

Exercise and Brain Health;

The Secret to Being Productive Well Into Your 80's!



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Advisory Board

Clinical Professor
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Every Body **WALK!**
The Campaign to Get America Walking

Exercise
is Medicine™

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Exercise and Health

- Physical inactivity has an astonishing array of harmful health effects.
- Exercise is a powerful tool for both the treatment and prevention of chronic disease and obesity, as well as premature death.
 - There is a linear relationship between physical activity and health status.
 - The association between disease and an inactive and unfit way of life persists in every subgroup of the population.
- Physical inactivity is **THE** major public health problem of our time.

THE LANCET

“In view of the prevalence, global reach and health effect of physical inactivity, the issue should be appropriately described as *Pandemic*, with far-reaching health, economic, environmental and social consequences.”

“In view of the prevalence, global reach, and health effect of physical inactivity, the issue should be appropriately described as pandemic, with far-reaching health, economic, environmental, and social consequences.”

Physical Activity

Boris Lushniak, MD, MPH

Acting United States Surgeon General



U.S. Department of Health & Human Services



Office of the Surgeon General

ACSM Annual Meeting
Orlando, Florida; May 30, 2014



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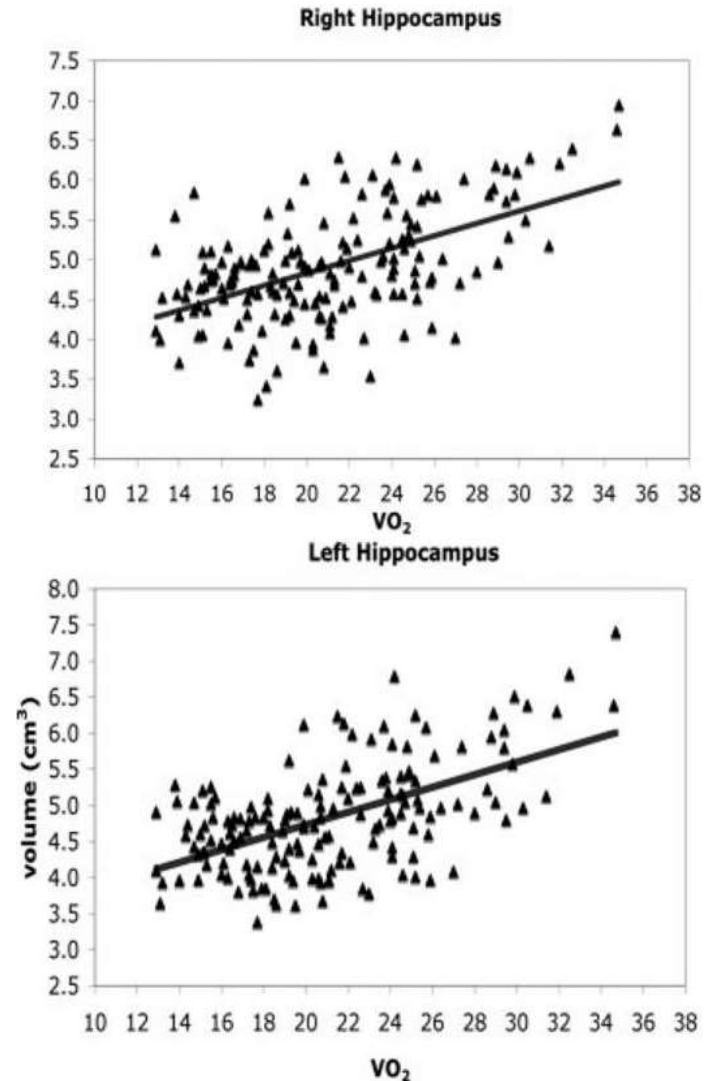
Most Powerful Effect of Exercise May be on the Brain!

- Observational studies showed:
 - More physically active are less likely to show cognitive decline & dementia.
 - Improvements in cognitive scores, psychomotor speed and info processing seen after exercise intervention.
 - Improvements in executive function seen after regular exercise.
 - Both aerobic and resistance exercise show benefits.



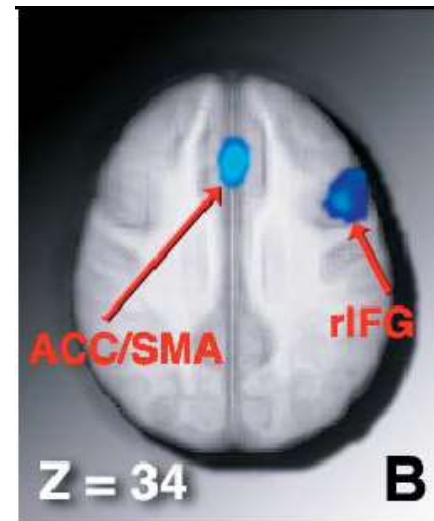
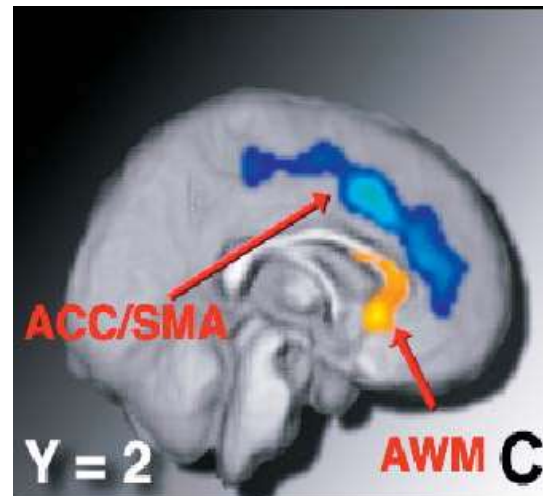
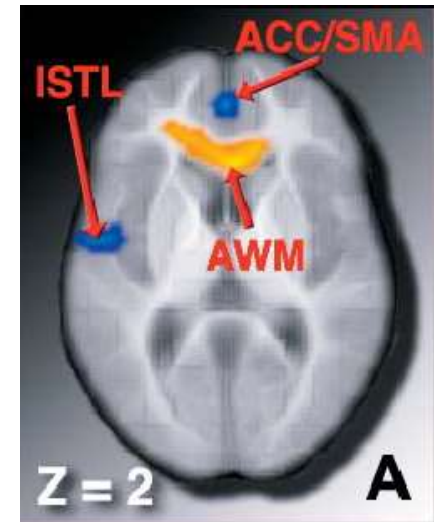
Aerobic Fitness Associated with Hippocampus Volume

- 165 healthy older adults (age 59-81) tested VO₂ with max treadmill.
- Brain MRI done with volumetric analysis of hippocampus.
- Higher VO₂ associated with;
 - Larger hippocampus volume.
 - Better spatial memory.
 - Higher levels of BDNF.
 - Similar studies in kids and middle age adults.



Exercise Increases Brain Volume

- 59 Healthy, sedentary old adults randomly assigned to exercise vs stretching.
- MRI done before and 6 months after and compared.
- Increases in grey and white matter in exercise group but not controls.
- 32.6% average increase; mainly frontal lobes.



Twins Study; One exercises the other does not

- Finland twins data base; 10 sets male twins in early to mid-30's; Divergent exercise patterns (avg ~3 yrs).
 - Compared active vs sedentary identical twins.
 - Diets were very similar.
- Measured endurance capacity, body comp, insulin sensitivity and brain scan; Sedentary twin had:
 - Lower endurance capacities, higher body fat percentages, and signs of insulin resistance.
 - Less grey matter, especially areas involved in motor control and coordination.



Benefits of Physical Activity in Kids



Physical Activity Improves Mental Health

- Regular PA may increase self esteem
- Regular PA may decrease anxiety/depression*
- Some evidence shows teen girls have lower rates of sexual activity and pregnancy when PA increased
- Some evidence regular PA associated with decreased smoking, alcohol and drug abuse



K.J. Calfas, W.C. Taylor. Ped Exerc Sci 1994. 6:406-423
Sabo et al. J Adolesc Health 1999;25:207-16

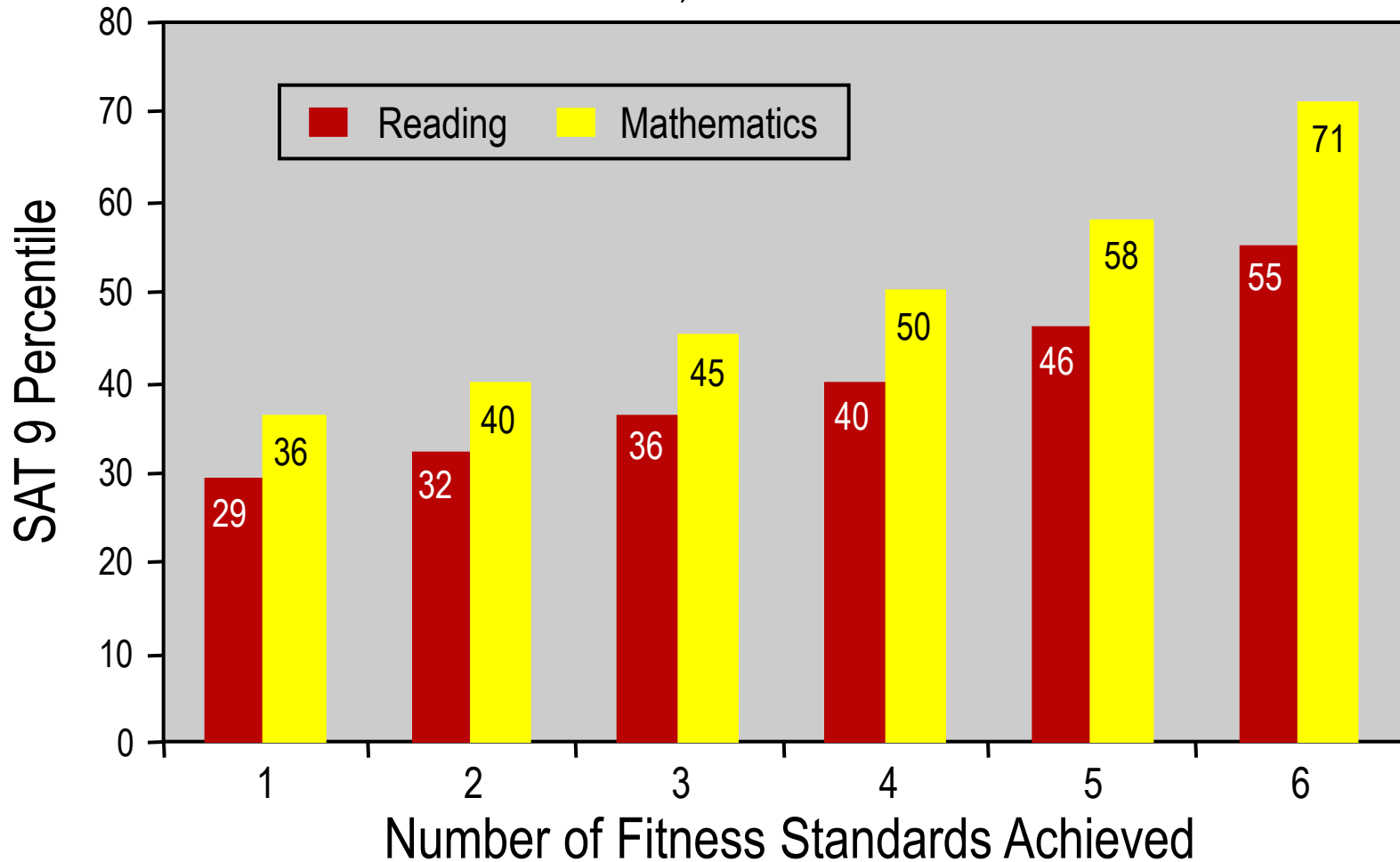
Fitness and Stanford Achievement Test 9th Ed SAT-9 and Fitnessgram Results

- Fitnessgram test:
 - 1. Aerobic Capacity
 - 2. Body Composition (% of body fat)
 - 3. Abdominal Strength and Endurance
 - 4. Trunk Strength and Flexibility
 - 5. Upper Body Strength and Endurance
 - 6. Overall Flexibility

Grade 5

SAT 9 and Physical Fitness

353,000 Students

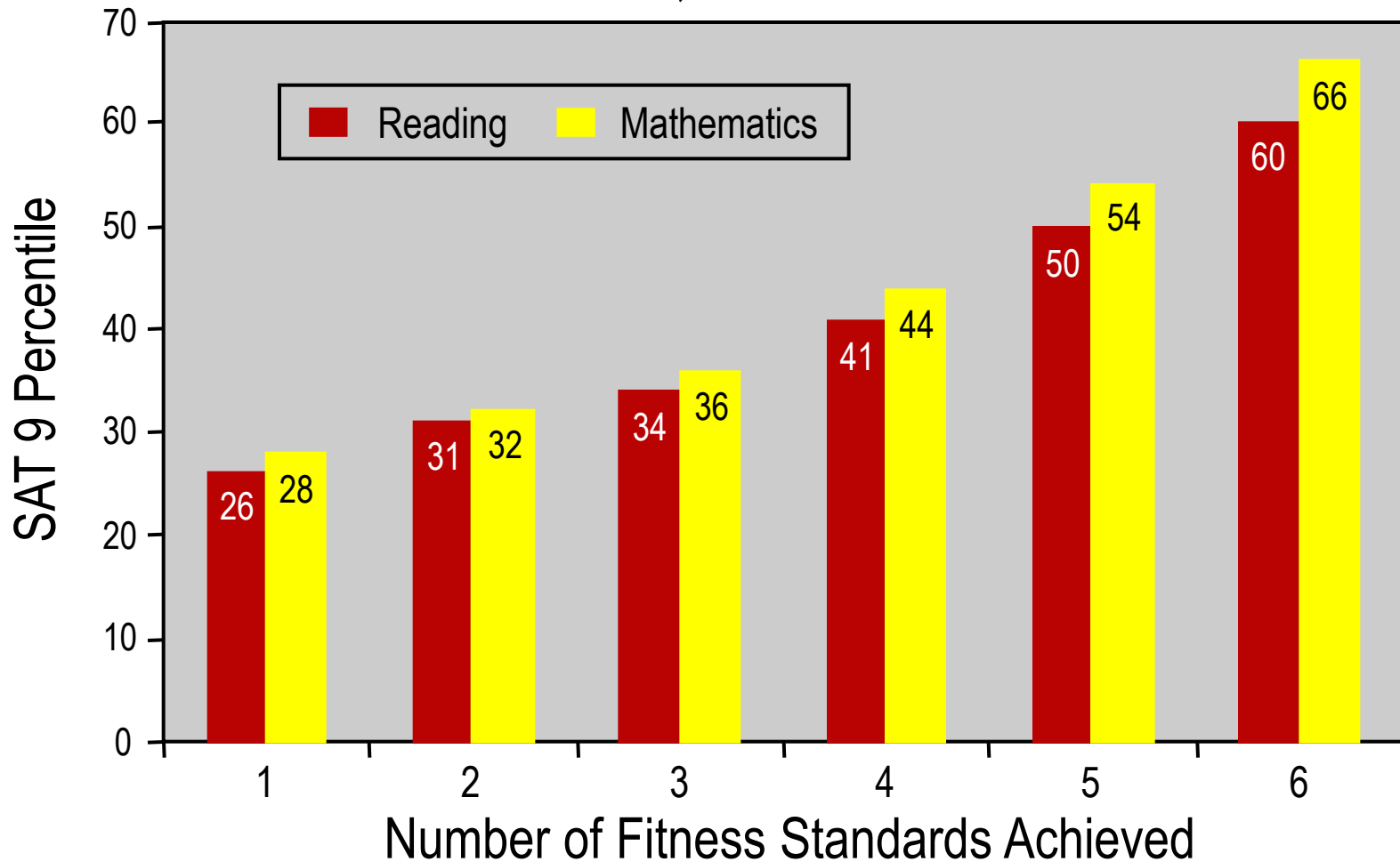


Source: California Dept. of Education Study, December 10, 2002

Grade 7

SAT 9 and Physical Fitness

322,000 Students

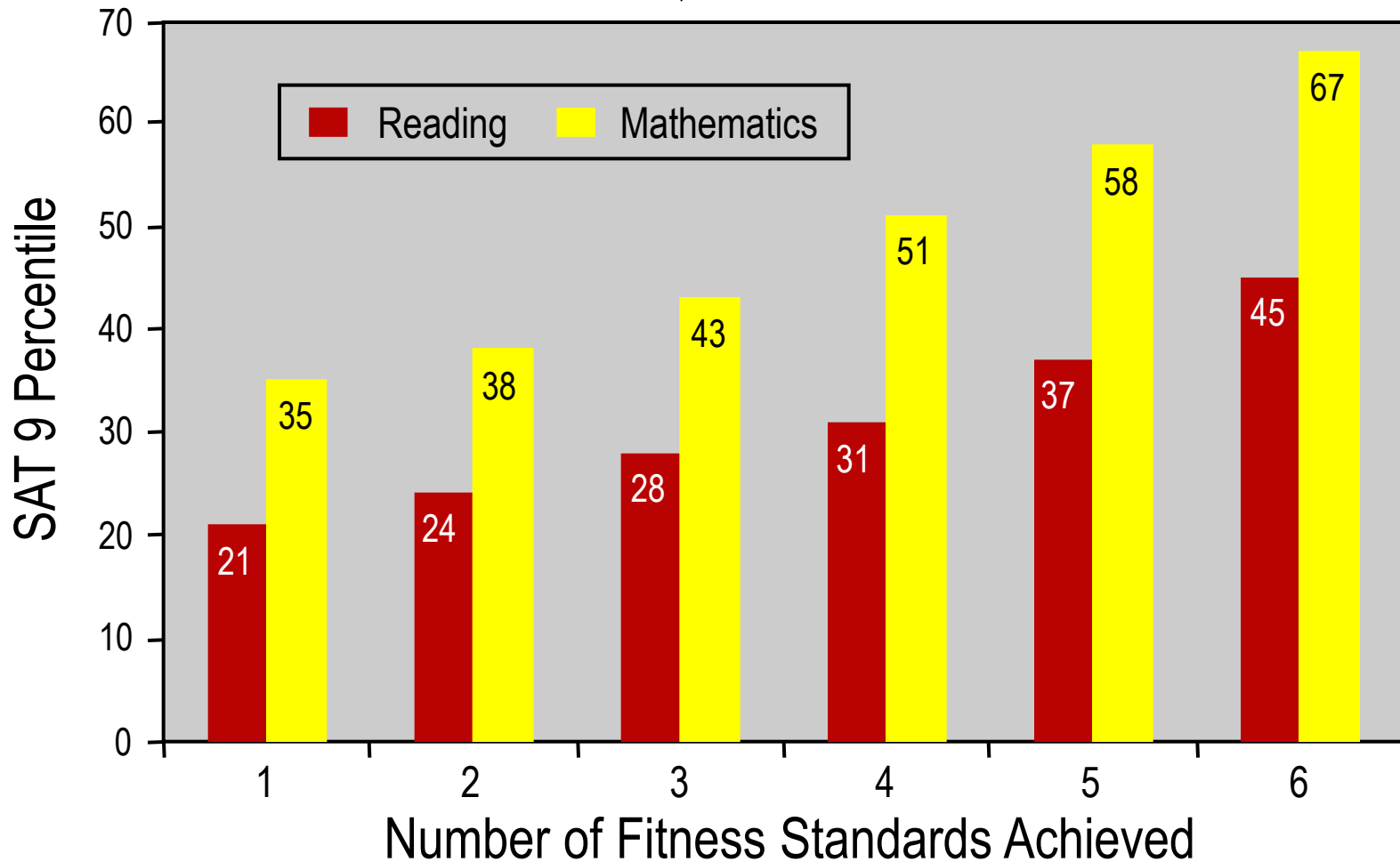


Source: California Dept. of Education Study, December 10, 2002

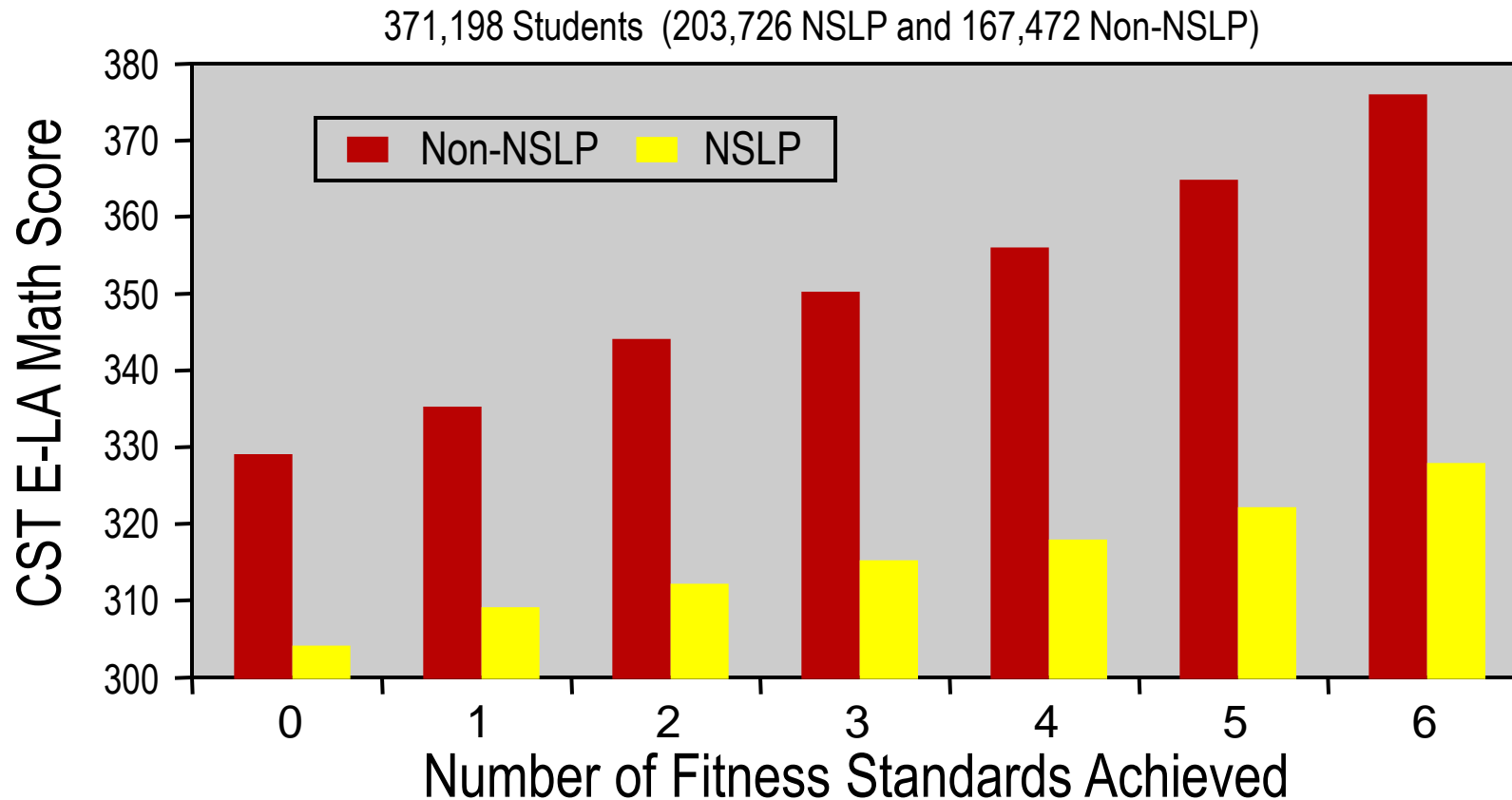
Grade 9

SAT 9 and Physical Fitness

279,000 Students



Socioeconomic Status** & Number of Fitness Standards 2004 CST* Scores in English- Grade 5



*California Standards Test

**National School Lunch Program

Results using math scores were consistent with those using English-Language Arts scores.

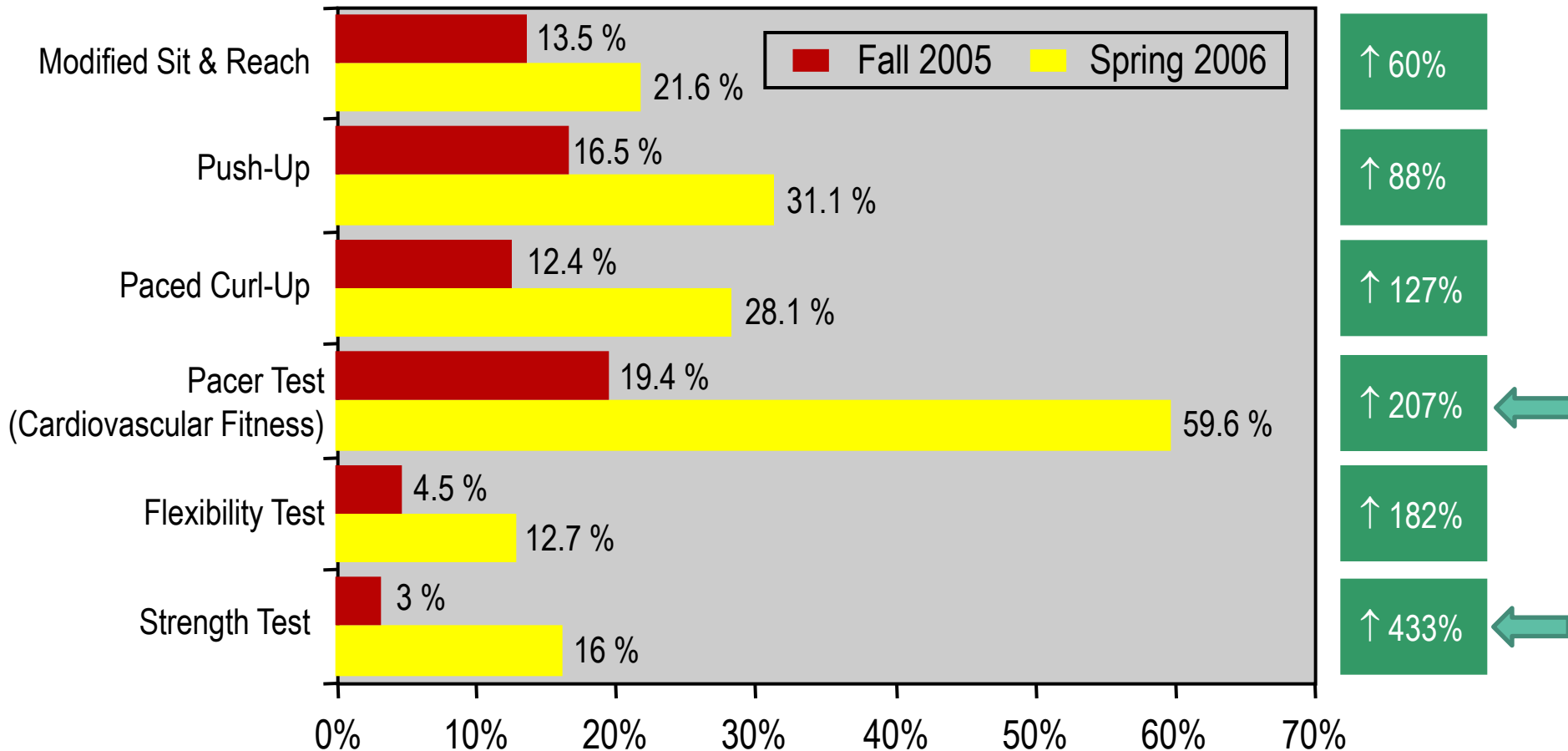
Results for seventh- and ninth-grade students were consistent with those for fifth graders.

Source: California Physical Fitness Test, 2004 Results, Calif. Dept. of Ed., April 2005

Improvements in Fitnessgram Results

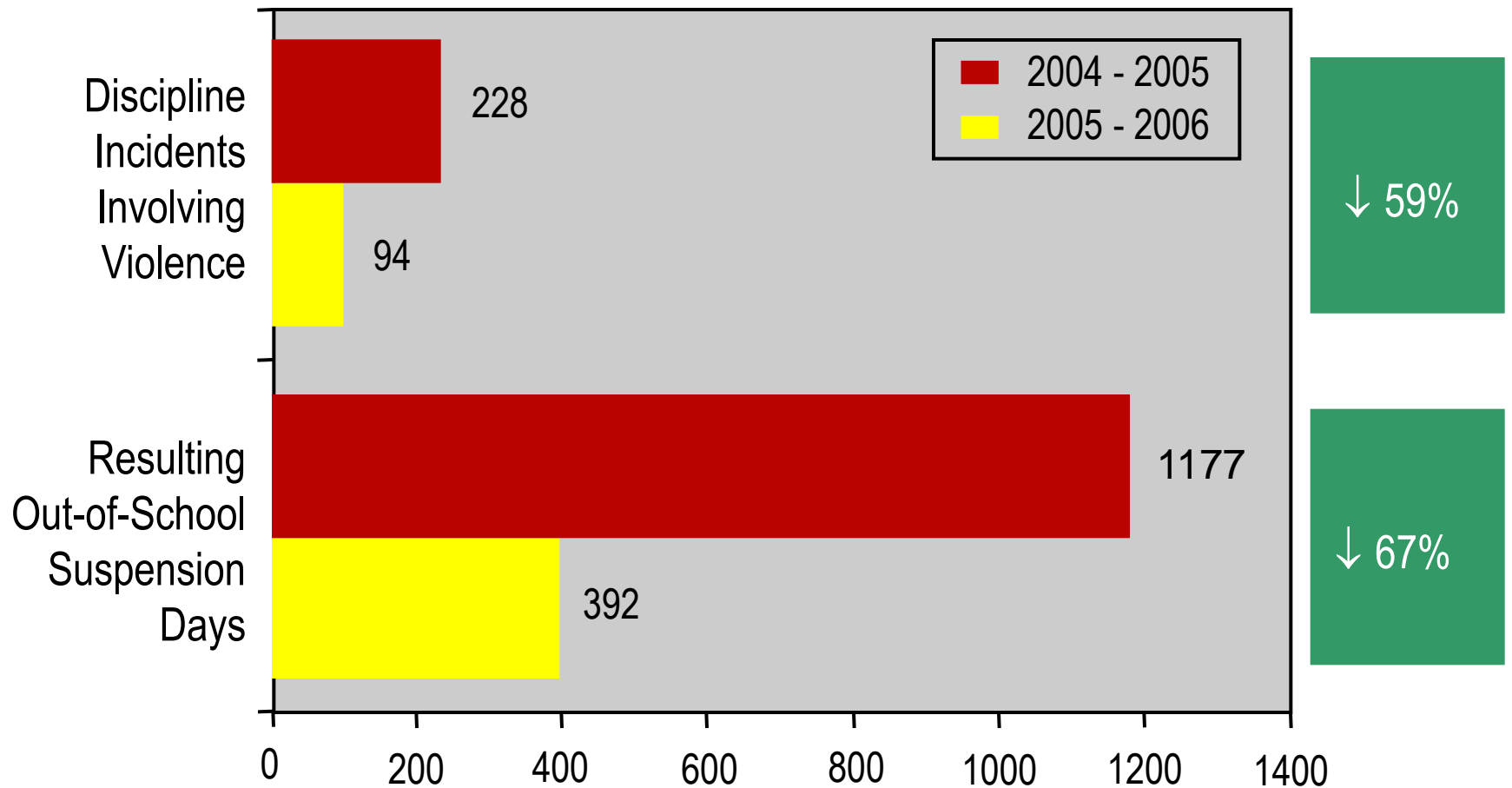
PE 4 Life Program at 6 months

Woodland Elementary School, Kansas City PSD
Fall 2005 – Spring 2006, Grades 4 and 5



Percent Reduction in Disciplinary Issues PE 4 Life Program at 6 months

Woodland Elementary School, Kansas City PSD #33
Fall 2005 – Spring 2006, Grades 4 and 5



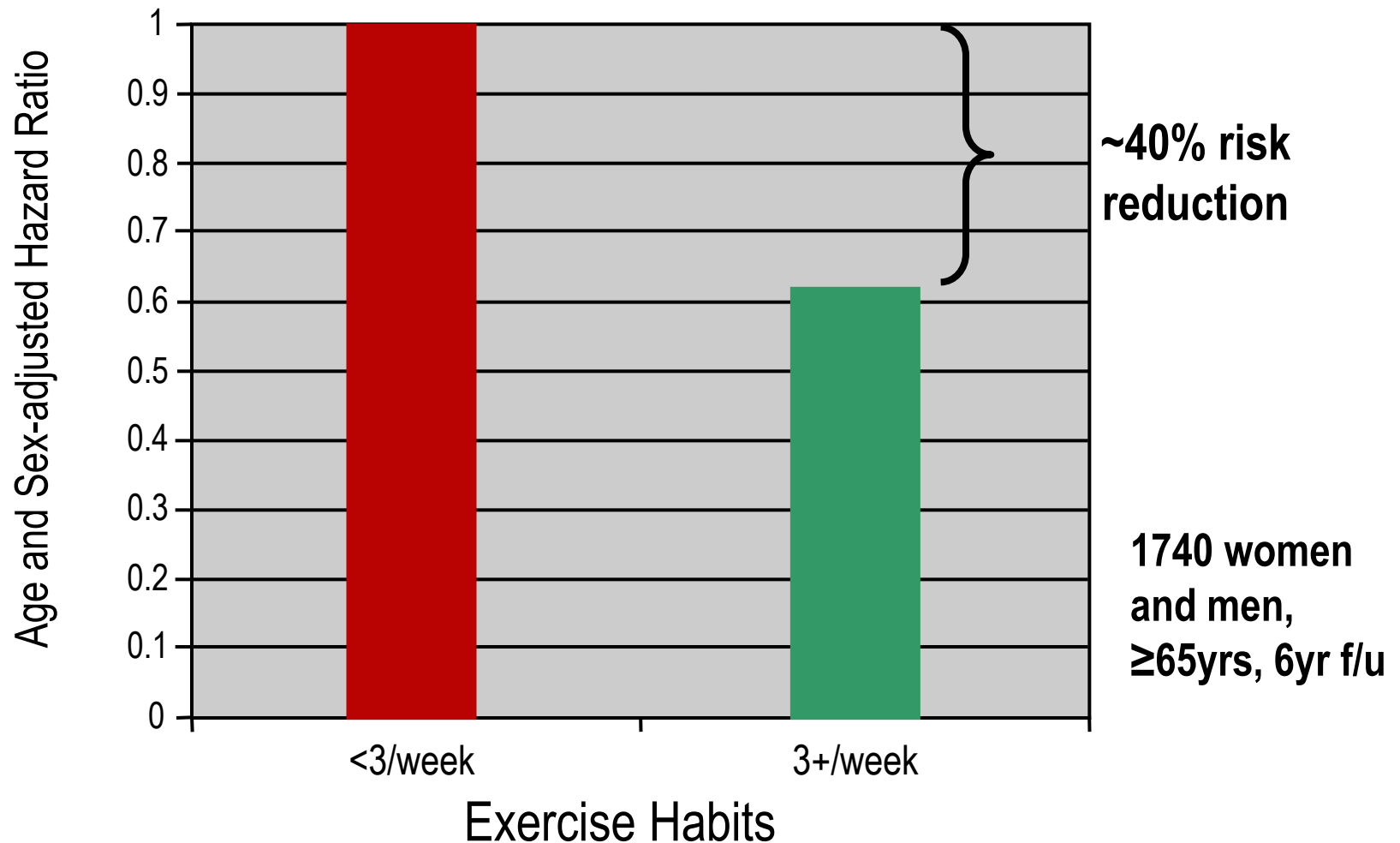
Fitness and Neurocognitive Function in Preadolescent Children

- 24 children, mean age, 9.6 years
- Fitness assessed by FITNESSGRAM
- Neurocognitive function assessed by responses to a stimulus discrimination task
- Fitness was positively associated with attention, working memory, response speed, and cognitive processing speed

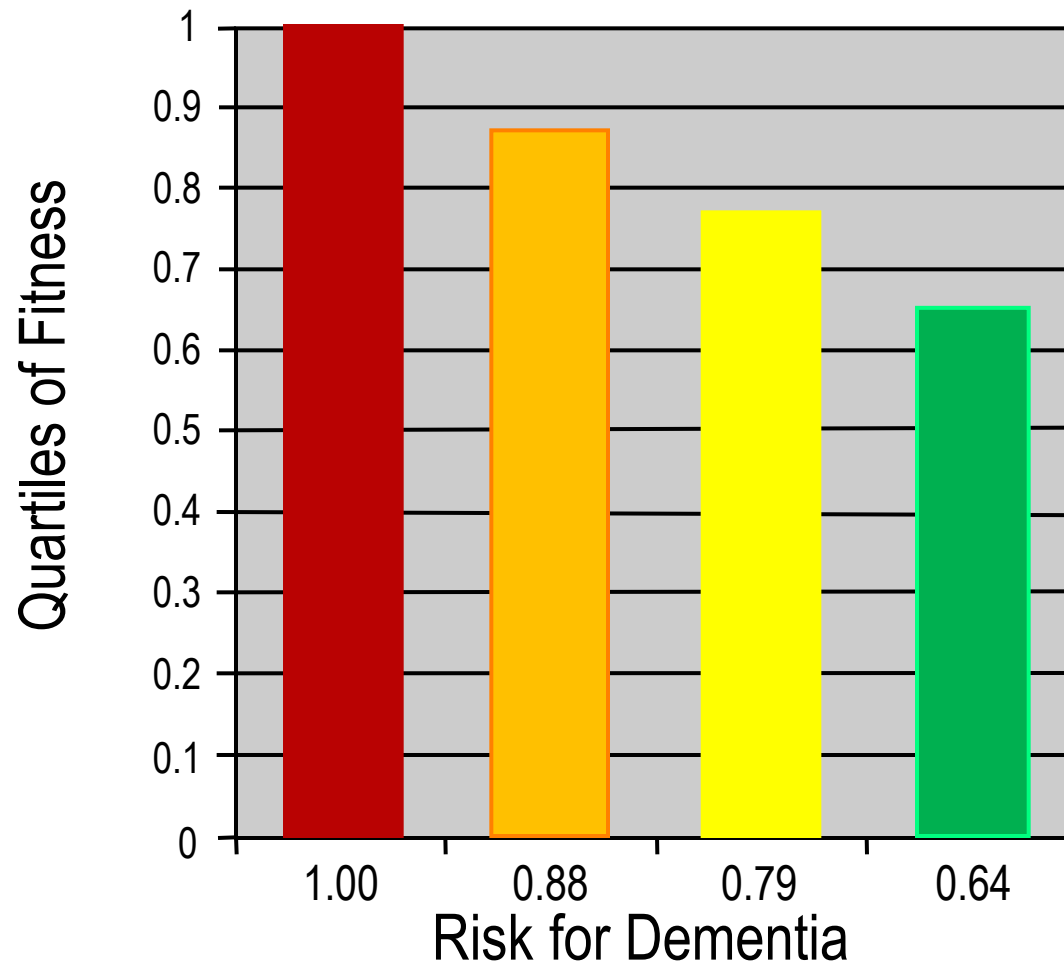
Benefits of Physical Activity as We Age



Exercise and *Dementia*



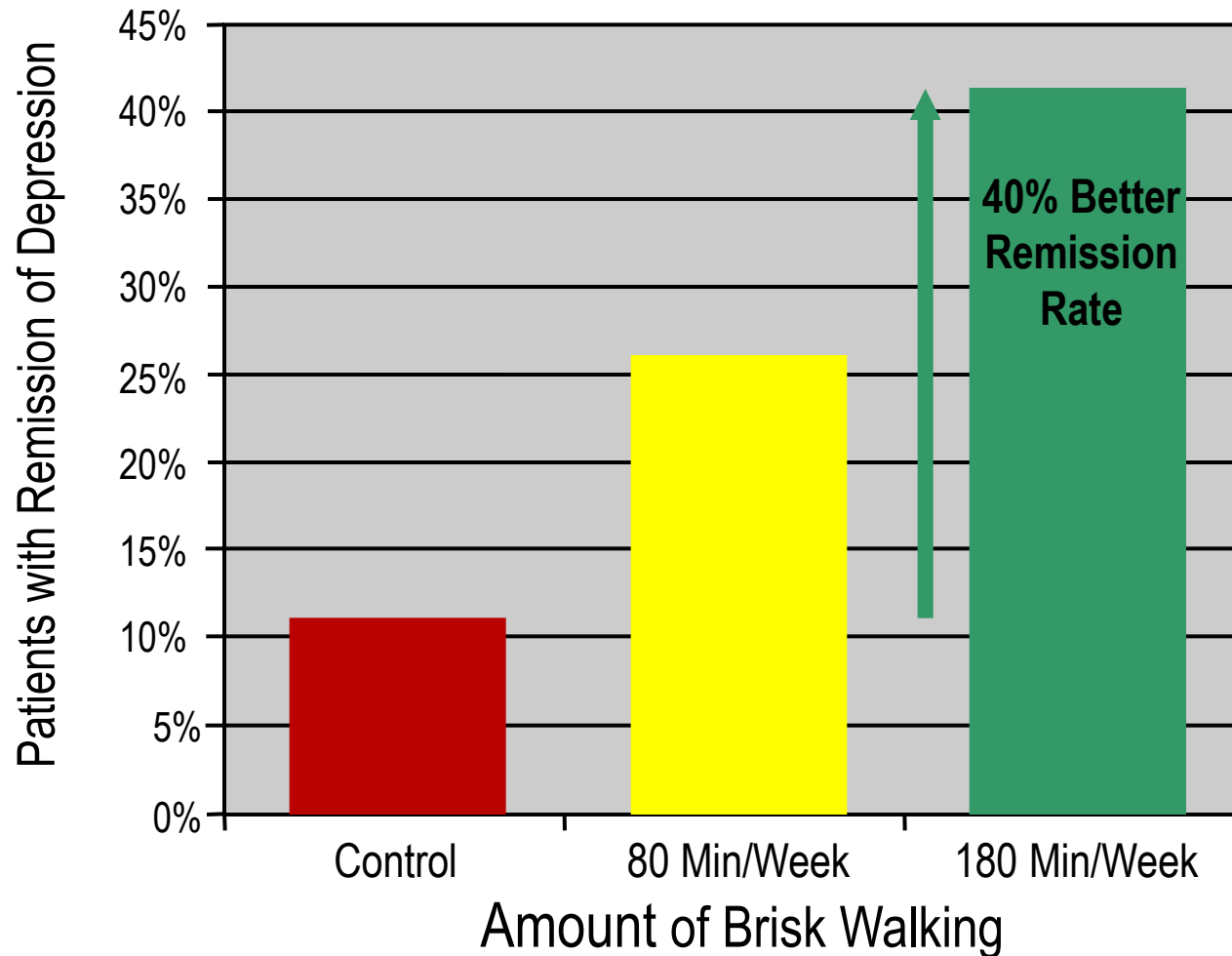
Middle Age Fitness and Dementia Risk



} Most fit ~36%
↓

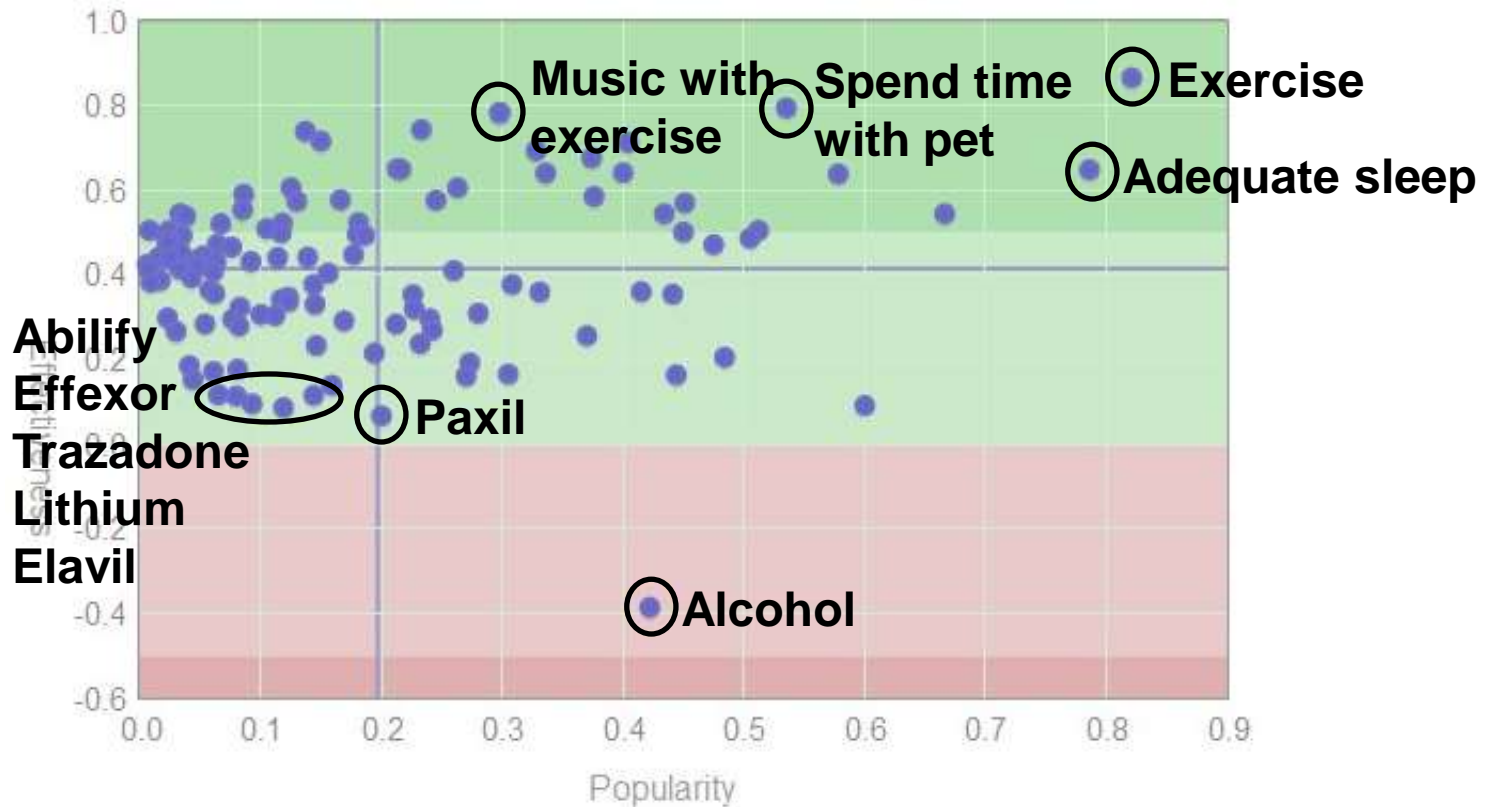
- 19,458 men & women;
- Mean age 49.9 yrs
- Fitness tested (Balke)
- Followed avg. 25 yrs;
- 1659 dementia cases.

Exercise is a Treatment for *Depression*





117 Depression Treatments Compared
Hover over each dot to see what treatment it represents.



This infographic is based on a total of 22,800 treatment effectiveness ratings.

Exercise and Quality of Life



Exercise and Quality of Life

- Examined effect of exercise on QOL in 430 healthy, sedentary post menopausal women.
- Randomly assigned to 50%, 100% and 150% of recommended PA.
- Examined 8 aspects of physical and mental QOL at baseline and 6 mo using Medical Outcomes Study 36-Item Short Form Health Survey (SF-36)

ORIGINAL INVESTIGATION

Exercise Dose and Quality of Life

A Randomized Controlled Trial

Carly K. Martin, PhD; Timothy S. Church, MD, MPH, PhD; Angela M. Thompson, MSPH; Conrad P. Earnest, PhD; Steven N. Blair, PED

Background: Improved quality of life (QOL) is a purported benefit of exercise, but few randomized controlled trials and no dose-response trials have been conducted to examine this assertion.

Methods: The effect of 50%, 100%, and 150% of the physical activity recommendation on QOL was examined in a 6-month randomized controlled trial. Participants were 430 sedentary postmenopausal women (body mass index range, 23.0-43.0 [calculated as weight in kilograms divided by height in meters squared]) with elevated systolic blood pressure randomized to a nonexercise control group (n=92) or 1 of 3 exercise groups: exercise energy expenditure of 4 (n=147), 8 (n=96), or 12 (n=95) kilocalories per kilogram of body weight per week. Eight aspects of physical and mental QOL were measured at baseline and month 6

with the use of the Medical Outcomes Study 36-Item Short Form Health Survey.

Results: Change in all mental and physical aspects of QOL, except bodily pain, was dose dependent (meta-analysis were significant, and exercise dose was a significant predictor of QOL change; $P < .05$). Higher doses of exercise were associated with larger improvements in mental and physical aspects of QOL. Controlling for weight change did not attenuate the exercise-QOL association.

Conclusions: Exercise-induced QOL improvements were dose dependent and independent of weight change.

Trial Registration: clinicaltrials.gov Identifier: NCT00011193

Arch Intern Med. 2009;169(3):269-278

Author Affiliations: Pennington Biomedical Research Center, Louisiana State University System, Baton Rouge (Drs Martin, Church, and Earnest and Ms Thompson); Arnold School of Public Health, University of South Carolina, Columbia (Dr Blair); and Department of Kinesiology, Health Promotion, and Recreation, University of North Texas, Denton (Dr Blair).

Author Disclosures of Potential Conflicts of Interest and Author Contributions: Disclosures: None reported. Contributions: Dr Martin designed the study, collected data, and drafted the manuscript. Dr Church designed the study, collected data, and drafted the manuscript. Dr Blair designed the study, collected data, and drafted the manuscript. Ms Thompson designed the study, collected data, and drafted the manuscript. Dr Earnest designed the study, collected data, and drafted the manuscript. Dr Blair designed the study, collected data, and drafted the manuscript.

Address correspondence to: Dr Martin, Pennington Biomedical Research Center, Louisiana State University System, Baton Rouge, LA 70803 (carly.k.martin@lsu.edu).

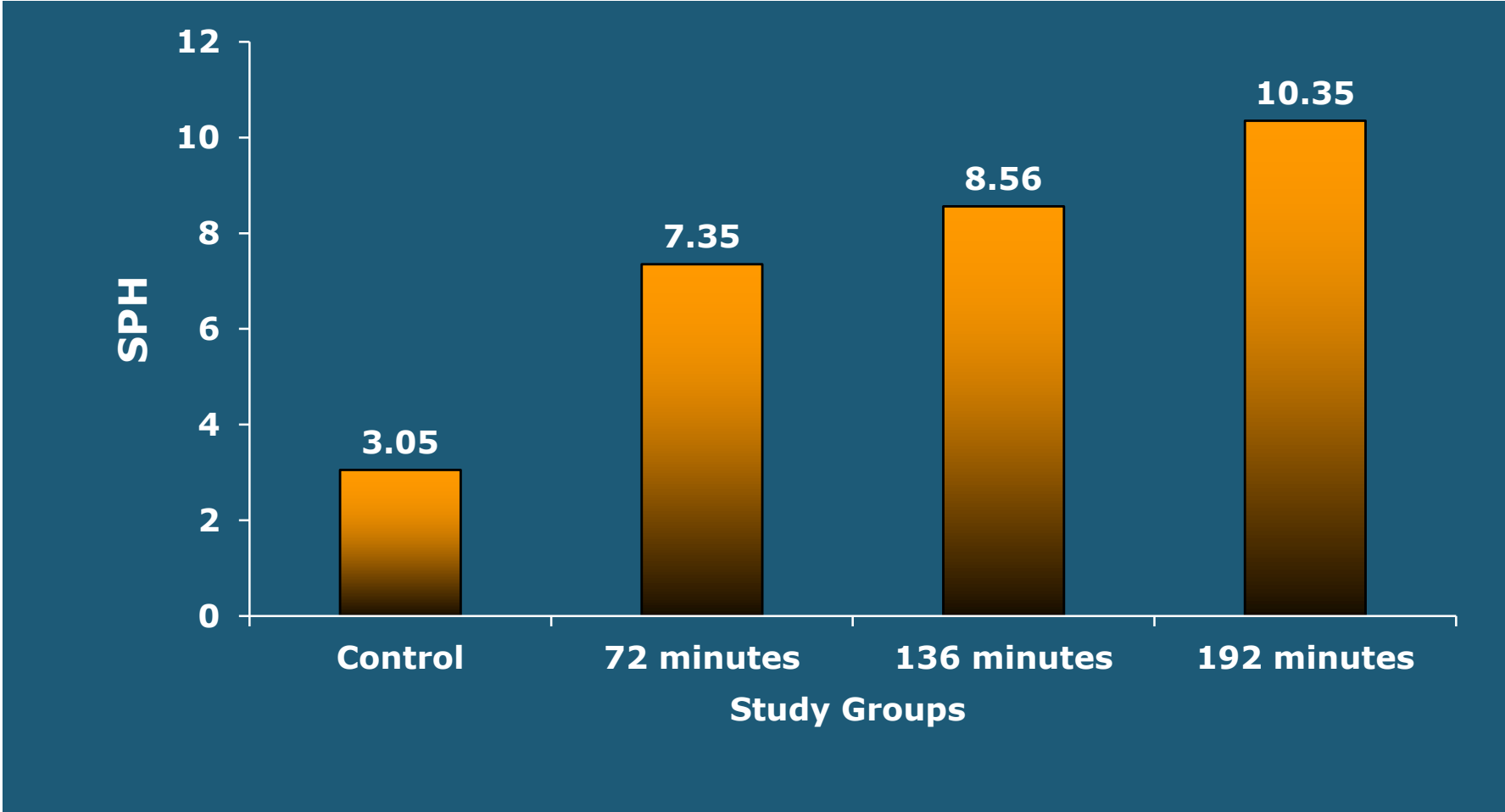
Reprints: Requests for reprints should be directed to Dr Martin, Pennington Biomedical Research Center, Louisiana State University System, Baton Rouge, LA 70803 (carly.k.martin@lsu.edu).

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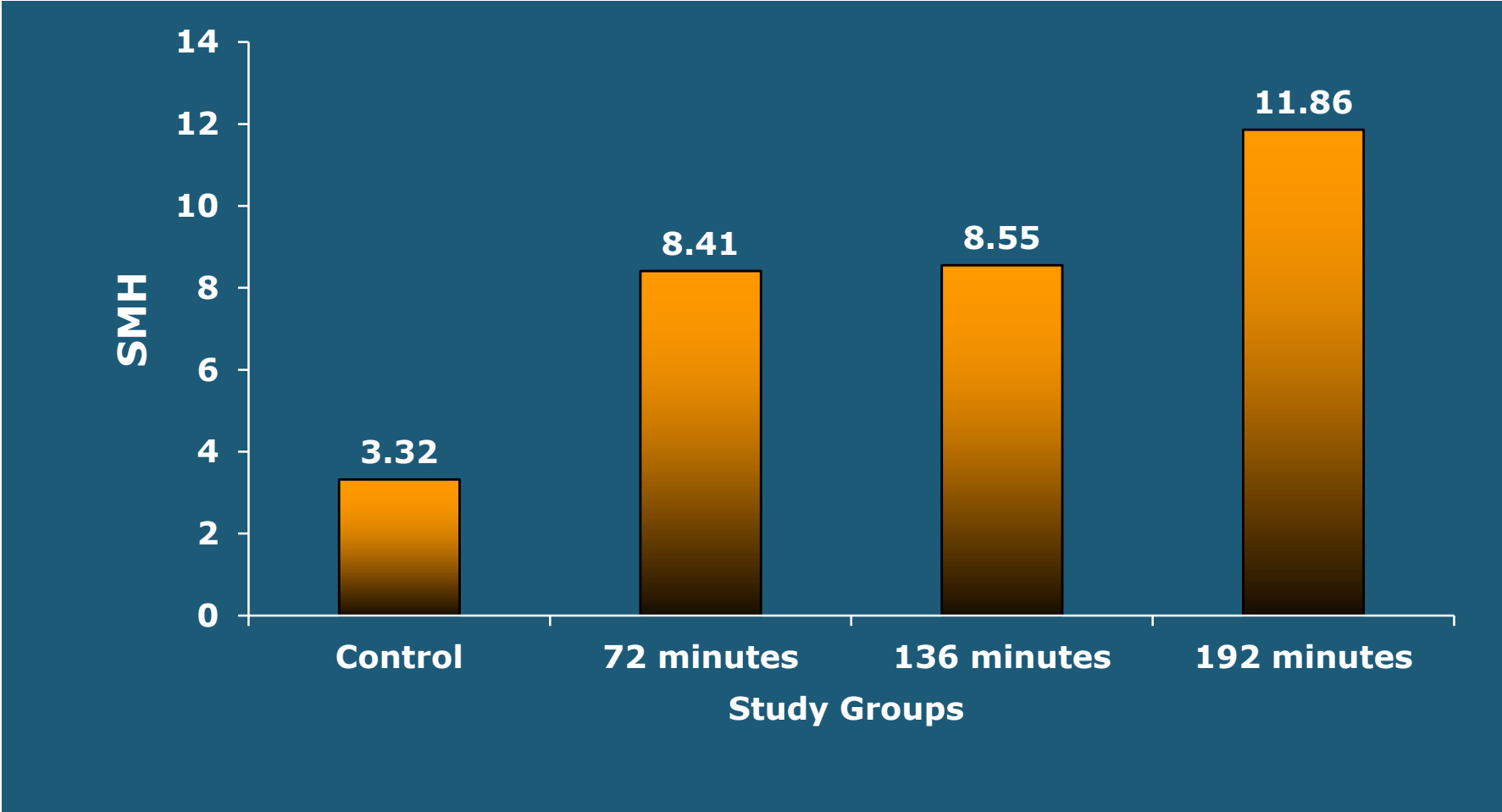
SEDENTARY LIFESTYLE IS A risk factor for many chronic conditions, including diabetes mellitus, heart disease, stroke, and certain types of cancers.^{1,2} Regular physical activity and higher levels of cardiorespiratory fitness are associated with lower risk for premature mortality, and exercise training has been demonstrated to improve a number of important risk factors, such as cardiorespiratory fitness,³ weight, high-density lipoprotein cholesterol level, and fasting insulin level.⁴ Although mood, level of functioning, energy level, and other measures of quality of life (QOL) are purported to be improved by regular exercise, this claim is largely unsubstantiated in populations without significant morbidities. There is strong evidence that regular exercise substantially improves QOL in populations with serious diseases, such as cancer⁵ or chronic obstructive pulmonary disease,⁶ but the data are not as supportive in populations without disease. Although many, but not all, epidemiological studies have found an association between exercise and QOL, the available data from intervention trials fail to consistently find a strong effect of exercise training on QOL.^{1,2,7} Furthermore, the data from intervention trials are difficult to interpret because of small sample sizes, inadequate control groups, and poor exercise compliance. In addition, many studies include a weight loss component, making it difficult to separate the benefits of weight loss from the benefits of increased exercise.

In our knowledge, there are no well-controlled, properly powered, randomized controlled trials (RCTs) examining the role of exercise in improving QOL among individuals without significant comorbidities. The Dose-Response to Exercise in Postmenopausal Women (DREW) study was designed to examine the health benefits of 50%, 100%, and 150% of the National Institutes of Health Consensus Development Panel⁸ physical activity recommendation among 464 sedentary, overweight or obese postmenopausal women with elevated blood pressure. The primary outcomes of cardiorespiratory fitness and blood pressure have been reported,⁹ but data on a number of important secondary outcomes also were included a priori in the study design, in-

Change in Physical Health

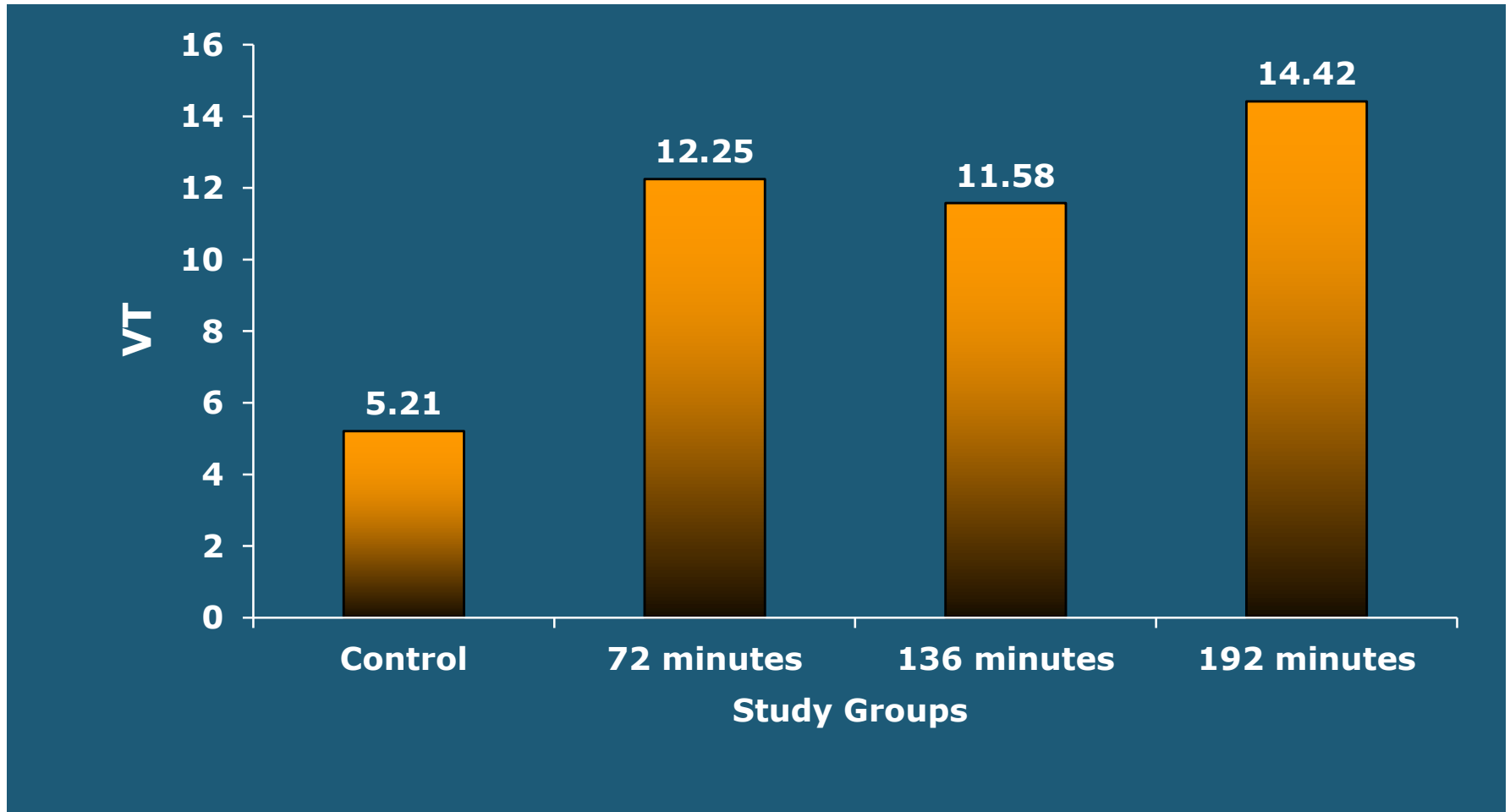


Change in Mental Health

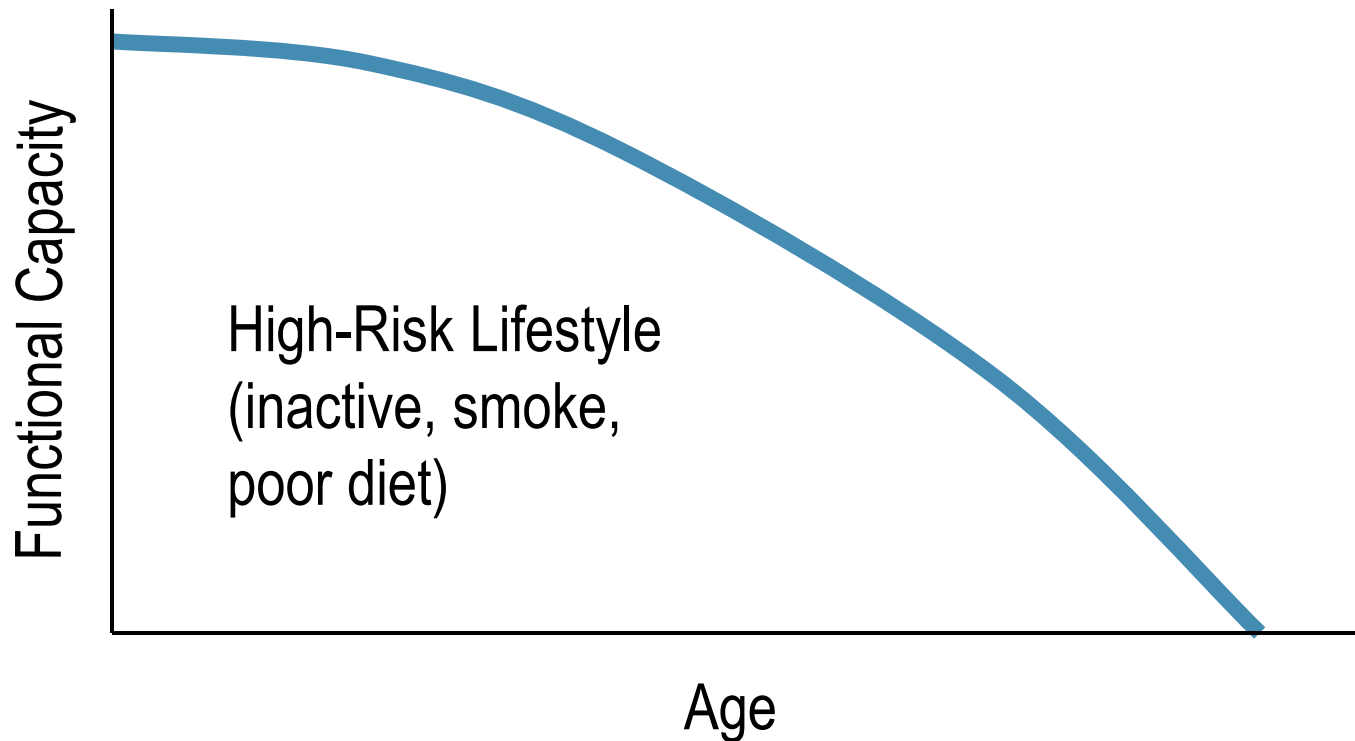


Martin, *Arch Intern Med.* 2009

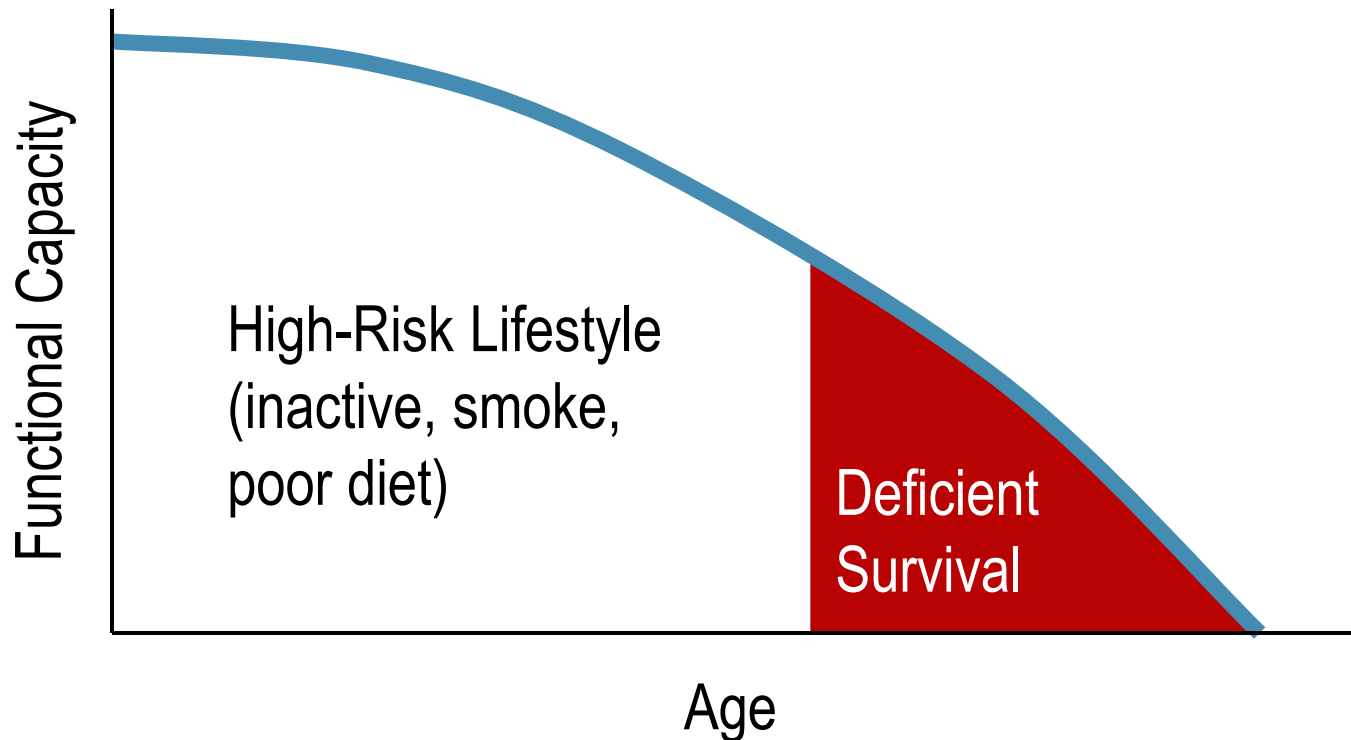
Change in Energy



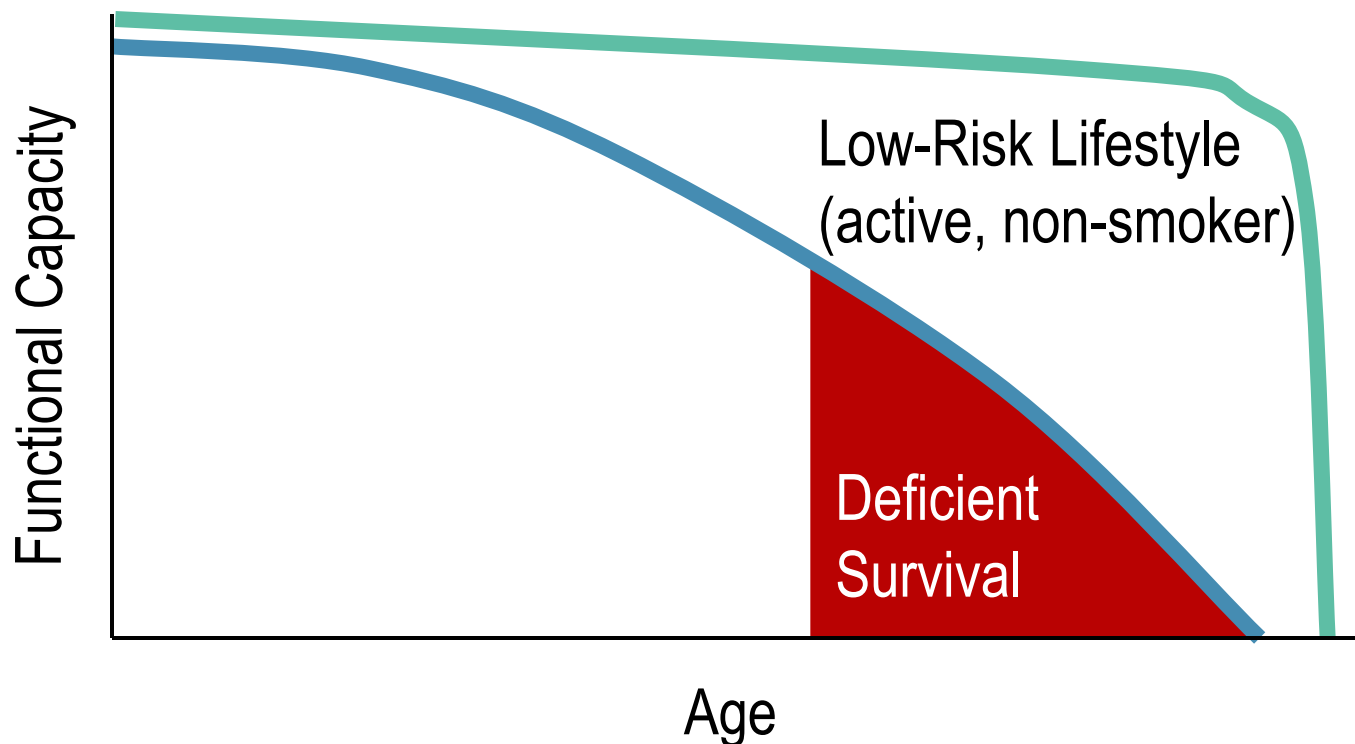
Quality of Life; The Geriatric Curve



The Effect of an Unhealthy Lifestyle “Deficient Survival”



The Effect of a Healthy Lifestyle “Squaring off” the Geriatric Curve



“The goal is to die young, but as late as possible.”
Aldous Huxley

What Can be Done?

- World wide exercise initiative:
 - Every patient. Every visit. Every treatment plan.
- Physical activity should be recorded as a vital sign; Patients advised to do 30 min of mod exercise, 5 days/wk.
- Message should be the same from every medical provider, regardless of specialty.
- We must begin to merge the healthcare industry with the fitness industry.



Exercise as a Vital Sign

- Essential first step in making exercise prescription a standard in clinical practice.
 - Every patient needs to be asked about their exercise habits at every visit.
 - Record with BP, HR, temp, BMI and smoking history.
- All Electronic Medical Records (EMR's) need a query for exercise.
 - Medical assistant should ask about exercise during patient intakes.
 - Must be easy to ask and record.

Smith, John W

MRN: 000017701887 Age: 30 year Sex: M PCP: Spero, Robert David (M.D.) Allergies: Sulfa Class, Acarbose, 5-alpha Reductas* Alert: Spec Feat: kp.org: Inactive

SnapShot

4/22/2009 visit with TEST DUMMY MD

[Images](#) [Questionnaires](#) [Admin](#) [Benefits Inquiry](#) [References](#) [SmartSets](#) [Open Orders](#) [Preview AVS](#) [Print AVS](#)
Allergies: Sulfa Class, Acarbose, 5-alpha Reductase Inhibitors, Acetaminophen + Propoxyphene Napsylate Reviewed on 2/27/2009

Last Vitals: BP: 120/80 P: 60 T: T Src: Resp: 22 W: 190 lbs (86.183 kg) H: 5' 10" (1.778 m)

BMI: 27.26 kg/m2, BSA: 2.06 m2 Exercise Vitals: 180 mins/wk

Height 5' 10" (1.778 m)

Peak Flow

Charting

- Chief Complaint
- Nursing Notes
- Vitals
- Exercise Vitals**
- Review Exercise VS
- Med. Document
- BestPractice
- History
- Progress Note
- SmartSets
- Dx and Orders
- Pt. Instructions
- LOS
- Follow-up
- Close Encounter

Exercise Vitals - Exercise Vitals (SHIFT+F6 to enter comments)

Instant Taken:

Date: 4/30/2009

Time: 1149

Exercise Level of Effort

 Days per week of moderate to strenuous exercise (like a brisk walk)

0	1	2	3	4	5	6	7
---	---	---	---	---	---	---	---

 On average, minutes per day of exercise at this level

10	20	30	40	50	60	90	120	150 or greater
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[Restore](#) [Close F9](#) [Cancel](#)
[Previous F7](#) [Next F8](#)

Review Exercise Vitals

 Mark as Reviewed Last Reviewed by SHARMA, PANKAJ on 4/24/2009 at 12:36:26 PM

Medication Documentation

Current Prescriptions	Taking?	Start Date	End Date
ATENOLOL 100 MG ORAL TAB TAKE 1 TABLET ORALLY DAILY		4/29/2009	
	Provider: William Lewis (M.D.) Spering		
ATENOLOL 100 MG ORAL TAB 1 TAB PO DAILY		4/29/2009	5/29/2011
	Provider: William Lewis (M.D.) Spering		

[Hotkey List](#)


Exit Workspace

[Navigator Hotkeys](#)



What Can Busy Physicians Do to Encourage Physical Activity?



0 Minutes:

-  Running late? Too many other concerns on the patient's list? Relax. Perhaps you can discuss physical activity at the next visit. Hopefully office staff will have assessed exercise and provided resources.

1 Minute for Advice:

-  Quickly congratulate patients who are getting 150 minutes or more of moderate or greater physical activity.
-  Advise patients who are getting fewer than 150 minutes of the importance of physical activity, especially linking benefits to patient's concerns, problems, and diagnosis.

Write a walking Rx for patients!



Name: John W. Smith Age: 30

Walking **R_x** Date: _____

Recommended activity level: Moderate

Minutes per day: 30 minutes

Number of days per week: 5 or more

Intensity: Hard enough that you can't sing,
but not so hard you can't talk during exercise.

Stop: If you experience chest pain,
excessive shortness of breath or feel ill.




Signature: Robert Sallis, MD






What Can Busy Physicians Do to Encourage Physical Activity?



2 Minutes for a Prescription:

-  Review key messages about the importance of physical activity.
-  Offer a generic Exercise Prescription.
-  Suggest useful resources (e.g. Pedometer, Wellness Coaching by phone, fitness professional, community resources, chair exercise DVDs, etc).

5 Minutes for Brief Counseling:

-  Assess readiness for change regarding exercise habits.
-  Ask what the patient might want to do to be more active and barriers to prevent this from happening -- brainstorm on how to get around them.
-  Explain in detail how exercise can affect diseases they have or are at risk for and how they can go about incorporating it into their life.

The Exercise Prescription

“Think FITT”

F = Frequency

Most days of the week; 5 or more.

I = Intensity

Moderate; 50-70% of max HR or use “sing-talk” test.

T = Type

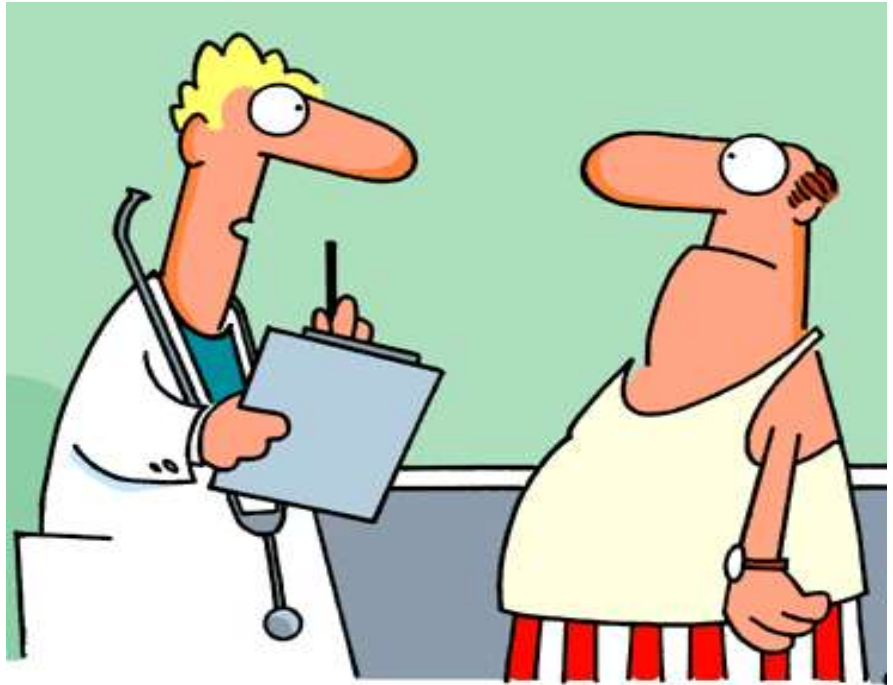
Use large muscle groups; something enjoyable.

T = Time

30 minutes.

Common Barriers to Exercise

- Competing demands (work/kids/spouse)
- Not enough time
- Too tired
- Physical limitations
- Too boring
- Sedentary habits



“What fits your busy schedule better, exercising ½ hour a day or being dead 24 hours a day?”

Breaking Down the Barriers

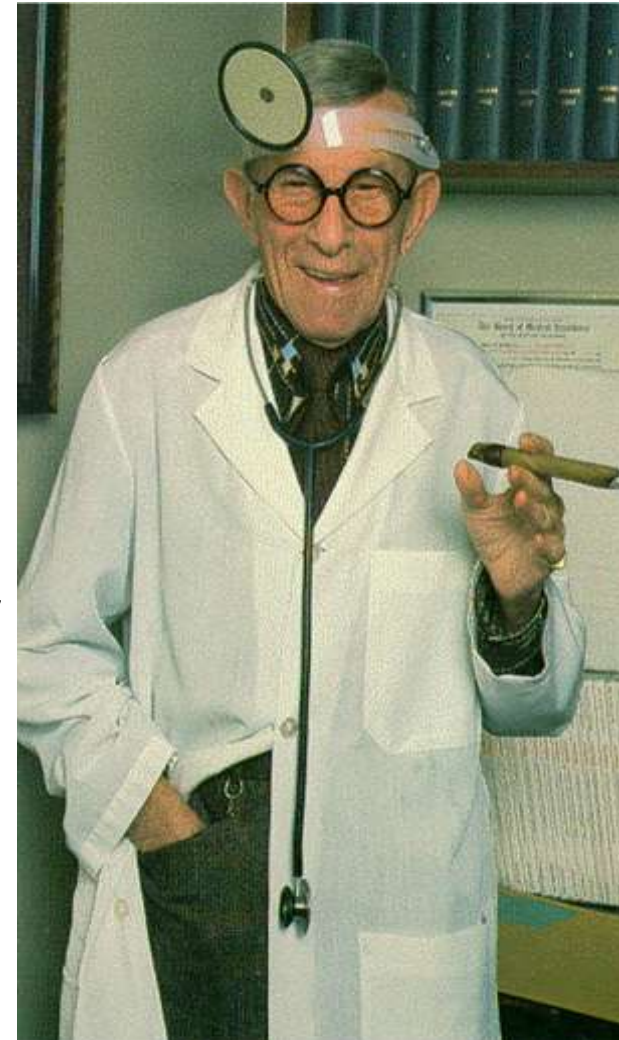
- Make exercise a habit, not an option.
- 150 min per week is goal – not starting point; so start small:
 - 1-2 days per week
 - Three 10-min bouts.
- Simple recipe for getting your exercise:
 - AM; park car 10 min from office, walk in
 - Lunch; walk 5 min out, eat, walk back
 - PM; Walk 10 min back to car

Breaking Down the Barriers

- Make weekends count!
 - Change mindset; weekends are for fitness.
 - Walk 60 min on Sat or Sun, only need 90 more minutes during week.
- Bump up the intensity!
 - 25 min of vigorous exercise (jog) done 3x per wk
 - 30 min of moderate (brisk walk) done 5x per wk
- More ideas:
 - Find an exercise partner
 - Get good shoes and nice workout clothes
 - Set goals (fun run, sprint triathlon)

Why Choose Walking as the Default Exercise Prescription?

- Walking is accessible
 - All ages, fitness level, ability, alone or in groups
- Walking is low cost
 - No gym, no equipment
- Walking is measureable
 - Pedometer, stop watch, distance
- Walking is the most common adult activity
 - Good long term adherence
- Walking is proven
 - Multiple studies prove benefit
- Walking is cost saving
 - Health costs lower, its “Green”



How fast do you need to walk; To stay ahead of the Grim Reaper?



- Several studies have shown correlation between walking speed and survival.
- 1705 Australia men, age ≥ 70 ; Measured walking speed at usual pace for 6 m (~20 feet); Speed correlated with mortality rates over 5 yrs:
 - Walking speed of 0.82 m/s (2 mph or 3 kph) was most predictive of mortality (i.e. speed of Grim Reaper)
 - No men walking at speeds ≥ 1.36 m/s (3 mph or 5 kph) were caught by Grim Reaper
- Encourage elderly patients to walk at least 3 mph!

Every Body WALK!

The Campaign to Get America Walking

www.everybodywalk.org

EVERY BODY WALK!

LET'S ALL WALK FOR FUN AND BETTER HEALTH

I'd like to personally invite you to join me on an important and fun mission to walk 30 minutes a day, five days a week ... and to help us spread the word about how walking may be the single most important commitment you can make to your health and the health of our nation.

If we each walk 30 minutes a day (or 15 minutes twice a day), five days a week, we will be taking the most effective course of action possible to help prevent or help manage chronic health conditions, including type 2 diabetes, heart disease, depression, and asthma. It's really that simple. The research supporting the benefits of walking is irrefutable and growing every day — and you'll feel good doing it.

I am pleased to announce that we are introducing a new online walking program, called KP Walk!, to support and encourage all of us at Kaiser Permanente to walk 30 minutes a day, five days a week. To learn more about this program, go to www.kpwalk.com and get started on your journey to better health.

KP Walk! is complemented by an external campaign that Kaiser Permanente is launching called Every Body Walk Information about this campaign can be found at www.everybodywalk.org.

Let's all walk ... and thrive!

George Halvorson
Chairman and CEO
Kaiser Foundation Health Plan, Inc. and Kaiser Foundation Hospitals



George Halvorson
Chairman and CEO

Kaiser Health Plan and Hospitals

A promotional poster for the 'Every Body Walk!' campaign. At the top right, it says 'healthyworkforce For the people who power KP'. The main title 'EVERY BODY WALK!' is in large, bold letters. Below it, the tagline 'LET'S ALL WALK FOR FUN AND BETTER HEALTH' is written. The poster features three photographs: a group of diverse people walking together on a path, a scenic view of a dirt road winding through a green forest, and a landscape with a blue sky and mountains. At the bottom, the 'kpwalk!' logo is displayed, followed by the text 'Introducing a new way to bring walking into our lives.' The entire poster is set against a background of a stylized map of the United States with blue lines representing water.

Every Body WALK!

The Campaign to Get America Walking

www.everybodywalk.org

Every Body WALK!
THE CAMPAIGN TO GET AMERICA WALKING
Celebrating Occupational Therapy Month

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Meet Up

Find walking meet ups near you with the help of MeetUp.com!

Meetup is the world's largest network of local groups. Meetup's mission is to revitalize communities and help people self-organize. Join one of many existing walking clubs, organize meetings and events, or form new walking groups in your neighborhood.

Enter zipcode or city
Example: "97000" or "Portland."

meatup

motivate meet or zip code

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Every Body WALK!
THE CAMPAIGN TO GET AMERICA WALKING
Celebrating Occupational Therapy Month

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Watch

Walking only 30 minutes a day can make a difference in your health. We've brought in medical experts to offer advice on getting started; we met up with walking groups to inspire ideas to bring walking to your community; and tracked down success stories to prove that walking really can improve your overall health.

Share 9 Tweet 0

Bob Sallis, MD: Wear a Pedometer

Every Body WALK!
THE CAMPAIGN TO GET AMERICA WALKING
Celebrating Occupational Therapy Month

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Read

Updates

National Walk To Work Day: 5 Great Health Benefits Of Walking

Today is the eighth annual National Walk to Work Day. If you're reading this, you may already be at your desk. And, like 51 percent of the population, you probably arrived there by car (86 percent) or public transportation (5 percent). But it's not too late! There's still time to pound the pavement on your way back home -- or, if that isn't possible, take a walk during your lunch break. If you happen to be in New York, the new "pedestrian center" in midtown might be a good place to start.

Every Body WALK!
THE CAMPAIGN TO GET AMERICA WALKING
Celebrating Occupational Therapy Month

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Latest News

- National Walk To Work Day: 5 Great Health Benefits Of Walking
- "The Way" Offers Inspiring Journey
- Take Walking To The Next Level
- The Best Cities For Walking
- National Start Planning Now
- Diabetes Alert Day: Take A Risk
- Test: Save Your Life
- A Long Walk Unspooled
- Time To Walk Off The Weight and Forget Your Escapes Ladies
- November Month 2012: 25 Common Food Myths Busted

Emmy-Nominated City Walk Television Series

KCET

50
YEARS

SHOWS | NEWS | ARTS | LIVING | SOCIAL | VIDEO | SCHEDULE | ABOUT



SUPPORT



WALKS
OF
LIFE

CITY
WALK,
MD

WALK
IN THE
PARK

CITIES

WATCH VIDEO

CITY WALK, MD

Inspiring stories centered about the biology of walking. Discover the importance of walking when recovering from a stroke, how walking can be a great anti-depressant, and reduce the likelihood of diabetes.

Sustainable.
Extraordinary.
Philanthropy.

For more than 50 years, we have made it our mission to further your mission. Discover how we can help you achieve exceed your goals.

GG+A
Grenzbach
Gler and
Associates
Consultants in Philanthropic Management

Kaiser Permanente – Thrive “Find Your Thing”



Vivek Murthy, MD, MBA

Surgeon General's Call to Action on Walking



Washington DC
September 9, 2015



Summary

- Benefits of exercise in treatment and prevention of chronic disease are irrefutable.
- Evidence is also overwhelming on the affect of exercise on brain health and health aging!
 - Studies show improved neurologic function at all ages with regular exercise.
 - MRI evidence of brain growth in those who exercise.
 - Results in better test scores in kids and lower rates of cognitive decline and Alzheimer's as we age.
- Exercise is Medicine to keep your brain healthy – you need to take it and prescribe it to your patients!



Exercise is Medicine for Life's Journey...

