

# Addressing Dementia Risk Through Social Determinants of Health:

*A Center of Excellence Workshop*



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DEMENTIA RISK  
REDUCTION

**July 29, 2022**

**Alzheimer's Association  
International Conference®**

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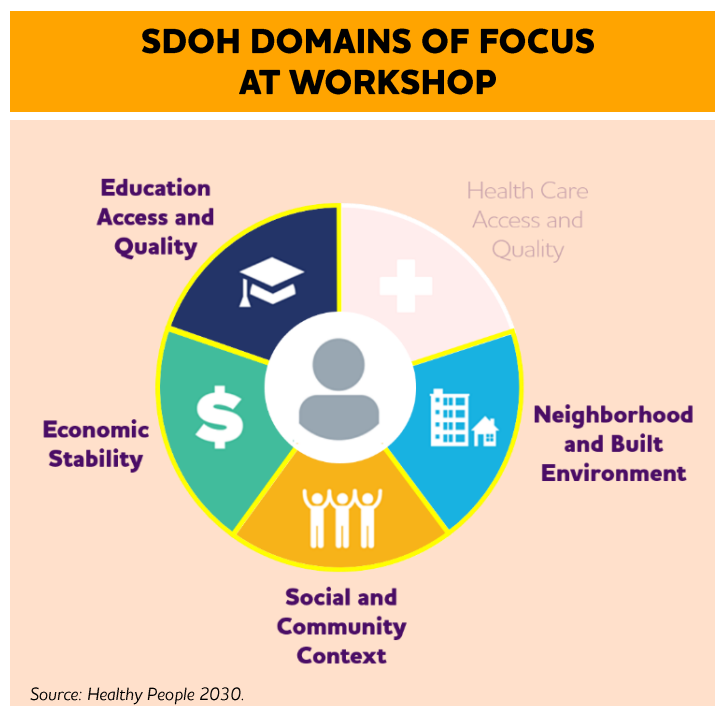
# ADDRESSING DEMENTIA RISK THROUGH SOCIAL DETERMINANTS OF HEALTH

On July 29, 2022, at the Alzheimer’s Association International Conference® (AAIC) in San Diego, the Public Health Center of Excellence on Dementia Risk Reduction, which is funded by the Centers for Disease Control and Prevention, held a workshop to discuss the social determinants of health (SDOH)—aspects of the environment in which individuals are born, grow up, go to school, work, and live—that may increase risk for dementia or that may act as barriers to addressing modifiable risk factors for dementia.

Prior to the workshop, Wake Forest School of Medicine led a review of the scientific evidence regarding SDOH and dementia risk, which formed the basis of the workshop’s scientific presentations around four of the five SDOH domains: neighborhood and built environment; social and community context; economic stability; and education access and quality.

Following the evidentiary presentations, dementia researchers, public health academics, public health practitioners, and other workshop attendees engaged in a dialogue about the implications of the science, public health’s role in addressing SDOH, and how public health might best act to address the issue.

This report summarizes the proceedings of the workshop.



## Acknowledgements

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Social determinants of health (SDOH) have a unique and significant role in influencing health and health care outcomes for a variety of health conditions, including many conditions (such as hypertension and obesity) that may be risk factors for dementia. And, while the body of research is less robust, emerging evidence indicates that a variety of SDOH may be directly associated with a higher or lower risk for dementia.

## Built and Natural Environments

A growing area of research in health care outcomes focuses on the built and natural environment, or how human behavior interacts with the environment to produce positive or negative outcomes. Features of the built environment at the community level include population density, green spaces (or a lack thereof), public resources such as community centers and parks, educational opportunities, food and nutrition options, transportation options, pollutants, and community cohesion.

Evidence indicates those who live in medium to high population density communities perform significantly better on cognitive measures than those residing in rural areas.<sup>1,2</sup> These differences have been attributed to differences in educational attainment, prevalence of chronic conditions, access to health insurance, and household income. Additionally, those living in neighborhoods with access to recreational centers, walking paths, parks, and similar resources have higher overall cognitive functioning,<sup>3</sup> and increasing residential greenspace has been associated with greater overall cognitive function.<sup>4</sup> The perceived quality of one's neighborhood also contributes to cognitive health. One study indicates that increased physical disorder of a neighborhood and decreased neighborhood social cohesion is associated with poorer cognitive functioning in later life.<sup>5</sup> Another study showed that adults who live in more violent areas but report more neighborhood social cohesion had higher cognitive performance.<sup>6</sup>

Outdoor air pollution may be an important contributor to long-term cognitive health. A systematic review found a robust association between cognitive decline and particulate matter 2.5.<sup>7</sup> More research is needed with respect to exposure to nitrous oxide, particulate matter 10, ozone, and noise pollution. Indoor air pollution has been linked to about 4 million deaths worldwide, but the understanding of its relationship to dementia remains understudied.

## Economics

Increasing evidence shows that economic disadvantage may be linked to cognitive decline and dementia. A longitudinal study in England showed a 68% increase in incidence of dementia among those with the

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<sup>1</sup> Cassarino M, O'Sullivan V, Kenny RA, et al. Disabilities moderate the association between neighbourhood urbanity and cognitive health: Results from the Irish longitudinal study on ageing. *Disabil Health J* 2018;11(3):359-366.

<sup>2</sup> Worn J, Ellwardt L, Aartsen M, et al. Cognitive functioning among Dutch older adults: Do neighborhood socioeconomic status and urbanity matter? *Soc Sci Med* 2017;187:29-38.

<sup>3</sup> Katayama O, Lee S, Makino K, et al. The association between neighborhood amenities and cognitive function: Role of lifestyle activities. *J Clin Med* 2020;9(7):2109.

<sup>4</sup> Jimenez MP, Elliott EG, DeVille NV, et al. Residential green space and cognitive function in a large cohort of middle-aged women. *JAMA Netw Open* 2022;5(4):e229306.

<sup>5</sup> Zaheed AB, Sharifian N, Kraal AZ, et al. Unique effects of perceived neighborhood physical disorder and social cohesion on episodic memory and semantic fluency. *Arch Clin Neuropsychol* 2019;34(8):1346-1355.

<sup>6</sup> Lee H, Waite LJ. Cognition in context: The role of objective and subjective measures of neighborhood and household in cognitive functioning in later life. *Gerontologist* 2018;58(1):159-169.

<sup>7</sup> Weuve J, Bennett EE, Ranker L, et al. Exposure to air pollution in relation to risk of dementia and related outcomes: An updated systematic review of the epidemiological literature. *Environ Health Perspect* 2021;129(9):96001.

lowest wealth, independent of education and other factors.<sup>8</sup> A longitudinal study from China showed a 34% increase in incidence of cognitive impairment among those in the lowest wealth bracket.<sup>9</sup>

The impact on dementia risk may extend beyond individual economic disadvantage to the economic status of the neighborhood in which an individual lives. A study in New York City found that, after controlling for family-level socioeconomic status, children living in more disadvantaged neighborhoods—based on factors such as income, education, employment, and housing—had markedly different brain structures, even as young as the age of two.<sup>10</sup> Similarly, a 10-year longitudinal study found that individuals living in the most disadvantaged neighborhoods had an acceleration in cortical thinning and more cognitive decline.<sup>11</sup>

## Education

Investment in a quality education has a significant impact on all facets of life and is also a key protective factor for cognitive decline and dementia. For example, a study from the United Kingdom showed that people who were born after policy changes mandating childhood education had less memory decline as they aged compared with those who were born before such changes.<sup>12</sup> Similarly, in the United States, compared with people born before 1920, those born after 1920—who had more exposure and access to education—had less memory decline as they aged.<sup>13</sup>

However, evidence has also shown that years of education may not have the same impact on risk for developing dementia across all populations. For example, White Americans see greater benefits to indicators of brain integrity with more years of formal education than Black and Hispanic Americans.<sup>14</sup> Thus, a key factor may be not just years of formal education but the quality of education an individual receives. A large cohort study found that those who attended higher quality high schools, particularly schools with a higher number of teachers with graduate

## THE LIVED-EXPERIENCE VOICE

"I'm 48 years old, and last year I was diagnosed with mild cognitive impairment. I know this disease can destroy careers and relationships—and every day it robs me more and more of my memories. But I stand here today to tell you that this disease does not define me. It does not define who I am. I'm living my best life with MCI and using every opportunity to share my story as a way of fighting back . . .

"I'm so fortunate for my wife and my care partner, Kori. . . She researched brain exercises, changed our diet to a new brain-healthy Mediterranean diet. She set up safe zones in my home for me to retreat to with brain activity exercises, like coloring and word finds and puzzles. I joined a neuro boxing class for individuals who are living with Parkinson's and other neurodegenerative diseases. We also started a new exercise routine, and now we're up to three miles several times a week.

"But it's important to remember that not everyone has a Kori. Not everyone lives in a safe and a beautiful place where they can walk and exercise. For those who don't have that access or the knowledge or the support, we need to find a way for them to not fall through the cracks and for them to live their best life in their communities."

*Tony Gonzales  
Alzheimer's Association Early Stage Advisor*

<sup>8</sup> Cadar D, Lassale C, Davies H, et al. Individual and area-based socioeconomic factors associated with dementia incidence in England: Evidence from a 12-year follow-up in the English Longitudinal Study of Ageing. *JAMA Psychiatry* 2018;75(7):723-732.

<sup>9</sup> Chen L, Cao Q. Poverty increases the risk of incident cognitive impairment among older adults: A longitudinal study in China. *Aging Ment Health* 2020;24(11):1822-1827.

<sup>10</sup> Ramphal B, DeSerisy M, Pagliaccio D, et al. Associations between amygdala-prefrontal functional connectivity and age depend on neighborhood socioeconomic status. *Cereb Cortex Commun* 2020;1(1):tgaa033.

<sup>11</sup> Hunt JFV, Vogt NM, Jonaitis EM, et al. Association of neighborhood context, cognitive decline, and cortical change in an unimpaired cohort. *Neurology* 2021;96(20):e2500-e2512.

<sup>12</sup> Banks J, Mazzone. The effect of education on old age cognitive abilities: Evidence from a regression discontinuity design. *Econ J* 2012;122(560):418-448.

<sup>13</sup> Vonk MJ, Arce Renteria M, Avila JF, et al. Secular trends in cognitive trajectories of diverse older adults. *Alzheimers Dement* 2019;15(12):1576-1587.

<sup>14</sup> Avila JF, Arce Renteria M, Jones RN, et al. Education differentially contributes to cognitive reserve across racial/ethnic groups. *Alzheimers Dement* 2021;17(1):70-80.

training, had greater cognitive abilities nearly six decades later.<sup>15</sup> The study found that Black students disproportionately attended lower-quality schools.

Literacy, an indicator of education, is also associated with later life cognition. Among older adults in a longitudinal study who had fewer than five years of formal schooling, those who were illiterate were significantly more likely to have dementia and develop dementia than those who were literate.<sup>16</sup>

## **Racial Disparities/Discrimination**

Black and Hispanic Americans are more likely develop Alzheimer's disease than White Americans. By 2030, 40% of Alzheimer's cases are projected to be among Black and Hispanic Americans. Racism and discrimination drive these disparities. Racism assigns differing value to individuals within a population, which in turn structures the environment in which people live and the opportunities available to individuals. This structural racism is multidimensional, manifests itself in a variety of ways, and is experienced across the lifespan.

In a study examining the relationship between residential segregation, later-life cognition, and the incidence of dementia in New York City, researchers found that dementia incidence was higher and cognitive function was lower in segregated neighborhoods compared with diverse neighborhoods.<sup>17</sup> A detailed analysis of the study data revealed that this relationship was primarily driven by Blacks living in segregated Black communities; there was not a statistically significant difference among Hispanics, who have faced less historical and structural racism in the United States. Another study found that executive function and semantic memory are lower among Black individuals who attended segregated schools compared with Black individuals who attended integrated schools.<sup>18</sup>

In addition to the direct links to dementia risk, racism and discrimination have been shown to be drivers of numerous other health conditions that are risk factors for cognitive decline and dementia.

## **Social Engagement**

Social engagement is defined as meaningful and sustained contact with at least one other person that is intrinsically beneficial to the self and/or others and pertains to a common interest, activity, or goal. It has long been viewed as an integral part of overall health and well-being in general and of healthy aging in particular. Evidence indicates that social engagement may also be a factor in cognitive decline and dementia.

One study showed that for individuals in later life, those with no or almost no social ties (the most socially isolated 11 percent of the study) had a significantly increased risk of dementia compared with the 30 percent of the study population who had robust social connections.<sup>19</sup> Another study looking at social

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<sup>15</sup> Seblova D, Eng C, Avila-Rieger JF, et al. High school quality is associated with cognition 58 years later. *Alzheimers Dement* 2023;15(2):e12424.

<sup>16</sup> Arce Renteria M, Vonk JMJ, Felix G, et al. Illiteracy, dementia risk, and cognitive trajectories among older adults with low education. *Neurology* 2019;93(24):e2247-e2256.

<sup>17</sup> Pohl DJ, Seblova D, Avila JF, et al. Relationship between residential segregation, later-life cognition, and incident dementia across race/ethnicity. *Int J Environ Res Public Health* 2021;18(21):11233.

<sup>18</sup> Peterson RL, George KM, Barnes LL, et al. Association of timing of school desegregation in the United States with late-life cognition in the Study of Healthy Aging in African Americans (STAR) cohort. *JAMA Netw Open* 2021;4(10):e2129052.

<sup>19</sup> Saczynski JS, Pfeifer LA, Masaki K, et al. The effect of social engagement on incident dementia: The Honolulu-Asia Aging Study. *Am J Epidemiol* 2006;163(5):433-440.

engagement and cognitive decline over time showed as much as a 70% reduction in the rate of cognitive decline in people who were frequently socially active compared with those who were infrequently socially active.<sup>20</sup>

Despite some compelling evidence from cross-sectional and longitudinal studies, more research is needed. Social engagement is interrelated with other modifiable factors of cognitive impairment, especially cognitive engagement and physical activity. The degree of interconnectedness between these three factors is not well understood, making it difficult to disentangle the independent effects of social engagement on cognitive functioning. There is also a lack of social engagement research inclusive of diverse populations.

## **Cardiovascular Health**

There are significant racial and ethnic disparities in the prevalence of cardiovascular health conditions and in mortality rates from cardiovascular disease and stroke. Because cardiovascular disease and the risk factors for cardiovascular disease are intertwined with modifiable risk factors for cognitive decline and dementia, it is also important to consider the SDOH that drive cardiovascular risk.

According to a scientific statement from the American Heart Association,<sup>21</sup> the key SDOH that drive risk of cardiovascular disease and cardiovascular health outcomes include socioeconomic status, racism, level of social support, culture and language, access to health care, access to quality education, and residential environment. In addressing these issues, experience indicates that a short-term, intermediate-term, and long-term approach is necessary and that solutions should be compelling to, and fully engage, the relevant populations.

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<sup>20</sup> James BD, Wilson RS, Barnes LL, et al. Late-life social activity and cognitive decline in old age. *J Int Neuropsychol Soc* 2011;17(6):998-1005.

<sup>21</sup> Havranek EP, Mujahid MS, Barr DA, et al. Social determinants of risk and outcomes for cardiovascular disease: A scientific statement from the American Heart Association. *Circulation* 2015;132(9):873-898.



## Observations for Public Health

Based on the state of the science on SDOH related to dementia risk, presenters made several recommendations on how these factors might be addressed.

- Environmental risk factors can be addressed in numerous ways, including:
  - Investing in more trees and plants;
  - Advocating for environmentally-friendly policies;
  - Investing in renewable energy sources;
  - Prioritizing access to quality early childhood education.
- Payment policies can help compensate for the added burden of SDOH. For example, the Centers for Medicare & Medicaid Services—the federal agency overseeing the Medicare program—recently developed an innovative payment model that prioritizes health equity and serving the most underserved communities.
- Racism must be accounted for as a key determinant of health and must be addressed as a public health priority.
- Equalizing educational opportunities should be a focus of attention, but it requires some re-thinking. Most public schools remain primarily funded by local property taxes, which means the quality of the years of education received are likely linked to local socioeconomic conditions. And while state funding or other programs look to diminish these disparities, they may be tied to expectations that under-performing schools implement programs that were successful in entirely different contexts.

Following the scientific presentations, workshop participants had the opportunity to engage in a dialogue about the implications of the science, issues that needed to be addressed with respect to dementia-related SDOH, and the role of public health. The central overarching theme of the conversation was the appropriate way to engage racial and ethnic minorities in research and public health practice.

There were several calls to expand research into sub-populations within larger racial and ethnic groups (e.g. Mexicans within the larger group of Hispanics), given some evidence that certain conditions may have different impacts on the risk for developing dementia among certain sub-populations. The lack of minority populations in research—and the historic mistreatment of minorities—has led to a mistrust of researchers, public health, and the health care system. Participants agreed that a concerted effort must be undertaken to proactively reach out to historically underrepresented communities and establish authentic, sustaining relationships. In addition, participants noted that individuals enrolled in research should be informed afterwards of how their involvement led to action or new conclusions. This will encourage future or continued enrollment and can begin to undo mistrust of the medical research community.

Several potential causes were cited as leading to disparities in research opportunities and in those receiving funding. There is concern that those involved in reviewing grant applications and deciding funding allocations are themselves not a diverse group, but instead overwhelmingly White. This is likely to lead to less diverse applications being accepted due to a lack of understanding of certain contexts that may be critical to the research or grant application itself. Similar concerns were raised about funding repeatedly going to the same institutions, leading to a closed loop network that does not add new viewpoints.

The lack of diversity in research makes it more difficult for public health to implement relevant interventions and culturally-appropriate messaging to diverse communities. Barriers to public health funding compound the problem. Participants noted that improvement was needed in the dissemination of grant opportunities, particularly for local and tribal public health agencies. These public health actors are closest to the communities for which action is needed but least likely to have existing infrastructure to devote resources to applying, or even being aware of opportunities, for funding.

Race and ethnicity were also the centerpiece of a conversation about how public health should engage in policy conversations. Evidence indicates that certain SDOH have long-term and significant roles in determining health care outcomes. Public health cannot address health outcomes without addressing these SDOH factors. But, public health cannot act alone. Collaborations with other sectors, such as housing and education, are critical. However, even this may not be enough. Pervasive racism and discrimination are underlying causes of many SDOH and continue to influence policy across all sectors and at all levels of government. While public health cannot be expected to end all forms of discrimination alone, public health cannot, on the other hand, ignore that racism and discrimination are the cause of disparate health care outcomes. Participants concluded that public health has a role in ensuring policymakers are aware of these connections and that health outcomes related to cognitive decline and dementia are affected by them.

In taking any action, participants agreed that public health should actively seek out the input from the populations it wishes to serve. When it does not, the effects of well-intentioned initiatives are minimized. This means not only bringing a diverse group of sectors to the table—such as housing, transportation, and education authorities—but also representatives from each prioritized population. For many reasons, certain populations may be hesitant to work with public health or any governmental body. Proactive engagement and partnership with community-based organizations, religious groups, or other channels serving as initial intermediaries and/or long-term partners may help alleviate these concerns and induce greater engagement.