

Pathways to Prevention: Maximizing Brain-Healthy Behavior to Decrease the Risk of Cognitive Decline

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I. Background: Normal Cognitive Aging vs. Dementia

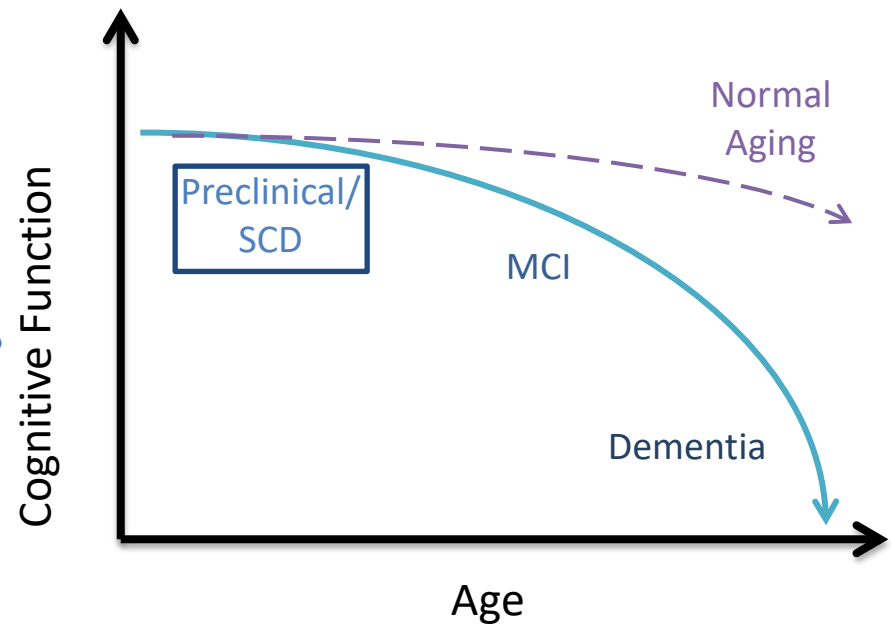
II. Brain Health Champion Study: Research

III. Brain Healthy Behaviors: What You Can Do Now!

IV. Get Involved! AHEAD

Background: Cognitive Aging

- **Subjective Cognitive Decline (SCD)** is the experience of worsening memory loss or cognition.
- Though this experience of memory or thinking problems does not affect performance on cognitive tests, **SCD is a risk factor for Alzheimer's disease and other dementias.**
- Many people with SCD will not develop MCI or dementia, but others will.



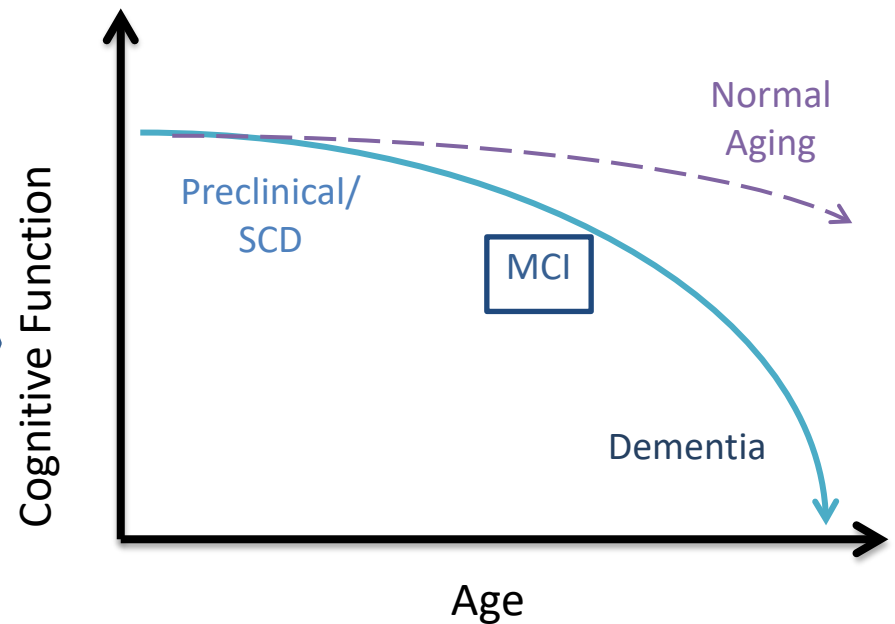
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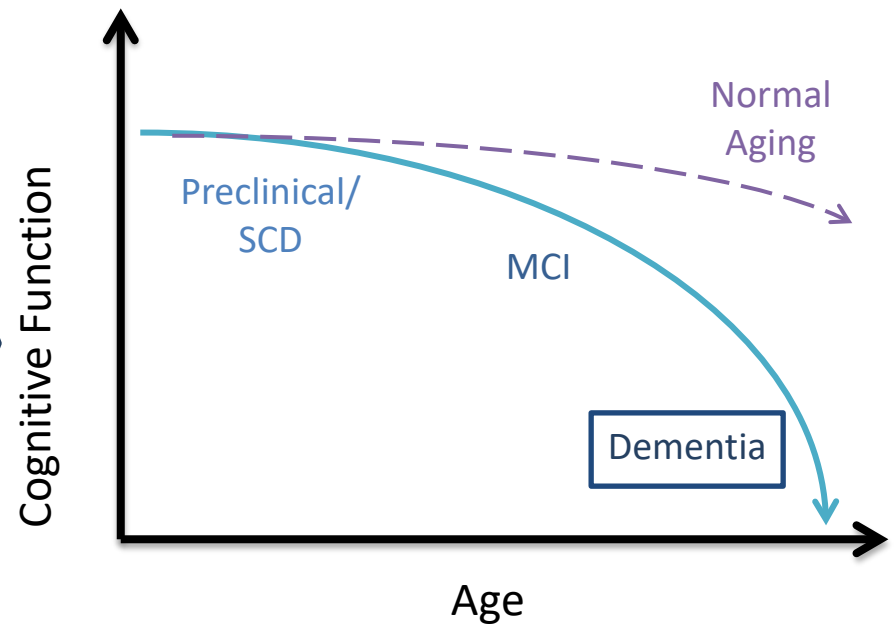
Background: Cognitive Aging

- **Mild Cognitive Impairment (MCI)** is a term used to describe the condition of people whose cognition lies *between* the normal cognitive changes of aging and early dementia.
- Cognition (or memory) is abnormal for what is expected at their age, but their memory changes have not caused an interruption in their daily activities or functioning.



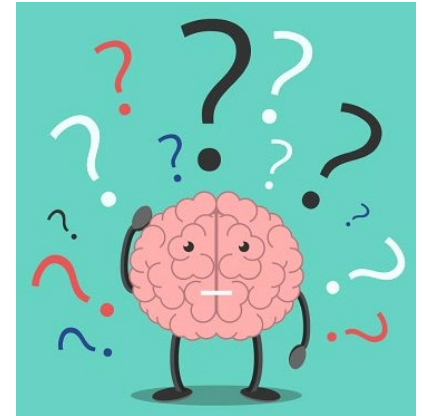
Background: Cognitive Aging

- People with **dementia** have significant memory problems that impact their ability to perform daily activities such as cooking, grooming or shopping.
- Recent estimates show that **14% of people in the United States over age 71** have dementia.
- The annual rate of conversion from MCI to dementia ranges from between **5-15% per year** for any one individual.



Normal Cognitive Aging: “Senior Moments”

- Common experiences include:
 - Forgetting why you walked into a room
 - “Word-finding” difficulty in conversation
 - Making wrong turns while walking or driving
 - Misplacing items around the house



Senior moments ≠ Alzheimer’s Disease!

BUT if frequent, they may be cause for concern.


- Neurologists and psychologists can do detailed testing to determine the cause of your memory concerns
- Many additional factors can cause or contribute to memory problems, including medications, head trauma, psychiatric disorders, alcohol or substance use, hypothyroidism, vitamin B-12 deficiency, fatigue

Normal Cognitive Aging: “Senior Moments”

Cause for Concern

vs.

Likely Harmless



Symptoms:	Alzheimer's disease	Normal aging memory changes
	Forgetting recently learned information	Forgetting things like names or appointments
	Difficulty performing familiar tasks such as preparing a meal	Occasionally forgetting reasons for entering a room
	Forgetting simple words or substituting unusual words	Sometimes having trouble finding the right word
	Disorientation; getting lost in familiar locations	Forgetting the day of the week or where you were going
	Poor or decreased judgment; difficulty with complex mental tasks	Making a questionable or debatable decision from time to time
	Misplacing items or putting them in unusual places	Temporarily misplacing keys or a wallet
	Rapid mood swings	Sometimes feeling sad or moody
	Extreme changes in personality	Slight change in personality
	Loss of initiative	Feeling weary of work or social obligations

SOURCE: Alzheimer's Association

AP

Talk to your primary care doctor or neurologist if you or family members are concerned about memory and thinking.



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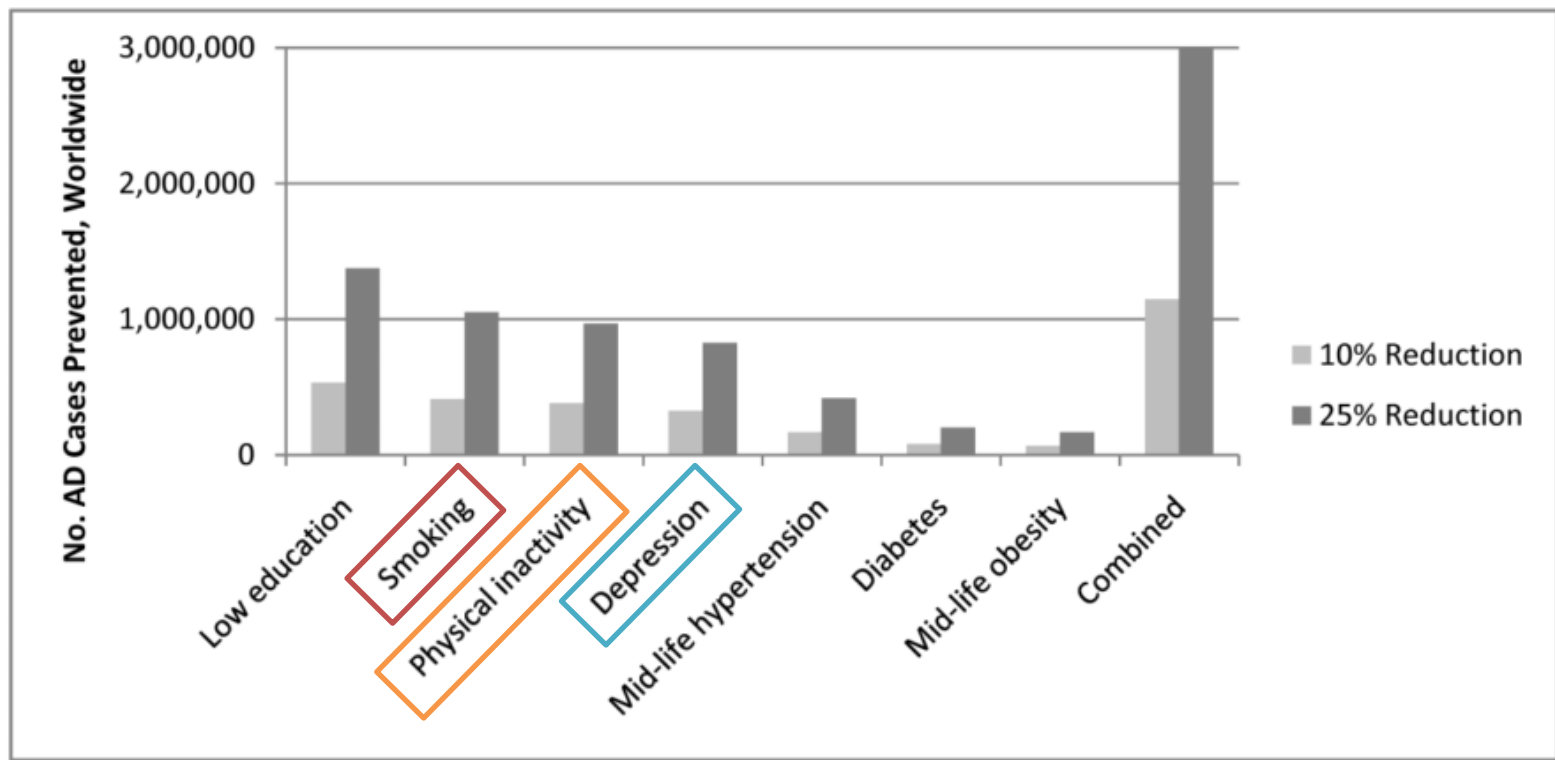
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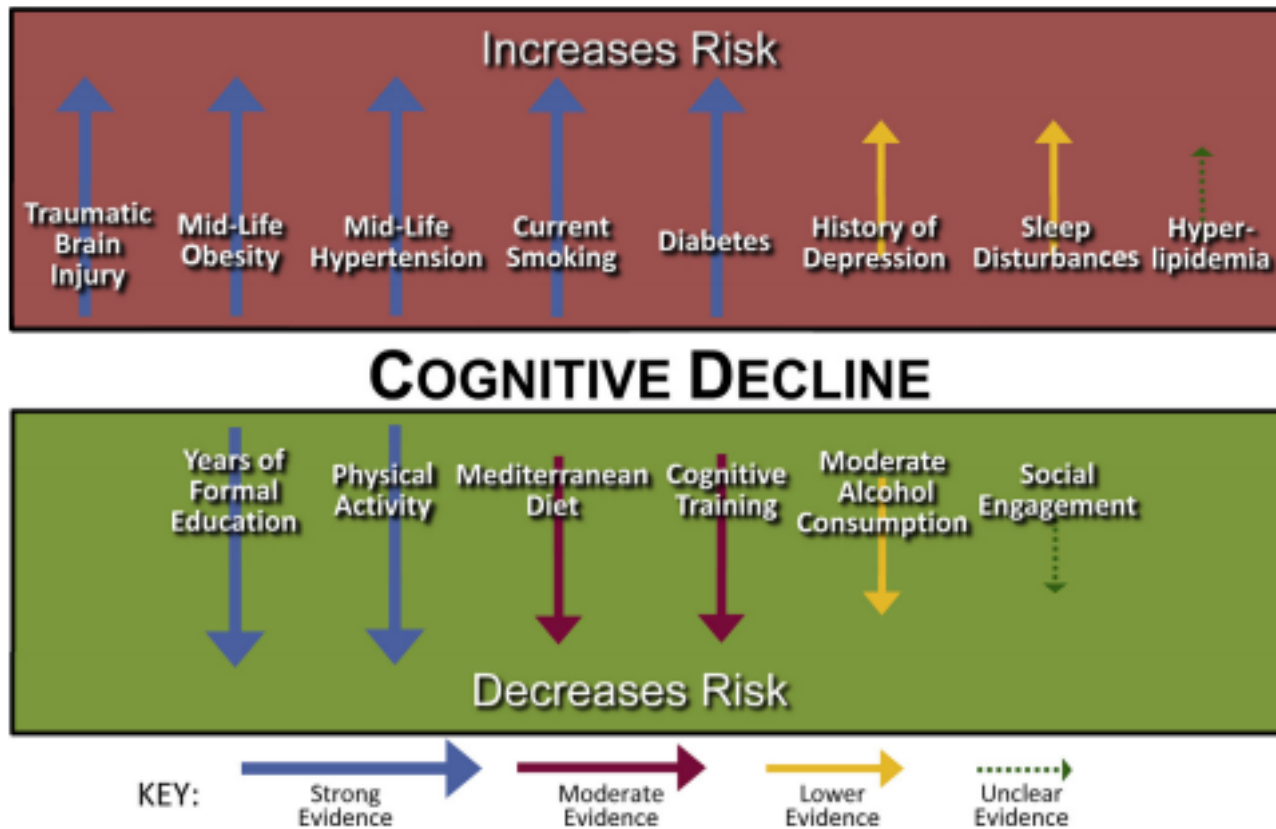
Research: Modifiable Risk Factors

- A 10-25% reduction in each of seven major risk factors could potentially prevent 1.1-3.0 million AD cases worldwide and 184,000-492,000 cases in the USA
- **Smoking**, **physical inactivity**, and **depression** were among the top 3 contributors in the US and worldwide



Research: Modifiable Risk Factors

- **Physical inactivity** is associated with many other AD risk factors, including depression, mid-life obesity, mid-life hypertension and diabetes
- **Depression** contributed to the second-largest proportion of AD cases in the USA and was the fourth-largest contributor globally

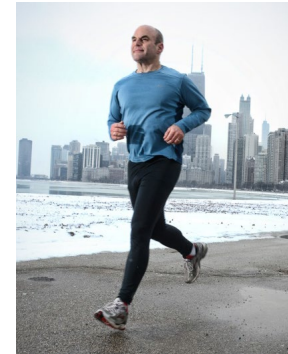


Brain Health Champion (BHC) Study - 1.0

- **6-month, randomized, controlled trial** of 40 patients from an academic, sub-specialty memory clinic, with mild dementia (15), MCI (21) , or subjective cognitive decline (4)
- **Active intervention (BHC) arm:** **Health coach**
Patients/caregivers worked with an additional clinical team member, the “brain health champion” (BHC)
 - 1) Weekly motivational interviewing phone calls
 - 2) In-person visits every six weeks (updated personalized, attainable goals)
 - 3) Focused counseling session with a dietician at 6 weeks
- **Control arm (Standard of Care; SOC):** **Usual care**
 - 1) Continuation of usual neurologic care, including some counseling by neurologists about optimal lifestyle/brain health

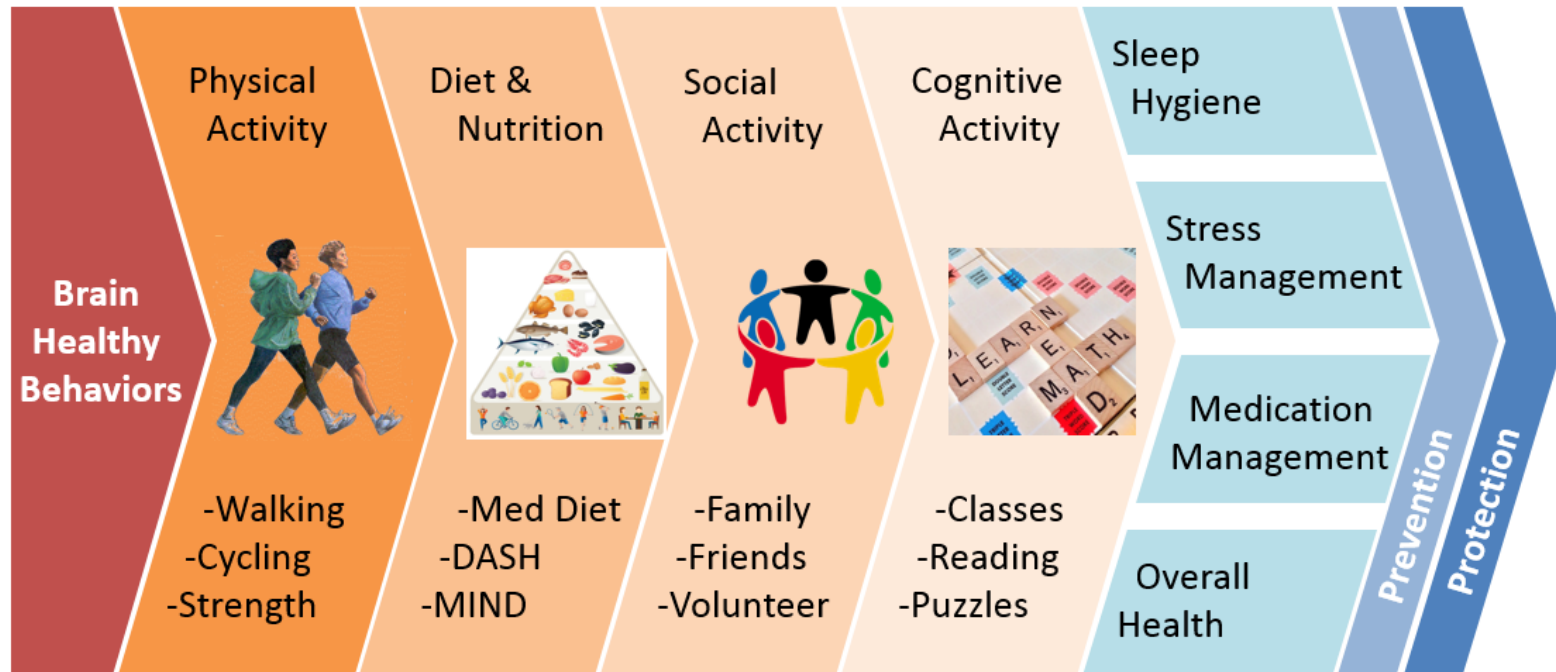
BHC Study: Outcomes

- **Primary outcomes:** Validated questionnaires assessing changes in physical activity, dietary pattern, and cognitive/social engagement (FCAS)



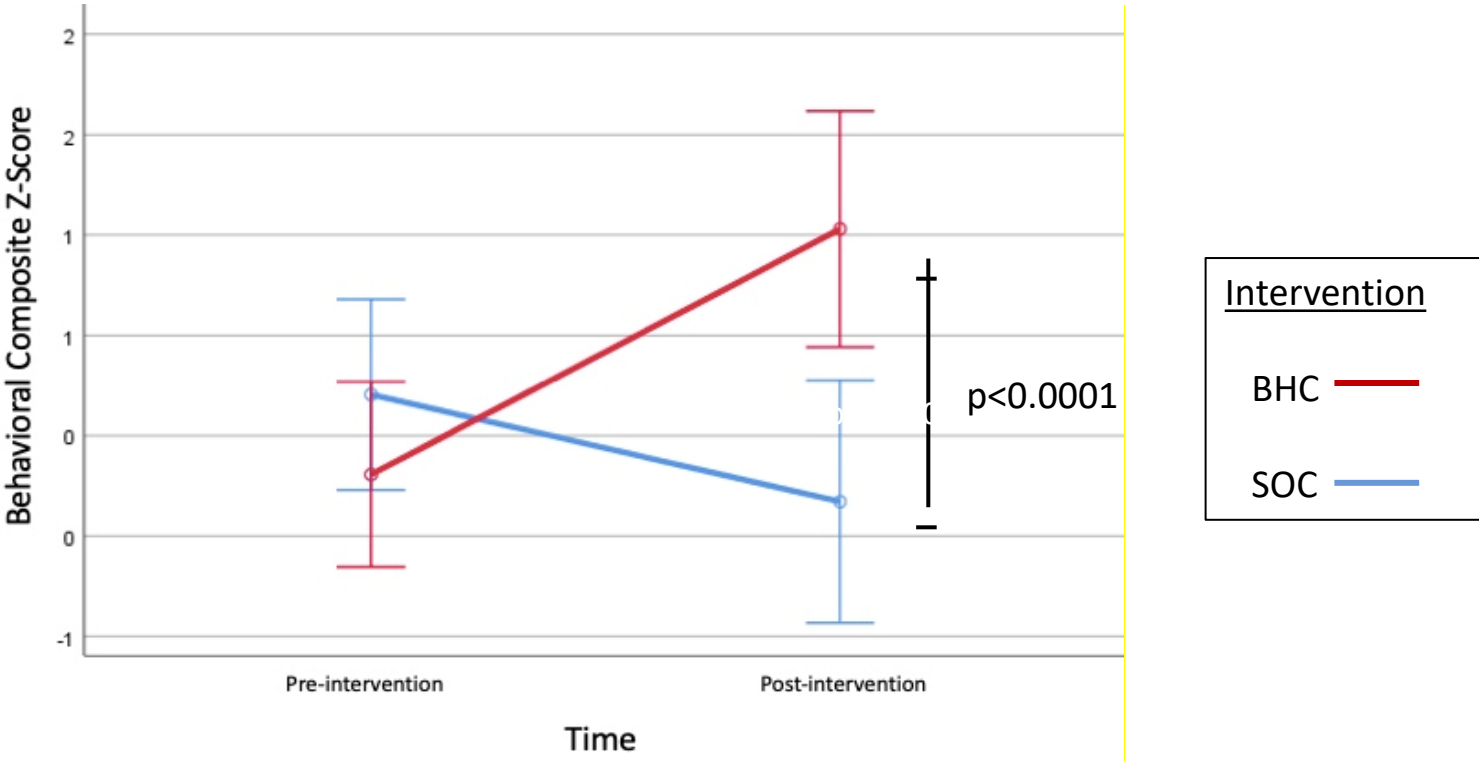
- **Secondary outcomes** included: Quality of life (QOL), general cognition/memory, neuropsychiatric status, sleep quality, social network size

Coaches Curriculum - Study Flow



- Significant evidence that certain behaviors can decrease the chance developing new or worsening cognitive problems.
- A set of behaviors is more effective at slowing the rate of conversion from SCD and/or MCI to dementia than a single lifestyle change.

Intervention Effect on Composite Behavioral Score



Change in brain-healthy behavior also strongly predicted improvement in QOL
($r=0.75$, $r^2 = .56$, $p<0.00001$)

Brain Health Champion (BHC) Study 2.0 - Mobile technologies-augmented

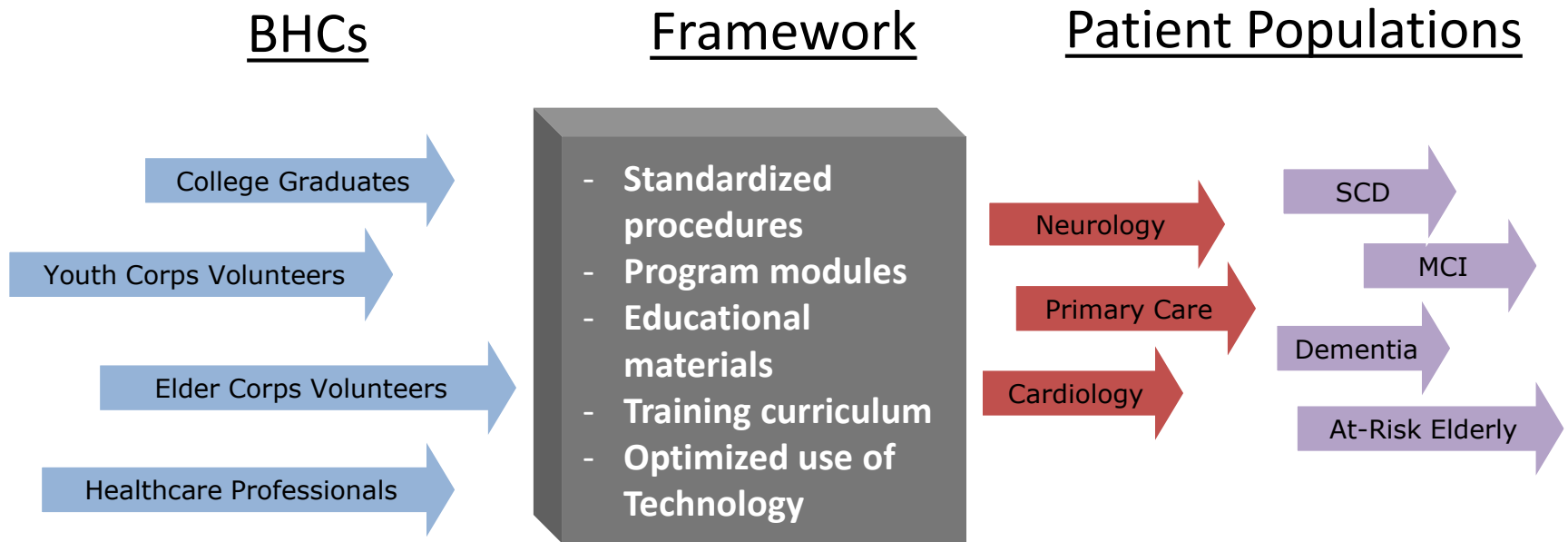
- **6-month, randomized, controlled trial** of ~45 patients (27 completers to-date; 34 enrolled), age 60-79, from BWH Behavioral Neurology and BWH Primary Care, with either MCI due to AD/Vascular/Mixed or cognitive normal (CAIDE dementia risk)
- **Active intervention (BHC) arm:** **Health coach**
Patients/caregivers worked with an additional clinical team member, the “brain health champion” (BHC)
 - 1) Weekly video-based motivational interviewing calls/ongoing mobile messaging on mobile platform; Use of wearable fitness tracker; Photographed food log (at assessments)
 - 2) Focused video-counseling session with a dietician at 6 weeks
- **Control arm (Standard of Care; SOC):** **Usual care**
 - 1) Continuation of usual neurologic care, including some counseling by neurologists about optimal lifestyle/brain health

Preliminary results for Study 2.0

- All participants successfully operated the mobile technology by themselves or with study partner (caregivers) assistance.
- Current trends show BHC participants increased participation in cognitive activities and adherence to a Mediterranean diet based on photographed food logs compared to CE.
- Participants in both arms show significantly increased scores on the composite neuropsychological assessment (pre- and post-study), quality of life (QOL) measures, and an increase in active minutes from pre- to post-assessments.

Future: The Vision of the BHC Program

Develop **flexible, replicable, scalable** programs, utilizing different groups of health coaches, and applied to diverse groups (patients; community members), across all SES strata





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“Healthy Heart, Healthy Brain”

≡ TIME |

HEART DISEASE

Heart Health Is Linked to Brain Health: Study



Harvard Health Publications
HARVARD MEDICAL SCHOOL

Trusted advice for a healthier life

Heart disease and brain health: Looking at the links



American Heart Association | American Stroke Association

life is why™

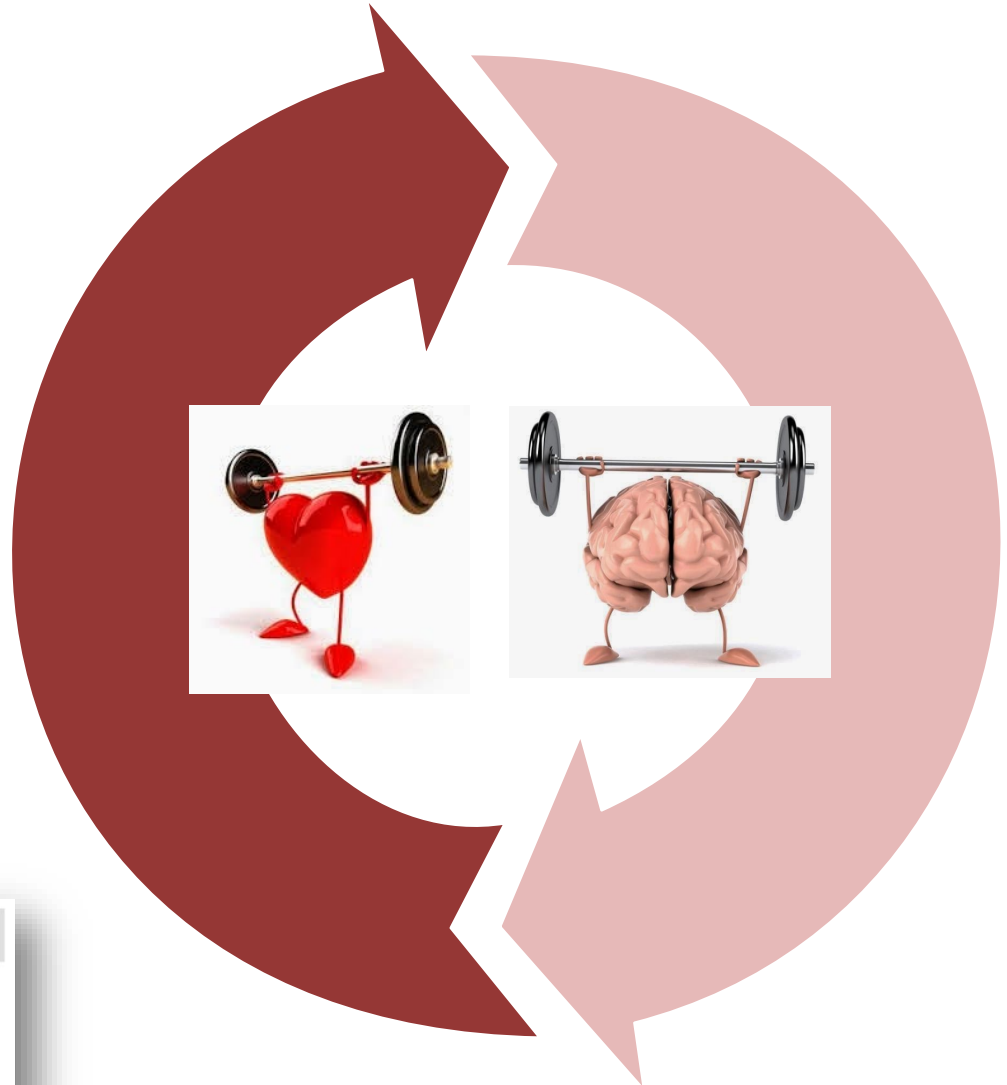
Protect Your Heart, Protect Your Brain

≡ npr WGBH RADIO

YOUR HEALTH

What's Good For The Heart Is Good For The Brain

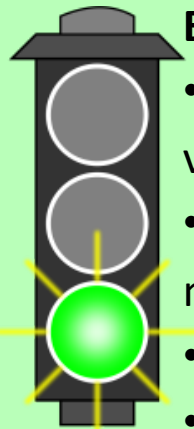
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Heard on Morning Edition



Brain Healthy Behaviors: Diet

- In many studies, **anti-inflammatory diets** are shown to be both brain and heart healthy.
- Greater adherence to the diet is associated with a **lower risk of conversion from MCI to Alzheimer's dementia**, and **lower mortality** in Alzheimer's dementia patients.

Mediterranean-Style Diet



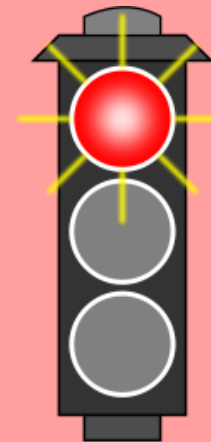
Every Day:

- Fresh fruits and vegetables
- Beans, lentils and nuts
- Fish
- Whole grains
- Olive oil



In Moderation:

- Poultry
- Eggs
- Dairy
- Alcohol (wine)

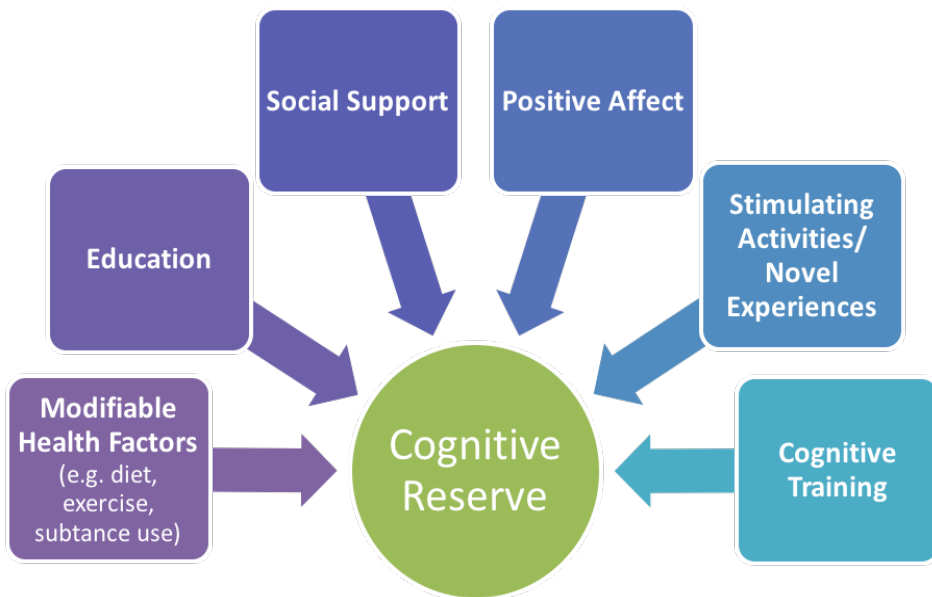
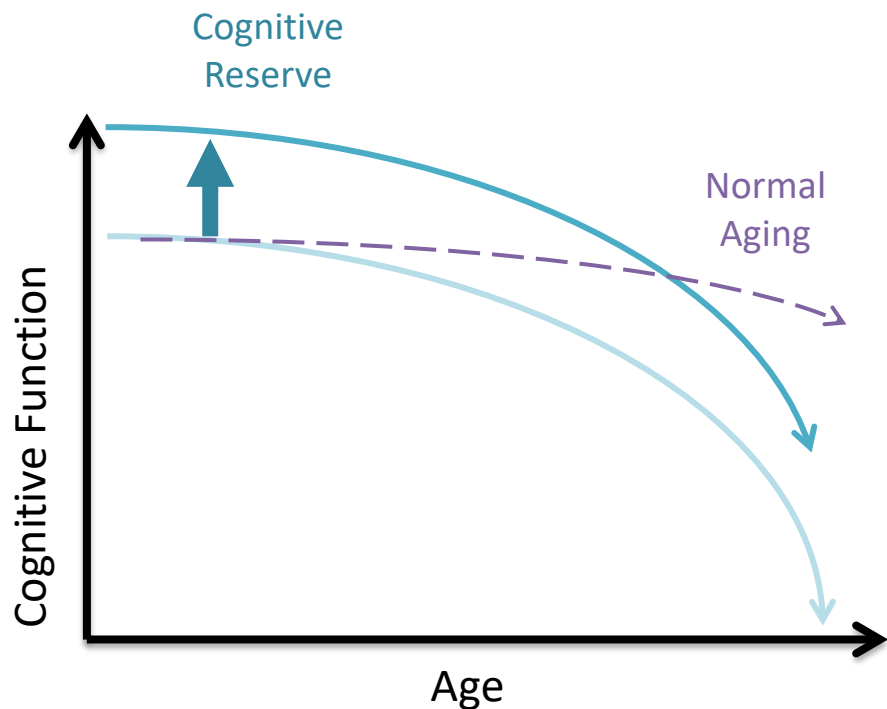


Avoid:

- Sweets with refined sugars
- Red meat
- Saturated fats (butter)

Brain Healthy Behaviors: Cognitive Reserve

- Cognitive reserve may make the brain **more resilient** to neurodegenerative changes, and **delay the onset** and **reduce severity** of cognitive symptoms
- **Many factors can contribute** to cognitive reserve, including high educational attainment, participation in cognitively challenging activities, and maintenance of a large and active social network



IFA Copenhagen Summit



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Prevention Trials based on Alzheimer's risk

- Anti-Amyloid Treatment in Asymptomatic AD (A4 Study) (Sperling 2013, Sperling 2020)
 - 1167 asymptomatic older adults with elevated amyloid on PET; ages 65-85; 4.5-year trial (with OLE); drug: solanezumab; [ongoing](#)
- AHEAD (A3/45) Trials:
 - 1400 asymptomatic older adults (planned); A45 elevated amyloid (similar to A4); A3 intermediate amyloid (lower threshold); ages 55-80 (55-64 additional risk factor); 4-year trial; drug: BAN2401/lecanemab; [launched Summer 2020](#)

AHEAD – 2 Trials in 1

- AHEAD (A3-45) Prevention trials
 - Lecanemab (BAN2401), anti-amyloid monoclonal antibody
 - **A3**: 4-year phase 2 trial in 400 participants ages 55-80 with preclinical AD (cognitively normal with intermediately elevated amyloid on PET); infusion every 4 weeks
 - **A45**: 4-year phase 3 trial in 1,000 participants ages 55-80 with preclinical AD (cognitively normal with elevated amyloid on PET); infusion every 2 weeks x2 years, then every 4 weeks x4 years

Research Needs YOU

- ➔ Nearly 6.5 million people in the United States have Alzheimer's disease
- ➔ Communities of color are especially at risk
- ➔ Treatments are needed now to help all people at risk for Alzheimer's disease



Who is Eligible?

- ➔ Healthy adults, ages 55 - 80
- ➔ Have not been diagnosed with Alzheimer's disease, but may be worried about memory loss in the future
- ➔ Agree to a four-year commitment
- ➔ Have a study partner



