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Emphasizing Prevention over Cure: The Critical Need for Promoting Healthy Lifestyles and Controlling Blood Pressure to Reduce the Risk of Cognitive Decline and Dementia

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INTRODUCTION

There is an immediate need to increase public health focus on the prevention of Alzheimer's disease and related dementias (ADRD). The population shift upwards in age drives this imperative, with one in five Americans expected to be 65 or older by 2030.[1] In 2020 there are an estimated 5.8 million people aged 65 years and older with ADRD in the United States, and as the population ages the number with ADRD is expected to reach 8.4 million by 2030, and 13.8 million by 2050.[2,] Research has suggested that the modifiable risk factors for ADRD are, for the most part, the same risks associated with cardiovascular disease. Similar to heart disease, Alzheimer's disease and related dementias take years to develop, presenting an opportunity for improved risk reduction as research continues for improved symptomatic treatments and disease-modifying agents. While the growing evidence supporting risk factor modification for ADRD is encouraging, with control of midlife hypertension an important example, the evidence supporting lifestyle interventions for cardiac diseases is consistently high, with substantial benefits. There are numerous examples of successful heart health programs, and efforts to support brain health should complement existing initiatives rather than compete for limited public health resources. In recent years, excellent lifestyle medicine and brain health resources have been developed to support development of public health programs for the prevention of cognitive impairment and for the care of ADRD. The time is now to focus on brain health, building on ongoing epidemiologic and encouraging clinical research. In addressing this crisis, one key theme to understand is: "What's good for heart, is good for the brain."

IMPORTANCE OF BRAIN HEALTH

Simply put, brain health is the development and preservation of cognitive abilities throughout the life-course, from birth to death.[3] Americans over the age of 50 consistently rank brain health and physical fitness as their top two interests, and Social Security and brain health as their top concerns.[4] Ideally, to support brain health, people attain an appropriate education, engage in work and social settings, receive appropriate preventive services and other health care, and practice healthful behaviors, such as , keeping physically fit, attaining adequate sleep, eating healthy, never starting smoking or stopping for current smokers, avoid excess alcohol, and protecting against traumatic brain injuries. As people age, most—though not all—will experience some degree of normal age-related cognitive decline, such as occasionally forgetting or misplacing things. Although perhaps a concern for an individual, these normal cognitive changes are relatively mild and do not impair one's ability to live independently. Cognitive impairment, on the other hand, is present when an individual, or their family members or friends, notice changes like difficulties performing the instrumental activities of daily living, such as shopping and household chores. The spectrum of cognitive impairment is broad, and someone with mild cognitive impairment could live independently with minimal to no assistance, while someone with advanced Alzheimer's disease may need around the clock care to support the basic activities of daily living, such as eating or bathing.

People in midlife, generally defined as 40–65 years of age, and adults 65 years of age and older are justifiably concerned about brain health and dementia. The most common form of dementia is Alzheimer's disease, representing 60–80% of ADRD, with vascular (related to bleeding or blockage from strokes and chronic disease related small vessel damage), frontotemporal, Lewy body, mixed, or combined causes and other less common types of dementias falling into the general classification of ADRD.[2] In the United States the prevalence of ADRD increases by age, from 3% for those 65–74 years, to 32% of those 85 years and older.[2] Among all ages, Alzheimer's disease was the sixth leading cause of death in the United States (fifth leading for adults ≥ 65 years) in 2017, and, when added to other causes of dementia, this jumps to the third leading cause of death.[5] This is alarming because among the top ten causes of death, ADRD is the only one with no effective treatment or cure.

Based on healthcare costs alone, ADRD is the costliest disease in America. The annual healthcare and out-of-pocket costs in the United States for ADRD are estimated at $305 million in 2020. By 2050, the costs are expected to reach $1.1 trillion.[2] A recent study estimated that if a treatment delaying onset of ADRD by five years was put in place by 2025, costs for ADRD would be reduced by 44% for out-of-pocket and 33% for healthcare payments—a staggering savings, and an incalculable personal benefit for the estimated 88 million individuals 65 years of age and older by 2050.[2,6] In addition to these costs, approximately 18.6 billion hours of unpaid caregiving was provided by family and others to those with ADRD in 2019, valued conservatively at $244 billion.[2]

PREVENTION OVER CURE

To address the critical need to focus on brain health prevention, again think: "What's good for the heart is good for the brain."[7] Numerous studies have identified modifiable risk factors for cognitive decline, impairment and ADRD. An estimated 40% of all ADRD is related to preventable risk factors, most of which are concurrent risk factors for cardiovascular and other chronic diseases, and include hypertension, diabetes, obesity, smoking, physical inactivity, social isolation, hearing loss, depression, attaining fewer years of formal education, excessive alcohol consumption, living in air polluted locals, and traumatic brain injuries.[8] In population-based studies, midlife hypertension is repeatedly associated with cognitive impairment and dementia[8,9] Systolic blood pressure levels ≥140 mm Hg) and age of exposure are also associated with dementia.[10] The risks of hypertension before and after midlife are less clear for brain health, though clearly established for cardiovascular disease. The evidence for the treatment of hypertension to prevent incident cognitive impairment and ADRD is encouraging. A National Academy of Science, Engineering, and Medicine systematic review found evidence that treating hypertension may prevent, delay or slow clinical ADRD.[11] Further, the body of evidence supporting the benefits of lifestyle medicine interventions to treat hypertension, cardiovascular disease and other chronic diseases is strong.[12] Findings from the SPRINT MIND study found that intensive (<120 mm Hg) versus standard (<140 mm Hg) blood pressure control was associated with lower risk of incident mild cognitive impairment.[13] While this study did not specifically address lifestyle interventions and had limitations that may delay immediate application in clinical care, it is an invaluable study showing the impact of hypertension treatment on prevention of cognitive impairment. Notably, a recent systematic review and meta-analysis that included the SPRINT MIND and other recent studies, found that treating hypertension with medications significantly lowered incident dementia or cognitive impairment.[14]

The evidence shows reduced incidence of cognitive decline using medications in the treatment of hypertension. The proven benefits and minimal potential harms of implementing lifestyle interventions for treating cardiovascular and other chronic diseases make the call for action for prevention of brain health impairment easy to understand. This focus on prevention needs to be in parallel with research on improved understanding of ADRD-related brain health neuro-pathophysiology, symptomatic treatments, and disease-modifying agents.

THE ROAD MAP

The *State and Local Public Health Partnerships to Address Dementia, The 2018–2023 Road Map*, currently in its third iteration, has been established as the guiding document to prepare and chart progress in addressing this critical public health problem.[15] The Road Map, developed by the Centers for Disease Control and Prevention (CDC), the Alzheimer's Association, and organizations, including the ACPM, includes 25 actions for state, tribal, and local public health departments to promote brain health, focus efforts aimed at cognitive impairment, and provide support for ADRD caregivers. Based on the Essential Services of Public Health, its 25 actions are subdivided into four categories: Educate and Empower the

Nation, Develop Policies and Mobilize Partnerships, Assure a Competent Workforce, and Monitor and Evaluate.

Whether you treat hundreds or thousands of patients in your practice, a key take-home point from the Road Map is to approach ADRD with a life-course perspective focusing on public health messaging and risk reduction efforts (Figure 1). There are many successful public health efforts consistent with this life-course approach, such as tobacco abstinence, nutrition, and heart health. Incorporating brain health into existing messaging and health efforts avoids competition for resources and presents a unified health approach. What's good for the heart is good for the brain.

One successful program was developed by the South Carolina Department of Health and Environmental Control, the **Take Brain Health to Heart** campaign. This initiative was created with public health partners, including the American Heart Association, and builds on successful heart health messaging, such as quitting smoking.[16]

In another engaging effort, the New Mexico Department of Health created the **10 Ways to Love Your Brain** public service announcement. This 60-second video posted on YouTube is engaging and informative, focusing on lifestyle choices for loving your brain.[16]

EDUCATION AND RESOURCES

Much has been written about the lack of the preparedness of our healthcare system in providing care for those with ADRD.[2,17] Concerns include brain health knowledge of health providers, managing patients with ADRD, and providing support to unpaid caregivers. Several items in the Road Map address these concerns, notably educating providers and ensuring the best evidence is applied to support care efforts. Three resources are worthy of mention. The first is a shared effort by the CDC, the Alzheimer's Association, and the Emory Centers for Technical Training and Assistance. This free, four-module course, *A Public Health Approach to Alzheimer's and Other Dementias*, is designed at the undergraduate level for faculty and has been shown to increase knowledge about ADRD.[18]

Another effort is the Lifestyle Medicine Core Competencies Program, established in partnership with ACPM and the American College of Lifestyle Medicine.[19] This course was developed after an expert panel report in 2010, represented by ACPM and the leading primary care and national medical societies, including the American Medical Association and American Academy of Family Physicians. This course instructs on building lifestyle medicine into clinical practice, with an emphasis on disease prevention, risk reduction and health promotion. The program includes 15 core competencies and several elective sections, including a CDC and ACPM developed course on brain health.

Another excellent resource is the Gerontological Society of America's KAER Model, developed with partner organizations for primary care providers to support brain health and ADRD care. KAER stands for Kickstart the cognition conversation, Assess for cognitive impairment, Evaluate for dementia, and Refer for community resources.[20] The free toolkit is available online and includes comprehensive ADRD-related resources by subject area. An emphasis on early diagnosis of ADRD is key, as it saves costs to the country and

individuals.[2] Early ADRD diagnosis also provides medical benefits, linking people to community resources, and allowing time to plan for future care needs. Early assessment also ensures necessary evaluations, as several reversible conditions may mimic cognitive impairment, such as hearing loss, depression, and medication side-effects. Lastly, the KAER model addresses community resources and care of the caregiver. We cannot give enough credit and support to caregivers who provide 18.6 billion hours a year of care for those with ADRD. This service is physically and emotionally demanding and stressful. Additional resources to support caregivers are found though the National Institute on Aging (www.nia.nih.gov) and the Alzheimer's Association (www.alz.org).[18]

CONCLUSION

Consider prevention of cognitive impairment and ADRD as public health imperatives, following the life-course model presented in Figure 1, with the Road Map as the public health guide for action. Talk about brain health with your patients, whether they be individuals or entire populations. Remember, "What's good for the heart is good for the brain." Think about treatment of hypertension, both because treating elevated blood pressure decreases the risk of further cardiovascular disease, and because therapeutic lifestyle interventions for hypertension, and pharmacologic when needed, may also benefit the brain. Attain and advocate professional education on brain health and lifestyle medicine subjects using the excellent educational programs and resources available. And remember to provide care and support to the caregivers who provide an incalculable benefit to those with ADRD and to society.

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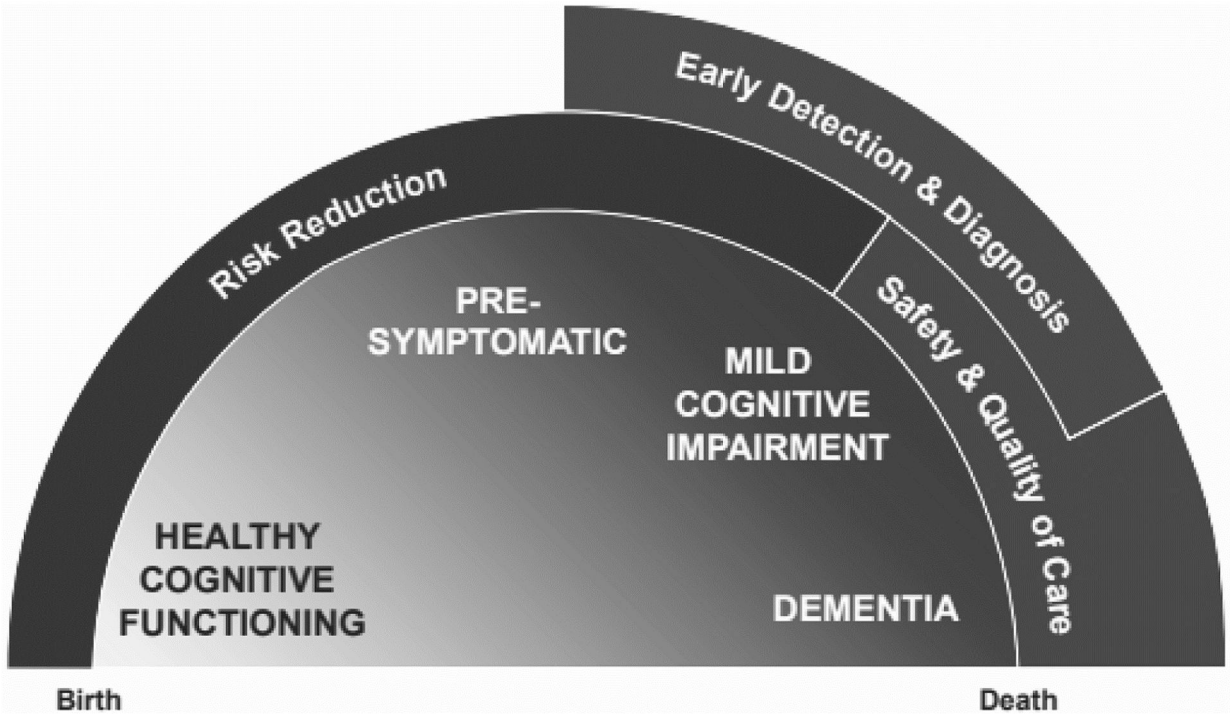

Figure 1.

Life-course perspective on Alzheimer's and related dementias and the role of public health. CDC and Alzheimer's Association. State and Local Public Health Partnerships to Address Dementia: The 2018–2023 Road Map. Atlanta, GA: US Department of Health and Human Services, CDC; 2018.