# Assessing Hearing Loss as a Communication Barrier During Diagnosis of Older Adults

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*of* PUBLIC HEALTH

Johns Hopkins Cochlear Center for
Hearing and Public Health

# Disclosures

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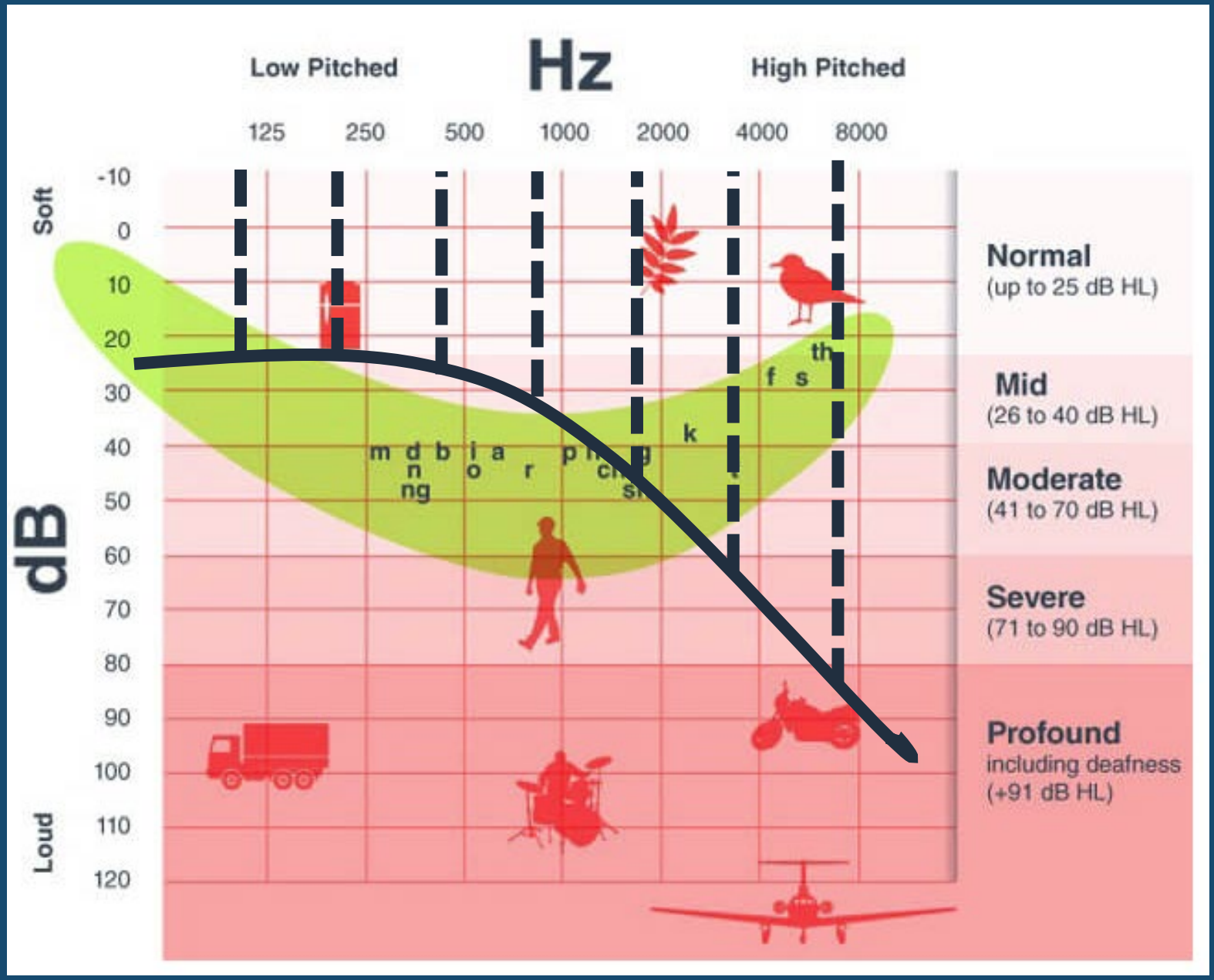
  - Neosensory
- Faculty at Cochlear Center for Hearing and Public Health supported by a private gift from Cochlear Inc

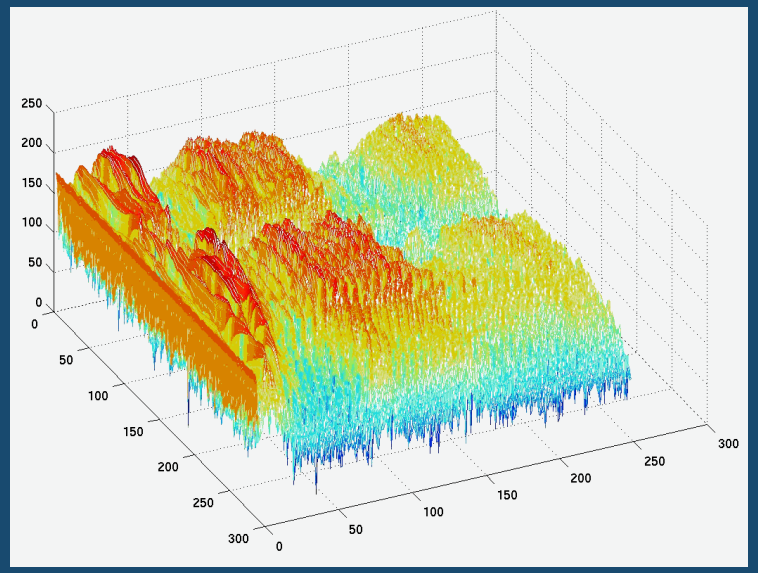
# What we'll cover

- What is hearing loss
- Association of hearing loss and health services utilization
- Epidemiology of hearing loss and hearing aids
- Measuring hearing loss
- Addressing hearing loss

# What is hearing loss?



# Hearing Loss: Clarity not Volume



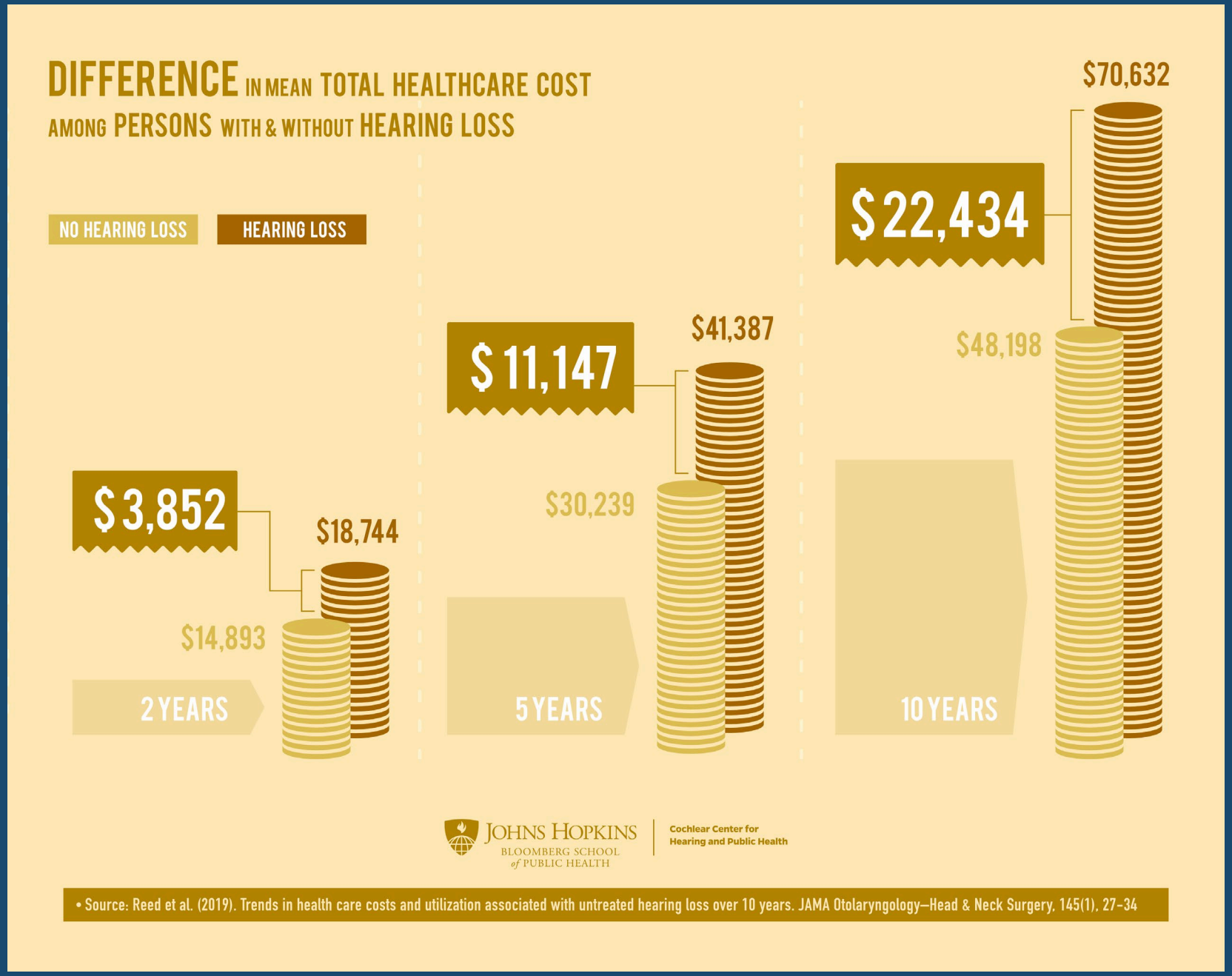

"You should go to the pharmacy before you get to your house."

# Hearing Loss & Patient-Provider Communication

- IOM 2001: Patient-provider communication is a cornerstone of patient-centered care
- Very few studies consider hearing loss in patient-provider communication (Cohen et al. JAGS 2017)
- When considered, hearing loss is strongly associated with poorer patient-provider communication (Cudmore et al., JAMA-Otolaryngology 2017; Shukla et al. AJHQ 2018)

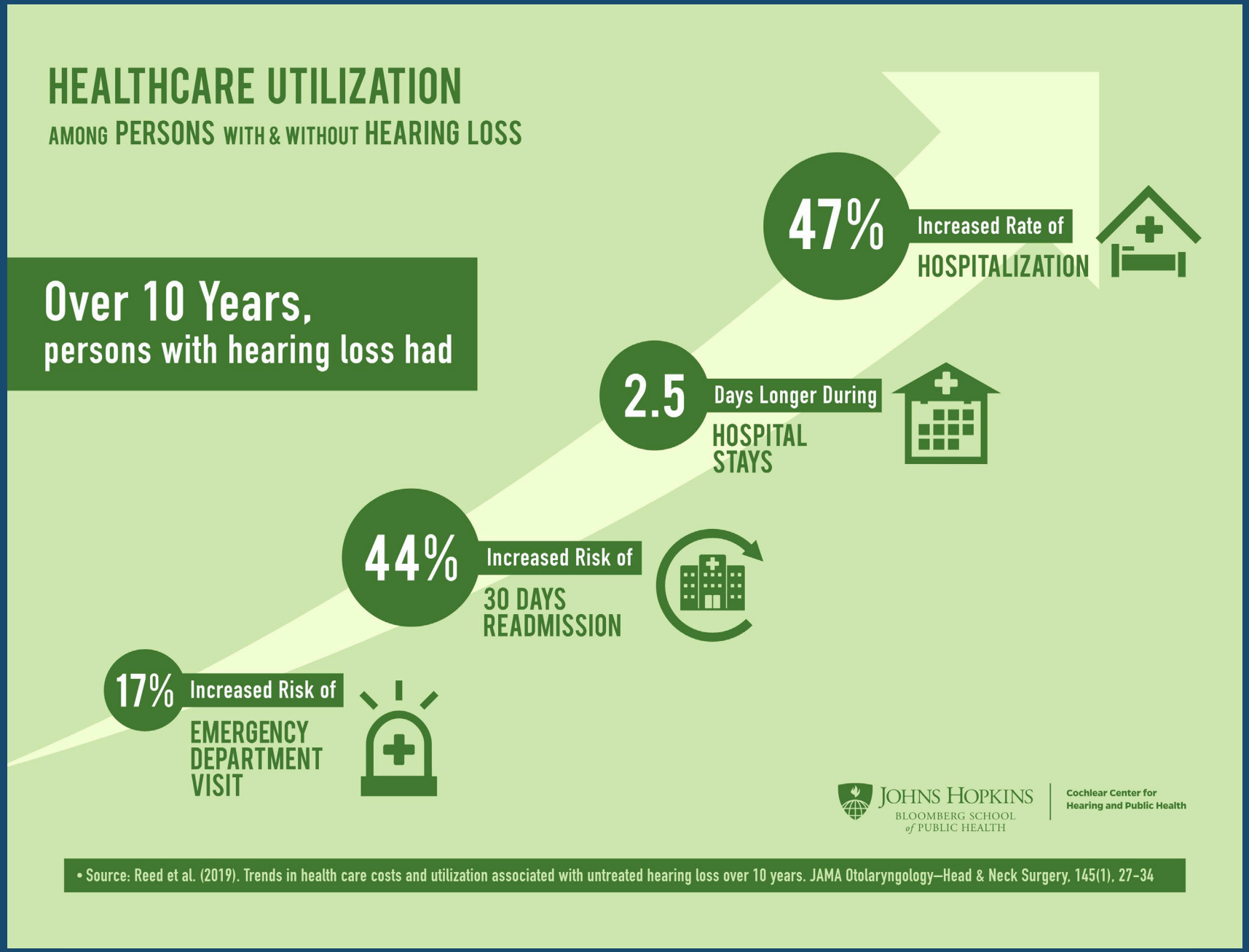


IOM Quality Chasm Report 2001






Reed et al. 2019 JAMA-Otolaryngology






Reed et al. 2019 JAMA-Otolaryngology

**TABLE 2.** Odds of Dissatisfaction With Quality of Care Over the Past Year Among Medicare Beneficiaries by Functional Hearing Loss*,†

| Variable | Adjusted‡ Odds Ratio (95% CI) | SE | *P* |
|---|---|---|---|
| Functional hearing loss | | | |
| No trouble | Ref | | |
| A little trouble | 1.496 (1.079–2.073) | 0.246 | 0.016 |
| A lot of trouble | 1.769 (1.175–2.664) | 0.365 | 0.007 |

Adjusted for Usual place of care, age, sex, race, marriage, education, income, general health, functional limitations, comorbidity count

**Table 3.** Relative Risks of Healthcare-Seeking Behaviors Over the Past Year Among Medicare Beneficiaries by Functional Hearing Status.[a,b]

| | Unadjusted model | | Adjusted for socio-demographics[c] | | Adjusted for socio-demographics and general health determinants[d] | |
|---|---|---|---|---|---|---|
| Functional hearing status | RRR | 95% CI | RRR | 95% CI | RRR | 95% CI |
| Avoiding seeing the doctor | | | | | | |
| No trouble | REF | | REF | | REF | |
| A little trouble | .93 | .85–1.02 | 1.01 | .93–1.09 | .98 | .90–1.07 |
| A lot of trouble | 1.31 | 1.15–1.50 | 1.29 | 1.14–1.46 | 1.22 | 1.06–1.40 |
| Delaying seeing the doctor when feeling sick | | | | | | |
| No trouble | REF | | REF | | REF | |
| A little trouble | 1.15 | 1.08–1.23 | 1.10 | 1.04–1.17 | 1.10 | 1.04–1.17 |
| A lot of trouble | 1.25 | 1.11–1.42 | 1.27 | 1.13–1.43 | 1.27 | 1.12–1.43 |
| Worrying about health more than others their age | | | | | | |
| No trouble | REF | | REF | | REF | |
| A little trouble | .93 | .86–1.01 | 1.14 | 1.06–1.22 | .99 | .92–1.06 |
| A lot of trouble | 1.21 | 1.04–1.41 | 1.38 | 1.21–1.58 | 1.04 | .92–1.17 |
| Keeping to him/herself when feeling sick | | | | | | |
| No trouble | REF | | REF | | REF | |
| A little trouble | 1.04 | .98–1.11 | 1.08 | 1.01–1.16 | 1.05 | .98–1.12 |
| A lot of trouble | 1.13 | 1.01–1.27 | 1.12 | 1.00–1.25 | 1.04 | .93–1.17 |

RRR = relative risk ratio; CI = confidence interval; SE = standard error; REF = reference.

[a]Data derived from the 2016 Medicare Current Beneficiary Survey public-use file ($n$ = 12,140).

[b]Survey weights applied based on Medicare Current Beneficiary Survey 2016 Data User's Guide (Office of Enterprise Data and Analytics, Centers for Medicare & Medicaid Services, 2018) (weighted $n$ = 50,984,256).

[c]Log-binominal regression model adjusted for socio-demographics including age, race/ethnicity, education, income, and marital status; the pseudo-R2 of this model = .043 (outcome = avoiding seeing the doctor), .027 (outcome = delaying seeing the doctor when feeling sick), .180 (outcome = worrying about health more than others their age), and .019 (outcome = keeping to him/herself when feeling sick), respectively. The AIC of this model = 13,623 (outcome = avoiding seeing the doctor), 15,857 (outcome = delaying seeing the doctor when feeling sick), 15,825 (outcome = worrying about health more than others their age), and 13,605 (outcome = keeping to him/herself when feeling sick), respectively.

[d]Log-binominal regression model adjusted for socio-demographics and general health determinants including general health, functional limitations, self-reported history of dementia or Alzheimer's disease, and self-reported history of depression; the pseudo-R2 of this model = .047 (outcome = avoiding seeing the doctor), .028 (outcome = delaying seeing the doctor when feeling sick), .260 (outcome = worrying about health more than others their age), and .024 (outcome = keeping to him/herself when feeling sick), respectively. The AIC of this model = 13,605 (outcome = avoiding seeing the doctor), 15,871 (outcome = delaying seeing the doctor when feeling sick), 10,051 (outcome = worrying about health more than others their age), and 15,762 (outcome = keeping to him/herself when feeling sick), respectively.



Lin et al. 2021 J. Aging and Health

# Unmet Health Needs by Hearing Status



**EXHIBIT 2**

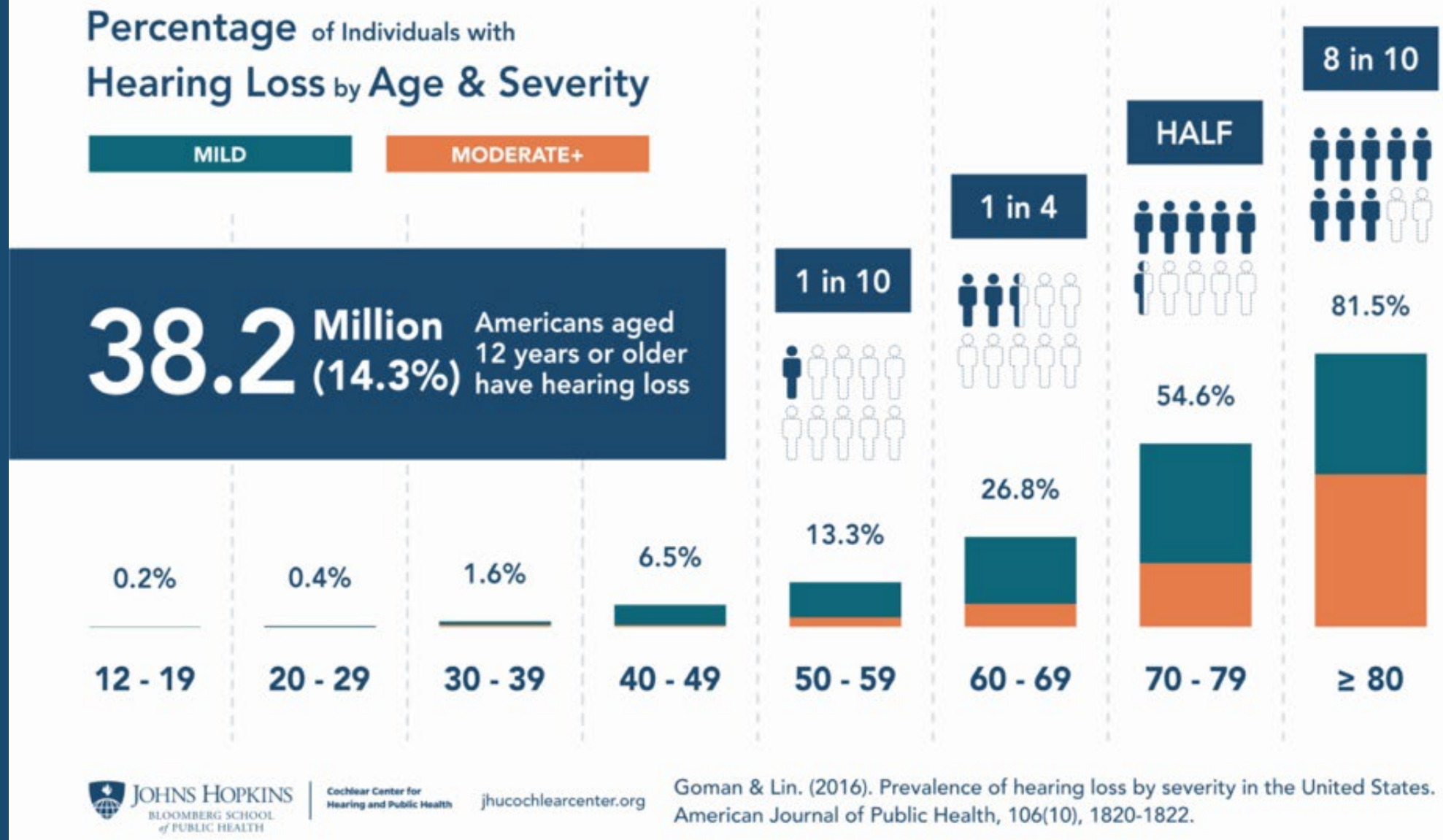
**Odds of reporting three outcome variables suggesting unmet health care needs among Medicare beneficiaries, by self-reported functional hearing difficulty, 2016**

| | Odds ratios for outcome variables | | |
|---|---|---|---|
| **Level of functional hearing difficulty** | **No usual source of care** | **Not obtaining needed medical care** | **Not filling a prescription** |
| No trouble hearing | Ref | Ref | Ref |
| A little trouble hearing | 1.038 | 1.595**** | 1.440*** |
| A lot of trouble hearing | 1.489** | 1.854**** | 1.556** |

**SOURCE** Authors' analysis of data from the Medicare Current Beneficiary Survey (MCBS), 2016. **NOTES** Survey weights were applied according to MCBS instructions. Logistic regression models were adjusted for age, sex, race/ethnicity, educational attainment, income-to-poverty ratio, marital status, Medicare Advantage plan, general health, functional limitations, and comorbidity count. **$p < 0.05$ ***$p < 0.01$ ****$p < 0.001$



Reed et al. 2021 Health Affairs


Percentage of Individuals with Hearing Loss by Age & Severity
MILD
MODERATE+
38.2 Million (14.3%) Americans aged 12 years or older have hearing loss
1 in 10
1 in 4
HALF
8 in 10
0.2%
0.4%
1.6%
6.5%
13.3%
26.8%
54.6%
81.5%
12 - 19
20 - 29
30 - 39
40 - 49
50 - 59
60 - 69
70 - 79
≥ 80
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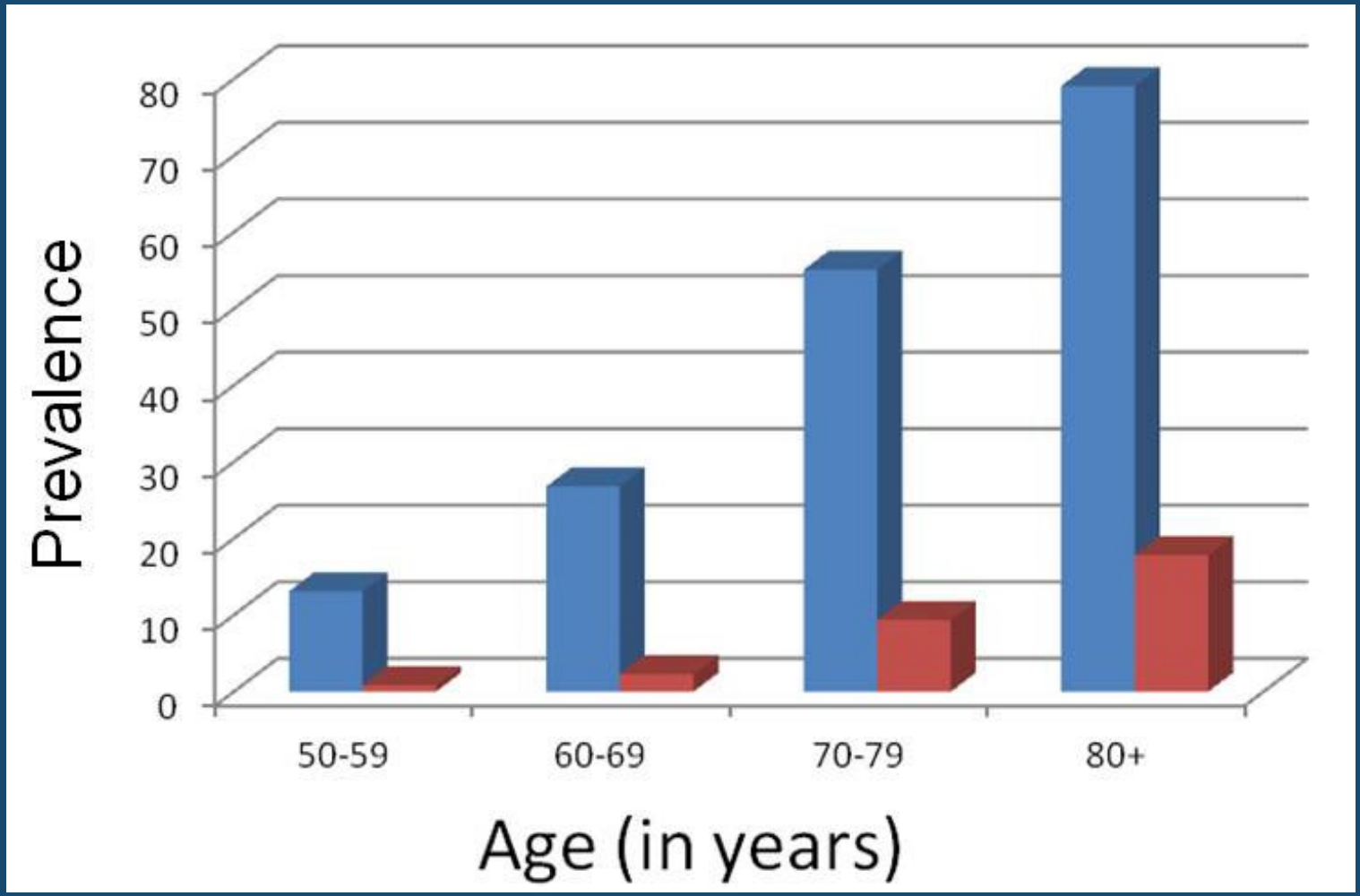
Cochlear Center for Hearing and Public Health
jhucochlearcenter.org
Goman & Lin. (2016). Prevalence of hearing loss by severity in the United States. American Journal of Public Health, 106(10), 1820-1822.

# Hearing Loss & Hearing Aid Use Prevalence in the U.S. by age decade 1999-2006



Less than 20% of adults with hearing loss own and use hearing aids in the US

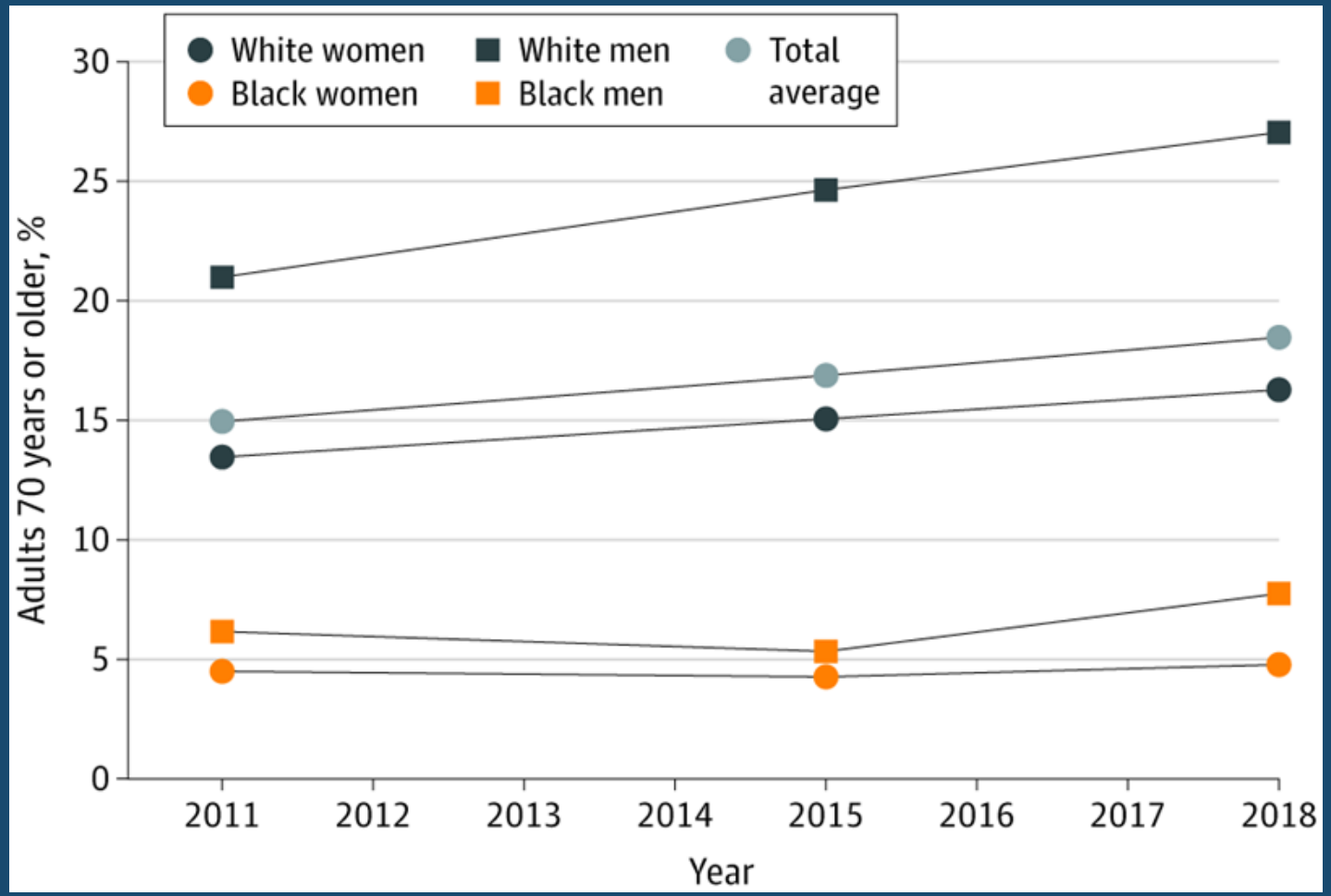





Chien & Lin, Arch Int Med. 2012

# Hearing Aid Uptake by gender and race among adults 70+ years in the U.S. 2011-2018



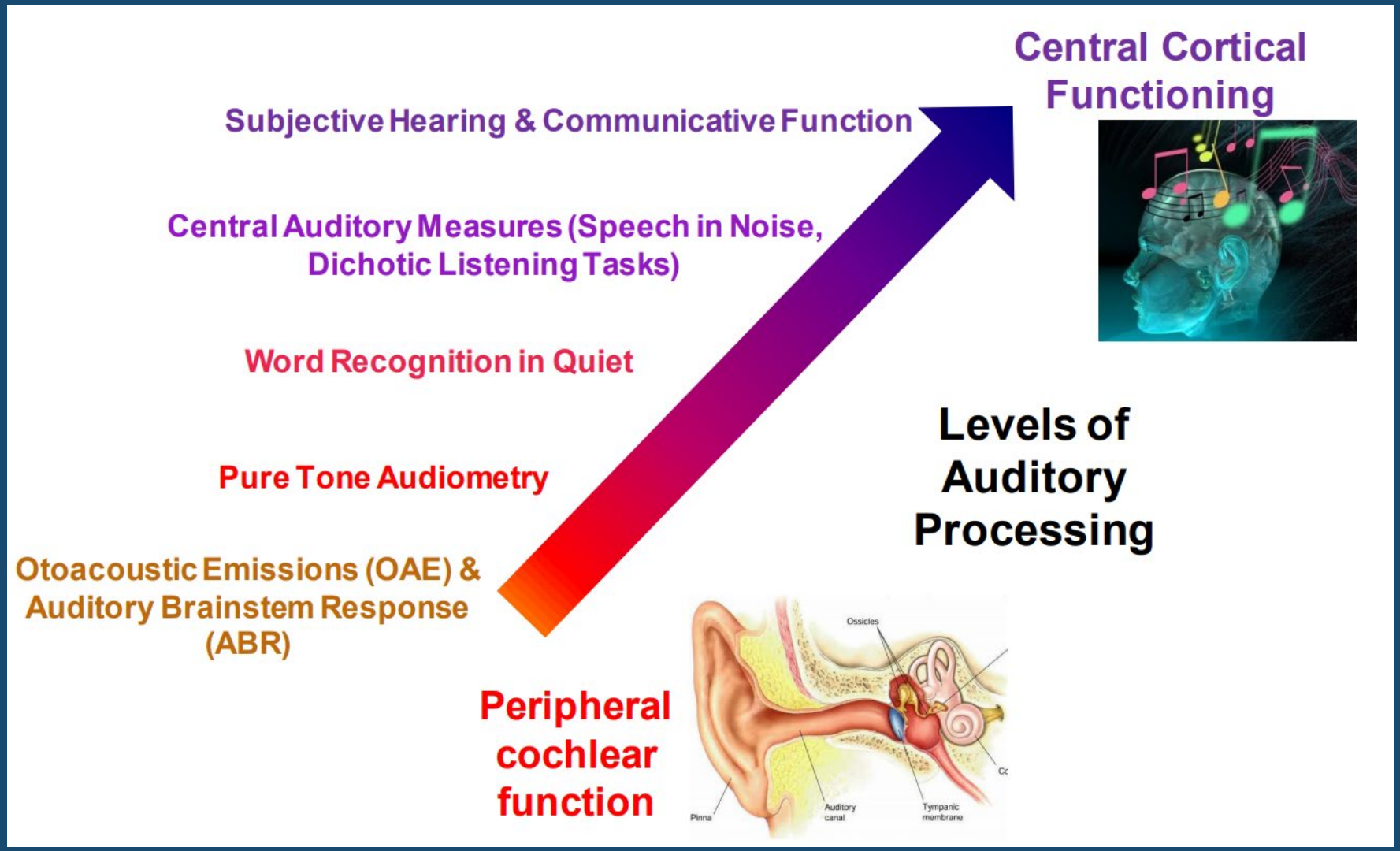





Reed et al. JAMA IM 2021

# Measuring Hearing Loss






- Pure-tone is the clinical gold standard
- Self-report accuracy changes by degree of hearing loss and demographic variables such as age, sex, and race/ethnicity

# Addressing Hearing Loss in Healthcare Settings



- We lack sustainable accommodation programs for hearing loss

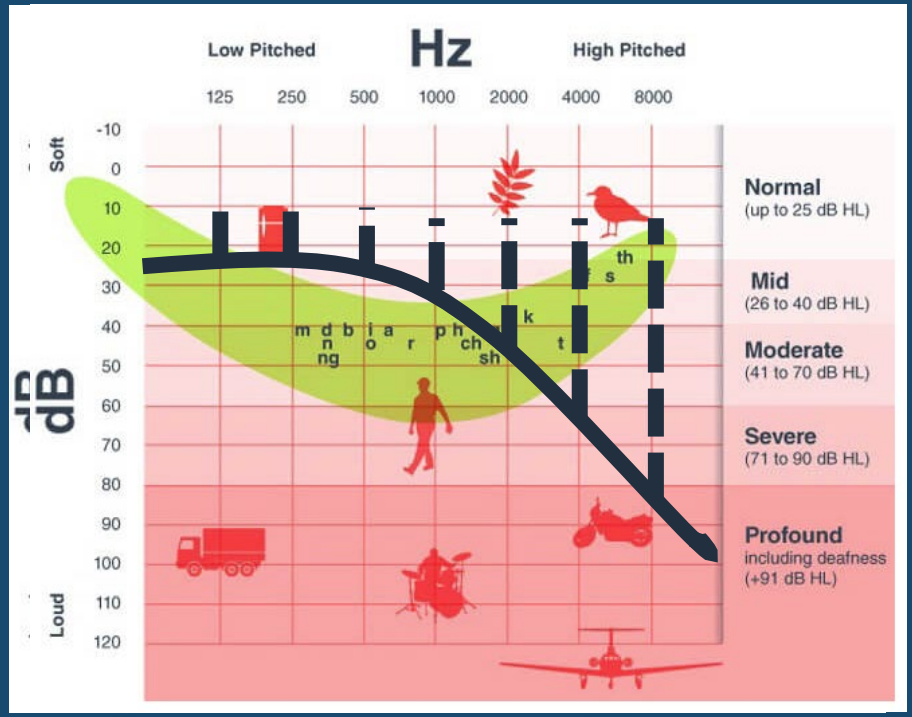
- Step 1: Recognition
- Step 2: Technology, Environment, & Communication
- Step 3: Reinforcement and Behavioral Nudges

# Addressing Hearing Loss in Healthcare Settings



- Hearing aids in healthcare settings?
  - Rarely brought to acute care settings
  - Requires deeper training to manipulate

- Amplifiers alone aren't up to the task

# Addressing Hearing Loss in Healthcare Settings



| Addressing Hearing Loss Checklist | | |
|---|---|---|
| **Technologic Considerations** | | |
| ☐ | Handheld Amplification | Simple handheld devices, such as the Pocket Talker (Williams Sound, Eden Prarie, MN) or SuperEar (Sonic Technology Products, Nevada County, CA), allow users 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 persons with hearing loss and provide increased amplification and captioned conversation |
| ☐ | In-Room Videoconferencing | Leveraging video technology to communicate with patients may seem like it would pose barriers; however, it allows for providers to speak clearly and show their mouth for lip-reading. In addition, technology companies can amplify frequencies important for speech and use speech to text to caption the video in real time. |
| ☐ | Speech to Text | Speech to test applications, such as the software provided by Google (Mountain View, CA), are increasingly available. These applications can provide live transcription of conversation to assist those with hearing loss. |
| ☐ | Smartphone Amplification | Applications, such as Google Sound Amplifier (Mountain View, CA), offer high quality noise reduction algorithms and amplification in personal smartphones. These may represent an option when handheld amplifiers are not available. |

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# Addressing Hearing Loss in Healthcare Settings



| Environmental Modifications | | |
|---|---|---|
| ☐ | Remove Background Noise | Reducing background noise by turning down the television and closing the door to noisy areas can improve communication. |
| ☐ | Improve Room Lighting | Proper lighting helps persons with hearing loss visualize the speaker to aid in lip-reading, but overwhelming lighting (such a window reflection) can be distracting. |
| ☐ | Preprepared Placards | Preprinted placards of common phrases, questions, and comments used throughout the hospital stay or outpatient visit can be helpful. Using large font with high contrast color can further help older adults. |
| ☐ | Whiteboards or Tablets | Although it can be cumbersome, using whiteboards to write out conversation or tablets to type out conversational items represents a last resort option. |

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# Addressing Hearing Loss in Healthcare Settings



| Communication Considerations | | |
|---|---|---|
| ☐ | Ensure Attention | Conversation and communication require both parties to be attentive and ready. |
| ☐ | 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. This means looking up from charts and away from computers when possible to communicate. |
| ☐ | Visualization of the Mouth When Possible | Covering the mouth area is a must to prevent spread of the COVID-19 virus. However, any opportunity possible to use clear masks or distance videoconferencing without masks can help people who consciously and subconsciously lip-read |
| ☐ | Speak Slow and Low | Age-related hearing loss generally occurs in higher frequencies and limits the clarity of speech. Slowing down and using a slightly lower tone can help listeners with hearing loss follow the conversation. |
| ☐ | Do Not Shout | Most age-related hearing loss is an issue of clarity rather than volume. Although some increased volume helps, shouting often further distorts information. |
| ☐ | Give Context to Conversation | By placing the conversation in context, it helps the listener decipher and fill in the gaps of difficult to hear words. This means adding supporting information like common descriptions or actions associated with topics and adding redundancy to information presented. |
| ☐ | Rephrase Rather than Repeat | Rephrasing can help the listener gain new context about the conversation and use words that are easier to hear. Repeating can create a frustrating negative feedback loop. |

Reed et al. , JAGS 2020

# Identification Signage


# Thanks!