

Sensory & Cognitive Health



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Université 
de Montréal

Psychology



UNIVERSITY OF
TORONTO

CCNA

Canadian Consortium
on Neurodegeneration
in Aging



CCNV

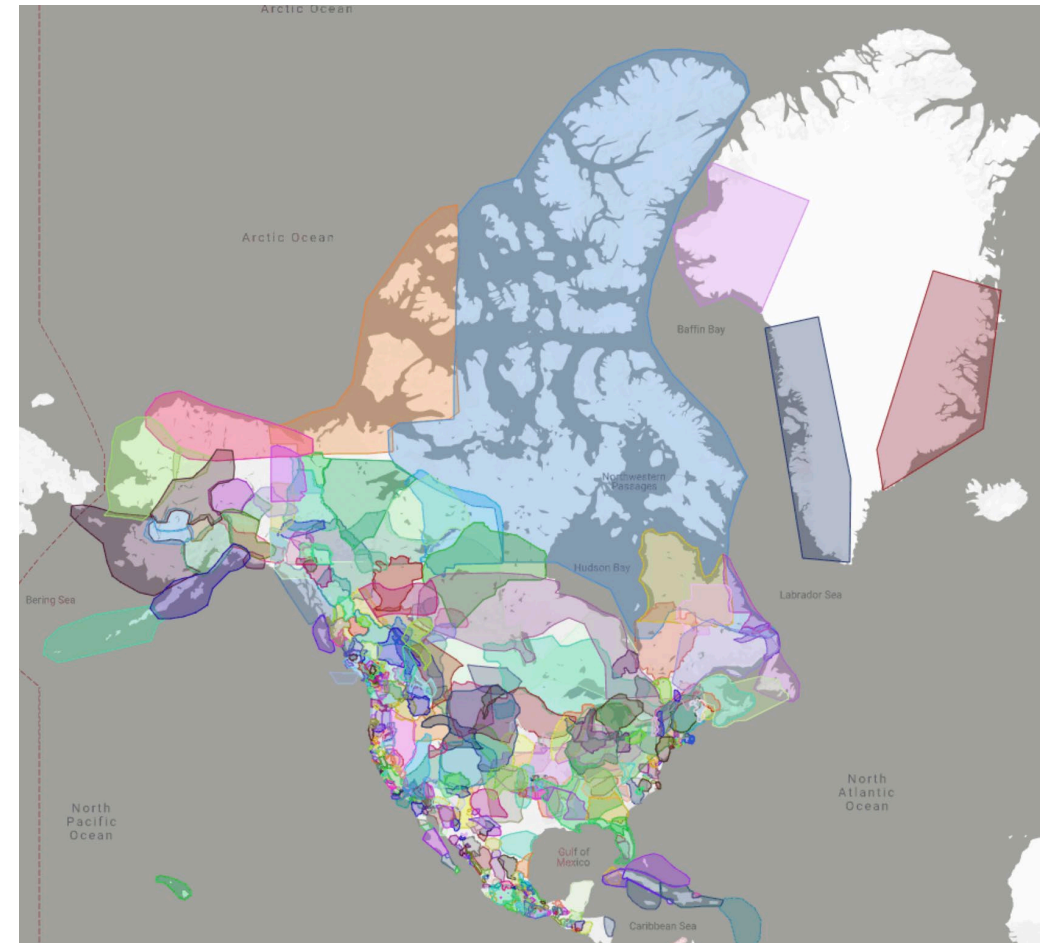
Consortium canadien en
neurodégénérescence
associée au vieillissement

I would like to begin by acknowledging that Montreal is located on unceded Indigenous lands.

The **Kanien'kehá:ka** Nation is recognized as the custodians of the lands and waters from which I present today. **Tiohtià:ke** (commonly known as Montréal) is historically known as a gathering place for many First Nations.

Kathy is joining us from **Nexwlélexwm** (commonly known as Bowen Island in British Columbia), which is on the the traditional land of the **Coast Salish peoples**, including the unceded homelands of the **Squamish** (sko-ho-mish) and **Tsleil-Waututh** (sail-wha-tooth) Nations.

We want to express our respect for the continued connections with the past, present and future in our ongoing relationships with Indigenous and other peoples within our communities.



<https://www.whose.land/en/>

Team 17: The Sensory-Cognitive Interface

CCNA
Canadian Consortium
on Neurodegeneration
in Aging



<http://ccna-ccnv.ca/>


psychology, audiology, otolaryngology, low vision rehabilitation, speech/language pathology, multi-sensory, gerontology, public health

Brain Health PRO




Vision & Hearing

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

 **ELSEVIER**

The Journal of Prevention of Alzheimer's Disease

journal homepage: www.elsevier.com/locate/tjpad

 **JPAD**
THE JOURNAL OF PREVENTION OF ALZHEIMER'S DISEASE

Original Article

Brain health PRO/Santé cerveau PRO: The development of a web-based program for dementia literacy and risk factor reduction

Vision & Hearing



Knowledge

Sensory loss is common, and increases with age. Hearing and vision are the second and third most **common impairments** globally.

- Age related changes in your senses typically start in your 40s. By **75 years of age**, 50% of Canadians have at least **mild vision or hearing loss**.
- Declines in sensory function are often observed before declines in cognitive performance like memory difficulties.
- **Sensory declines are risk factors for dementia**, and you may be able to reduce these risks.

Sensory health is key to staying physically, mentally, and socially active, and can support brain health.



Action

- Get your **vision** and **hearing checked regularly**, so problems can be detected and treated early.
- **Protect your vision and hearing**, for example, by wearing sunglasses when outside, and avoiding noisy environments.
- Don't let your sensory problems keep you from living your life as fully as possible.

There are many solutions out there waiting for you, including **using technology**, **adjusting your attitudes and behaviours**, and **modifying your environment to your needs**.

Let your friends, family, and the people around you be part of the solutions.



3: Aging Eyes: What is Normal?

**5: What does 20/20 Vision
Actually Mean?**

7: Magnification Devices

10: How Can Light Affect Your Vision?

**12: Behavioural Strategies to
Make Seeing Easier**

**21: The 4 Most Common Age-related
Eye Diseases**



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**2: Why Are Our Senses Important
For Cognitive Health?**

**13: Communication and Close
Relationships**

**14: Overcoming Conversational
Dilemmas**

15: My Senses Support Communication

16: My Senses Support My Cognition

**17: My Senses Support Social
Connectedness**

18: My Senses Support Safe Mobility

**19: Overcoming the Stigma
of Sensory Loss**

20: Services, Benefits and Entitlements

**23: Combined Changes in
Vision and Hearing**

24: Hearing and Vision Chapter Summary



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**22: Tinnitus: Can I get help for
ringing in my ears?**



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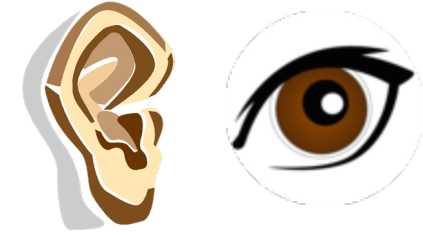
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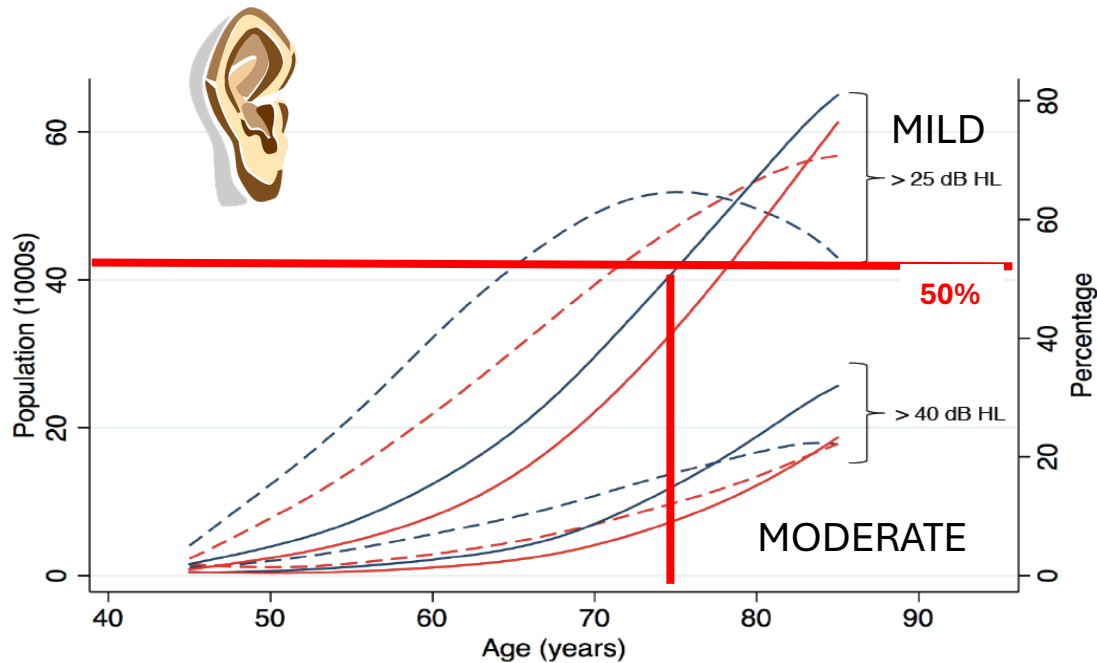
Sensory loss is common



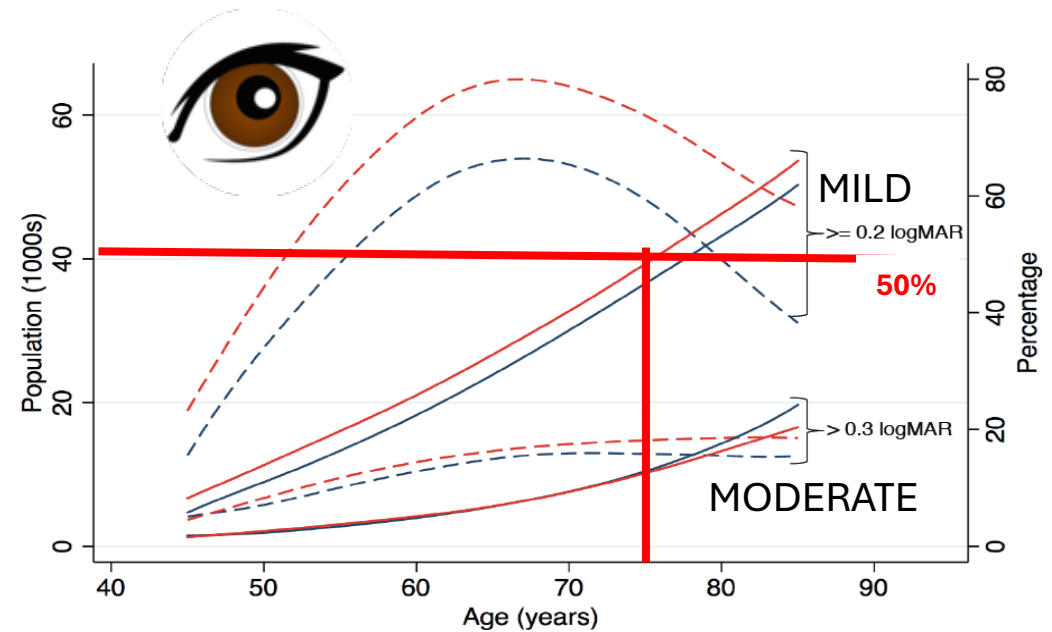
A 2015 report on the **Global Burden of Disease** (Vos et al., 2016) estimated that **hearing loss and vision loss, respectively, were the 2nd and 3rd most common impairments**

Sensory loss increases with age

Mick, P., Hämäläinen, A., Kolisang, L., Pichora-Fuller, M., Phillips, N., Guthrie, D., & Wittich, W. (2021). The Prevalence of Hearing, Vision, and Dual Sensory Loss in Older Canadians: An Analysis of Data from the Canadian Longitudinal Study on Aging. *Canadian Journal on Aging / La Revue Canadienne Du Vieillissement*, 40(1), 1-22. DOI: <https://doi.org/10.1017/S0714980820000070>



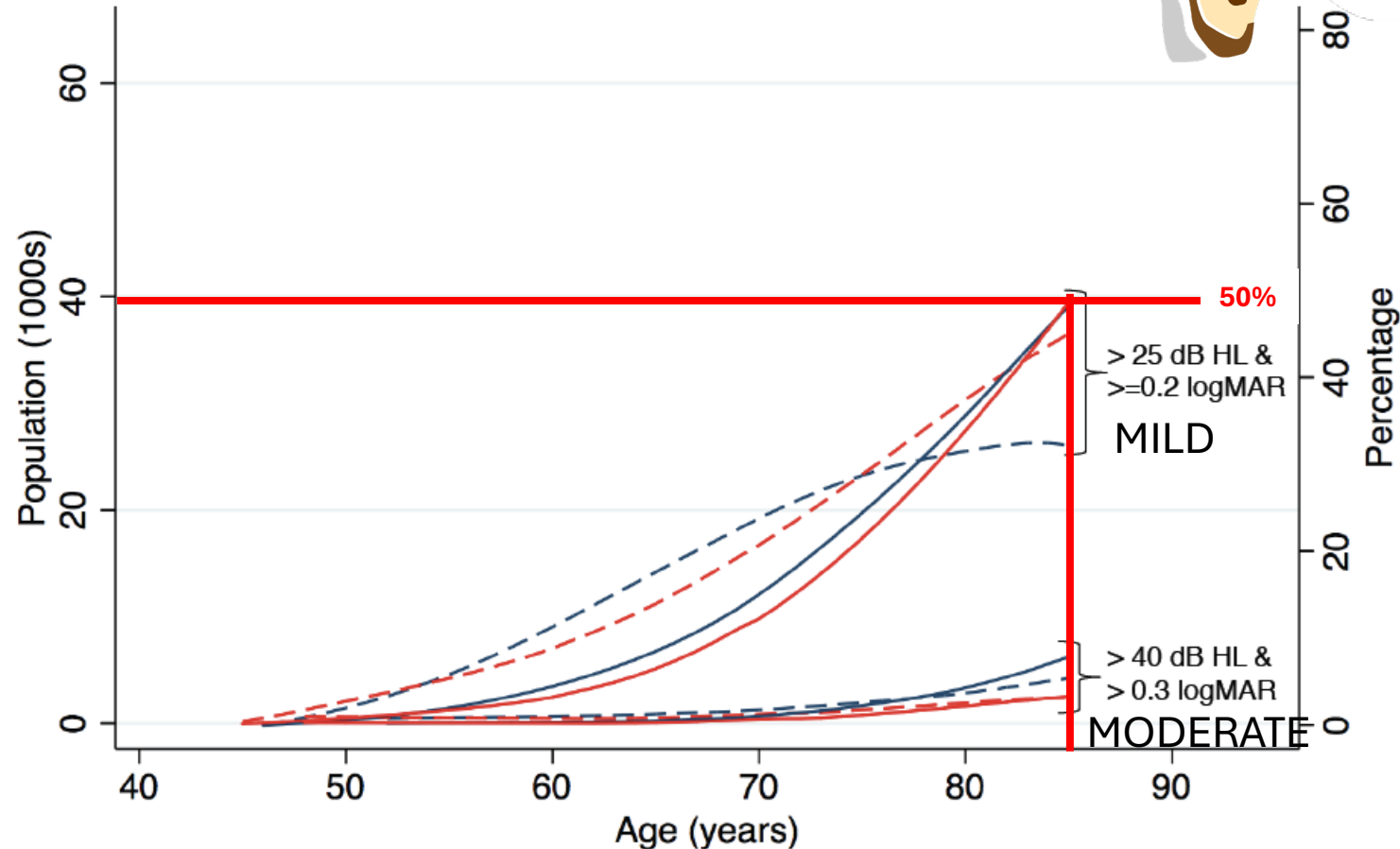
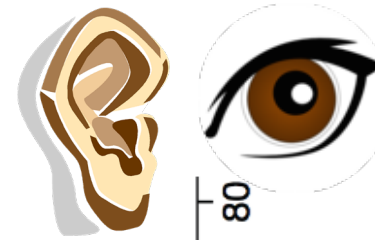
- Dashed lines: prevalence **COUNT** (left axis)
- Solid lines: prevalence **PROPORTION** (right axis)
- **Red:** Females; **Blue:** Males



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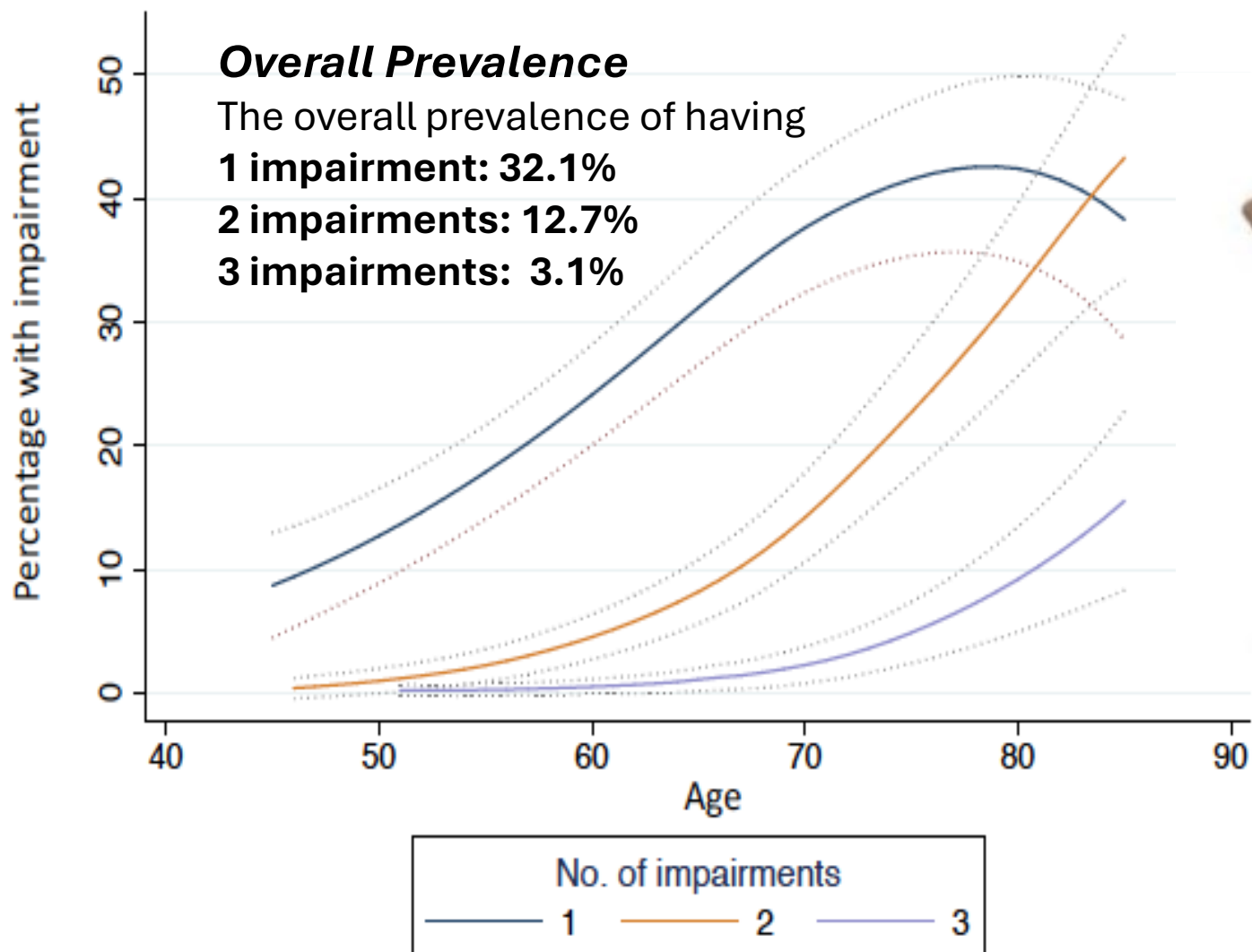
50% before 75 years

Dual hearing & vision loss 50% by 85 years of age



- Dashed lines: prevalence **COUNT** (left axis)
- Solid lines: prevalence **PROPORTION** (right axis)
- **Red**: Females; **Blue**: Males

Combined hearing, vision, balance



Lancet Commission – the progression!

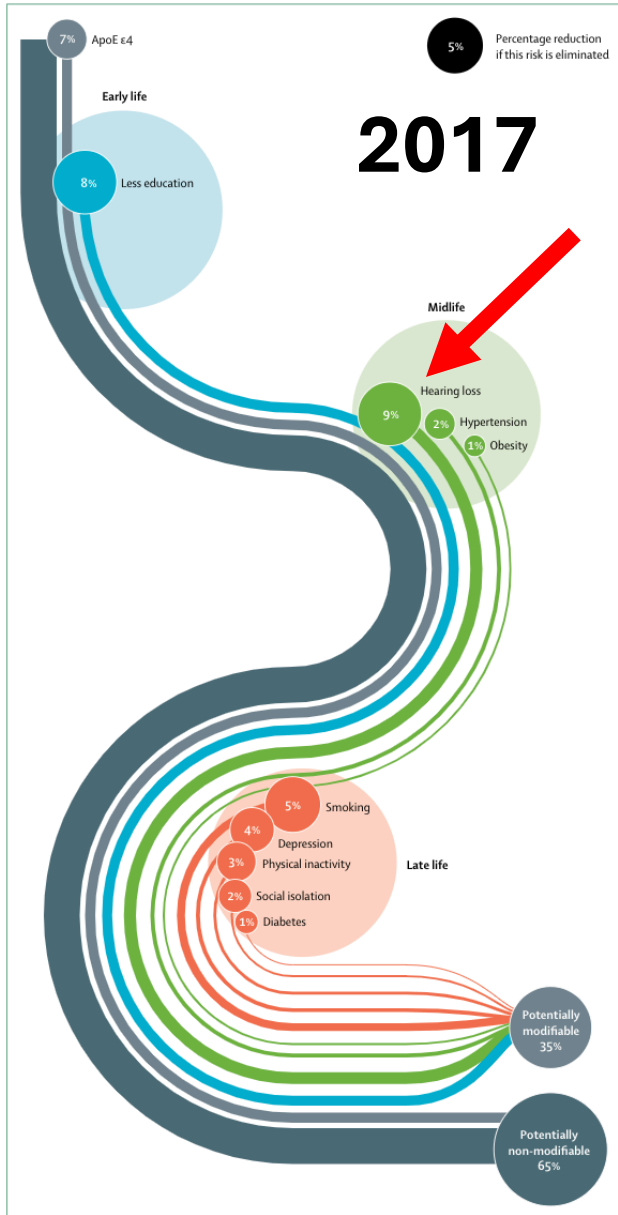


Figure 4: Life-course model of contribution of modifiable risk factors to dementia. Numbers are rounded to nearest integer. Figure shows potentially modifiable or non-modifiable risk factors.

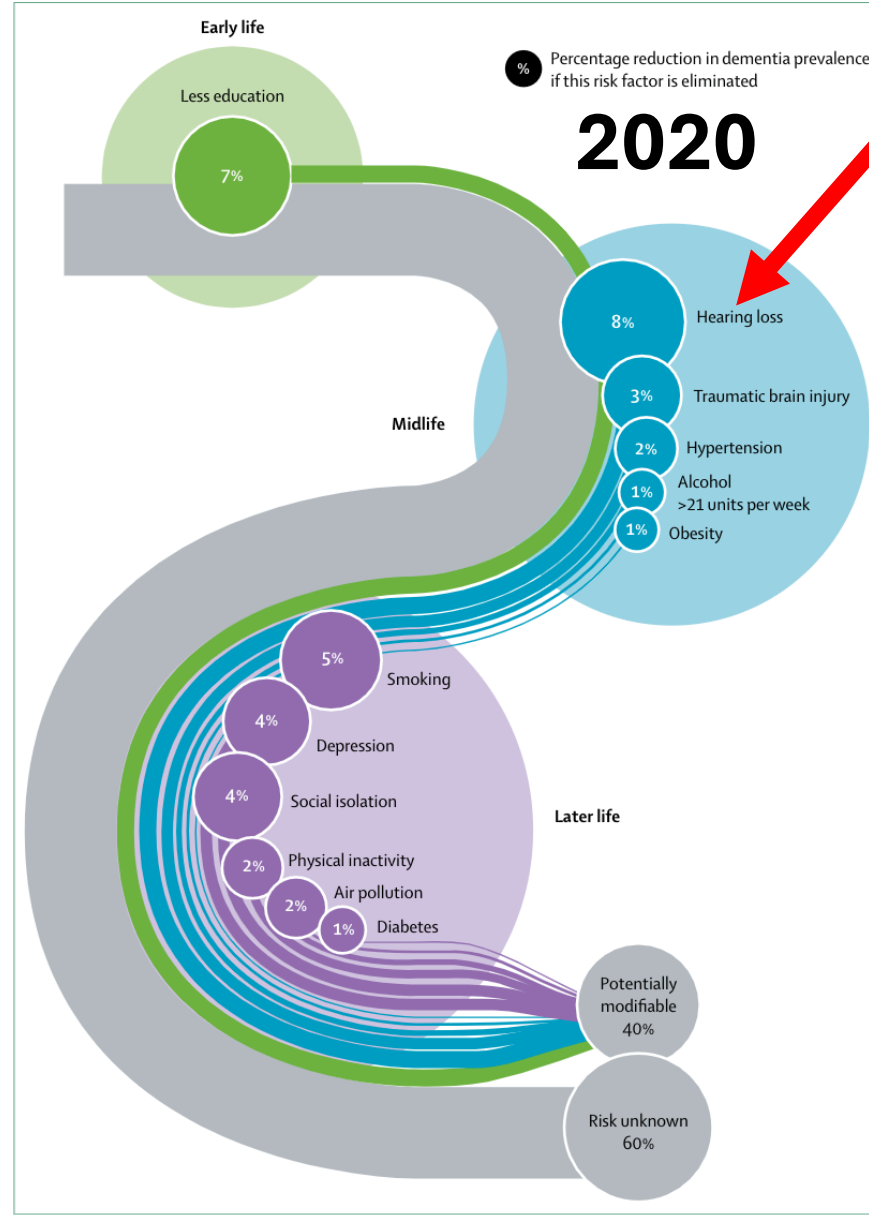
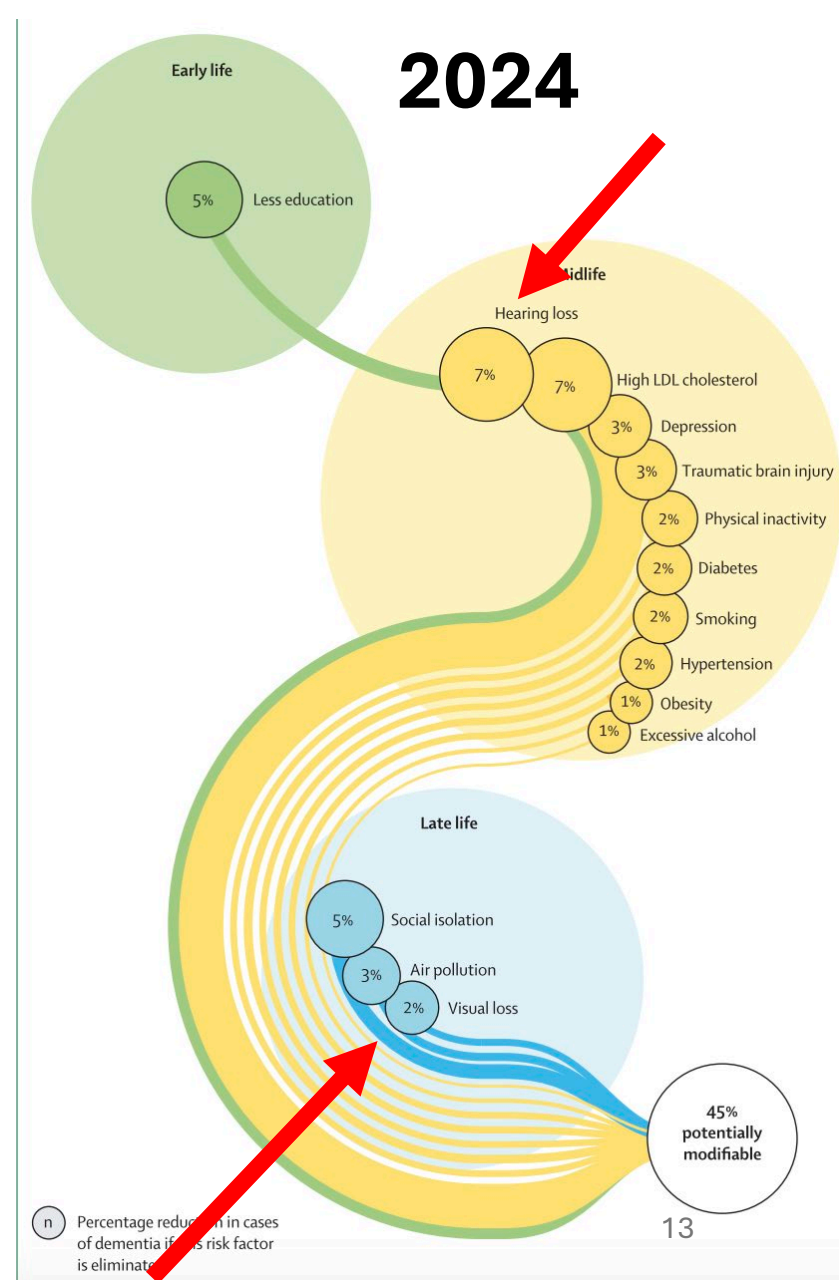


Figure 7: Population attributable fraction of potentially modifiable risk factors for dementia



Percentage reduction in cases of dementia if this risk factor is eliminated



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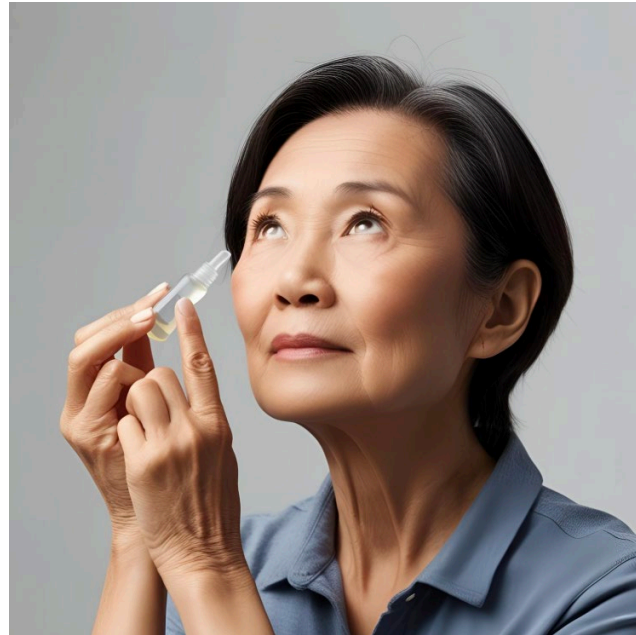


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Normal Vision & Aging

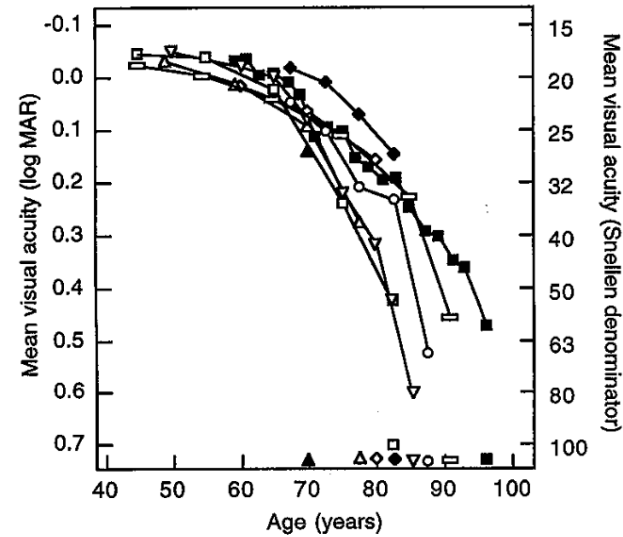
- Glasses
- Lighting
- Dry eyes
- Floaters
- Cataracts



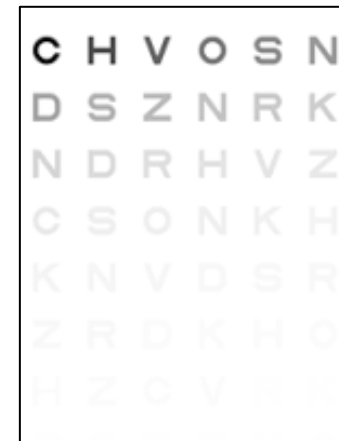
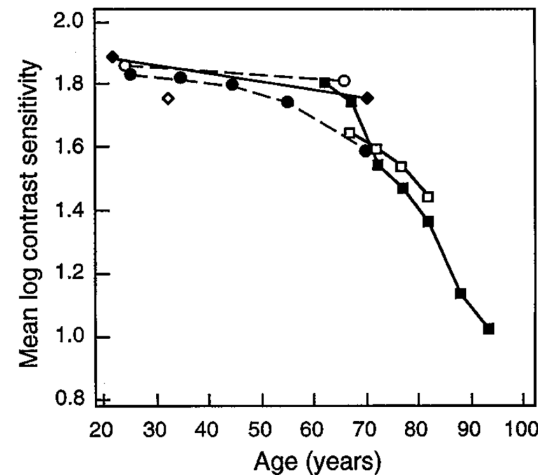
Getting your eyes tested



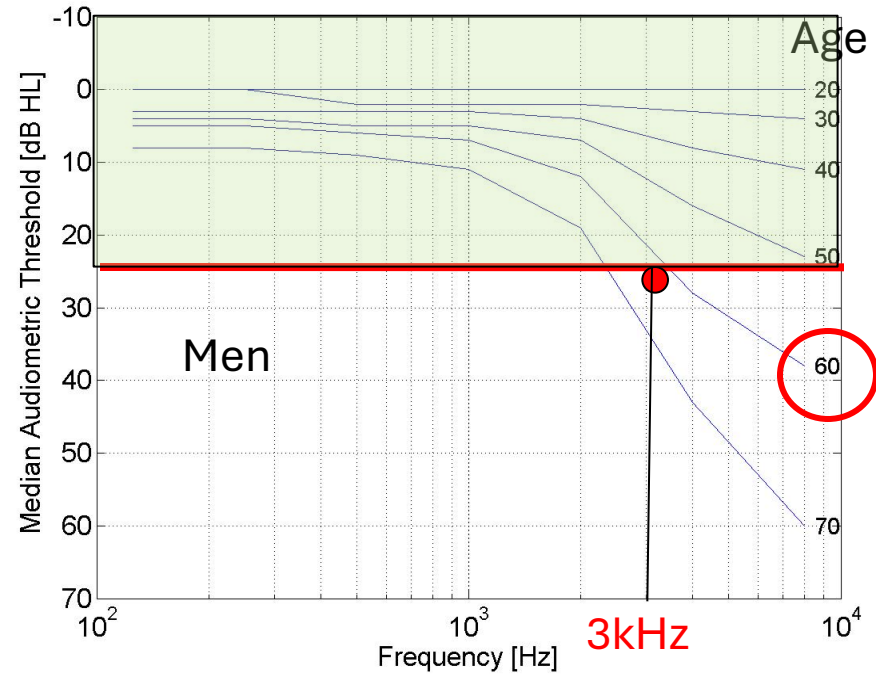
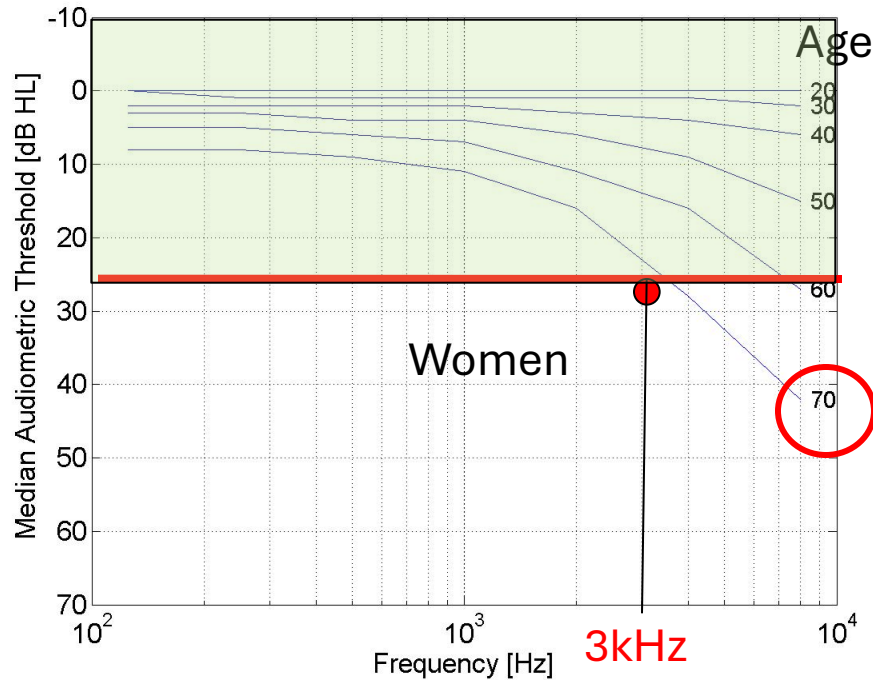
Visual Acuity



Contrast Sensitivity



Audiograms and Age (ISO 7029)



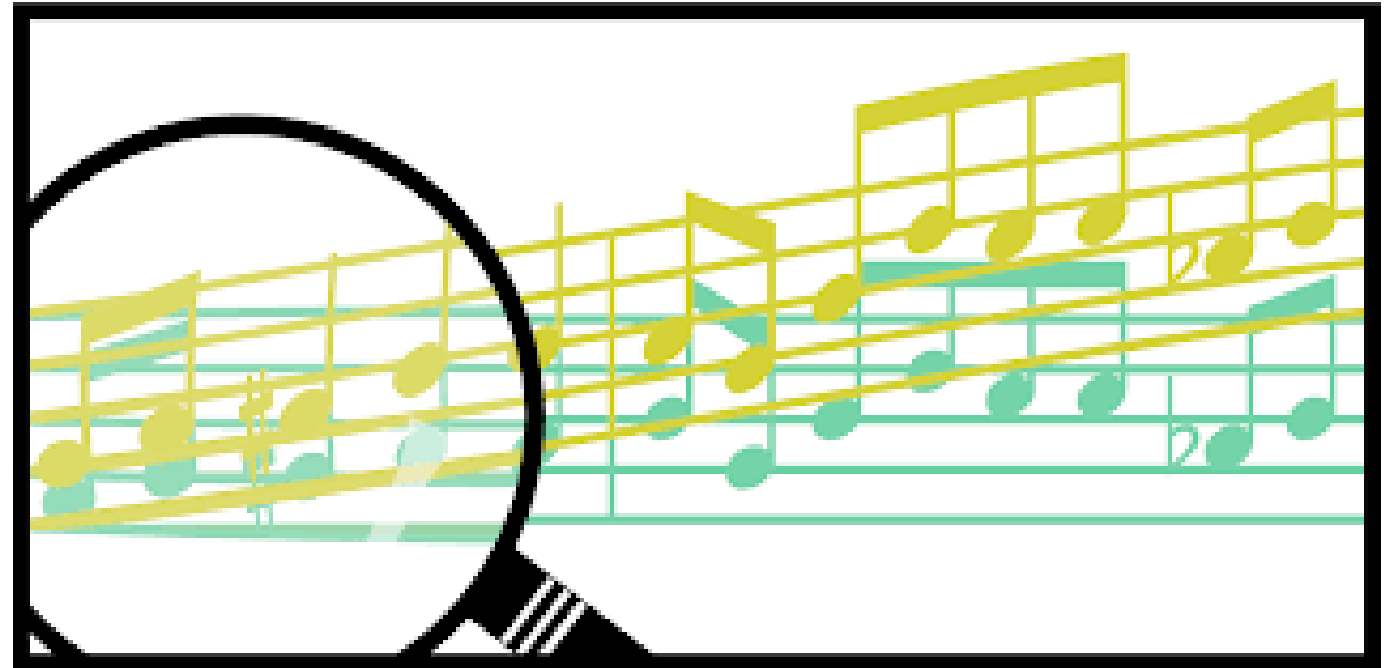
- High-frequency audiometric hearing loss
 - Noise exposure
 - Vascular changes in the ear
- Problems hearing in noise
 - Neural loss

Heterogeneity
Audibility vs Clarity

Clarity and audibility



- Attending to signals & ignoring noise
- Multiple sounds
 - Who
- Spatial location
 - Where
- Speed





Action

- Get your eyes checked every year after age 60
- <https://opto.ca/find-doc>

- Get your hearing tested every 3 years starting at 50
- <https://member-membre.sac-oac.ca/search/custom.asp?id=7109>
- <https://canadianaudiology.ca/find-an-audiologist/>

You can test yourself!

- <https://www.who.int/teams/noncommunicable-diseases/sensory-functions-disability-and-rehabilitation/hearwho>



You can test yourself!

- <https://www.who.int/teams/noncommunicable-diseases/sensory-functions-disability-and-rehabilitation/whoeyes>



Problem Solving Trio

Environment



Technology



Changing attitudes
and behaviours



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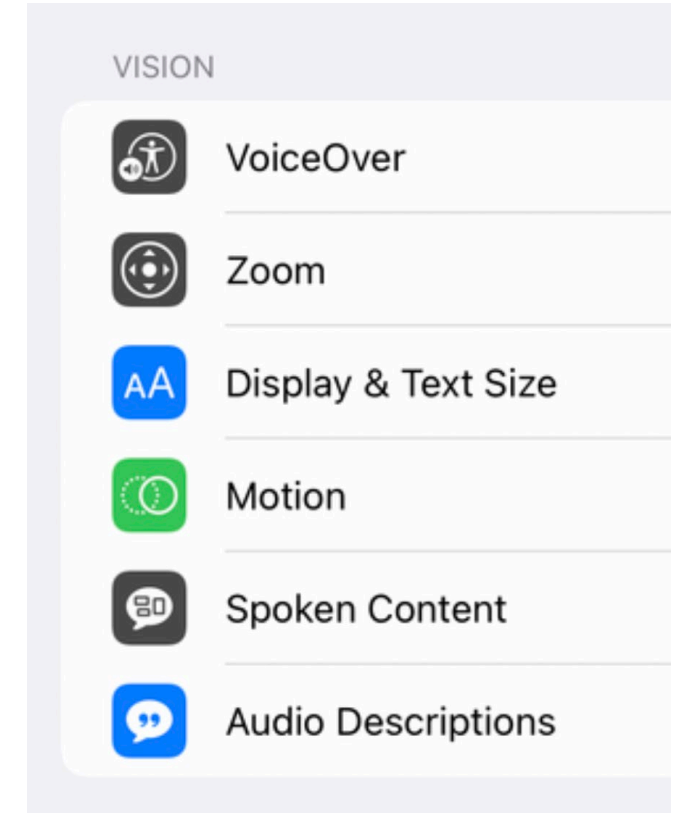
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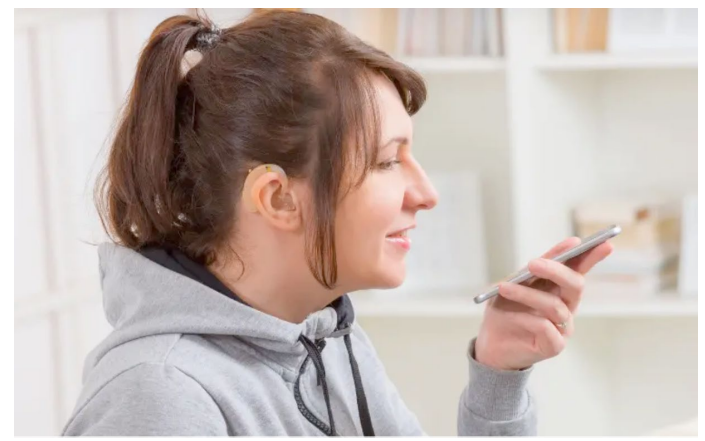
Vision Devices

Magnification
In all its forms



Magnification
In mainstream devices
AND
Many other accessibility features

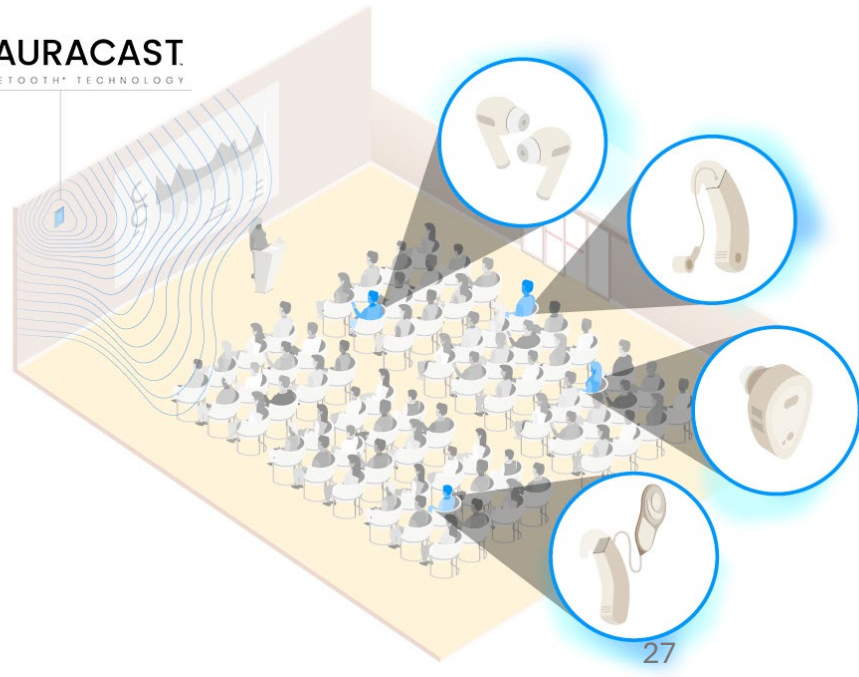
Hearing Devices



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AURACAST
A BLUETOOTH® TECHNOLOGY





Action

- Ask your optometrist about what vision rehabilitation can do for you!
- <https://opto.ca/find-doc>

- Ask your audiologist about what hearing rehabilitation can do for you!



Canadian Academy of Audiology
Académie Canadienne d'audiologie



Find An
Audiologist.ca



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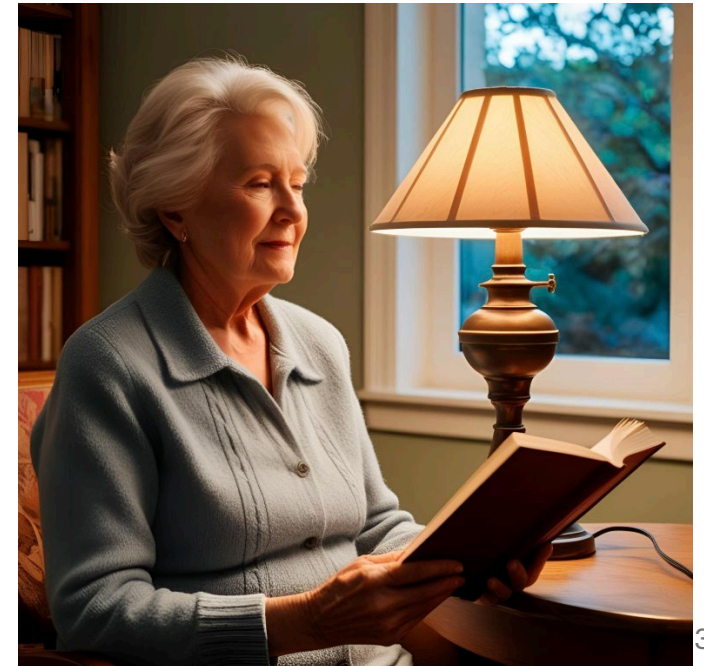
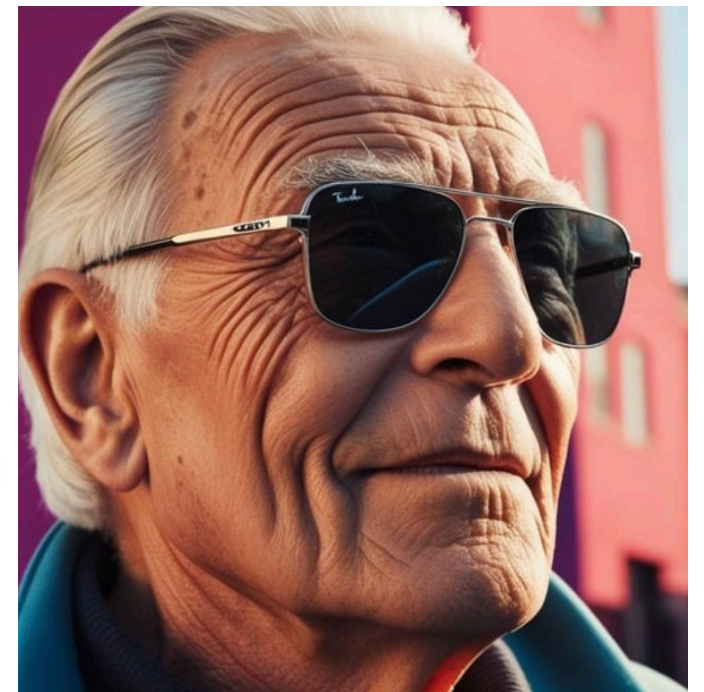
Optimizing Listening Environments

- Noise (reduce; use ear protection)
- Echo (building materials, interior design)
- Distance (seating; use room systems)
- Lighting (see face; speechreading)



Vision & your Environment

- Sunglasses
- Contrast
- Glare
- Light
- Light adaptation





Action

- YOU can modify YOUR environment!
- YOU can select environments (seating, time of day)!



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Problem Solving Trio



Behavioural Adaptations to Vision Difficulties

- Tell people about your difficulties:
 - Recognizing faces at a distance
- Let people know what you need
 - Extend your hand first to avoid awkward reaches
- Walking on the side-walk
 - Is it a shadow, a gap or a step?
- Written materials
 - Restaurant menu

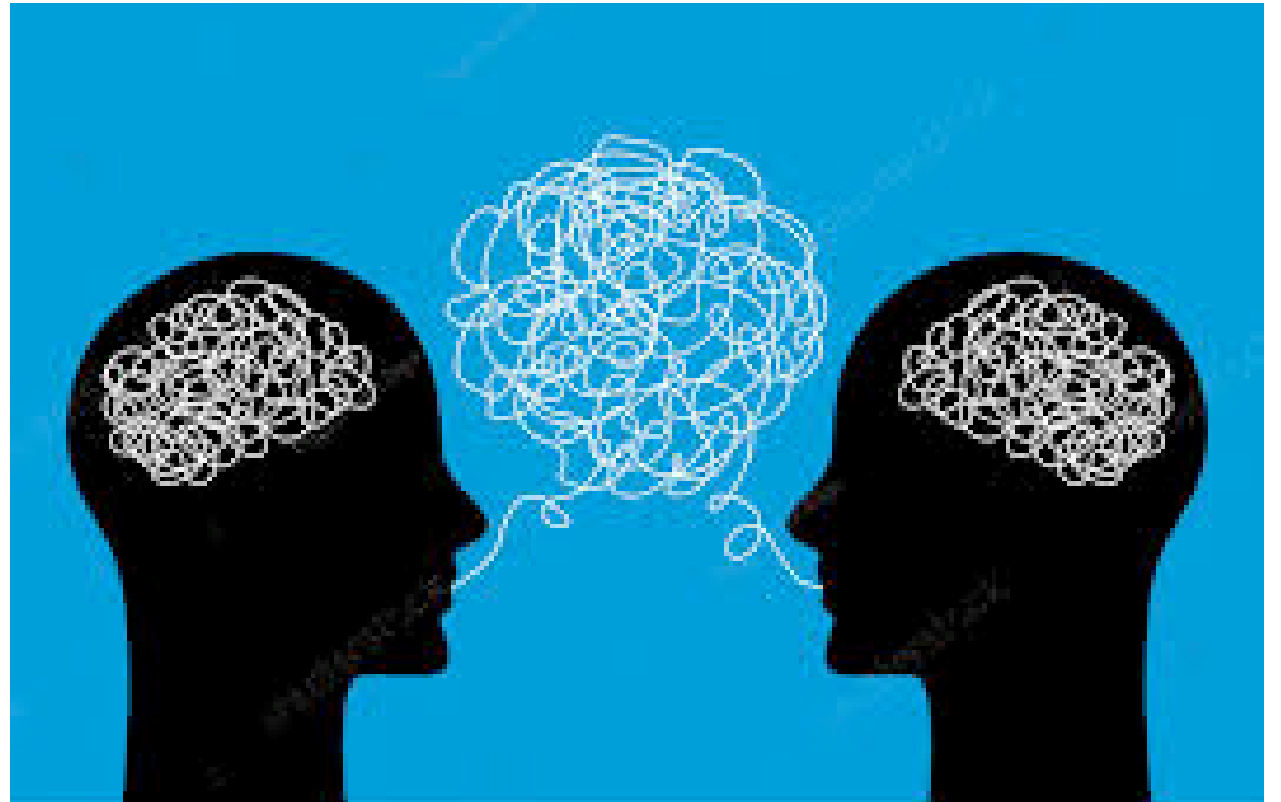


Adapting Listening Behaviours and Attitudes

PURPOSE OF COMMUNICATION MATTERS KNOWLEDGE & CONTEXT ARE IMPORTANT

- Situational context (familiar?)
- Purpose (information, emotion)
- Relationships (you and others)

- Topic
- Speech speed
- Turn taking
- Repetition and clarification
- Pretending
- Confidence
- Humour
- Emotions





Action

- You can modify YOUR attitudes and behaviours!
- AND: You can suggest some changes to the people around you as well.



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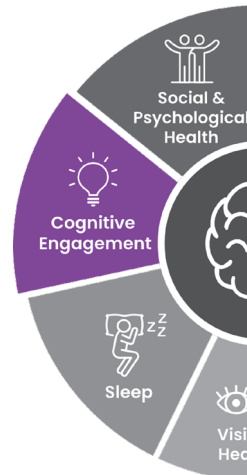
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Speech reading

- Lips
 - Sounds that are hard to hear are easy to see
- Eyes
 - Get attention
 - Follow gaze
- Face
 - Emotion
- Gestures
 - Pointing with hand



Communication and Social Interaction



Social Support

WEB EXCLUSIVE

Associations between sensory loss and social networks, participation, support, and loneliness

Analysis of the Canadian Longitudinal Study on Aging

Paul Mick MD MPH Maksim Parfyonov MD Walter Wittich PhD
Natalie Phillips PhD M. Kathleen Pichora-Fuller MSc PhD



Literature on Communication & Dementia



*Canadian Journal on Aging /
La Revue canadienne du vieillissement*

www.cambridge.org/cjg

Article

Cite this article: Guthrie DM, Williams N, Campos J, Mick P, Orange JB, Pichora-Fuller

A Newly Identified Impairment in Both Vision and Hearing Increases the Risk of Deterioration in Both Communication and Cognitive Performance

Dawn M. Guthrie^{1,2} , Nicole Williams¹, Jennifer Campos^{3,4}, Paul Mick⁵, Joseph B. Orange⁶, M. Kathleen Pichora-Fuller⁷, Marie Y. Savundranayagam⁸, Walter Wittich^{9,10,11}  and Natalie A. Phillips¹²

RESEARCH ARTICLE

Combined impairments in vision, hearing and cognition are associated with greater levels of functional and communication difficulties than cognitive impairment alone: Analysis of interRAI data for home care and long-term care recipients in Ontario

Dawn M. Guthrie^{1,2}*, Jacob G. S. Davidson¹, Nicole Williams¹, Jennifer Campos^{3,4}, Kathleen Hunter^{5,6}, Paul Mick⁷, Joseph B. Orange⁸, M. Kathleen Pichora-Fuller⁹, Natalie A. Phillips¹⁰, Marie Y. Savundranayagam¹¹, Walter Wittich^{12,13,14}





Action

- Do not underestimate the importance of social interaction
- The senses help you to stay connected – look after your senses to stay connected!



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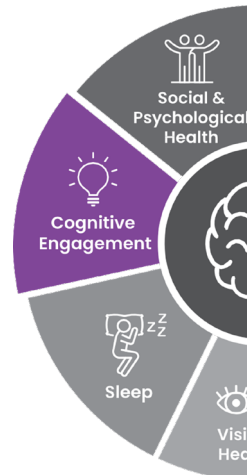
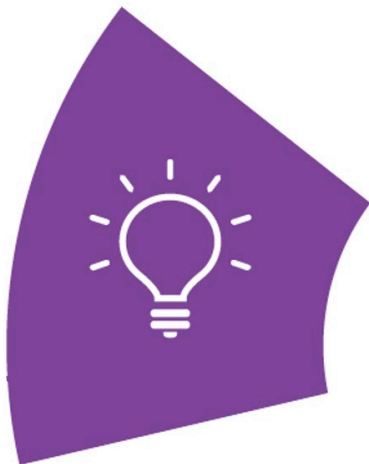
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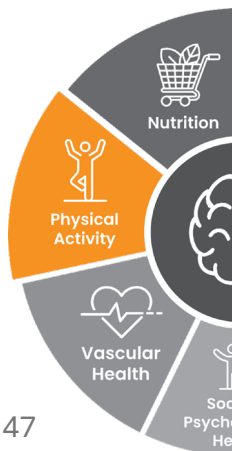
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Sensory & Mobility

- Balance
- See where you go
- Listen as you go
- Multitasking
 - walking
 - driving
 - safety





Action

- Looking after your sense can make walking and driving safer – for you and for those around you!
- It is another example where the sense can help stay active.



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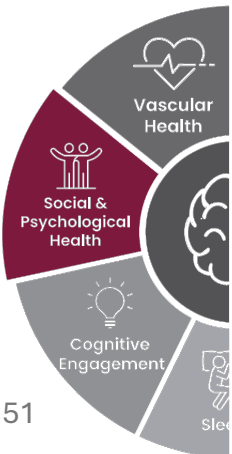
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Multiple Stigmas: Others & Self

Open access

Research

BMJ Open Stereotyping as a barrier to the social participation of older adults with low vision: a qualitative focus group study

Sarah Fraser,¹ Irene Beeman,² Kenneth Southall,² Walter Wittich^{3,4}

Psychology and Aging
2015, Vol. 30, No. 4, 881–893

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0882-7974/15/\$12.00 <http://dx.doi.org/10.1037/a0039723>

Do Negative Views of Aging Influence Memory and Auditory Performance Through Self-Perceived Abilities?

Alison L. Chasteen and M. Kathleen Pichora-Fuller
University of Toronto

Kate Dupuis
University of Toronto and Baycrest Health Sciences, Toronto,
Ontario, Canada

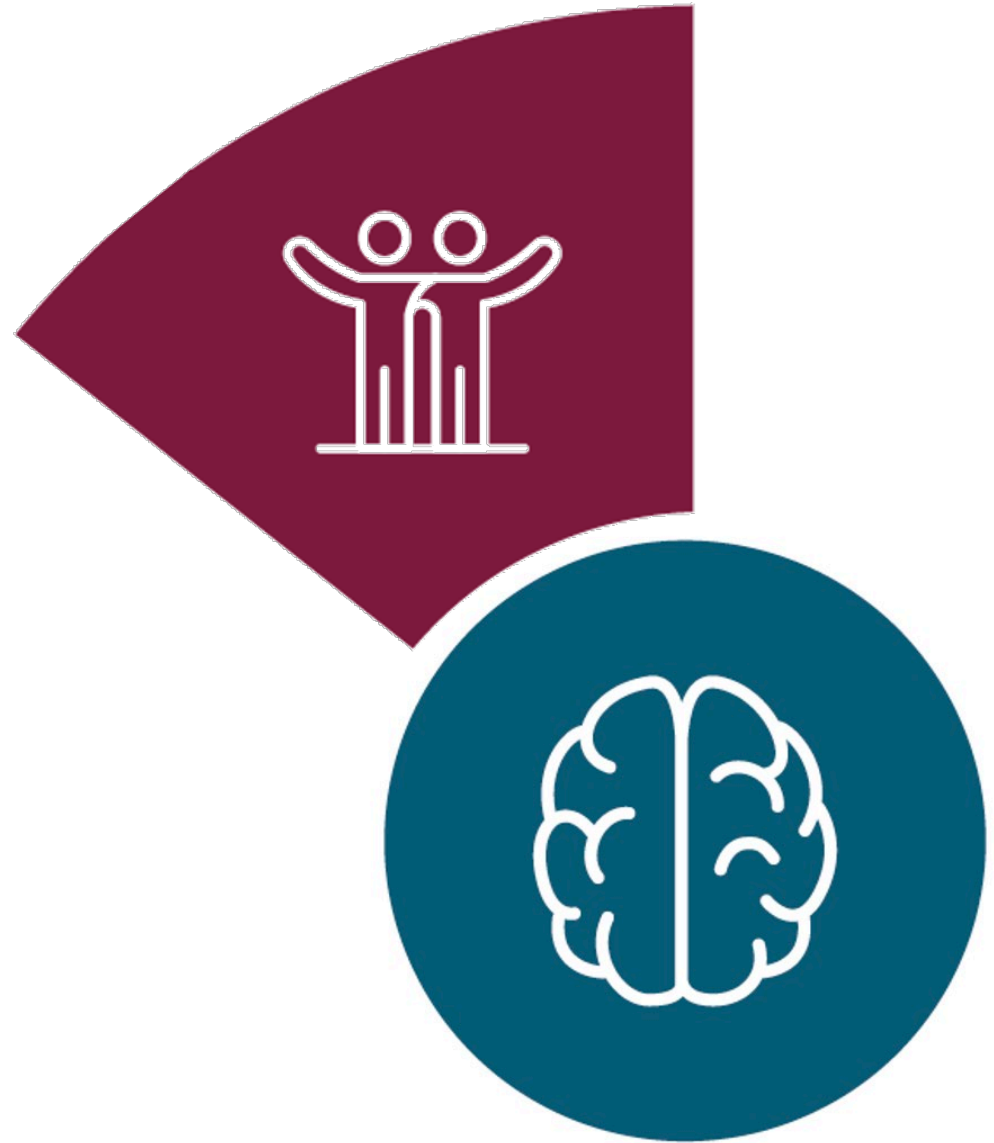
Sherri Smith
James H. Quillen VA Medical Center, Mountain Home,
Tennessee, and East Tennessee State University

Gurjit Singh
University of Toronto and Phonak AG, Toronto,
Ontario, Canada



Stigma and Ageism

- Self-stigma
- Believe in yourself
- Practice to master
- Pace yourself (one thing at a time; reduce stress)
- Ask for help





Action

- Looking after your senses will empower you and reduce stereotypes
- You can take control and influence your own perceptions



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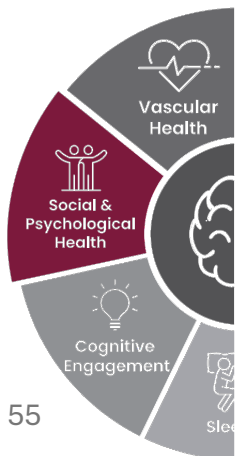
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3: Aging Eyes: What is Normal?

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**21: The 4 Most Common Age-related
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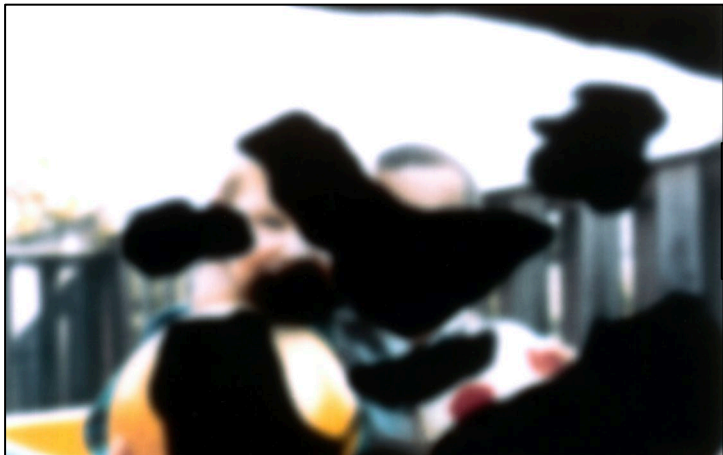


Common Eye Diseases in Older Adults



Cataract: 100 mill. globally
Leading cause of VI, treatable

Glaucoma: 7.77 mill. globally
Often asymptomatic, screening crucial



Diabetic Retinopathy: 4.5 mill. globally
Early detection and treatment essential

Age-related Macular Degeneration:
8 mill. globally, significant cause of VI





Action

- Prevention
- Get tested
- See treatment whenever possible and available.



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Services

Table 1. Federal and provincial hearing and vision care health policies across Canada.

Location	Vision Care Coverage	Hearing Care Coverage
Canada	<p>Canada Health Act: Does not cover vision care, dental care, prescription drugs, ambulance services, and independent living [11].</p> <p>Non-Insured Health Benefits Program (NIHB): Covers eye exams and eyeglasses for First Nations/Inuit, Canadian Armed Forces, veterans, RCMP [12–14].</p> <p>The Mobile Eye Clinic initiative brings optometrists to schools, youth centers, colleges/universities, seniors' residences and community health centers to perform comprehensive eye exams [15].</p>	<p>Eligibility for hearing aids expanded under non-insured health benefits; coverage varies for veterans, RCMP, etc. [16].</p>
Ontario	<p>Ontario Health Insurance Program (OHIP): covers routine eye exams once a year for ages 19 and under; 65+; conditions apply for ages 20–64 with eye disease [17,18].</p>	<p>Assistive Devices Program: covers hearing aids and equipment (FM systems) for eligible individuals [17,19].</p> <p>Universal Newborn Hearing Screening [19].</p> <p>Infant Hearing Program: universal newborn screening and assessment services [20].</p>
Quebec	<p>Régie de l'assurance maladie du Québec (RAMQ): covers optometric services for children under 18 and seniors 65+, annually; certain low-income adults are also eligible; excludes eyeglasses, contact lenses, unless under 18 [21].</p> <p>See Better to Succeed: offers \$250 for children's eyeglasses or contacts [22].</p>	<p>Hearing Devices Program: covers aids and assistive listening devices for all ages; no universal newborn screening [23].</p>

Combined Vision & Hearing Difficulties

- Dual Sensory Impairment
- One cannot compensate for the other anymore
- Rehabilitation approaches to consider interaction
- E.g.,
 - How to change the battery in a hearing aid with low vision
 - Listening to your talking watch when hard of hearing





Action

- There are options and help out there.



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Vision & Hearing



Knowledge

Sensory loss is common, and increases with age. Hearing and vision are the second and third most **common impairments** globally.

- Age related changes in your senses typically start in your 40s. By **75 years of age**, 50% of Canadians have at least **mild vision or hearing loss**.
- Declines in sensory function are often observed before declines in cognitive performance like memory difficulties.
- **Sensory declines are risk factors for dementia**, and you may be able to reduce these risks.

Sensory health is key to staying physically, mentally, and socially active, and can support brain health.



Action

- Get your **vision** and **hearing checked regularly**, so problems can be detected and treated early.
- **Protect your vision and hearing**, for example, by wearing sunglasses when outside, and avoiding noisy environments.
- Don't let your sensory problems keep you from living your life as fully as possible.

There are many solutions out there waiting for you, including **using technology**, **adjusting your attitudes and behaviours**, and **modifying your environment to your needs**.

Let your friends, family, and the people around you be part of the solutions.

Brain Health PRO in a Nutshell

Thank you!



Merci!



Knowledge

It is possible to **lower your risk of developing dementia**. Factors such as physical health, diet, sleep, sensory and social health can reduce your risk of developing dementia.

Action

To lower your risk of dementia, implement positive **lifestyle changes**, such as exercising, sleeping well, solving sensory problems, or by having an active cognitive and social life.

