

Exploring the connections between hearing loss and cognitive health

Kate Dupuis, Ph.D., C.Psych.
Schlegel Innovation Leader

Sheridan | Centre for
Elder Research

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Enhancing Life

Objectives

1. Provide a status report on the connections between hearing loss and cognitive health
2. Describe solutions for managing hearing loss in an older population



- Why focus on connections between hearing loss and cognitive health?
- Why is this such an important consideration when working with and supporting older adults?

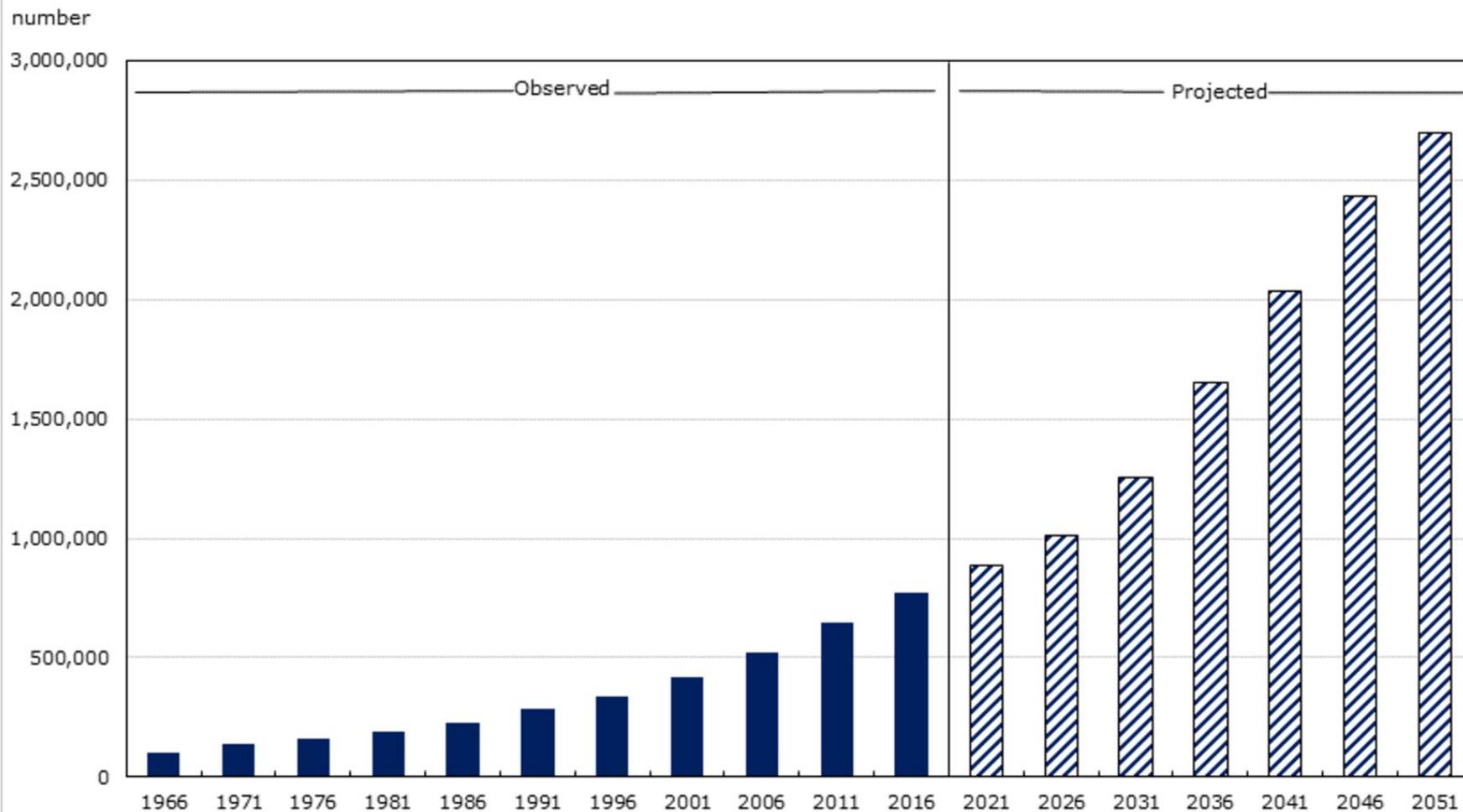
#1 risk factor for hearing loss...

AGE

#1 risk factor for cognitive loss...

AGE

Chart 1
Population aged 85 and older, Canada, 1966 to 2051



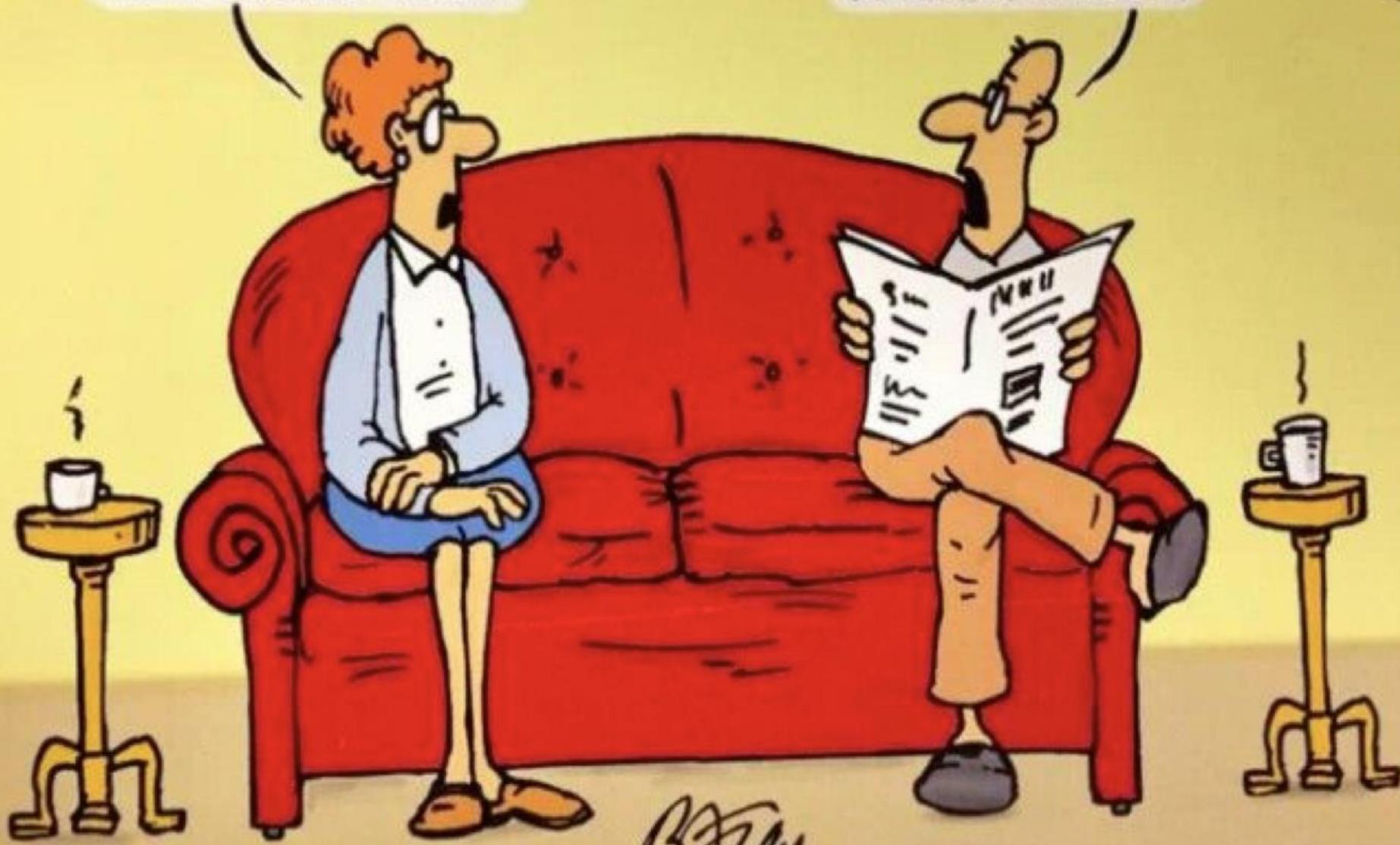
Stats Can (2016)

Hearing loss in an aging population

- Age-related hearing loss (sensorineural)
 - Most common type
 - Typically has a gradual onset
- Combination of hearing + cognitive changes
 - Disproportionately affects higher frequencies
 - Consonants important for conversation (e.g., s, t, p)
 - Slower processing speed, difficulty inhibiting background noise
- Impact on communication and social interactions

I THINK YOU NEED
A HEARING TEST!

WHY THE HECK DO I NEED
A HAIRY CHEST?



Boyer

Prevalence of hearing loss

- Third most common chronic condition in older adults
 - 30% of persons over the age of 65
(Minister of Public Works and Government Services Canada, 2006)
 - 50-90% of persons over the age of 85
(Cruickshanks et al., 2010, *American Journal of Epidemiology*)



Signs of hearing loss

- Difficulty following conversations
 - Especially in a crowded or noisy setting
- Having to increase volume on television/radio
- Difficulty speaking on the telephone

- Clinical presentation
 - Inappropriate responses to questions or comments unrelated to the current topic
 - Repeated requests for repetition

(Berry et al., 2004, *Care Management Journals*)

Communicating in caregiving

- Communication difficulties are one of the most distressing problems reported by caregivers of people with dementia

(Kinney & Stephens, 1989; Ripich & Honer, 2004)

- Breakdowns in communication can lead to frustration and difficulties in accomplishing everyday tasks

(Orange, 1991; Savundranayagam et al., 2005)

Cognitive Loss	Untreated Hearing Loss
Social Isolation (Holman et al, 2000)	Social Isolation (Weinstein & Ventry, 1982)
Decreased comprehension (Pogacar & Williams, 1984)	Decreased understanding/discrimination (Dubno et al, 1984)
Repeating questions (Nyatsanza et al, 2003)	Repeating questions (Katz, 2002)
Short-term memory problem (Miller, 1973)	Working memory problem (Salthouse, 1998)
Stereotyped/inappropriate word use (Nyatsanza et al, 2003)	Stereotyped/inappropriate word use (Tesch-Romer, 1997)
Difficulty following conversation (Bozeat et al, 2000)	Difficulty following conversation (Dalton et al, 2003)
Depression, anxiety (Bierman et al, 2007)	Depression, anxiety (Cacciatore et al, 1999)

Many of the behavioural consequences of cognitive impairment in older adults are very similar to those of untreated hearing loss

How will I know if someone has hearing loss?

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- Won't I just see that they are wearing a hearing aid?

How will I know if someone has hearing loss?

- Won't I just see that they are wearing a hearing aid?
- Most people with hearing loss **do not** pursue treatment
 - Only 14% of adults aged ≥ 50 years have hearing aids (Chien & Lin, 2012)
 - 12% of adults aged ≥ 66 years (Mahmoudi et al., 2019)

Access vs. Success

- Even those who own hearing aids do not always **use them consistently**
 - Care and maintenance can be a barrier to successful hearing aid use
(McCormack & Fortnum, 2013)

How will I know if someone has hearing loss?

- Average time to seek treatment is 10 years
(Davis et al., 2007)

How will I know if someone has hearing loss?

- Average time to seek treatment is 10 years
(Davis et al., 2007)
- Average age of first-time hearing aid use is **63** years (down from 70 years)
(Abrams & Kihm, 2015)

How will I know if someone has hearing loss?

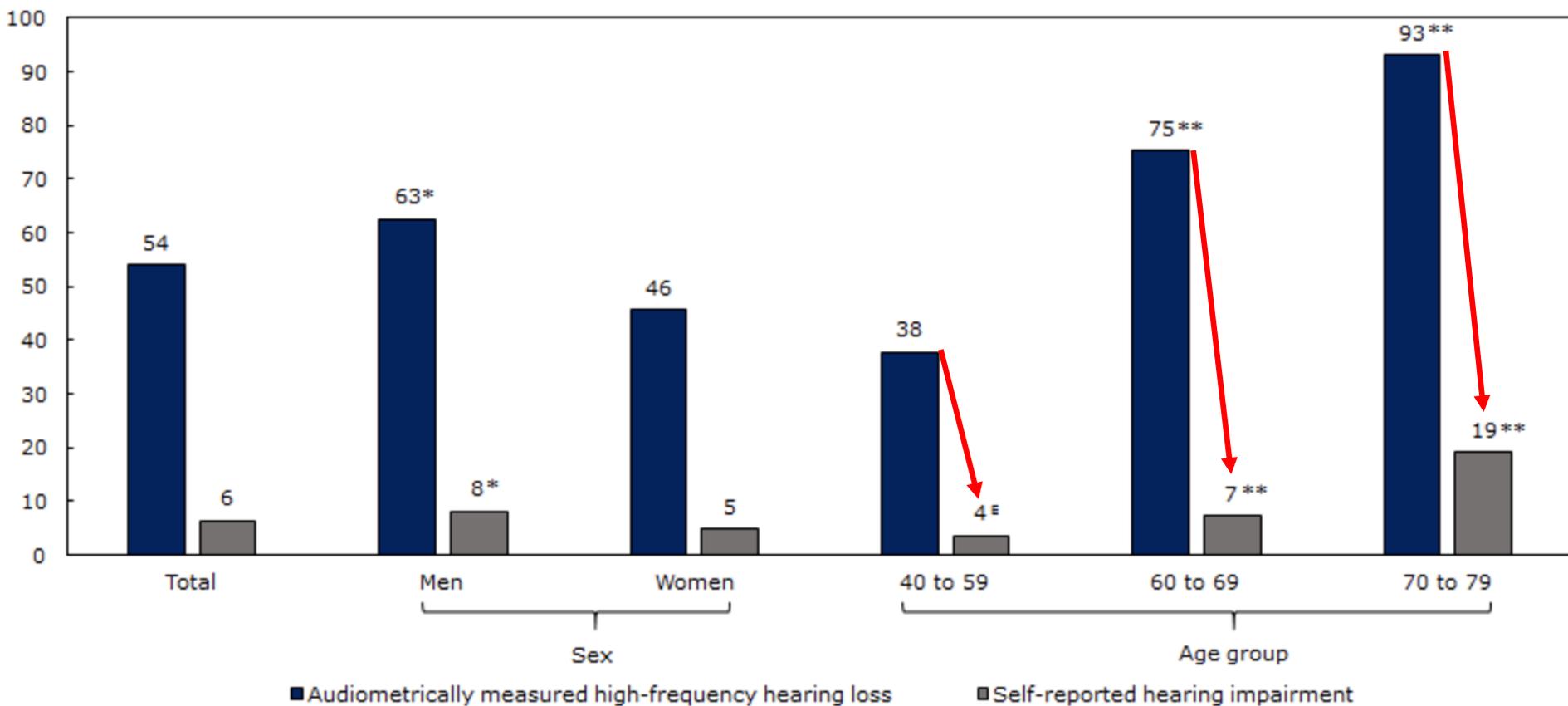
- Won't they just tell me they have hearing loss?

How will I know if someone has hearing loss?

- Won't they just tell me they have hearing loss?
- Notoriously low levels of self-reported hearing loss
 - “Unperceived” hearing loss

Figure 1
Prevalence of audiometrically measured hearing loss¹ and self-reported hearing impairment² by sex and age group, household population aged 40 to 79, Canada excluding territories, 2012 to 2015

percent



Canadian Health Measures Survey (CHMS)
 Stats Can (2019)

How will I know if someone has hearing loss?

- Wearing hearing aids?
 - Probably not

How will I know if someone has hearing loss?

- Wearing hearing aids?
 - Probably not
- Self-report?
 - Probably not

How will I know if someone has hearing loss?

- Wearing hearing aids?
 - Probably not
- Self-report?
 - Probably not
- How can you find out about hearing loss?

How will I know if someone has hearing loss?

- **Ask!**
 - Do you find that people mumble when they are speaking to you?
 - Do you have trouble understanding when two or more people talk at the same time?
 - Do people complain that you turn the TV volume up too high?
 - Do you have trouble hearing in a noisy place?

American Speech-Language-Hearing
Association

Hearing loss as a **public health imperative**

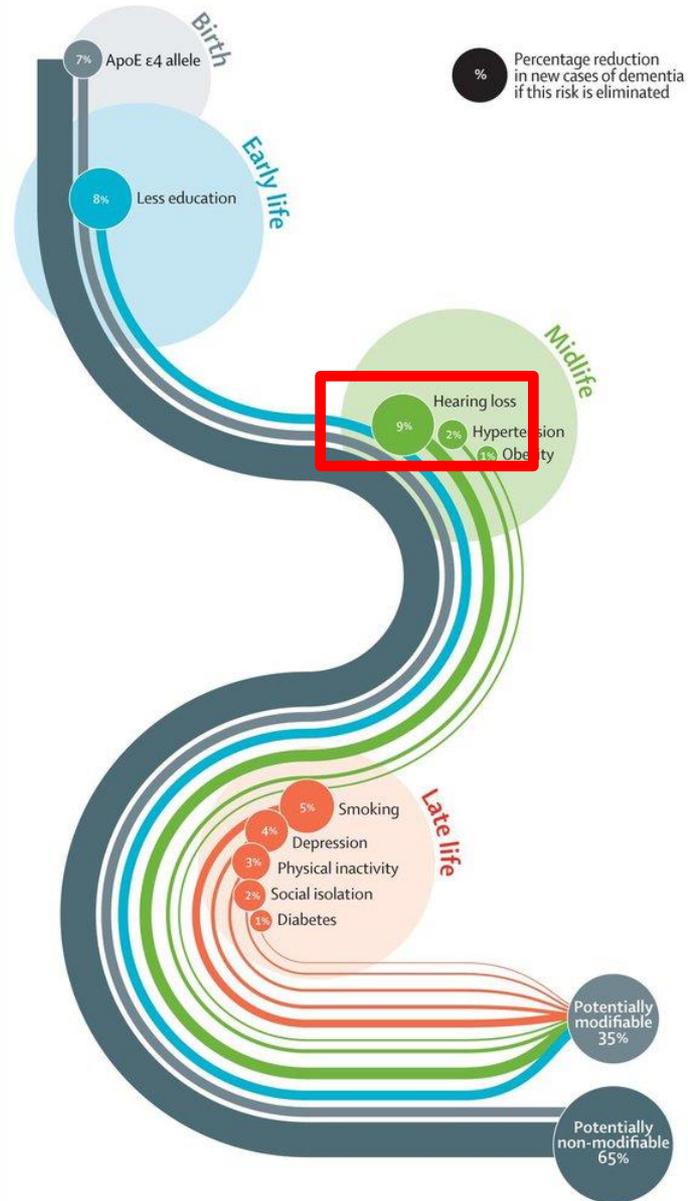
- Overall quality of life
- Communication
- Emotional wellbeing
- Can compromise safety
 - Reduce independence

Hearing loss as a **public health imperative**

- Increases risk for
 - Falls
 - ER visits
 - Dementia
- Increases burden on
 - Healthcare system
 - Friends and family

Risk factors for dementia

The Lancet Commission presents a new life-course model showing potentially modifiable, and non-modifiable, risk factors for dementia.



Livingston et al., (2017),
Lancet Commission

Link between hearing loss and cognitive loss

- Age-related hearing loss is independently associated with cognitive impairment

(e.g., Deal et al., 2017; Gurgel et al., 2014; Lin et al., 2011; Loughrey et al., 2018; Thompson et al., 2017)

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- The likelihood of developing dementia is directly proportional to degree of hearing loss
- The more severe the hearing loss → the greater the risk

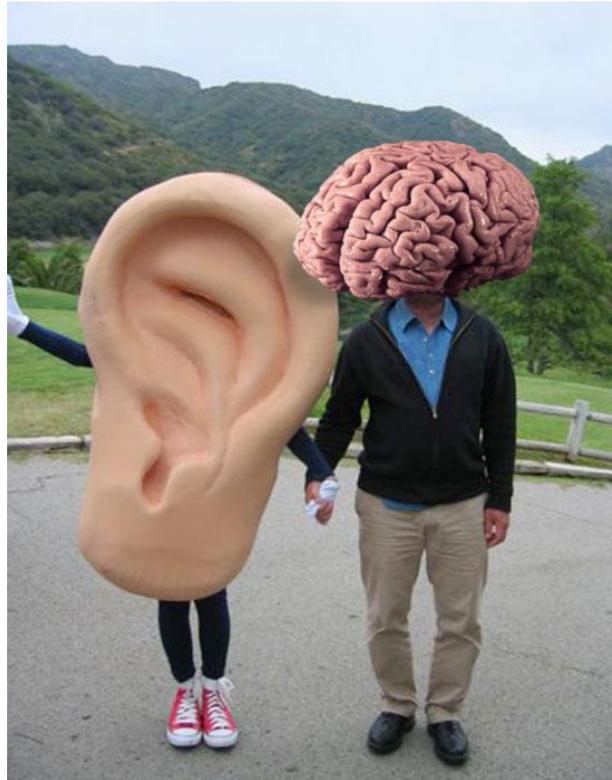
Link between hearing loss and cognitive loss

- Risk of developing dementia for people with hearing loss compared to those individuals with normal hearing... (Lin, Metter, et al., 2011, *Archives of Neurology*)
 - Mild hearing loss: **2 x risk**
 - Moderate hearing loss: **3 x risk**
 - Severe hearing loss: **5 x risk**

Link between hearing loss and cognitive loss

- Potential explanations
 - Specific cause
 - Cognitive
 - Underlying neuropathological process
 - Social isolation (“use it or lose it”)
 - Mood

What can we do to help?



2. Describe solutions for managing hearing loss in an older population

Treatment options

- Refer to a physician (ENT) to rule out any medical issues
 - Wax, Infection etc.
- Refer to Audiologist/Hearing Clinic
- Motivational counselling: link between cognitive loss and hearing loss
 - Inter-professional communication and collaboration to facilitate treatment compliance and trajectory

(Reed, M., Dupuis, K., & Pichora-Fuller, M. K. (in press). *Adult Audiology Casebook* (2nd ed.))

Barriers to seeking treatment

- Denial

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- Stigma

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- Ease of accessing services
 - Financial constraints

Barriers to seeking treatment

- Denial
- Stigma
- Ease of accessing services
 - Financial constraints
- Just a “normal” part of aging
 - Lack of assessment
 - Lack of referral
 - Misconceptions about treatment options/success

Treatment for medically complex older adults

- Physicians may incorrectly believe that clients are unable to receive/benefit from treatment for hearing loss due to comorbid medical conditions

(Jorgensen, Nowak, & McCarthy, 2016, *The experience of hearing loss: Journey through aural rehabilitation*)

- As a result may not refer to/consult with hearing healthcare professionals
 - Only **13/100** clients diagnosed with dementia in a university-based primary care clinic were asked about hearing loss, and **4/100** clients referred to Audiology
- (Jorgensen et al., 2014, *Audiology Today*)

Managing hearing loss in an older population

- Assistive technology
- Environmental modifications
- Behavioral communication strategies

Can older individuals living with dementia use hearing aids successfully?

Can older individuals living with dementia use hearing aids successfully?

- **Yes!**
- 50% of sample of 135 clients of a geriatric audiology clinic had some level of cognitive loss indicated in EHR
 - Hearing aids kept at follow-up
 - Benefits of treatment noted

(Dupuis et al., 2019, JSLHR)

Benefits of hearing aid use for individuals living with dementia

- Hearing aid provision can lead to....
 - Qualitative improvement in quality of life
 - e.g., Enjoying church more, speaking to wife and friends more
 - Reduction in personal expressions
 - Stable caregiver burden over a period of 6 months
 - Improvement in caregivers' subjective ratings of their care recipients' hearing

Benefits for caregivers are often secondary to gain in their care recipients' functioning

Benefits for clients and significant others

- Qualitative reports
 - Mother is more joyful... I'm more joyful!
 - She hangs up on me less
 - She is **safer**
 - She will not become **isolated socially** and can continue to **enjoy her activities**
 - My mother is less frustrated and angry and is complaining less.
 - **There are no more arguments over getting hearing aids**

Hearing aids and cognition

- First-time hearing aid users over a period of six months
 - Improved memory, speech processing, listening ease
(Karawani et al., 2018, *Clinical Neurophysiology and Neuropsychologia*)

Hearing aids and cognition

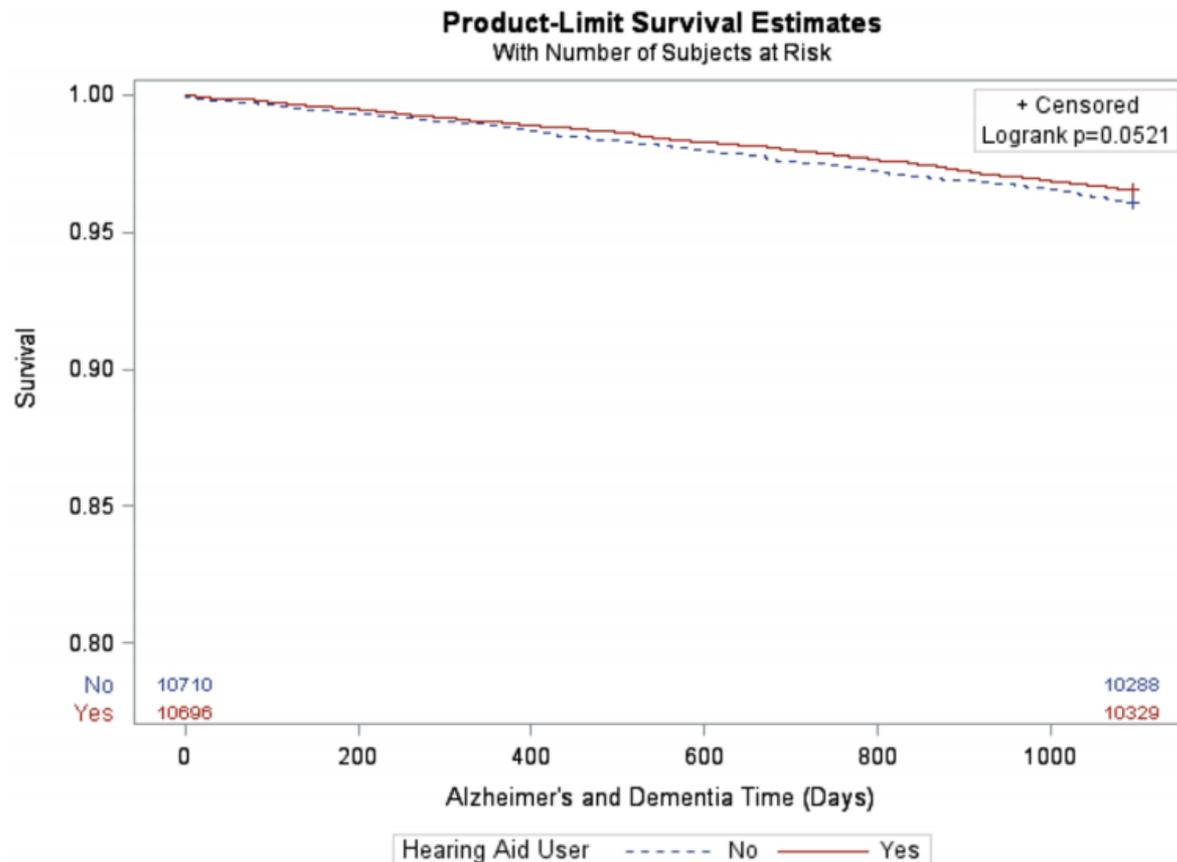
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- Cognitive testing over two years
 - Hearing aid users: better working memory, attention
(PROTECT study, Corbett et al., 2019)

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- First-time hearing aid users over a period of six months
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 - Hearing aid users: better working memory, attention
(PROTECT study, Corbett et al., 2019)
- With equivalent hearing loss, hearing aid use associated with better cognitive performance
(Dawes et al., 2015, *PLOS One*)

Hearing aids and dementia

- Higher risk of dementia without hearing aid use (Mahmoudi et al., 2019, JAGS)



Hearing aids and dementia

- Higher risk of dementia without hearing aid use
(Mahmoudi et al., 2019, *JAGS*)
- Randomized trial (pilot): Gold standard
 - Hearing aid(s) or successful aging health education
 - Better hearing handicap and memory scores at 6 months post-intervention for hearing aid group
(Deal et al., 2017, *Alzheimer's & Dementia*)

✓ Alz·heim·ers

...a disease that attacks the brain, the most common form of dementia



TERESA CULLEN, AU.D., CCC-A
Doctor of Audiology
President: Cape Cod
Hearing Center



MELANIE HIGGINS, M.S., CCC-A
Masters of Science in Audiology

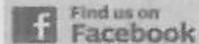
DID YOU KNOW that significant hearing loss increases the risk of Alzheimer's disease and dementia?

Findings from a recent Johns Hopkins University study state that an intervention as simple as wearing hearing aids could delay or prevent dementia.

According to the Better Hearing Institute, hearing loss has long been linked to a variety of medical conditions, including Alzheimer's. Recently, an August 2011 report published by **Johns Hopkins University** and the **National Institute on Aging (NIA)** found that hearing loss can lead to dementia and Alzheimer's by making individuals more socially isolated. Something even as simple as wearing hearing aids could delay or even prevent dementia by improving patients' hearing.

This study shows that early treatment of hearing loss allows your cognitive functions to remain sharper.

Visit www.hopkinsmedicine.org for more information



Trust your hearing to an Audiologist



60 North Street, Hyannis | Nantucket | www.capecodhearing.com
508-775-0959

What **CAN** we say?

- “Age-related hearing loss is independently associated with dementia and accelerated cognitive decline”
(Johns Hopkins Institute of Medicine, 2018)
- “Age-related hearing loss is the largest potentially modifiable risk factor for dementia at a population health level”
(Livingston et al., 2017, *Lancet*)
- Hearing aid use may mediate cognitive decline through reduced social isolation and depression or neurobiological effects of sensory deprivation
(Amieva et al., 2015; Dawes et al., 2015; Maharani et al., 2018)

What comes next?

- Randomized Control Trial (RCT) studies underway now to determine whether preventing or treating hearing loss will:
 - reduce the risk of dementia
 - delay the onset of dementia
 - modify progression of dementia
- Canadian Consortium on Neurodegeneration in Aging (CCNA) team studying interventions at the sensory and cognitive interface

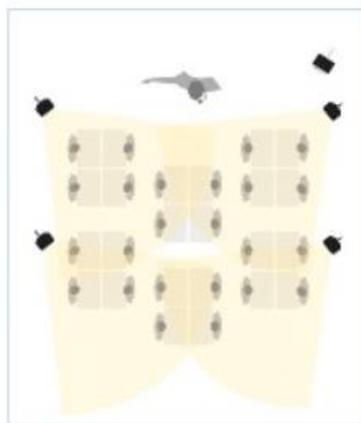
Potential barriers to hearing aid satisfaction

- Changing batteries
 - Rechargeable technology
- Insertion/removal
 - Custom-fit molds
- Wax filters plugged
 - Relationship with clinic



Assistive listening devices

- Personal amplifiers e.g., PocketTalker and FM
 - Large and easy to manipulate
 - Robust and durable
 - Harder to lose!
- Sound field systems



Assistive technology: Independent living and safety



Environmental modifications

- Quiet environments with minimal distractions
 - Reduce competing noise (music, other talkers), use carpeting, wall coverings
- Sit close by and facing one another, and at same eye level
- Ensure good lighting for use of visual cues
 - Speech reading

Communication strategies

- Use “clear speech”
 - Slower paced, slightly louder, articulation, pauses
- Provide context for your conversation
- Keep sentences short and simple
- Repetition is key
 - Seek feedback to ensure that information has been heard correctly
- Minimize background noise

Communication strategies

- Maximize use of visual cues
 - Ensure face is visible to facilitate speech reading
 - Use written materials, pictures and objects to facilitate understanding
- Don't hold your hand/papers up to your mouth
- Encourage use of visual aids (e.g., glasses)

- Ask- how can I help you communicate better?

Summary and Clinical Implications

- Hearing loss as a public health imperative
 - Hearing health as a key component of healthy aging
- Awareness/Assessment/Referral is key
 - Ask questions of client/significant other
 - Observe!
 - Simply looking for a hearing aid is not enough...
- Make use of assistive technologies such as a during appointments
 - Hearing aids and PocketTalkers



Questions?