

Physical Activity and Cognitive Aging

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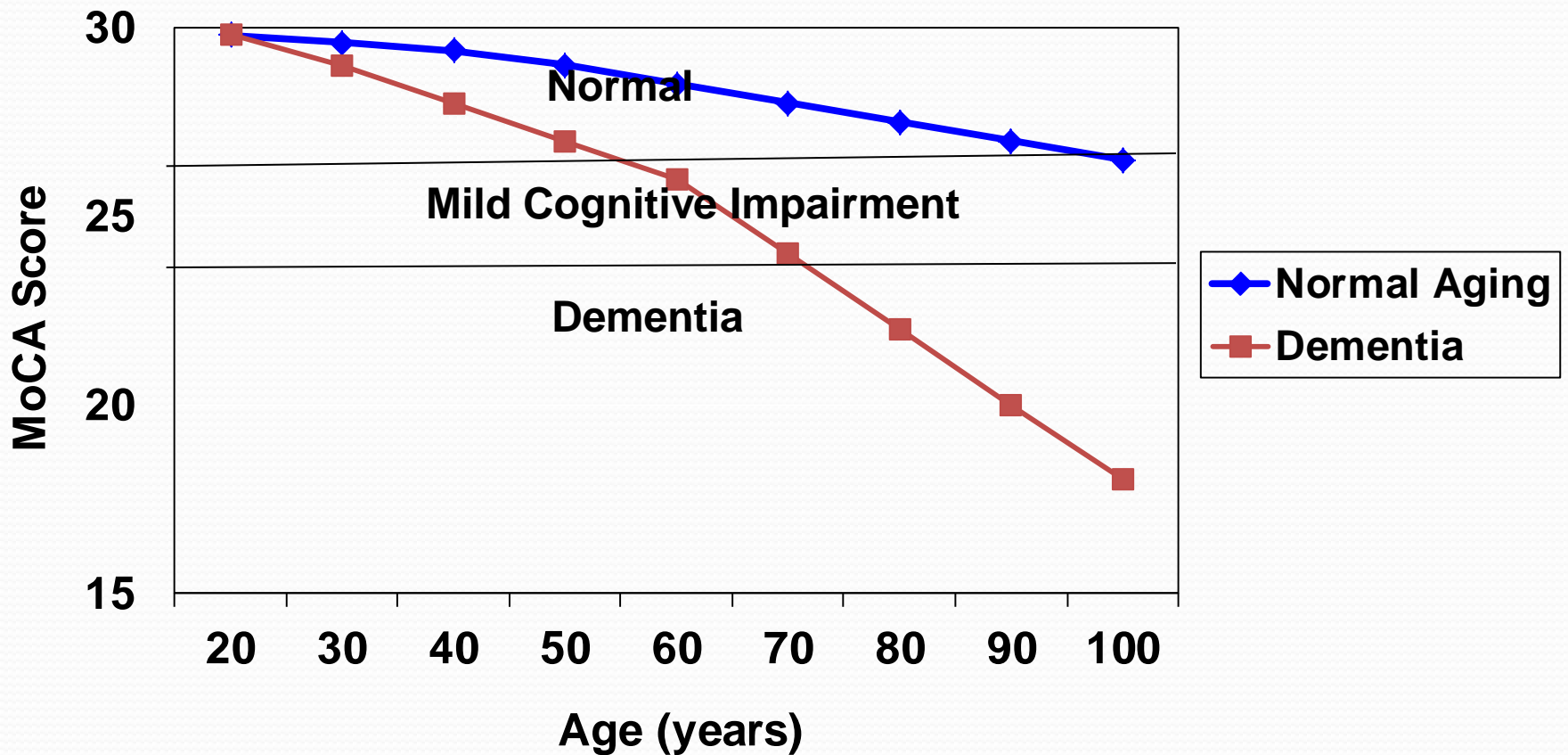
Psychiatry and Epidemiology & Biostatistics

University of California, San Francisco

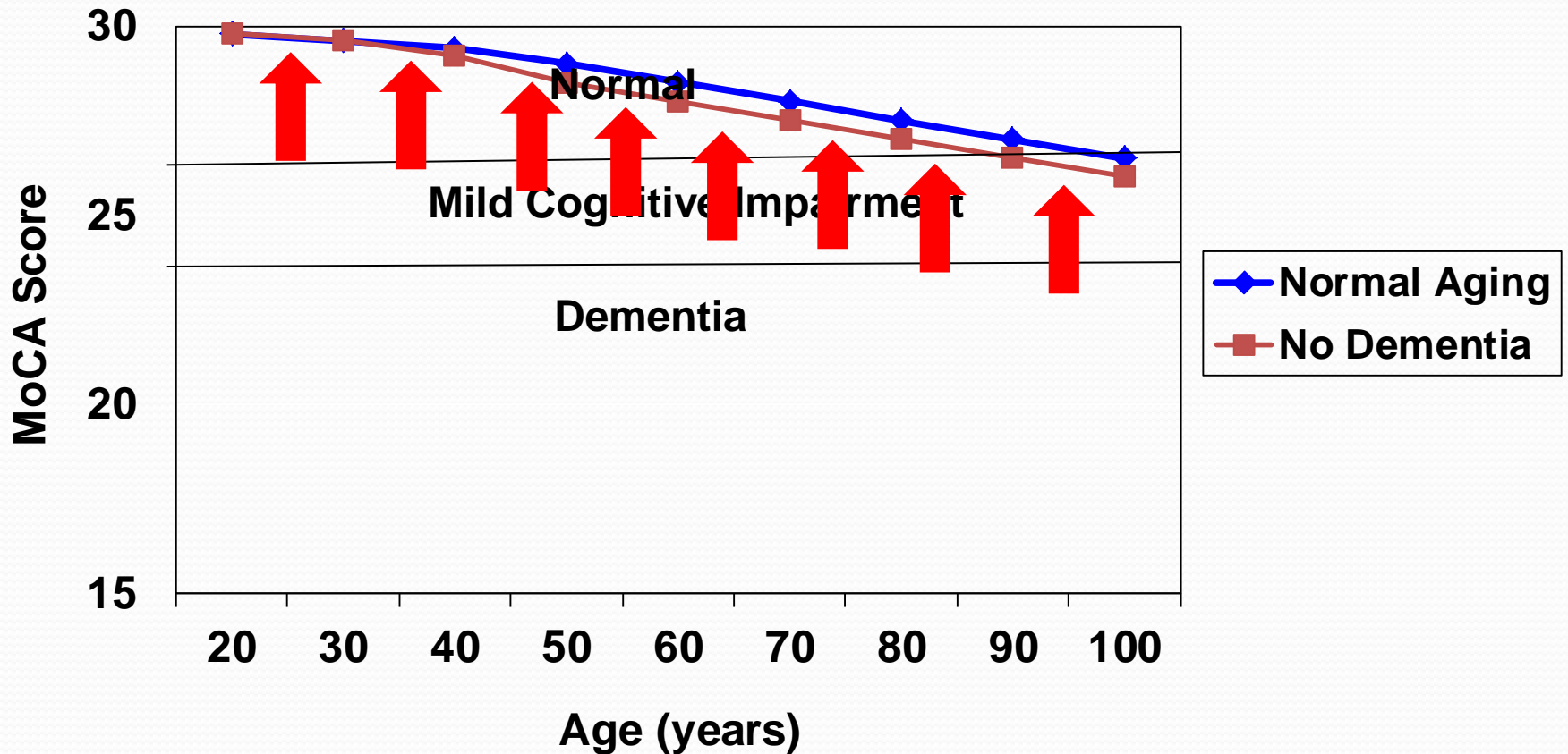
San Francisco VA Medical Center

The Cognitive Continuum

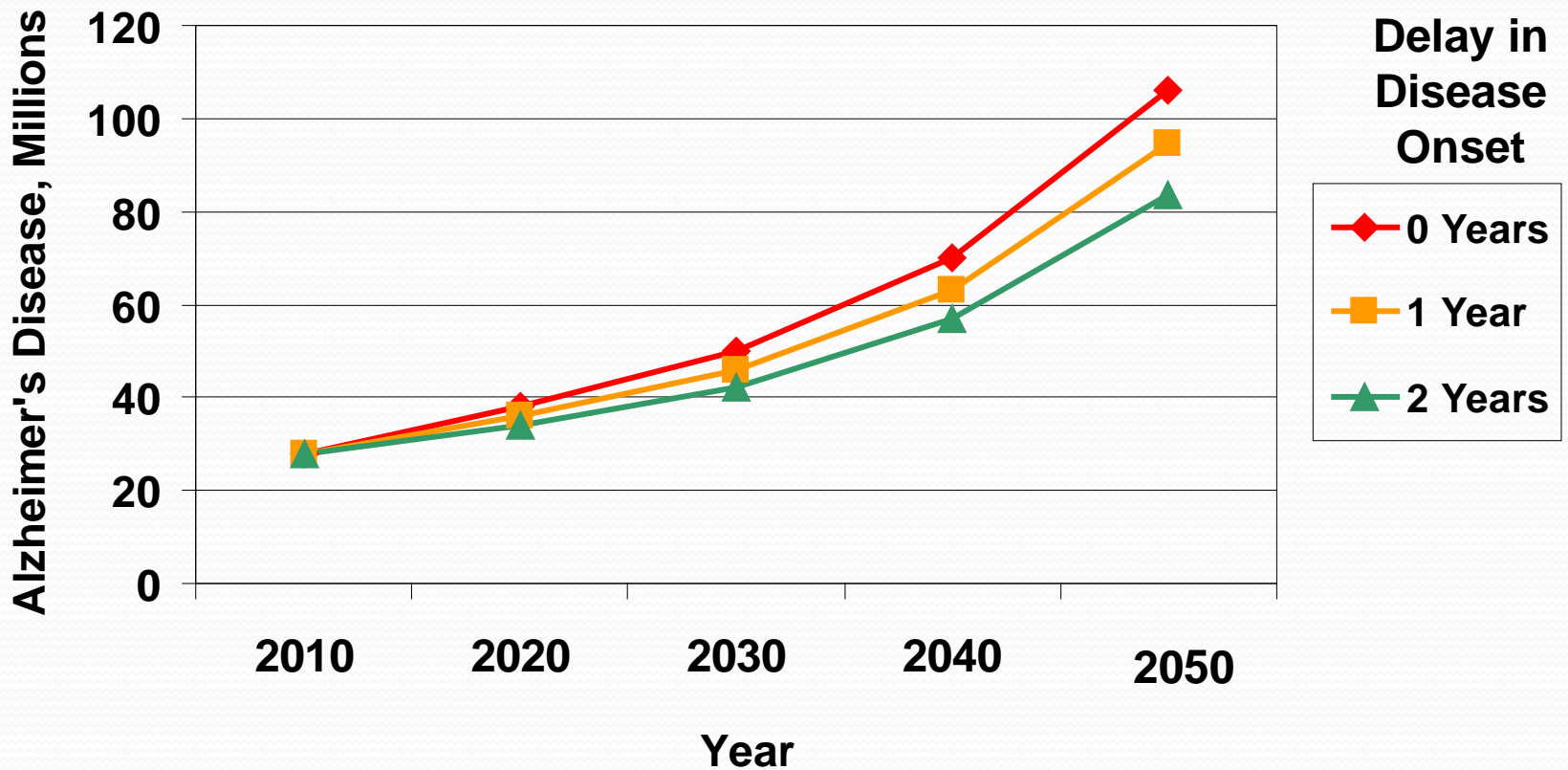
Cognitive Decline with Age – ‘Normal’ vs. Dementia



Many Opportunities for Intervention



Delaying Dementia Onset Could Prevent Millions of Cases



Brookmeyer et al., Alzheimer's & Dementia, 2007

Physical Activity



Brief History of Physical Activity and Health in Human Culture

- Promoted for thousands of years as critical component of healthier, longer life
 - Ancient Chinese records (~2500 BC) describe exercises based on animals to promote health
 - Ancient Greeks (~1000 BC) recommended daily exercise to prevent disease
 - Modern times (~1950s-today) physical activity associated with lower risk of mortality, cardiovascular disease and diabetes

Physical Activity and the Brain

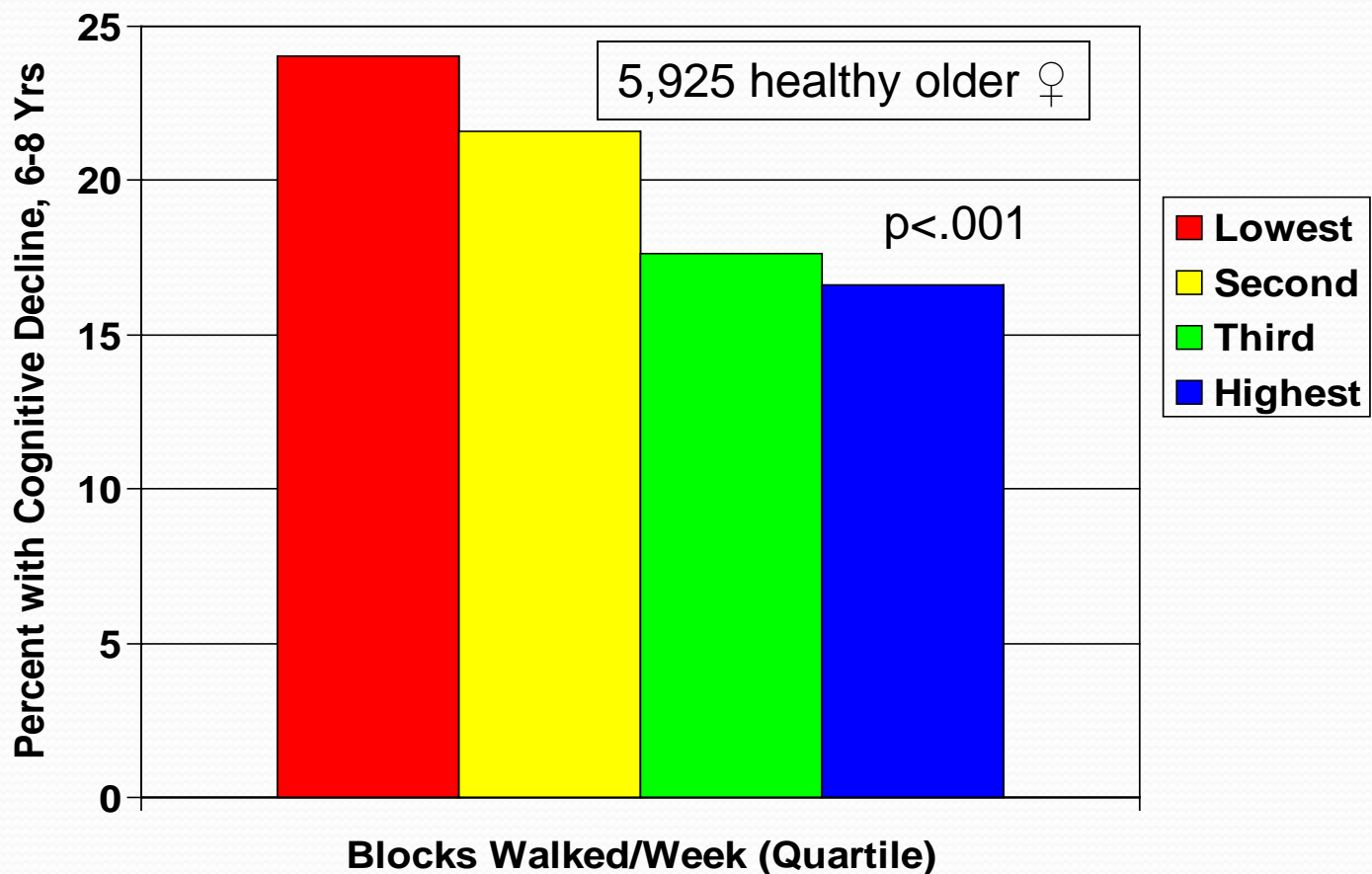
“Physical fitness is not only one of the most important keys to a healthy body, it is the basis of dynamic and creative intellectual activity.”



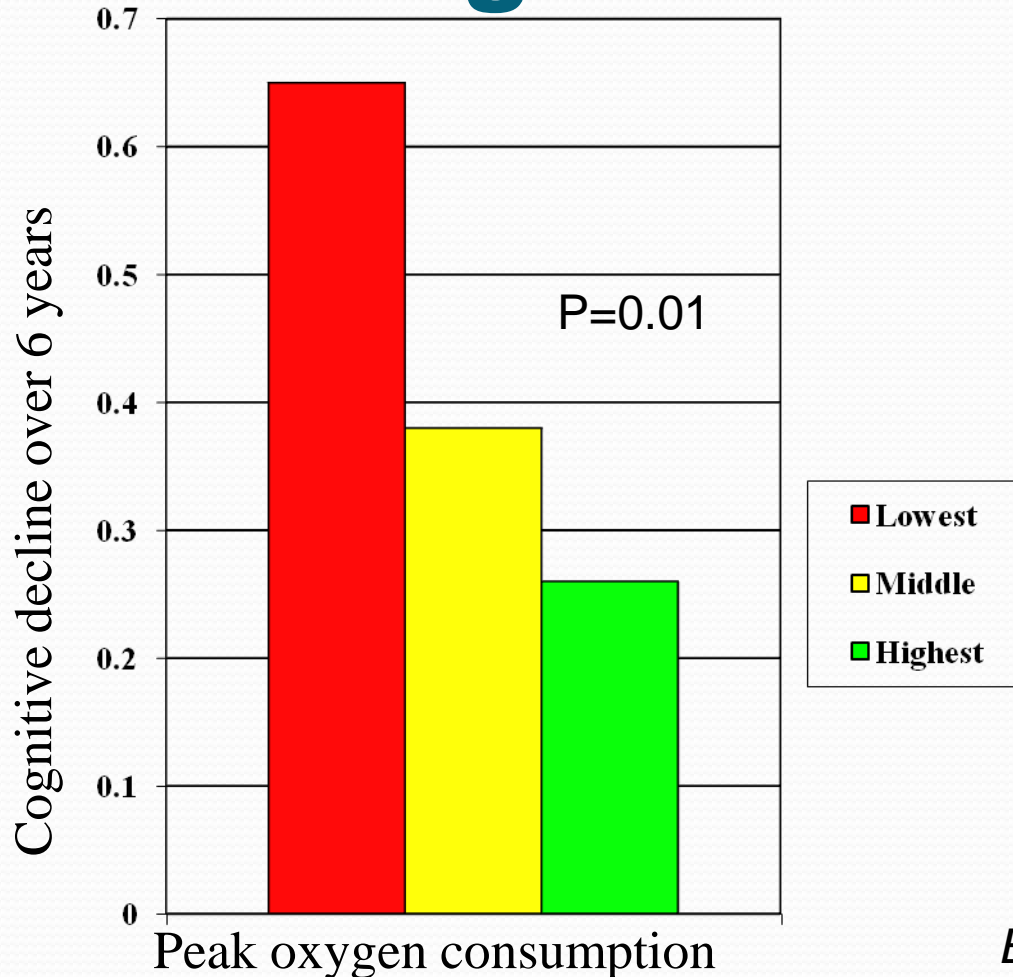
John F. Kennedy (1917-1963)

Observational Studies

Women Who Walk Have Lower Risk of Cognitive Decline

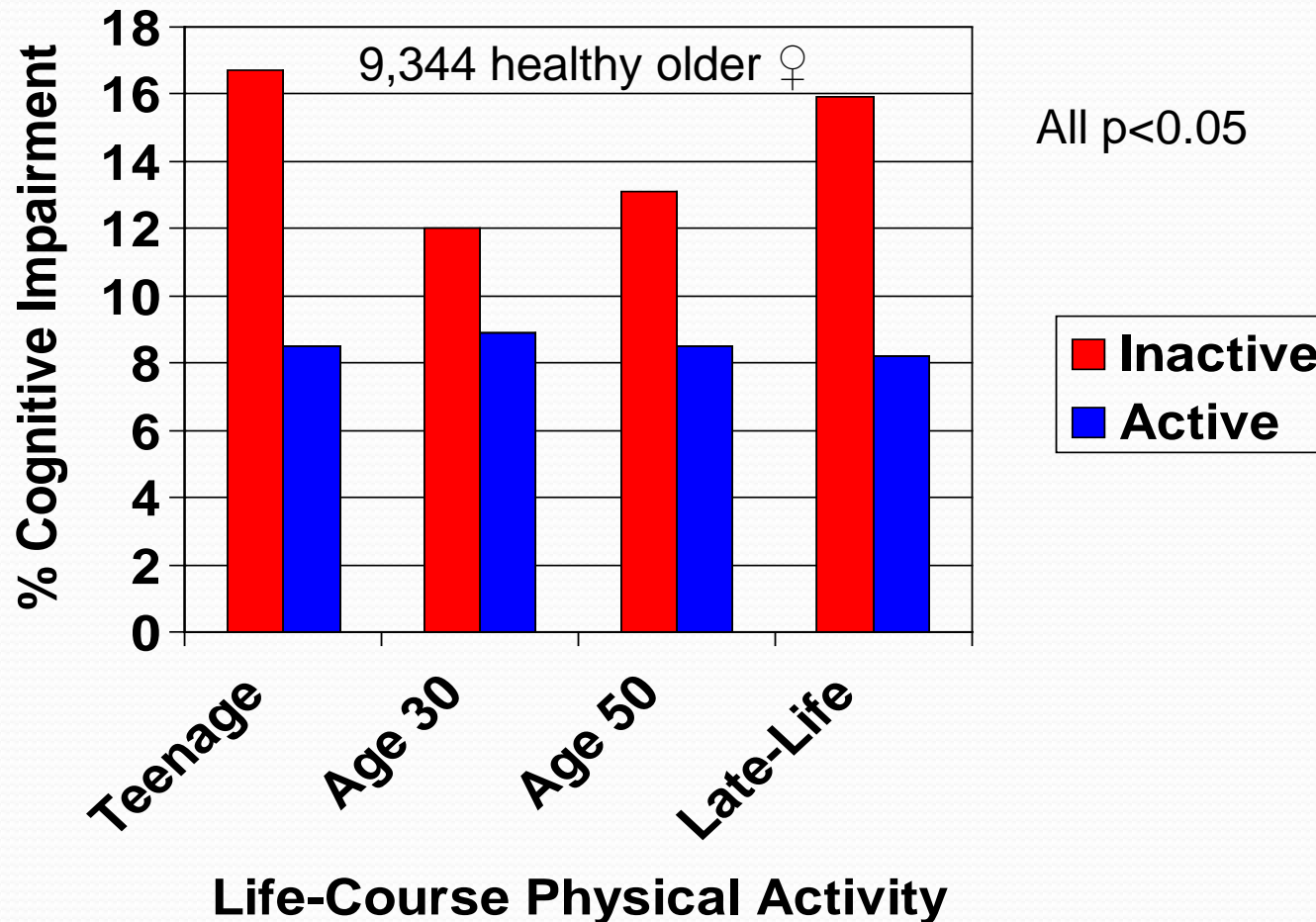


Better Aerobic Fitness → Less Cognitive Decline

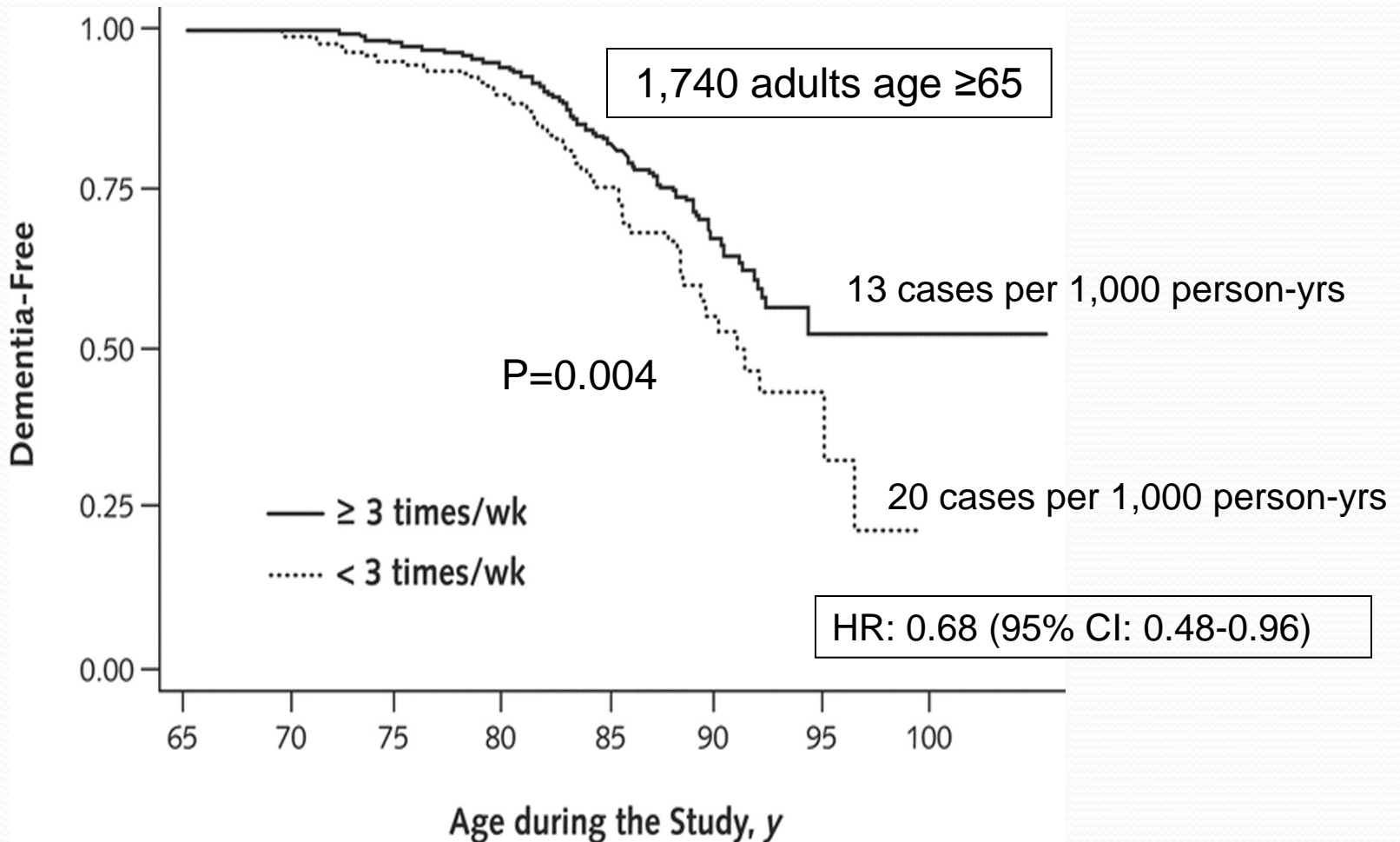


349 healthy
adults ≥ 55 yrs

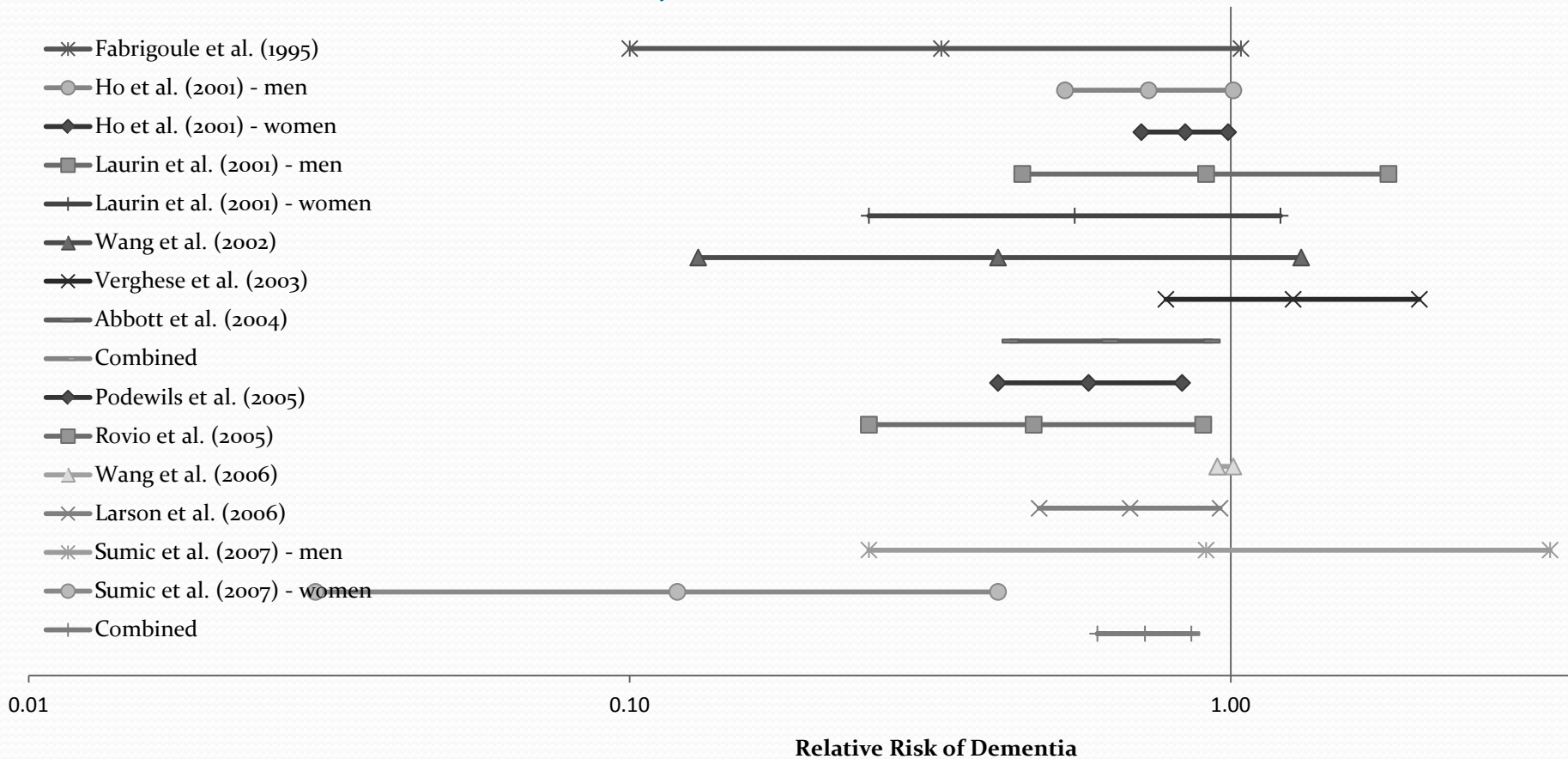
Physical Activity Over Life-Course Lowers Later Cognitive Impairment



Frequent Exercisers Experience Delayed Dementia Onset



Physical Activity: 45%↓ Alzheimer's, 28%↓ Dementia



Adapted from Hamer & Chida, Psychol Med 2009

**What if we could change
the prevalence of
physical inactivity?**

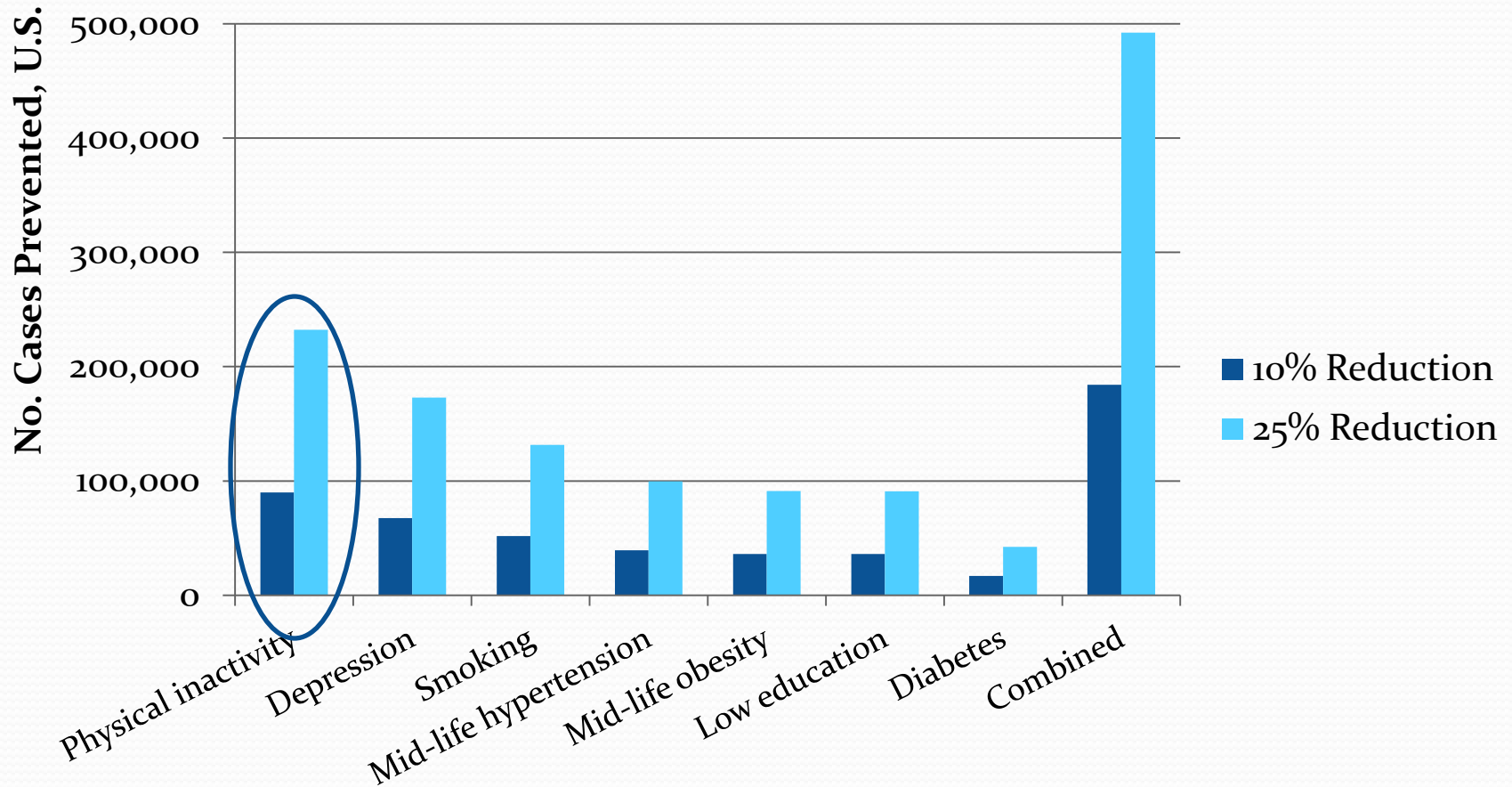
Population Attributable Risks (PARs)

- Tools to estimate impact of risk factor reduction
- Take into account prevalence of risk factor and strength of association
- Assume casual relationship

Alzheimer's PARs, U.S.

Risk Factor	Population Prevalence	Relative Risk (95% CI)	PAR % (Range)
Physical inactivity	33%	1.8 (1.2, 2.8)	21% (6-37%)
Depression	19%	1.9 (1.6, 2.3)	15% (10-20%)
Smoking	21%	1.6 (1.2, 2.2)	11% (3-20%)
Mid-life hyperten.	14%	1.6 (1.2, 2.2)	8% (2-15%)
Mid-life obesity	13%	1.6 (1.3, 1.9)	7% (4-11%)
Low education	13%	1.6 (1.4, 1.9)	7% (4-10%)
Diabetes	9%	1.4 (1.2, 1.7)	3% (2-5%)
Combined (max.)			54%

No. Cases Potentially Prevented, U.S.



Summary & Conclusions

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- Cognitive function declines with age
 - Rate of decline highly variable
 - Many opportunities for intervention
- Physical inactivity has many adverse effects
 - Including ↑ risk cognitive impairment/dementia
- Physical inactivity is common
 - Could account for 1 in 5 cases of Alzheimer's
 - 25% reduction in physical inactivity could potentially prevent >200,000 cases



Thank You!