



To: Neighbourhoods and City development

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Date: 18/10/2013

Subject: Essential Evidence on a page: No.108 Association between midlife cardiorespiratory fitness levels and later-life Dementia

Top line: A large cohort study provides direct evidence that physical activity contributes to a lower risk of dementia in later life independent of other cardiovascular risk factors.

Alzheimer disease and other types of dementia (all-cause dementia) are important public health problems, particularly in light of the aging population. One in 3 persons aged 65 years or older in the UK will develop Alzheimer disease.¹ Because of the effect of dementia on quality of life and functional status, identifying preventable causes of dementia is critical. The most cost-effective measures to prevent dementia would be those mediated through lifestyle changes requiring minimal medical intervention. However, because of insufficient evidence there are no specific public health recommendations for the prevention of cognitive disability other than maintaining good general health.

In a 2013 US study researchers evaluated the association between objectively measured midlife fitness levels and development of all-cause dementia in a large cohort of men and women with a long follow-up duration.² They hypothesized that people with greater midlife fitness levels would have lower risk for dementia in later life and that this association would be, at least partially, independent of intervening brain dysfunctions. A cohort study was employed comprising 19,458 persons who had an exercise treadmill test between 1971 and 2009 who could be matched with Medicare administrative claims data between 1999 and 2009 and who had their baseline examination more than 9 years before a Medicare claim. Study participants gave a comprehensive medical history, including self-reported medical, family, and social history confirmed by the clinic doctor. They had physical examinations, including height and weight measured to calculate body mass index and seated resting blood pressure. Laboratory studies, done after a 12-hour fast, included fasting blood glucose and cholesterol profile were also measured.

In terms of results, lower fitness levels at midlife examination were associated with a higher prevalence of cardiovascular risk factors, including increased body mass index, hypertension, diabetes, & smoking. Overall, researchers saw an association between midlife fitness levels, measured with treadmill testing, and lower risk for dementia in later life independent of other cardiovascular risk factors. Greater fitness levels may be associated with lower dementia risk through several mechanisms. First, enhanced fitness levels are associated with lower risk for diabetes and hypertension, which are established risk factors for dementia. Physical activity and fitness levels may also have direct effects on the brain that lower dementia risk. Higher fitness levels have been associated with greater brain volume, which may be associated with enhanced cognitive function. While the researchers did not discuss findings in terms of active travel UK Chief Medical Officers state that for most people, the easiest and most acceptable forms of physical activity are those that can be incorporated into everyday life. Examples include walking or cycling instead of travelling by car, bus or train.³

¹ See <http://www.alzheimers.org.uk/infographic> accessed 18th October 2013.

² DeFina, L., et al, 2013 The association between midlife cardiorespiratory fitness levels and later-life Dementia, *Annals of Internal Medicine*, 158: 162-168.

³ Start Active, Stay Active. A report on physical activity for health from the four home countries' Chief Medical Officers. London: Dept Health.