# Supporting Brain Health in Older Adults

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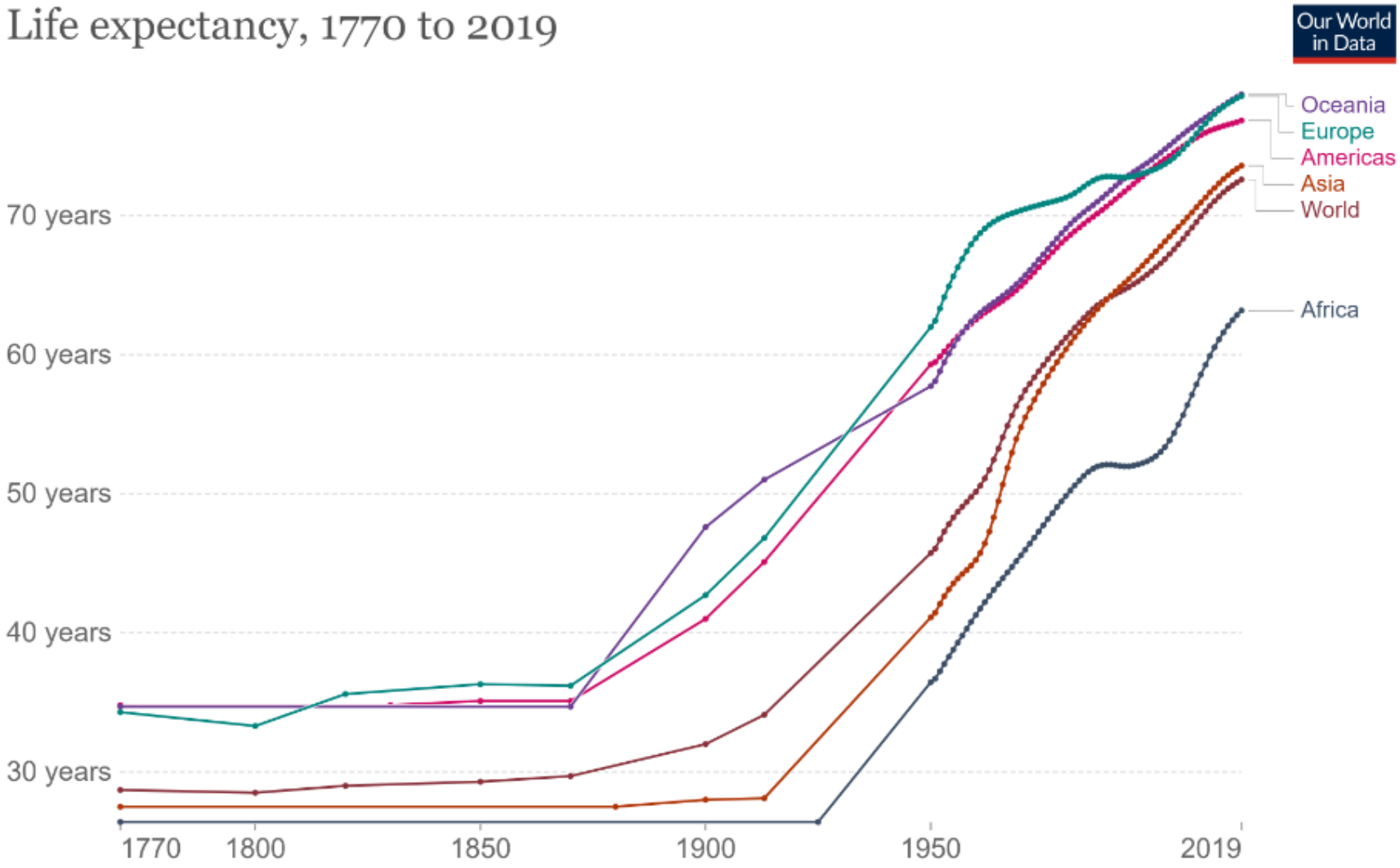
# Overview

- Aging and Brain Health
- Person-centered care across the cognitive continuum
  - Education
  - Addressing sensory issues
  - Cognitive Engagement and Rehabilitation
  - Social Engagement

# Life expectancy, 1770 to 2019




Source: Riley (2005), Clio Infra (2015), and UN Population Division (2019)
OurWorldInData.org/life-expectancy • CC BY
Note: Shown is period life expectancy at birth, the average number of years a newborn would live if the pattern of mortality in the given year were to stay the same throughout its life.

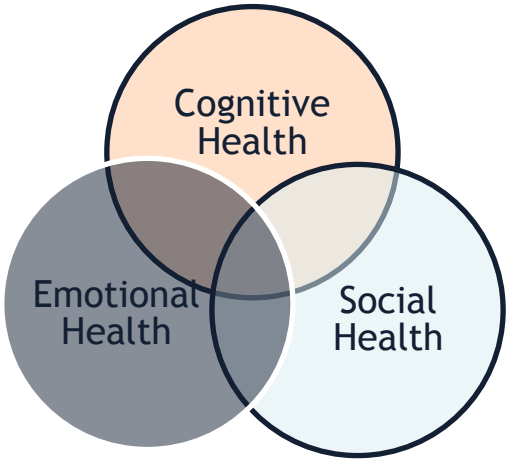
# Aging with Grace and Dignity

# Big Questions

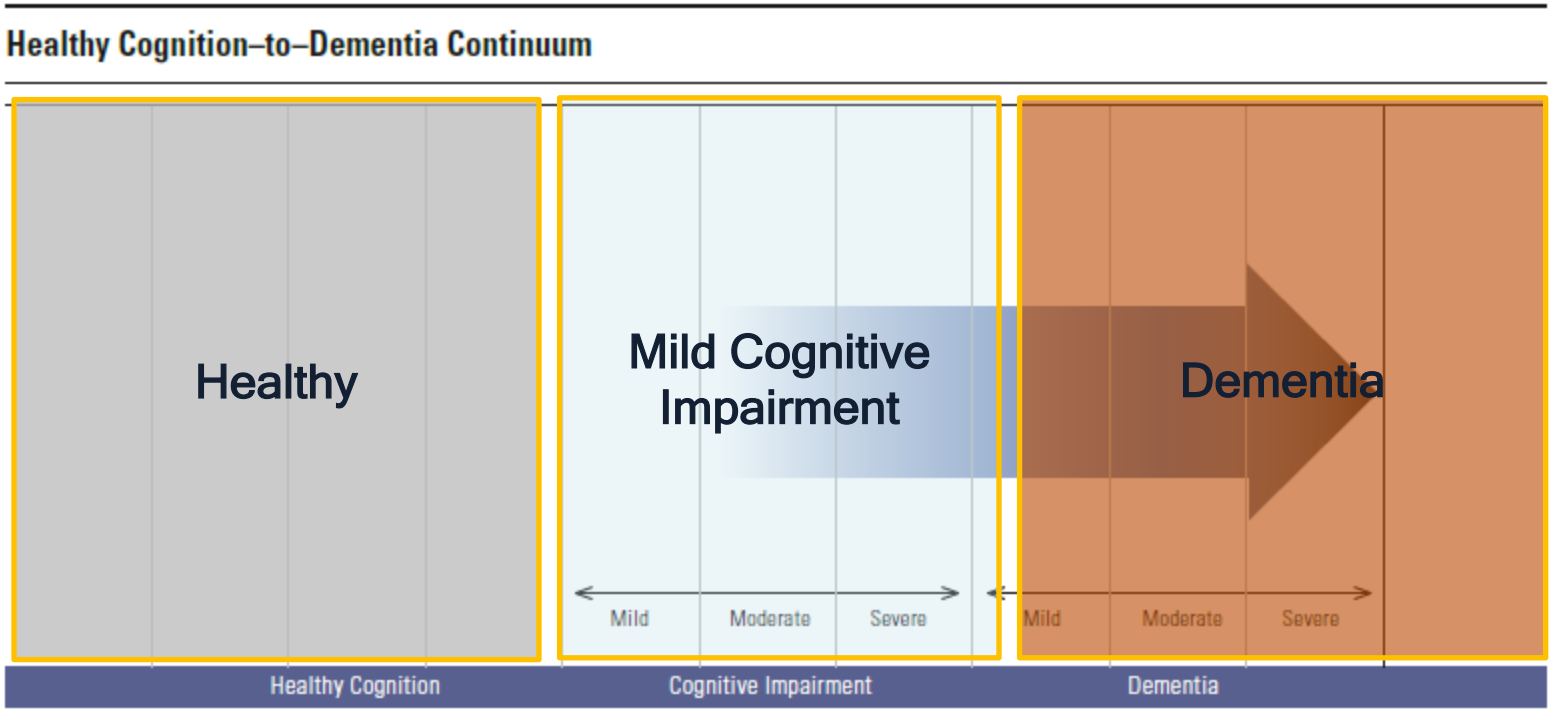
- Are we prepared as a society to serve the growing population of older adults?
- Do we understand the complexity of aging to deliver person-centered care?

# Brain Health

- Good brain health is a state in which every individual can realize their abilities and optimize their functioning to cope with life situations.



# Aging and Cognitive Continuum




**An individual's movement from healthy cognition to dementia is a continuum. The transition from healthy or normal cognition to cognitive impairment is not distinct, but blurred, as represented by the blurred coloring between various stages of cognitive function in the illustration. Similar transitions occur between cognitive impairment and dementia. When individuals experience declines in cognitive function that are severe enough to be noticeable to others and show up on cognitive tests, but not severe enough to interfere with daily life, they may have mild cognitive impairment (MCI). Individuals with MCI are at greater risk of developing Alzheimer's disease.**

# Threats to Brain Health

- Degenerative brain disease, such as Alzheimer's disease (in which case, MCI is often a precursor to dementia)
- Stroke or Cerebrovascular disease
- Traumatic brain injury
- A medication side effect
- An underlying health problem, such as sleep deprivation, depression, or anxiety

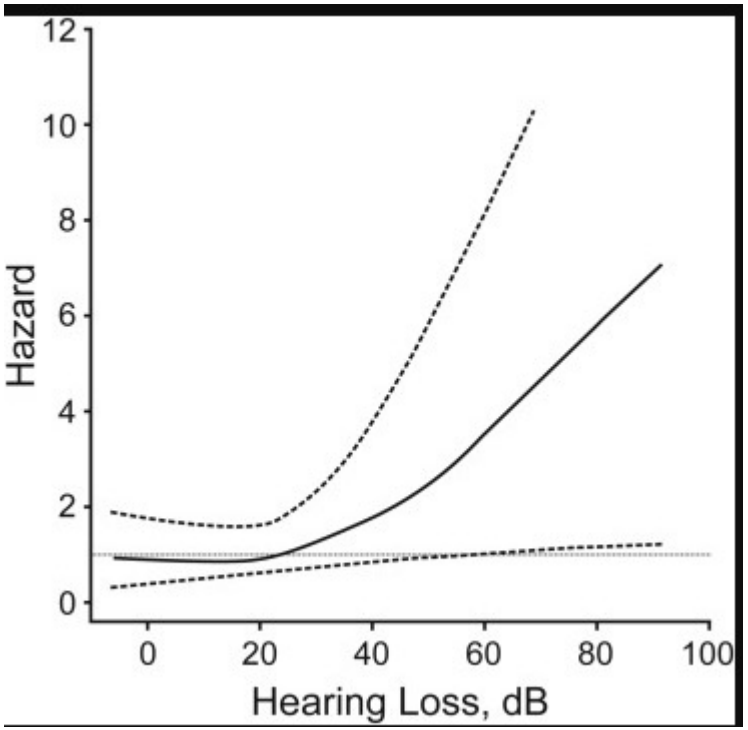

How can we support brain health in older adults?

# Educating older adults about healthy aging practices

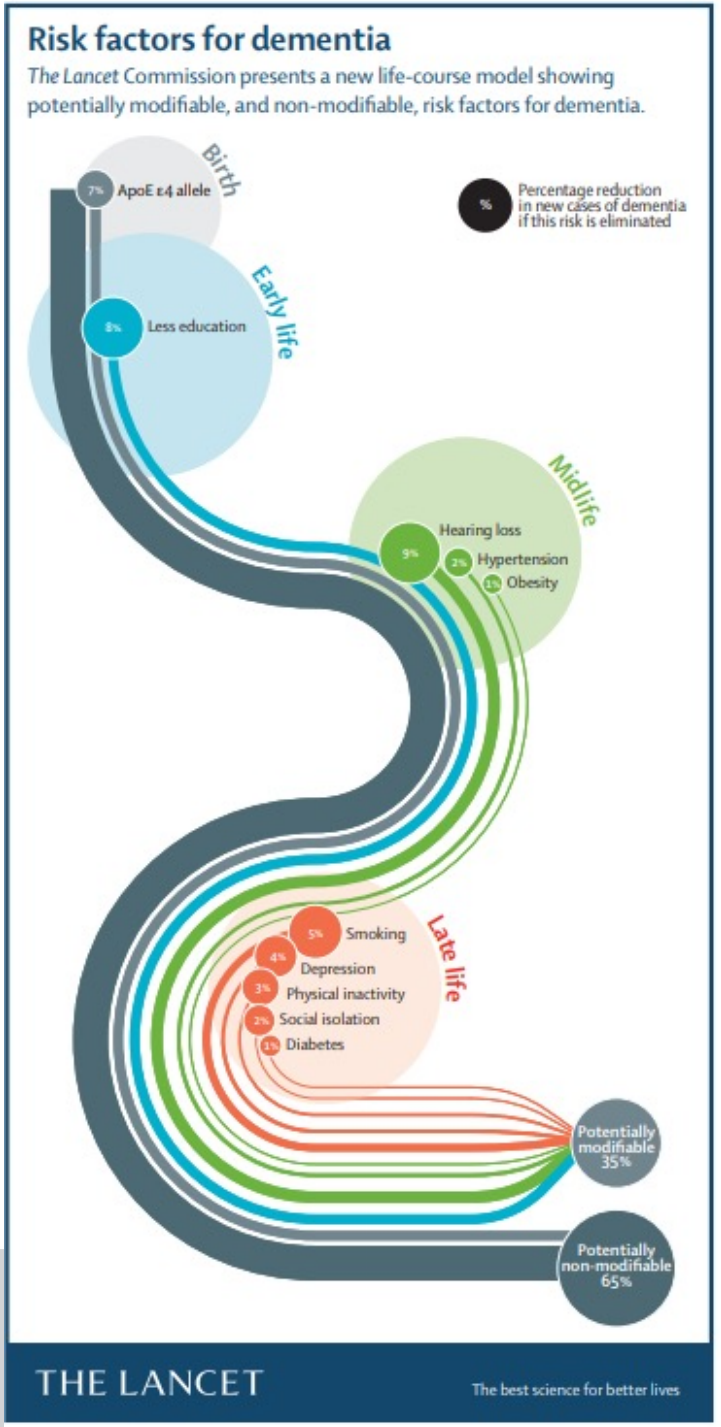
# Educating older adults to seek help when there are concerns related to cognition

# Educating clients and families on strategies to minimize decline in cognition

# Promoting assessment and treatment of hearing loss in older adults




Lin, F.R., Metter, E.J., O'Brien, R.J., Re-snick, S.M., Zonderman, A.B., and Ferrucci, L. (2011). Hearing loss andincident dementia. Arch. Neurol. 68, 214–220.



# Developing programs that promote cognitive engagement

**Real world skill training involves teaching new skills that involve multiple cognitive functions**

- Example: Synapse Project (Chan et al., 2016; Park et al., 2014)

**Cognitive training involves structured cognitive practice/stimulation targeting specific cognitive functions or strategy**

Examples:

- Advanced Cognitive Training for Independent and Vital Elderly (ACTIVE; Ball et al., 2002)

Gist reasoning training in cognitively normal older adults and individuals with MCI

Table 2 Gist reasoning training

| Session | Strategy | Brief description |
|---|---|---|
| 1 | Inhibit | Deleting unimportant or extraneous information, allowing important information conveying global theme to emerge. |
| 2 | Organize | Organizing of information into a purposeful sequence, by focusing on concepts, or themes abstracted from the text. |
| 3 | Inference | Binding information across adjacent sentences/information units to fill in the gaps and read between lines. |
| 4 | Generalize | Integrating newly encountered information in the context of life experience and world knowledge to construct broader meanings than conveyed by the explicit content. |
| 5–8 | All strategies | |


- Anand, R., Chapman, S. B., Rackley, A., Keebler, M., Zientz, J., & Hart, J. (2011). Gist-based reasoning training in cognitively normal seniors. *International Journal of Geriatric Psychiatry*, *26*(9), 961-968.
- Mudar, R. A., Chapman, S. B., Rackley, A., Eroh, J., Chiang, H., Perez, A., Venza, E., & Spence, J. (2017). Enhancing latent cognitive capacity in mild cognitive impairment with gist reasoning training: A pilot study. *International Journal of Geriatric Psychiatry*, 32(5), 548-555.
- Mudar, R. A., et al. (2019). Event-related neural oscillation changes following reasoning training in individuals with Mild Cognitive Impairment. *Brain Research*, 1704, 229-240.

# Using cognitive rehabilitation approaches to support functional ability in persons with dementia

- Memory Books
- Reminiscence

# Memory Book

- Compensatory strategy, does not treat memory deficits (Sohlberg, 2011)
- Capitalizes on preserved semnatic abilities and a desire to communicate (Bourgeois et al., 2001)
- Facilitates expression of wants and needs and active participation in daily life activities (Bourgeois et al., 2001)
- **Benefits**
  - topic maintenance (Egan, 2010)
  - verbal attention (Egan, 2010)
  - quantity and quality of the conversation (Chang, 2011)
  - reduced unintelligible, ambiguous, and preservative utterances (Chang, 2011)

# Reminiscence Therapy

"Reminiscence is the deliberate use of prompts to promote the recall of pleasant memories." (Woods et al., 2005)

**Goals**

- Stimulate the person mentally and socially
- Provide enjoyment and a sense of life achievement

**Benefits**

- Improved communication (Cooney et al. 2014)
- Improved mood (Testad et al., 2014)
- Positive behavioral change (reduced anxiety) (Cooney et al. 2014)
- Reduced depression (Nakamae et al., 2014; Testad et al., 2014)
- Improvements in memory (Haslam et al. 2012)
- Improvements in Social wellbeing/ engagement (Lai et al. 2003, Wimbermuehle, 2014)


# Developing programs that promote social engagement

- Intergenerational programs have been found to strengthen social and cognitive health
  - **Experience corps:** An intergenerational, volunteer-based tutoring program that engages adults aged 50 and older as literacy tutors for struggling students in public schools.

https://www.aarp.org/experience-corps/our-stories/

# Using video-technology platform we provide opportunities for older adults with MCI and Caregivers:

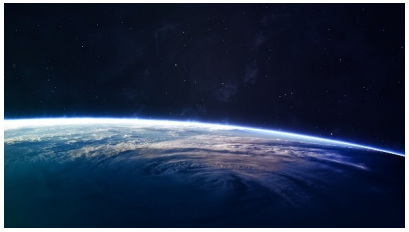
**Connect** with others using a vide-technology platform

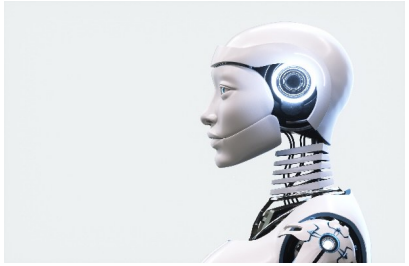
**Reminisce** with others in a casual setting

**Engage** with others on topics of shared interests

# Categories for Social Engagement

Science and Technology





Life Experiences


Nature, Health & Wellness

# Pilot Data Findings

- All participants were able to use video-technology from home
- Trends for increased pre-post
  - Quality of Life score
  - Friendship Scale ( “feeling less isolated from other people’)
- Willingness to use in future
  - 100% yes for MCI; 75% yes/maybe non-MCI

“It would help communication skills…keep your brain working” (MCI)

“….It’s like having a friend at the touch of a button” (non-MCI)

# Training to use accessible technology to support functional ability

SMART Phone/Tablet Utilization

- Support memory
  - Information about day/time of the week
  - Information about family members/doctors
  - Daily schedule and appointment/event reminders
  - Information about bills to pay
  - Maintain a shopping list
  - Medication reminders
  - Personal health reminders (e.g., check BP; call doctors office; fill prescription; pick up prescription)
- Support visual and spatial functions
  - Help with navigation
  - Finding way back to familiar location
  - Finding way around neighborhood

# Thank You!

# Physical Activity and Exercise Interventions for Cognition

Margaret Danilovich PT, DPT, PhD
Senior Director
Leonard Schanfield Research Institute
CJE SeniorLife

# Why might exercise improve cognition?

What's good for the heart is good for the brain

- Enlargement of cognitive reserve because of increased brain perfusion
- Exercise reduces risk for cardiovascular disease; CVD linked with cognitive decline & dementia risk


Exercise reduces stress

Chronic stress is associated with higher dementia risk

# Can exercise prevent cognitive decline?

Research article | Open Access | Published: 27 May 2014

**Does physical activity prevent cognitive decline and dementia?: A systematic review and meta-analysis of longitudinal studies**

Sarah J Blondell, Rachel Hammersley-Mather & J Lennert Veerman

*BMC Public Health* **14**, Article number: 510 (2014) | Cite this article

- 35% decrease in risk of cognitive decline among people who are highly active compared to people who are less active
- 14% decrease in risk of dementia among people who are highly active compared to people who are less active

**Exercise & physical activity have neuroprotective**

# What exercise prescription prevents cognitive decline?

**Physical training**

1. Aerobics
2. Resistance

**Motor training**

3. Balance
4. Flexibility

**Intensity matters**

**Complexity matters**

# Exercise programming strategies

- Aerobics & resistance
  - Intensity matters
  - GOAL: feel like you are working hard to very hard; increased heart rate, increased respiratory rate

- Balance
  - Complexity matters
  - GOAL: dual-task – performing 2 tasks simultaneously (motor-cognitive, motor-motor)
  - Examples:
    - Standing on one foot and counting backwards from 100 by 3s
    - Walking fast while naming vegetables or fruits or animals or book titles or songs
    - Standing on one foot and throwing a ball

# Can exercise slow cognitive decline in people **with** cognitive impairment?

RESEARCH ARTICLE: OBSERVATIONAL STUDY

**The impact of exercise on patients with dementia**

**A 2-year follow-up**

Chen, Ke-Hau BSE[a]; Chen, Hsiu-Hui BSE[b]; Li, Lin BSMed[c]; Lin, Hui-chen MD[c]; Chen, Chien-Liang MD[d,e]; Chen, Nai-Ching MD[c,e,*]

Editor(s): Bush., Eric

Author Information

Medicine: June 05, 2020 - Volume 99 - Issue 23 - p e20597

Exercise improves strength and physical function in people with mild cognitive impairment, but not moderate impairment

Exercise is associated with reduced hospitalization

No exercise group: 31% hospitalized over 2 years

Exercise group: 8% hospitalized over 2 years

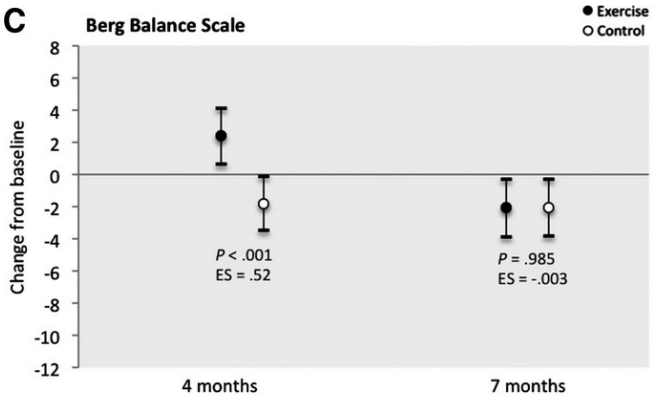
Goal: Keep people as mobile as possible

# What about yoga?

- Powerful intervention for caregivers of those with dementia
- Small evidence that yoga may improve attention, processing speed, and verbal memory
  - Potential mechanisms of action:
    - 1. Sleep disturbance present in 45% of people with ADRD
    - 2. Neuropsychiatric systems present in 30% of people with ADRD
    - 3. Stress: excessive cortisol levels damages the hippocampus

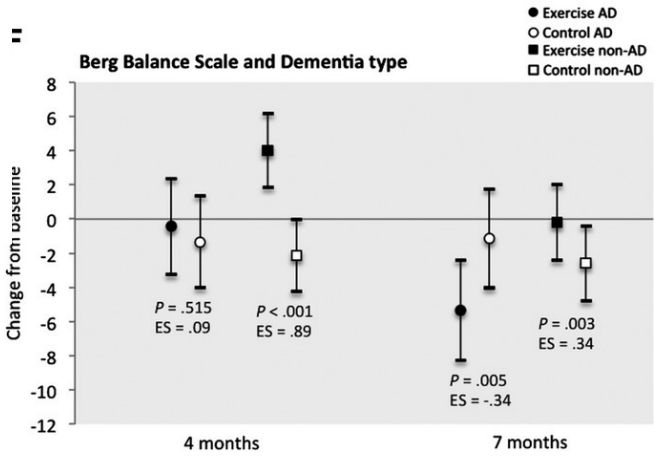
# What about balance classes?

- ~30% of older adults fall each year
- >65% of older adults with ADRD fall each




**Effects of a High-Intensity Functional Exercise Program on Dependence in Activities of Daily Living and Balance in Older Adults with Dementia**

Annika Toots PT, Håkan Littbrand PhD, Nina Lindelöf PhD, Robert Wiklund PT, Henrik Holmberg PhD, Peter Nordström PhD, Lillemor Lundin-Olsson PhD, Yngve Gustafson PhD, Erik Rosendahl PhD




Exercises were functional:
up and down from a chair, walking, stairs, lunges, etc

# Key take home messages

- Tailor programming to your desired outcomes
  - If you want to improve client balance, do balance exercises
  - If you want to improve flexibility, do yoga and stretching

- If you want to improve cognition…
  - Start earlier in the lifespan
  - Make it functional, particularly for those with worsening cognitive impairment
  - Turn up the intensity for our aerobic and strengthening classes
  - Turn up the complexity for our balance classes – dual-task!
  - In our agencies, every clients should have an exercise referral

# Cje.net/exercise

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