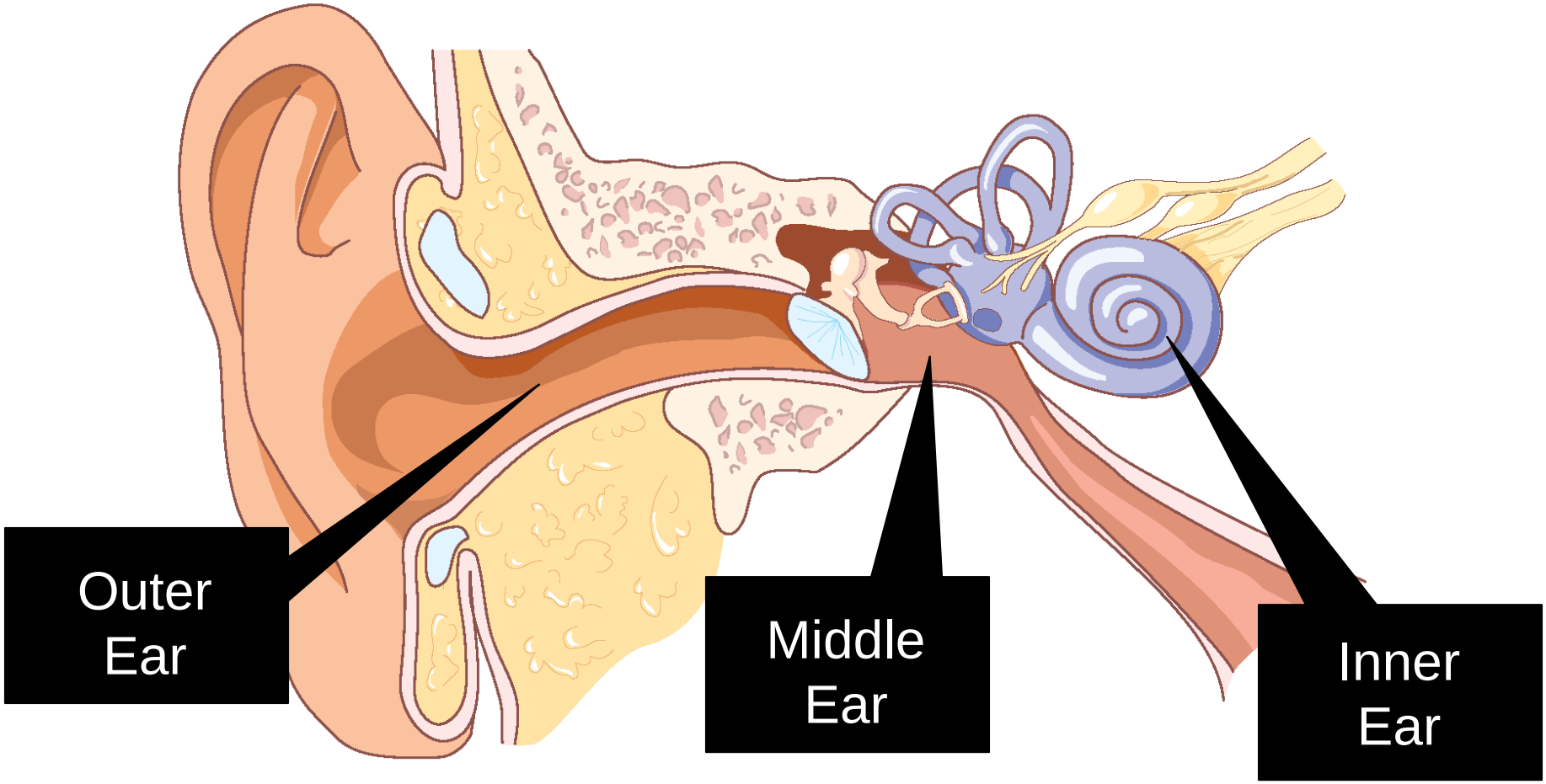
Program

- How we hear
- Prevalence of Hearing Loss (HL)
- Effects of HL on aging adults
- Treatment of Hearing loss with hearing aids
- Hearing Aids & Purchase advice
- Solutions when hearing aids are not enough

- Additional materials – indicated by: ***See Handout**

*Available via Dropbox – email jsterkens@hearingloss.org

How We Hear



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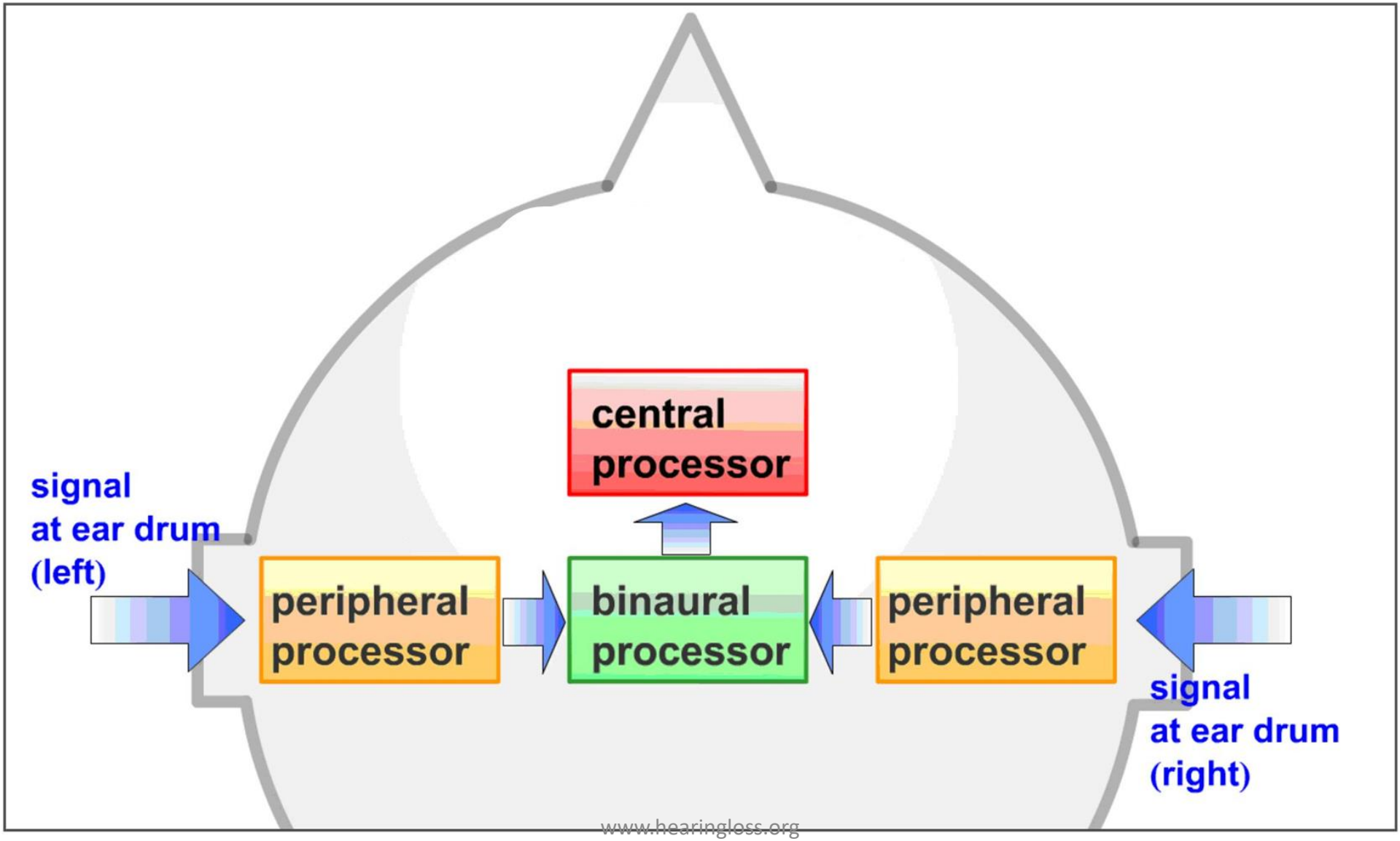
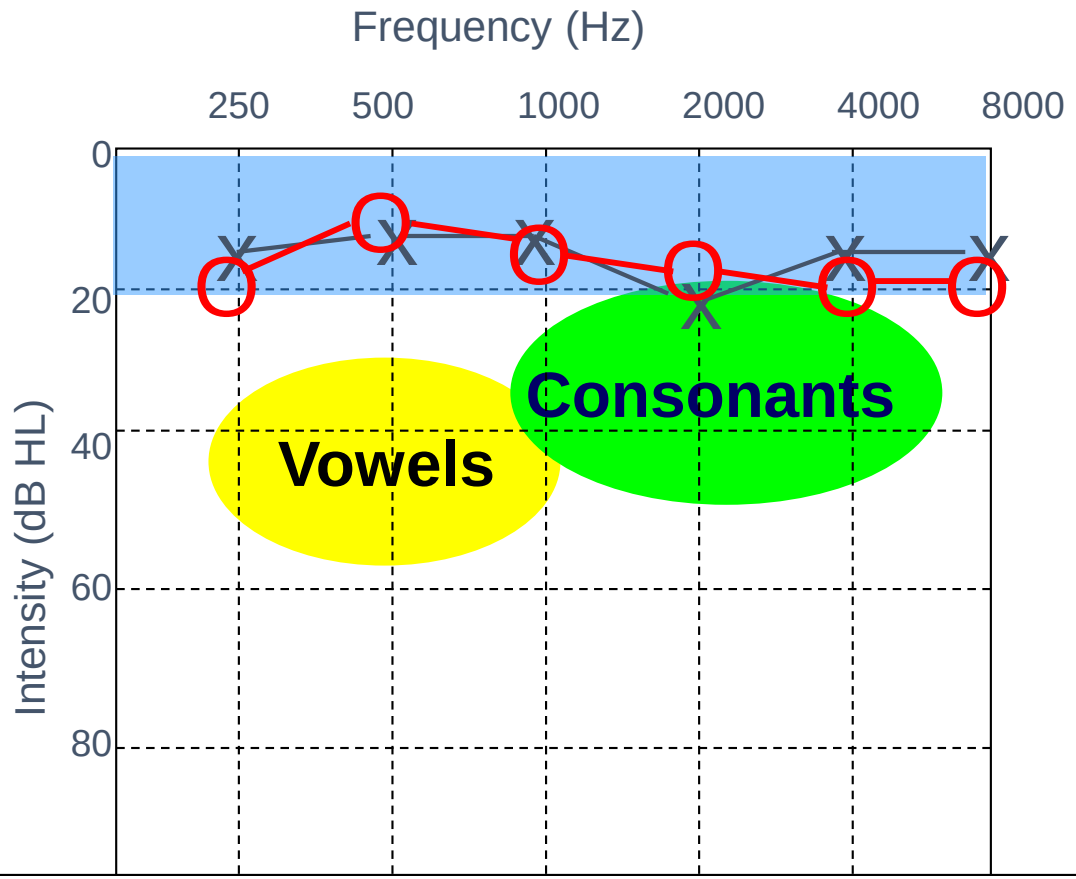
How we *really* hear…



AUDIOGRAM – *Normal Hearing*

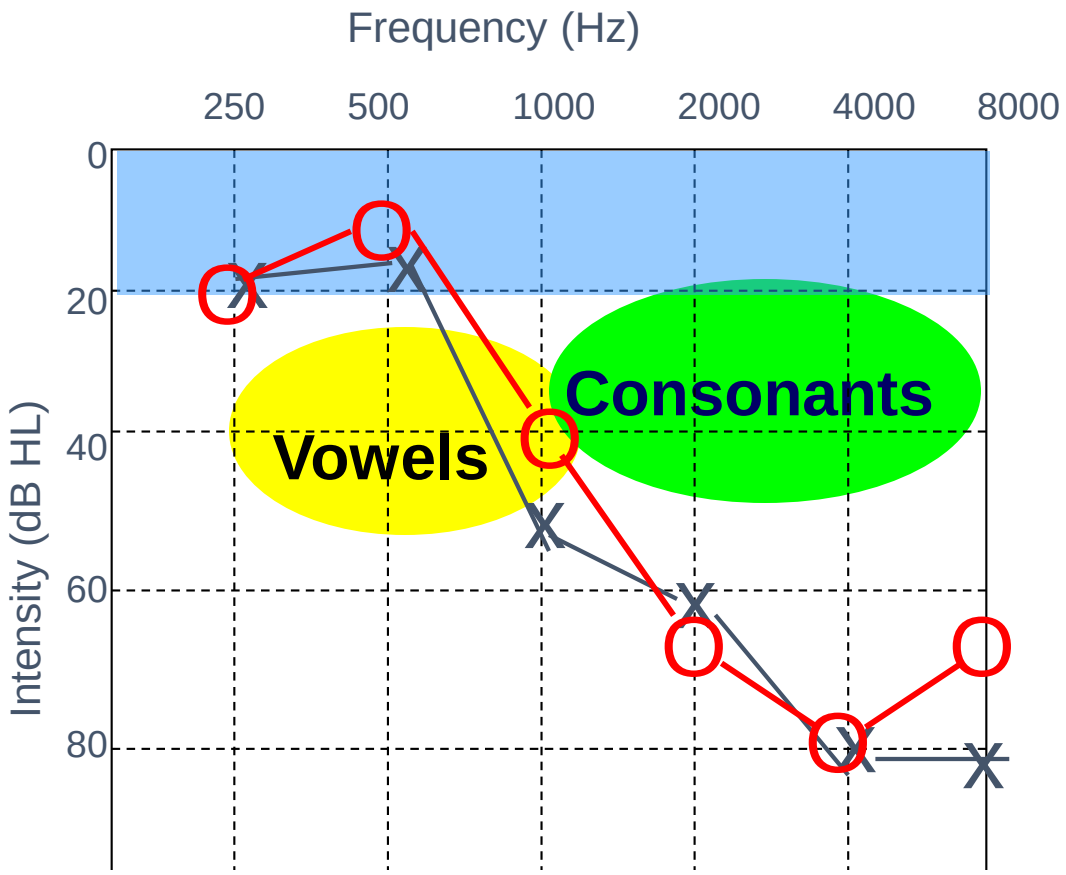


Blue bar indicates Normal Hearing Range

Sounds occur at different intensity (loudness) and frequency (pitch)

With normal hearing all the vowels and the consonants are audible

Hearing Test – high pitch hearing loss



Blue= Range of Normal Hearing

With high tone hearing loss few of the consonants are audible. The complaint? "I can hear but not understand!"

How we understand speech

- The vowels carry 80% of speech **intensity**
- The consonants carry 80% of speech **intelligibility**

Th. P.ck.rs d.d *n.t* pl.y .n th. S.p.rb.wl

The Packers did not play in the Superbowl

How we understand speech

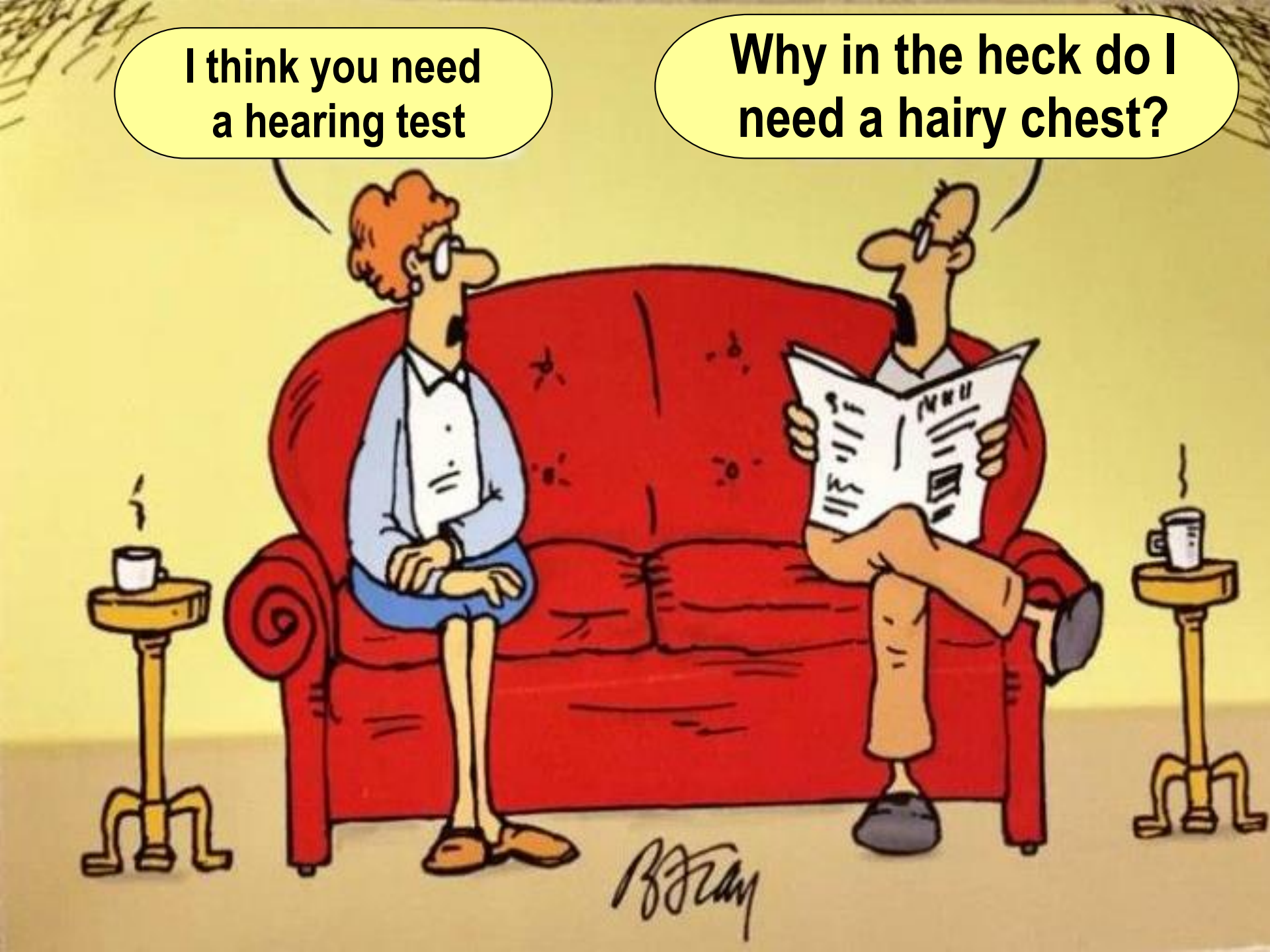
- The vowels carry 80% of speech **intensity**
- The consonants carry 80% of speech **intelligibility**

Th. P.ck.rs d.d *n.t* pl.y .n th. S.p.rb.wl

The Packers did not play in the Superbowl

I .o.e .o ..o. .u.i.. i. .y .a..e.

I love to grow tulips in my garden


I think you need a hearing test
Why in the heck do I need a hairy chest?

Common causes of hearing loss?

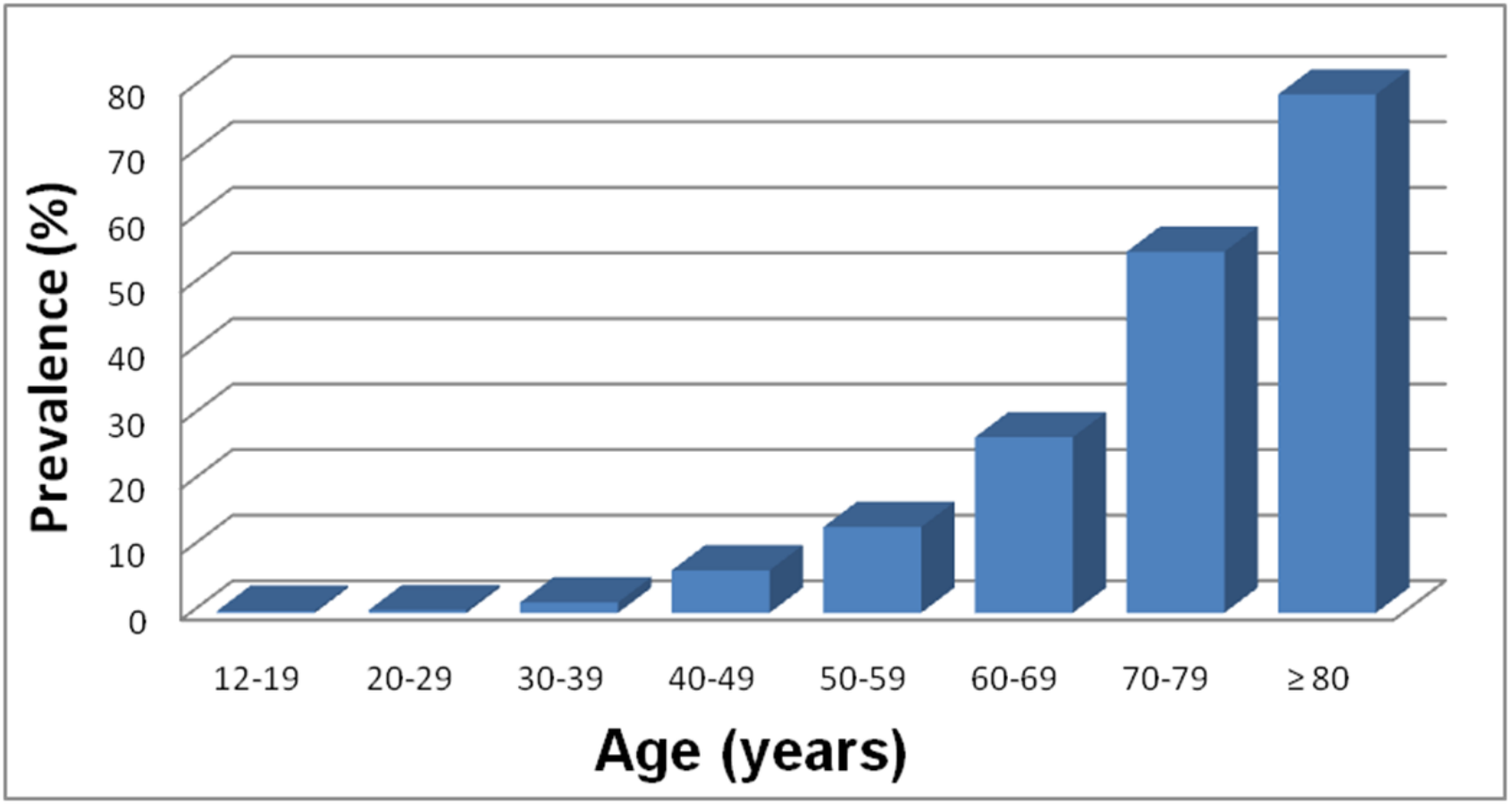
At birth 3-4%
Ear infection 12%
Ear injury..... 5%
Loud brief noise..... 10%
Long-term noise exposure 24%
•Other (such as sudden hearing loss)…. 17%
Getting older..... 28%

Source: Nat'l. Center for health statistics, data from the National Health Interview Survey Series 10, #188, 1994

Show of Hands:

Hearing loss is the most prevalent sensory loss in older adults

30% - adults ages 65-74 & 47% adults 75+ and older



Prevalence of hearing loss
(35 Million)

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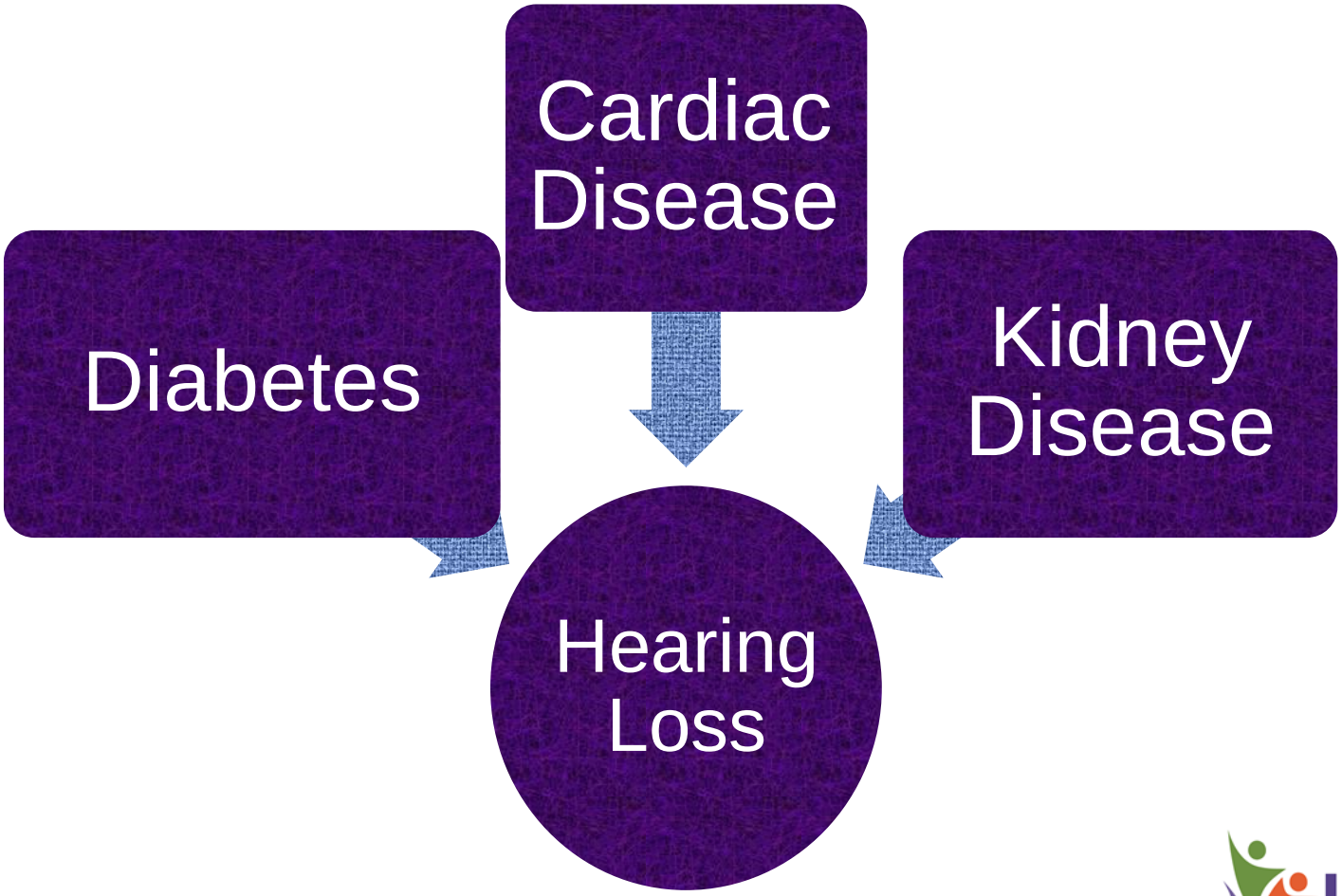
Medical Conditions that can cause hearing loss in older adults



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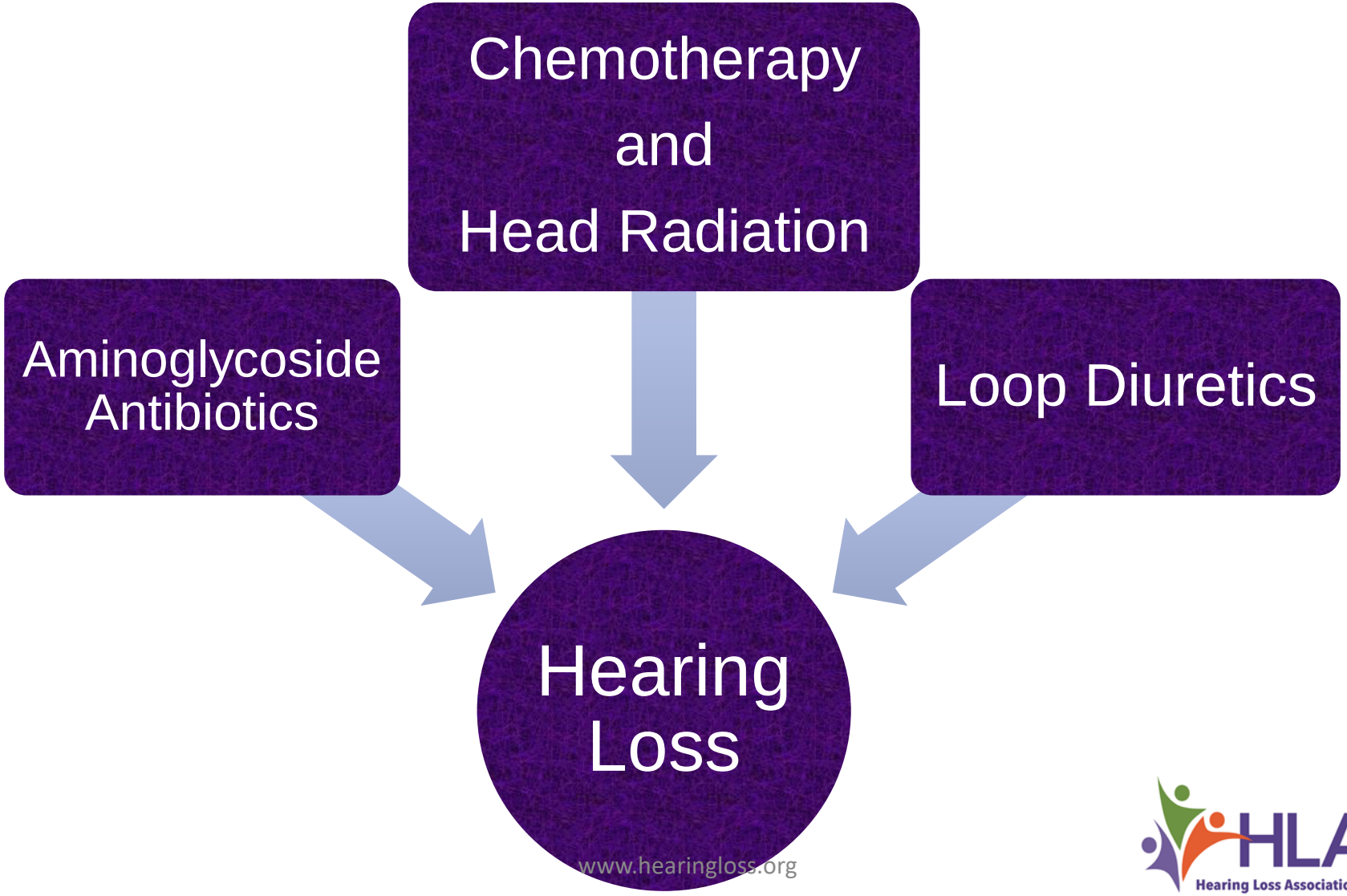
Some life prolonging treatments can cause hearing loss



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Hearing Loss and Physical Function

- **Psychosocial Function**

***Hearing loss linked to increased risk of depression [1] and loneliness [2]**

[1] Saito, et al., *J.American Geriatrics Society*, *2010*
[1] Gopinath, et al., *Age and Aging*, *2012*
[2] Pronk et al, *Int J of Audiology*, *2011 (only for men & non-aided HL)*

***Increased social isolation linked to hearing loss**

Wallhagen et al., *JAGS*, 2001
Weinstein & Ventry, *J Speech, Language & Hearing Res*, 1982

- **Physical Function**

***Hearing loss is linked to increased risk of falls**

Viljanen et al., *JAGS*, 2009
Lin and Ferruci, *Archives of Internal Medicine, 2012*

***Greater levels of hearing loss associated with poorer function**

Chen et al, *JAGS, 2014*

- **Driving Ability**

***Individuals with hearing loss more likely to stop driving**

Gilotra et al., *Clinical & Experimental Ophtalmalogy, 2001*

***Hearing loss associated with significantly poorer driving performance in the presence of auditory distractors)**

Hickson et al., *JAGS, 2010*

Perhaps the biggest reason why hearing loss should be a concern for those of us involved with aging adults:

- Recent studies confirm a definite and positive link between hearing loss and dementia
- The more hearing loss, the higher the likelihood of a person developing dementia

Archives of Neurology February, 2011
Johns Hopkins and the National Institute on Aging

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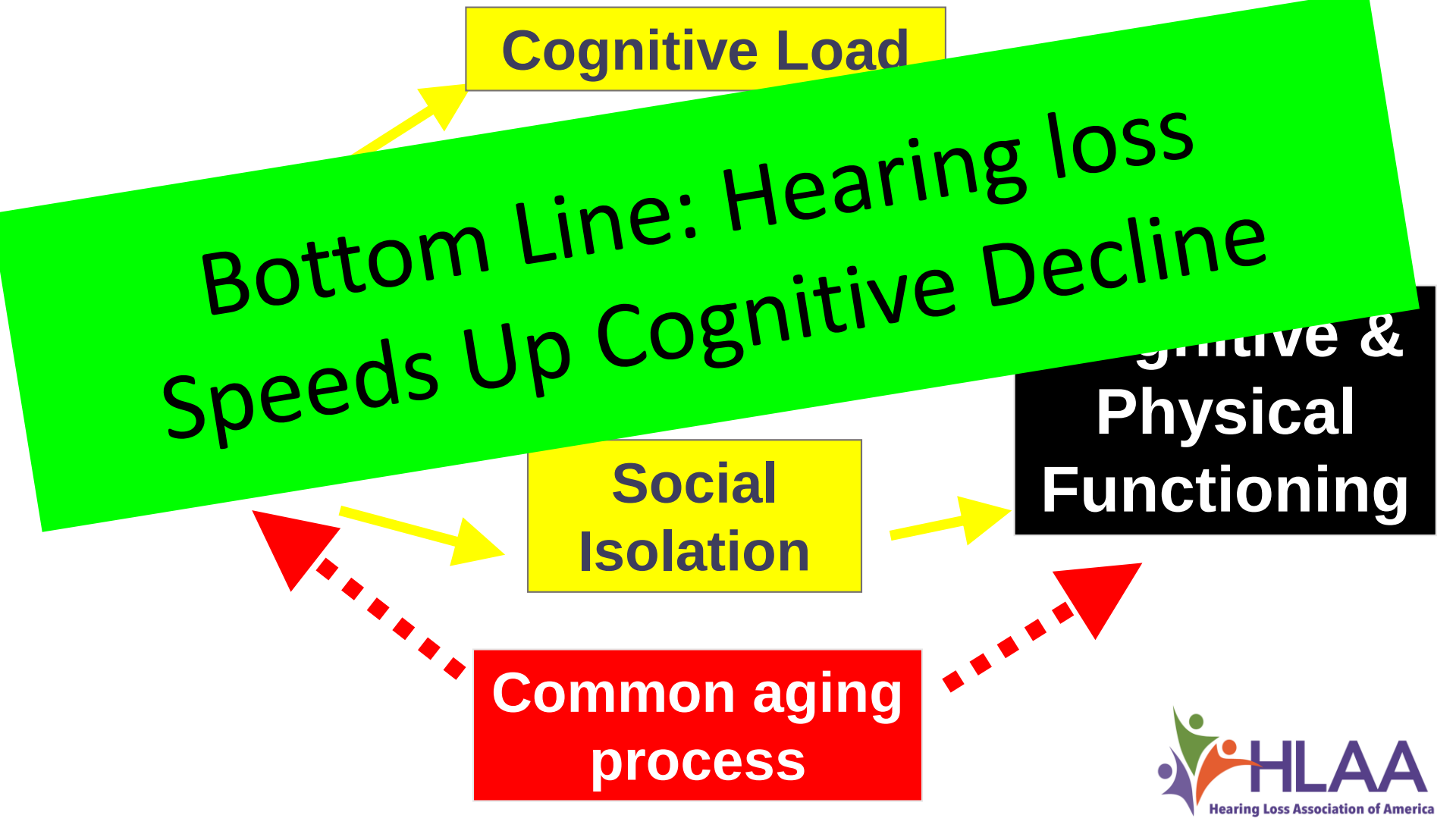
Hearing Loss & Healthy Aging

Common Cause? **or** *Modifiable Risk Factor?*



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Good news:

A 25-yr-long study by Helene Amieva, PhD (J of Am Geriatrics Society -Oct 2015) concluded:

People >65 years, who opted to treat hearing loss, experienced a rate of cognitive decline at a level similar to their peers without hearing loss.

This study confirmed Dr. Frank Lin's results that HL Is associated with cognitive decline and that using hearing aids – attenuated the cognitive decline in adults presenting with hearing loss.

And how can Hearing Loss not be associated with cognitive decline?

- It is hard to remember someone's name…
  if the introduction ***was not heard***
- It is difficult to remember a previous conversation…
  when that conversation was ***only partially heard***
- One cannot be compliant when…
  the request was not heard
- How can you discuss a television program if…
  the television dialogue or the news **was not heard?**

Typical hearing loss symptoms

✓Misunderstanding conversations or questions

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Typical hearing loss symptoms

- ✓Misunderstanding conversations or questions
- ✓Inconsistent responses to soft or distant speech
- ✓Frequent requests for repetitions or clarifications
- ✓Favoring an ear or cupping hand behind the ear to hear
- ✓Turning up TV or radio (particularly when in own room)
- ✓Withdrawal from conversations in background of noise (Especially in the dining room or at group gatherings)
- ✓Difficulty hearing in poor acoustical environments such as church or larger gathering spaces/lectures

So what to do about hearing loss? It depends…

- The degree of hearing loss
- The needs of the person with hearing loss
- Individual motivation

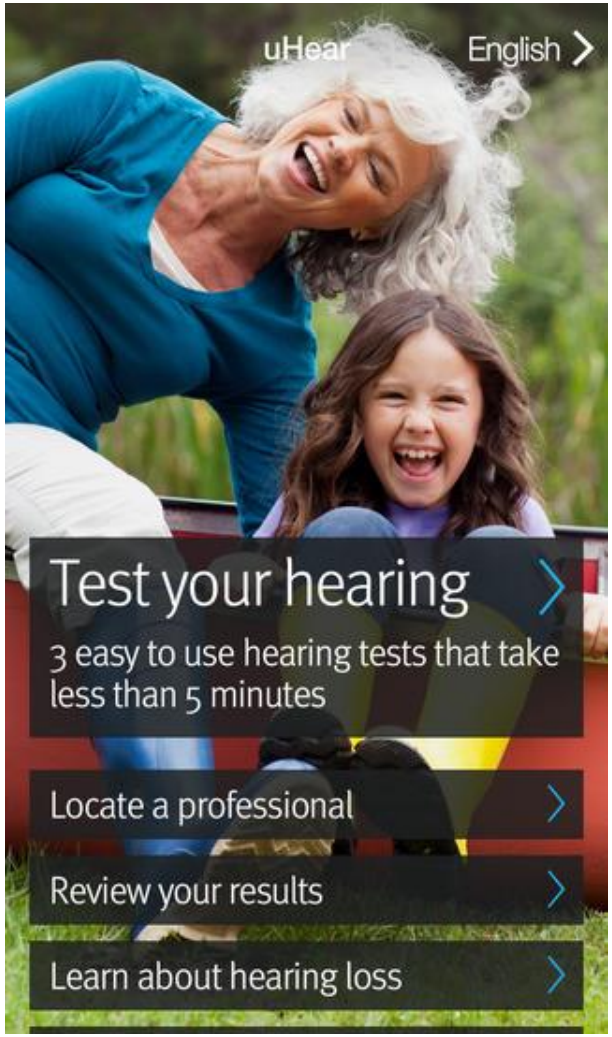
<u>One thing is certain</u>: It is important that hearing loss is addressed early. Hearing aids can only work with the hearing left, so the earlier detection, the easier it will become to adjust to them.

- Yet only 1 in 4 with significant HL seek treatment
- After waiting 7-10 yrs
- Only 12% of those with significant hearing loss use their hearing aids

Self-Assessment

- Smart phone app by Unitron – “uHear”

- Practical – and includes
  Questionnaire
  Hearing Test
  Speech in Noise test



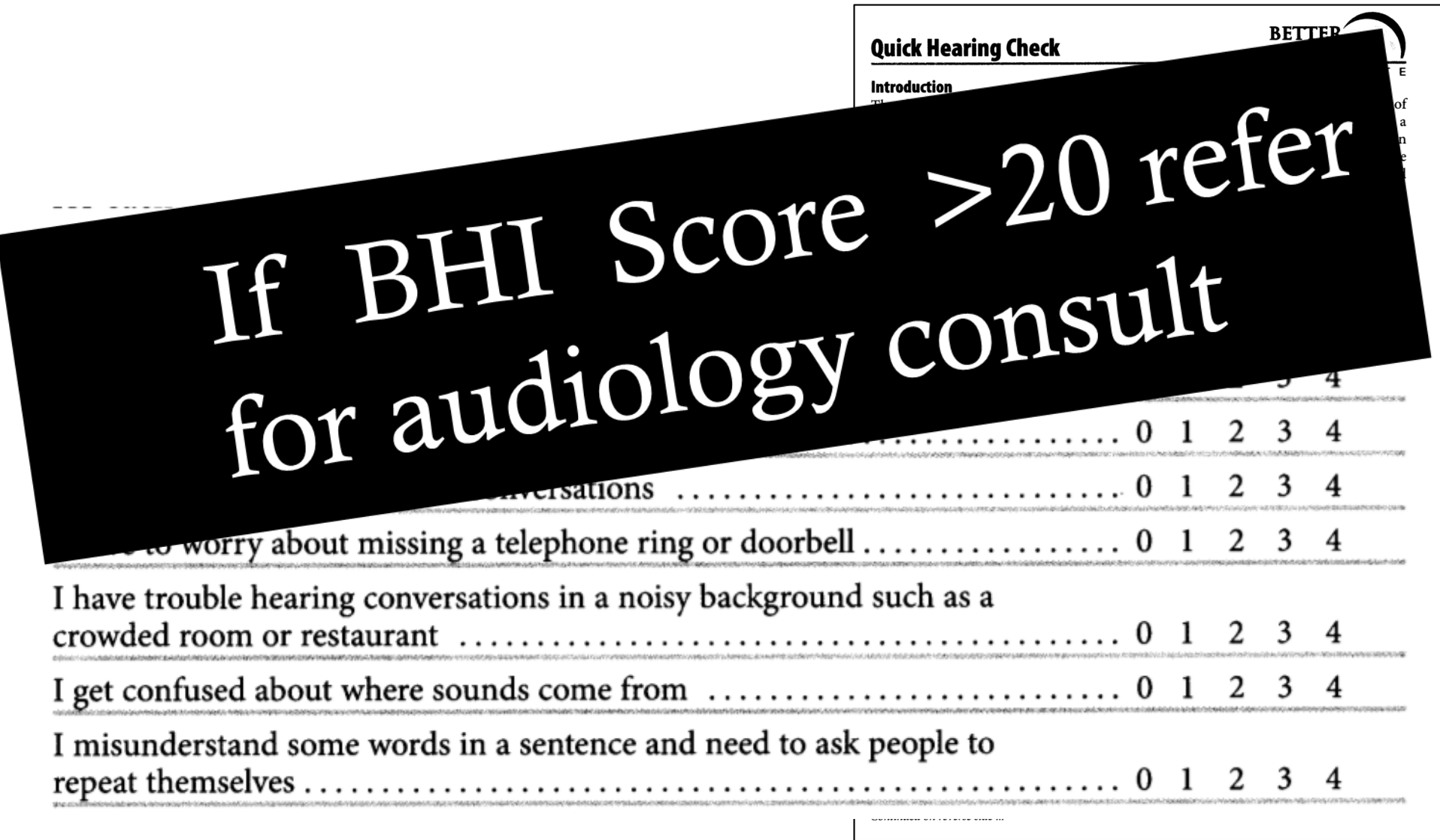
“Paper and Pencil” Hearing Test

Quick Hearing Check
Kochkin, S. & Bentler, R. (2010).

The validity and reliability of the BHI Quick Hearing Check.
Hearing Review, 17(12), 12 – 28

(*See Handout)

BHI Quick Hearing Check (Better Hearing Institute)
Paper and Pencil 15Q “hearing test”:



Quick Hearing Check

Introduction

If BHI Score >20 refer for audiology consult

.....	0	1	2	3	4
...versations	0	1	2	3	4
...worry about missing a telephone ring or doorbell	0	1	2	3	4
I have trouble hearing conversations in a noisy background such as a crowded room or restaurant	0	1	2	3	4
I get confused about where sounds come from	0	1	2	3	4
I misunderstand some words in a sentence and need to ask people to repeat themselves	0	1	2	3	4

www.hearingloss.org/wp-content/uploads/HLAA_DoYouThinkYouHave_Hearing-Loss.pdf?pdf=DoYouThink

(*See Handout)

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Some Low cost options

Pocketalker
(Handheld amplification device for one-on-one conversations)

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Use a Smart phone with a sound amplification app

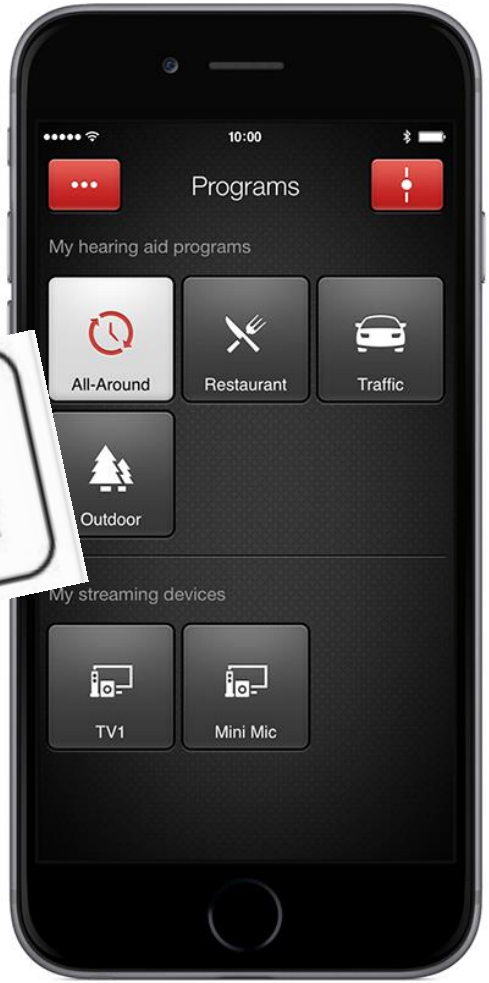
(Such as: SoundAMPR, Jacoti Listen App. uHear)

Use of PSAPs
Personal **S**ound **A**mplification **P**roduct

- "Over the Counter "hearing aids"
  (Cost <$100-500) - FDA is creating an OTC category
- PSAPs are becoming more sophisticated and many look & work very much like hearing aids
- **But: Require on-your-own "tech-savvy users"**

https://hearinghealthmatters.org/hearingnewswatch/2019/jama-study-compare-premium-hearing-aids-psaps-mild-loss/

Hearing Aids:



"It's a special hearing aid. It filters out criticism and amplifies compliments."

Important hearing aid features:

- 1. Noise suppression &
- 2. Directional microphones
  1+2 make listening more comfortable – but do not improve understanding
- 4. Rechargeability – good for those with dexterity issues
- 3. Volume Control - Remote Control - App
  RC is good if user has dexterity issues and will allow volume changes
  Having a volume control has been shown to improve user satisfaction
- 4. **Telecoil*** for listening on the telephone, in a hearing loop and with other ADA systems to make hearing possible in public venues

***** The telecoil feature is usually free/a low cost option

Additional (optional) features

- 5. Bluetooth devices –
  Can connect to cell phones, though some are tricky to “pair,” its use not easy to master and will add to the cost
- 6. TV “streamer” – streams TV sound direct into ears & (IMHO) ***one of the most user appreciated features***

Note: The user’s needs, ear-canal anatomy, type & degree of loss, earwax issues, dexterity, net cost outlay etc. dictates model of hearing aid

https://hearingloss-wa.org/cms/wp-content/uploads/Final-Buy-Hearing-Aid-Brochure-Washington.pdf

(*See Handout)

Buying Hearing Aids in Washington
(What to expect)

Audiologists and **Hearing Instrument Specialists (HIS)** are licensed to sell hearing aids in Washington. Both are trained to test hearing, fit and adjust hearing aids. Audiologists have a master's or doctoral degree in audiology. They are trained to interpret test results from a medical perspective and to use advanced testing to determine the need for further medical treatment. HIS are qualified to fit and adjust hearing aids and to recognize problems that require referral to an audiologist or medical doctor. Your primary care physician and people you know who use hearing aids, may be good resources for choosing a dispensing professional.

The Hearing Evaluation

A **screening or hearing exam**—Hearing screenings are quick pass/fail tests designed to let you know if you need further hearing evaluation. Hearing exams determine the degree, type and configuration of your hearing loss. They are conducted in a sound proof booth, and must be done prior to your being fitted with hearing aids. A proper hearing exam will include testing your comprehension of spoken words, and should include **Speech in Noise** testing as well.

Your audiogram—An audiogram is a graph that displays the results of the hearing exam. Pure tone audiometry is used to identify hearing thresholds (the softest heard) at different pitches in both ears. An audiogram also displays comprehension results of spoken words in both quiet and in noise. Pure tone and speech comprehension audiometry, as depicted on an audiogram, provide information needed for proper hearing aid fitting.

Types of Hearing Loss

Sensorineural Hearing Loss occurs when the the cochlea and/or the auditory nerve is damaged or malfunctioning, making it unable to accurately send information to the brain. Almost always permanent, nearly always improved with modern hearing aids.

Conductive Hearing Loss occurs when there is a problem with the Outer or Middle Ear that interferes with sound passing to the Inner Ear. Causes include infections, impacted ear wax (cerumen), fluid buildup, a damaged eardrum, or abnormal bone growth in the Middle Ear. An exam by an Ear-Nose & Throat (ENT) physician is suggested.

Mixed Hearing Loss means both Sensorineural and Conductive loss are present. While the sensorineural component is likely permanent, the conductive component may or may not be and warrants an ENT physician examination.

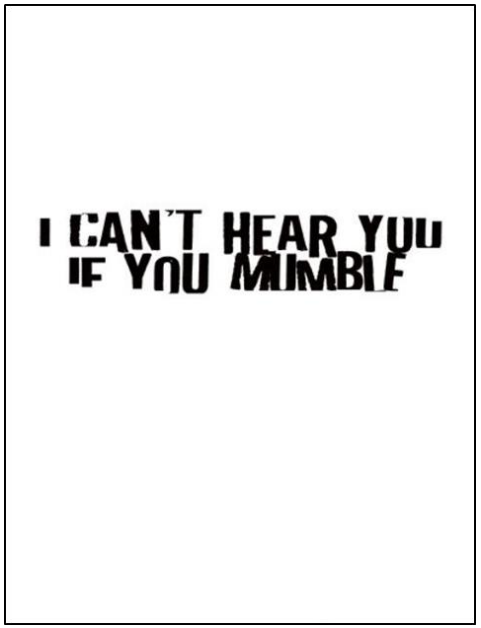
Consumer Advice:

- Request audiologist follow "**Best Practices**" Protocol and **Real Ear Probe Microphone measurements**: http://audiologist.org/_resources/documents/publications/clinical/Hearing_aid_fittings_best_practices_for_the_busy_audiologist.pdf
- Does the audiologist/provider offer a trial period? (Usually 30 day-some 60 or 90 days – *negotiable*)
- Are "Get more from Hearing Aids" classes offered?
- If "top of the line" HAs are recommended – ask to try/compare with a set of more "basic" hearing aids

.

Cox RM et al: Impact of advanced hearing aid technology on speech understanding for older listeners with mild to moderate, adult-onset, sensorineural hearing loss. ***Gerontology, 2014; 60(6):557-68***.

Spouses or family can help (a LOT!)



Other (low cost) recommendations:

Employment of good meeting strategies

- Seating arrangements
  (Use a circle / sit around a table – to allow lip-reading)
- Captions for movies or videos on TV
  Seattle City Council requires TVs in business to activate captions
- "Like the Mic" – when using PA systems
- Coach presenters on clear speaking habits and passing the mic around *(Yes, this takes practice)*

Where are hearing aids helpful?

Hearing aids are most useful in quieter situations (offices and homes) and in small groups, though individual hearing ability varies widely

1. Effective range for many is under 10’ (& for some < 3-5’)
2. In large public places hearing aids make <u>all</u> sounds louder, limiting benefit to the user
3. And some hearing loss is so severe – that understanding speech is *very* limited –

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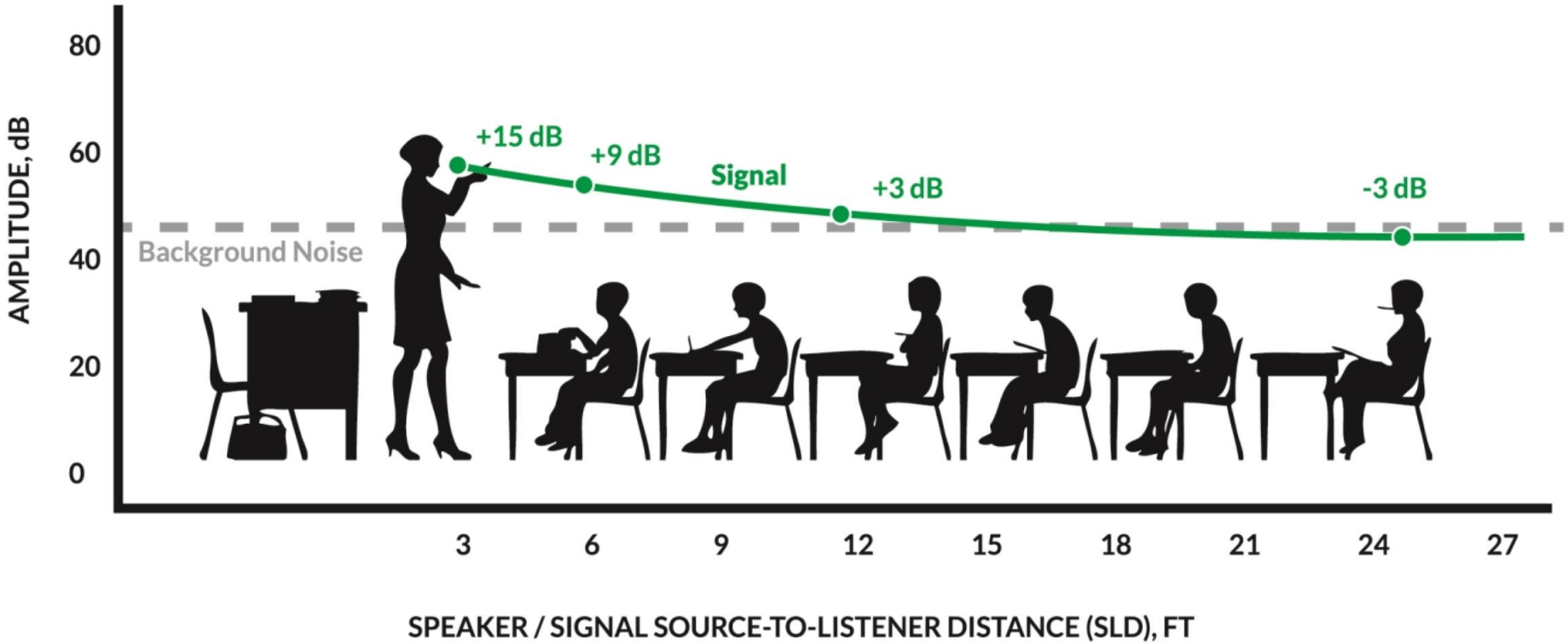
In many public places – speech is difficult to hear due to:

- Reverberation (echoing)
- Distance & Time delays
- Background Noise



Why the complaints?

PWHL and “Aging Ears” require a boost in volume as well as an improvement in *Signal-to-Noise ratio (SNR)*

This SNR improvement can **only** be improved by:

1. Moving closer
2. Using a PA system to increase volume (but even that is often *not* enough)
3. Using an Assistive Listening System (ALS) as mandated by the Americans with Disabilities Act (or the “ADA”)

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Using a public Assistive Listening System requires a telecoil

The original ADA law (1990)
& the updated ADA Standards (2010)
are written to the benefit of HA users as
by mandating hearing loops and neckloops

Yet hearing aid users aren't told about the ADA
& the benefit of having a telecoil in a hearing aid

courtrooms, public meeting rooms, auditoriums, theaters, stadiums, convention centers, churches and more

- **Where?**

  Where PA systems are in use

Assistive Listening Systems are like having an “extra set of "ears.”

. . . that can be moved across the room and placed next to the talker’s mouth.

http://www.audiologyonline.com/Articles/article_detail.asp?article_id=561

Telecoils: a useful low cost option available in most hearing aids

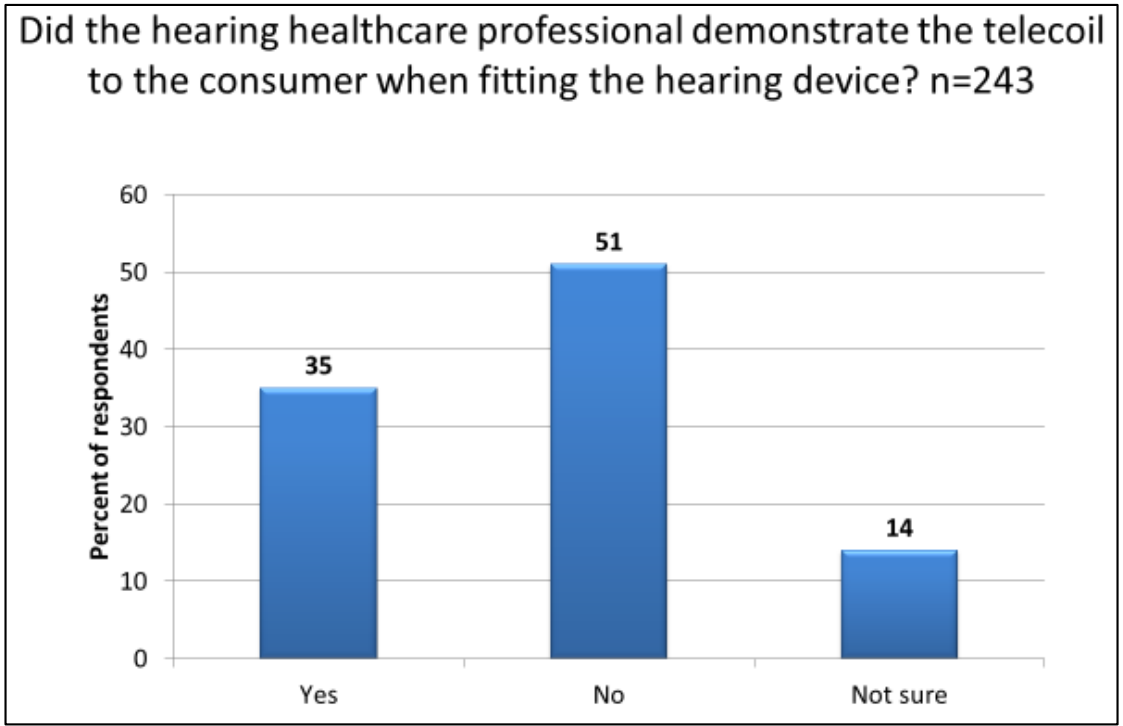
Consumer Desire for Telecoil Information

When asked, "If you are hard of hearing, do you believe audiologists and dispensers should be required to counsel their clients on telecoils prior to fitting them with hearing aids?" **95% of survey respondents answered "YES."**[4]

When asked, "If you are hard of hearing, would you like to see a law requiring such telecoil counseling in your state?" **92% of survey respondents answered "YES."**[5]

97% of experienced users: would never buy a hearing aid without a telecoil

Yet, audiologists and hearing care providers not consistently counsel on the benefits of telecoils



Kochkin et al (2014)
www.hearingreview.com/2014/09/consumer-perceptions-impact-inductively-looped-venues-utility-hearing-devices/

New Washington State Law Helps People with Hearing Loss

Governor Inslee signs Senate Bill 5210 into law April 29, 2019

Good News for Hearing Aid Consumers

In April 2019, Governor Inslee signed into law Senate Bill 5210. This law requires any person who engages in fitting or dispensing hearing aids to inform their customers – prior to fitting – about the uses, benefits, and limitations of current hearing assistive technologies, considering solutions that are compatible with the public Assistive Listening Systems required by the Americans with Disabilities Act (ADA).

When consumers have a telecoil they can benefit from ADA recognized Public Assistive Listening Systems

The ADA recognizes 3 Types of systems

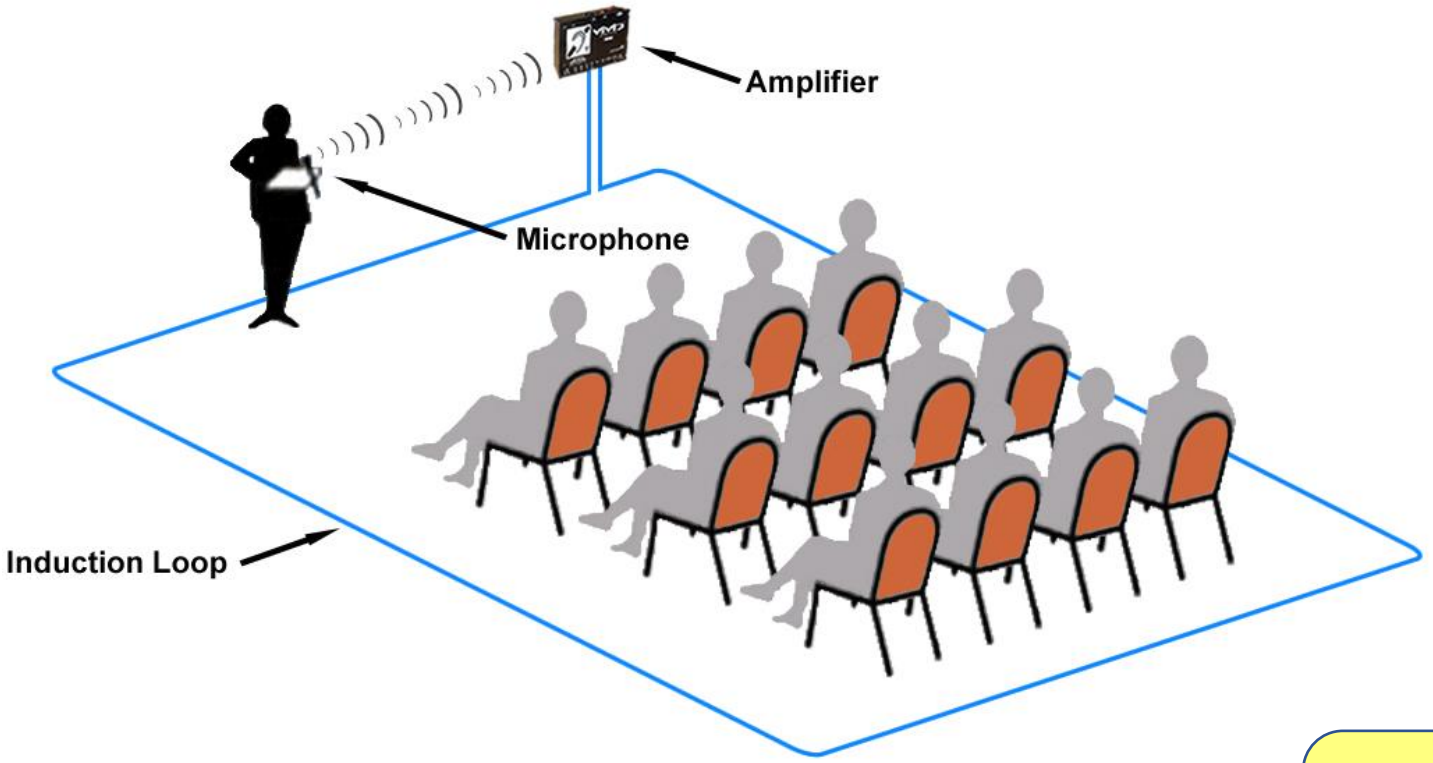
1. **FM/RF systems**
2. **Infra red systems**

   Requires users to self identify & pick up a receiver prior to the lecture/service/show. The law **requires** 25% of the listening receivers be hearing aid compatible via **neckloops**

3. **Hearing loops,** which are user preferred, allow user to use their own programmed hearing aid as the receiver

How to know what kind of ALS is offered?

Hearing Loop diagram



Sound (Voice from speaker)

Microphone

Hearing

Amplifier

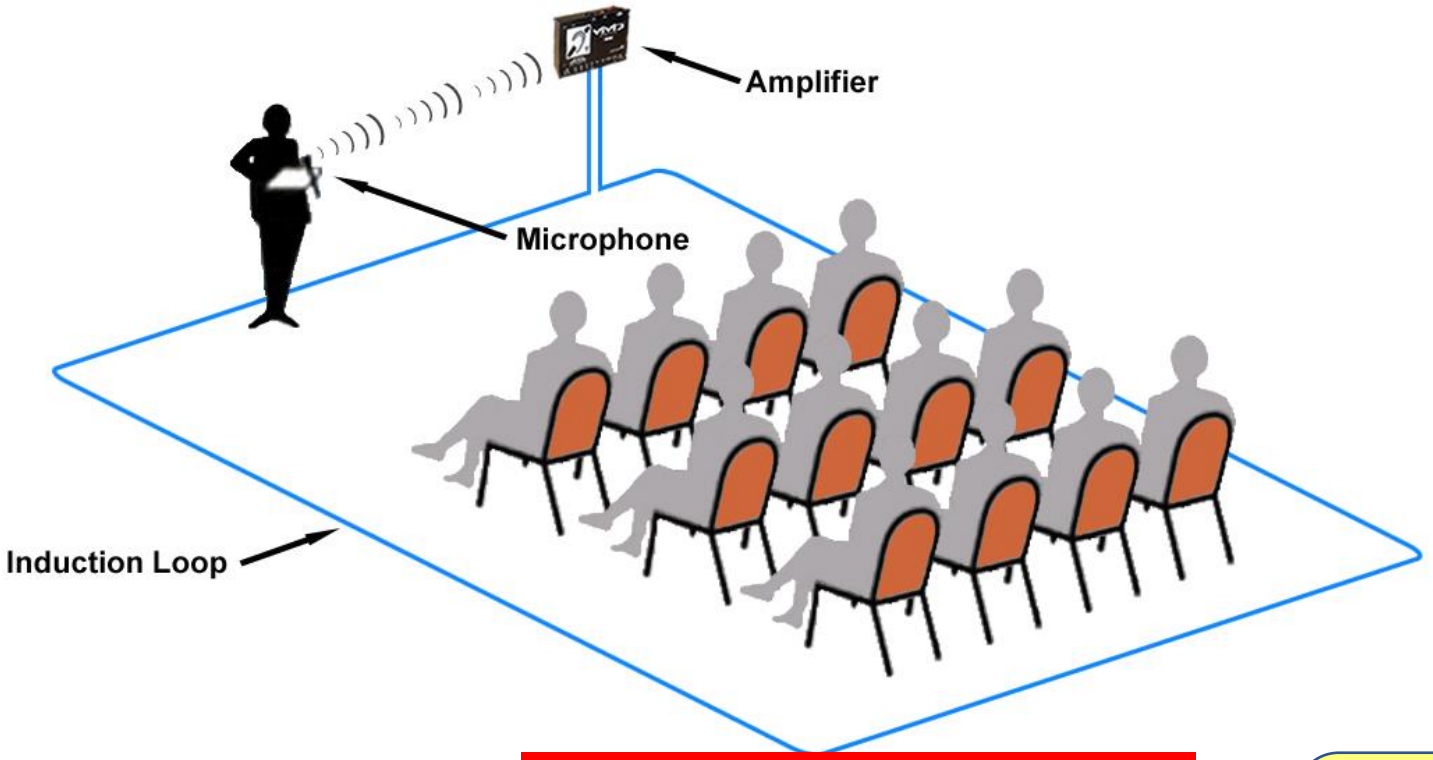
wire

T-coil in Hearing Device

This speaker's Mic

***Becomes* the HA Mic**

Why do loops benefit hearing aid users?

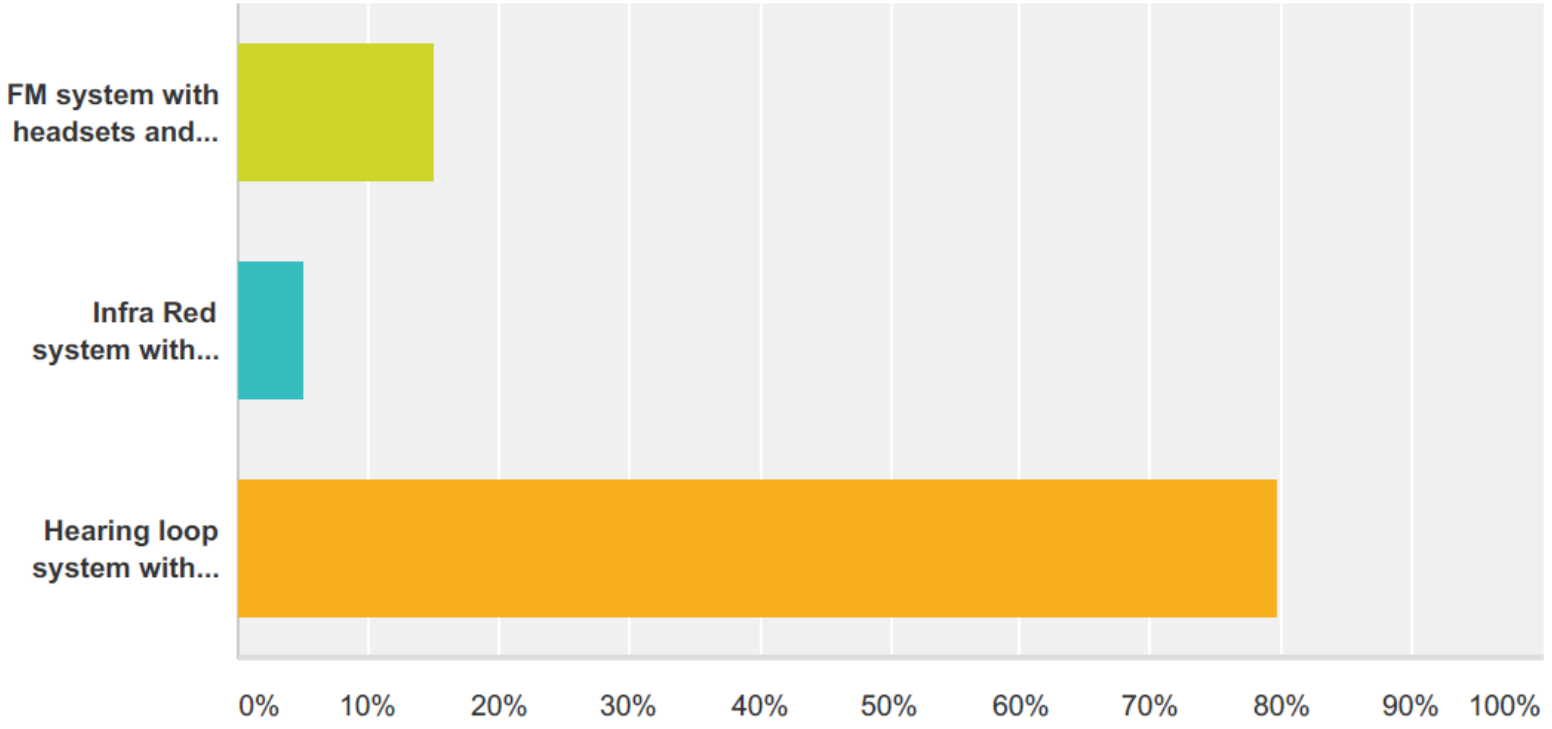


Sound (Voice from speaker) → **Microphone** → **Wireless connection to the sound system Clearest Sound possible for the user** → **T-coil in Hearing Device**

Benefits of Loops over other systems

- Broadcast sound in form of magnetic waves *wirelessly* to hearing aids equipped with a telecoil –direct HAC
- No need to pick up a separate device
- Hearing loops are inconspicuous and easy to use
- Universal Worldwide system
- No Hygienic concerns with headphones
- Hearing aid is programmed for the user's hearing loss
- Greatly enhance the utility of hearing aids

Do consumers have preferences as to Type of Assistive Listening System?



Steve Frazier
n=337 (2016) 79% of consumers prefer hearing loops over FM or IR

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Telecoils and Looping in recent hearing industry media

THE HearingReview

NEWS PRODUCTS BUYER'S GUIDE RESOURCE CENTER BLOGS

RESEARCH

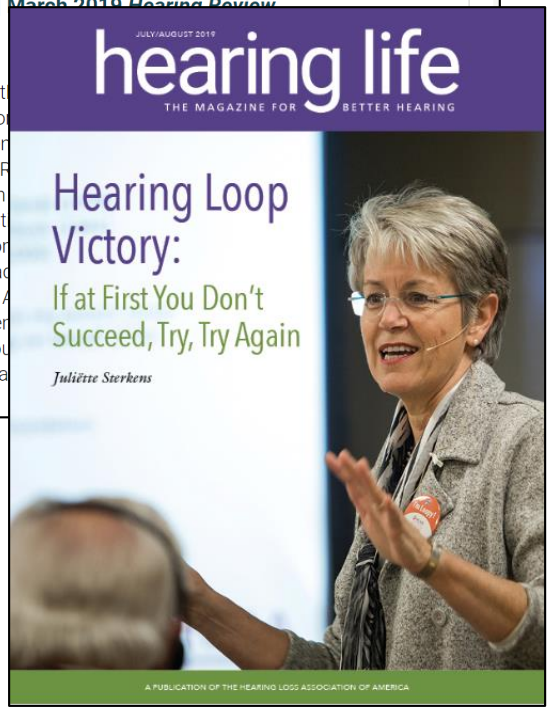
Telecoils and Hearing Loops: An Interview with Juliëtte Sterkens, AuD

Published on February 18, 2019

Inside the Research | March 2019 *Hearing Review*

By Douglas L. Beck, AuD

It's probably safe to say t
professional advocate fo
Sterkens, AuD. Dr Sterker
Speech Pathology from F
Arizona School of Health
retired from private pract
Hearing Loss Associatio
Advocate. For her past a
including the Wisconsin A
Audiology (AAA) Presider
from her alma mater. You
professionals gather. I ca



THE HearingReview

NEWS PRODUCTS BUYER'S GUIDE RESOURCE CENTER BLOGS

BLOG

Perspectives: Hearing Care Offices Getting in the Loop

Published on September 11, 2019

By Stephen O. Frazier, Hearing Loss Support Specialist

From Faull Audiology in Jacksonville, Fla to Ko'olau Aud
Services in Kailua, Hawaii, hearing care offices are begi
hearing loop/telecoil technology to benefit both their cli
practices. An Internet search today for "hearing care an
find offices in nearly every state that have devoted spac
hearing loops/telecoil technology in a clear demonstrat
actively promoting the time-tested technology with thei
show their commitment to the technology, many are ins

America Is Getting in the Hearing Loop

BY STEPHEN O. FRAZIER

HLAA leaders could have been singing the old Steve Allen lyrics, "This could be the start of something big" when, in partnership with the American Academy of Audiology, they kicked off the Get in the Hearing Loop (GITHL) campaign in 2010. Back then there were just a few formally organized efforts, such as Loop New Mexico and Loop Wisconsin, promoting awareness and the availability of hearing loops in public places. But only in Michigan, thanks to the groundbreaking work of Dr. David Myers of Hope College, and at many of the nation's HLAA Chapter meetings did hearing loops have any real presence.

The creation of the GITHL campaign really was the start of something big and it has inspired an impressive consumer-driven effort that stretches from coast to coast. There are now nearly three dozen looping campaigns sponsored by HLAA Chapters and State Organizations and a handful of other nonprofit efforts such as Loop Minnesota and Let's Loop Tucson. Sertoma clubs around the country are promoting the technology as part of their national "A Sound Investment" campaign, often fully or partially funding the looping of local nonprofit venues.

Hearing health care offices are beginning to promote hearing loops on their websites and the technology is also being adopted by business and governmental entities with growing speed. In many communities, like Kearney, Nebraska (population 34,000) and Lawrence, Kansas (population 95,000), cities with no local HLAA chapter, HLAA members have successfully advocated for hearing loops and now more than two dozen places of worship, theaters and other public places are featuring the technology in those two cities.

From Local to National

The Minnesota Governor's signing of a Capital Improvement Appropriations Bill last May didn't just appropriate money, it placed a law on the books requiring that future construction of, or improvements to, all state-funded gathering places equipped with a public address system must also be equipped with an assistive listening system using hearing loop technology. The Minnesota action was mirrored in New York City,

Hearing Loop initiatives around the country

HLAA Hearing Loss Association of America
GET IN THE HEARING LOOP

- 39 HLAA member led hearing loop initiatives all receive support from GITHL advocates

Most active states: Arizona - California – Colorado - Florida – Michigan – Minnesota - New Jersey - New York – New Mexico – North Carolina - Ohio - Oregon – Rhode Island – Washington - Wisconsin

Oklahoma Hearing Loop Initiative

Texas Hearing Loop Initiative

Let's Loop Coloradol
Hearing Loop

Loop Miami

LOOP NEW MEXICO
www.LoopNM.com

America's Hearing Land
LOOP WISCONSIN

LOOP MINNESOTA

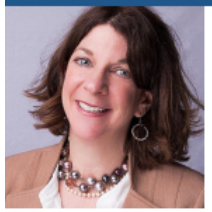
Loop Washington
CREATING HEARING FRIENDLY COMMUNITIES

Let's Loop Arkansas!
Hearing Loop Initiative

New Legal Requirements are emerging

- Consumers in several states are working to change (or have already changed) dispensing , CE and/or ALD laws

UT, CA, AZ, NY, IA, IN, DE, MA, NM, CO, WA, WI



Minnesota Law to Expand Hearing Loop Access

By Kim Fishman and Justin R. Burwinkel

Our patients' access to hearing loops has never been greater, as the successes of Minnesota's local activist group, Loop Minnesota, continues to mount. According to the group, the number of hearing loops available in Minnesota doubled in 2017 and new legislation is expected to contribute to this rate of growth going forward.

The Minnesota law, which requires good acoustics and hearing loops in state-funded construction, is the first of its kind and sets a new precedent nationally. The Commission of Deaf, Deafblind & Hard of Hearing Minnesotans celebrated the achievement and its benefit to individuals with reduced ranges of hearing, "From now on, whenever the state helps pay for construction or remodeling of a public gathering space in which it's important to be able to hear, contractors will be required to consider including good acoustics and hearing loops." The law applies to all meeting and conference rooms in capital funded buildings, throughout Minnesota, where the intended capacity is for at least 15 listeners.

The respective bills (Senate File 161 and House File 423) were authored by the following State Senators and State Representatives:

- Ann Rest (New Hope)
- John Hoffman (Champlin)
- Julie Rosen (Vernon Center)
- Matt Klein (Mendota Heights)
- Dave Senjem (Rocheste
- Tama Theis (Saint Cloud)
- Jeff Howe (Rockville)
- Tim O'Driscoll (Sartell)
- Paul Anderson (Starbuck)

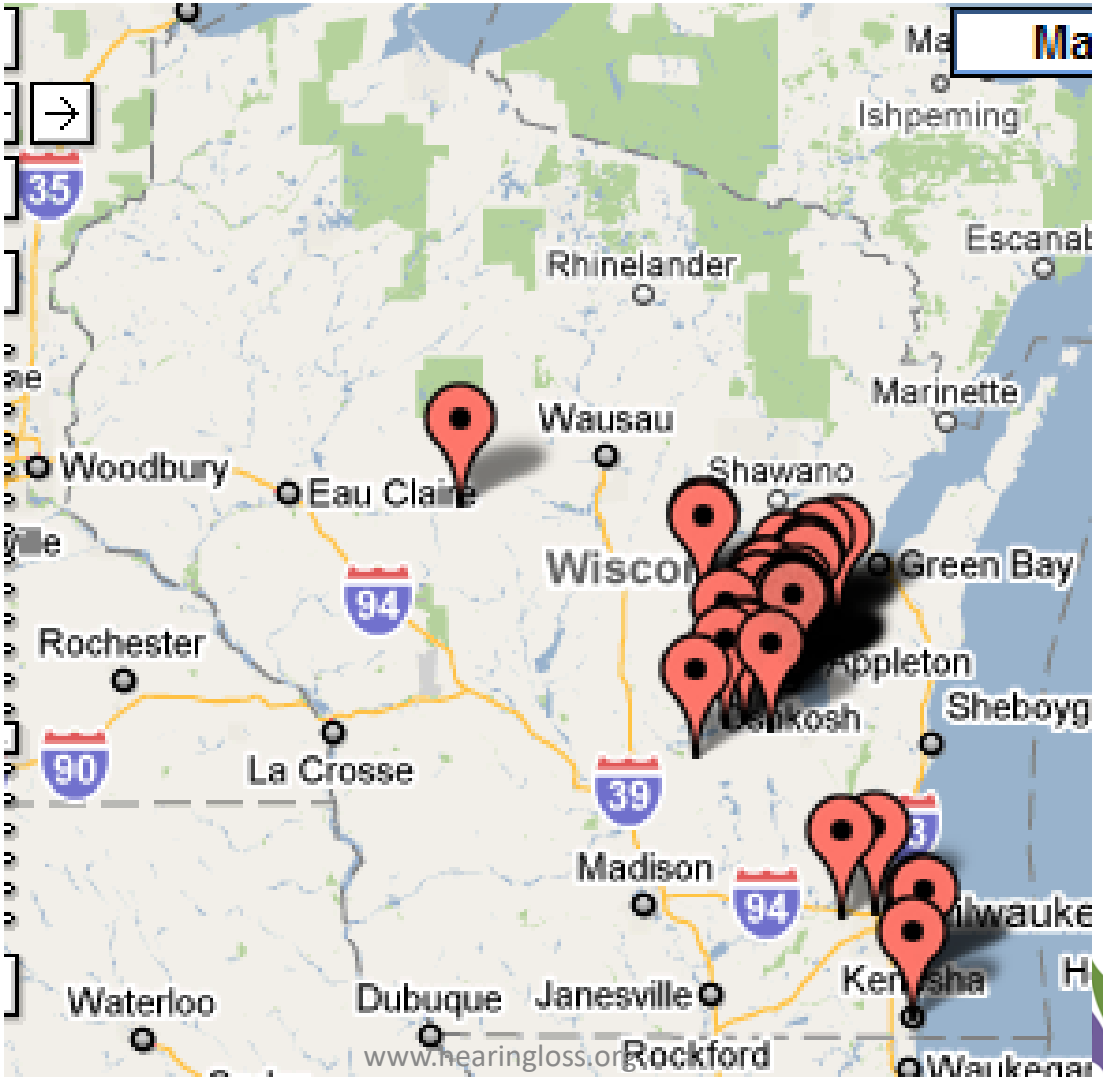
More legislation is expect
laws which require dispen
patients about the availabi
patients do not know that
where they already visit a
benefit from switching ov
are not well-informed abo
audiologists, need to facili
the benefit of our patients

In Minnesota, patients ca
the Minneapolis-St. Paul
Owatonna Public Library
The Mill City Museum is
planning to pilot a tempo

What if a person doesn't wear a hearing aid or if their device doesn't have a telecoil?

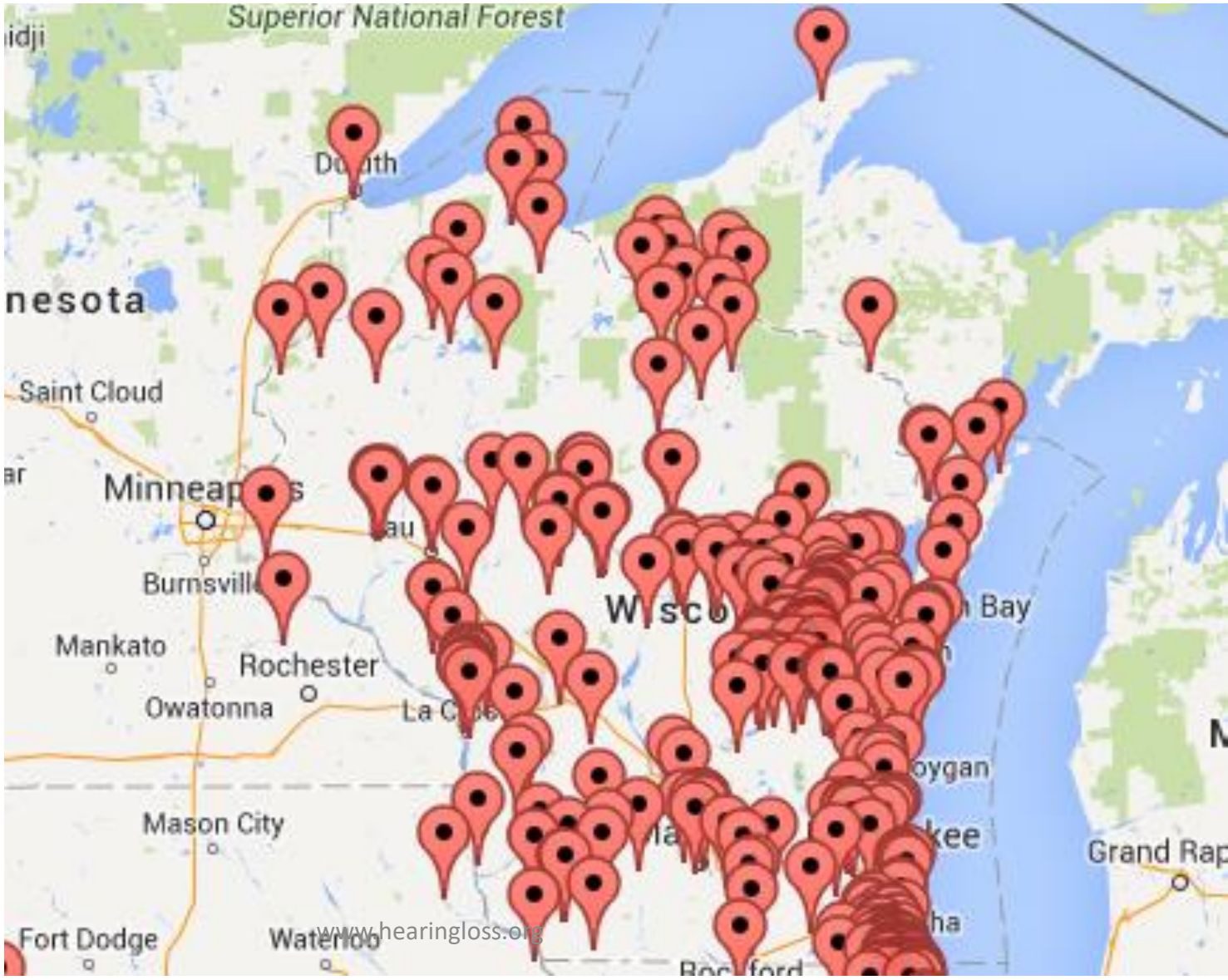
HLAA
Hearing Loss Association of America

Back in June 2010 – fewer than 25 places were looped in the Fox Valley



HLAA
Hearing Loss Association of America

Today: Some 750+ looped venues: Incl. 400 churches & 100+ libraries



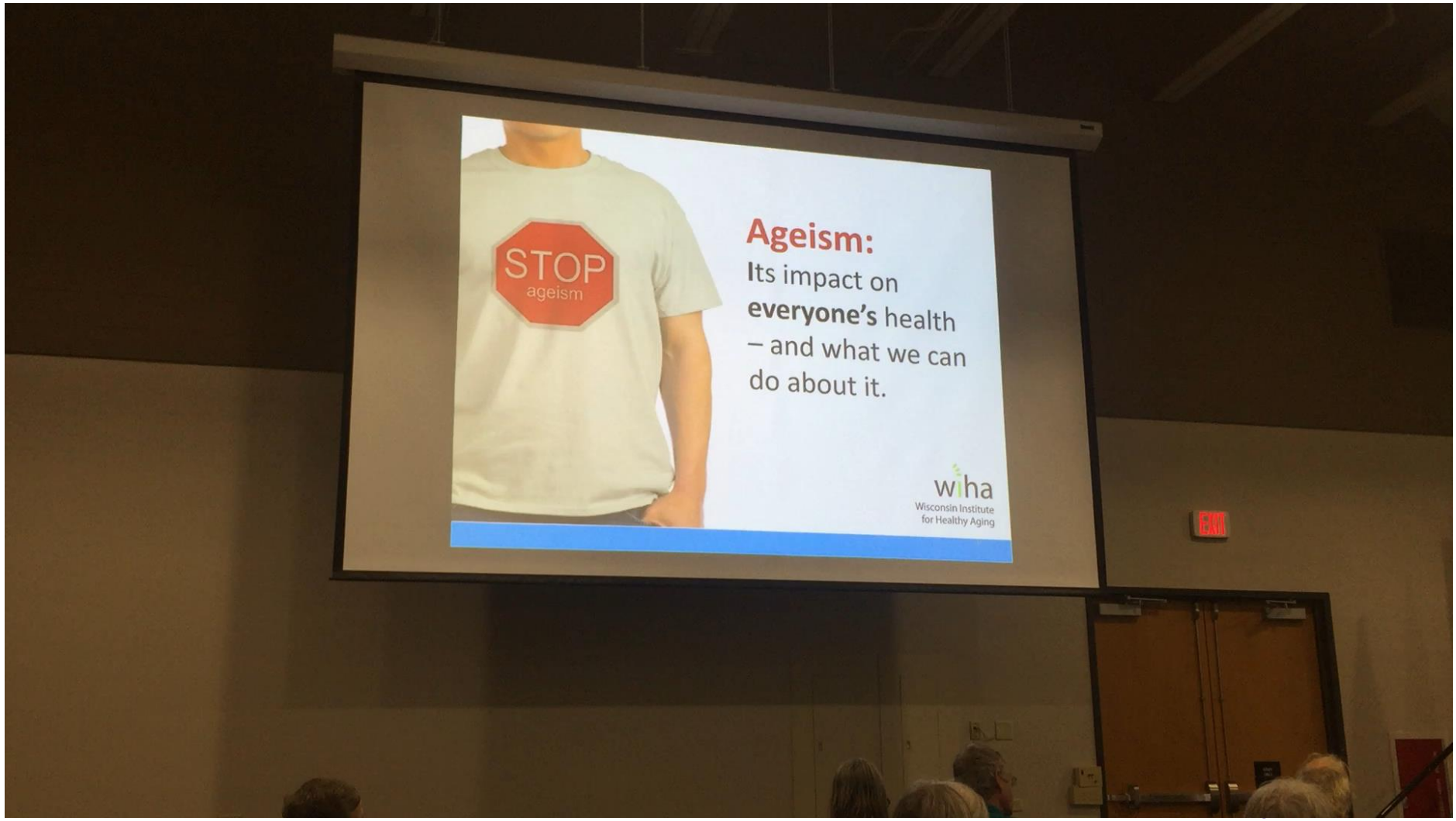
A few quotes from hearing loop users

- **Love it, love it, LOVE IT!!!**

Recently attended a meeting at the Convention Center and was able to hear well, even though I sat way in the back!

- Probably the first time in 20 years that I have been able to hear the sermon clearly…
- **It is the greatest joy to hear in a loop**

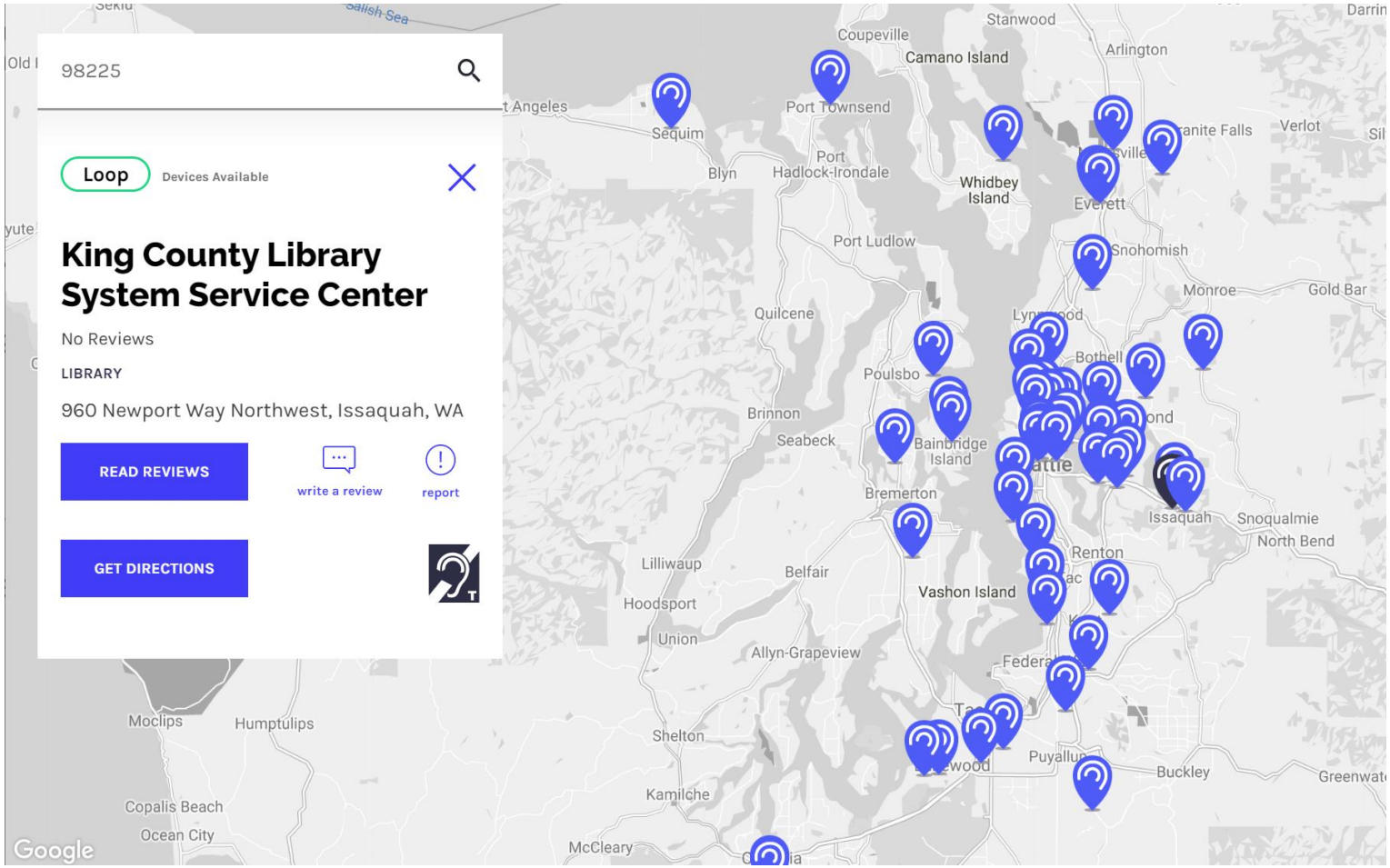
Oshkosh Convention Senior EXPO – **Out of the Loop**
– recorded with an iPhone *(much how hearing aid users hear)*



Oshkosh Convention Senior EXPO – in the Loop
- how hearing aid users would hear, using their telecoil

Progress in Washington State

www.ALDLocator.com



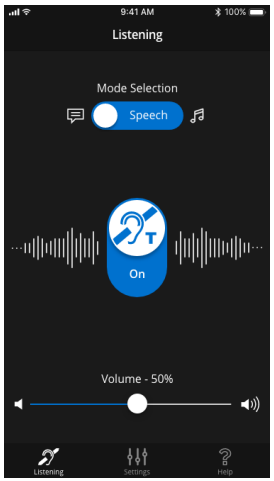
Developments in progress

Time2LoopAmerica.com

LoopFinder

ALDLocator app

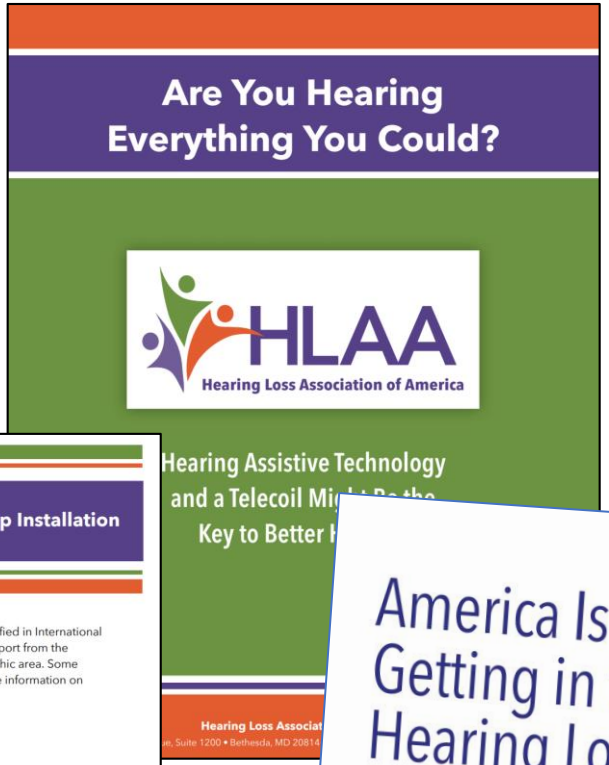
ASSISTIVE LISTENING DEVICE LOCATOR

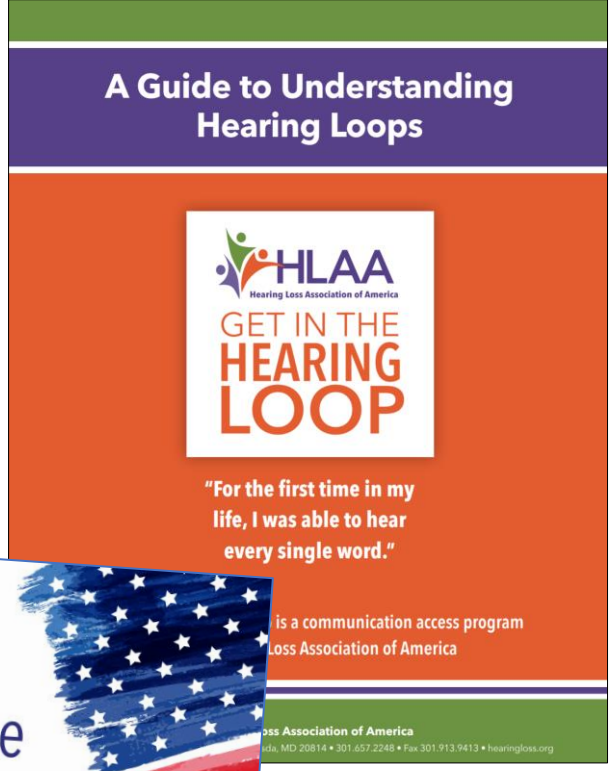


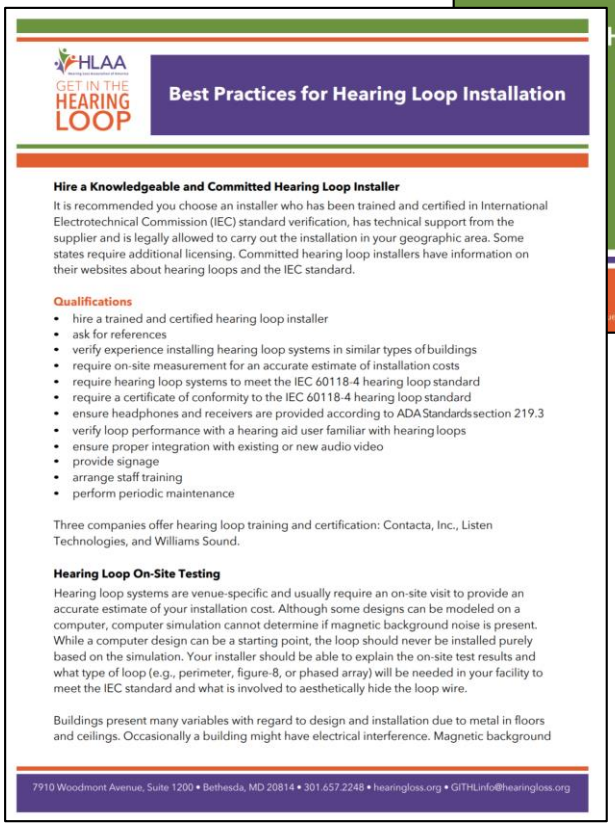
OTOJOY
If ears could smile...

Google Accessibility

HLAA GITHL Toolkit







HLAA
Hearing Loss Association of America
GET IN THE HEARING LOOP

www.hearingloss.org/hearing-loop-toolkit

Handouts:

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The needs of hard-of-hearing people are complex and multifaceted.

LOUDER Isn't Necessarily Better

By Stephen O. Frazier

Just turn up the volume and people can hear what's being said, right? Well, not really....

A loud public address (PA) system might help some who have a relatively mild hearing loss hear well enough at a place of worship, theater or city council chamber, especially if they also have hearing aids to boost just those frequencies they have trouble hearing. However, for many, loud is simply not enough. Although most with hearing aids might still be able to communicate effectively in one-on-one conversations in quieter settings, hearing and understanding in public venues—especially in large and reverberant churches—can be difficult or impossible. That's why the Americans with Disabilities Act (ADA) mandates hearing-aid-compatible assistive-listening systems in certain venues, if there is a functioning PA system.

Louder is not necessarily better for the hard of hearing. Some fundamentals of sound, along with sound-processing problems that are sometimes unique to the hard of hearing, are key in understanding the problem.

Most people who have hearing loss have difficulty hearing higher-pitched sounds or cannot hear them at all with the unaided ear. Vowels fall into the lower- to mid-frequency range of sounds typical of human speech, whereas consonants fall into the upper range. Consequently, a person who has the typical high-frequency hearing loss will have difficulty discriminating between words such as "sill" and "till." That is particularly true in a setting such as a place of worship, a legislative chamber or another place where the listener is some distance from the person speaking, and therefore following the proceedings through sound from a PA system.

Today's Hearing Aids

Today's hearing aids compensate, to some degree, for the user's inability to hear high-pitched sounds by providing more amplification for those frequencies as compared to the lower-pitched vowel sounds. And they're adjustable, so that the amplification matches the user's hearing loss at various frequencies, as depicted in his or her audiogram. With hearing aids, a hard-of-hearing person in a one-on-one situation will usually be able to hear and understand what's being said. If the speaker moves away, however, that understanding is impaired because of factors for which the hearing aids cannot compensate.

Typical directional microphones in hearing aids, intended to improve speech understanding in noisy environments, have an effective hearing range of about six feet; beyond that distance, speech can become problematic due to some fundamentals of sound and hearing. By adhering to the typical emphasis on pushing lower frequencies to make a PA system "sound good," engineers are actually making it more difficult for a hard-of-hearing person to understand what's being broadcast by that system, because they're being denied strong higher frequencies.

One of the basic rules of sound engineering is the 6dB rule of distance. Every time the distance from the noise source is doubled, the sound pressure weakens and the level decreases by 6dB. Another rule—this one is not of sound engineering, but, rather, of people's perception of sound—is the 10dB rule. To wit, people generally perceive that the loudness of a sound doubles every time the sound pressure level (SPL) increases by 10dB. Thus, a sound at 60dB will be perceived as being twice as loud as a sound at 50dB; at 70dB, it would be heard as being four times as loud. The reverse is true as the sound level is reduced.

Signal Strength By Frequency

Another problem faced by those who have hearing loss is the relative strength of sounds at various frequencies. In general, low-frequency sound waves will travel further than high-frequency waves, because less of their energy is transferred to the medium (such as a wall or even just the air) through which they are passing. This allows low-pitched sounds to be heard at a distance, whereas the higher-pitched ones will have weakened to the point that they cannot be heard.

As a result, as distance from a sound source increases, the typical hard-of-hearing person who has high-frequency hearing loss might still hear the lower-frequency vowel sounds, but he or she, regardless of whether hearing aids are in use, will

From TECHNOLOGIES FOR WORSHIP, May, 2010, with permission

LET'S LOOP America's WORSHIP CENTERS

By making assistive listening hearing aid compatible, churches are leading the way to doubled hearing aid functionality for people with hearing loss

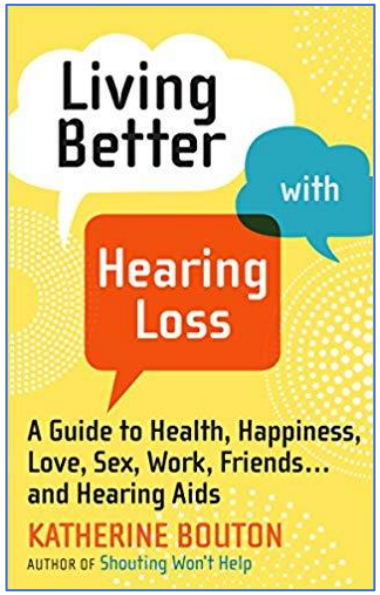
by David G. Myers

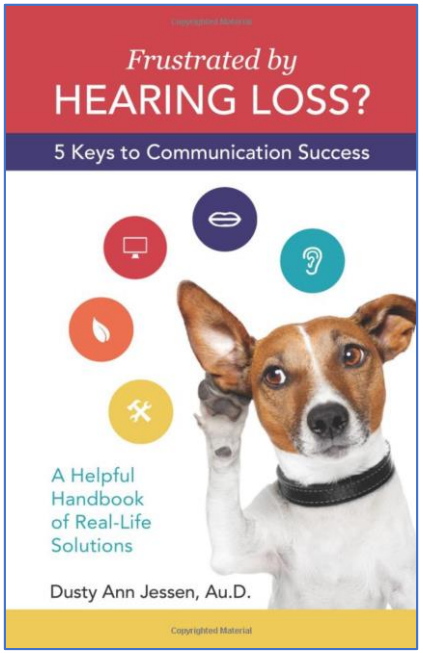
Imagine yourself as a person with hearing loss attending your place of worship. As you struggle to

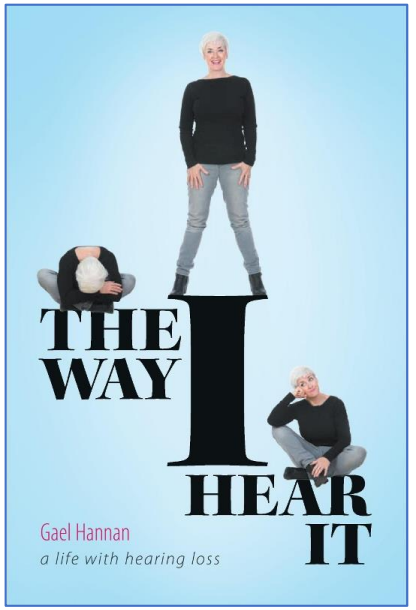
HLAA
Hearing Loss Association of America

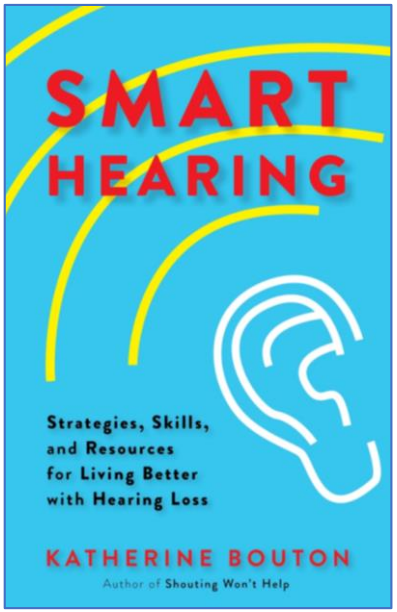
Want to learn more?

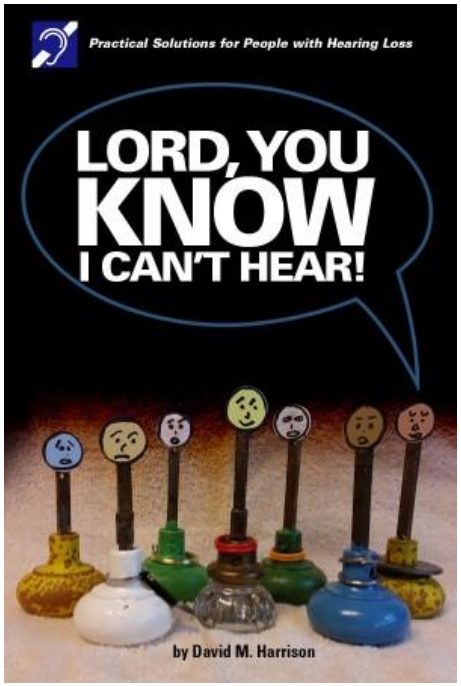
I can recommend these books:

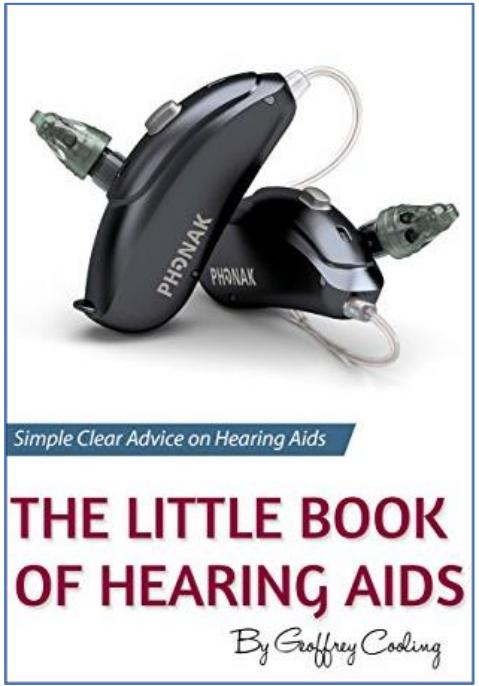












In closing (1)

Keys to successfully dealing with hearing loss

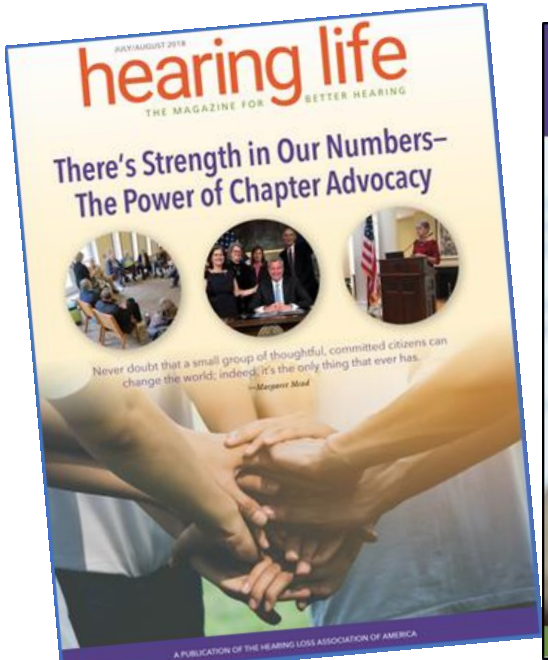
- "Shop" for the right provider – the perfect HA *does not* exist
  Interview providers and be sure to visit: www.HearingTracker.com
- Choose providers who follow Best Practices, perform Real-Ear testing, multiple brand devices and (optional) Aural Rehab classes.
- Bring a "2nd set of ears" to all appointments – ask questions
- Ask for recommendations & results in writing
- Getting used to takes time...give it *lots of time – WEAR THEM*
- Utilize TV, phone accessories, remote mics and remote controls (many users find them *very* helpful!)

HLAA
Hearing Loss Association of America

In closing

- Hearing loss is *not* innocuous. Treat hearing loss EARLIER rather than later
- Hearing aids greatly improve QoL – *regardless* of level of technology
- Shortcomings of HAids can be overcome - use Assistive Listening Technology
- **Support the needs of PWHL & the creation of <u>hearing accessible communities</u> using hearing loops and hearing aid compatible Assistive Listening Systems**
- Consider the needs of PWHL and create legislation to ensure consumers are fully informed and receive appropriate services re: Hearing aids and accessories,

Healthy aging requires Healthy hearing



Questions?

Thank you for your attention

Juliëtte Sterkens, AuD
jsterkens@hearingloss.org

Special thanks to David Myers PhD,
Cheri Perazzoli, Linda Remensnyder AuD,
Karen MacLennan AuD & *many others*

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