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Exercise is Medicine: A Historical Perspective

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BERRYMAN, J.W. Exercise is medicine: a historical perspective. *Curr. Sports Med. Rep.*, Vol. 9, No. 4, pp. 195–201, 2010. *Much of the early information about exercise and medicine appeared in the ancient, medieval, and Renaissance medical literature in the context of the "six things nonnatural." These were the things that were under everyone's own control, directly influenced health, and became the central part of the new "physical education" movement in the early 19th century in the United States. They were known then as the "Laws of Health." Until the early 1900s, "physical education" was dominated by physicians who specialized in health and exercise. However, physical education changed to a games and sports curriculum led by coaches who introduced competition and athletic achievement into the classroom. As that happened, physicians disappeared from the profession. Through the last half of the twentieth century, as exercise became more central to public health, the medical community began to view exercise as part of lifestyle, a concept embracing what was once called the "six things nonnatural."*

Is sitting the new…..

- Harvard Business Review Blog by Nilofer Merchant 1/14/13
- "Excessive sitting is a lethal activity."
- Circulation article
  - 8,800 Australians
  - Each additional hour of television watched per day translated to an 11% increase in all cause mortality.

Circulation.2010;121:384-391

American College of Lifestyle Medicine

Too Much Sitting: The Population-Health Science of Sedentary Behavior

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Abstract

Even when adults meet physical activity guidelines, sitting for prolonged periods can compromise metabolic health. TV time and objective-measurement studies show deleterious associations, and breaking up sedentary time is beneficial. Sitting time, TV time, and time sitting in automobiles increase premature mortality risk. Further evidence from prospective studies, intervention trials, and population-based behavioral studies is required.

Original scientific paper

European Journal of Preventive Cardiology

European Journal of Preventive Cardiology
0(00) 1–7

DOI: 10.1177/2047487312471759
ejpc.sagepub.com
SAGE

Ability to sit and rise from the floor as a predictor of all-cause mortality

Leonardo Barbosa Barreto de Brito[1], Djalma Rabelo Ricardo[1,2], Denise Sardinha Mendes Soares de Araújo[3], Plínio Santos Ramos[1,2], Jonathan Myers[4] and Claudio Gil Soares de Araújo[1,5]

Abstract

Background: While cardiorespiratory fitness is strongly related to survival, there are limited data regarding musculoskeletal fitness indicators. Our aim was to evaluate the association between the ability to sit and rise from the floor and all-cause mortality.

Design: Retrospective cohort.

Methods: 2002 adults aged 51–80 years (68% men) performed a sitting-rising test (SRT) to and from the floor, which was scored from 0 to 5, with one point being subtracted from 5 for each support used (hand/knee). Final SRT score, varying from 0 to 10, was obtained by adding sitting and rising scores and stratified in four categories for analysis: 0–3;

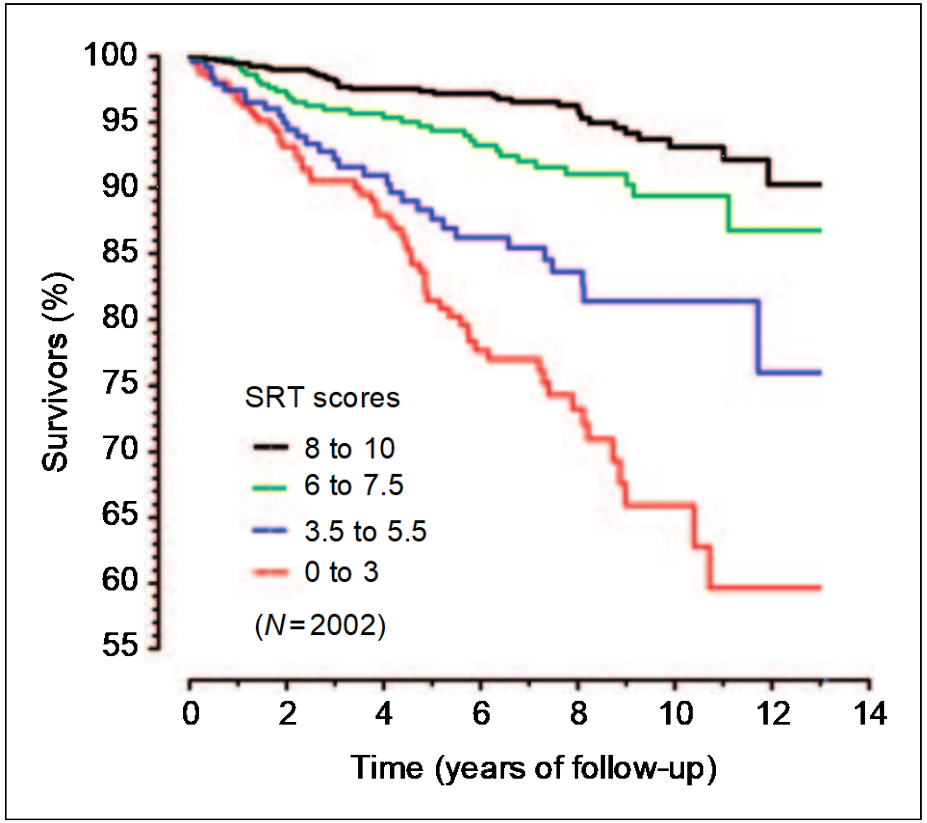


Figure 2. Kaplan-Maier survival analysis for four ranges of SRT scoring in subjects aged 51–80 years.

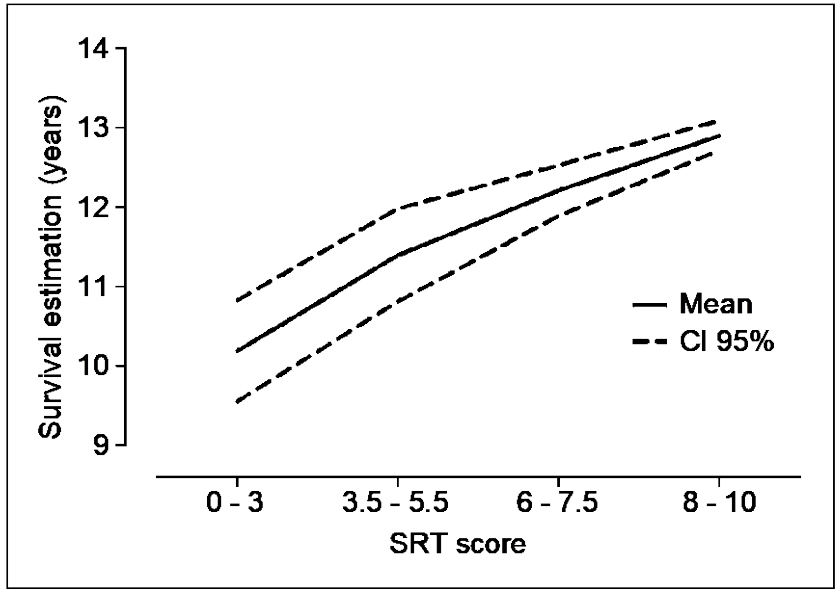


Figure 3. Survival estimation (years) for subjects aged 51 to 80 years based on SRT scores, Curves are based in Cox model and were adjusted for age, gender, and BMI.

AHA SCIENTIFIC STATEMENT

Importance of Assessing Cardiorespiratory Fitness in Clinical Practice: A Case for Fitness as a Clinical Vital Sign

A Scientific Statement From the American Heart Association

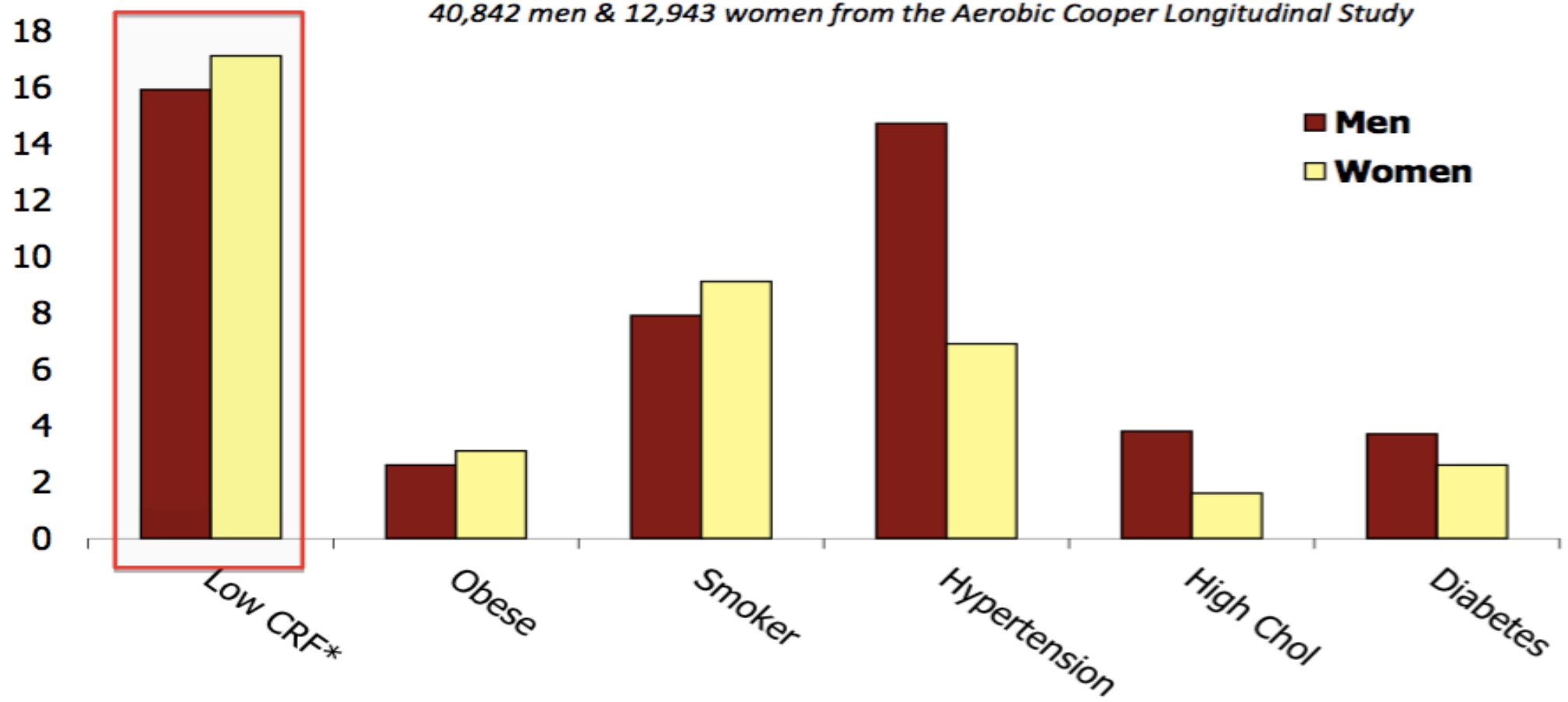
mine CVD risk was uncertain. There is, however, a large body of epidemiological and clinical evidence demonstrating not only that CRF is a potentially stronger predictor of mortality than established risk factors such as smoking, hypertension, high cholesterol, and type 2 diabetes mellitus (T2DM), but that the addition of CRF to traditional risk factors significantly improves the reclassification of risk for adverse outcomes.

Circulation. 2016;134:00–00. DOI: 10.1161/CIR.0000000000000461

Effect of CRF on Mortality

Attributable Fractions (%) for All-Cause Deaths

40,842 men & 12,943 women from the Aerobic Cooper Longitudinal Study



Blair SN. *Br J Sports Med* 2009; 43:1-2.

Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy

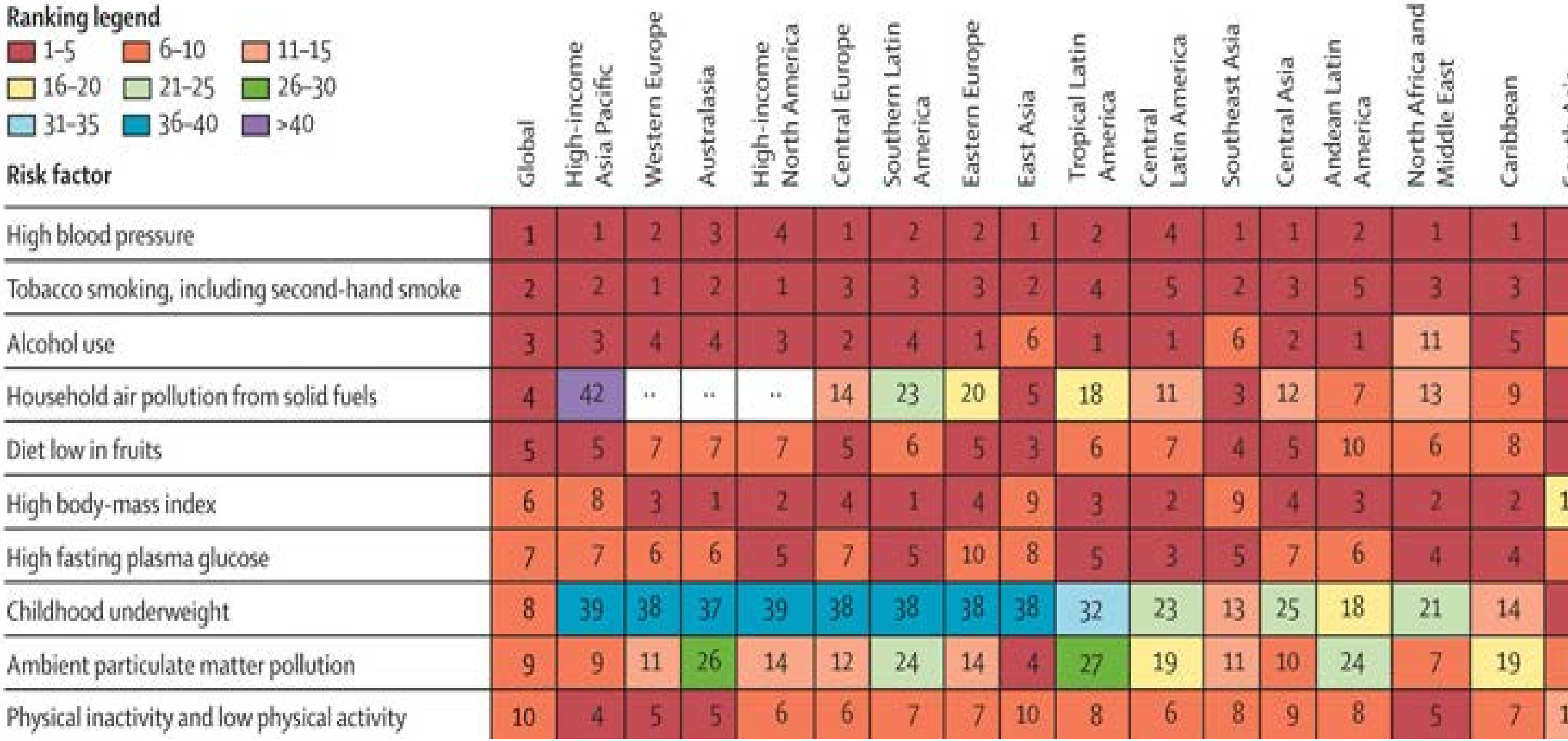
*I-Min Lee, Eric J Shiroma, Felipe Lobelo, Pekka Puska, Steven N Blair, Peter T Katzmarzyk, for the Lancet Physical Activity Series Working Group**

Summary

Background Strong evidence shows that physical inactivity increases the risk of many adverse health conditions, including major non-communicable diseases such as coronary heart disease, type 2 diabetes, and breast and colon cancers, and shortens life expectancy. Because much of the world's population is inactive, this link presents a major public health issue. We aimed to quantify the effect of physical inactivity on these major non-communicable diseases by estimating how much disease could be averted if inactive people were to become active and to estimate gain in life

Lancet 2012; 380: 219–29

Published Online
July 18, 2012
http://dx.doi.org/10.1016/S0140-6736(12)61031-9



Lancet. 2012 Dec 15; 380(9859): 2224–2260.
doi: 10.1016/S0140-6736(12)61766-8

Findings

Worldwide, we estimate that physical inactivity causes 6% (ranging from 3·2% in southeast Asia to 7·8% in the eastern Mediterranean region) of the burden of disease from coronary heart disease, 7% (3·9–9·6) of type 2 diabetes, 10% (5·6–14·1) of breast cancer, and 10% (5·7–13·8) of colon cancer. Inactivity causes 9% (range 5·1–12·5) of premature mortality, or more than 5·3 million of the 57 million deaths that occurred worldwide in 2008. If inactivity were not eliminated, but decreased instead by 10% or 25%, more than 533000 and more than 1·3 million deaths, respectively, could be averted every year. We estimated that elimination of physical inactivity would increase the life expectancy of the world's population by 0·68 (range 0·41–0·95) years.

Circulation

ORIGINAL RESEARCH ARTICLE

Impact of Healthy Lifestyle Factors on Life Expectancies in the US Population

BACKGROUND: Americans have a shorter life expectancy compared with residents of almost all other high-income countries. We aim to estimate the impact of lifestyle factors on premature mortality and life expectancy in the US population.

METHODS: Using data from the Nurses' Health Study (1980–2014; n=78 865) and the Health Professionals Follow-up Study (1986–2014, n=44 354), we defined 5 low-risk lifestyle factors as never smoking, body mass index of 18.5 to 24.9 kg/m^2, ≥30 min/d of moderate to vigorous physical activity, moderate alcohol intake, and a high diet quality score (upper 40%), and estimated hazard ratios for the association of total lifestyle score (0–5 scale) with mortality. We used data from the NHANES (National Health and Nutrition Examination Surveys; 2013–2014) to estimate the distribution of the lifestyle score and the US Centers for

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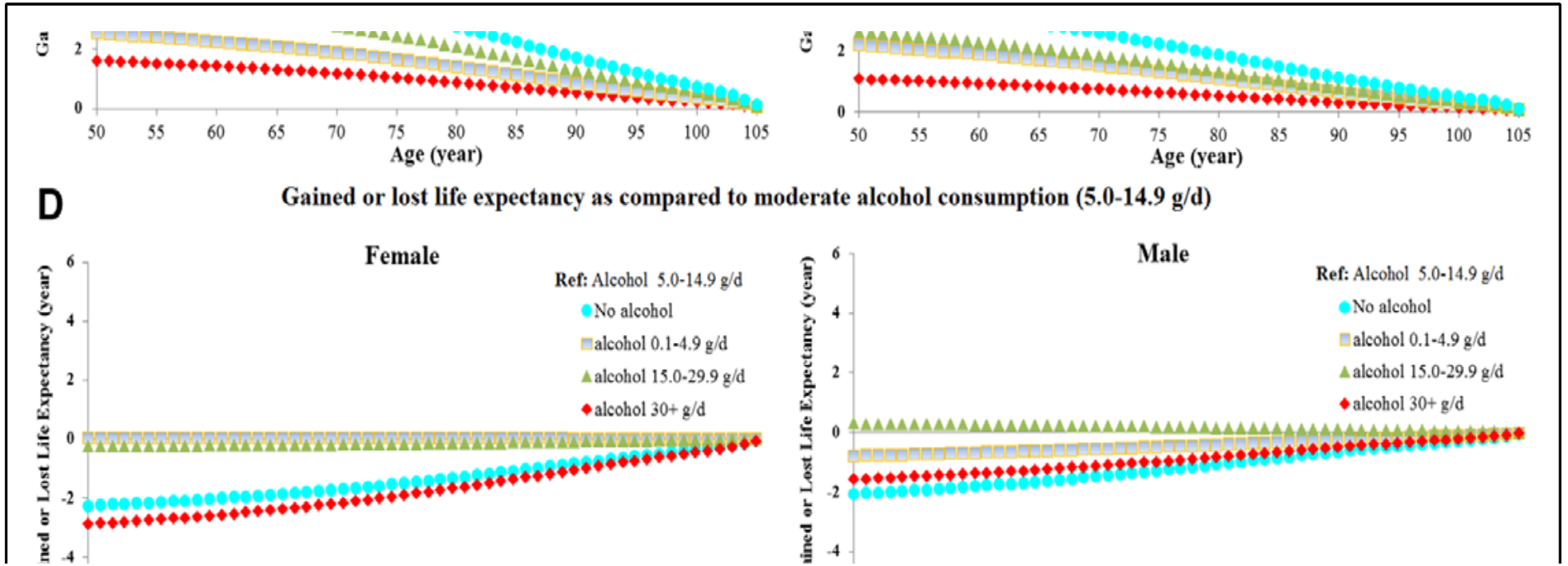

Un aumento de 3/5 años por ser activo

Science shows that physical activity can reduce your risk of dying early from the leading causes of death, like heart disease and some cancers. Only a few lifestyle choices have as large an impact on your health as physical activity. People who are physically active for about 7 hours a week have a 40 percent lower risk of dying early than those who are active for less than 30 minutes a week.

CDC, 2015

Diabetologia (2015) 58:1751–1758
DOI 10.1007/s00125-015-3624-6

REVIEW

Sick of sitting

Abstract Sitting too much kills. Epidemiological, physiological and molecular data suggest that sedentary lifestyle can explain, in part, how modernity is associated with obesity, more than 30 chronic diseases and conditions and high healthcare costs. Excessive sitting—sitting disease—is not innate to the human condition. People were designed to be bipedal and, before the industrial revolution, people moved substantially more throughout the day than they do presently. It is encouraging that solutions exist to reverse sitting disease. Work environments, schools, communities and cities can be re-imagined and re-invented as walking spaces, and people thereby offered more active, happier, healthier and more productive lives.

olution 200 years ago, 90% of the world's population lived in agricultural communities where shelter, nutrition and reproduction all required physical exertion. Data from agricultural communities suggest that, prior to the industrial revolution, people sat for 300 min per day and lived actively [8]. From 1760 onward, the industrial revolution precipitated urbanisation; it was the predominant demographic shift into modern history [9–11]. Now more than half the world's population live in cities and urbanisation continues to grow worldwide

FROM THE EDITOR

Exercise training?

An Agent with Lipid-Lowering, Antihypertensive, Positive Inotropic, Negative Chronotropic, Vasodilating, Diuretic, Anorexigenic, Weight-Reducing, Cathartic, Hypoglycemic, Tranquilizing, Hypnotic and Antidepressive Qualities

William C. Roberts

William C. Roberts, MD
Editor-in-Chief

American Journal of Cardiology ***1984;*** *53: 261-262*

TO TREAT THIS CONDITION:	THE PolyPill FOR ATHEROSCLEROSIS CONTAINS:	THE PolyPill FOR DIABETES CONTAINS:
• elevated cholesterol	a statin	a statin
• elevated blood sugar	(none)	metformin
• hypertension	• a diuretic • a beta-blocker • an ACE inhibitor	• an ACE inhibitor
• to lower thrombotic risk	aspirin	aspirin
REFERENCE:	Yusuf S, et al. 2009.	Kuehn BM. 2006.

Kuehn BM. "Polypill" could slash diabetes risk. ***JAMA*** 2006;296:377.

Yusuf S, Pais P, Afzai R et al. Effects of a polypill (Polycap) on risk factors in middle-aged individuals without cardiovascular disease (TIPS): a phase II, double-blind, randomised trial. ***Lancet*** 2009;373:1341-1351.

- Un agente con propiedades hipo-lipemiantes, anti-hipertensivas, inotrópicas positivas, cronotrópicas negativas, vasodilatadoras, diuréticas, anorexígenos, reductores de peso, catárticas, hipoglucemiantes, tranquilizantes, hipnóticos y antidepresivas

Comparative effectiveness of exercise and drug interventions on mortality outcomes: metaepidemiological study

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Researchers at the London School, Harvard, and Stanford compared exercise to drug interventions, and found that exercise often worked just as well as drugs for the treatment of heart disease and stroke, and the prevention of diabetes.

BMJ 2013;347:f5577 doi: 10.1136/bmj.f5577 (Published 1 October 2013)

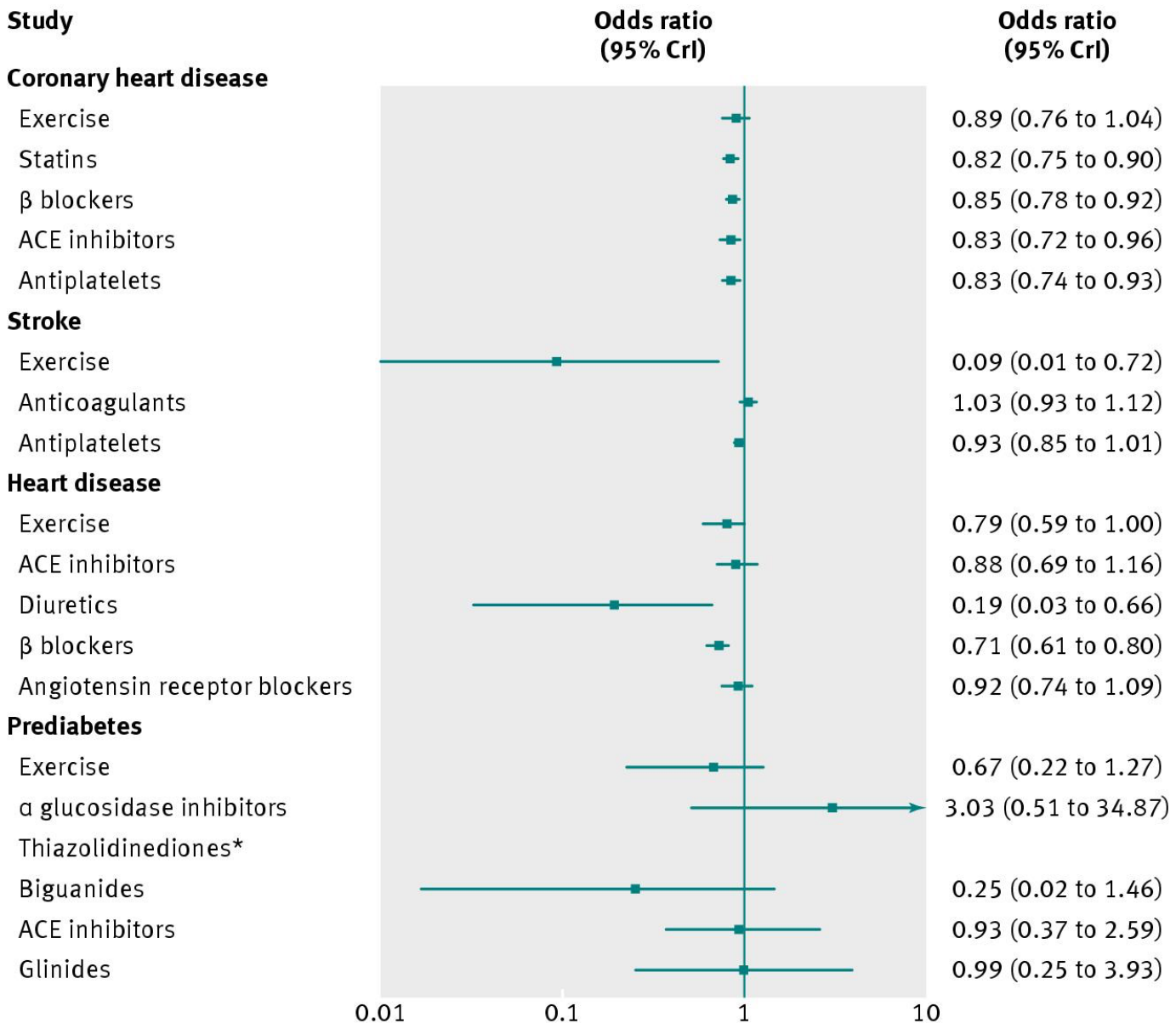

Fig 4 Findings of network meta-analysis: effects of exercise and drug interventions compared with control on mortality outcomes in coronary heart disease, stroke, heart failure, and prediabetes. Results shown are odds ratios and 95% credible intervals. Odds ratios lower than 1.00 favour intervention compared with control. ACE=angiotensin converting enzyme. *Number of data points for thiazolidinediones was insufficient to obtain an estimate of odds ratio compared with control

Scand J Med Sci Sports 2015: (Suppl. 3) 25: 1–72
doi: 10.1111/sms.12581

SCANDINAVIAN JOURNAL OF MEDICINE & SCIENCE IN SPORTS

Exercise as medicine – evidence for prescribing exercise as therapy in 26 different chronic diseases

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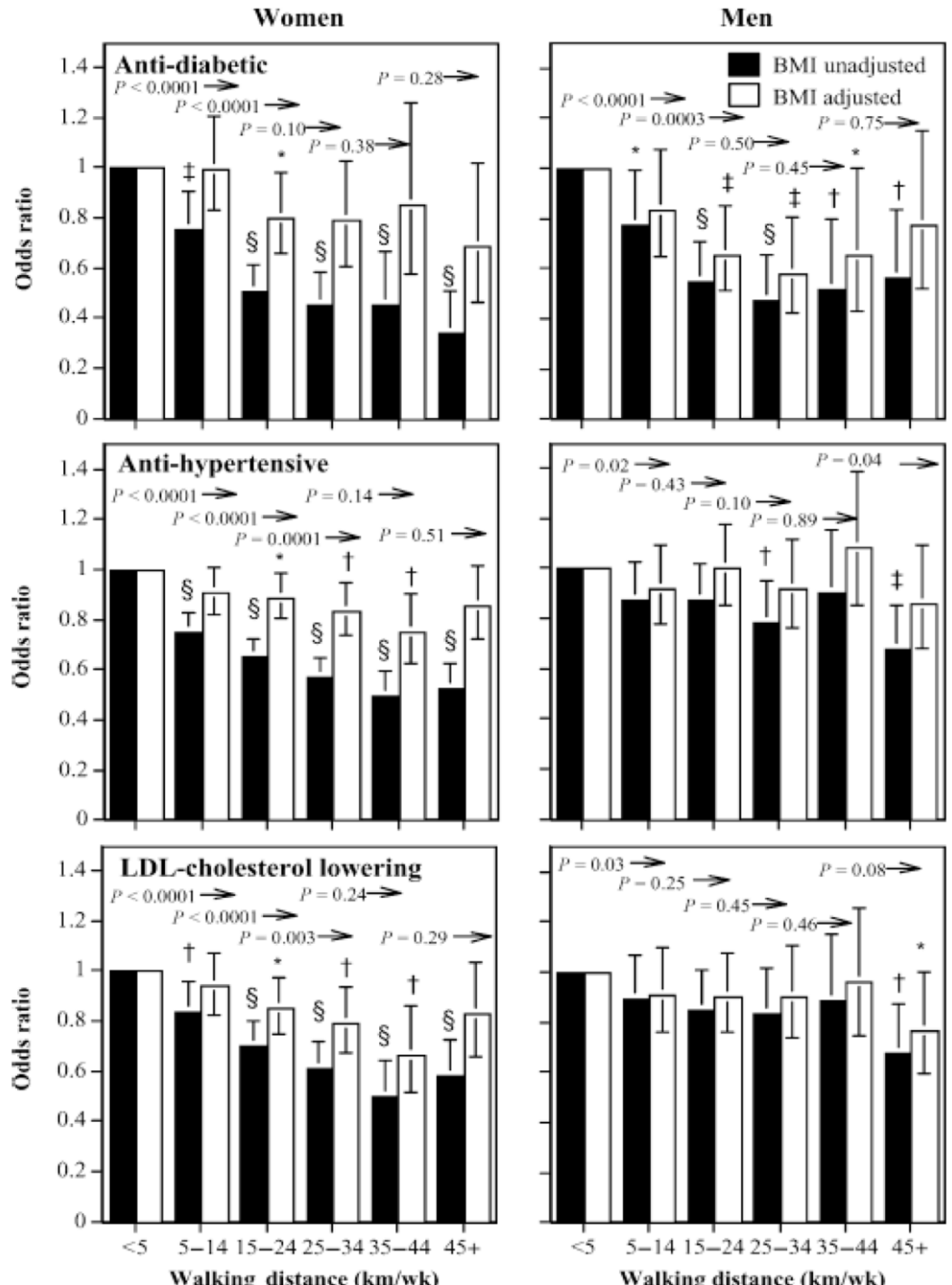
Accepted for publication 16 September 2015

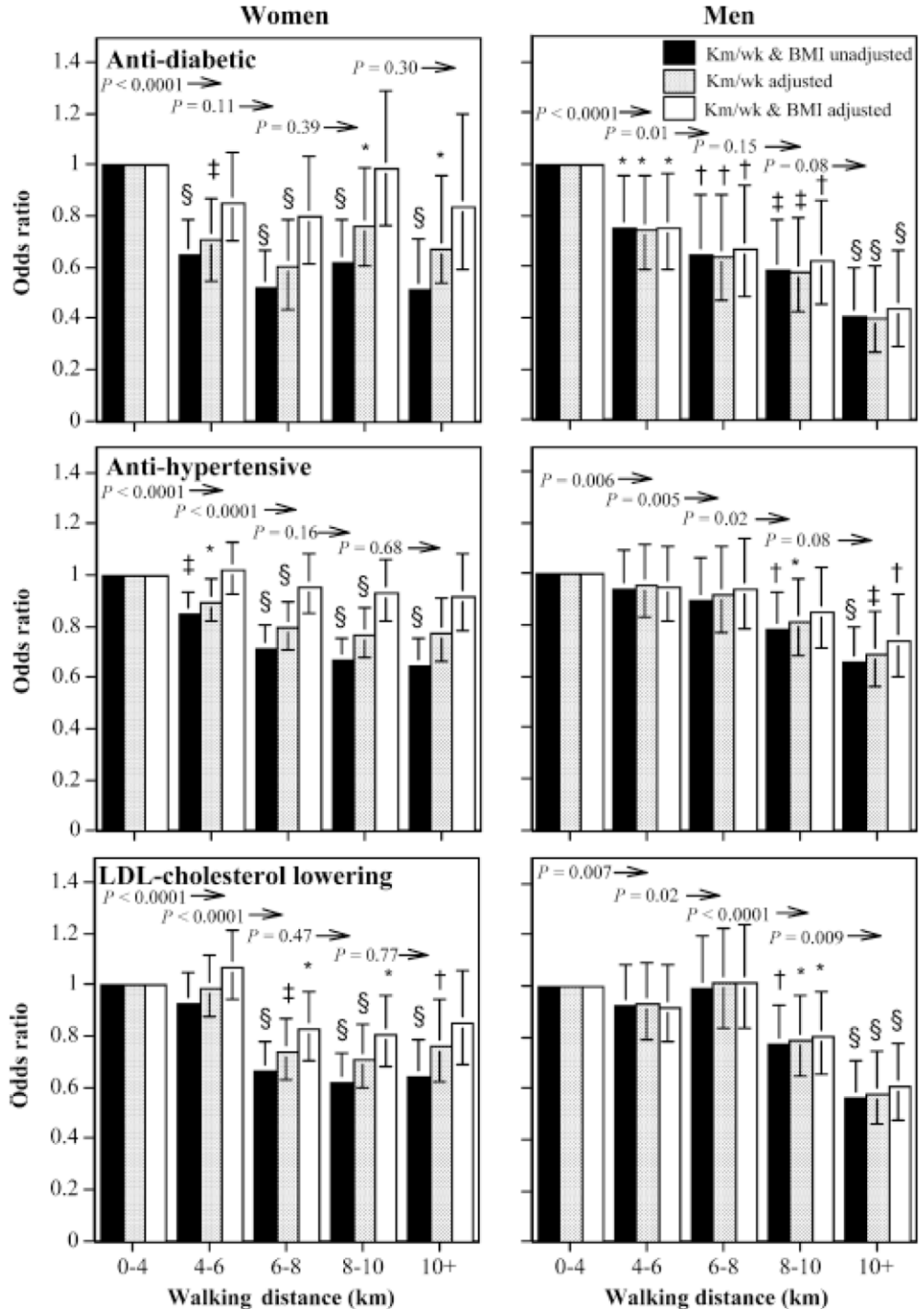
Reduced Diabetic, Hypertensive, and Cholesterol Medication Use with Walking

Purpose—To assess the relationships of walking distance, frequency, and intensity to the prevalence of antidiabetic, antihypertensive, and LDL cholesterol–lowering medications use.
Methods—Cross-sectional analyses of 32,683 female and 8112 male participants of the National Walkers' Health Study, of whom 2.8% and 7.4% reported antidiabetic, 14.3% and 29.0% reported antihypertensive, and 7.3% and 21.5% reported LDL cholesterol–lowering medication use, respectively.

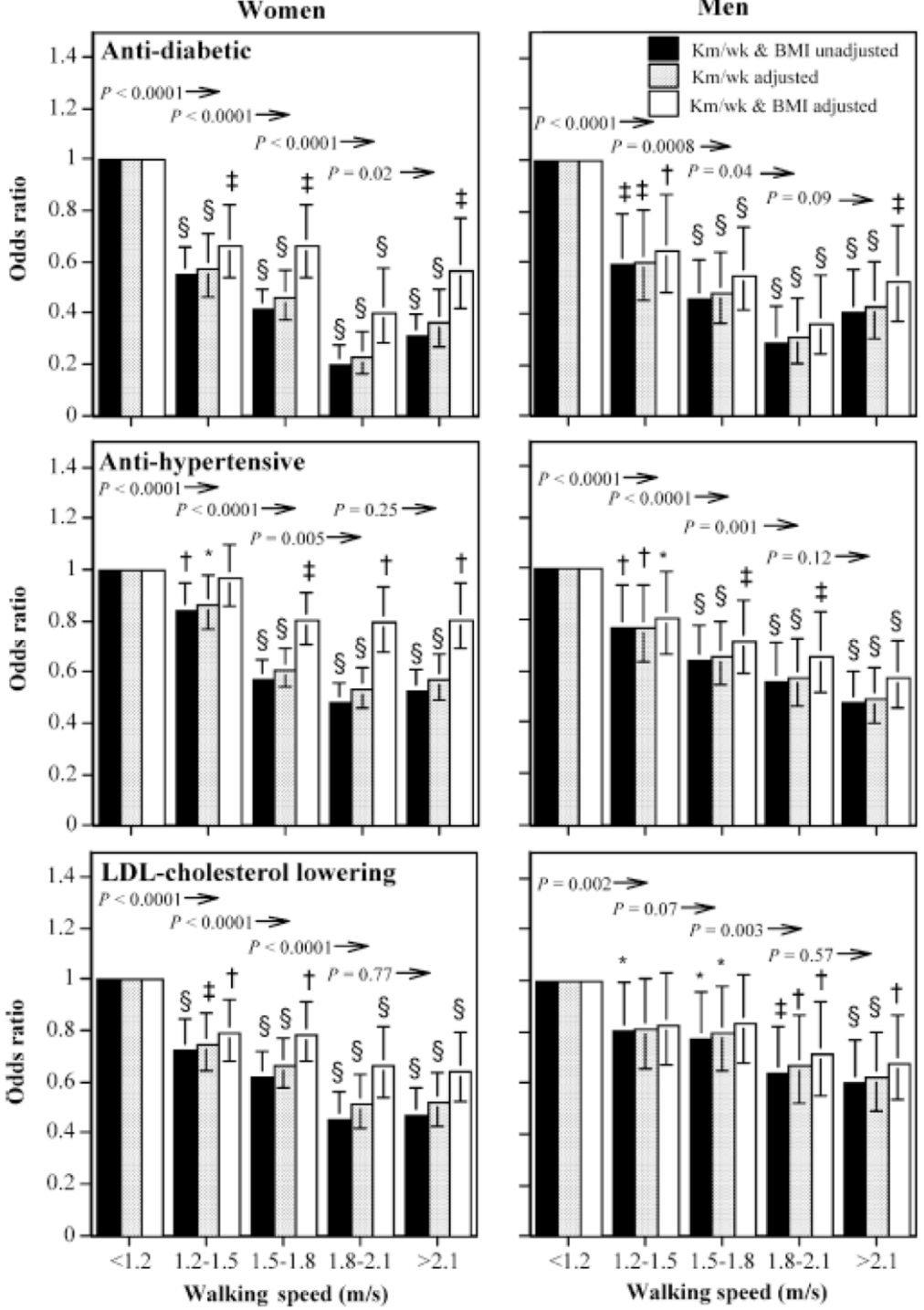
- Med Sci Sports Exerc. 2008 March ; 40(3): 433–443. doi:10.1249/MSS.0b013e31815f38f1.



Odds ratios for medication use by walking distance relative to < 5 km/wk, adjusted for age, smoking, and intakes of meat, fish, fruits, and BMI where indicated. Brackets designate 95% confidence intervals. Significance levels for the odds relative to < 5 km/wk are coded: * P < 0.05, † P < 0.01, ‡ P < 0.001, and § P < 0.0001. Significance levels relative to all men of women who walked greater distances are presented above the bars and to the left of the arrows.



Odds ratios for medication use by longest usual weekly walk relative to < 4 km, adjusted for age, smoking, and intakes of meat, fish, fruits, and kilometers per week and BMI where indicated. Brackets designate 95% confidence intervals. Significance levels for the odds relative to < 4 km are coded: * P < 0.05, † P < 0.01, ‡ P < 0.001, and § P < 0.0001. Significance levels relative to all men of women who walked greater distances are presented above the bars and to the left of the arrows.



Odds ratios for medication use by usual walk speed relative to < 1.2 m/s, adjusted for age, smoking, and intakes of meat, fish, fruits, and kilometers per week and BMI where indicated. Brackets designate 95% confidence intervals. Significance levels for the odds relative to < 1.2 m/s are coded: * P < 0.05, † P < 0.01, ‡ P < 0.001, and § P < 0.0001. Significance levels relative to all men of women who walked greater distances are presented above the bars and to the left of the arrows.

Appendix: Evidence Chart (Added July 24, 2009)

Target patient behaviors	Evidence supports a positive effect on health outcomes																									Evidence supports physicians can affect behavioral changes
	A. Obesity	B. Hypertension	C. Dyslipidemia	D. Impaired Glucose Tolerance Metabolic Syndrome	E. Type 2 Diabetes	F. Cardiovascular Disease	G. Stroke	H. Heart Failure	I. Peripheral Artery Disease	J. Chronic Obstructive Pulmonary Disease	K. Osteoarthritis	L. Rheumatoid arthritis	M. Cancer – All	N. Breast Cancer	Prostate Cancer	O. Osteoporosis	P. Depression	Q. Fibromyalgia	R. Chronic Fatigue Syndrome	S. Type 1 Diabetes	T. Non-alcoholic fatty	U. Multiple Sclerosis	V. Parkinson's	W. Cognitive Impairment /Dementia	X. Chronic Low Back Pain	
Exercise	X	X	O	X	X	X	X	X	X	O	X	O	X	O		X	X	X	O	X	O	O	O	X	X	X[3]
Diet/nutrition	X	X	X	O	X	X					O			O												
Stress reduction		X[1]				O																				
Smoking cessation		O	O			O																				X
Alcohol moderation		X				O																				
Multiple Behaviors	X	X	X	X	X				O	X	O	X	O		O[2]										O	

X = Evidence includes randomized controlled trials support.

O = Evidence is limited to observational studies.

X/O = Evidence based on literature not cited in literature review.

1. Manikonda JP, Stork S, Togel S, et al, Contemplative Meditation reduces ambulatory blood pressure and stress induced hypertension: a randomized pilot trial; Journal of Human Hypertension, 2007, 1-3.
2. Ornish D, Magbanua MJM, Weidner G. Changes in prostate gene expression in men undergoing an intensive nutrition and lifestyle intervention. PNAS, 2008; 105 (24): 8369–8374.
3. Grandes G, Sanchez A, Sanchez-Pinilla RO, Torcal J, et al. for the PEPAF Group Effectiveness of Physical Activity Advice and Prescription by Physicians in Routine Primary Care: A Cluster Randomized Trial. Arch Intern Med. 2009;169(7):694-701.

The Benefits of Exercise

MEDICAL MODEL

- Helps prevent cardiac disease and stroke
- Reduces blood pressure
- Controls blood glucose
- Controls weight and helps prevent obesity
- Helps prevent bone loss
- Can increase self-esteem and energy, improve mood, and decrease stress.

MENTAL HEALTH MODEL

- Improve sleep
- Increase interest in sex
- Better endurance
- Stress Relief
- Improvement in mood
- Increased energy and stamina
- Reduced tiredness that can increase mental alertness
- Weight reduction
- Reduced Cholesterol and improved cardiovascular fitness

Sharma et al. Exercise for Mental Health. Prim Care Companion J Clin Psychiatry. 2006;8(2):106.

Hwang MY. Why you should exercise. JAMA. 1999;281(4).

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Cognition

- Exercise, brain, and cognition across the lifespan
  - Beneficial in both childhood and adulthood
  - Aerobic and resistance exercise helpful
- Positive association between aerobic fitness and enhanced performance in both the classroom and laboratory
- Improved memory-*Hippocampus*
- Improved multi-tasking, planning and inhibition-pre-frontal cortex

"…there is ample evidence to support it (exercise) as one of the most effective means available to improve mental and physical health…"

Voss MW, et al. Exercise, brain, and cognition across the lifespan. J Appl Physiol 111:1505-1513,2011.

There are four parts of the exercise prescription…

If exercise is prescribed for reversal of disease then this is how we must use it

- F: Frequency- how often?
- I: Intensity- how hard?
- T: Time- how long?
- T: Type- what?

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F.I.T.T.

- **Frequency**: number of sessions or workouts
  - Ex. I will walk 3 times per week
- **Intensity**: difficulty of the exercise
  - Ex. I will walk at a moderate intensity, such that I will be able to talk, but not be able to sing
    - More on intensity in upcoming slides
- **Time**: number of minutes of activity
  - Ex. I will walk for 30 minutes during each session
- **Type**: choice of activity to engage in
  - Ex. I will swim…, I will bike…, I will walk…, etc.