In 2006 the Centers for Disease Control and Prevention issued its *Healthy Brain Initiative*, a multifaceted approach to promoting cognitive health (http://www.cdc.gov/aging/healthybrain/index.htm). Citing the “need for a clearly delineated public health role comes at a critical time given the dramatic aging of the U.S. population, scientific advancements in knowledge about risk behaviors (e.g., lack of physical activity, uncontrolled high blood pressure) related to cognitive decline, and the growing awareness of the significant health, social, and economic burdens associated with cognitive decline.”

**What is cognitive health?** A healthy brain is one that can perform all the mental processes that are collectively known as cognition, including the ability to learn new things, intuition, judgment, language, and remembering. (CDC) “The lack of cognitive health—from mild cognitive decline to dementia—can have profound implications for an individual’s health and well-being. Older adults and others experiencing cognitive decline may be unable to care for themselves or conduct necessary activities of daily living, such as meal preparation and money management. Limitations with the ability to effectively manage medications and existing medical conditions are particular concerns when an individual is experiencing cognitive decline or dementia. If cognitive decline can be prevented or better treated, lives of many older adults can be improved.” (CDC)

The Franklin Institute (http://www.fi.edu/learn/brain/exercise.html) states “Brain chemistry reveals an essential unity of mind and body. Neurons not only contact other neurons, they also connect with skeletal muscles, at a specialized structure called the neuromuscular junction. There the brain uses acetylcholine – its primary chemical neurotransmitter for memory and attention – to communicate with muscles. Another of the brain’s key chemical messengers, dopamine, helps regulate fine motor movement.” The role of these neurotransmitters in regulating movement underscores the intimate relation between body and mind, muscle and memory. “Movement and exercise increase breathing and heart rate so that more blood flows to the brain, enhancing energy production and waste removal. Studies show that in response to exercise, cerebral blood vessels can grow, even in middle-aged sedentary animals.”

**How Does Physical Exercise Affect the Brain?** University of California at San Francisco researchers measured the brain function of nearly 6,000 women during an eight-year period. The results were correlated with the women’s normal activity level, including their routine walking and stair-climbing. “In the higher-energy groups, we saw much less cognitive decline,” said neurologist Kristine Yaffe, MD. Of the women who walked the least (a half-mile per week), 24% had significant declines in their test scores, compared to only 17% of the most active women (17 miles per week). "In the higher-energy groups, we saw much less cognitive decline” – a protective effect amounting to as much as 40% – according to Yaffe. "This is an important intervention that all of us can do and it could have huge implications in preventing cognitive decline."

Psychologist James Blumenthal reported in the July, 2003 issue of the *Harvard Women’s Health Watch* (http://health.harvard.edu/women) that “exercise had its beneficial effect in specific areas of cognitive function that are rooted in the frontal and prefrontal regions of the brain.” "The implications are that exercise might be able to offset some of the mental declines that we often associate with the aging process." Physical exercise has a protective effect on the brain and its mental processes, and may even help prevent Alzheimer’s disease. Based on exercise and health data from nearly 5,000 men and women over 65 years of age, those who exercised were less likely to lose their mental abilities or develop dementia, including Alzheimer’s. “Running’s brain-boosting effects were in the hippocampus, a region of the brain linked to learning and memory and known to be affected by Alzheimer’s disease.” A five-year study at Laval University in Sainte-Foy, Quebec suggests that the more a person exercises the greater the protective benefits for the brain, particularly in women. “Inactive individuals were twice as likely to develop Alzheimer’s, compared to those with the highest levels of activity (exercised vigorously at least three times a week). But even light or moderate exercisers cut their risk significantly for Alzheimer’s and mental decline” (http://health.harvard.edu/women). In another study, “physically fit subjects had less age-related brain-tissue shrinkage than less active subjects. Using magnetic resonance imaging, the researchers saw clear differences in the frontal, temporal, and parietal regions of the brain. The tissues
affected are crucial to memory, learning, and cell communication. The researchers also found that exercising less than 30 minutes per session had very little impact on cognitive function.”

http://www.health.harvard.edu/newsweek/Physical_exercise_sharpens_the_brain.htm

Readers may have heard the NPR broadcast on February 21 that reported on aerobic exercise and the brain (focusing on the hippocampus) http://www.npr.org/2011/02/21/133777018/aerobic-exercise-may-improve-memory-in-seniors. Some interesting quotes to consider: “The major chemical change in the hippocampus during aerobic exercise is an increase in a brain protein called BDNF, which acts like a fertilizer during the birth of new brain cells by nourishing new connections between neurons.” “Neuroscientist Peter Snyder, a researcher at Brown University's Alpert Medical School and Rhode Island Hospital, says the hippocampus is one of those brain areas that continue to form new cells and make new connections between cells,” and "What we’re finding is that of all of these noninvasive ways of intervening, it is exercise that seems to have the most efficacy at this point — more so than nutritional supplements, vitamins and cognitive interventions.”

For those interested in further reading, check Price, et al. study, “Older Adults’ Perceptions of Physical Activity and Cognitive Health: Implications for Health Communication” in the February, 2011 issue of Health Education & Behavior, Society for Public Health Education. Also, Perceptions of Cognitive Health Factsheet (a pdf file). Both these publications provide information about population groups views/perceptions of physical activity.