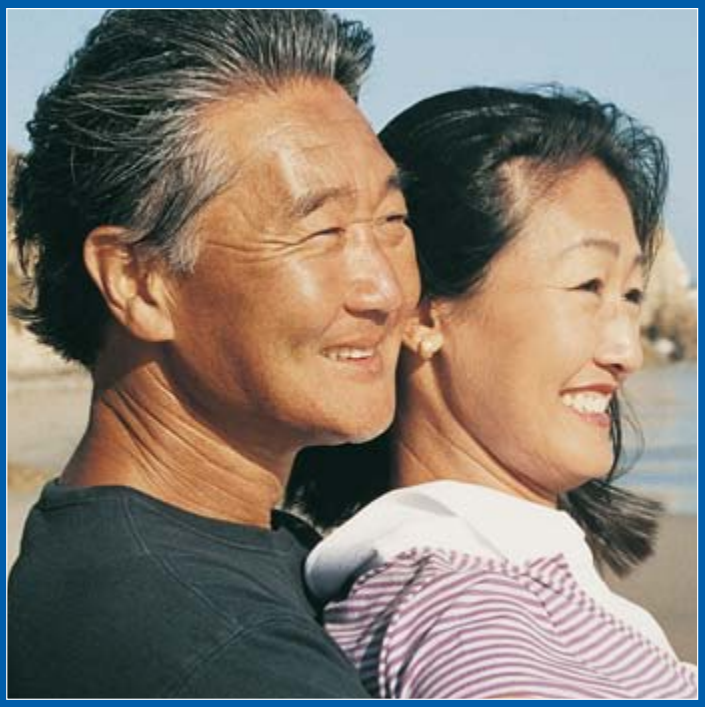

The CDC Healthy Brain *Initiative*

Progress 2006–2011

National Center for Chronic Disease Prevention and Health Promotion

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Available at www.cdc.gov/aging

Introduction

Cognitive health has only recently been recognized as an important issue for the public health system. Supported by a Congressional appropriation in fiscal year 2005, the Centers for Disease Control and Prevention (CDC) established the Alzheimer's-specific segment of CDC's Healthy Aging Program, referred to as The Healthy Brain Initiative. CDC then formed a partnership with the Alzheimer's Association, National Institute on Aging, Administration on Aging, AARP, and other public and private sector organizations to launch the activities of The Healthy Brain Initiative. Together these organizations embarked on a deliberative 18-month process to examine the current state of knowledge regarding the promotion and protection of cognitive health, to identify important knowledge gaps, and to define the unique role and contributions of public health.

The groundwork for The Healthy Brain Initiative emanated from a critical analysis of the scientific literature in 2001, the Cognitive and Emotional Health Project (CEHP), sponsored by the National Institutes of Health (NIH). Building on this work, CDC co-chaired a Steering Committee of national experts to guide the initial phases of The Healthy Brain Initiative. The Steering Committee was comprised of members from the Administration on Aging, National Institute on Aging, non-profit organizations, academia, and state public health departments (Appendix A, column 1). One of its initial efforts was to convene a public health research meeting *The Healthy Brain and our Aging Population: Translating Science to Public Health Practice* planned by a Work Group convened jointly by CDC and the Alzheimer's Association (Appendix A, column 2). During this intensive 2-day meeting, invited participants examined public health research and provided opinions from their research perspective about addressing risk and protective factors for promoting cognitive health. As a result of this review, the Steering Committee provided oversight for the creation of *The Healthy Brain Initiative: A National Public Health Road Map to Maintaining Cognitive Health* (2007). The Road Map (2007) is not directed at a particular agency or organization, but rather provides a framework to guide a coordinated public health response across agencies and organizations to address cognitive health.

In a separate but related major Congressional initiative, the National Alzheimer's Project Act (NAPA) was signed into law on January 4, 2011, by the President of the United States. Passed unanimously in both the Senate and House of Representatives, NAPA (Public Law 111-375) calls for a national strategic plan among federal agencies to address and overcome the rapidly escalating crisis of Alzheimer's disease. This plan will help coordinate Alzheimer's disease efforts across the federal government by specifying outcome-driven objectives, recommendations, implementation steps, and accountability.

Given the recent passage of the National Alzheimer's Project Act and a desire to assess what has been achieved by CDC's activities related to the Healthy Brain Initiative, this progress report was prepared. It is based on an extensive document review and abstraction, as well as interviews with selected key partners and collaborators. Background on the public health burden of cognitive health and the National Public Health Road Map (hereafter referred to as the "Road Map") is followed by highlights of CDC's accomplishments to date. Also discussed are additional relevant agency activities and anticipated next steps for CDC's Healthy Brain Initiative.

Background

In 2007, when the Road Map was published, Alzheimer's disease was ranked as the 7th leading cause of death among American adults aged 18 and older.[1] Since then, it has surpassed diabetes to become the 6th leading cause of death among adults,[2] and continues to be the 5th leading cause of death for those aged 65 and older.

Public Health Burden

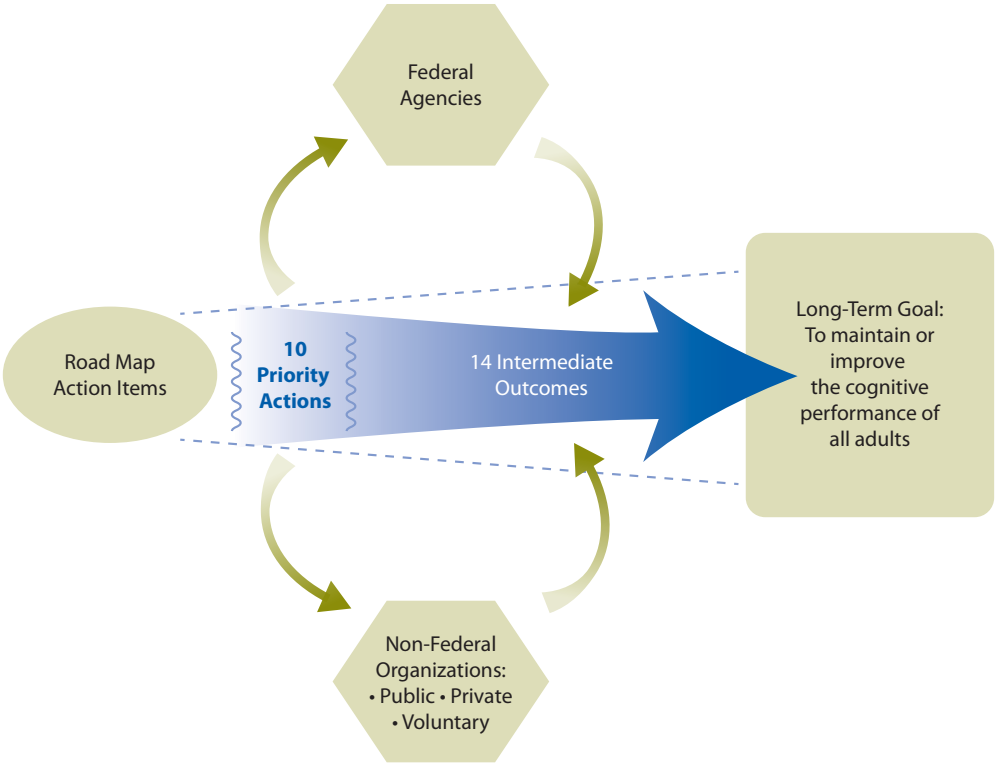
One in eight people aged 65 and older (around 13%)—and nearly half of those aged 85 and older—are estimated to have Alzheimer's disease.

Dementia, including Alzheimer's disease, has profound social and economic implications, especially given the current trends of an aging population. Prevalence estimates differ due to the various approaches for identifying individuals with dementia, and can make it challenging to develop sound public health policy.[3] Current estimates for the prevalence of Alzheimer's disease range from 2.6 million to 5.2 million Americans,[4,5] and the risk of developing the disease increases with age. If present trends continue, by 2050, as many as 16 million people may be living in the United States with Alzheimer's disease.[6]

Further, for people with Alzheimer's disease and other dementias, aggregate payments for health care, long-term care, and hospice are projected to increase from $183 billion in 2011 to $1.1 trillion in 2050 (in 2011 dollars). The growing burden on individuals, families and communities has moved Alzheimer's disease, once considered a rare disorder, to a recognized major public health problem that severely impacts older adults and their families.[7]

Cognitive health is not simply the absence of disease such as Alzheimer's disease but is far more complex. As noted in the Road Map (2007), cognitive health "can be viewed along a continuum—from optimal functioning to mild cognitive impairment to severe dementia" … and cognitive health "should be respected for its multidimensional nature and embraced for the positive changes that occur as a natural part of the aging process."[8] Although standardized, widely accepted definitions of *cognitive health* have yet to be adopted, most experts agree that the components of healthy *cognitive functioning* include: language, thought, memory, executive function (the ability to plan and carry out tasks), judgment, attention, perception, remembered skills such as driving, and the ability to live a purposeful life.[9]

Along with physical and emotional functioning, optimal cognitive functioning is an essential component of a person's overall health. The challenge becomes how best to rally the public health community to apply its traditional core functions—assessment, policy development, and assurance—in a coordinated and effective effort to promote cognitive health.



Strategic Framework for Cognitive Health

The Road Map

The Road Map (2007), developed by a steering committee of members representing federal agencies, academia, non-profit organizations and state health departments, focused on physical activity and vascular factors because of their association with cognitive outcomes.[8] Several key principles underlie the approach to maintaining cognitive health described in the Road Map: a firm grounding in science, an emphasis on primary prevention, a community and population approach, and a commitment to eliminating disparities. In addition, it includes a "synergistic" model for moving science into public health practice.[10]

The creators of the Road Map envisioned a nation where the public embraces cognitive health as a priority and invests in furthering research and health promotion. Toward this end, they adopted a long-term goal to maintain or improve the cognitive performance of all adults. As shown above in the Figure: *Strategic Framework for Cognitive Health,*14 intermediate outcomes were identified. They encompass the areas of communication, surveillance, research, policy, and public health capacity. Additionally, the Road Map documented a set of 44 action items, 10 are priority actions ready for immediate action. Federal agencies and non-federal organizations can use the Road Map for guidance.

While development of the Road Map by a wide range of interested agencies and organizations is itself a major accomplishment, the greater value of having such a tool lies in its use by those agencies to focus efforts in a strategic and mindful manner. As one of those organizations, CDC's Healthy Aging Program has embraced the Road Map (2007) and used it to allocate resources for the Healthy Brain Initiative. Select outcomes relate directly to the mission of CDC's Healthy Brain Initiative. Others clearly fall into the purview of the National Institutes of Health, other federal agencies, the Alzheimer's Association, and other important partners. Select areas of focus for The Healthy Brain Initiative are highlighted in the following Table: *Ten Priority Actions for Improving Cognitive Health.*

Ten Priority Actions for Improving Cognitive Health

- **Develop a population-based surveillance system with longitudinal follow-up that is dedicated to measuring the public health burden of cognitive impairment in the United States.**
- **Include cognitive health in *Healthy People 2020,* a set of health objectives for the nation that will serve as the foundation for state and community public health plans.**
- **Initiate policy changes at the federal, state, and local levels to promote cognitive health by engaging public officials.**
- **Determine how diverse audiences think about cognitive health and its associations with lifestyle factors.**
- **Disseminate the latest science to increase public understanding of cognitive health and to dispel common misconceptions.**
- **Help people understand the connection between risk and protective factors and cognitive health.**
- **Conduct systematic literature reviews on proposed risk factors (vascular risk and physical inactivity) and related interventions for relationship with cognitive health, harms, gaps and effectiveness.**
- **Conduct research on other areas potentially affecting cognitive health such as nutrition, mental activity, and social engagement.**
- Conduct controlled clinical trials to determine the effect of reducing risk factors or lowering the risk of cognitive decline and improving cognitive function.
- Conduct controlled clinical trials to determine the effect of physical activity on reducing the risk of cognitive decline and improving cognitive function.

Bold type indicates priorities currently being worked on by CDC.

Major Collaborators

One of CDC's primary collaborators is the Healthy Aging Research Network, established in 2001 to develop and implement a national research and dissemination agenda related to the public health aspects of healthy aging. Funded through CDC's Healthy Aging Program, the Network's member universities are a subset of CDC's Prevention Research Centers located in schools of public health throughout the United States. The Network's Healthy Brain Workgroup comprises leading researchers, graduate students, and partners with interests in examining issues related to cognition among older adults.

Another key collaborator is the Alzheimer's Association, whose activities are supported by CDC's Healthy Brain Initiative. Founded in 1980, the Alzheimer's Association's mission is to eliminate Alzheimer's disease through the advancement of research; provide and enhance care and support for all affected; and, most importantly, reduce the risk of dementia through the promotion of brain health. Major objectives of the work with the Alzheimer's Association include collaborating on the dissemination and implementation of the actions cited in the Road Map; providing technical support to states related to surveillance activities regarding cognitive impairment; supporting linkages with other federal efforts, such as those of the National Institutes on Aging and Centers for Medicare and Medicaid Services, concerning the assessment and measurement of the burden of cognitive impairment; enhancing communication strategies for persons, families, and caregivers affected by Alzheimer's disease and related dementias, health professionals, policy makers and organizations that focus on cognitive health; and creating partnerships to enhance capacity for the inclusion of evidence-based interventions to reduce risk factors associated with cognitive impairment and promote evidence-based caregiver interventions.

Progress to Date

The Healthy Brain Initiative, a segment of CDC's Healthy Aging Program, is working diligently to implement activities to achieve the desired objectives described in the Road Map (2007) that fall under the purview of CDC's mission and vision. The CDC Healthy Brain Initiative's accomplishments during the past five years focus on priorities relevant to CDC's public health mission in four areas: conducting surveillance, supporting policy change, advancing communication, and guiding applied prevention research. To describe progress to date, each priority area of the Road Map is followed by a brief summary of CDC's accomplishments, noted by a blue arrowhead.

ROAD MAP PRIORITY ACTION

- Develop a population-based surveillance system with longitudinal follow-up that is dedicated to measuring the public health burden of cognitive impairment in the United States.

New Cognitive Impairment Module: Behavioral Risk Factor Surveillance System

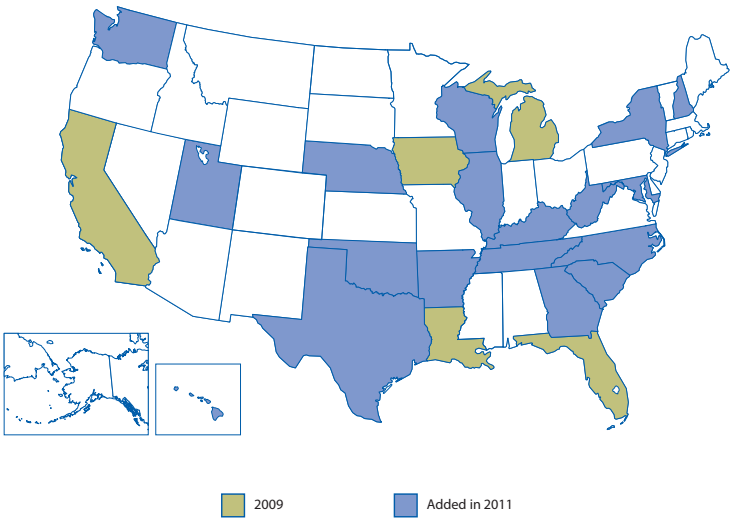
In 2007, CDC's Healthy Aging Program began exploring an optional module in the Behavioral Risk Factor Surveillance System (BRFSS) on cognitive impairment and cognitive health. BRFSS is a unique state-based telephone survey of non-institutionalized adults that addresses health behaviors, preventive health screenings, and immunizations related to the leading causes of death and disability. Coordinated and supported by CDC, the BRFSS is currently conducted in all 50 states, the District of Columbia, and some territories. All participating states agree to ask certain core questions, although not necessarily in the same year, and can supplement them with optional modules that cover additional health topics.

A meeting with the members of Michigan's Dementia Coalition in September 2007 helped to define the need and requirements for a new optional BRFSS module. The effort was guided by a panel of national experts comprised of specialists in public health, population-based surveillance, cognitive impairment, and aging. The panel was charged with defining the constructs to be assessed, identifying and reviewing questions that have been used previously to assess the impact of cognitive impairment and cognitive health at the population level, and developing a final set of questions to assess the public's perception of the impact of cognitive health and cognitive impairment for use in a population-based surveillance system.

These questions were presented to the state BRFSS coordinators at their national conference in 2009 and approved. The resulting 10-item *Impact of Cognitive Impairment Module* gathers information about:

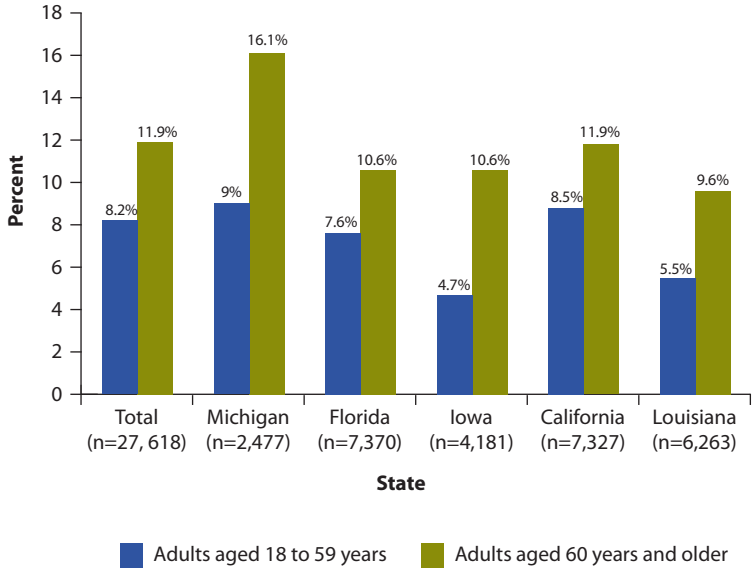
- Individuals affected by cognitive impairment;
- The impact of cognitive impairment on activities in and outside of the home;
- The need for assistance and caregiving;
- Healthcare-seeking behaviors and treatment; and
- In households with more than one person, the total number of persons affected by cognitive impairment.

Five states—California, Florida, Iowa, Louisiana, and Michigan—piloted the questions in 2009 (see Map on the following page: *States Using the BRFSS Cognitive Impairment Module in 2009–2011;* states shaded in green) and 23 states are currently using the module in their 2011 BRFSS state-added questions (states shaded in blue and green). The Alzheimer's Association worked with states and provided state support for the module through funding from CDC.



States Using the BRFSS Cognitive Impairment Module in 2009–2011

Data from the five pilot states are currently being analyzed. As shown below, preliminary results indicate that among adults aged 60 years and older, the overall percent with perceived cognitive impairment was 11.9 percent (range 9.6–16.1%), defined as "confusion or memory loss happening more often or getting worse." Data from the 2011 surveys will be available in 2012.



- The percentage of adults aged 18 to 59 years with perceived cognitive impairment ranged from approximately 5% in Iowa to 9% in Michigan and California.
- The percentage of adults aged 60 years and older with perceived cognitive impairment ranged from approximately 10% in Louisiana to 16% in Michigan.

Cognitive impairment (CI) is defined as "confusion or memory loss that is happening more often or is getting worse during the past 12 months." Data refer to the respondent's perception of cognitive impairment and not any specific diagnosis. These data refer to the civilian, noninstitutionalized population. For more information about BRFSS, see www.cdc.gov/brfss. Source: Centers for Disease Control and Prevention, BRFSS, 2009.

Percentage of Adults with Perceived Cognitive Impairment, by Selected State and Age, BRFSS 2009

States have used the *Impact of Cognitive Impairment Module* to better understand how cognitive impairment impacts their residents, families, and communities. The information generated places them in a better position to evaluate the impact of cognitive impairment within communities and regions of their state and assists them in developing strategies to address the impact of cognitive impairment. The information can also serve as a vehicle to inform community coalitions, identify calls to action, and educate the public, policy makers, and health professionals about cognitive impairment. In addition, this state-level information can be used by state units on aging, area agencies on aging, and organizations that support older adults, persons with disabilities, or caregivers.

Several states are conducting further analyses of their data, and California, Florida, Iowa, and Louisiana have used their data to prepare briefs for public health professionals on the burden of cognitive impairment in their states. Two additional briefs were developed by CDC's Healthy Aging Program to share similar messages with the general public and policy makers. See Supporting Policy Change, below, for a detailed description of the policy brief, *Decision Making, Cognitive Impairment: A Call for Action: Now!*

Reports are available at www.cdc.gov/aging/healthybrain/surveillance.htm.

Assessing Cognitive Function in the National Health and Nutrition Examination Survey

CDC's Healthy Aging Program has been working with the National Center for Health Statistics to incorporate a cognitive function component within the National Health and Nutrition Examination Survey (NHANES) for adults aged 60 and older. As a result, two questions on cognitive impairment are included in the 2011-2012 NHANES household survey to assess subjective complaints of memory and cognitive decline. In addition, three brief neuropsychological assessments of cognitive functioning are included in the mobile examination component of NHANES to measure executive function, memory, processing speed, and attention.

The addition of these cognitive components is designed to advance the goals of NHANES to estimate the national prevalence of selected diseases and risk factors and contribute to understanding the distributions of select health characteristics across populations. Additionally, their inclusion provides a unique and critical opportunity to examine prevalence, morbidities, and co-morbidities of cognitive functioning using combinations of physical, psychological, and social variables not available simultaneously from other data sources. Finally, the inclusion of these instruments facilitates linkages between measures in NHANES and the BRFSS, Patient-Reported Outcomes Measurement Information System (PROMIS), and REasons for Geographic And Racial Differences in Stroke (REGARDS).

ROAD MAP PRIORITY ACTIONS

- Include cognitive health in *Healthy People 2020,* a set of health objectives for the nation that will serve as the foundation for state and community public health plans.
- Initiate policy changes at the federal, state, and local levels to promote cognitive health by engaging public officials.

New Topic Area and Objectives Focused on Dementia in *Healthy People 2020*

When the "Proposed Healthy People 2020 Objectives" were released in the fall of 2010, Alzheimer's disease was the only leading cause of death that did not have a designated topic area. Following extensive input from the public during the comment period, CDC's Healthy Aging Program was invited to lead a workgroup to develop national objectives related to dementias, including Alzheimer's disease. CDC subsequently co-chaired this effort with the National Institute on Aging and worked with the large set of stakeholders. As a result, the Federal Interagency Workgroup supported the inclusion of the topic and a set of objectives related to Alzheimer's disease and other dementias in *Healthy People 2020.*

The goal of the new topic area, "Dementias, including Alzheimer's disease" is to "reduce the morbidity and costs associated with, and maintain or enhance the quality of life for, persons with dementia, including Alzheimer's disease." The topic area currently consists of two developmental objectives—

- To increase the proportion of persons with diagnosed Alzheimer's disease and other dementias, or their caregivers, who are aware of the diagnosis.
- To reduce the proportion of preventable hospitalizations in adults with diagnosed Alzheimer's disease and other dementias.

The first objective calls for increasing the proportion of persons with diagnosed Alzheimer's disease and other dementias, or their caregivers, who are *aware* of the diagnosis. Improved care quality and outcomes for people with dementia have been achieved when individuals are provided active medical management, information and support, and coordination of medical and community services.[11,12] However, many individuals with Alzheimer's disease or other dementias are currently undiagnosed, which seriously reduces a person's access to available treatments and valuable information. Awareness is critical to ensuring that individuals and their families are in the best position to plan for future healthcare, financial, and legal needs.

The second objective aims to reduce the number of potentially *preventable hospitalizations* for individuals living with Alzheimer's disease and other dementias. In a nationally representative sample of Medicare beneficiaries, older adults with dementia are three times more likely to have preventable hospitalizations than older adults without dementia, after adjusting for age, sex, race, and comorbidity.[13] Preventing these hospitalizations can lead to decreased healthcare costs incurred by families and the healthcare system.

CDC's Healthy Aging Program is currently leading a workgroup on "Dementias, including Alzheimer's disease" to identify and obtain relevant data from the necessary sources so that baseline measures can be established and changes tracked at regular intervals throughout the 10-year time frame. Primary data sources are likely to include the Medicare Current Beneficiary Survey, Medicare Part B claims, and other data sources from the Centers for Medicare and Medicaid Services (CMS), and the Health and Retirement Survey. In collaboration with the National Institute on Aging and other federal partners, the baseline data will be available in Spring 2012.

Briefs to Educate Decision Makers

CDC's Healthy Aging Program and the Alzheimer's Association created a brief on cognitive impairment and older adults to inform decision makers about the burden of dementia and other forms of cognitive impairment. Released in Spring 2011, *Cognitive Impairment: A Call for Action, Now!* provides information on the impact of cognitive impairment, along with "Calls to Action," state and community examples of successful efforts, and other resources.

Another publication that was part of the Healthy States project of the Council of State Governments, with support from the Alzheimer's Association and CDC, offers valuable guidance for states seeking to inform cognitive health policy. The brief opens with a remarkable case study of policy change in Missouri and provides talking points for legislators, data on prevalence and cost of Alzheimer's disease, suggested legislative actions, and additional resources.

Technical Assistance

CDC has also provided technical assistance and consultation to state and national agencies interested in modifying policies on cognitive health. A few highlights:

- Assistance to the Council of State Governments on aging-related matters, with particular emphasis on information to inform state legislators and policy makers as they craft and enact policy improvements related to older adult health, specifically brain health.
- Participation in the Megasummit event, "Alzheimer's Disease: A Megacommunity Approach to Prevention, Detection, Treatment and Care," which brought together hundreds of practitioners, researchers, and decision makers concerned with Alzheimer's disease that subsequently formed a leadership group focused on Alzheimer's disease and prevention.
- Consultation with the Alzheimer's Study Group in the creation of a national strategic plan for Alzheimer's disease on behalf of CDC, available at www.alz.org/documents/national/report_ASG_alzplan.pdf.

Excerpt from Healthy States Brief

Cognitive impairment needs to be addressed with a comprehensive and coordinated approach. The condition will continue to impose an increasing economic burden on states, families, and individuals unless action is taken now. As a legislator, you play a crucial role by exploring policy changes and initiatives that will expand research, increase support, and, ultimately, improve conditions for people living with cognitive impairment and their families. Some potential strategies include the following—

- Establish a legislative task force to study cognitive impairment in your state.
- Support the development and implementation of a state Alzheimer's disease or dementia action plan or address the needs of individuals living with cognitive impairment in existing state action plans.
- Check to see if your state is collecting information to assess cognitive impairment in your state; for example, your state includes the Impact of Cognitive Impairment module in your state's Behavioral Risk Factor Surveillance Survey, available at www.cdc. gov/brfss.
- Encourage your state health agencies to consider the needs of community-dwelling people with cognitive impairment in their policies and programs.
- Support state-level collaboration and expansion of home- and community-based services to better serve the needs of individuals with cognitive impairment.
- Encourage collaboration and pooling of resources, starting with wraparound community projects, to assist individuals living with dementia and other forms of cognitive impairment and their family caregivers.
- Support training for people in the health and human services fields.
- Seek Medicaid and Medicare waivers for demonstration projects designed to find solutions to complex conditions such as Alzheimer's disease.

Brief is available at www.healthystates.csg.org/NR/rdonlyres/265E9FFC-18C4-4757-9254-CB6AC771EA46/0/AlzheimersTPfinal.pdf.

ROAD MAP PRIORITY ACTIONS

- Determine how diverse audiences think about cognitive health and its associations with lifestyle factors.
- Disseminate the latest science to increase public understanding of cognitive health and to dispel common misconceptions.
- Help people understand the connection between risk and protective factors and cognitive health.

Understanding the Public's Perception of "Brain Health"

CDC's Healthy Aging Program funded the Healthy Aging Research Network to identify how diverse groups of older adults understand cognitive health and which health promotion and disease prevention approaches related to cognitive health the public may find most appealing. Between 2005 and 2007, researchers from the network conducted 55 focus groups with over 450 participants from nine states. The diverse audiences included older adults (some of whom were experiencing cognitive impairment); individuals caring for family or friends experiencing cognitive impairment; healthcare providers; residents of rural and urban areas; speakers of English, Spanish, Mandarin, Cantonese, and Vietnamese; and African Americans, American Indians, Asian Americans, Hispanics, and non-Hispanic whites.

Several key themes emerged.

- Race and ethnicity can influence how we define a healthy brain.
- Older adults believe that physical activity can protect cognitive health but are often less clear on the role nutrition can play.
- Media messages concerning cognitive health are rare and often conflicting.

It is anticipated that these themes and other findings will lead to the development and testing of effective public health messages to promote cognitive health in older adults, along with questions that can be used in national surveys to track their attitudes and beliefs. A special issue of *The Gerontologist,* "Promoting Cognitive Health in Diverse Populations of Older Adults," was published in 2009 to share the results of this formative research. A fact sheet describes the major findings from the focus groups for the general public.

Fact sheet is available at www.cdc.gov/aging/pdf/Perceptions_of_Cog_Hlth_factsheet.pdf.

Using National Social Marketing Surveys

The Styles Project is a collaborative effort between the CDC Healthy Aging Program and the CDC Healthy Aging Research Network's Healthy Brain Interest Group, and focuses on assessing the general population and healthcare providers' attitudes and practices with respect to cognitive health. Information obtained through this project will inform the development of communication messages related to cognitive health, and assist with determining the most appropriate dissemination methods for future health promotion campaigns. Two surveys, HealthStyles and DocStyles, which are proprietary databases of Porter Novelli and licensed by the CDC for analysis in health communication planning, are used to assess the attitudes and practices of the general public and healthcare providers.

General Population's Beliefs and Self-Reported Behaviors

The HealthStyles survey is one of a pair of linked postal mail surveys sent to a sample of adults aged 18 years and older. It is drawn to be nationally representative of seven U.S. Census Bureau demographic characteristics. The first survey is a consumer survey about general media habits, product use, interests, and lifestyles. The second survey, HealthStyles, is linked to the consumer survey and focuses on health orientations and practices.

Cognitive health-related questions were added to the 2009 and 2010 HealthStyles survey to better understand public beliefs about cognitive health and how individuals obtain information about this topic. Findings from the HealthStyles surveys suggest an opportunity for cognitive health promotion. The most recent 2010 HealthStyles data, derived from a stratified random sample of 4,183 U.S. adults, show that 70 percent of respondents expressed concern about memory loss and 20 percent feared becoming cognitively impaired. Furthermore, findings revealed that Americans believe health behaviors can influence cognitive health. Participants most commonly perceived the following activities to be associated with maintaining cognitive health: mental stimulation (81%), physical activity (80%), healthy diets (75%), social involvement (62%), vitamins (60%), healthy weight (53%), and avoiding smoking (43%). Participants reported their main sources of information for learning about maintaining cognitive health were television (46%), magazines (42%), family and friends (36%), newspapers (33%), Internet (30%), healthcare providers (28%), and radio (19%).[14]

Healthcare Providers' Beliefs and Self-Reported Practices

The public is increasingly inundated with information about how they can reduce their risk of developing cognitive impairment and are turning in part to physicians for advice. Little is known, however, about physicians' perceptions and practices for reducing patient risk of cognitive impairment. To learn more about this issue, CDC's Healthy Aging Program and the Healthy Aging Research Network included questions in Porter Novelli's 2008 and 2009 DocStyles surveys. This is a Web-based survey with a main sample of primary care physicians and additional samples of other specialties. Findings from these surveys revealed that primary care physicians report discussing cognitive health-related concerns with patients who do not have dementia, and advise them to reduce risk through behavioral interventions.

Published in the March 2011 issue of the *Journal of Applied Gerontology*,[15] data from the 2008 DocStyles survey of physicians (n=972) show that approximately 40 percent of respondents reported discussions with their patients about reducing risk of cognitive impairment. Physicians reported they most frequently sought out information about new evidence and practice guidelines about cognitive impairment through professional journals (42%), online or in-person continuing medical education (17.4%), and professional websites or listservs (16.5%).

In 2009, an additional question was added to the DocStyles survey to measure physicians' perceptions about early diagnosis of cognitive impairment. Of the 1,000 respondents, 71 percent agreed that early diagnosis of cognitive impairment gives patients and families opportunities for treatment and planning. Such information sheds light on

physicians' perceptions and practices and can be used to inform development of and access to educational materials for physicians seeking to address patient concerns related to reducing cognitive impairment or dementia risk.

Sharing Knowledge

CDC's Healthy Aging Program continued to expand communication strategies that focus on cognitive health, Alzheimer's disease, and other dementias by:

- Providing links on its website (www.cdc.gov/aging) to the Alzheimer's Association and disseminating information through its "Public Health and Aging Listserv."
- Working with CDC's Science Ambassador Program to partner with middle and high school science teachers to develop public health-related lesson plans.
- Responding to public inquiries from individuals and media regarding cognitive health.
- Publishing peer-reviewed articles related to cognition, emotional health, and caregiving.

In addition, over the past five years, CDC staff and associated members of the Healthy Brain Initiative have made more than 70 formal presentations. These presentations and symposia have been given at 25 local, national, and international meetings.

Targeted audiences have included public health professionals, aging services professionals, decision makers, and the general public. As one example, the Director of CDC's Healthy Aging Program delivered an invited presentation to the Council of State Governments on CDC's progress in the area of cognition at their 75th Anniversary Celebration–Spring Conference on May 29–30, 2008, in Lexington, Kentucky. The presentation highlighted the new optional BRFSS module on the perceived impact of cognitive impairment and the key role of states in acquiring state-level data to tackle the projected impact of cognitive function on their constituents, services, and resources.

Increasing Awareness Among African Americans: A Community-Based Demonstration

CDC's Healthy Aging Program supported the Alzheimer's Association in developing and evaluating the nation's first community level, culturally-relevant demonstration project designed to increase awareness of cognitive health, increase intentions to engage in physical activity, and promote prevention and management of vascular risks among African American baby boomers. In partnership with the Alzheimer's Associations, ICF Macro conducted an evaluation of the demonstration projects in Atlanta and Los Angeles. A key finding was that strategic partners—such as organizations supporting prevention of cardiovascular disease and the community members who volunteered to serve as "Healthy Brain Champions"—reported strong commitment to the project, a great sense of accomplishment in their role, and the intent to be strong advocates of brain health in their communities and remain as active partners. The final report is available from the Alzheimer's Association.

ROAD MAP PRIORITY ACTIONS

- Conduct systematic literature reviews on proposed risk factors (vascular risk and physical inactivity) and related interventions for relationships with cognitive health, harms, gaps and effectiveness.
- Conduct research on other areas potentially affecting cognitive health such as nutrition, mental activity, and social engagement.

Understanding the Impact of Cognitive Impairment on Co-Occurring Chronic Conditions

Investigators at the University of Washington, in partnership with representatives from the Healthy Aging Research Network, received funding from CDC's Healthy Aging Program for a 3-year project (2011 to 2013): *Examining the Impact of Cognitive Impairment on Co-Occurring Chronic Conditions and Geriatric Syndromes.* The study's intent is to gather information and resources that can assist public health practitioners at national, state, and local levels to articulate the impact of cognitive impairment on public health strategies and policies, in particular the design and delivery of evidence-based health promotion and chronic disease self-management programs. It is designed to examine the effects of multiple chronic conditions (dementia plus other chronic illness or geriatric syndromes) on various health outcomes such as functioning, quality of life, and mortality and consists of three interrelated phases.

Phase 1: A comprehensive review of the published literature on multiple chronic conditions, guided by a panel of subject matter experts, to describe the state of the science as well as point to critical gaps where additional research is needed.

Phase 2: An inventory of public and private databases that include a large sample of adults aged 50 years and older along with data on multiple chronic conditions including measures of dementia. This inventory will be used to identify data sources that can be accessed by researchers concerned with filling in the identified research gaps.

Phase 3: Exploration of one or more important research gaps identified in the prior phrases.

Each phase will produce important findings that will be disseminated to the public health community through a variety of methods. The study is one of many efforts to implement the Department of Health and Human Services' new *Strategic Framework on Multiple Chronic Conditions*—an innovative private-public sector collaboration to coordinate responses to a growing public health challenge (www.hhs.gov/ash/initiatives/mcc). The new strategic framework is designed to reduce the risks of complications and improve the overall health status of individuals with multiple chronic conditions by fostering change within the system; providing more information and better tools to help healthcare professionals—as well as consumers—learn how to better coordinate and manage care; and facilitating research to improve oversight and care.

Assessing the State-of-Science of Physical Activity Interventions and Cognitive Health Outcomes

CDC's Healthy Aging Program funded a systematic literature review on community-based physical activity interventions designed to promote cognitive health. Guided by an expert panel, project investigators developed an organizing model and analytic framework to guide the review. Subsequently, they performed a systematic review to identify physical activity interventions related to cognitive health, focusing on physical activity interventions most relevant to the public health community.

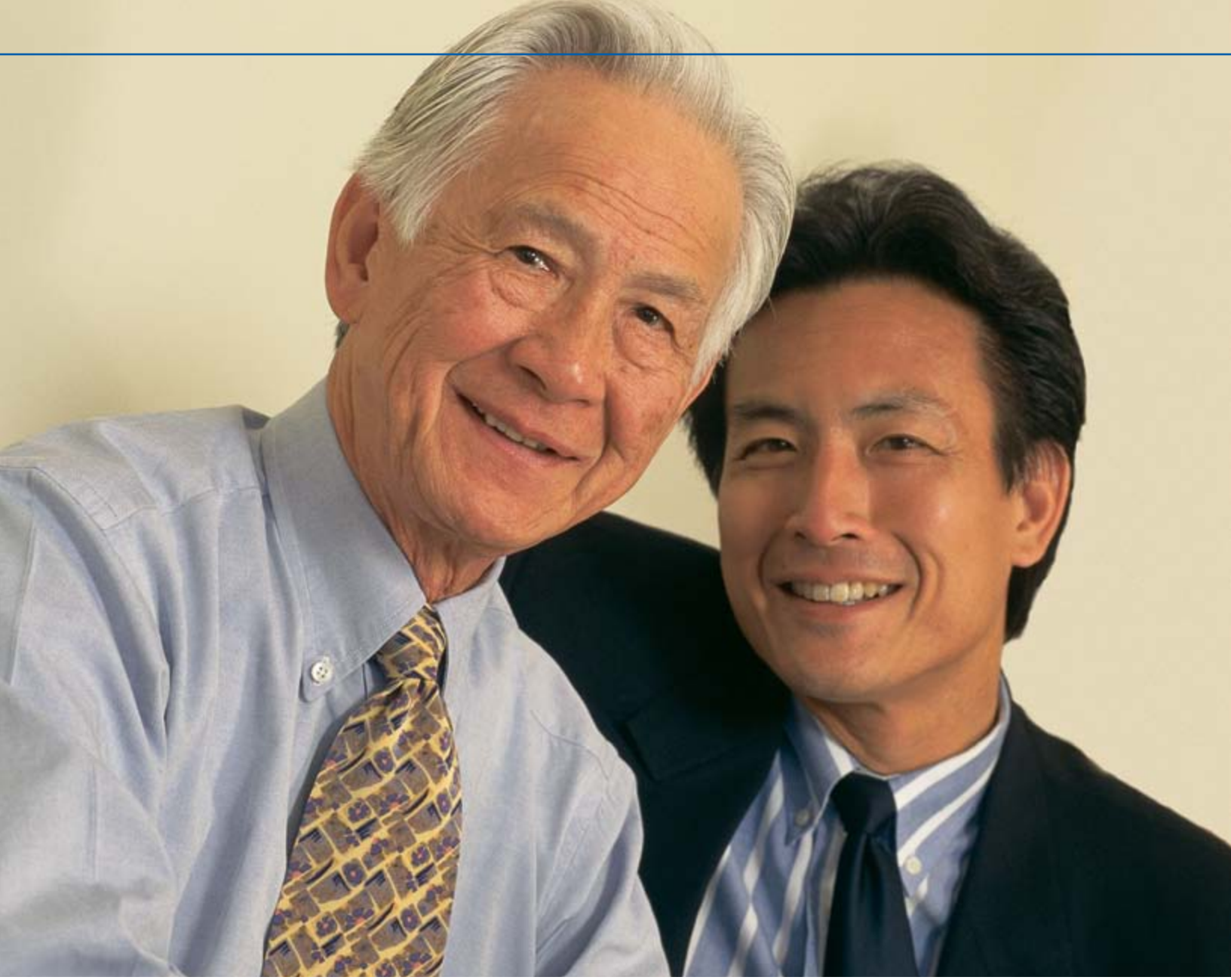
Six scientific databases and reference lists of previous reviews were searched; thirty studies were eligible for inclusion. Articles were grouped into intervention–outcome pairings, with interventions grouped as cardiorespiratory, strength, and multi-component exercises. Cognitive outcomes were general cognition, executive function, memory, reaction time, attention, cognitive processing, visuospatial, and language.

An 8-member multidisciplinary panel rated the quality and effectiveness of each pairing, examined the robustness of the evidence, and considered whether it was sufficient to support public health interventions regarding exercise for preserving or improving cognition in older adults. Of the 30 studies reviewed, some had positive outcomes for certain exercise types and cognitive domains, but many found no significant benefits. The panel concluded that the available data from these intervention studies were insufficient for determining whether physical activity or exercise interventions improve cognition in older adults. It outlined that future research should report exercise adherence, use longer study durations, and determine the clinical relevance of measures used. The methodology and findings of the review were recently published, *Effect of Exercise on Cognitive Performance in Community-Dwelling Older Adults: Review of Intervention Trials for Public Health Practice and Research.*[16]

Disseminating Results

CDC collaborated with the Alzheimer's Association on a publication, *Cognitive Health: An Emerging Public Health Issue,* which describes the demographic and historical imperatives compelling the nation to attend to the issue of cognitive health. The article appeared in a special issue of *Alzheimer's & Dementia: The Journal of the Alzheimer's Association.*

This article was one of the first of many submitted and accepted by peer-reviewed journals. A full listing of Healthy Brain Initiative publications can be found in Appendix B.



Related Accomplishments

The developers of the Road Map recognized the increasing burden of cognitive impairment on family caregivers. Additionally, as stated in the NIH Cognitive and Emotional Health Project, "consideration of emotional health separate from cognitive health is impossible as emotion is always involved in cognitive processes." Thus, it is also critical and timely to focus public health effort on emotional health and identify factors that can help adults maintain or enhance both their cognitive and emotional health as they age. This section highlights some of the related work in CDC's Healthy Aging Program.

Learning More About Caregivers: BRFSS

Nearly 15 million Americans currently provide unpaid care for a person with Alzheimer's disease or another dementia. Although national population-based surveys describe some important characteristics of these caregivers, they do not address their health status nor provide state and community level data. To address this gap, one caregiver question was added to the core BRFSS questionnaire in 2009:

> *People may provide regular care or assistance to a friend or family member who has a health problem, long-term illness, or disability. During the past month, did you provide any such care or assistance to a friend or family member?*

In addition, CDC's Disabilities and Health Branch, CDC's Healthy Aging Program, and investigators at the University of Florida developed an optional caregiver module for the BRFSS to obtain state and local data on the prevalence of caregiving as well as the life span health effects of caregiving. This 10-question "Caregiver Module" was piloted during the 2005 BRFSS administered in North Carolina (CDC, 2007). With minor revisions, the module was subsequently used in 2009 by Illinois, Louisiana, New York, Ohio, and Washington DC and in 2010 by Connecticut, New Hampshire, New York, North Carolina, Tennessee, and Virginia.

This optional module enables states to determine who is a caregiver; the relationship between the caregiver and the care recipient; the average hours of caregiving per week; the most difficult problem facing the caregiver; the age and gender of the care recipient; the types of assistance needed by the care recipient; the major health problem, long-term illness, or disability of the care recipient; the duration of caregiving; and whether the care recipient has had more difficulty with thinking or remembering in the past year. Increasingly, state and federal agencies, as well as private organizations, are concerned about caregiving and can employ this module to design programs and interventions.

Improving Caregivers' Health and Quality of Life

CDC's Healthy Aging Program released *Assuring Healthy Caregivers, A Public Health Approach to Translating Research into Practice: The RE-AIM Framework,* to respond to challenges in translating science-based caregiver interventions into "real world" settings. This document helps practitioners and researchers plan, conduct, and evaluate intervention programs and policies that promote the health and well-being of caregivers. It also illustrates the benefits of applying the RE-AIM framework (Reach, Effectiveness, Adoption, Implementation, and Maintenance) to caregiver intervention programs, using Alabama's REACH II (Resources for Enhancing Caregiver Health) Caregiver Demonstration Project as an example.

CDC's Healthy Aging Program, in collaboration with the University of Michigan and the National Association of Chronic Disease Directors, developed an Action Guide focused on caregiving interventions. The *REACH OUT Action Guide: Implementing a Community-Based Program for Dementia Caregivers* is designed to assist community and state agencies in implementing evidence-based programs for improving health and quality of life for persons caring for older adults with dementia.

Emotional Health

Addressing Depression in Late Life

As indicated in the NIH Cognitive and Emotional Health Project, "consideration of emotional health separate from cognitive health is impossible as emotion is always involved in cognitive processes."[8] Thus, it is also critical and timely to focus public health effort on emotional health and identify factors that can help adults maintain or enhance both their cognitive and emotional health as they age. The work of CDC's Healthy Aging Program in this related area is described briefly below.

CDC's Healthy Aging Program funded a Special Interest Project through a cooperative agreement with investigators from the University of Washington's Prevention Research Center (PRC), which is part of the Healthy Aging Research Network. Guided by an expert panel, project investigators performed a systematic review to identify interventions and screening instruments for depression that are particularly suitable for dissemination to older adults through the public health and aging services networks.[17] A second expert panel examined the findings of this literature review to identify interventions that are ready for translation to older adults in the community.[18,19]

The findings on a subset of interventions from the systematic review were presented to the Task Force on Community Preventive Services. Based on the findings, the Task Force will issue three new recommendations concerning mental health and older adults in *The Guide to Community Preventive Services.* These recommendations will become part of the Task Force's larger set of population-based interventions to promote health and prevent disease, injury, disability, and premature death, appropriate for use by communities and healthcare systems.

Educating Public Health, Aging, and Mental Health Professionals

CDC's Healthy Aging Program provided guidance and support to the Healthy Aging Research Network to plan and conduct a dynamic 2-day symposium designed to equip public health, aging services, and mental health professionals with effective strategies for depression screening and treatment for older adults. Held at the Carter Center in Atlanta, the symposium was conducted in collaboration with the Rosalynn Carter Georgia Mental Health Forum. Former First Lady Rosalynn Carter attended and spoke at the symposium, strongly voicing her appreciation and support for CDC's efforts in the area of mental health. Over 175 professionals from community agencies across the country heard national experts in research, clinical practice, and program development and implementation present the latest scientific evidence related to depression screening and management, and describe effective strategies and programs to reach community-based older adults at higher risk for depression.[20]

Assessing What is Known About Community-Based Interventions Related to Emotional Health in Late Life

CDC's Healthy Aging Program, working in collaboration with the National Association of Chronic Disease Directors, supported the University of Washington's Prevention Research Center to design and conduct a review of the literature on community-based interventions designed to address emotional health in older adults. Guided by an expert panel, project investigators developed an analytic framework to guide the review. The abstraction process is complete and evidence tables are being developed. This work is expected to enrich the prior systematic review of interventions to address depression in older adults. Results will be shared through various publications.

Increasing Knowledge About Public Health's Role in Mental Health: State of Mental Health and Aging in America Interactive Web Site

To meet the needs of public health and aging services professionals, policy makers, journalists, and others, CDC's Healthy Aging Program has developed *The State of Mental Health and Aging in America, Issue Brief #1: What Do the Data Tell Us?* This brief features current state and national data on mental health among older adults from the 2006 BRFSS.[21]

In recognition of the essential role mental health plays in overall health, CDC's Healthy Aging Program released a second issue brief focused on the mental health of older adults in the United States, *Issue Brief #2: Addressing Depression in Older Adults: Selected Evidence-based Programs.* This brief features a discussion of depression as a public health issue and presents three evidence-based programs that communities can use to address depression in older adults.[22]

Supplementing these issue briefs is an interactive Web site that provides current data on six key indicators related to the mental health of adults aged 50 years and older from BRFSS. This project was funded in part through an award to CDC's Healthy Aging Program with support from the Behavioral Surveillance Branch of CDC's Division of Adult and Community Health.

Next Steps

Over the next five years, depending on the type and levels of funding, the Healthy Brain Initiative will build on the accomplishments described in this report and continue to focus on the Road Map (2007) priorities and interim outcomes related to chronic disease prevention and health promotion. The Healthy Brain Initiative also remains committed to working with key national, state, and local partners such as the Healthy Aging Research Network, Alzheimer's Association, and National Institute on Aging among others. As the state of the science is strengthened and the implementation of the NAPA unfolds, CDC's Healthy Aging Program remains committed to a firm grounding in science, an emphasis on primary prevention, a population approach, and the elimination of disparities. As such, updating the Road Map may become necessary to reflect the evolving scientific evidence and policy implications associated with cognitive health.

Contingent on funding and CDC priorities, future activities would include the following:

Surveillance

- Promote the inclusion of the BRFSS Cognitive Impairment Module in states and territories and work with states to prepare data, design on-line tools to facilitate access to state level data, and disseminate findings.
- Continue to support the cognitive impairment component of NHANES, including data analyses and dissemination of findings as they become available.

Policy

- Establish baseline data for tracking and monitoring the national Healthy People 2020 objectives regarding "Dementias, including Alzheimer's disease."
- Create policy briefs and provide information to decision makers about the CDC Healthy Brain Initiative findings and their implications.

Communication

- Disseminate the latest science to increase public understanding of cognitive health and help people understand the connection between risk and protective factors and cognitive health.
- Work with partners to enhance education of healthcare providers, policy makers, and the general public.
- Work to create and test appropriate messages across multiple chronic conditions.

Applied Prevention Research

- Identify gaps in research on co-occurring chronic diseases and dementia and support research that fills them.
- Identify opportunities to fill knowledge gaps concerning public health and aging services informational needs through applied research.
- Continue to disseminate results to relevant audiences through appropriate scientific peer-reviewed journals and presentations.

The ultimate aim of CDC's Healthy Aging Program through its Healthy Brain Initiative is to better understand the public health burden of cognitive impairment through surveillance, to build a strong evidence base for policy, communication, and programmatic interventions for improving cognitive health—and then to translate that foundation into effective public health practice in states and communities.

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The Alzheimer's Association, dedicated to eliminate Alzheimer's disease through advancement of research; provide and enhance care and support for all affected; and reduce the risk of dementia through the promotion of brain health.

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Disclaimer: The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.

Appendix A

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Appendix B

Healthy Brain Initiative Publications

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