Promoting Hearing Health in Older Adults

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Conflicts of Interest and Acknowledgements

Conflicts of Interest:

Funded by Johns Hopkins Via NIH (NIA, NIDCD), Cochlear Inc Gift, Eleanor Schwartz Foundation Gift
Non-financial member of Scientific Advisory Board (Shoebox, Inc)
Consultant to Helen of Troy

Acknowledgements:

Frank R. Lin, MD, PhD
Jennifer A Deal, PhD
Amber Willink, PhD
Adele Goman, PhD
Joshua Betz, MS

Hearing Loss Primer: Limited Communication

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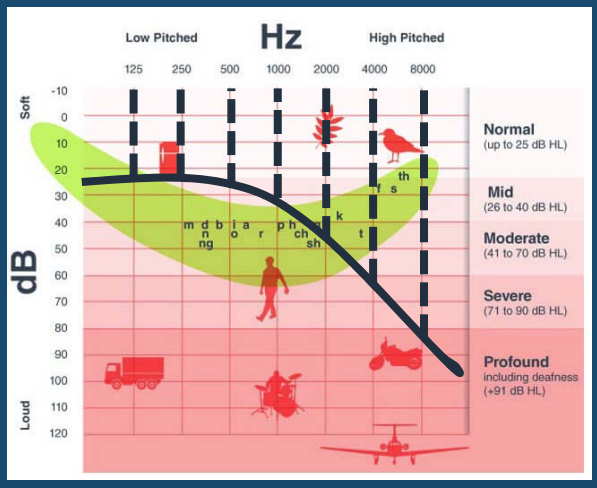

Hearing Loss Primer: Limited Communi tion

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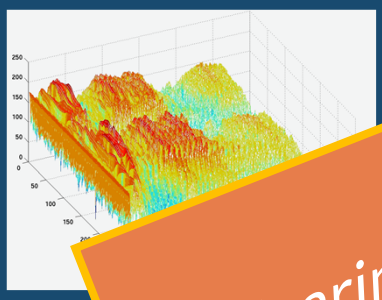

Hearing loss tends to be a clarity issue not a volume issue.

"You shoul to your house."

Prevalence of Hearing Loss

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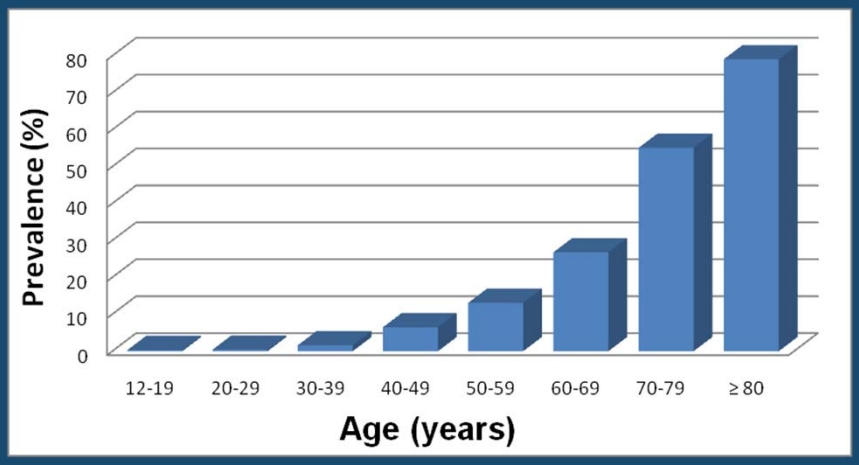

Two-thirds of adults over the age of 70 years have hearing loss

38 million adults in the United States have hearing loss

48 million have hearing loss if we include unilateral hearing losses

Hearing loss defined as a better-ear PTA of 0.5-4kHz tones > 25 dB

Lin et al., Arch Int Med. 2011; Goman & Lin, AJPH, 2016

Hearing Aid Use Among those with Hearing Loss

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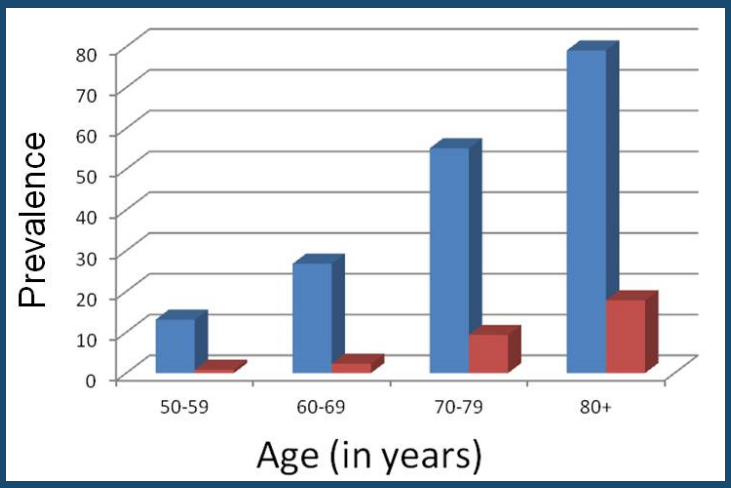

Less than 20% of persons with hearing loss own and use hearing aids

Hearing loss defined as a better-ear PTA of 0.5-4kHz tones > 25 dB

Chien & Lin, Arch Int Med, 2012

Age-Related Hearing Loss

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Basic Questions

- What are the consequences of ARHL for older adults?
- What is the impact of treating ARHL on older adults?
- How can ARHL be effectively addressed in the community?

Age Paradox in Hearing Care

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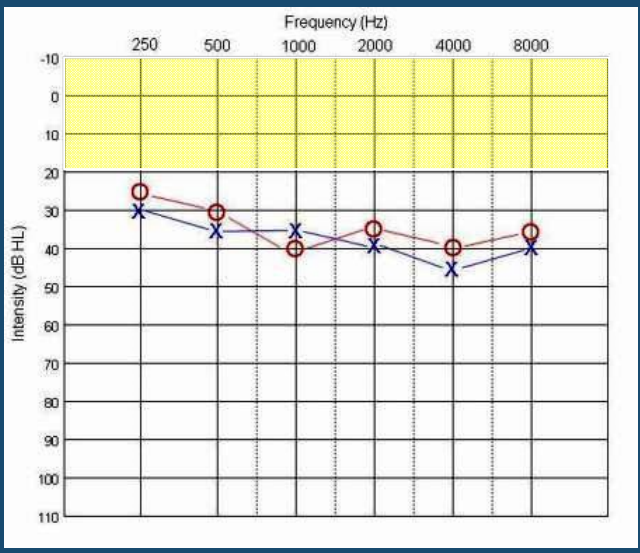
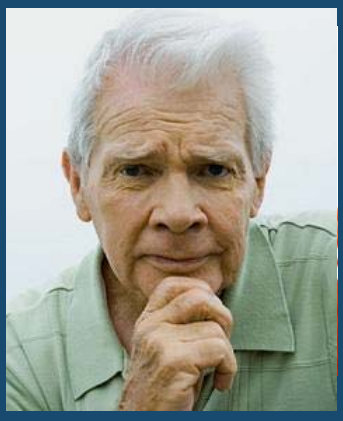


John Smith, 72 y.o.



Age-Related Hearing Loss

9

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Healthy Aging & Hearing Loss

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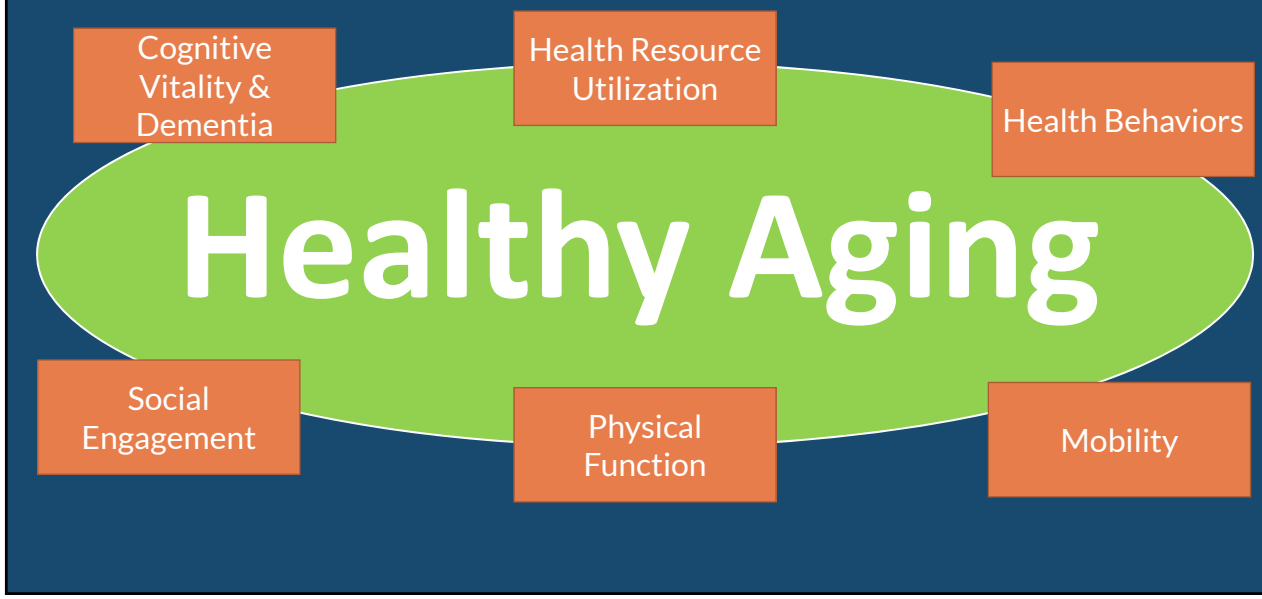
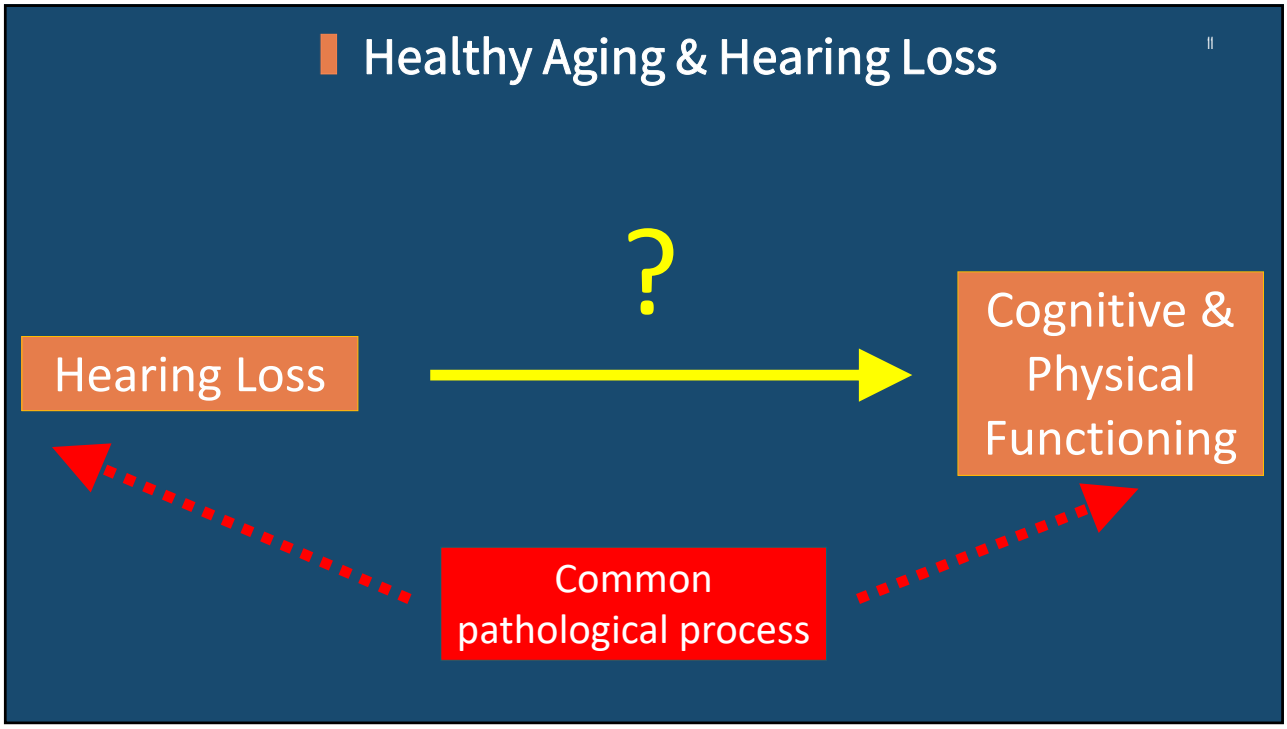
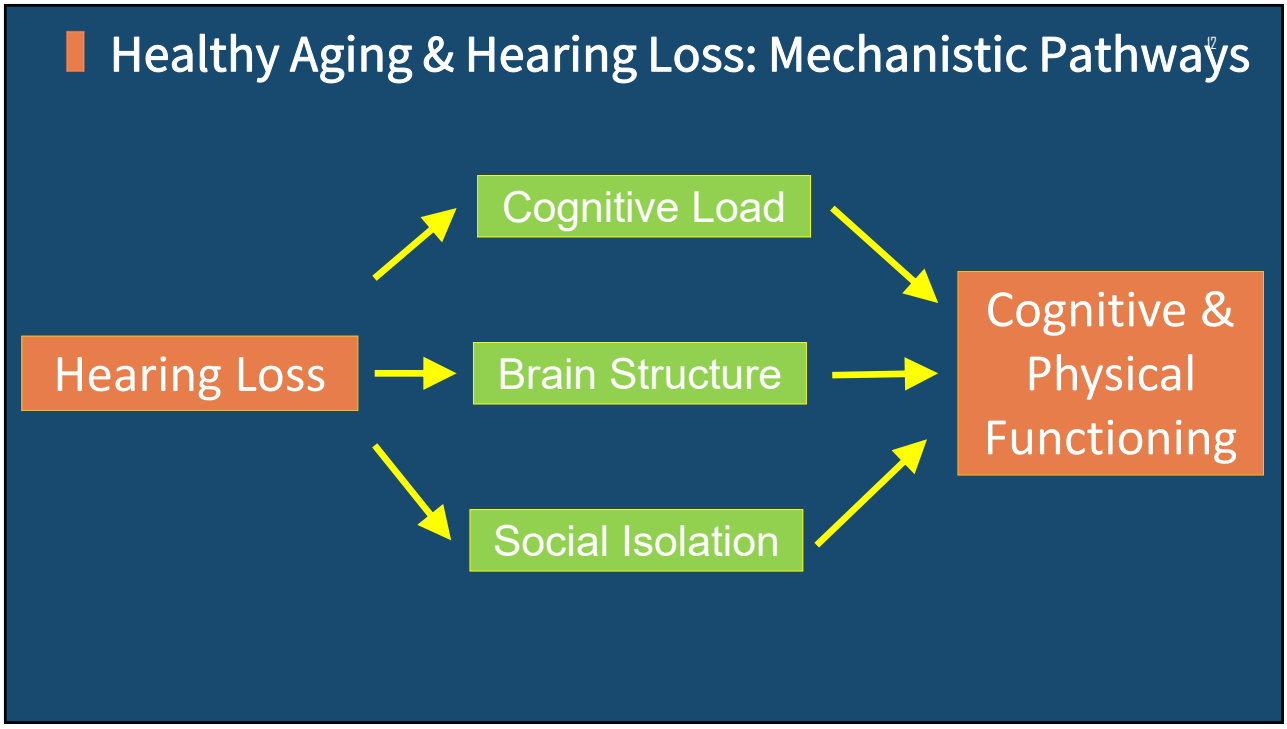



Healthy Aging & Hearing Loss
?
Hearing Loss
Cognitive & Physical Functioning
Common pathological process


Healthy Aging & Hearing Loss: Mechanistic Pathways
Cognitive Load
Hearing Loss
Brain Structure
Cognitive & Physical Functioning
Social Isolation

Hearing Loss & Cognition

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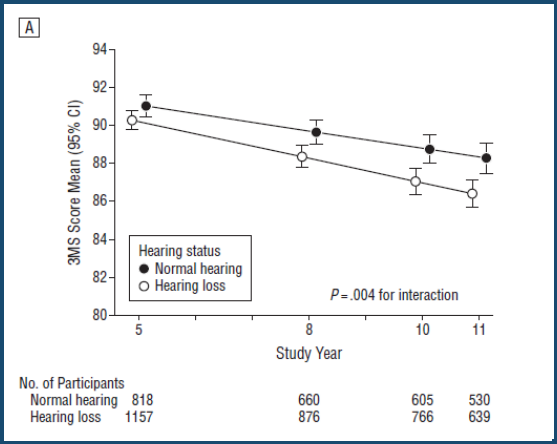

Adjusted 3MS & DSS scores by years of follow-up and hearing loss status in 1,966 adults > 70 years followed for 6 years

42% faster rate of cognitive decline in 3MS scores in HL vs. NH

Lin et al. JAMA Int Med, 2013

Hearing Loss & Dementia

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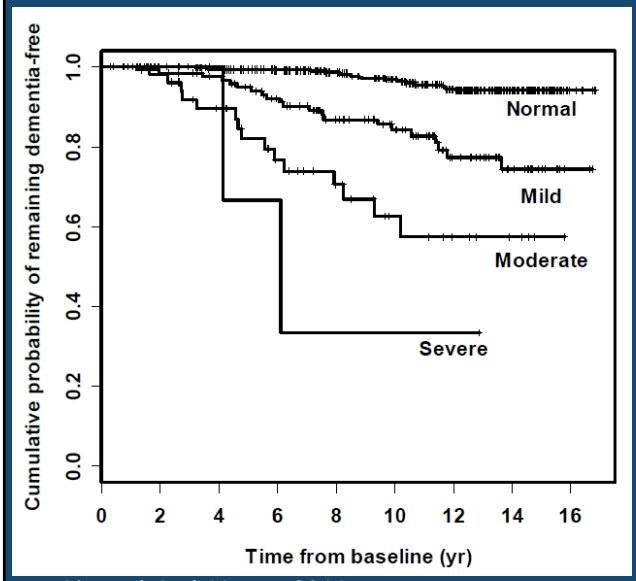

Lin et al. Arch Neuro., 2011

Dementia incidence in 639 adults followed for >10 years in the Baltimore Longitudinal Study of Aging

Risk of incident all-cause dementia (compared to normal hearing)[a]

	HR	95% CI	p
Mild	1.89	1.00 – 3.58	0.05
Moderate	3.00	1.43 – 6.30	.004
Severe	4.94	1.09 – 22.4	.04

[a] Adjusted for age, sex, race, education, DM, smoking, & hypertension

Hearing Loss & Dementia

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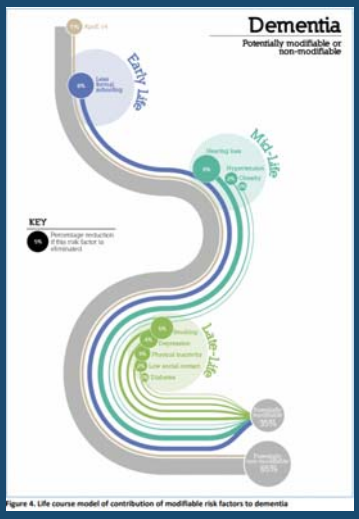

Livingston et al., Lancet 2017

Hearing and Health Care

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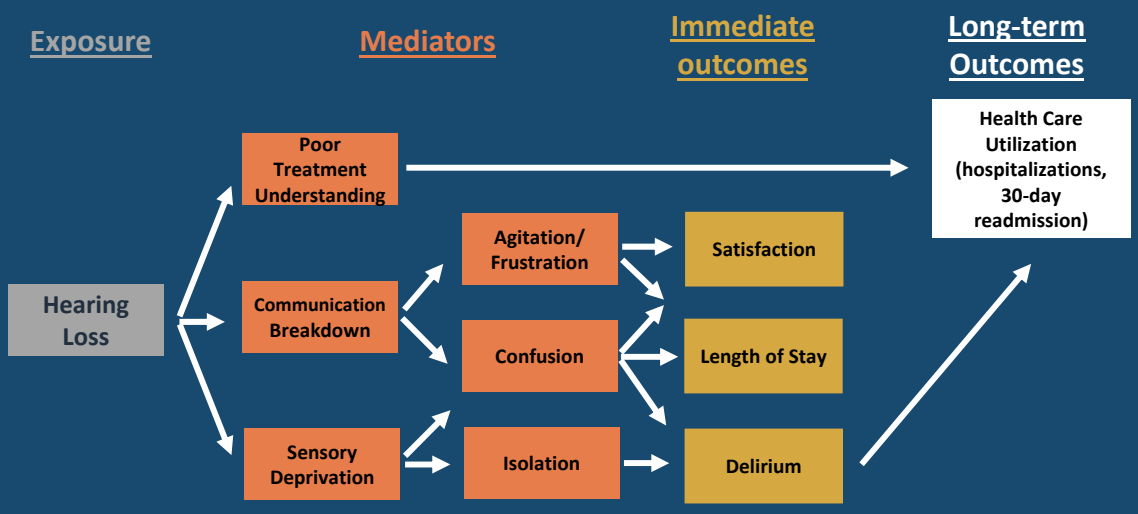

Hearing and Health Care Cost

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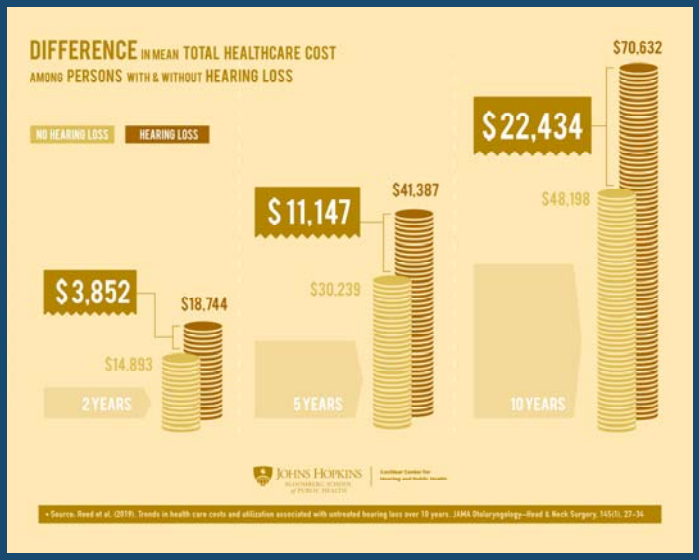

Reed et al. 2019 JAMA-Otolaryngology

Retrospective, propensity-matched cohort study of persons with and without untreated hearing loss from a large health insurance claims database.

Population at follow-up points:
154 414 at 2-year
44 852 at 5-year
4728 at 10-year

Hearing and Health Care Utilization

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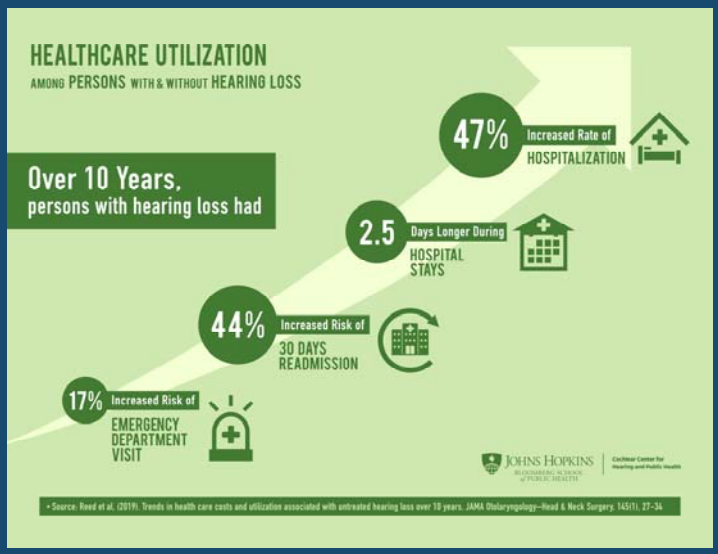

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Hearing Loss and Satisfaction with Care

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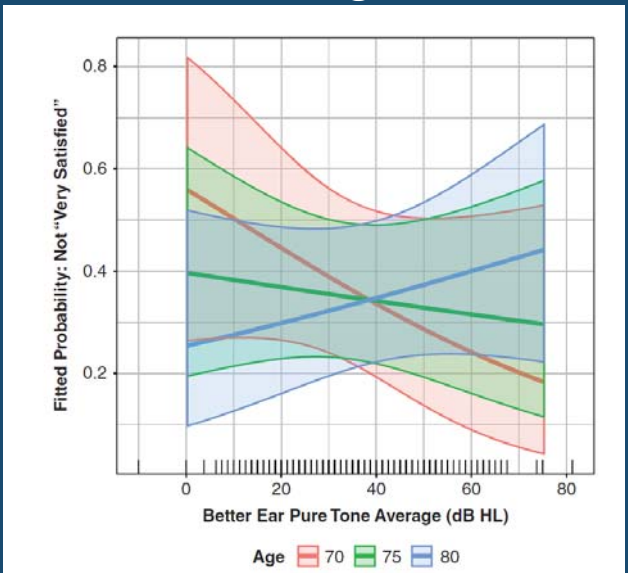

Data Source: Atherosclerosis Risk in Communities Study Visit 5 (2013) Hearing Loss pilot (Washington County), 256 participants aged 67-89 years

Exposure: Pure-tone audiometry

Outcome: Self-report satisfaction with quality of care over last year

Reed et al., JAGS 2019

Hearing Loss and Satisfaction with Care

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75-year-old participant: every 10 dB increase in hearing loss, the odds of being less satisfied increased 0.94 (95% CI:0.74-1.20).

85-year-old: for every 10 dB increase in hearing loss, the odds of being less satisfied increased 1.33 (95% CI:0.96-1. 83).

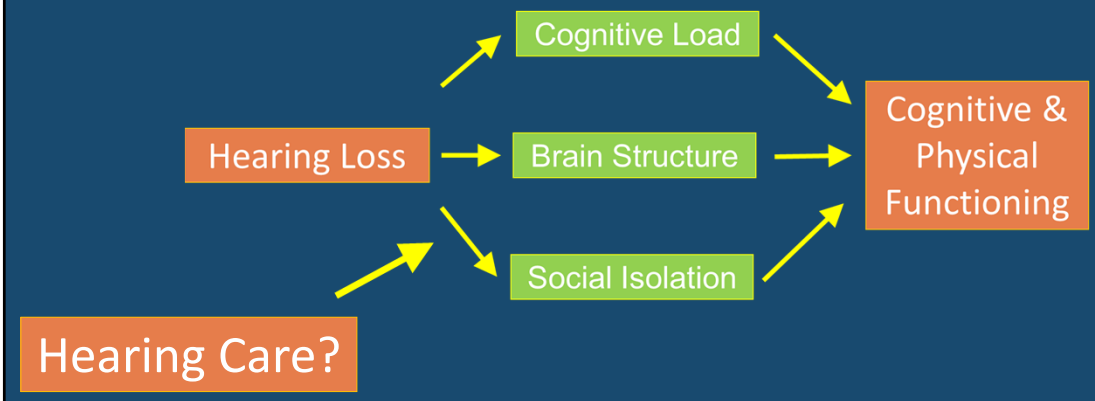
Reed et al., JAGS 2019

Patient-Provider Communication

- IOM 2001: Patient-provider care is cornerstone of patient-centered care
  - "…care that is respectful of and responsive to individual patient preferences, needs, and value"
- Only 23.9% (16/67) of patient-provider communication papers involving older adults included any mention of hearing loss
  - Of those 16, only 4 included hearing loss in analyses
- Systematic review of inpatient patient-provider communication
  - 13/13 studies that included hearing loss found it <u>associated with poorer patient-provider communication</u>

Cudamore et al, JAMA Oto, 2017; Shukla et al. 2018 AJHQ; IOM 2001; Cohen et al. (2017) JAGS

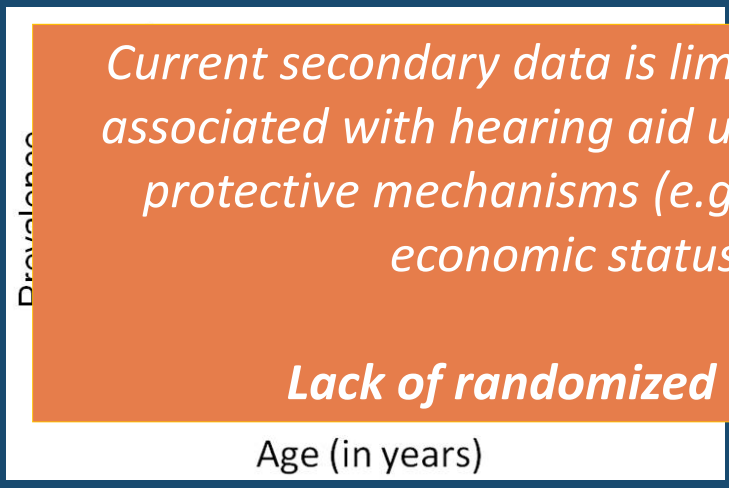
Healthy Aging & Hearing Loss: Mechanistic Pathways



<u>Hearing loss intervention could:</u>

- Reduce the cognitive load of processing degraded sound
- Provide increased brain stimulation
- Improve social engagement

Hearing Aid Use Among those with Hearing Loss [23]



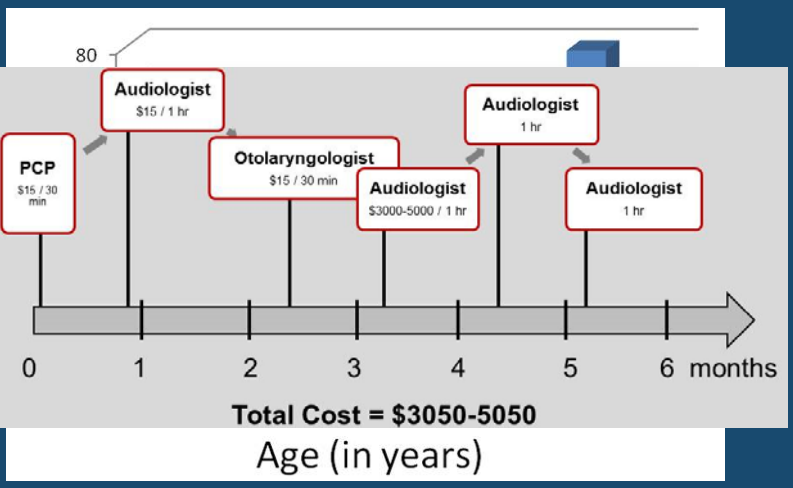
Current secondary data is limited as factors associated with hearing aid use are likewise protective mechanisms (e.g., education, economic status)

Lack of randomized trials!

Hearing loss defined as a better-ear PTA of 0.5-4kHz tones > 25 dB

Chien & Lin, Arch Int Med, 2012; Nieman et al, Journal of Aging and health 2016

Hearing Aid Use Among those with Hearing Loss [24]



Hearing loss defined as a better-ear PTA of 0.5-4kHz tones > 25 dB

- **Cost/Affordability**
- **Access to Services &Technology**
- **Awareness & Understanding**
- **Technology Design & Utility**

Chien & Lin, Arch Int Med, 2012; Nieman et al, Journal of Aging and health 2016

Translating Epidemiologic Evidence into Policy

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The National Academies of SCIENCES ENGINEERING MEDICINE

Over the Counter Hearing Aid Act 2017*

*FDA Reauthorization Act

2014 2015 2016 2017 2018 2019 2020

FDA

Over the Counter Hearing Aid Regulations in Place

Over-the-Counter Hearing Aid Act of 2017

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Entry of consumer electronics manufacturers (e.g., Bose) will

Cost/

Acces &T

Aw Unc

Technology Design & Utility

VIEWPOINT

Hearing Care Access?
Focus on Clinical Services, Not Devices

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Hearing loss, the third most common chronic condition among older adults,[1] has suddenly been thrust into the legislative spotlight following the emergence of research that found an association between hearing loss and important health care outcomes, including cognitive decline and dementia.[1] Hearing loss and hearing care access have received attention from the White House,[2] US Congress,[3] and major scientific institutions.[1] Following recent legislation, hearing aids to address mild to moderate hearing losses are set to become available over-the-counter (OTC) by 2020, disentangling the purchase of hearing aids from the hearing rehabilitative ser-

Hearing aids are regulated by the FDA, and until the recently passed OTC hearing aid legislation becomes effective in 2020, hearing aids can still only be sold by licensed professionals.[1] Hearing aids are generally sold to the patient along with hearing rehabilitative services as a bundled model. These services are typically bundled together with the cost of the hearing aid, leading to poor transparency in the relative costs of the device vs services. The mean price to consumers for a pair of hearing aids is $4700 but can range from $1000 to more than $8000.[1]

with consumer electronics & adoption of wireless standards for far-field sound transmission

OTC Hearing Care?

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Hearing Aids:

Regulated by the FDA

$800 to $3000 per device

Minimal insurance benefit (no Medicare benefit)

Accepted gold standard of care

Advertise to treat hearing loss

Personal Sound Amplification Products:

Unregulated by the FDA

Cost $30-300 per device

E-commerce

Tremendous recent advances

Cannot advertise to treat hearing loss

Reed et al., JAMA 2017

Hearing Aid v. PSAPs

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Single-blind crossover; within-subject

Screening

Consent & Otoscopy
Audiologic evaluation
MMSE (≥24)
Questionnaire

Speech-in-Noise Testing

Completed in 7 conditions: unaided, 5 PSAPs, & HA
Order of devices and sentences randomized
Participants blinded

Device Fitting

Best-practice, prescriptive fitting

Analysis

Reed et al., JAMA 2017

Hearing Aid v. PSAPs

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Table. Accuracy in Speech Understanding in Noise From Unaided to Aided With PSAPs and a Hearing Aid Among 42 Older Adults With Mild to Moderate Hearing Loss[a]

	Cost, US $[b]	Mean Accuracy, % (95% CI)	Change From Unaided Hearin Percentage Points (95% CI)	Difference Between PSAP and Hearing Aid Change, Percentage Points (95% CI)
Unaided hearing		76.5 (72.7 to 80.3)		NA
Oticon Nera 2 hearing aid[c]	1910.00	88.4 (84.5 to 92.4)	11.9 (9.8 to 14.0)	
PSAP				
Sound World Solutions CS50+	349.99	87.4 (83.5 to 91.4)	11.0 (8.8 to 13.1)	−1.0 (−2.7 to 0.8)
Soundhawk	349.99	86.7 (82.7 to 90.6)	10.2 (8.0 to 12.3)	−1.8 (−3.5 to 0)
Etymotic BEAN	299.99	84.1 (80.2 to 88.1)	7.7 (5.5 to 9.8)	−4.3 (−6.1 to −2.5)
Tweak Focus	269.99	81.4 (77.4 to 85.3)	4.9 (2.8 to 7.0)	−7.0 (−8.8 to −5.3)
MSA 30X Sound Amplifier	29.99	65.3 (60.1 to 70.4)	−11.2 (−15.2 to −7.3)	−23.1 (−26.9 to −19.4)

Abbreviations: NA, not applicable; PSAP, personal sound amplification products.

[a] The pure-tone average was 500-4000 Hz; the mean dB HL was 34.7 in the right ear and 36.1 in the left ear.

[b] The cost of the hearing aid was the wholesale price paid by the Johns Hopkins University Audiology Clinic. PSAPs were purchased online (Sound World Solutions CS50+, Soundhawk, Etymotic BEAN, Tweak Focus) and storefront retail (MSA 30X Sound Amplifier). All devices were purchased between January 2016 and April 2016.

[c] Oticon Nera 2 is a US Food and Drug Administration–regulated hearing aid, whereas all other devices are PSAPs.

jama.com JAMA July 4, 2017 Volume 318, Number 1

Reed et al., JAMA 2017

Community Based Hearing Care

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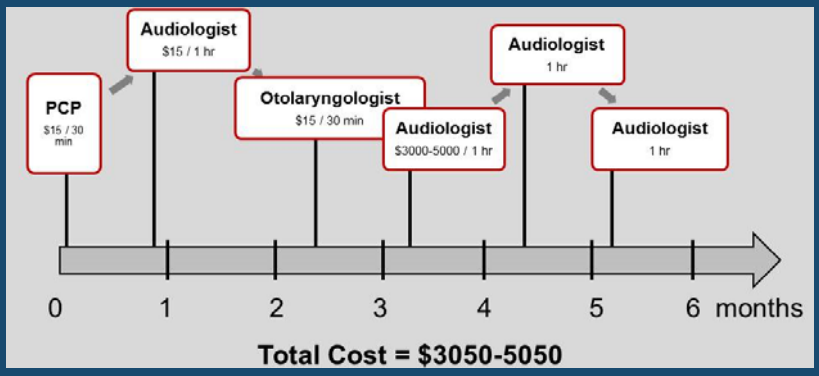

Community Based Hearing Care

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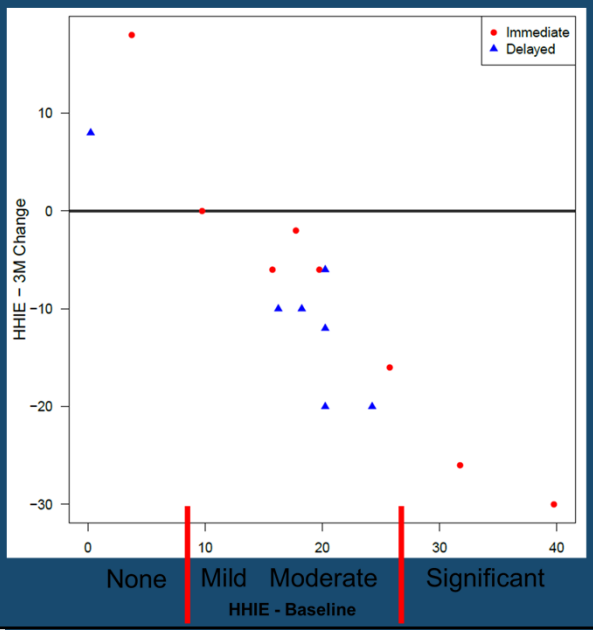

Nieman et al., Gerontologist 2017

Hospital Based Hearing Care

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- No universal program to identify and intervene on hearing loss in adults in the hospital system
- Many calls for adult hearing screening but most have ignored basic principles of implementation science

Shukla et al. 2018 AJHQ; IOM 2001; Cohen et al. (2017) JAGS

Hospital Based Hearing Care (ENHANCE)

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TABLE

ADDRESSING HEARING LOSS IN THE HEALTH CARE SYSTEM CHECKLIST

Item	Strategies
Technological Considerations	
Handheld amplification	Simple handheld devices, such as the PocketTalker® or SuperEar®, allow users to use standard headphones and easily amplify sound to their desire with the volume control to improve communication.
Amplified and caption telephones	These telephones are specially designed for individuals with hearing loss (HL) and provide increased amplification and captioned conversation.
Environmental Modifications	
Remove background noise	Reduce background noise by turning down the television or radio and closing the door to noisy areas to improve communication. If the noise cannot be removed, try going somewhere away from the noise for communication.
Improve room lighting	This is a balancing act. Proper lighting helps individuals with HL visualize the speaker to aid in lip reading but overwhelming lighting (e.g., a window reflection) can be distracting.
Use sound absorbent materials	Carpet, drapes, and even acoustic foam placed on the walls can improve the reverberant (i.e., echo) qualities of a room.
Communication Considerations	
Ensure attention	Start conversation and communication when both parties are attentive and ready. Consider body position, ideally seated at the same level for optimal eye contact.
Face-to-face communication	Ensuring that the listener can see your face to leverage lip reading skills is important. This also ensures sound is being directed at the listener rather than in another direction.
Do not cover mouth area	Many individuals consciously and subconsciously lip read to help follow conversation.
Speak slow and low	HL is a clarity issue rather than a volume issue. Slowing down and using a slightly lower tone can help listeners with HL follow the conversation.
Do not shout	Shouting does not help and often further distorts information.
Give context to conversation	Place the conversation in some kind of context to help the listener decipher difficult to hear words.
Rephrase rather than repeat	Rephrase remarks to help the listener gain new context about the conversation and use words that are easier to hear. Repetition can create a frustrating negative feedback loop.

Wallhagen and Reed, J Gero Nurs 2018

Changing Hearing Care Ecosystem

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Take-Home Messages

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1. Hearing loss has an independent association with markers of healthy aging
   - Cognitive decline, dementia
2. Persons with hearing loss interact with the health care system differently
   - Satisfaction, health resource utilization
3. Poor uptake of hearing care
   - Access and affordability
4. Pending policy effects
   - Over-the-counter hearing aids
5. Novel delivery models
   - Over-the-counter, community-based, hospital-based
6. RESEARCH NEEDED!
   - Randomized control trials

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Thanks!

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