

# A PRIMARY CARE AGENDA FOR BRAIN HEALTH

## A Statement for Healthcare Professionals from the American Heart Association/American Stroke Association

*The American Academy of Neurology affirms the value of this statement as an educational tool for neurologists*

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A stylized white torch is positioned in the lower-left corner of the image. The torch has a white handle and a white flame that is rendered as a series of overlapping, curved shapes. The background is a solid red color with some faint, larger-scale white graphic elements, including a dotted line that curves across the right side of the page.

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# INTRODUCTION

# BRAIN HEALTH

## PREVENTION OF AGE-RELATED COGNITIVE DECLINE AND BRAIN HEALTH IS PARAMOUNT

- Optimal brain health is the absence of cognitive impairment, dementia, stroke, and other brain diseases
- Our aging population is at risk of increasing rates of declining brain health, mild cognitive impairment, and dementia
- Primary care providers play a critical role in maintaining brain health of their patients

## PURPOSE OF THIS SCIENTIFIC STATEMENT

- To provide an up-to-date summary for primary care providers in the assessment and modification of risk factors at the individual level that maintain brain health and prevent cognitive impairment

# SECTIONS

1) METHODS

2) COGNITION

3) MODIFIABLE RISK FACTORS AND BRAIN HEALTH

- Life's Simple Seven
- Other Modifiable Risk Factors

4) IMPLEMENTATION INTO CLINICAL PRACTICE

# METHODS

# METHODS

- The Brain Science Subcommittee was convened in 2019 by the AHA Stroke Council to address issues related to brain health
- A scientific statement on the role of primary care in maintaining brain health was recommended with a planned focus on defining brain health, risk factors for cognitive impairment, strategies to safeguard brain health, and integration of best practices into primary care
- The writing committee included experts from neurology, neuropsychology, internal medicine, family practice, epidemiology, and nursing
- The statement was reviewed and approved by the AHA Science Advisory and Coordinating Committee

# COGNITION



# DEFINITIONS OF COGNITION

- Cognition: All brain functions that support the perception, acquisition, storage, retrieval, and complex processing of information, including communication, planning, and navigation.

## THE CONTINUUM OF COGNITIVE DECLINE

- Cognitive decline is measured on a continuum and encompasses subjective cognitive decline, mild cognitive impairment (MCI), and dementia.
  - Subjective cognitive decline: Self-experienced, persistent decline in cognitive function from a previous state,  $\geq 6$  months, without or before a formal exam by a health care provider
  - MCI: Characterized by measurable cognitive impairment that does not significantly impair daily, social, or occupational functioning
  - Dementia: Characterized by objective cognitive impairment occurring over months to years and interferes with daily, social, or occupational functioning

# EPIDEMIOLOGY OF COGNITIVE DECLINE

- Though MCI and dementia increase with age, prevalence estimates differ across studies
- Estimates of prevalence in the U.S.:
  - Subjective cognitive decline: 11.7% of those  $\geq$  65 years old\*
  - MCI: 22.25% among those  $\geq$  71 years old\*\*
  - Dementia: 13.9% among those  $\geq$  71 years old\*\*\*
- The prevalence of MCI and dementia in the U.S. is projected to triple by 2050 due to the growth of the population  $>$  65 years old.
- The risk of progression from MCI to dementia varies across populations and ranges from 3 to 15% per year.

\*Taylor, CA et al. Subjective Cognitive Decline Among Adults Aged  $\geq$ 45 Years-United States, 2015-2016. MMWR Morb Mortal Wkly Rep. 2018;67(27):753-757.

\*\*Plassman, BL et al. Prevalence of cognitive impairment without dementia in the United States. Ann Internal Med. 2008;148(6):427-434.

\*\*\*Plassman, BL et al. Prevalence of dementia in the U.S.: The aging, demographics, and memory study. Neuroepidemiology. 2007;29(1-2):125-132.

# RISK FACTORS FOR COGNITIVE DECLINE

## EXAMPLES OF MODIFIABLE RISK FACTORS

- Depression
- Hypertension
- Physical inactivity
- Diabetes
- Midlife obesity
- Hyperlipidemia
- Smoking

## THE CASE FOR TARGETING RISK FACTORS

- Some estimate that 35% of the cases of dementia are attributable to obesity, hypertension, depression, smoking, physical inactivity, diabetes, hearing impairment, lack of education, and social isolation.
- Modifiable risk factors increase the risk of cognitive decline in both middle and older age groups.
- Data on declining incidence rates of cognitive decline may be due to control of risk factors, emphasizing the need for better control of modifiable risk factors.

# **MODIFIABLE RISK FACTORS AND BRAIN HEALTH**

# MODIFIABLE RISK FACTORS

## LIFE'S SIMPLE 7

- Hypertension
- Smoking
- Physical Activity
- Diabetes
- Dietary Patterns
- Body Mass Index
- Cholesterol

## OTHER RISK FACTORS

- Alcohol consumption
- Sleep
- Social engagement
- Hearing
- Mood
- Education

# LIFE'S SIMPLE SEVEN



# HYPERTENSION

- Hypertension has been well-established as a risk factor for stroke and vascular dementia.
- Observational data have demonstrated an 18% increased risk of Alzheimer's dementia for systolic blood pressure (SBP) > 140 and a 25% increase for SBP > 160
- Trial data from SPRINT MIND, an RCT of patients > 50 years old with high risk of cardiovascular risk, showed a 19% decrease in the risk of MCI or dementia in the SPB < 120 mm Hg group compared with the SBP < 140 mm Hg group
- More trial data are needed to confirm optimal blood pressure targets.



**SMOKING**



# SMOKING

- Smoking is the third most important modifiable risk factor for dementia.
- Data indicate an association between smoking and cognitive impairment, though high mortality related to smoking may impact findings of observational studies through a survival bias.
- Encouraging data indicate that among smokers, quitting smoking may decrease dementia risk to close to the level of individuals who have never smoked.

# PHYSICAL ACTIVITY

- Epidemiologic studies have demonstrated an association between lower physical activity and higher risk of cognitive decline.
- Some data even indicate an association between early life physical activity and better cognition in later life (after age 60).
- Clinical trial data conflict as to whether aerobic exercise improves cognitive function in older adults with normal cognition.
- More data are needed on the dose, type, frequency, and duration of physical activity for optimal brain health.

**DIABETES**



# DIABETES

- An association between diabetes and increased risk for severe cognitive decline has been demonstrated in many observational studies
- In prospective cohorts, those with diabetes have a 50% higher risk of cognitive decline.
- The underlying mechanism may include diabetes-associated endothelial dysfunction or inflammation, progression of atherosclerosis, and insulin resistance.
- Clinical trial data are needed to evaluate the glycemic targets needed to prevent cognitive decline.

# DIETARY PATTERNS

## THE DIETS

- DASH: Dietary Approach to Stop Hypertension
  - High in fruits, vegetables, whole grains, and low-fat dairy foods
- Mediterranean
  - High consumption of fruits, vegetables, olive oil, and moderate alcohol consumption
- MIND: Mediterranean-DASH Intervention for Neurodegenerative Delay
  - Combination of Mediterranean and DASH, has special categories for green leafy vegetables and berries.

## THE EVIDENCE

- Observational data indicates an association between greater adherence to healthy diets and slower cognitive decline
- More trial are needed to guide specific dietary recommendations for prevention of MCI, though current evidence suggests primary care doctors can recommend DASH, Mediterranean, or MIND.

**OBESITY**



# BODY MASS INDEX

## ALZHEIMER'S DISEASE AND RELATED DEMENTIAS

- Obesity is one of the most common risk factors for Alzheimer's Disease and related dementias

## OTHER COGNITIVE OUTCOMES

- The association between obesity and other cognitive outcomes is less consistent, likely due to study limitations such as cross-sectional BMI measurements, timing of obesity measurements (mid vs. late-life), small sample size, and residual confounding bias
- BMI may be negatively associated with factors such as language ability, episodic memory, and cognitive flexibility

## OTHER COGNITIVE OUTCOMES

- More data are needed on the effects of midlife weight loss on future cognition
- Helping patients to manage obesity will help reduce risk of other co-morbid conditions including diabetes and hypertension





# CHOLESTEROL

- The role of serum cholesterol and cholesterol lowering treatments in cognitive decline and dementia are not well-understood.
- High total cholesterol has been found to increase the risk of Alzheimer's Disease later in life.
- Data on HDL, triglycerides, and trans- and saturated fat intake is limited.
- Evidence is limited to support any causal role of lipid-lowering drugs and reduced risk of dementia or MCI.

# OTHER MODIFIABLE RISK FACTORS

# ALCOHOL CONSUMPTION

- Light to moderate alcohol consumption appears to be protective against MCI, though the nature of the relationship is not entirely clear.
- The relationship between light to moderate alcohol consumption and MCI may be U-shaped, J-shaped, or linear.
- On the high end of the spectrum, excessive alcohol use can cause neurotoxicity, nutritional deficiency, and neuro-inflammation.
- The mechanism linking light/moderate alcohol consumption to protection from MCI may include decreased platelet aggregation, modification of lipid profiles, or acetylcholine release in the brain leading to enhanced memory and learning.

# SLEEP

- Sleep disorders including sleep apnea and insomnia are associated with cognitive decline based on observational studies.
- Obstructive sleep apnea contributes to vascular dementia through a range of mechanisms including hypoxia, systemic inflammation, endothelial dysfunction, hypertension, and atrial fibrillation.
- Primary care physicians may consider sleep interventions including sleep restriction-sleep compression therapy and multicomponent cognitive-behavior therapy to improve sleep disorders.



**SOCIAL ISOLATION**

# SOCIAL ENGAGEMENT

## DEFINITIONS

- Social isolation: having little or no social contact, or a diminished social network
- Loneliness: the subjective feeling related to isolation

## THE EVIDENCE

- Social isolation and loneliness are risk factors for cognitive decline and dementia
- One study of 1905 participants in Sweden demonstrated a 51% increase in risk for all-cause dementia associated with self-report of feeling lonely.
- Structured social activities may lead to improved global cognition.

# HEARING

- About 1/3 of older adults experience hearing impairment, and it often goes untreated.
- A large meta-analysis demonstrated an association between age-related hearing loss and cognitive impairment.
- This relationship may be driven by sensory deprivation or by common factors that cause both hearing loss and dementia.
- Early trial data of hearing interventions for adults with untreated hearing loss demonstrate improvements in memory, but more data are needed on global cognition.



# MOOD

- Depression and dementia are highly interrelated, and each serves as a risk factor for the other in older age.
- Data from a systematic review/ meta-analysis demonstrated an elevated risk of progression from MCI to dementia associated with depression.
- Some prospective cohort data indicate that depressive symptoms later in life may be an early sign of dementia.
- More evidence is needed to understand whether use of antidepressants to treat late-life depression can prevent MCI and/or progression to dementia.

# EDUCATION

- Higher education levels are thought to be protective against cognitive decline through greater cognitive reserve, the ability to function cognitively even in the setting of brain pathology.
- It is also well-established that higher education levels are associated with better access to care and control of CVD risk factors.
- Low educational levels as defined by  $\leq 8$  years increases the risk for dementia or cognitive impairment by 80%.

# INTEGRATION INTO CLINICAL PRACTICE

# PUBLIC HEALTH AND PRIMARY CARE

## PUBLIC HEALTH POLICY

- The modifiable risk factors associated with cognitive decline and impairment are amenable to public health policies.
- Using a public health approach to decrease tobacco use, promote physical activity, encourage healthy eating, reduce noise-related hearing loss, reduce social isolation, and improve access to education is critical to improving risk factor profiles across the life course.

## PRIMARY CARE PHYSICIANS

- Office-based primary care practice is an ideal setting to complement the public health approach to promote cognitive well-being and brain health.
- By participating in the evaluation of acute symptoms, prevention of acute and chronic disease, and management of chronic disease, primary care physicians can use their continued relationship with patients to promote brain health and cognitive well-being.
- Brain health is a hidden purpose and outcome of good primary care.

# PRIMARY CARE AND LIFE'S SIMPLE 7

## ELEMENTS WITH FORMAL SCREENING RECOMMENDATIONS

- Blood pressure
- Glucose
- Cholesterol
- Smoking status
- Weight
- Screening should occur every 1-5 years beginning in very early adulthood.
- Physicians should implement published treatment goals and strategies for these elements to optimize the brain health of their patients.

## ELEMENTS WITH PROFESSIONAL GUIDELINES FOR COUNSELLING

- Healthy diet
- Physical activity
- Though there are no commonly accepted screening instruments for primary care providers, professional guidelines recommend that all patients receive counseling to eat well and exercise  $\geq 150$  minutes each week.

**FRAILTY**



# INTERVENING ON OTHER MODIFIABLE RISK FACTORS

- Depression screening is recommended by the US Preventative Services Task Force.
- Patients with sleep apnea should be referred for care.
- Patients who report hearing loss or are observed to have hearing loss should be referred for formal testing.
- Frailty is defined as the accumulation of symptoms, signs (including weight loss), physical limitations, and comorbid illnesses that increase vulnerability to poor health outcomes
  - Is associated with increased risk of Alzheimer's dementia
  - Interventions including physical therapy and nutritional improvement may be effective in preventing cognitive decline, though research is ongoing.

# SCREENING FOR COGNITIVE DECLINE

- Neither the USPSTF nor the Academy of Neurology currently recommend the screening of asymptomatic people for cognitive impairment, but they do suggest maintaining vigilance for any change in cognitive status.
- Primary care physicians should consider the use of a validated cognitive assessment instrument if there is a concern for cognitive decline based on patient/family report or clinical observations.
- Validated instruments for cognitive assessment include:
  - Montreal Cognitive Assessment
  - Brief Alzheimer's Screen
- Some recent data suggest that earlier recognition might help to identify treatable causes or help with planning and that a broad approach involving vascular risk modification and lifestyle changes may be effective





# CONSIDERATION OF DIFFERENCES BY BIOLOGIC SEX, RACE, AND ETHNICITY

## COMPREHENSIVE APPROACHES TO RISK MODIFICATION AND LIFESTYLE IMPROVEMENT FOR THE PREVENTION OF COGNITIVE DECLINE MAY NEED TO BE TAILORED BY FACTORS SUCH AS BIOLOGIC SEX, RACE, ETHNICITY, AND SOCIOECONOMIC STATUS

- Rates of cognitive impairment are higher in Black and Hispanic populations, which is likely due to disparities in rates of vascular risk factors and inequities in access to care
- Preventative strategies for cognitive impairment should aim to decrease disparities by race, ethnicity, and socioeconomic status

### BIOLOGIC SEX

- There are notable differences in the associations between certain risk factors and cognitive decline
- For example, the association between alcohol consumption and cognition may be stronger in men than women
- The benefit from aerobic exercise may also be greater in men than women
- Sex-specific analyses are needed to help tailor prevention strategies for cognitive decline.

# BARRIERS TO IMPLEMENTATION

## THE EVIDENCE-BASED PRACTICE GAP

- Specific recommendations for prevention of cognitive decline are widely accepted by primary care physicians, but implementation may fall short.
- Innovations such as telehealth, self-monitoring programs, and team-based collaborative care integrated into primary care practices may help close these gaps.

## ACCESS TO PRIMARY CARE SERVICES

- Lack of access to primary care is a major barrier to improving brain health.
- About 15% of U.S. adults lack health insurance, and in 2015, 25% of Americans did not have a source of primary care.
- With our aging population, improved primary care services are needed.

# A PRIMARY CARE AGENDA FOR BRAIN HEALTH

## SUMMARY

- Primary care practice is an ideal setting for efforts to prevent or postpone cognitive decline, but gaps remain in the use of this setting to address modifiable risk factors for brain health
- Modifiable risk factors linked to brain health include Life's Simple 7 (blood pressure control, smoking status, physical activity, diabetes, diet, body mass index, and lipid control) as well as factors such as alcohol consumption, sleep, social engagement, mood, hearing, access to education, and frailty.
- To establish brain health as a focus in primary care practice, not only are local innovations needed, but larger reforms are needed to improve primary care access.
  - Efforts to recruit more providers into the primary care workforce
  - Improved health care coverage to make access to primary care more equitable across populations