Aging and Cognition: What Do We Know and How Can We Protect Brain Health
Hallmarks of Aging and Cognitive Aging

Dr. Kate Hayden
Since the turn of the 20th century, life expectancy has increased dramatically.
Full life expectancy is not the same as healthy life expectancy

Sources: Data on life expectancy and healthy life expectancy come from the World Health Organization's Global Health Observatory. Data on country national income level come from the World Bank’s Country Classifications by Income Level. Production of this infographic was supported by the National Institute on Aging.
Full life expectancy is not the same as healthy life expectancy.
With increased age, our senses decline.
Sensory declines:

- **Vision**
  - **Lens loses elasticity** → trouble focusing
  - **Cornea becomes less transparent** → distortion and blurring
  - **Pupil** loses ability to **dilate** as easily
  - **Cataracts cloud** the lens → decrease the amount of light that passes
  - **Retina becomes thinner** → decreases visual acuity and contrast sensitivity

- **Hearing**
  - **Stiffening of the tympanic membrane**
  - **Atrophy** of ear muscles
  - **Loss of auditory neurons** in brain
Sensory declines:

- **Taste**
  - Dentures
  - Medications
  - Reduced number of taste buds

- **Smell**
  - Decline in ability to smell due to changes in nasal mucosa
  - Loss of neurons in brain areas involved with smell

- **Touch**
  - Loss of receptors on the skin
  - Reduction in the number of sensory fibers innervating the skin
What is normal cognitive aging?
The only cognitive domain that shows a steep decline from early life is perceptual speed.
Change in Cognition Over Lifespan

The only cognitive domain that shows a steep decline from early life is perceptual speed.

Schaie, Amer Pscyhol 1994
Some abilities are maintained

Crystallized = past learning (rote) and experience

Fluid = abstract reasoning, thinking on your feet

Adapted from Baltes Ann Rev Psych 1999
What is normal cognitive aging?

As a result of decreased sensory input in normal aging:

• **Mild declines** in:
  • Visual and verbal memory
  • Visuospatial abilities
  • Immediate memory
  • Ability to name objects

• **Decreased** control and maintenance of attention

• Common to have **less recall of recent events** and be **slower** to remember names and details
What is normal cognitive aging?

✓ Vocabulary and verbal reasoning remain unchanged or may improve

• Does not include:
  • Memory impairment
  • Loss of ability to function
Aging Memory

NORMAL

NOT NORMAL
Aging Memory

- Forget names
- Get a little more confused when doing too many things at once
- It takes more time and energy to learn something new ... it “feels” more difficult
- Amount of new information learned in a short period of time is a little less than before
- Not always able to recall information WHEN you need it (tip-of-the-tongue)
Aging Memory

- Feel confused - more often than usual
- Get lost or turned around more frequently
- Parts of conversations are repeated - more often than usual
- Family and friends notice a difference
- Difficulty managing daily tasks
- Loss of interest in hobbies and usual activities
- Dementia ....
Aging Memory

NORMAL

"Grey" Zone

??

NOT NORMAL
More trouble remembering appointments, dates, events, etc.

May feel “overwhelmed” more often

Feel that “something is not right” even though others fail to notice a change

May feel a little more irritable or “short fused”

Feel more “stressed” than usual

May feel like mood is not what it used to be
Adults with MCI are at increased risk of developing Alzheimer’s or other type of dementia in the next few years.
Definitions of cognitive impairment

• Mild cognitive impairment
  • Stage between normal aging and the more serious decline of dementia.
  • Causes cognitive changes that are serious enough to be noticed
  • ~ 12-18% of people age 60 or older are living with MCI.
Definitions of cognitive impairment

• Dementia
  • **General term** for loss of memory, language, problem-solving and other thinking abilities that are severe enough to interfere with daily life
  • **Alzheimer's** is the most common cause of dementia
What have we learned from WHI about MCI and dementia?