

MoCA Talk #20



Thu, Apr 10, 2025, 12:00 PM EDT

The Neurocognitive Impact of Hearing Loss: Longitudinal Insights and Clinical Implications



Christian Myrstad, MD
Geriatrician and PhD Student
Levanger Hospital
The Norwegian National Centre
for Ageing and Health





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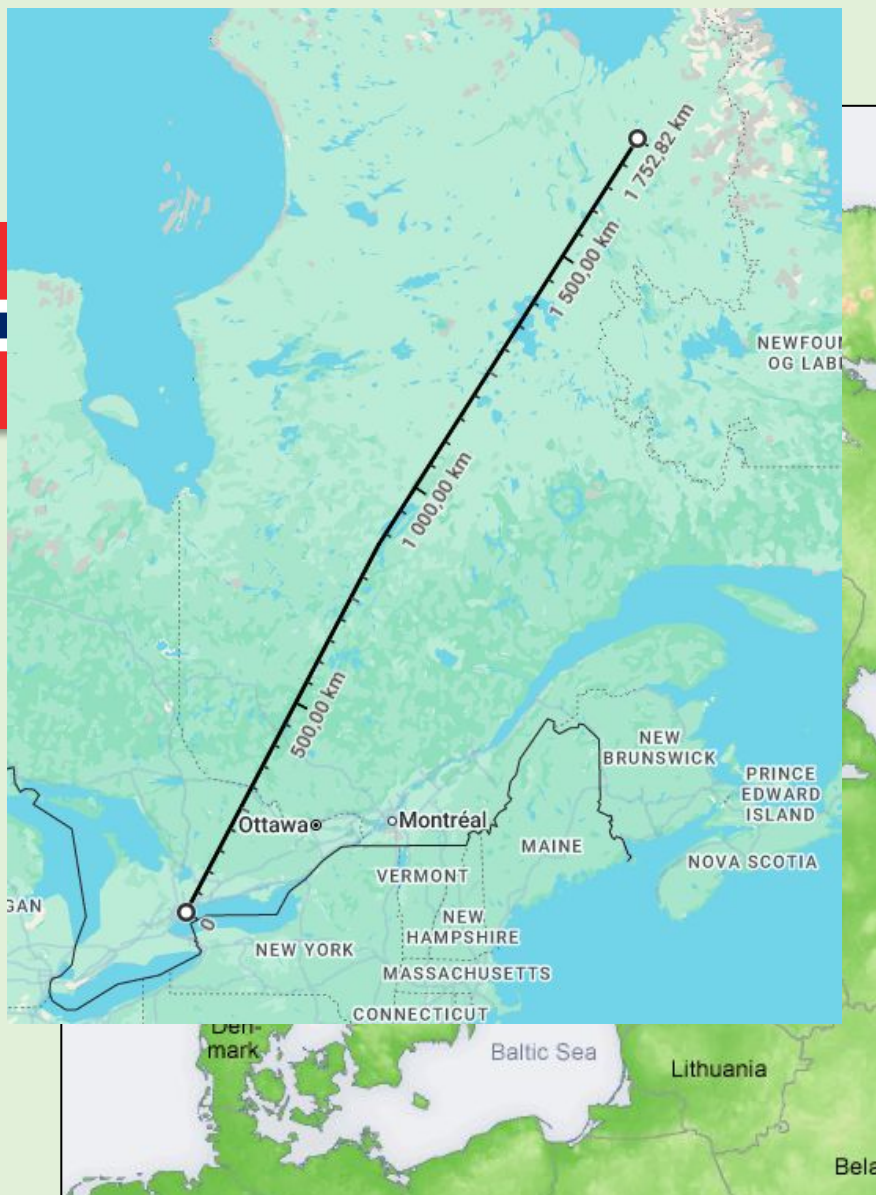
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UNIVERSITY
OF OSLO



Ageing and Health
Norwegian National Centre

I have no potential conflict of interest to report

What you will hear

1. H_1 = Hearing Impairment is an individual Risk factor for Dementia - HIRD
2. The latest update





What you will hear

1. H_1 = Hearing Impairment is an individual Risk factor for Dementia - HIRD
2. The latest update
3. Do you listen?

hear



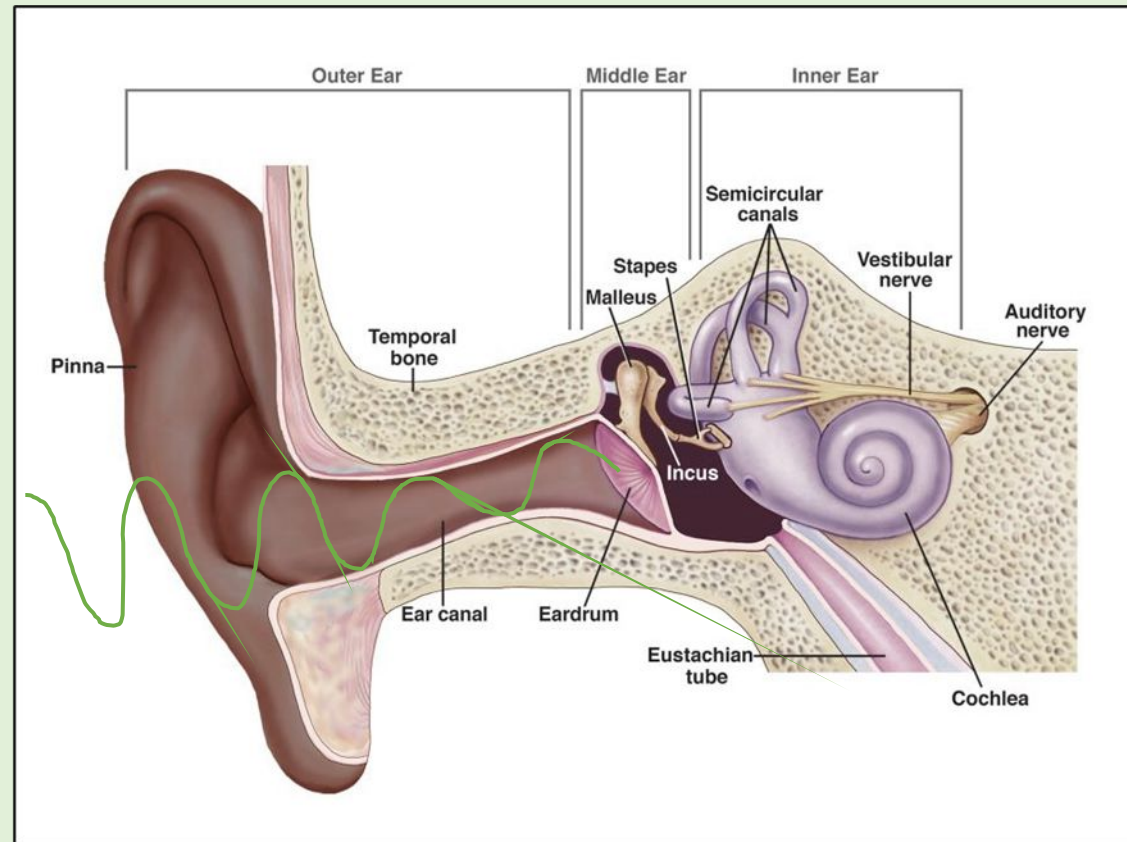
Hearing Impairment is an individual Risk factor for Dementia

listen

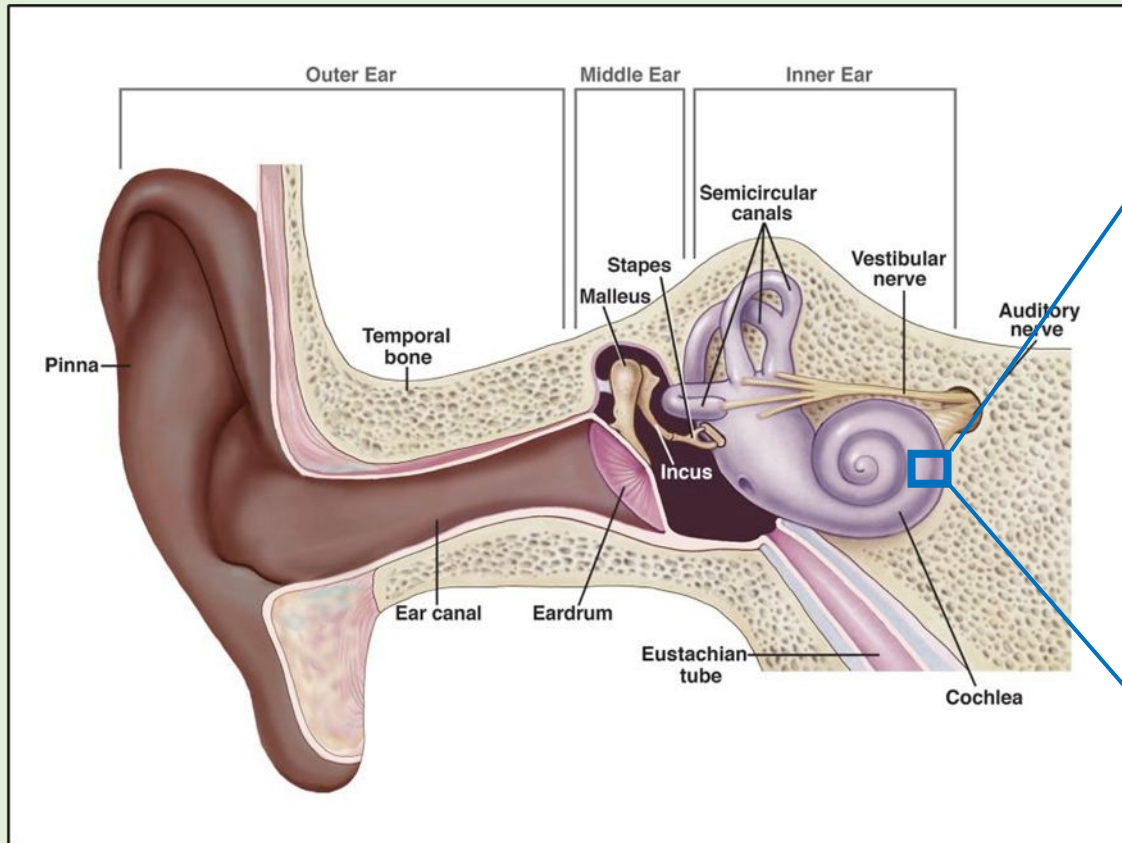


The HIRD Project

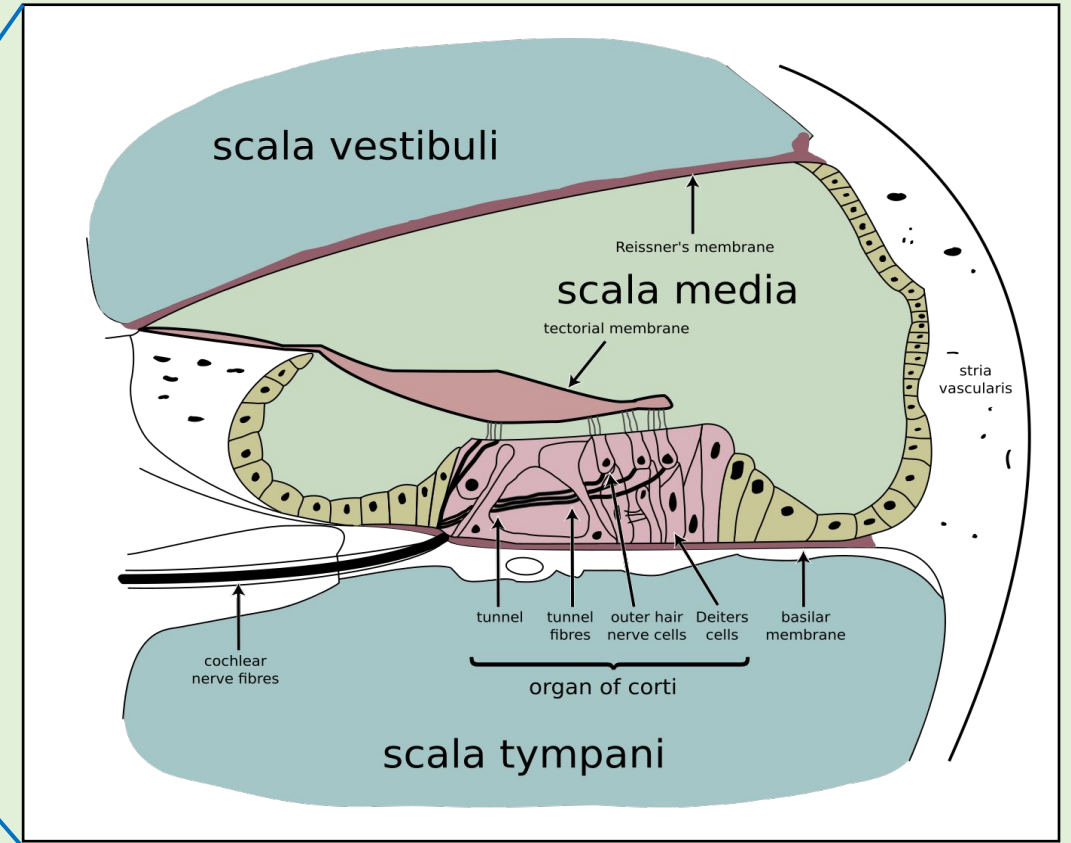
Poll 1



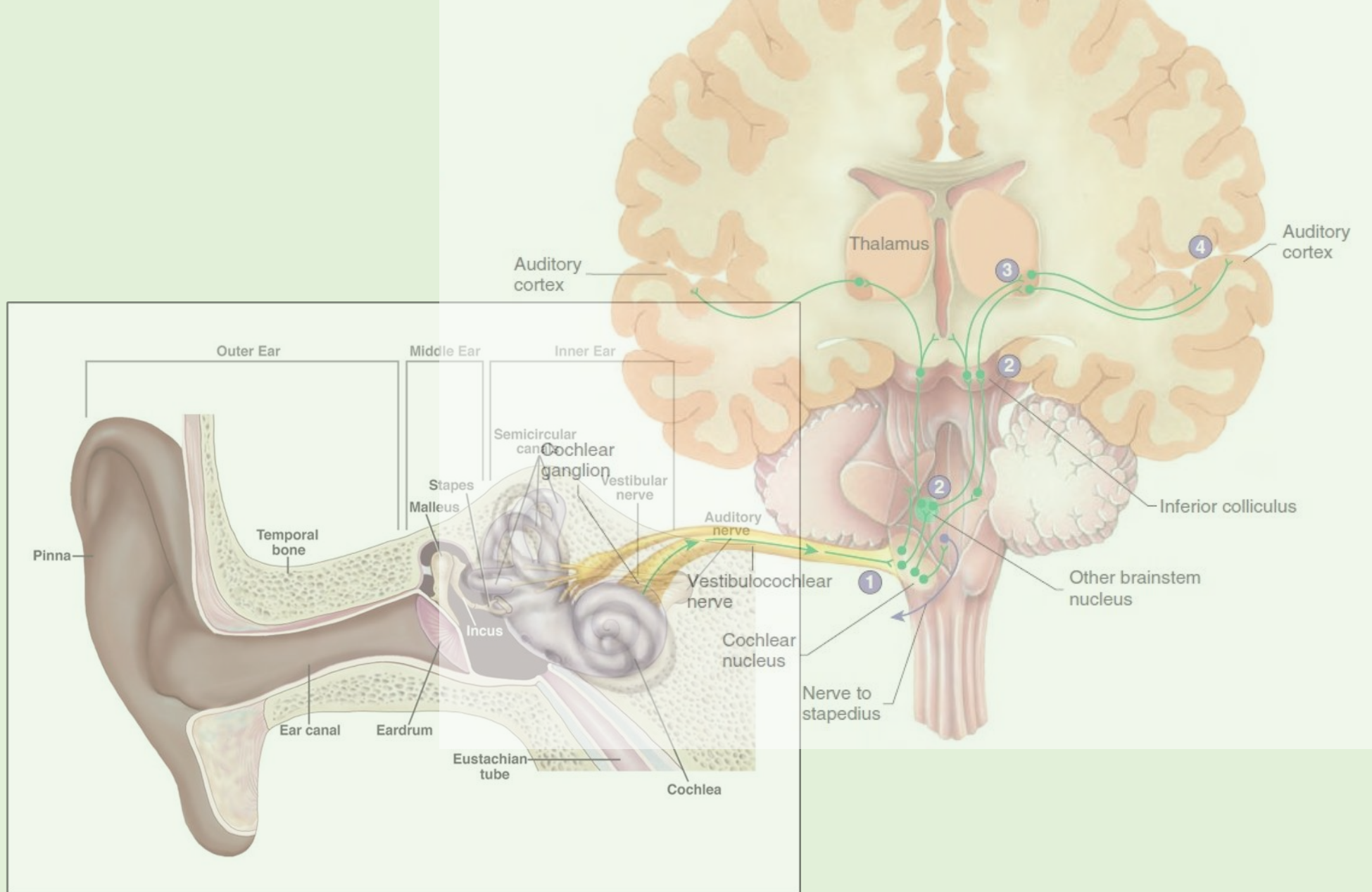
Source: NIH/NIDCD



Source: NIH/NIDCD

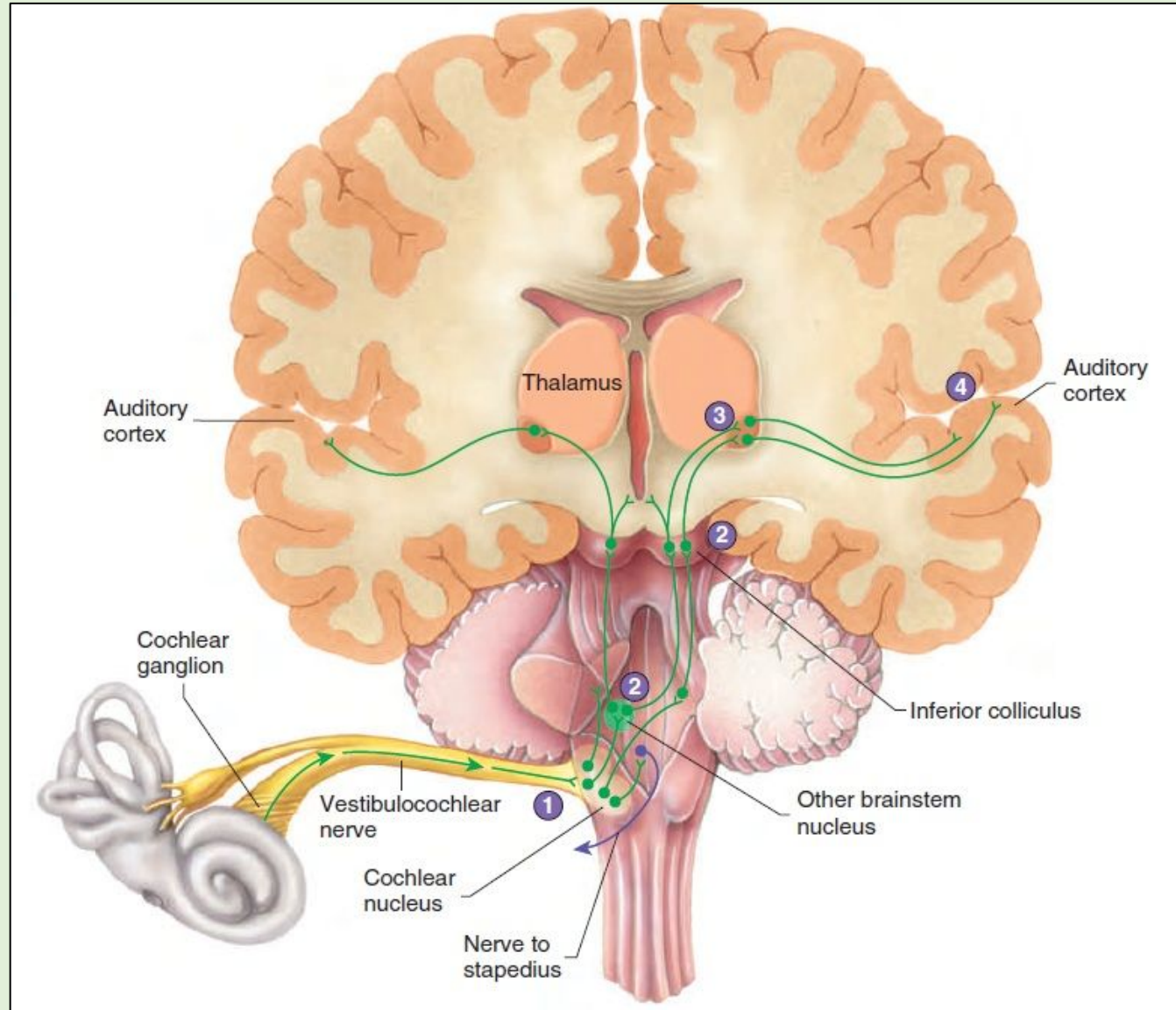


Source: Oarih Ropshkow/CC BY-SA 3.0



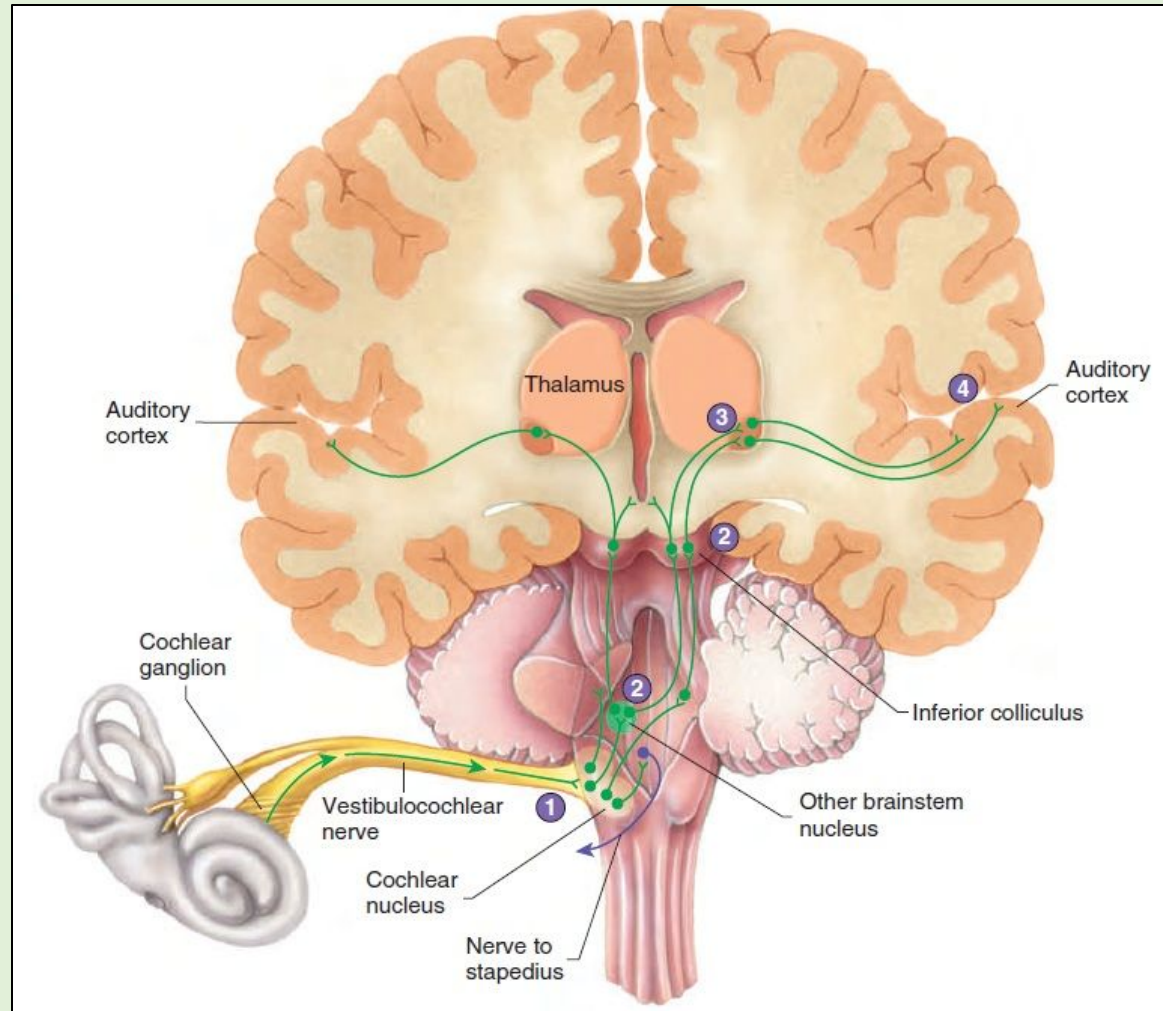
Source: NIH/NIDCD

- motor coordination
- balance
- language
- emotions
- integration with other senses
- memory
- learning

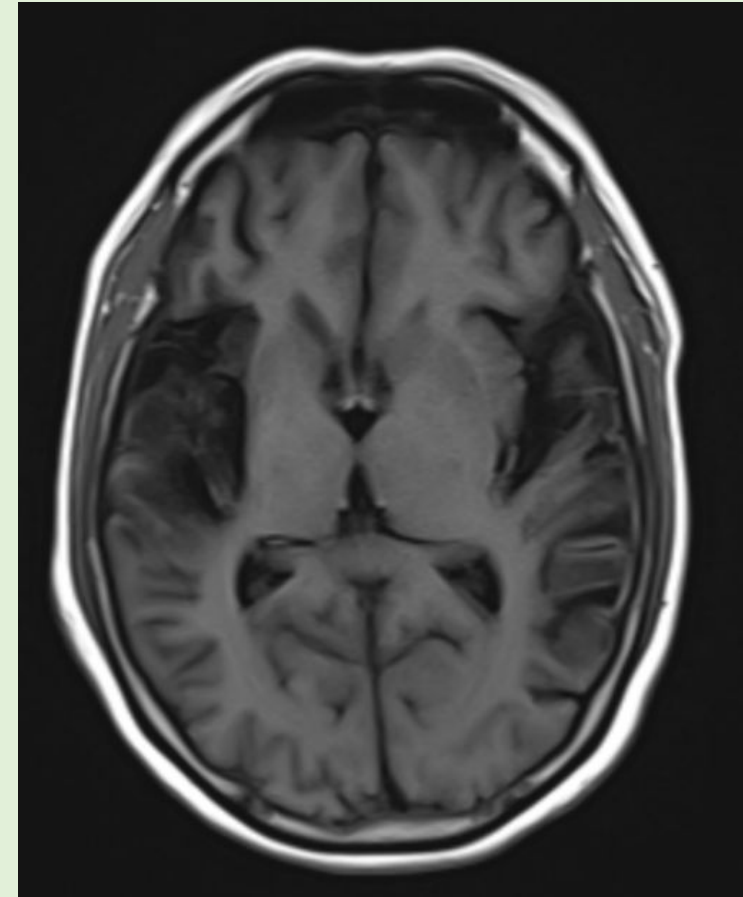
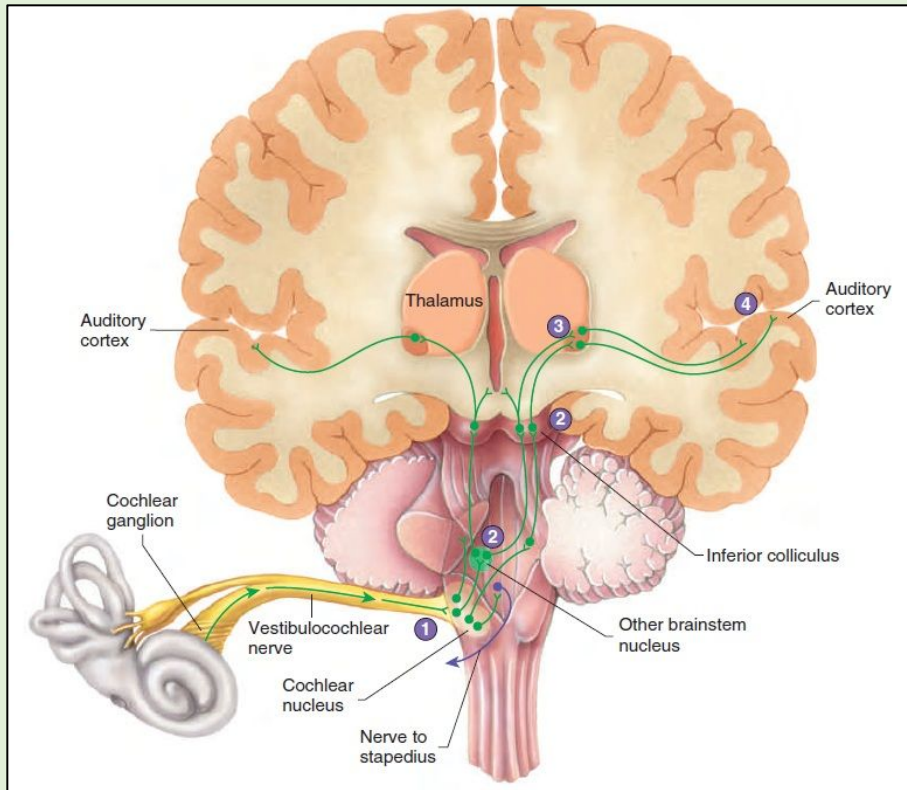


Source: BrainKart.com

1. Sensory Deprivation Hypothesis



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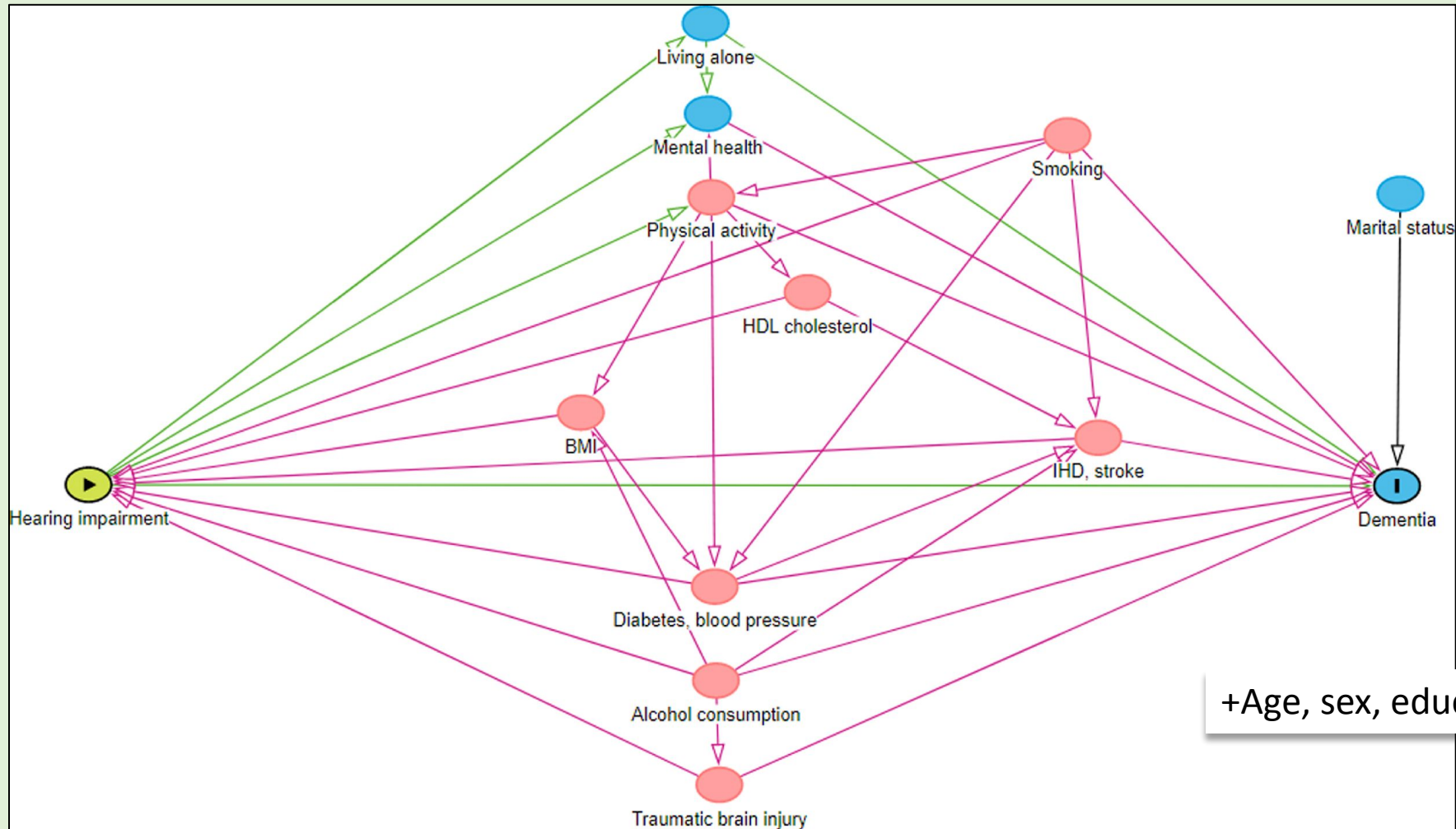


Source: Kumar K, Radiopaedia.org
<https://radiopaedia.org/cases/174778>

What we believe

1. Sensory Deprivation Hypothesis
2. Shared aetiology
3. Cognitive load
4. Social isolation and depression

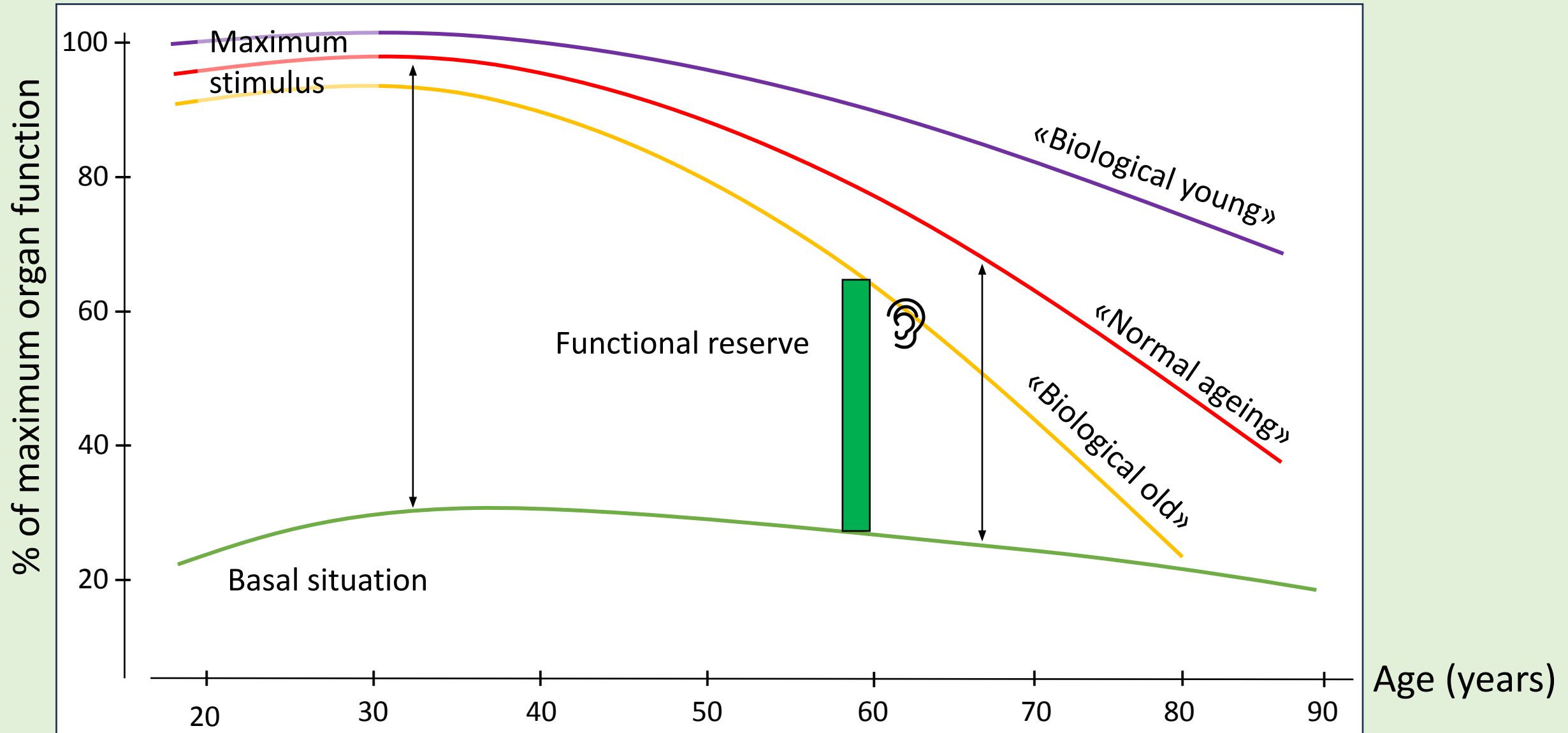
2. Shared aetiology



Source: Myrstad et al, eClinicalMedicine, 2022.

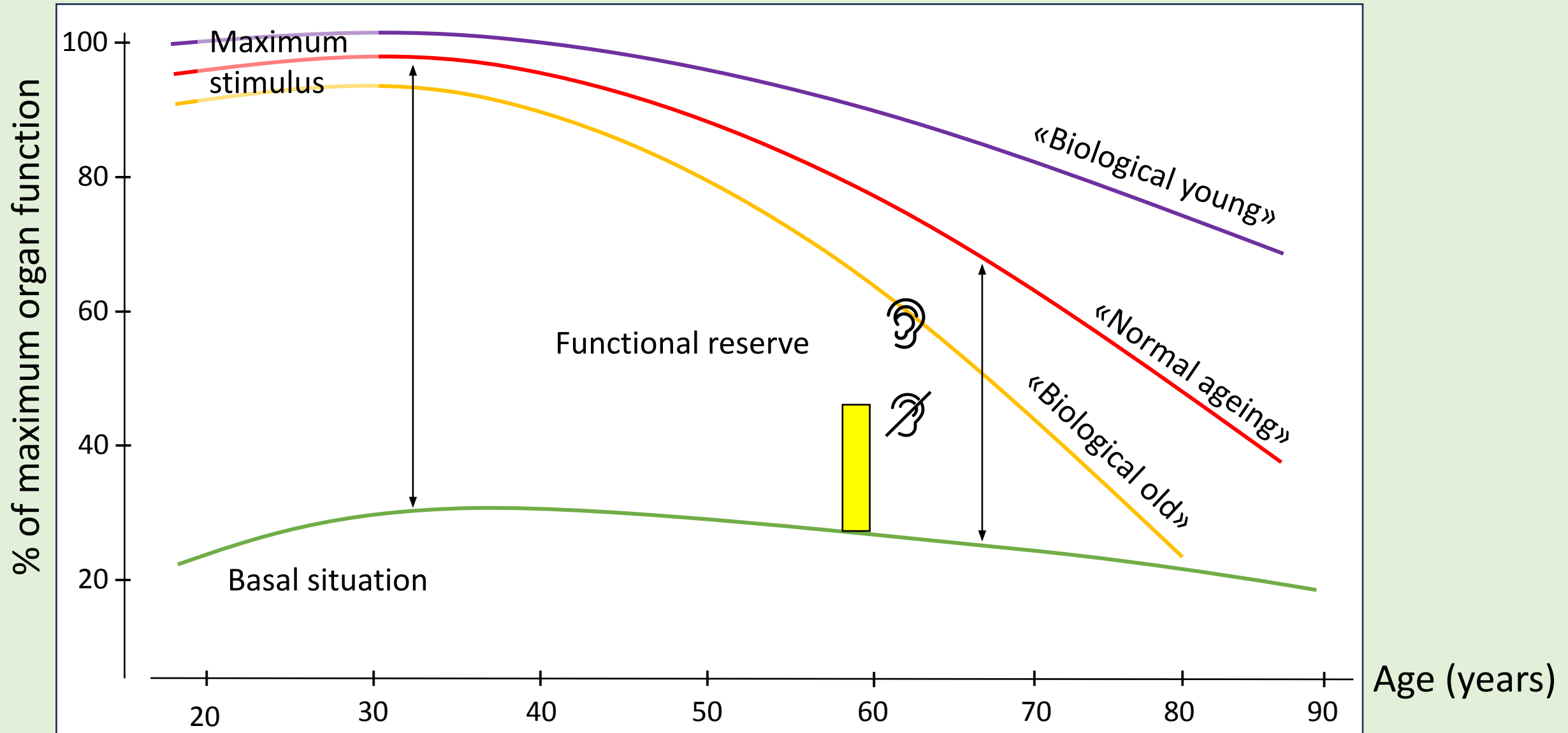
3. Cognitive load

Figure reproduced from Wyller TB,
Geriatrici, 2018

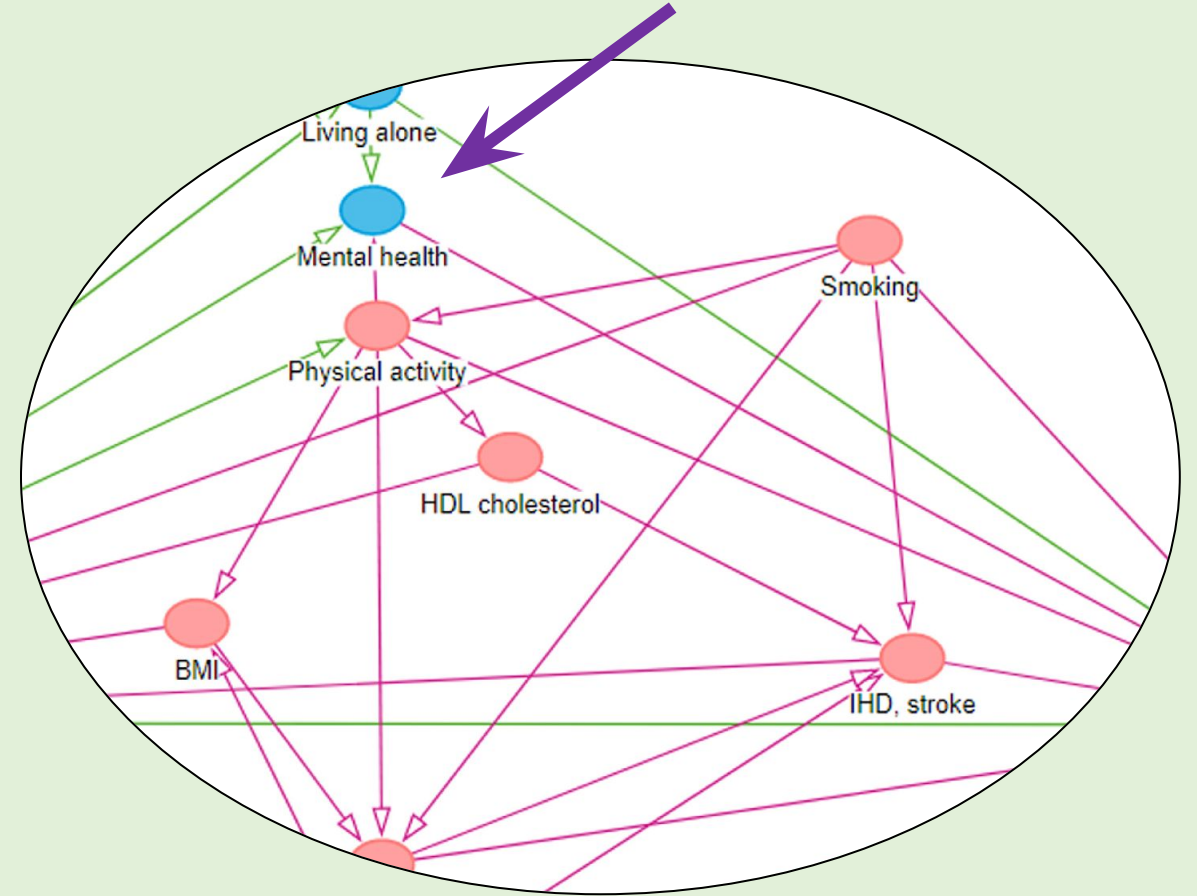
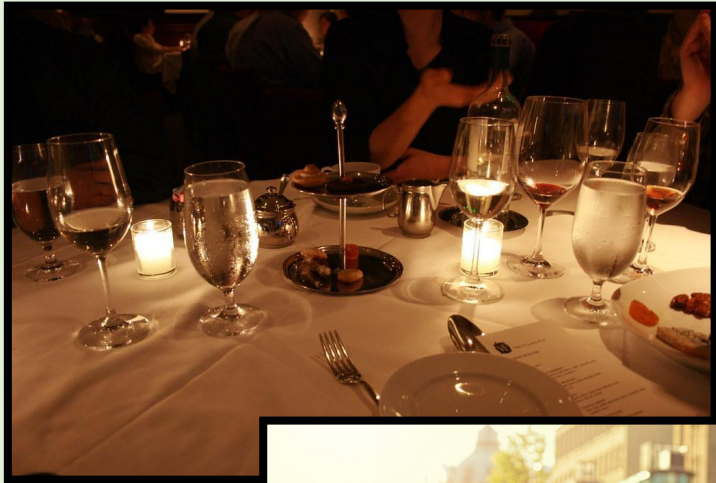


3. Cognitive load

Figure reproduced from Wyller TB,
Geriatrici, 2018



4. Social isolation and depression



What we believe

Genetic factors?

Hearing aids?



Poll 2

What you will hear

1. H_1 = Hearing impairment is an individual risk factor for dementia
2. The latest update
3. Do you listen?





What we should have heard

Hearing impairment

Dementia

What we should have heard

Hearing impairment

- audiometrically verified at baseline

Dementia

- not further specified

Design

- 5 years follow-up
- adjustment for confounding variables

What we should have heard

Previous research

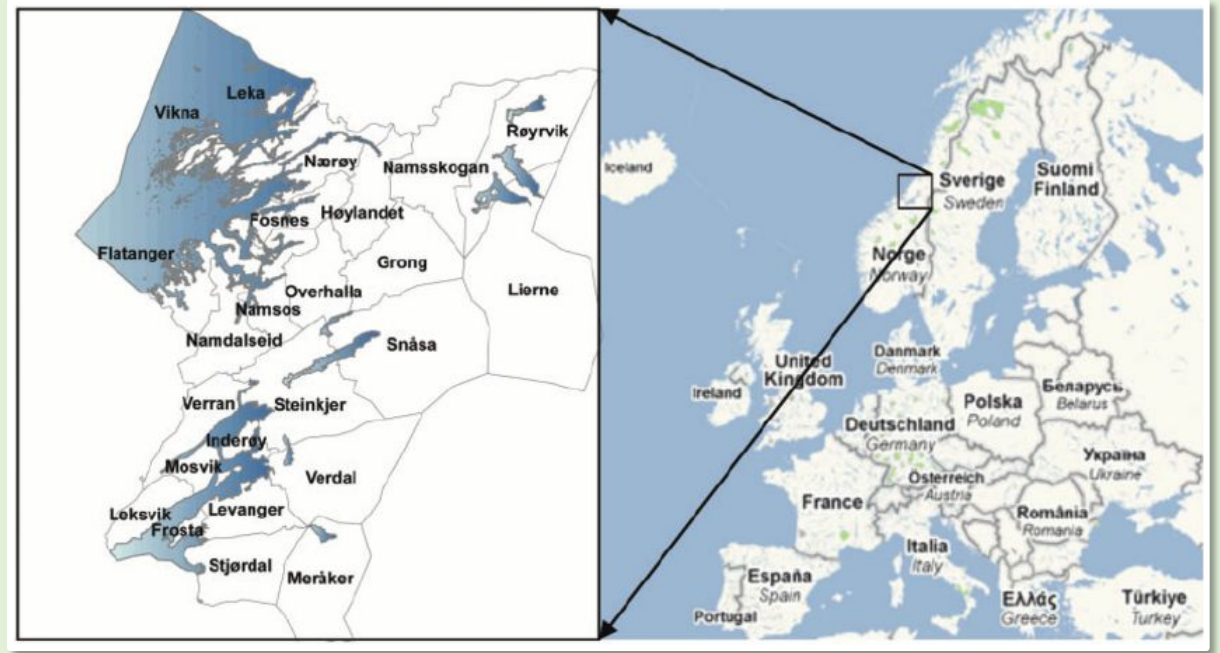
- audiometrically verified at baseline
- 5 years follow-up
- adjustment for confounding variables

Limitations

- no representative community cohort
- only male gender
- relatively short follow-up
- no dementia subtypes

The HUNT Study

- audiometrically verified at baseline
- 20+ years follow-up
- adjustment for confounding variables
- reliable dementia diagnostics
- dementia subtypes
- population-based cohort



The Trøndelag Health Study (HUNT)

HUNT1 1984-1986

HUNT2 1995-1997

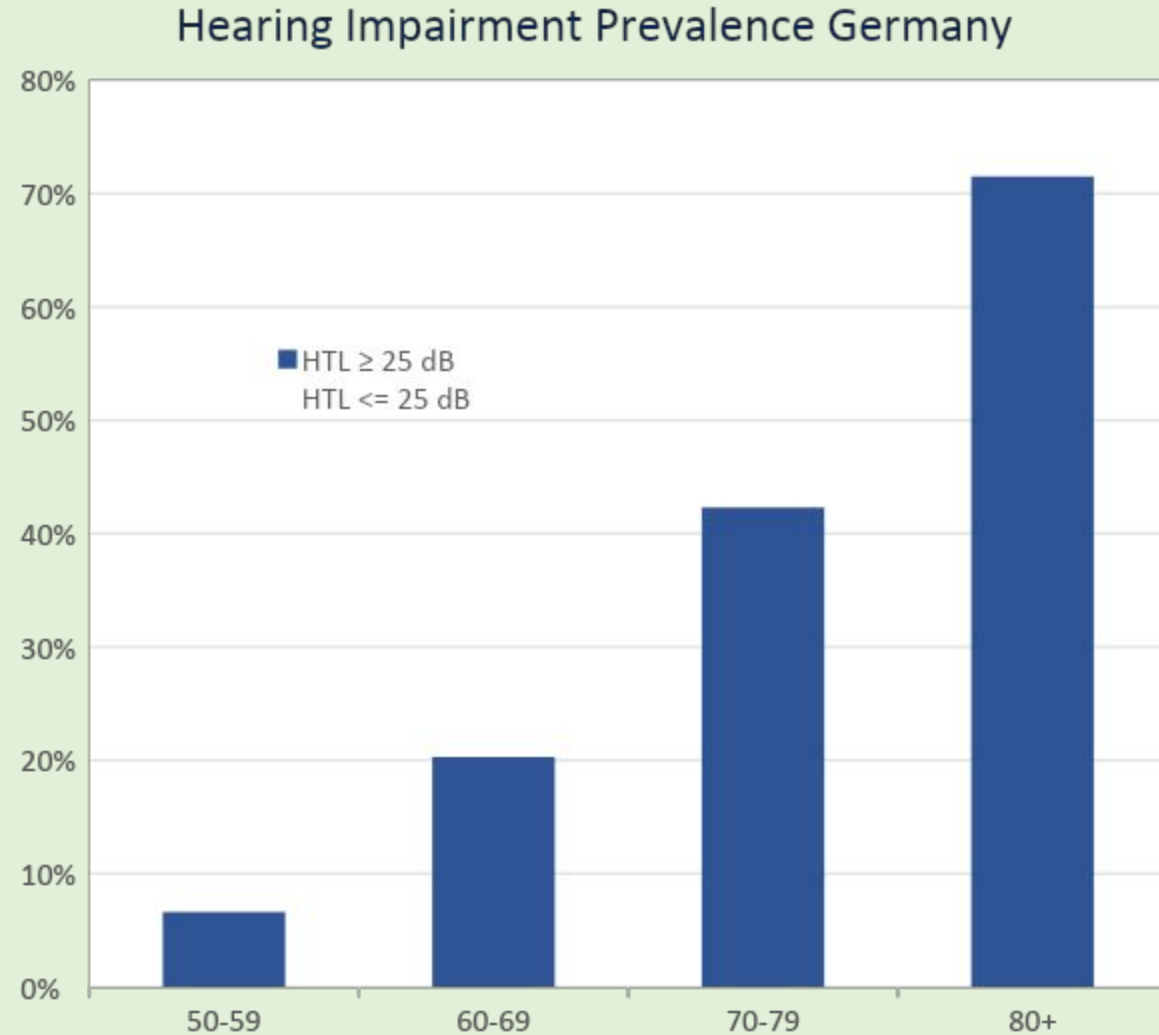
HUNT3 2006-2008

HUNT4 2017-2019

Hearing impairment prevalence

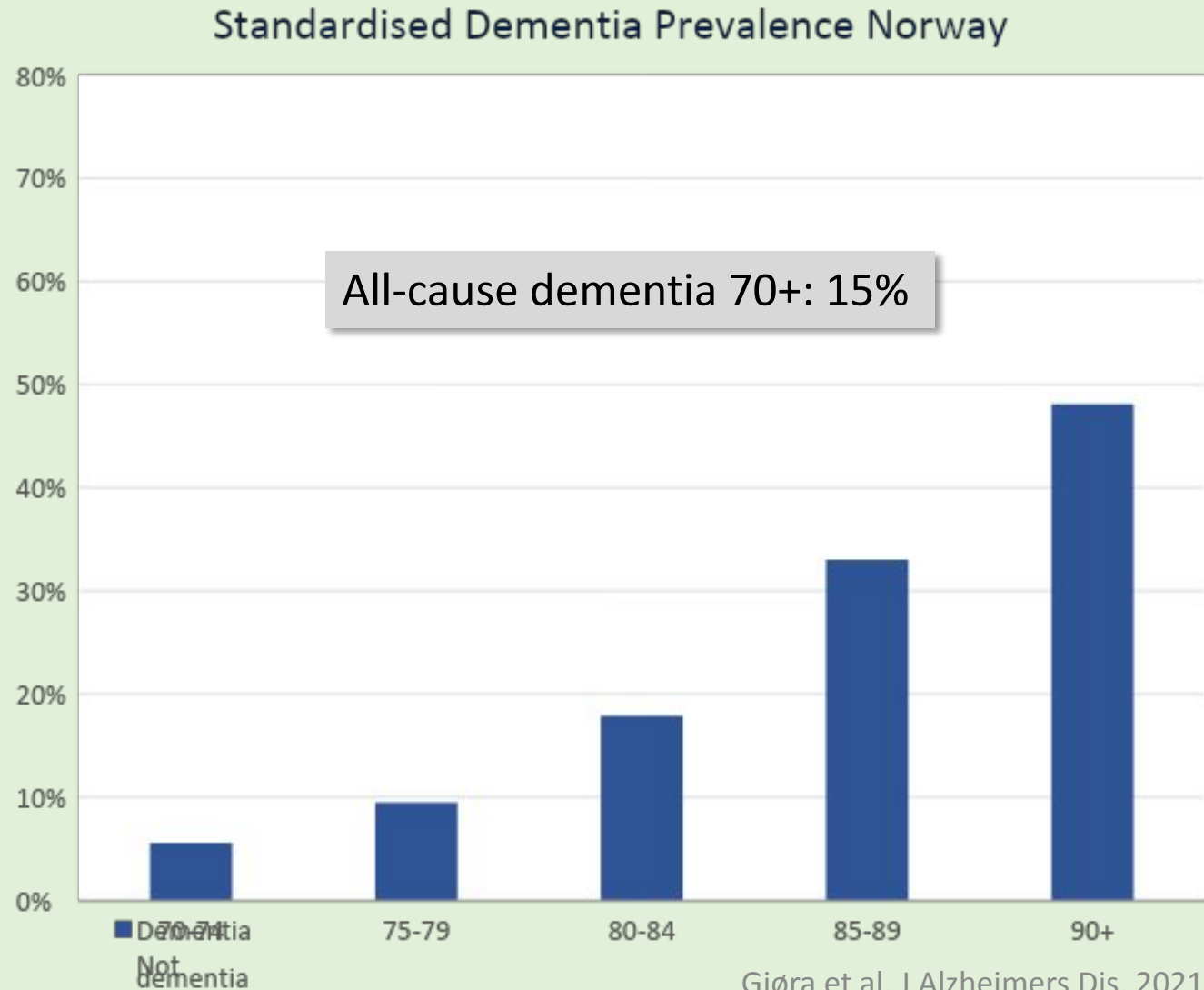
Hearing threshold level

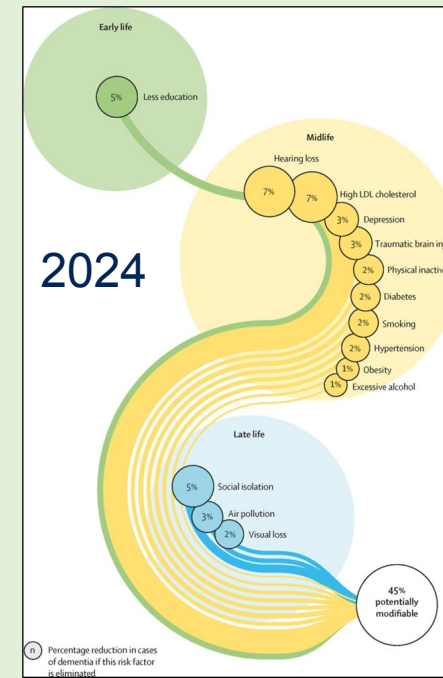
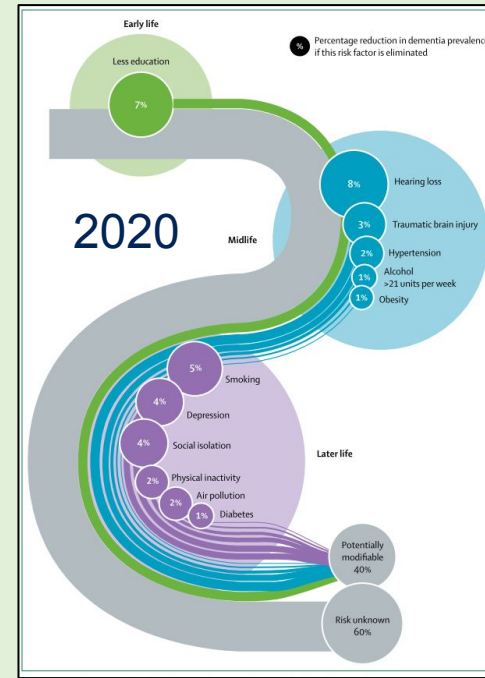
≤25dB: Normal hearing
26-40: Mild impairment
≥35 dB: Disabling hearing loss
>40: Severe impairment



Dementia diagnostics and prevalence

- MoCA
- CERAD WLMT
- SIB-8
- I-ADL, P-ADL
- PSMS
- NPI-Q
- CDR
- HADS





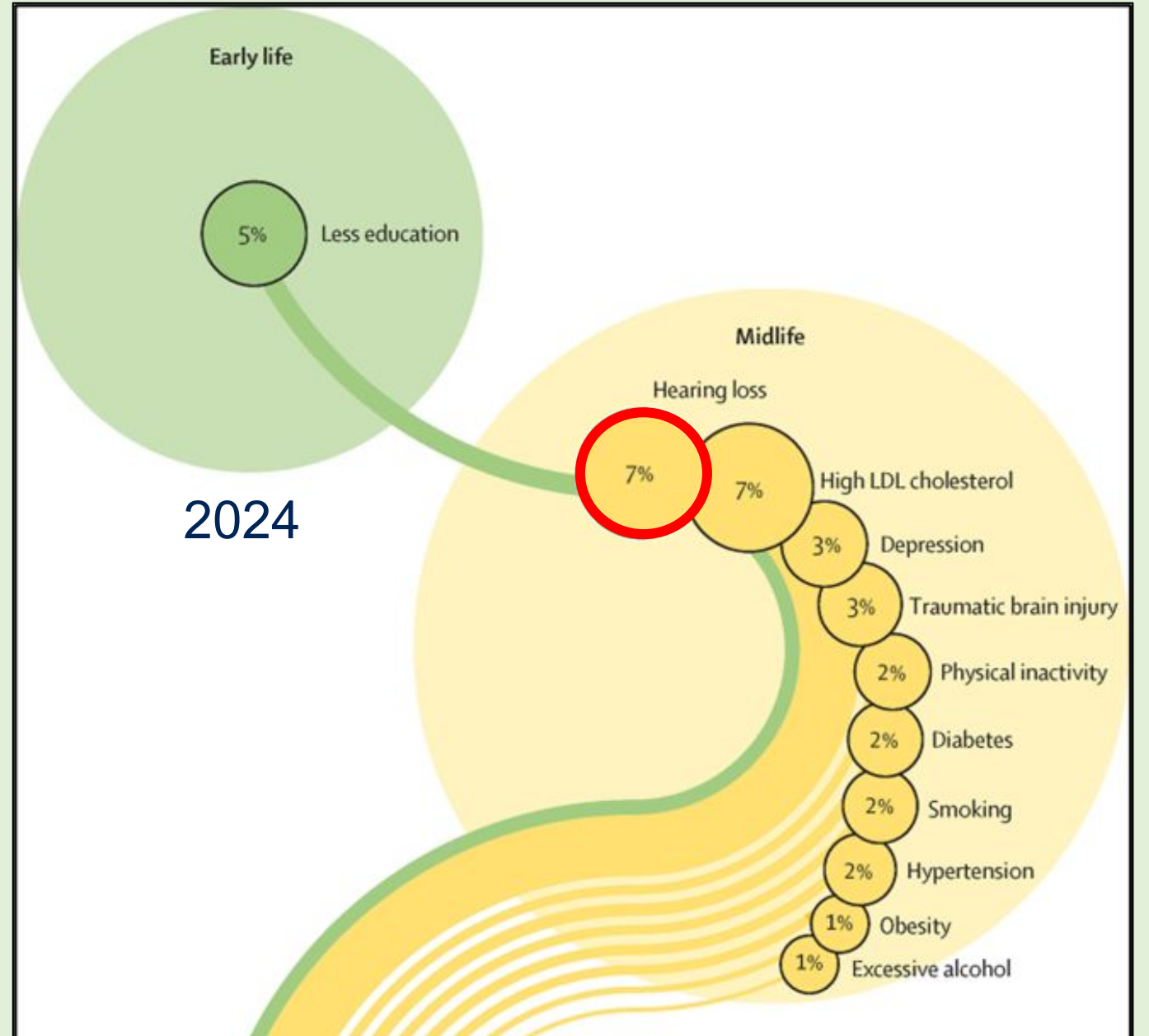
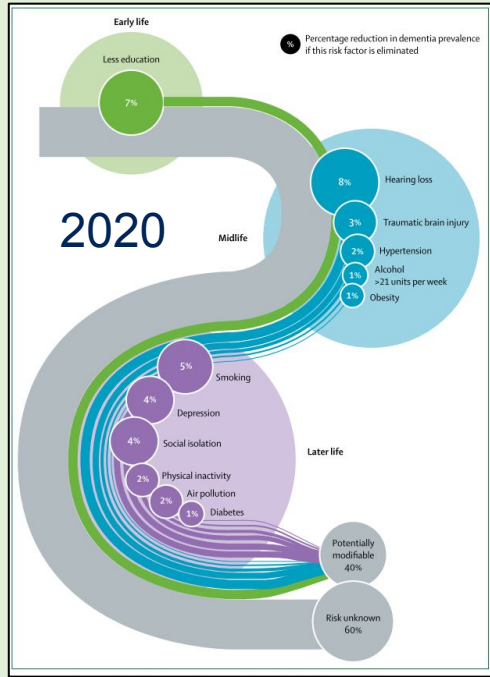
Livingston et al, The Lancet

What we should have HIRD

(Hearing Impairment is an individual Risk Factor for Dementia)

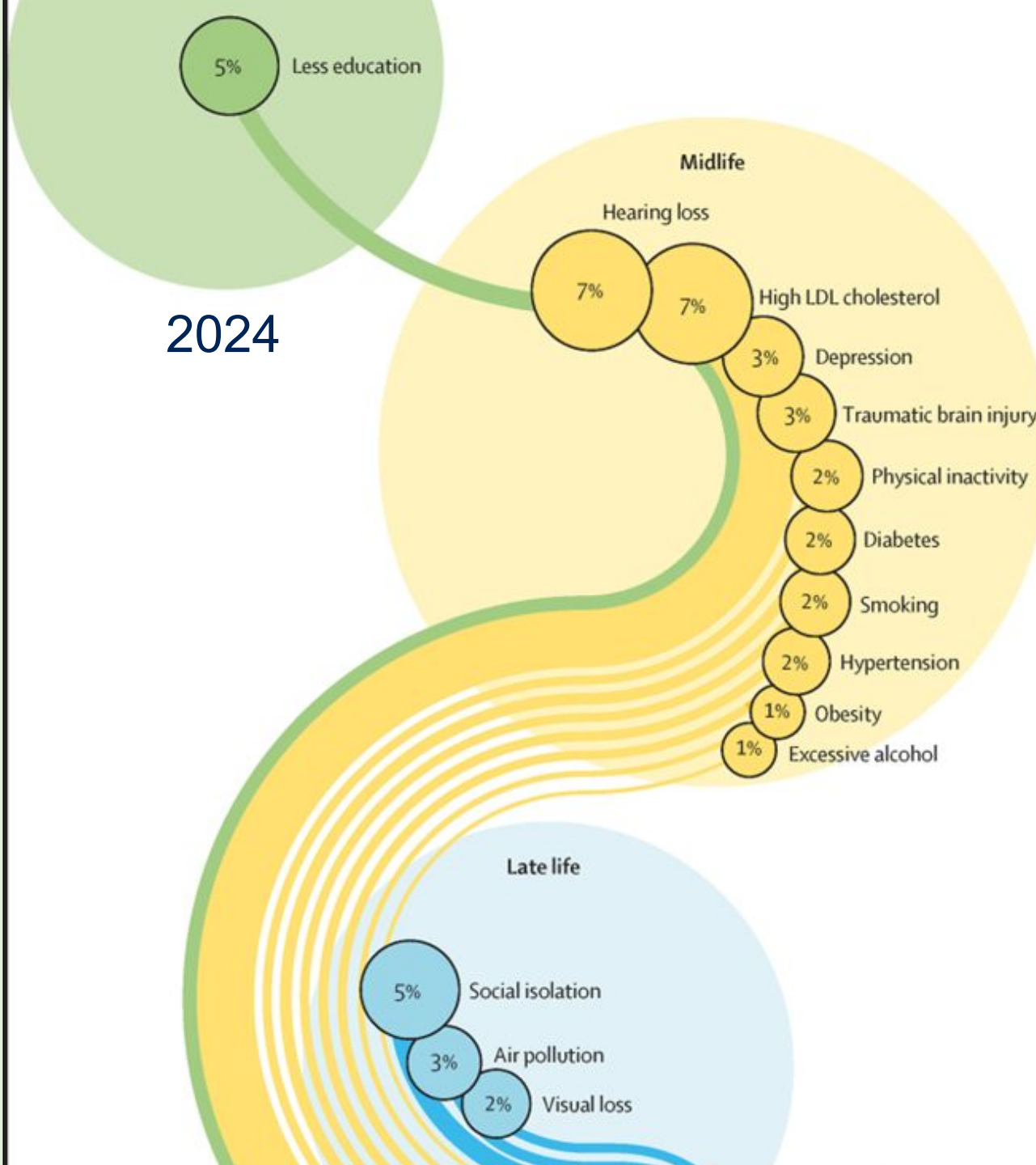
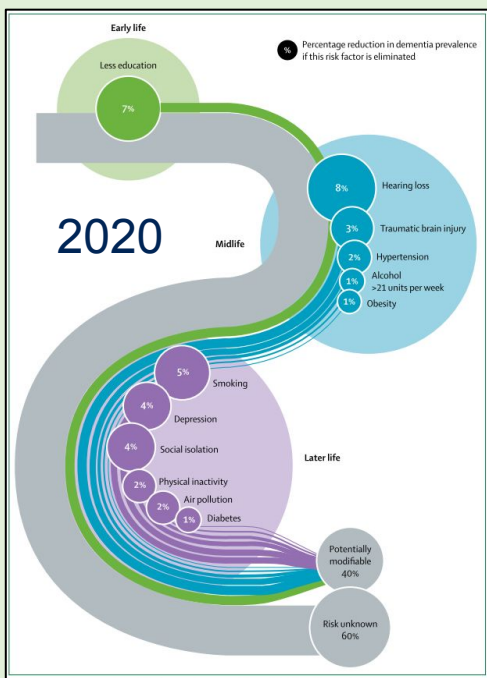


The Lancet



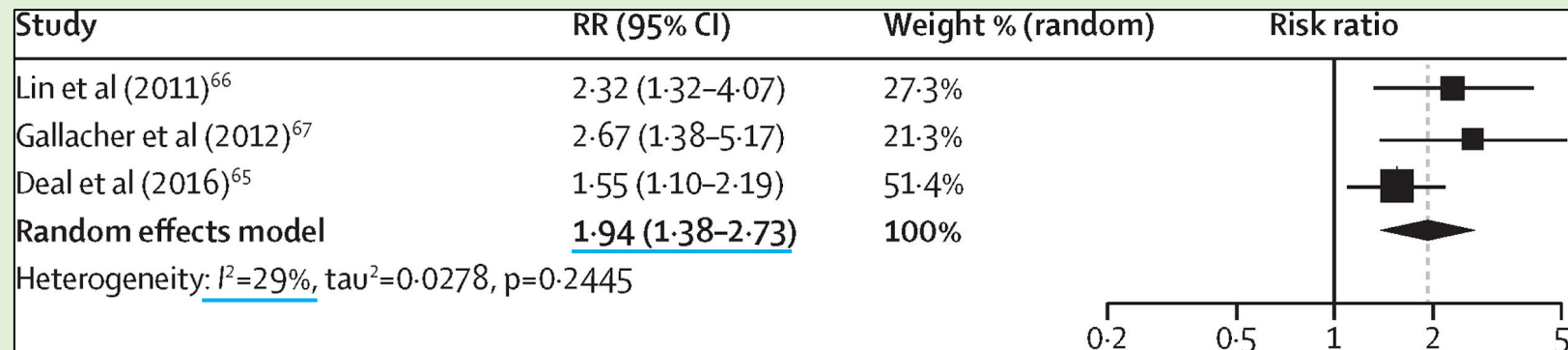


The Lancet



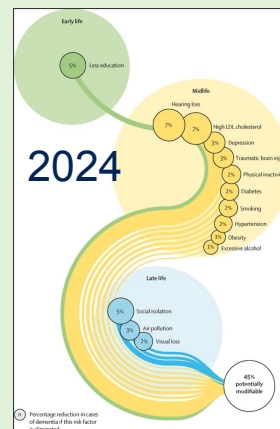


RR 1.94 (95% CI 1.38 to 2.73)

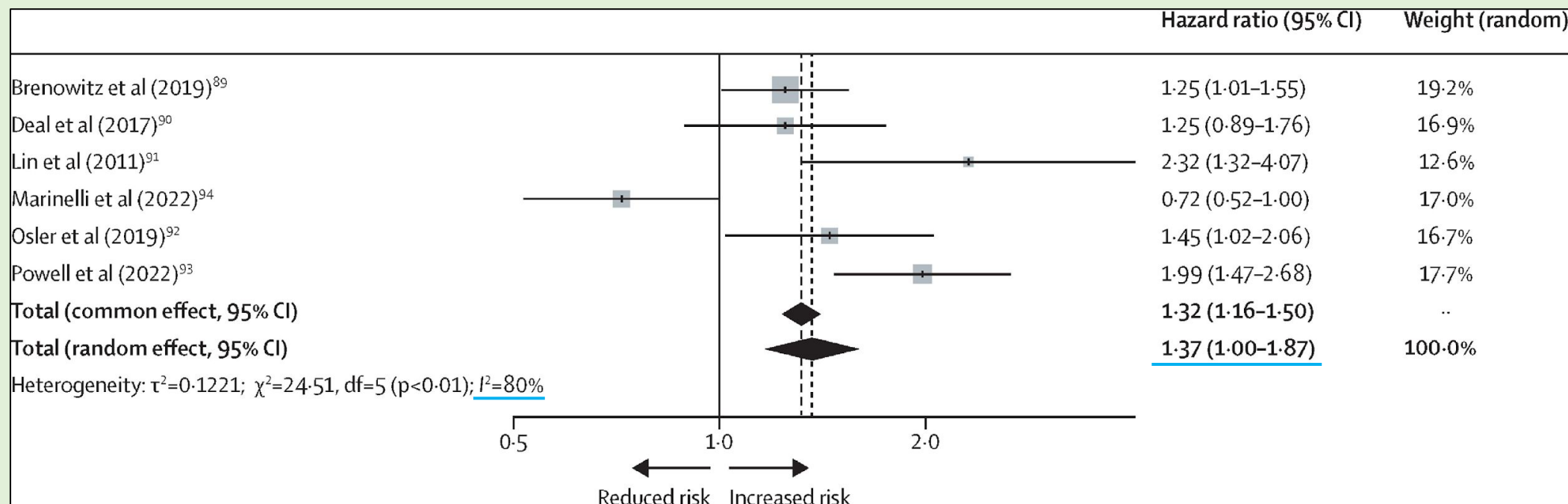




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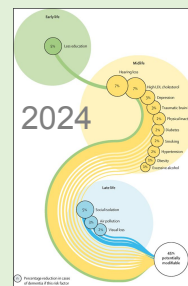


HR 1.37 (95% CI 1.00 to 1.87)

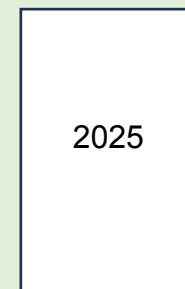




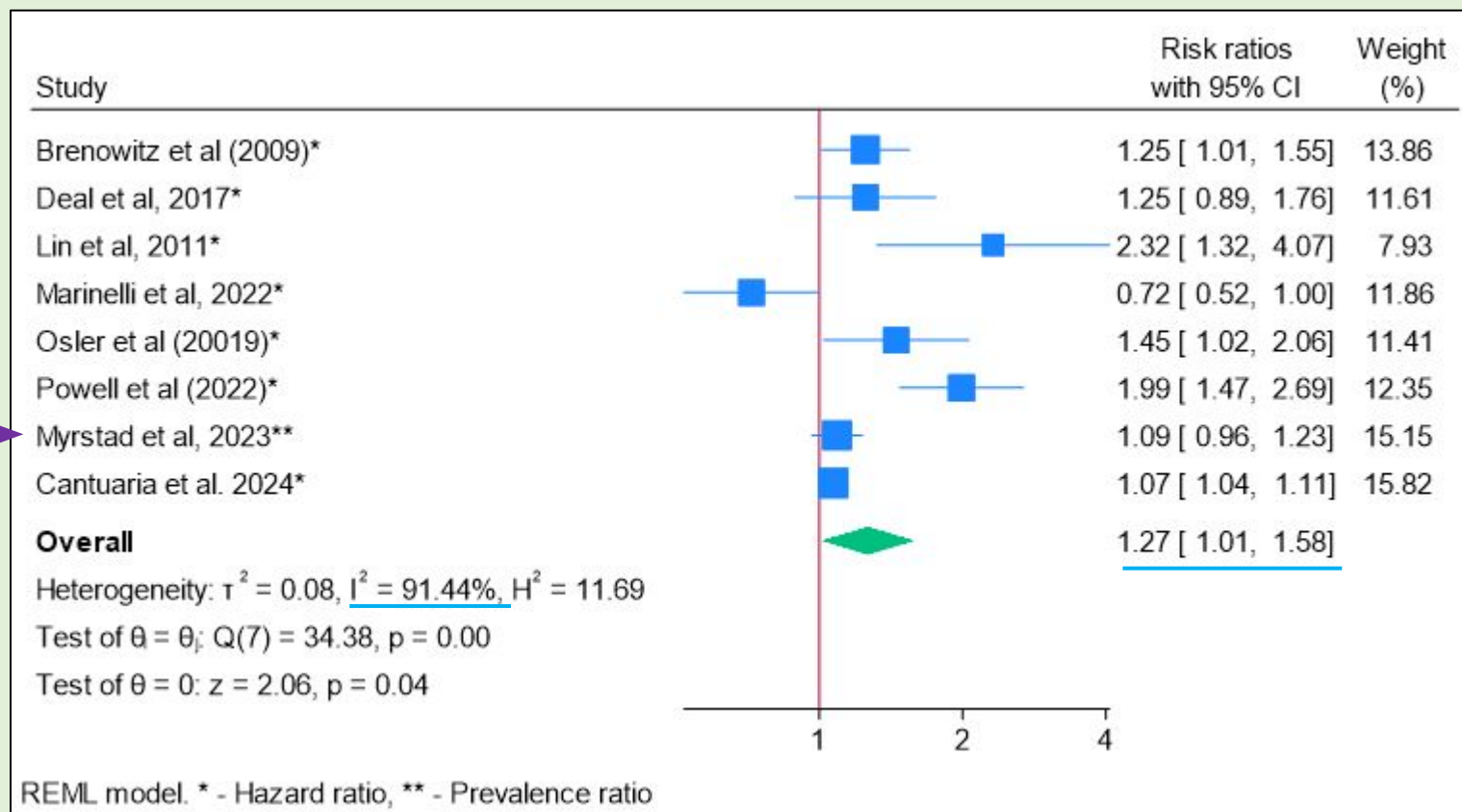
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HR 1.37 (95% CI 1.00 to 1.87)

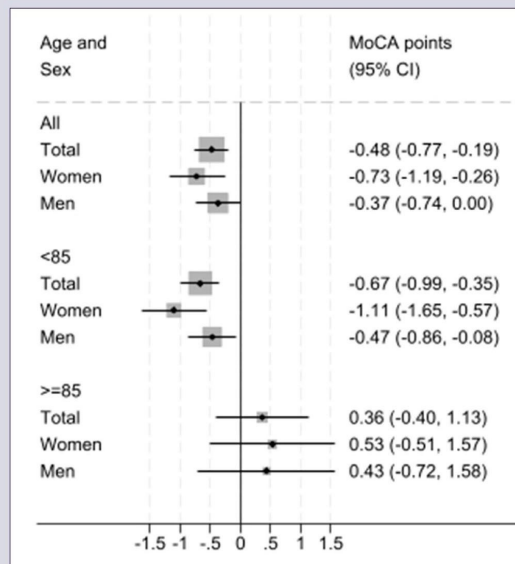
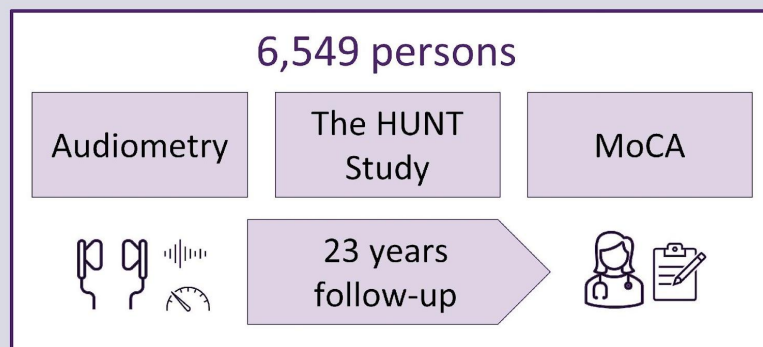


RR 1.27 (95% CI 1.01 to 1.58)





Hearing impairment reduces performance in MoCA



We found a **0.67 point reduction** in the Montreal Cognitive Assessment Scale in persons under 85 years with ≥ 25 dB hearing impairment

- Hearing loss predicts reduced cognitive performance over 20+ years
- The association remained after excluding hearing-dependent tasks in the MoCA
- These findings emphasize the importance of addressing hearing loss in cognitive assessment



Hearing impairment reduces performance in **MoCA**

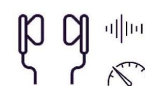


6,549 persons

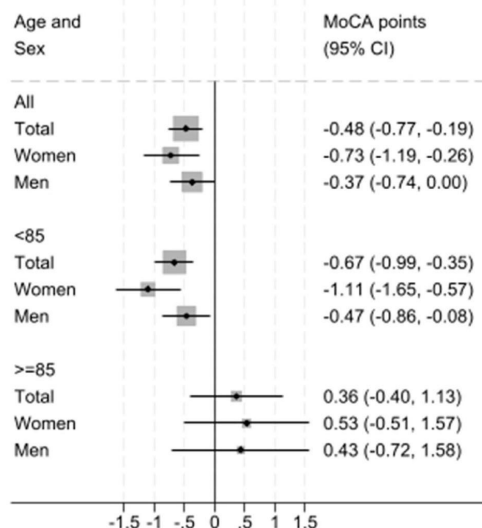
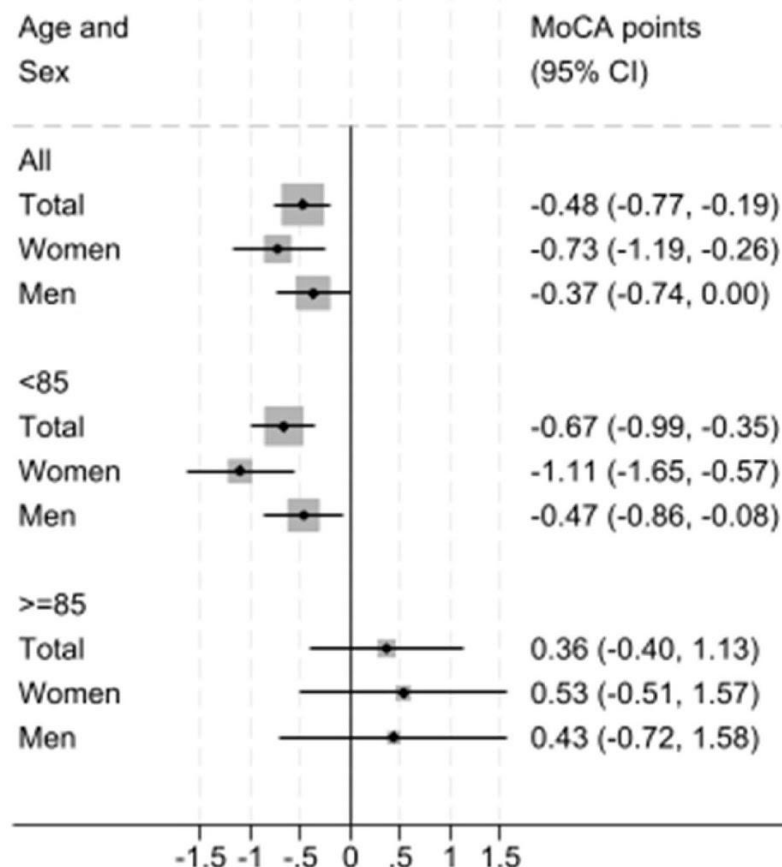
Audiometry

The HUNT Study

MoCA



23 years follow-up

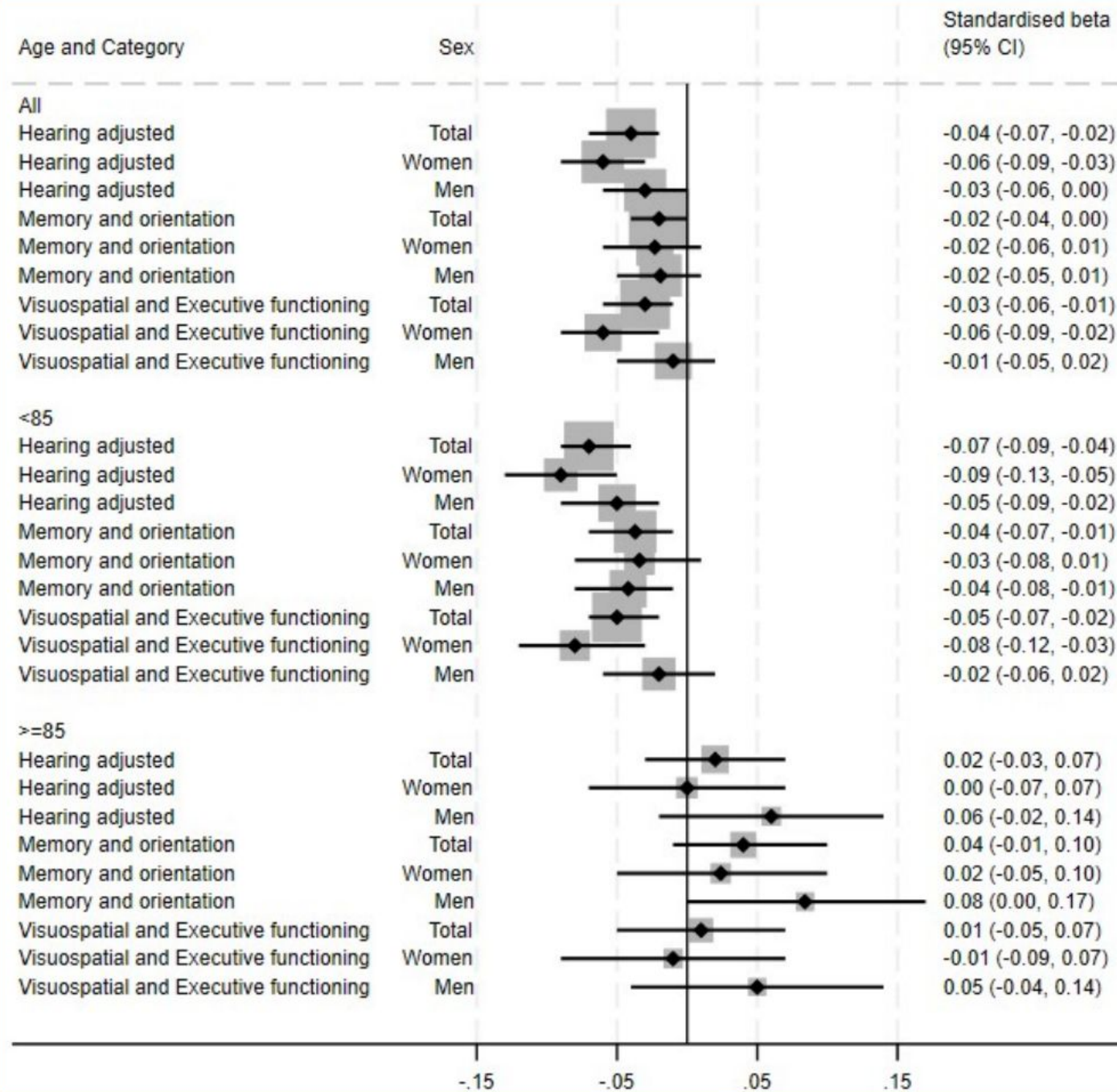


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THE JOURNAL OF THE ALZHEIMER'S ASSOCIATION

Myrstad C, Engdahl BL, Costafreda SG, Krokstad S, Livingston G, Selbæk G. Hearing and cognitive scores measured with the Montreal Cognitive Assessment Scale in The HUNT Study, Norway.
[Alzheimers's Dement. 2024. DOI: 10.1002/alz.14514. Open Access](https://doi.org/10.1002/alz.14514)





- ✓ Hearing impairment is a major cause of dementia
- ✓ Don't let hearing impairment decide how to live your life
- ✓ Recognize hearing impairment as a disease and start treatment

What you **HIRD**

Hearing impairment was associated with an increased risk of dementia
RR 1.27 (95% CI 1.01 to 1.58)

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