

Exercise Is Medicine:

The Health Benefits of Physical Activity

Robert Sallis, MD, FACSM

Department of Family Medicine

Kaiser Permanente Medical Center

Fontana, California

President ; American College of Sports Medicine

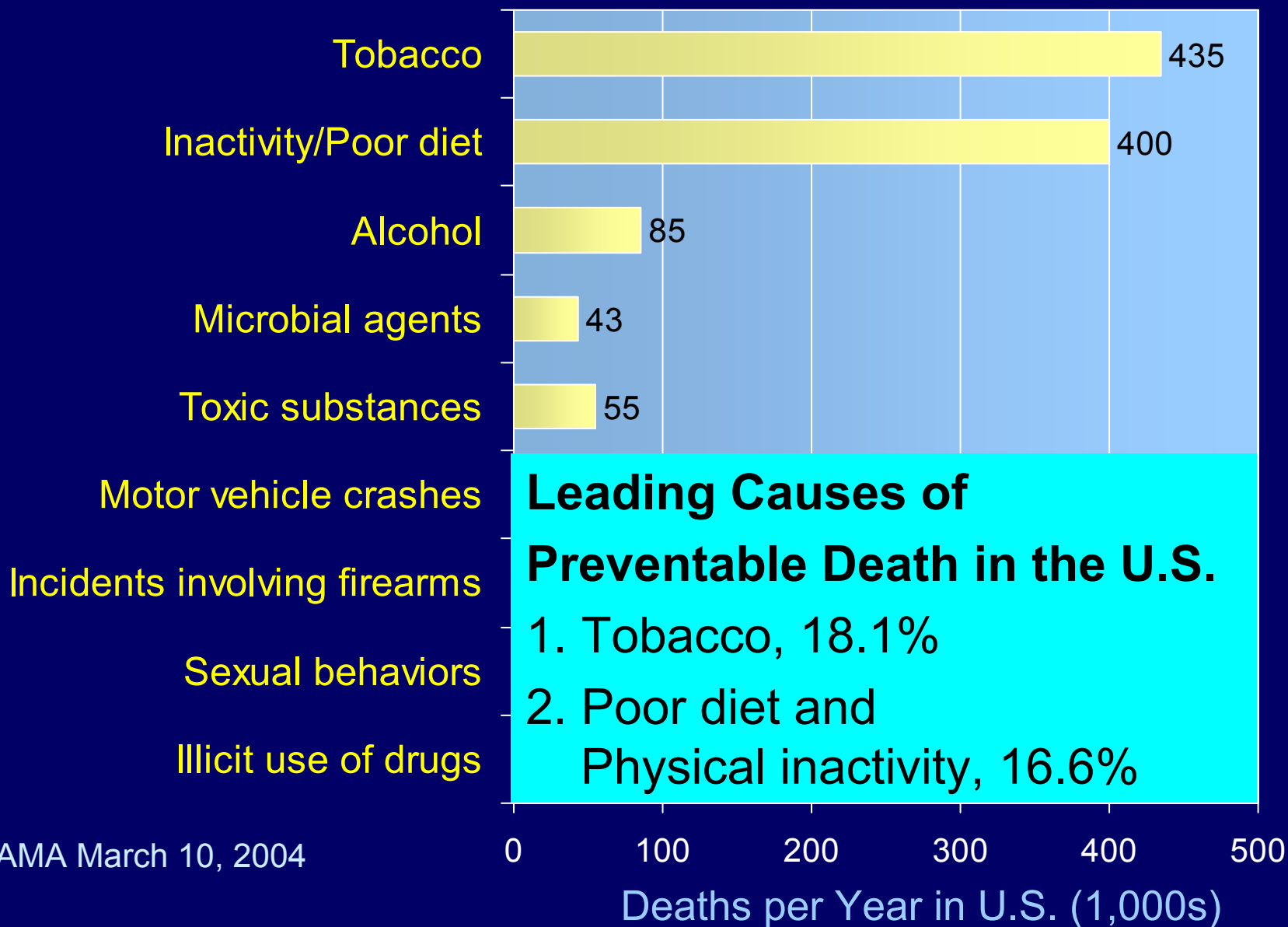
Chair ; Science Advisory Committee

California Governor's Council for Physical
Fitness and Sports

Exercise and Health

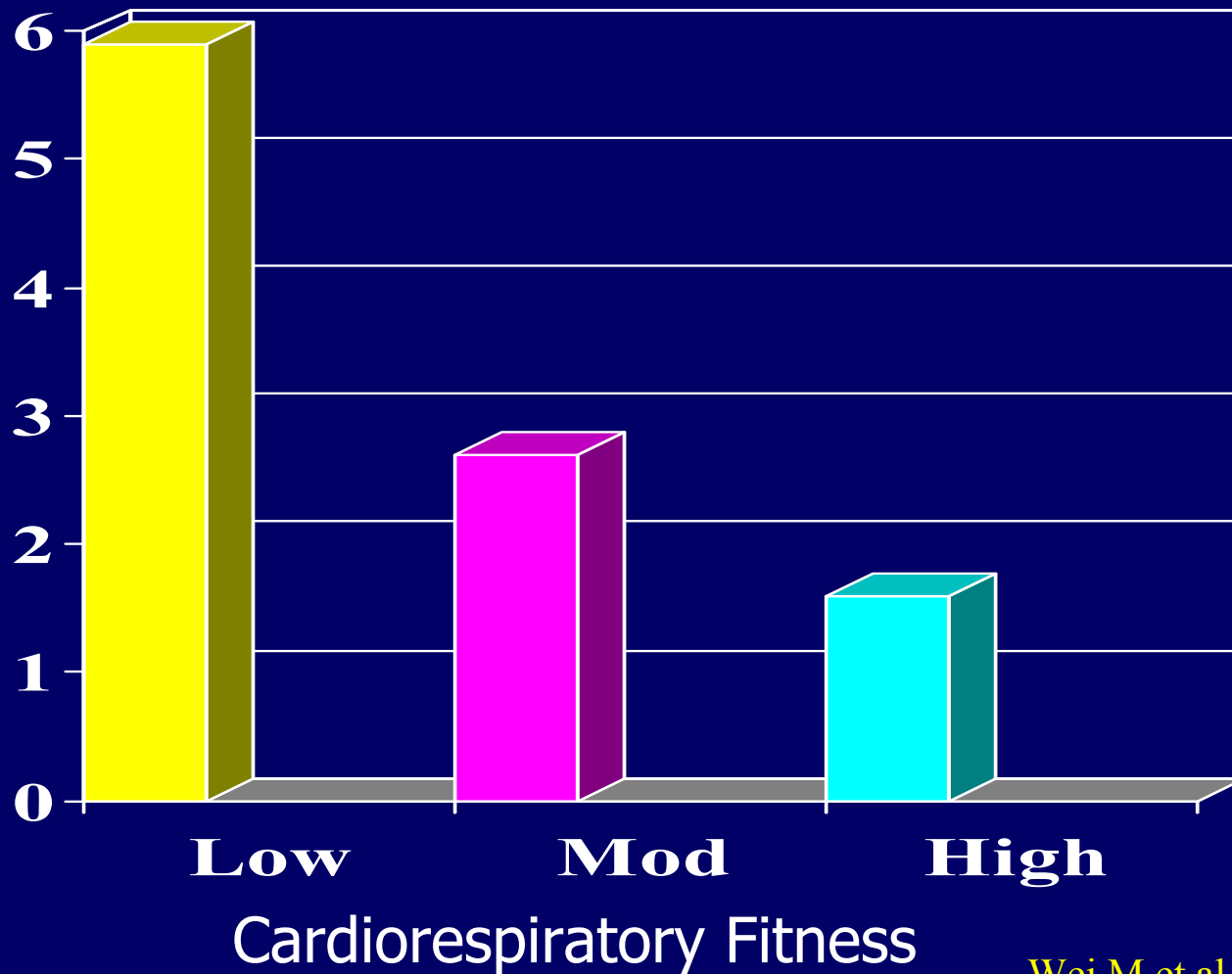
- Physical inactivity has an astonishing breadth of harmful health implications.
- Exercise has a powerful effect on both treatment and prevention of chronic disease and obesity, as well as premature death.
 - There appears to be a linear relationship between physical activity and health status.
 - The association between disease and an inactive and unfit way of life persists in virtually every subgroup of the population.
- Physical inactivity is THE major public health problem of our time.

Actual Causes of *Death*



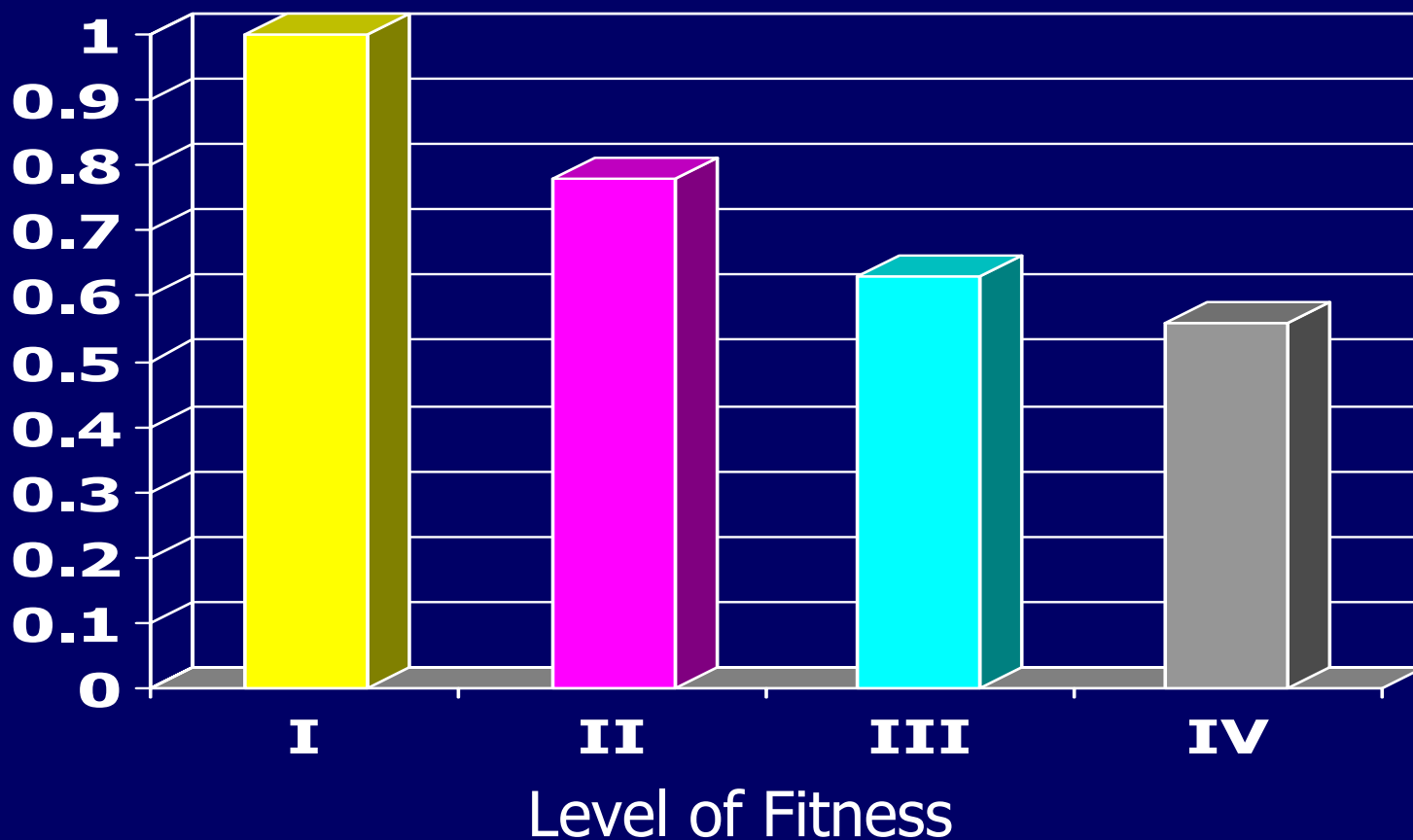
Fitness and Incident Type 2 Diabetes; 8633 Healthy U.S. Men

Diabetes incidence/1000 men



Fitness and Incident Type 2 Diabetes; 4747 Japanese Men; Tokyo Gas Company

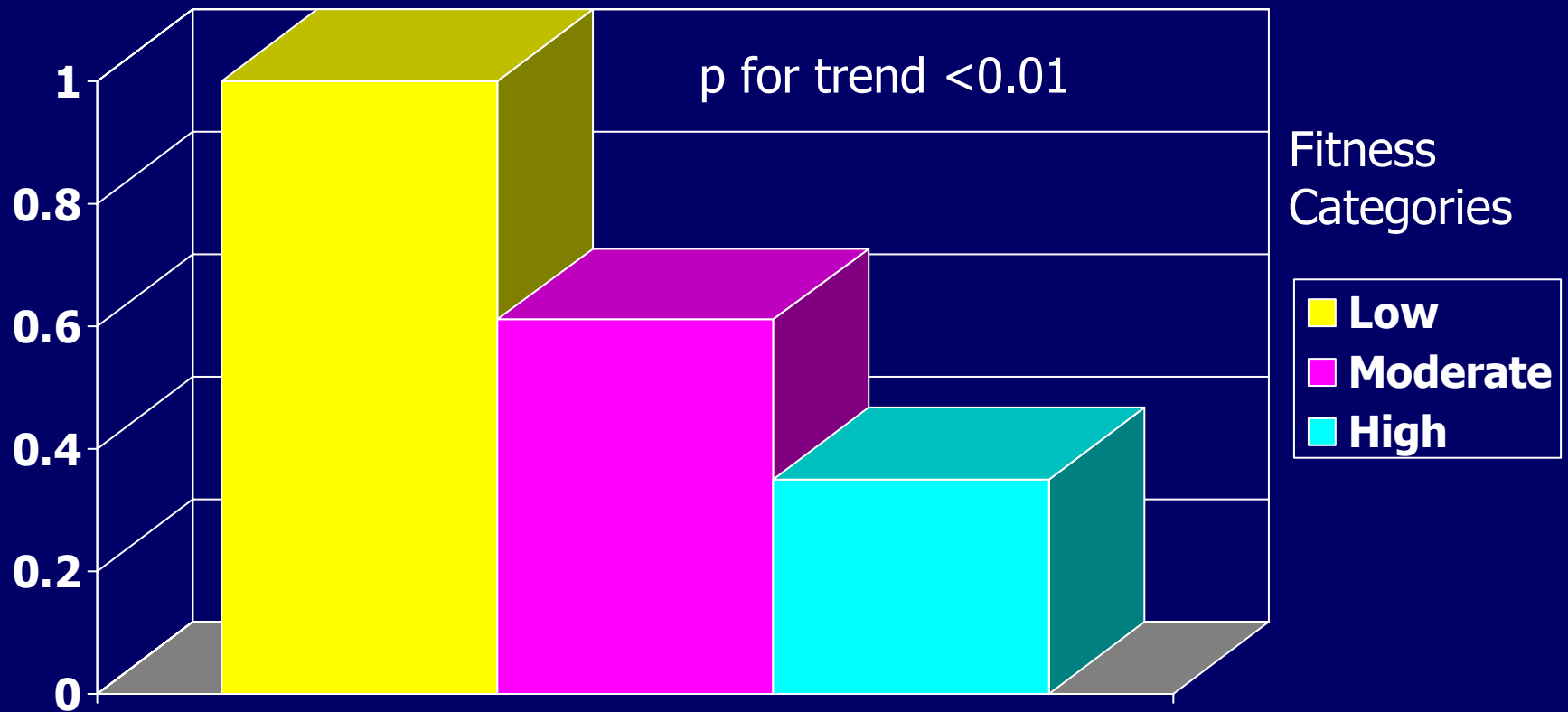
Relative risk adjusted for age and risk factors



Fitness and Risk of Incident Hypertension

4884 Healthy Women; 5yr follow-up

Relative Risk
for Hypertension

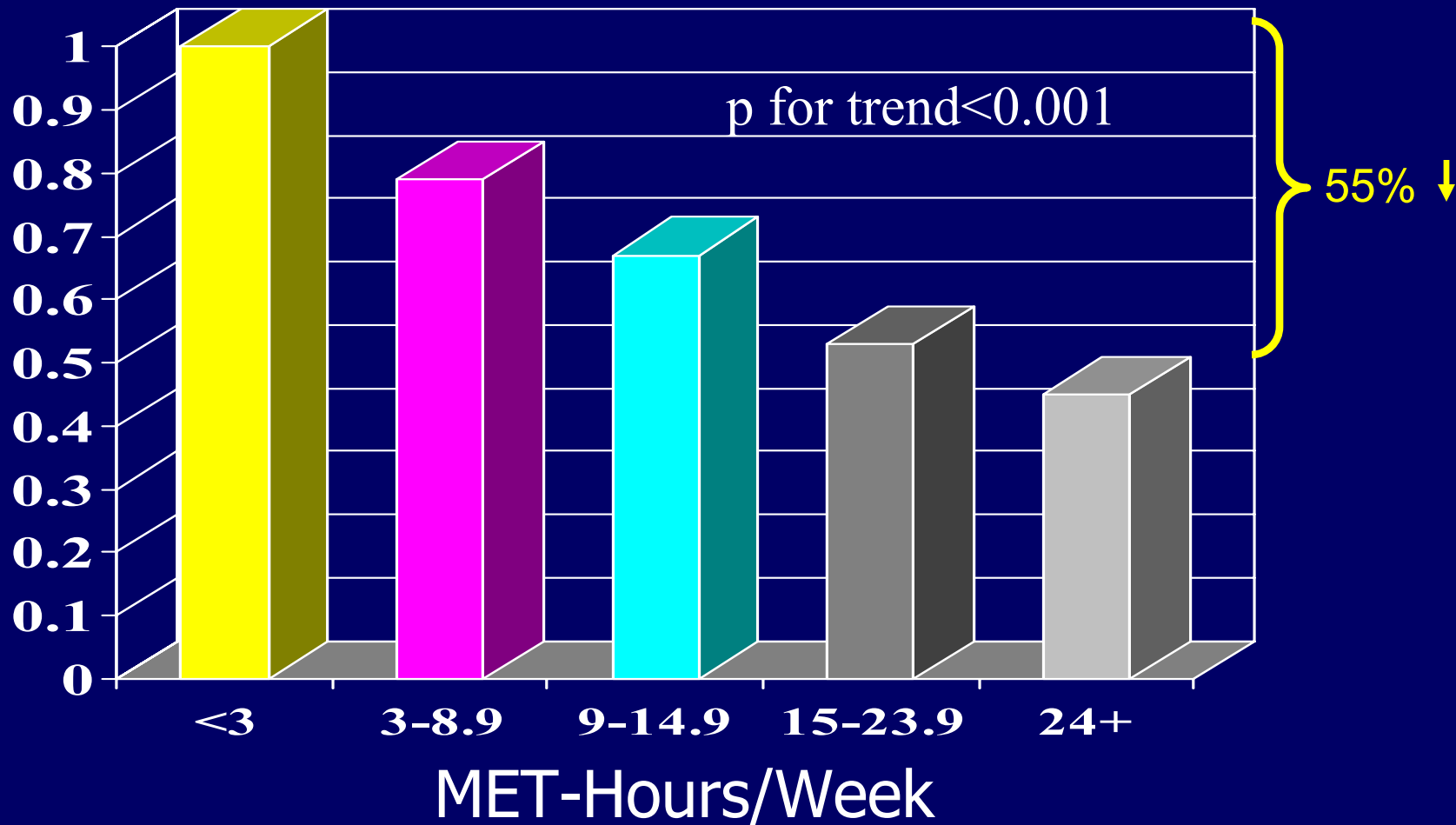


Controlled for BMI, age, hx htn

Barlow CE et al. *Am J Epidemiol* 2006; 163:142-50

Physical Activity and Hip Fracture Risk: Nurse's Health Study; 61,200 Women

Adjusted relative risk for hip fracture; Post-menopause

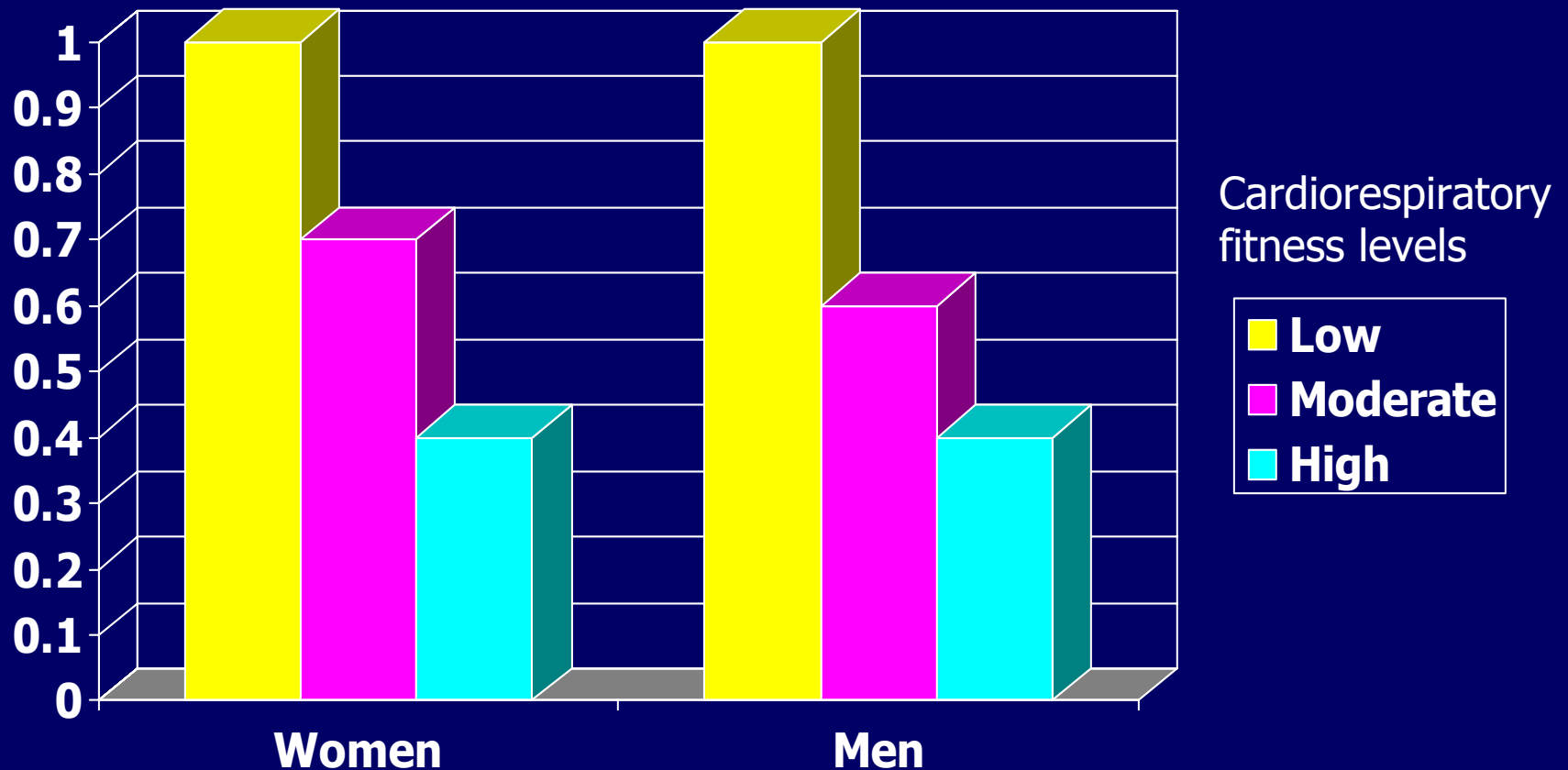


Controlled for age, BMI, ERT, smoking, diet

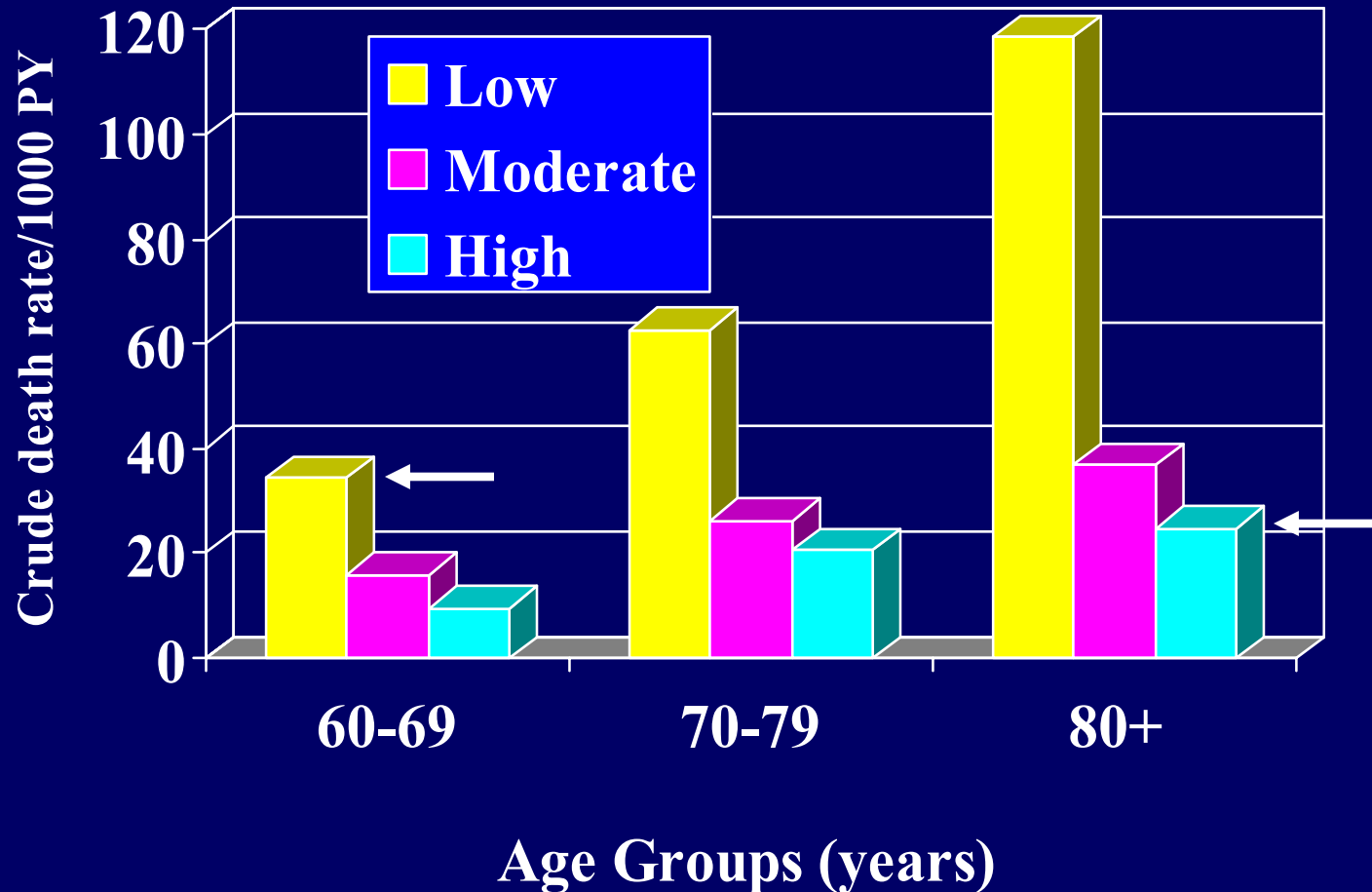
Feskanich D et al. *JAMA* 2002; 288:2300

Risk of Death by Fitness Groups; 749 Women and 1758 Men ≥ 60

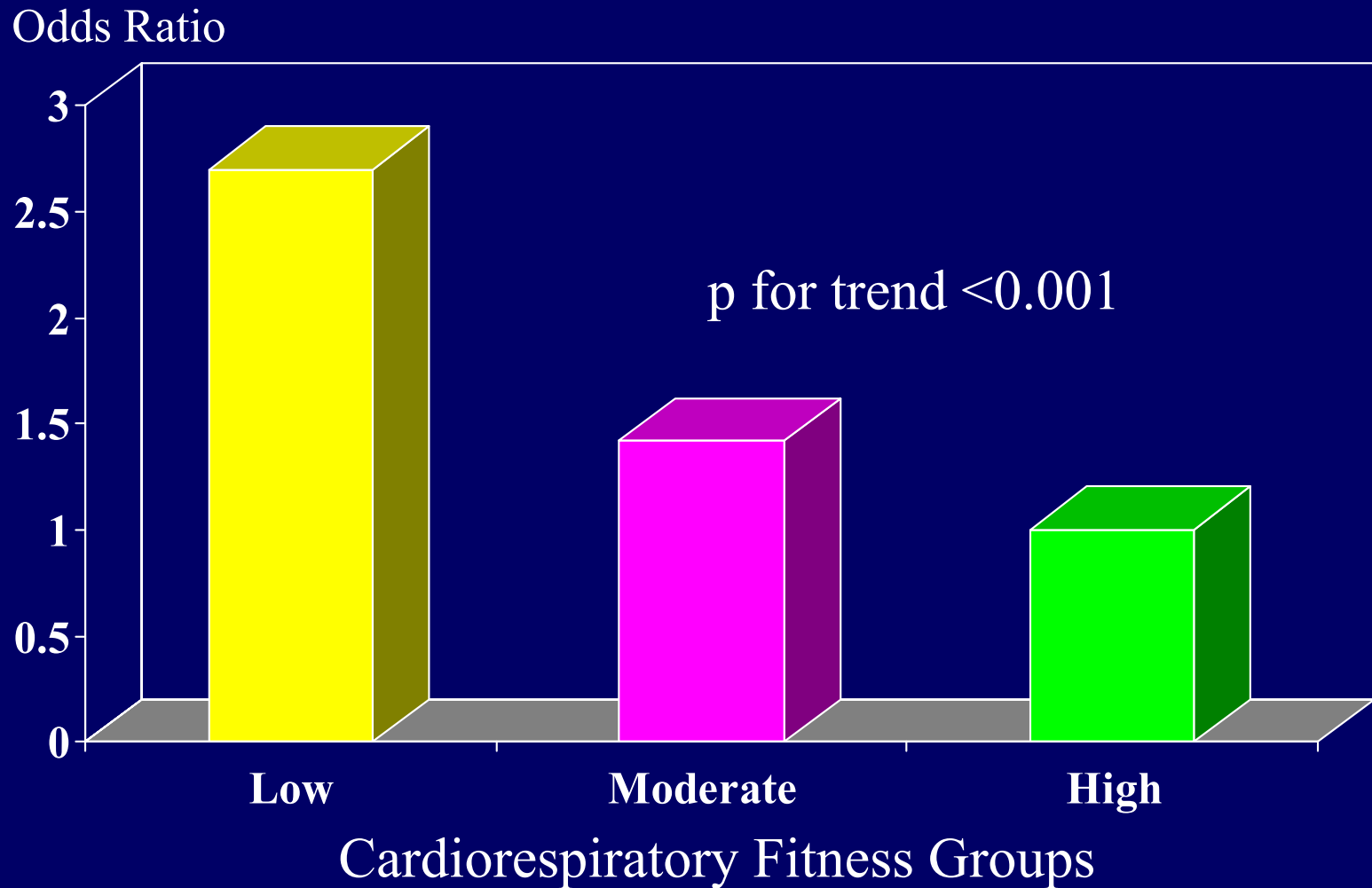
Relative risk adjusted for age and risk factors



Death Rates/1000 by Fitness Level; 2135 Men Aged Grouped Men

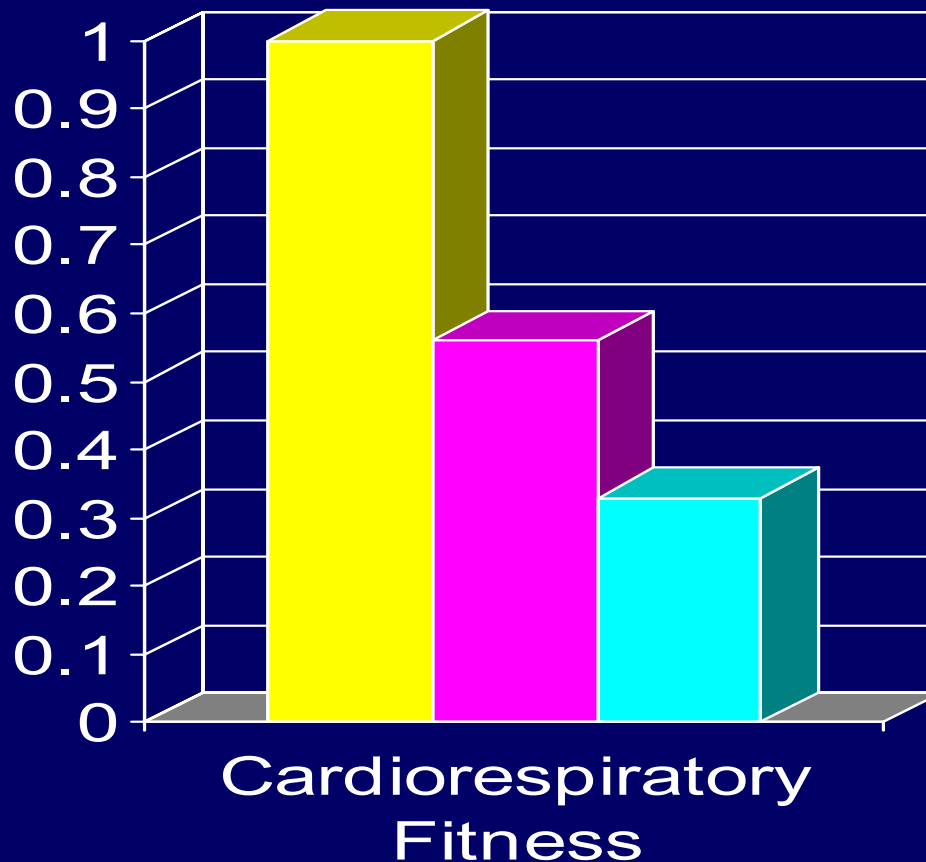


All-Cause Mortality by Fitness Groups in 3,757 Men with Metabolic Syndrome



Fitness and Cancer; Mortality in 1744 Men with Diabetes

Relative risk of
Cancer Death *



p for trend =0.002



*Adjusted for age and risk factors

Thompson AL et al. In progress

Exercise and Colon Cancer

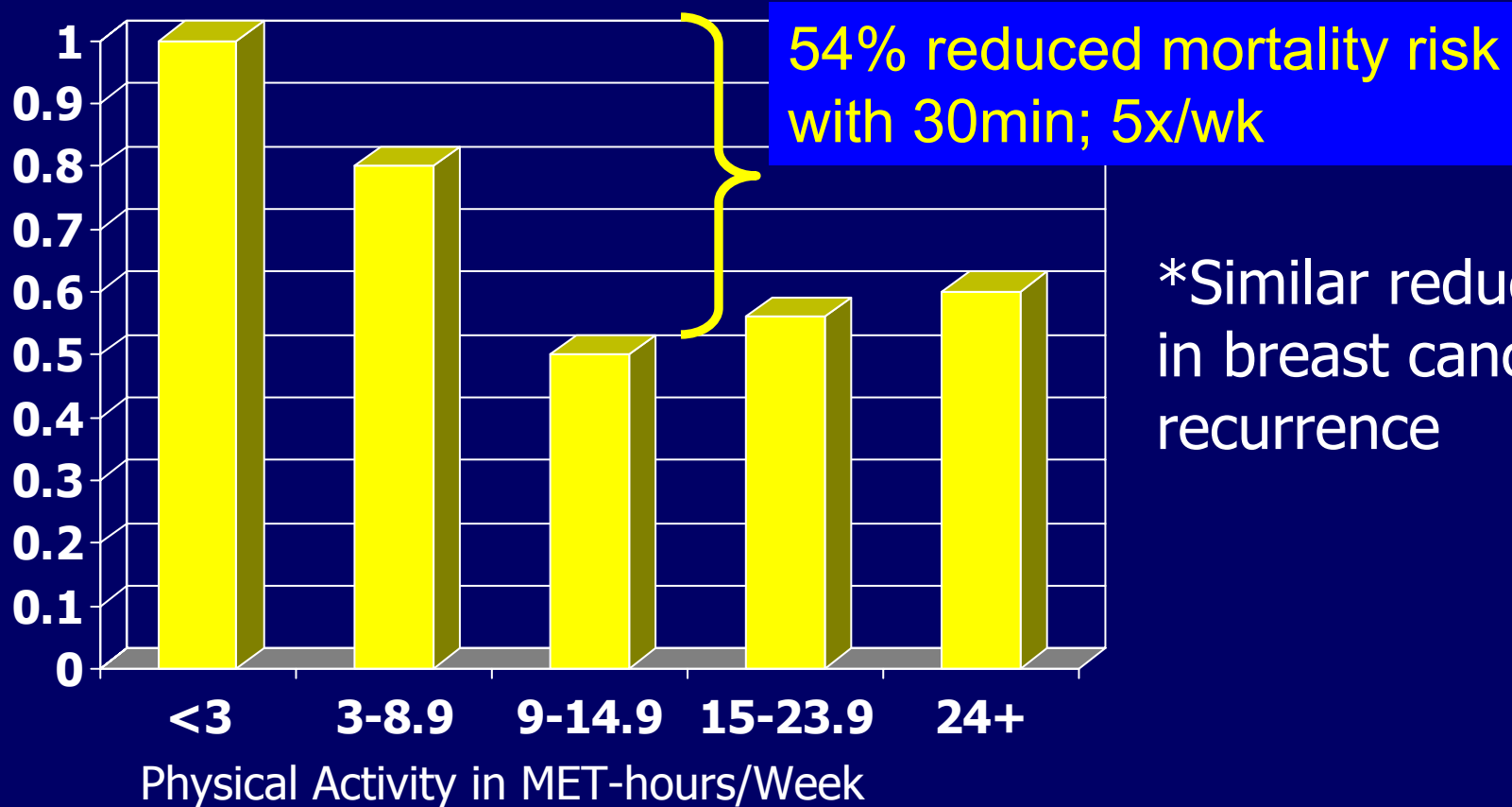
- Important in both primary and secondary prevention
- Median risk reduction:
 - 30-40% in men
 - 10-20% in women
 - Dose-related response; Need 30 min, 5 days per week
- Cancer survivors:
 - Improved quality of life
 - Less severe side effects from chemo
 - Appear to have reduced mortality rate

Nurses' Health Study

2987 Women with Breast Cancer

Physical Activity and *Survival*

Relative mortality risk

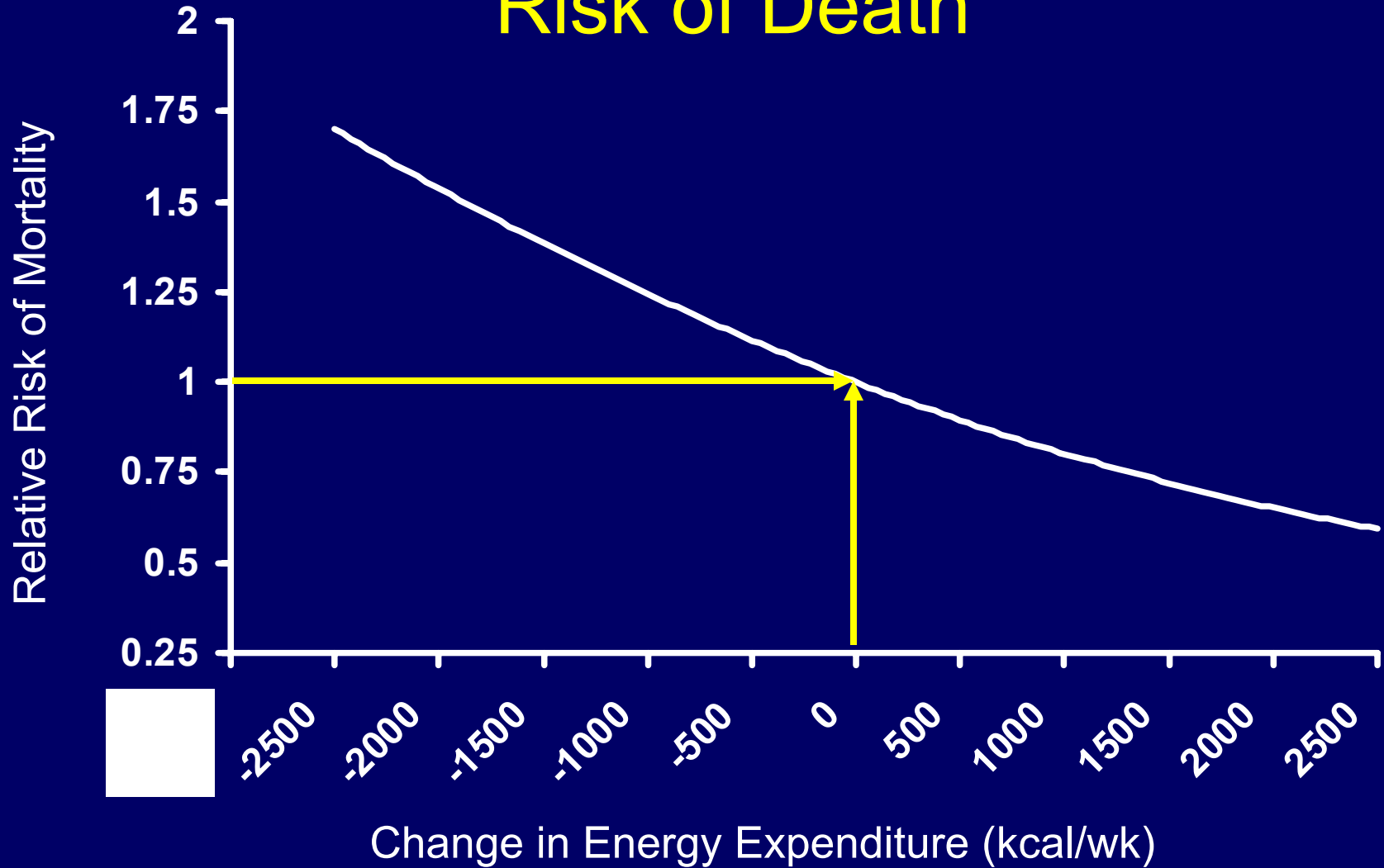


*Similar reduction in breast cancer recurrence

Cardiovascular Health Study; Elderly Individuals with CAD Physical Activity and Mortality

- 1045 women and men ≥ 65 years with coronary artery disease
- Followed for mortality for 9 years
 - 489 deaths in 7284 patient years of follow-up
- Physical activity assessed at baseline and at 3 years of follow-up
- Shows dose-response relationship PA and mortality in patients with CAD

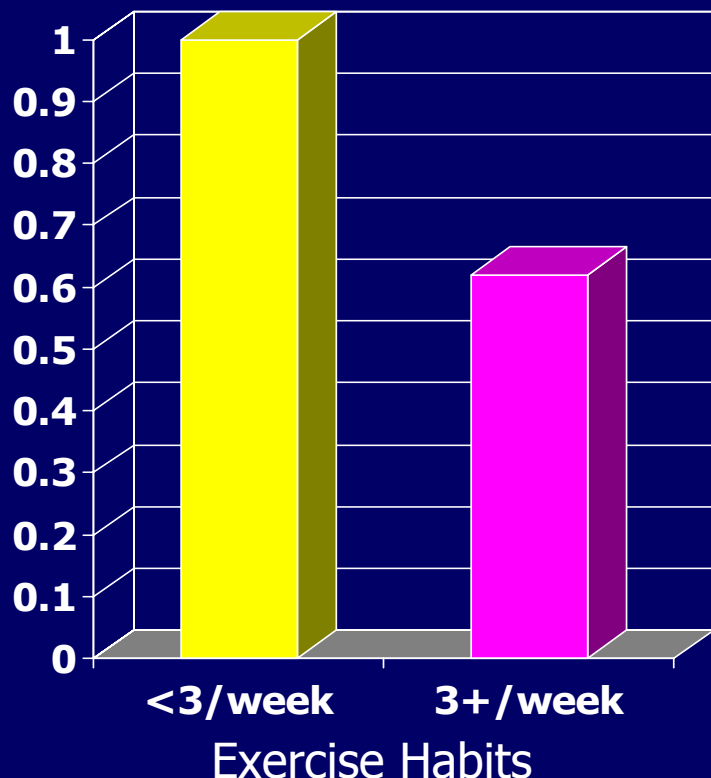
Change in Activity and Adjusted* Risk of Death



*Adjusted for baseline activity, age, sex, race, smoking, alcohol, adiposity, comorbidities

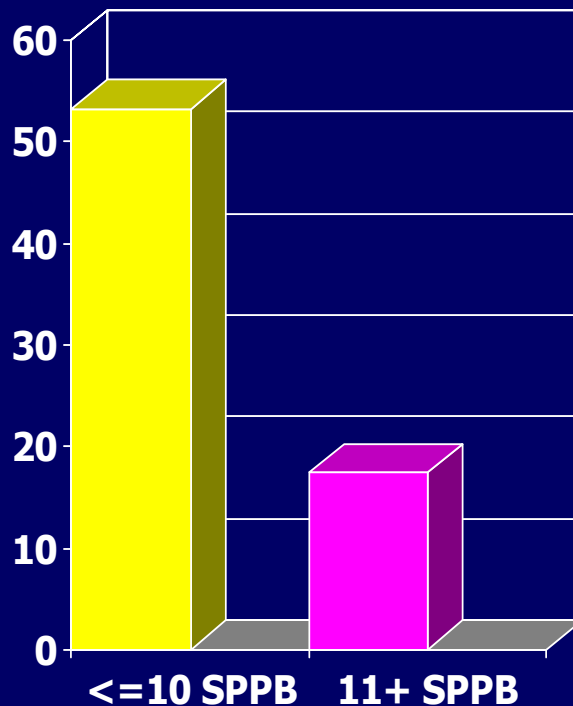
Physical Activity and Dementia in Women and Men; ≥ 65 Years (6yr f/u)

Age- and sex-adjusted Hazard ratio for incident dementia



Exercise and incident dementia
In 1740 women and men

Age-specific incidence of dementia/1000 person-years



Short physical performance battery scores Vs dementia incidence
in 2288 women and men

Lifestyle-related Risk Factors and Risk of Future Nursing Home Admissions; 6462 Adults

Risk Factor	45-64 years Hazard Ratio (95% CI)
Smoking	1.56 (1.23-1.99)
<i>Inactivity</i>	1.40 (1.05-1.87)
BMI \geq 30.0	1.35 (0.96-1.89)
High BP	1.35 (1.06-1.73)
High Cholesterol	1.14 (0.89-1.44)
Diabetes	3.25 (2.04-5.19)

Physical Activity or Fitness and Health Benefits Proven in Diverse Populations

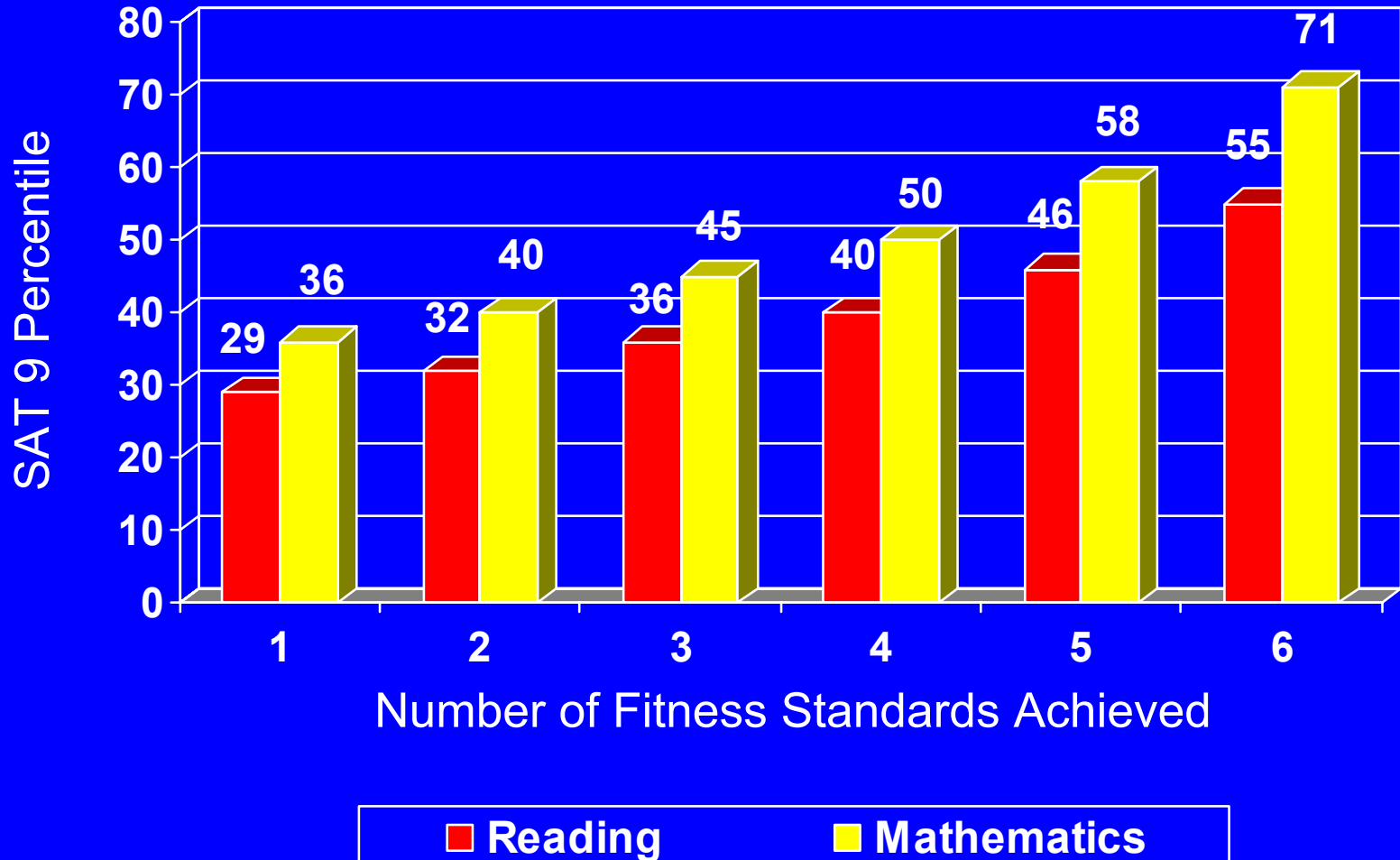
- Trinidadian men – fitness correlated with reduced Cardiovascular disease.
- Indian women and men – activity shown to reduce CAD.
- Native Americans – activity shown to reduce diabetes.
- Chinese women and men – activity improves lipids and other CVD risk factors.

Stanford Achievement Test; 9th Edition (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

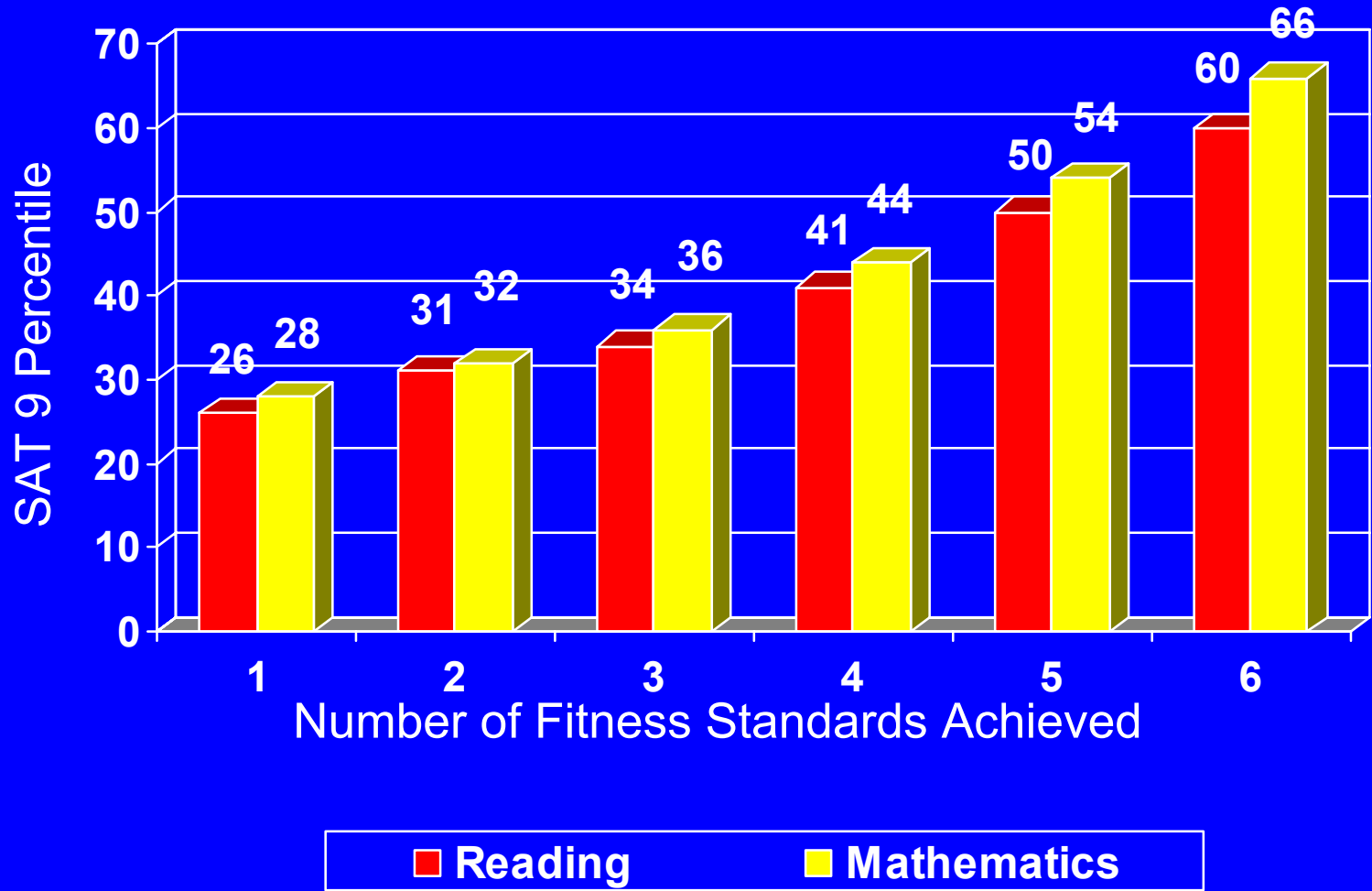
2001 Grade 5 SAT 9 and Physical Fitness

353,000 Students



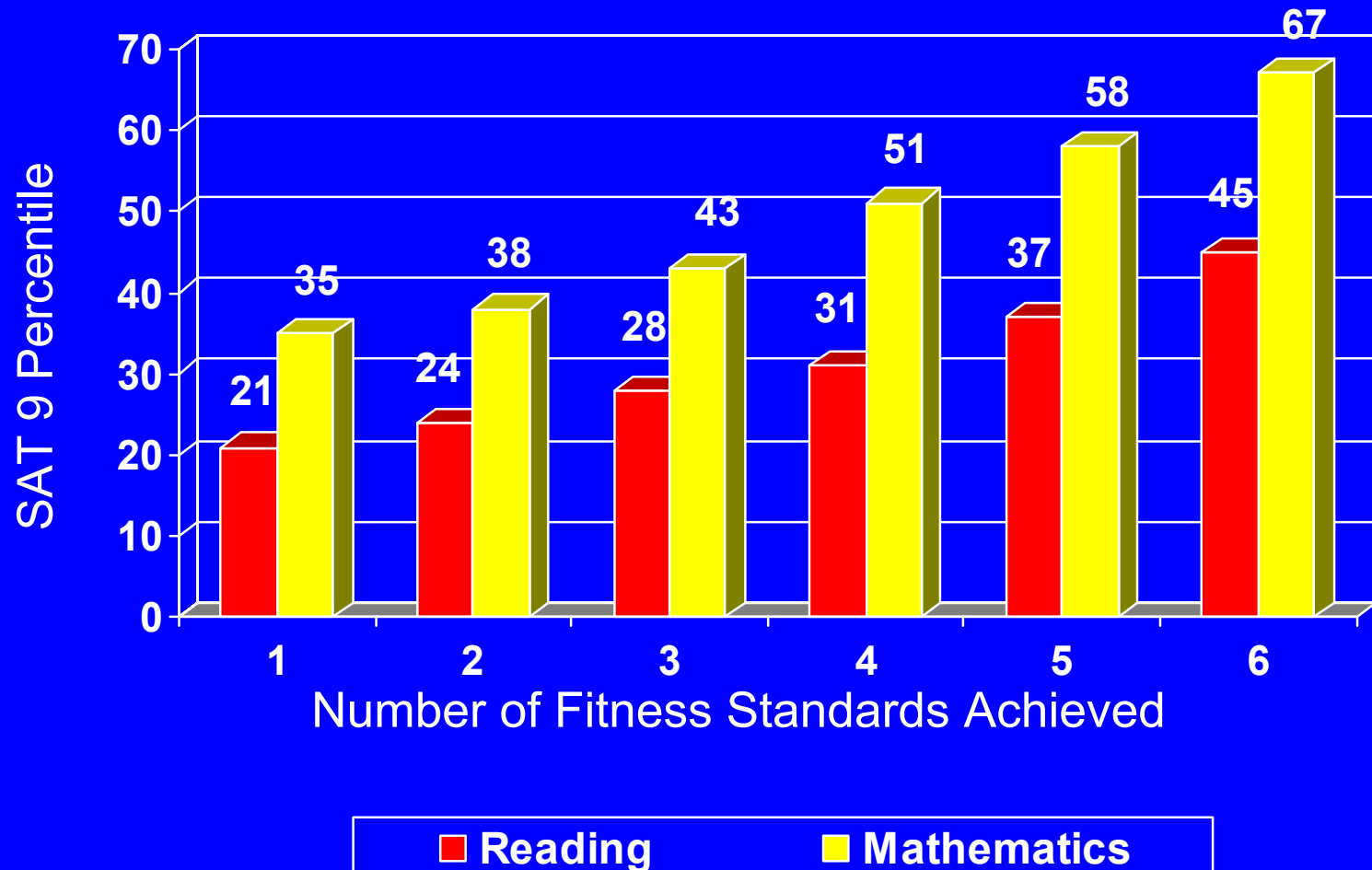
2001 Grade 7 SAT 9 and Physical Fitness

322,000 Students



2001 Grade 9 SAT 9 and Physical Fitness

279,000 Students



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

CDC Data

- Obesity rates (BMI>30) climbed in 31 states last year.
- No state showed a decline.
- Mississippi #1; First state to crack 30% for obese adult population.
- CA ranked 36; CO was 51 (best).
- 66% of adults were either overweight or obese.

MONDAY, AUGUST 27, 2007

Obesity rates climb in most US states



WASHINGTON, USA - Obesity rates continued their climb in 31 US states last year. No state showed a decline. Mississippi became the first US state to crack the 30 percent barrier for adult residents considered to be obese. West Virginia and Alabama are just slightly behind, according to the Trust for America's Health, a research group that focuses on disease prevention.

Colorado continued its reign as the leanest state in the nation with an obesity rate projected at 17.6 percent.

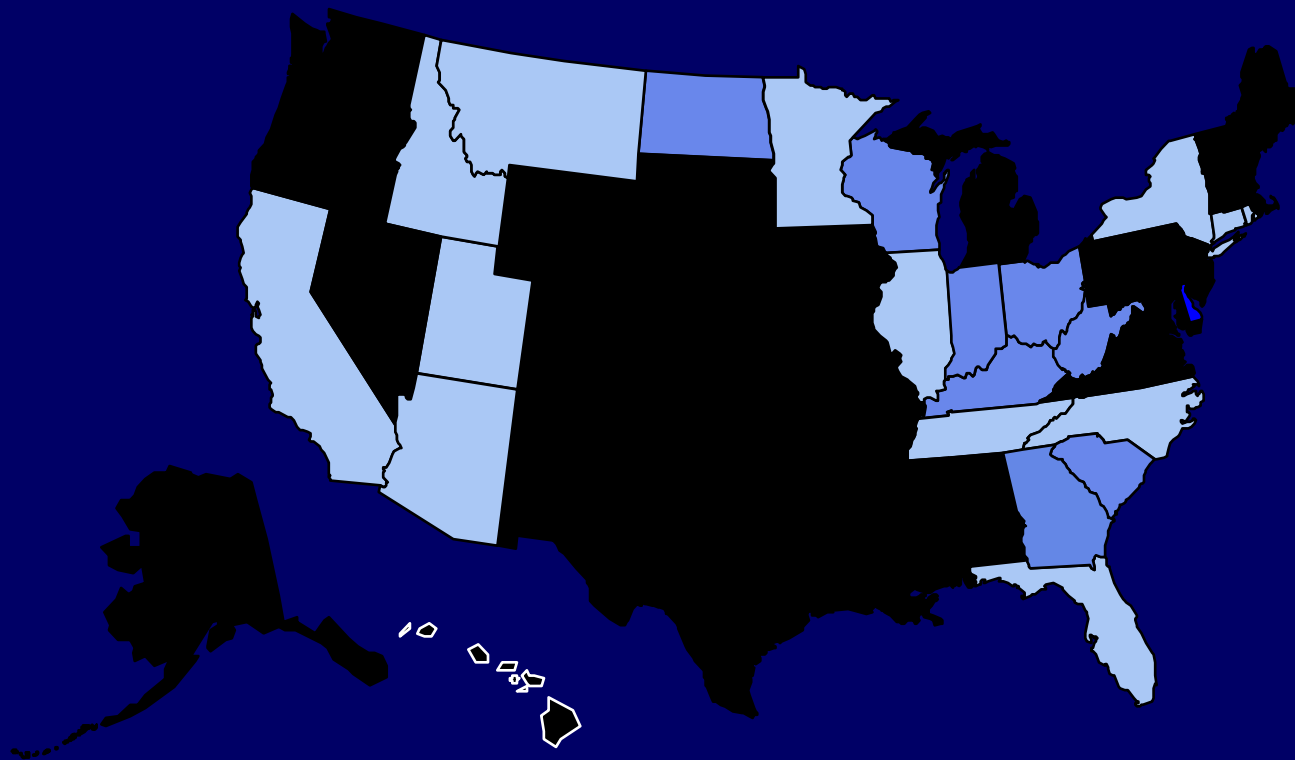
This year's report, for the first time, looked at rates of overweight children ages 10 to 17. The District of Columbia had the highest percentage — 22.8 percent. Utah had the lowest percentage of overweight youth — 8.5 percent.

Ten of the 15 US states with the highest rates of adult obesity are located in the South. Rates of adult obesity now exceed 25 percent in 19 states, an increase from 14 states last year and 9 in 2005. In 1991, none of the states exceeded 20 percent.

US Health officials say the latest state rankings provide evidence that the

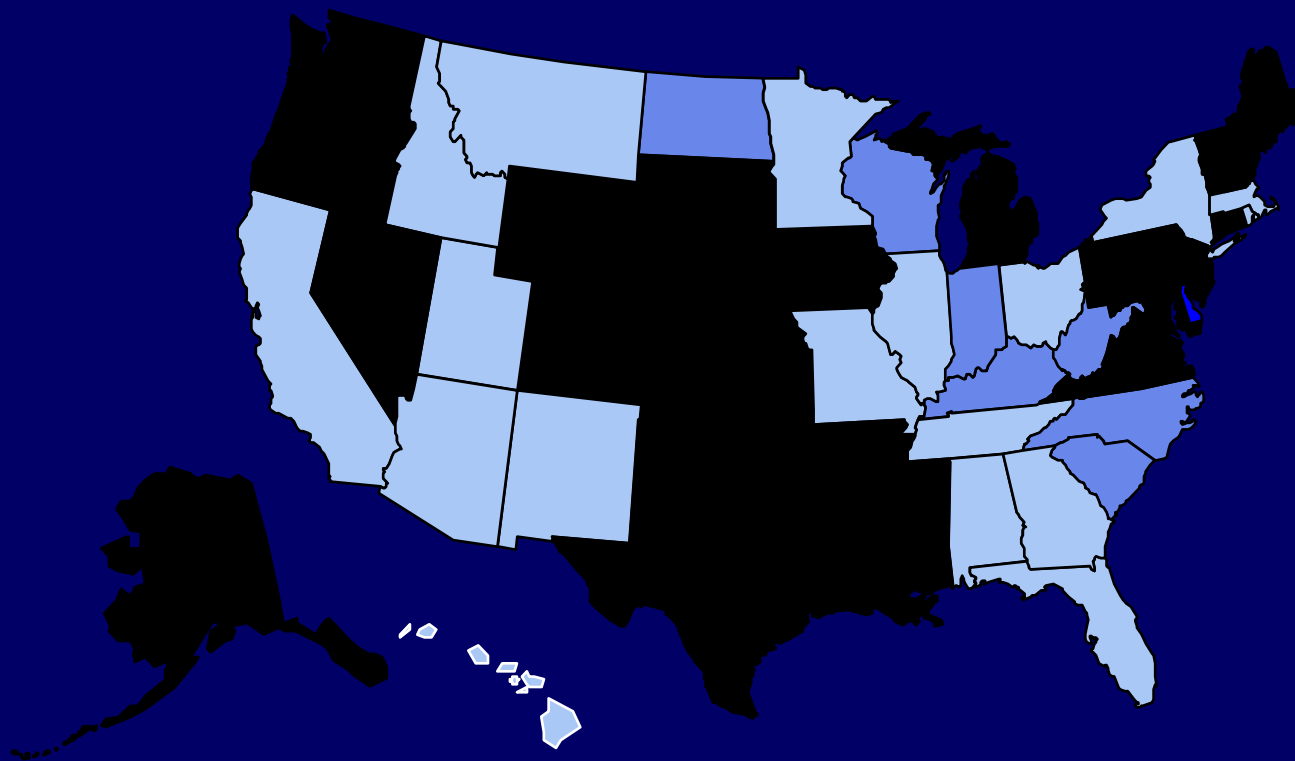
Obesity Trends* Among U.S. Adults 1985

(*BMI ≥ 30 , or ~ 30 lbs overweight for 5' 4" person)



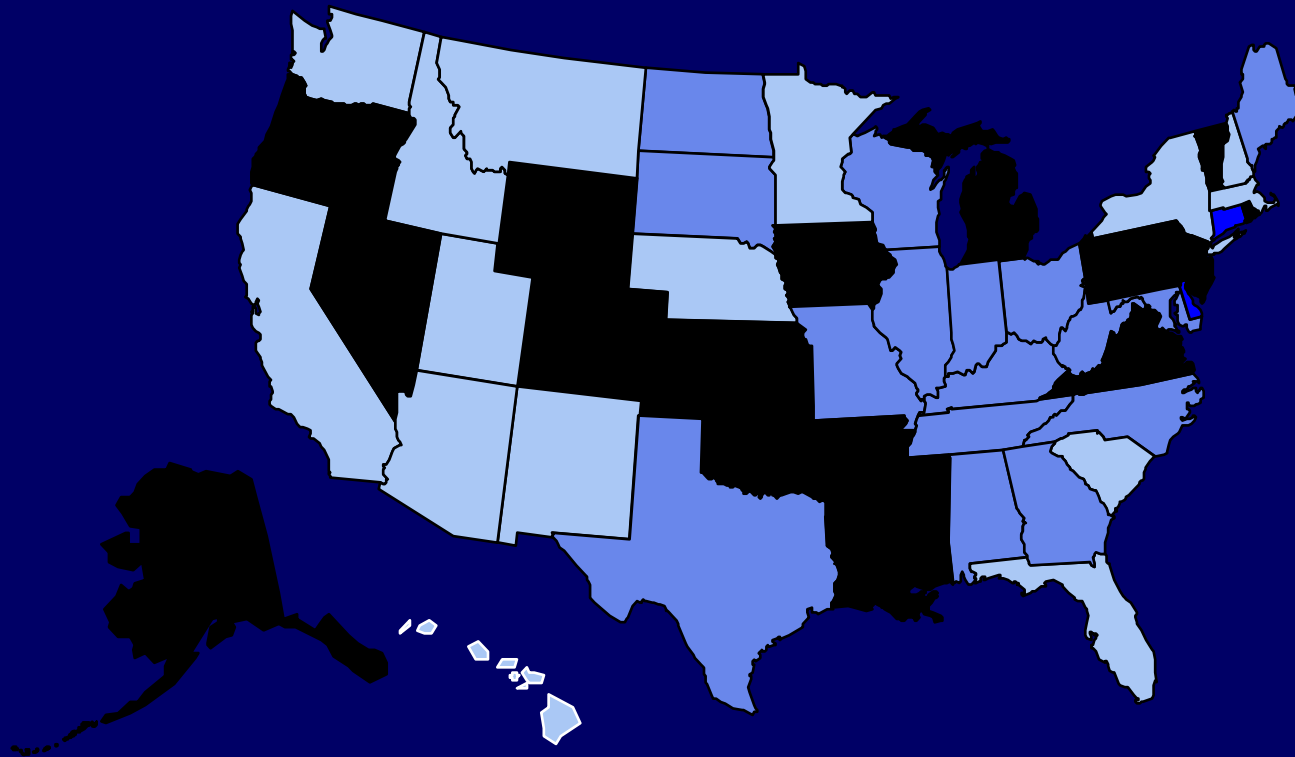
Obesity Trends* Among U.S. Adults 1986

(*BMI ≥ 30 , or ~ 30 lbs overweight for 5' 4" person)



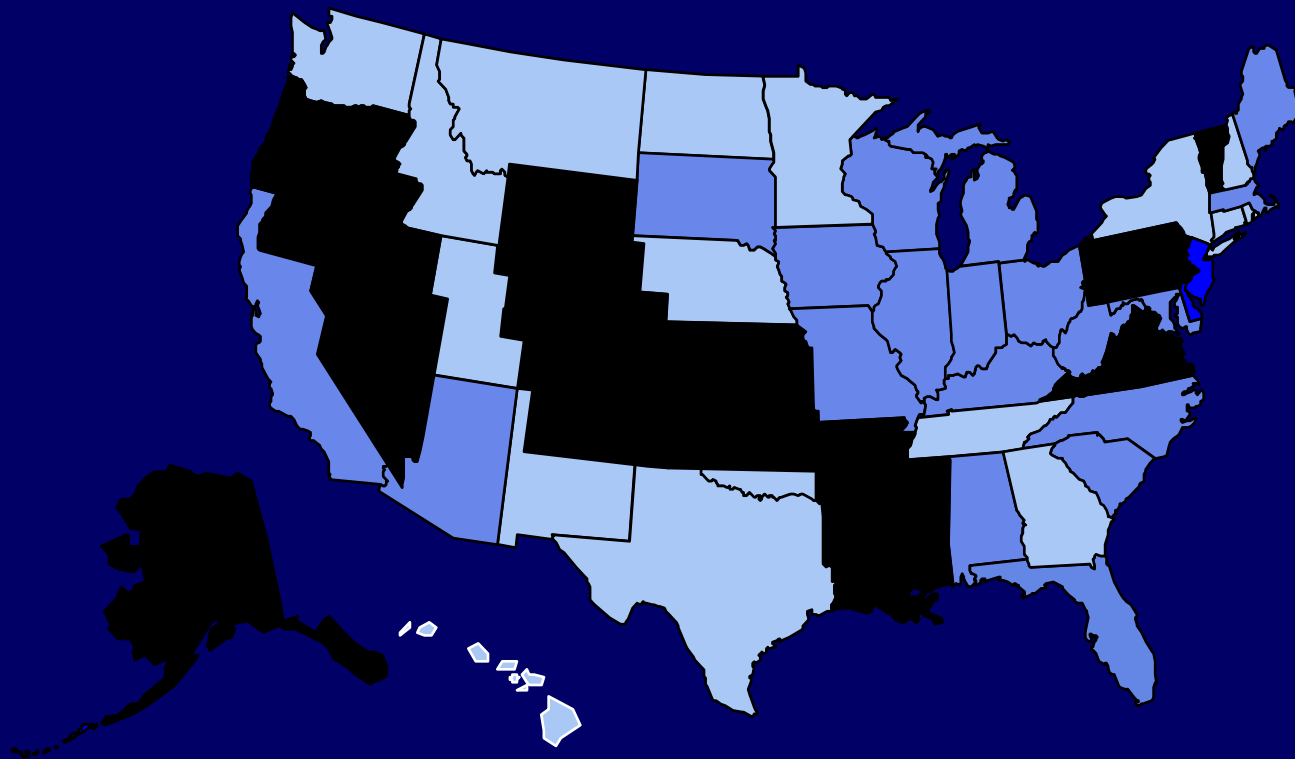
Obesity Trends* Among U.S. Adults 1987

(*BMI ≥ 30 , or ~ 30 lbs overweight for 5' 4" person)



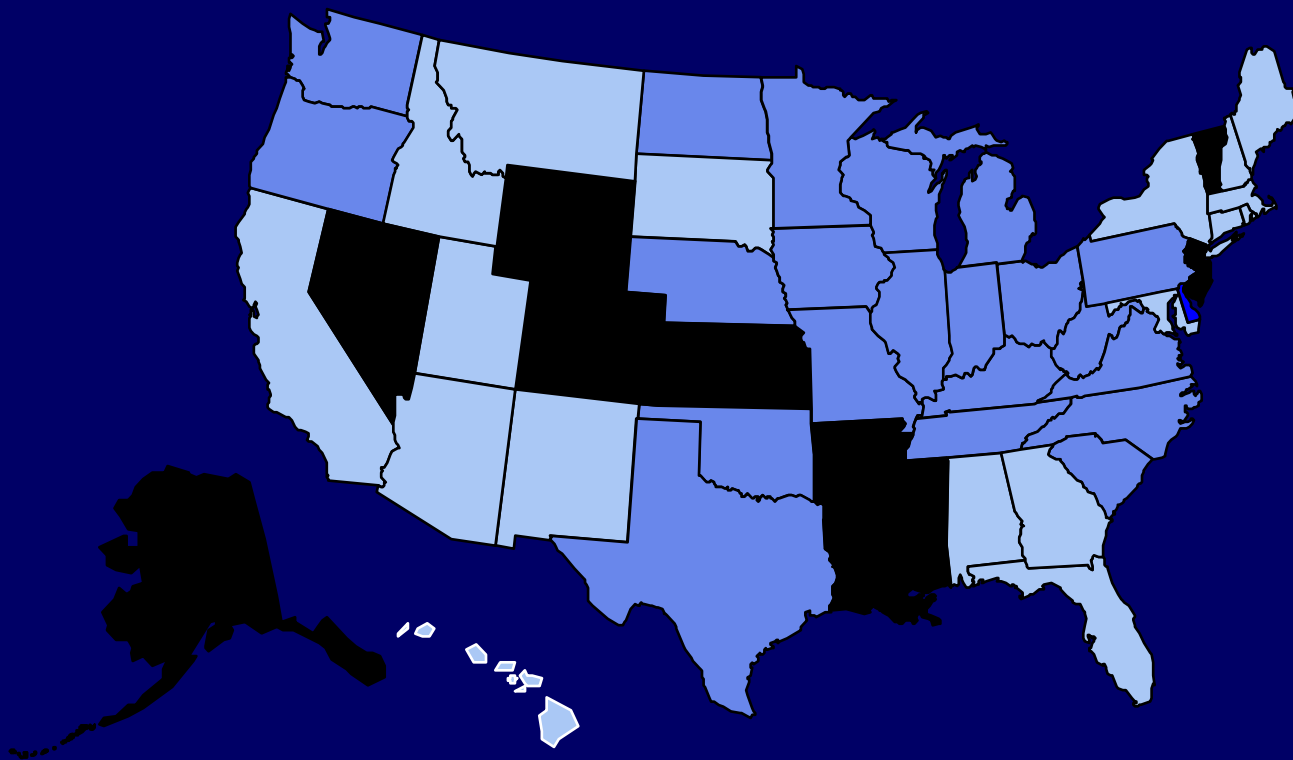
Obesity Trends* Among U.S. Adults 1988

(*BMI ≥ 30 , or ~ 30 lbs overweight for 5' 4" person)



Obesity Trends* Among U.S. Adults 1989

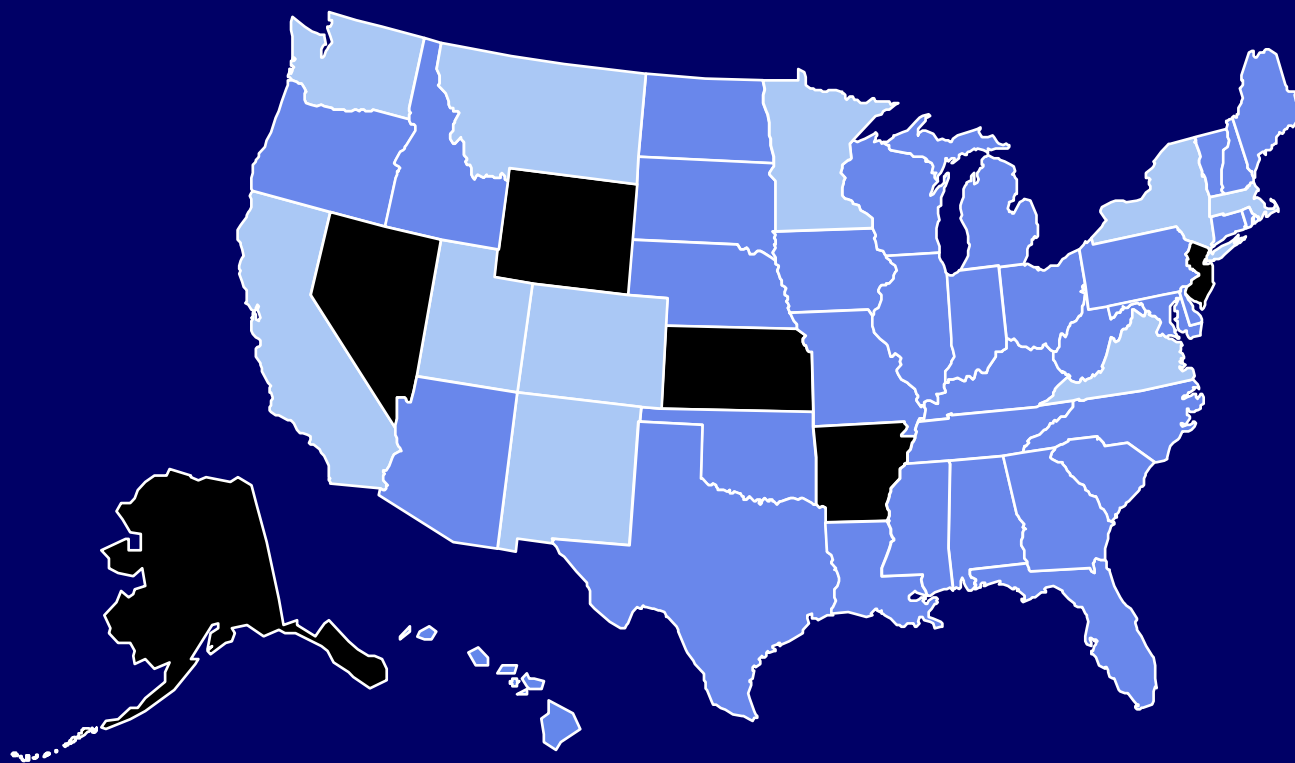
(*BMI ≥ 30 , or ~ 30 lbs overweight for 5' 4" person)



Obesity Trends* Among U.S. Adults

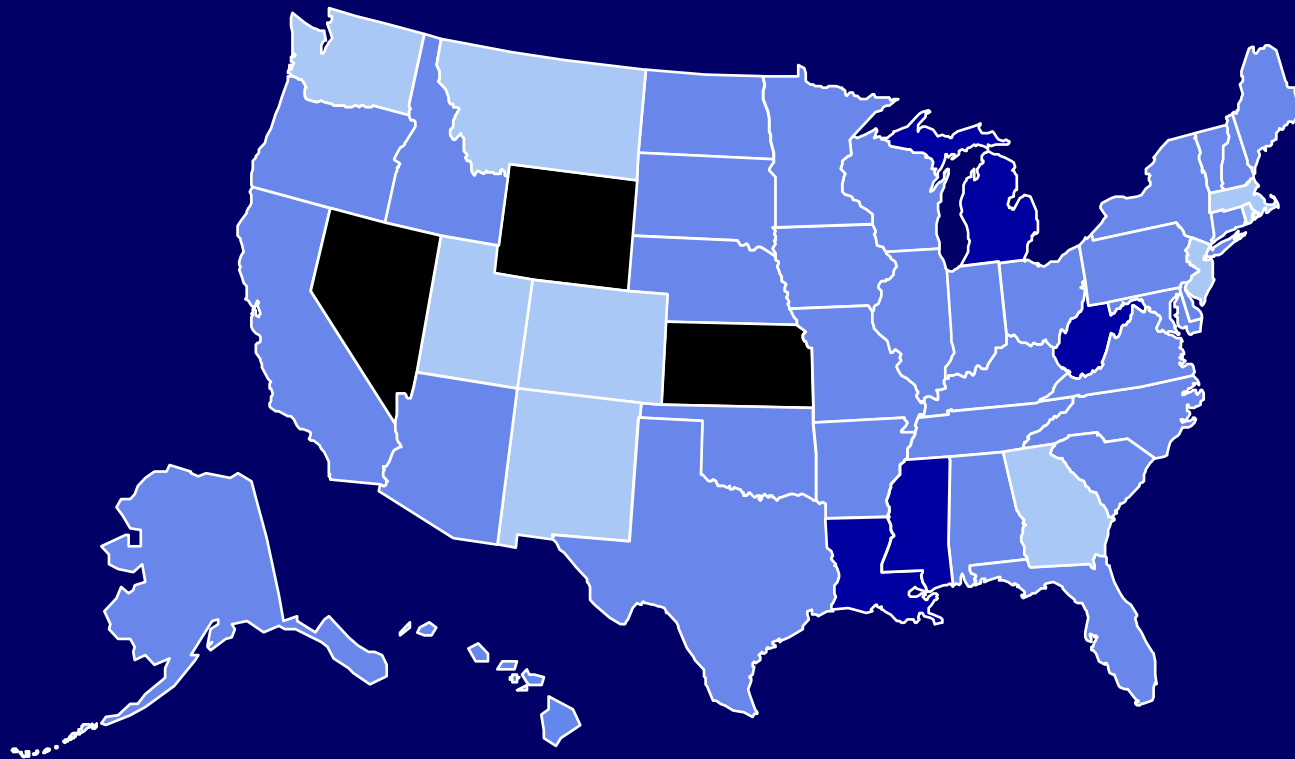
1990

(*BMI ≥ 30 , or ~ 30 lbs overweight for 5' 4" person)



Obesity Trends* Among U.S. Adults 1991

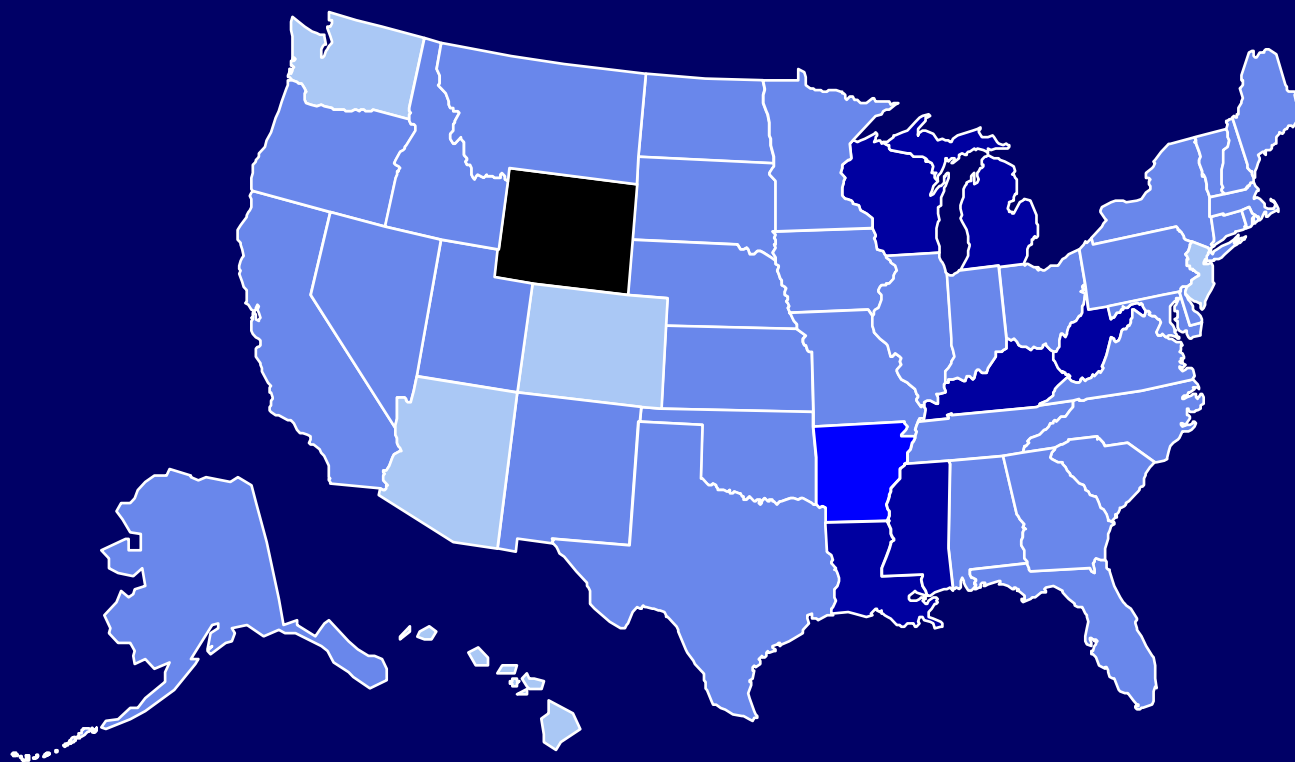
(*BMI ≥ 30 , or ~ 30 lbs overweight for 5' 4" person)



*First year with 15-19% category

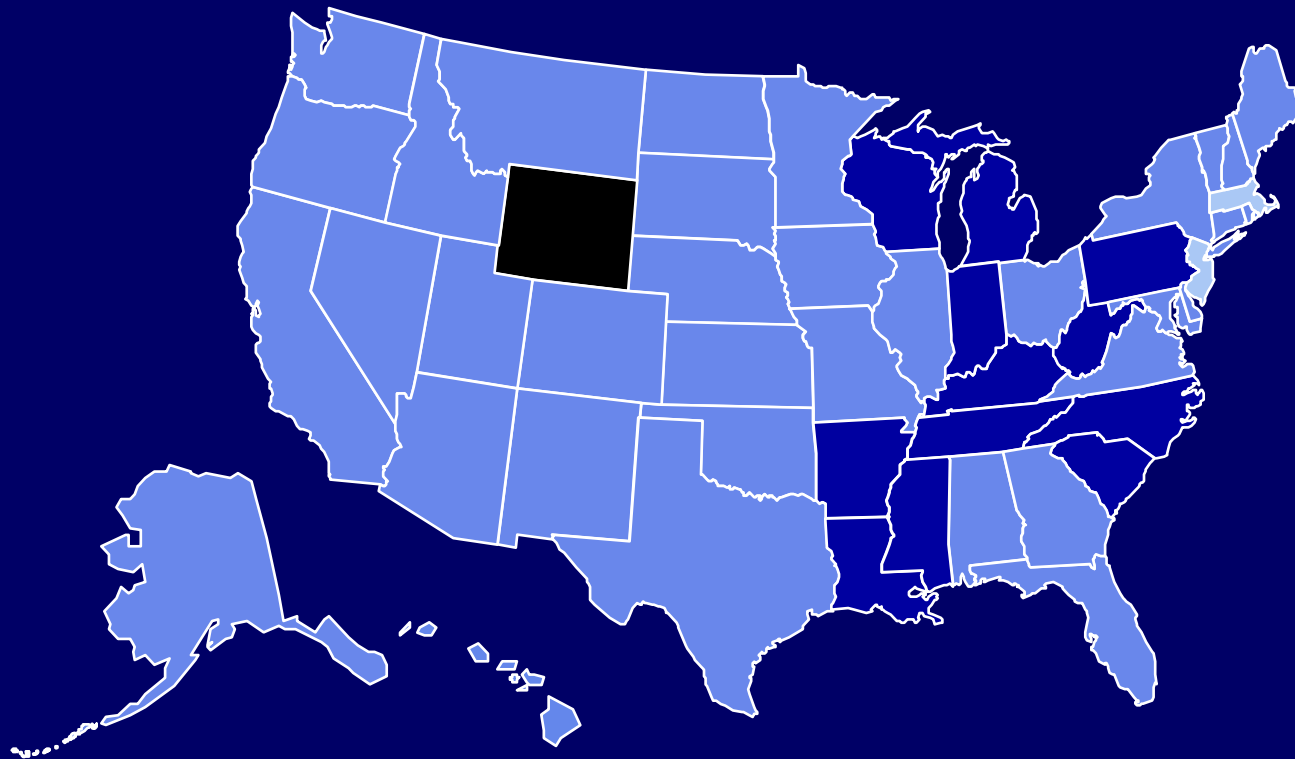
Obesity Trends* Among U.S. Adults 1992

(*BMI ≥ 30 , or ~ 30 lbs overweight for 5' 4" person)



Obesity Trends* Among U.S. Adults 1993

(*BMI ≥ 30 , or ~ 30 lbs overweight for 5' 4" person)

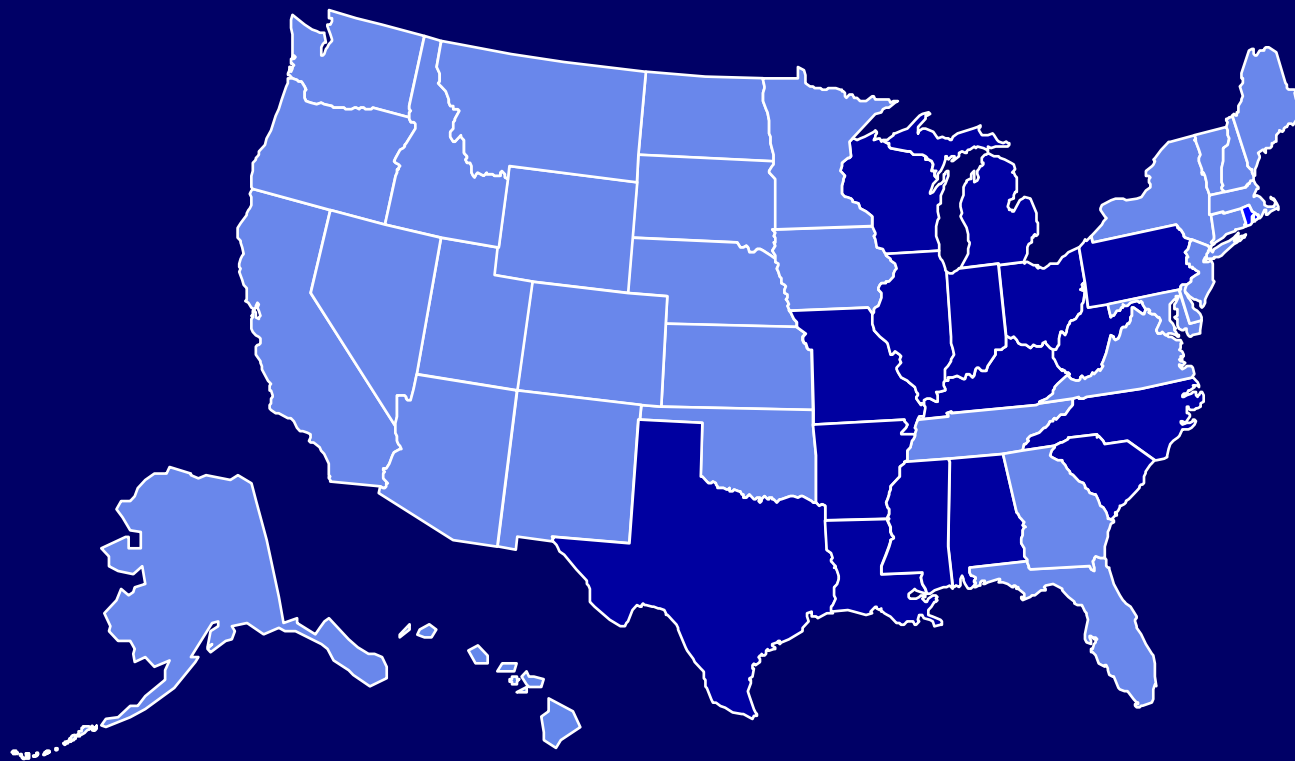


*Every state now has >10% obese

Obesity Trends* Among U.S. Adults

1994

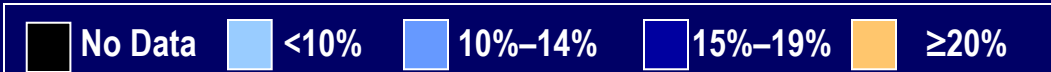
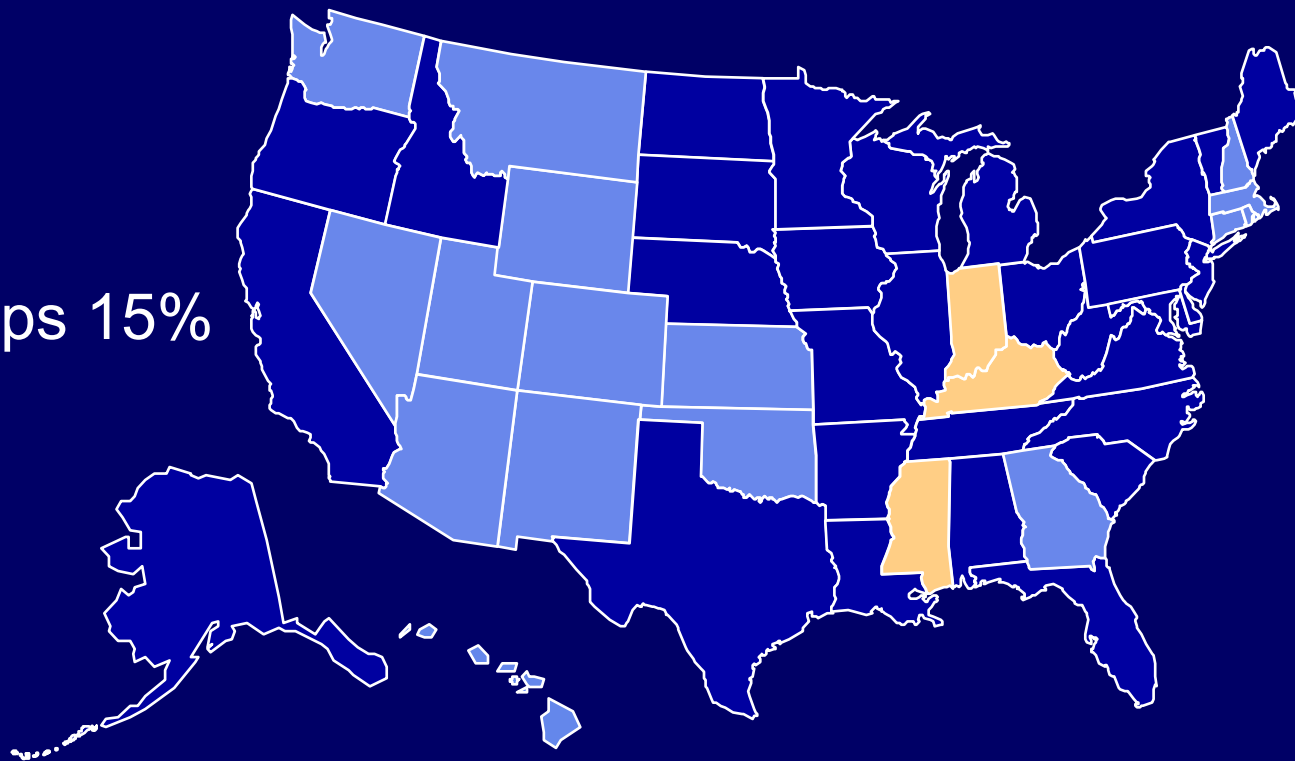
(*BMI ≥ 30 , or ~ 30 lbs overweight for 5' 4" person)



Obesity Trends* Among U.S. Adults 1997

(*BMI ≥ 30 , or ~ 30 lbs overweight for 5' 4" person)

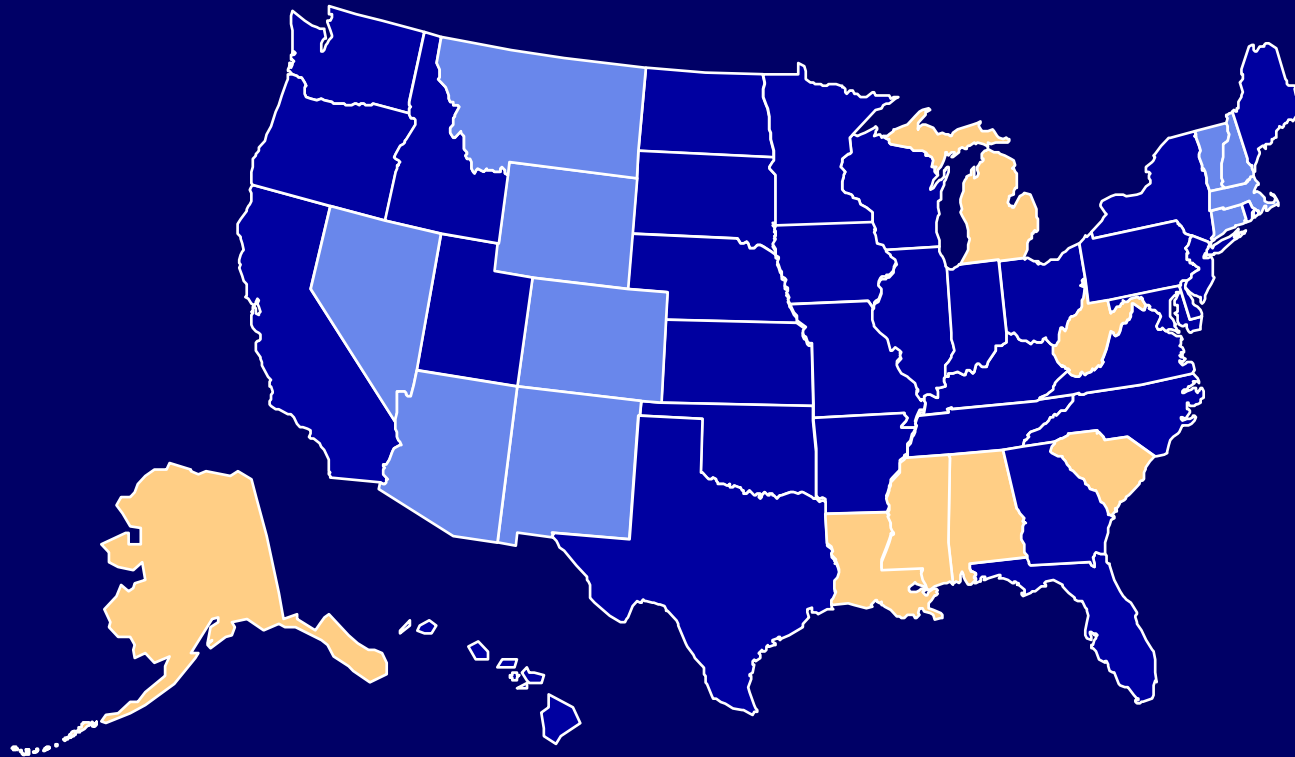
*CA tops 15%



*First year with $\geq 20\%$ category

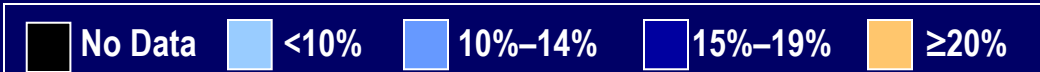
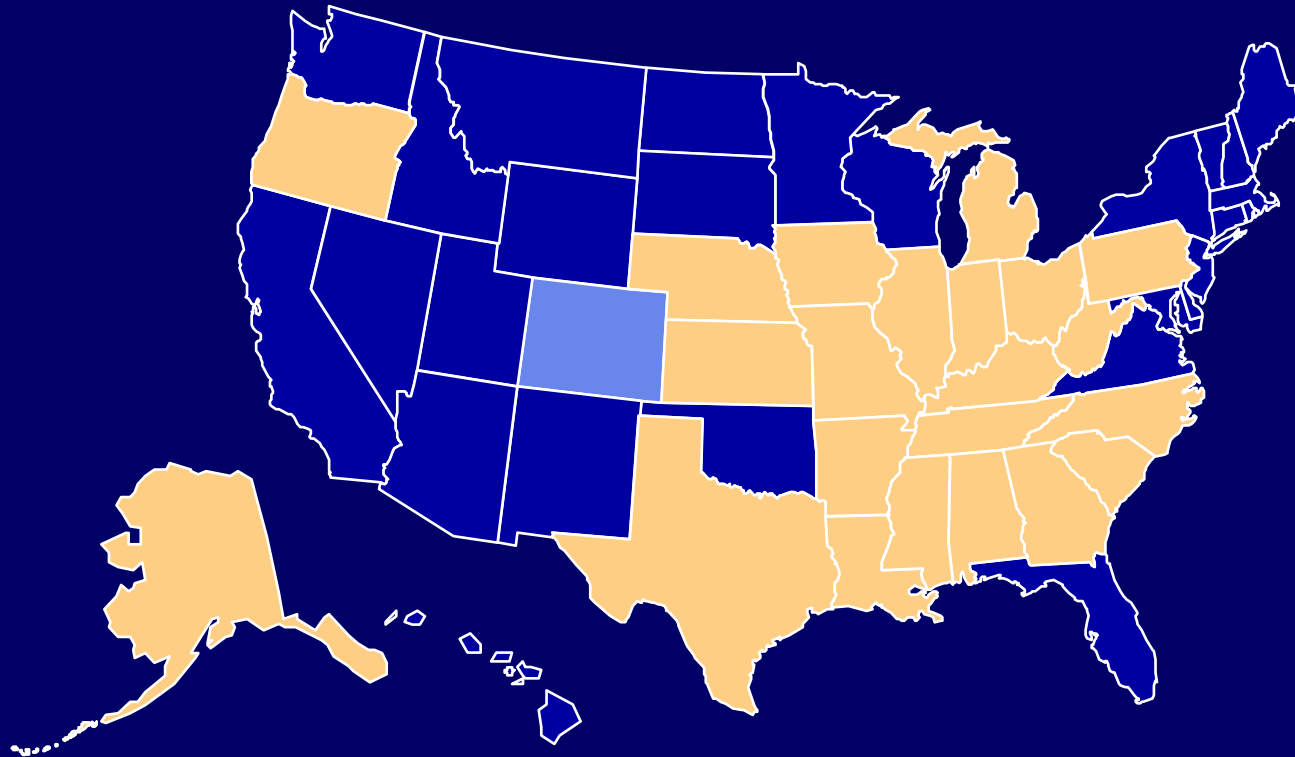
Obesity Trends* Among U.S. Adults 1998

(*BMI ≥ 30 , or ~ 30 lbs overweight for 5' 4" person)



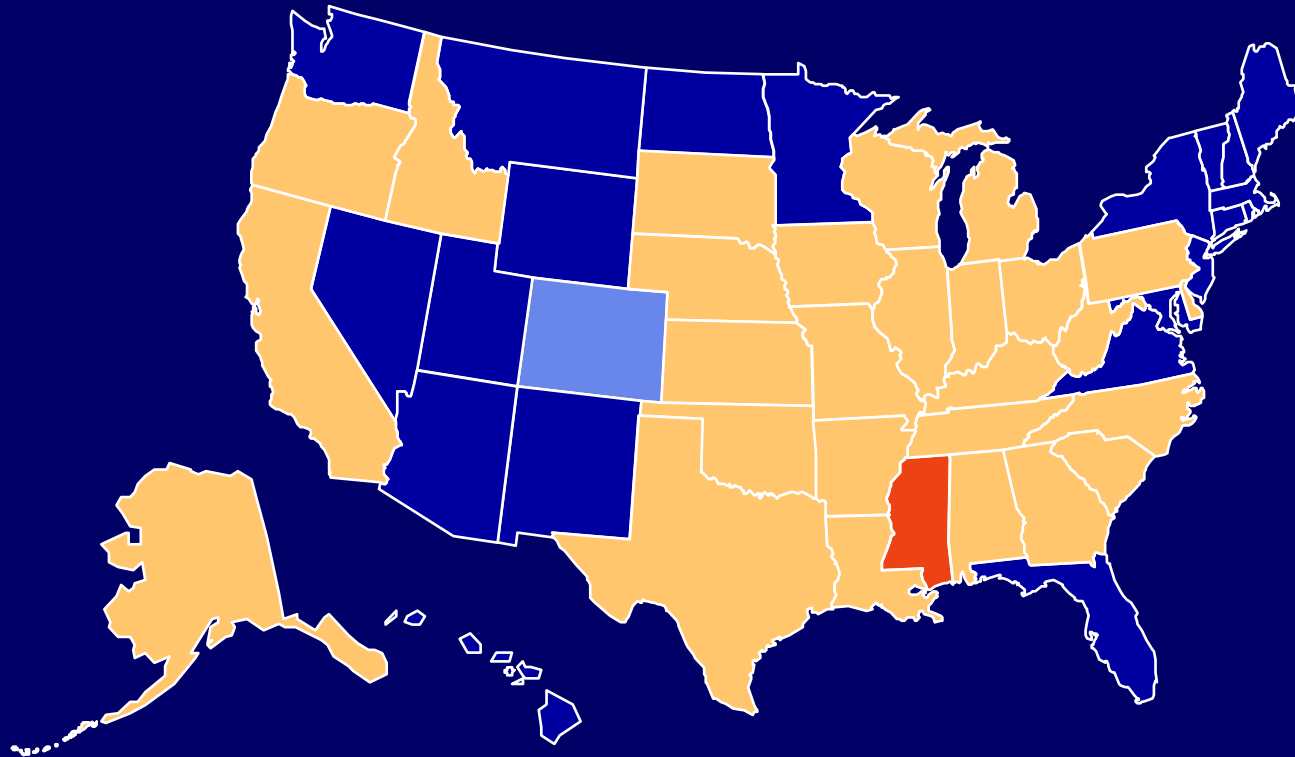
Obesity Trends* Among U.S. Adults 2000

(*BMI ≥ 30 , or ~ 30 lbs overweight for 5' 4" person)



Obesity Trends* Among U.S. Adults 2001

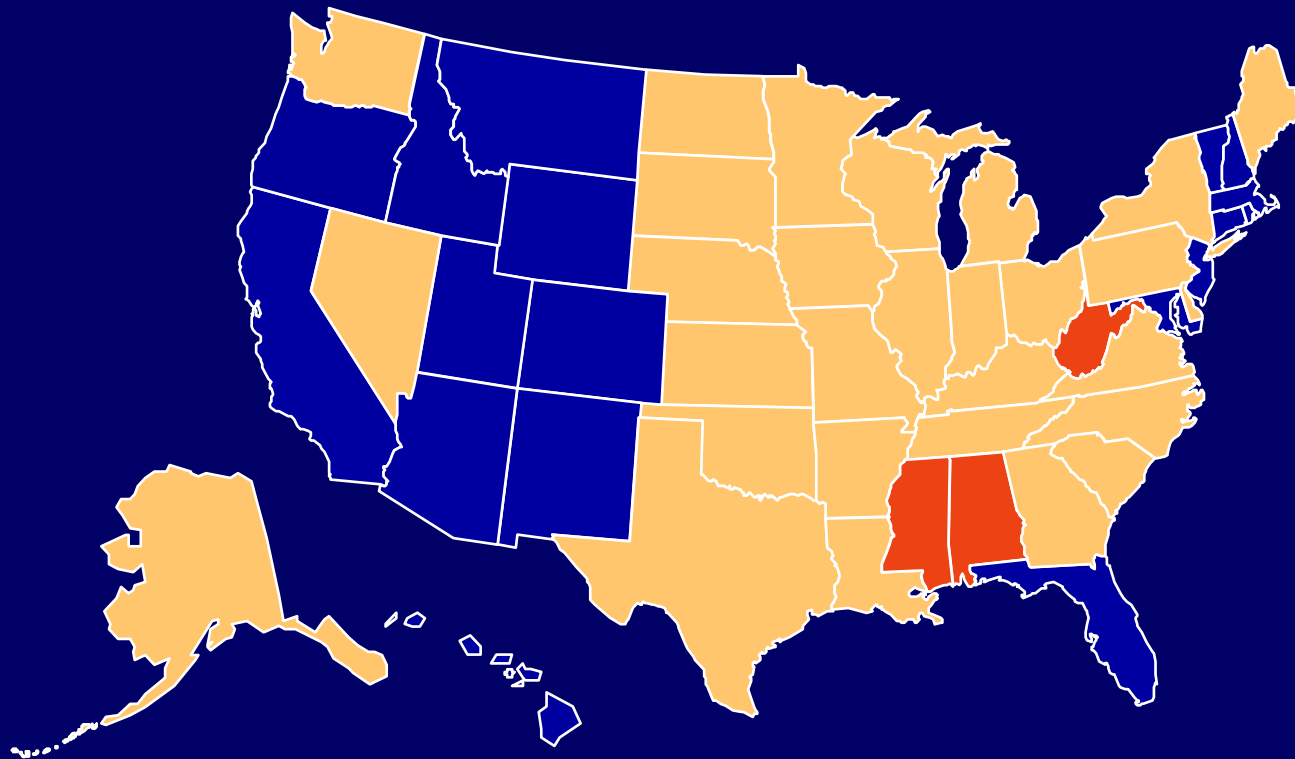
(*BMI ≥ 30 , or ~ 30 lbs overweight for 5' 4" person)



*First year with $\geq 25\%$ category

Obesity Trends* Among U.S. Adults 2002

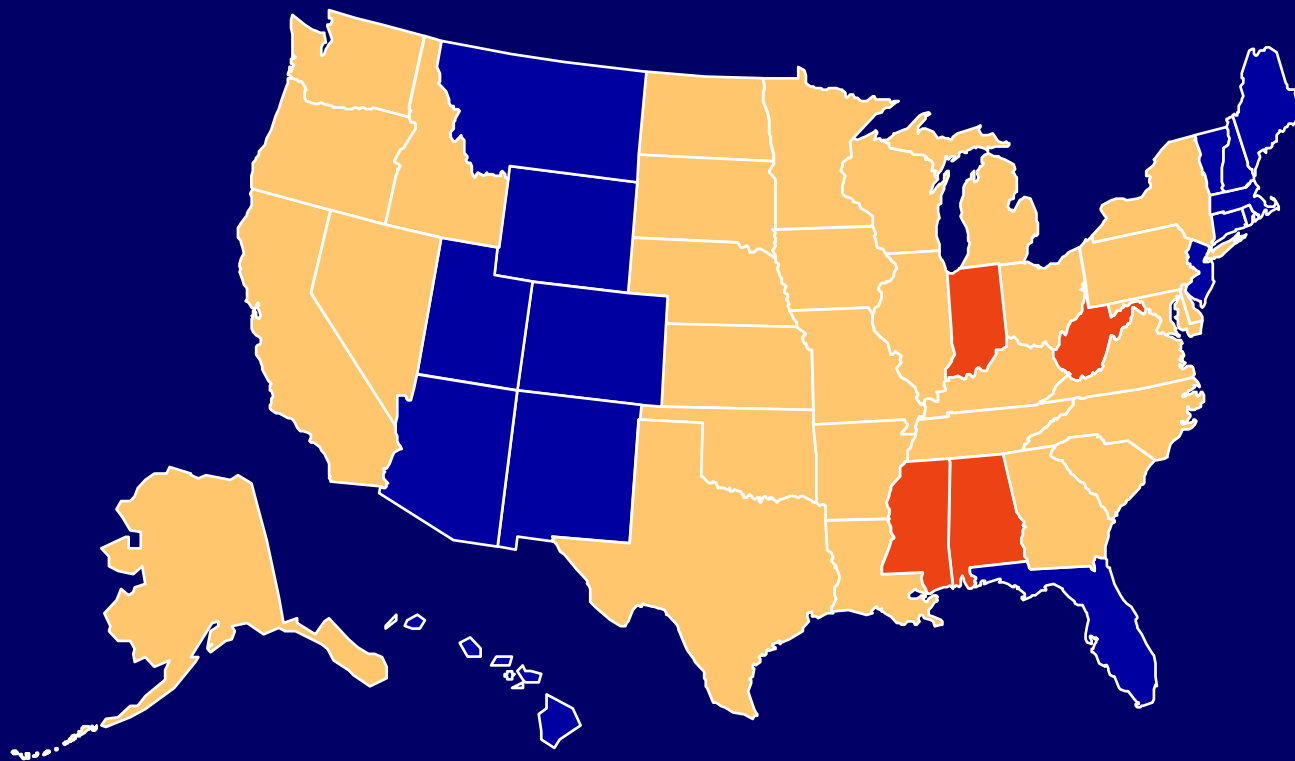
(*BMI ≥ 30 , or ~ 30 lbs overweight for 5' 4" person)



*Vast majority of states $\geq 20\%$

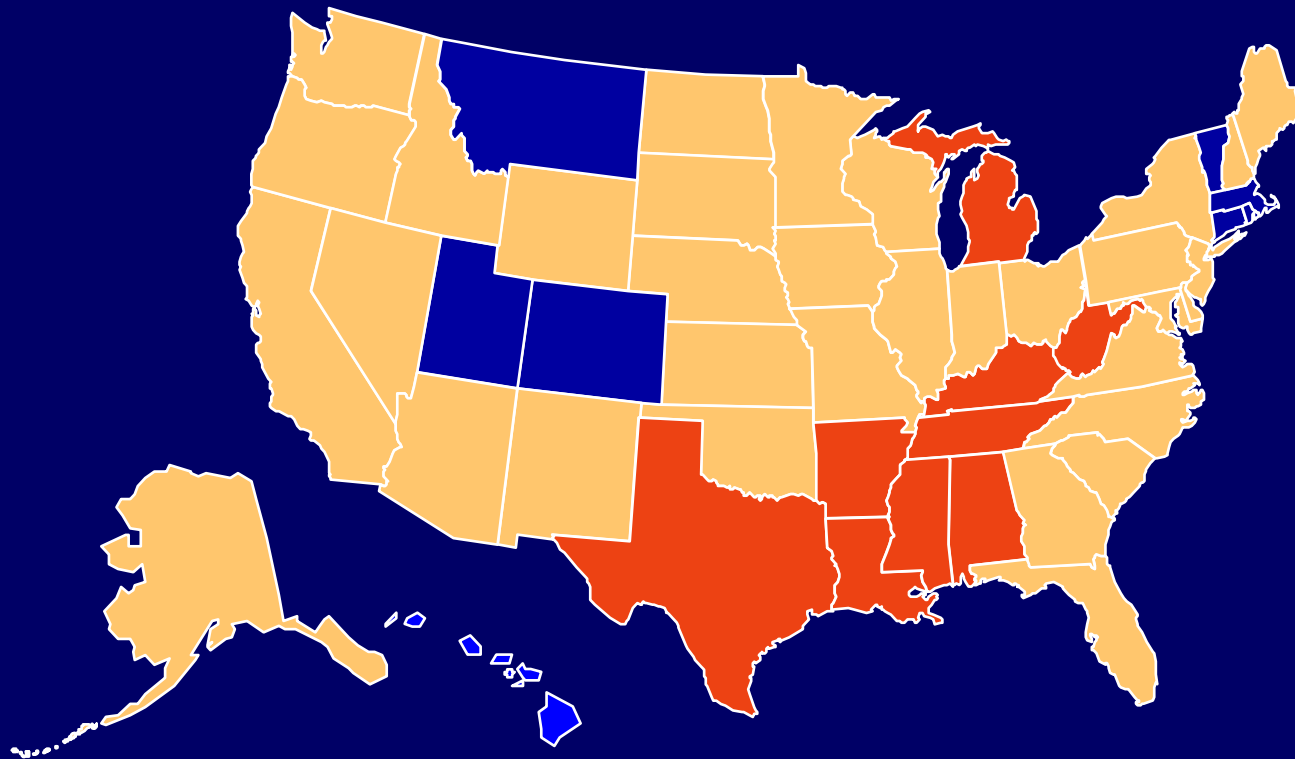
Obesity Trends* Among U.S. Adults 2003

(*BMI ≥ 30 , or ~ 30 lbs overweight for 5' 4" person)



Obesity Trends* Among U.S. Adults 2004

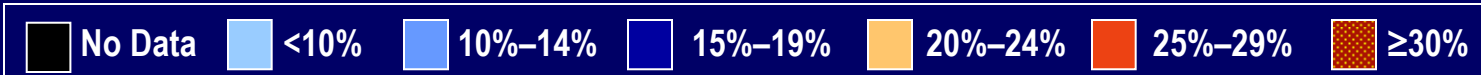
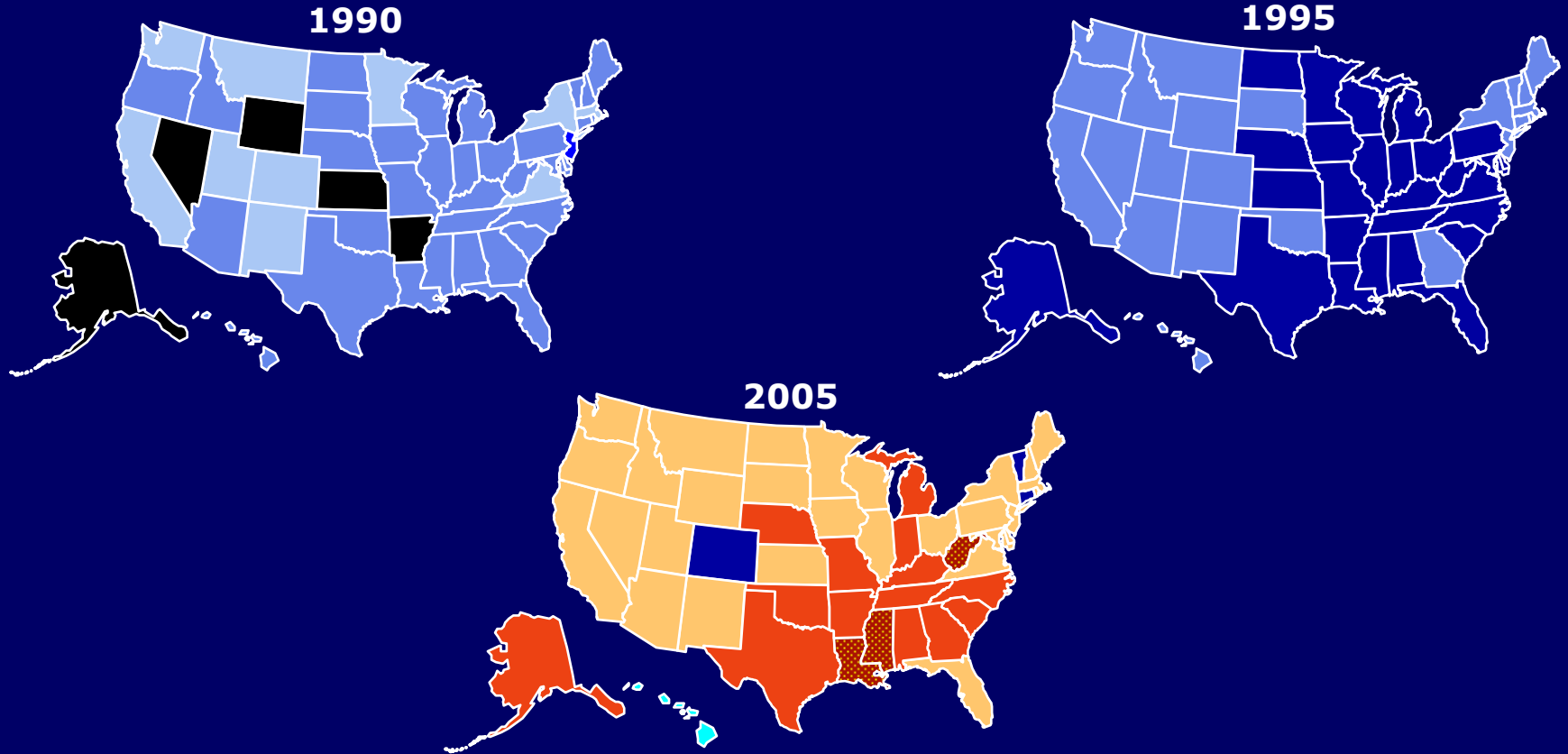
(*BMI ≥ 30 , or ~ 30 lbs overweight for 5' 4" person)



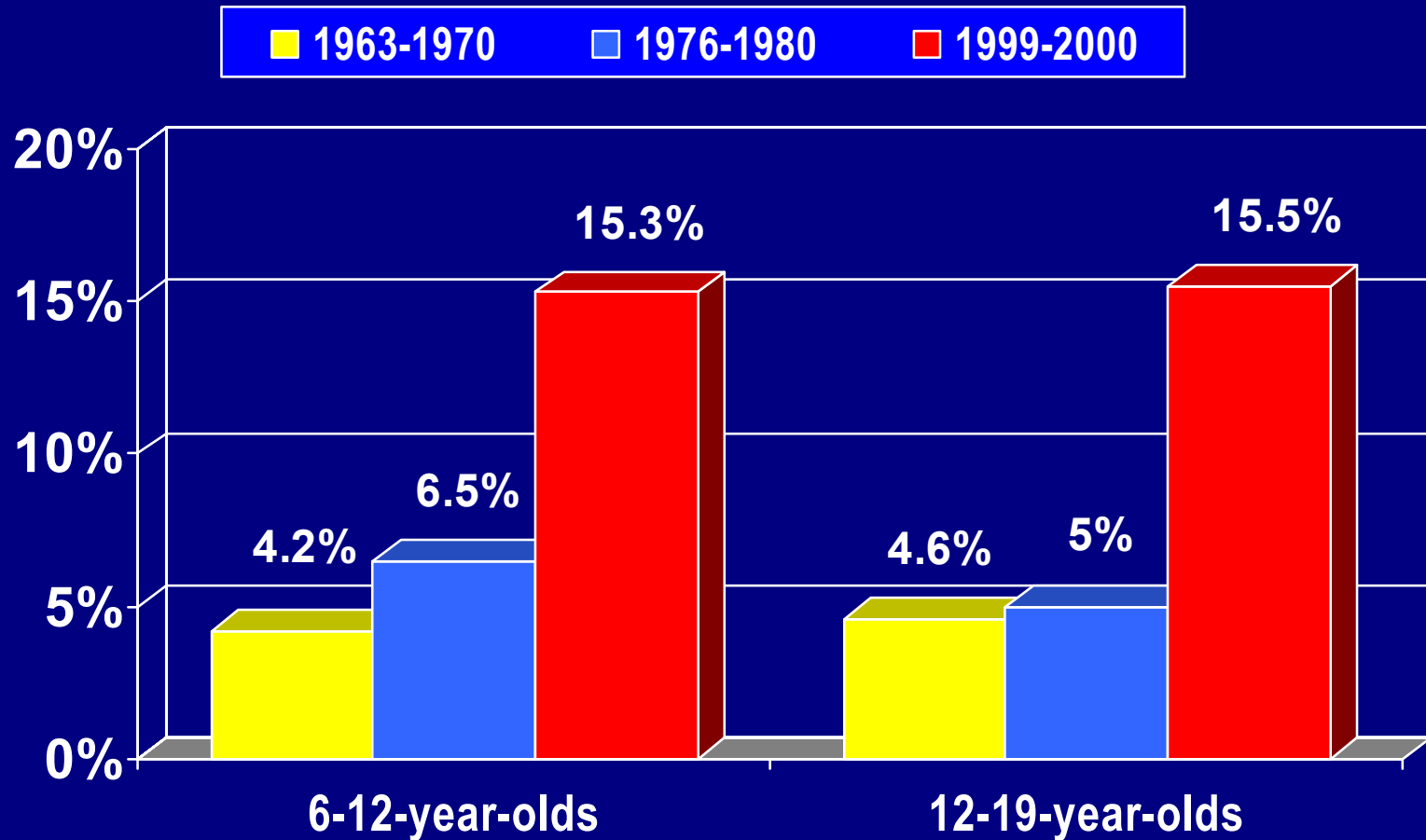
Obesity Trends* Among U.S. Adults

1990, 1995, 2005

(*BMI ≥ 30 , or about 30 lbs overweight for 5'4" person)



Proportion of Overweight Children in the United States in the United States



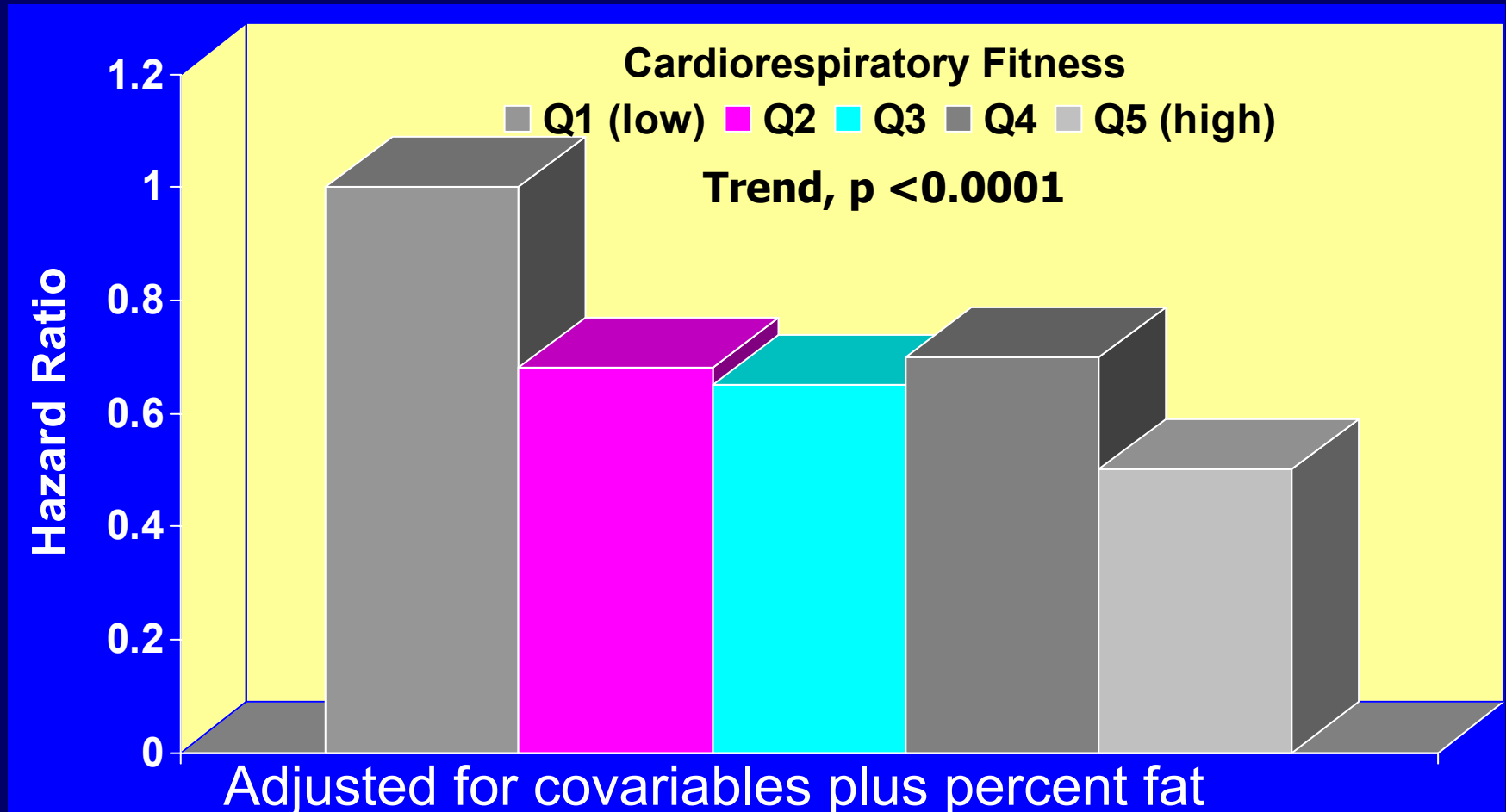
Source: Centers for Disease Control and Prevention, 2003.

Fitness Vs Fatness

- Better to be fat and fit, than skinny and un-fit.
- Low level of fitness is a bigger risk factor for mortality, than mild-moderate obesity.
- Benefits of physical activity are the same, regardless of how much you weigh.

Fitness, Adiposity, Fat Distribution and Cancer Mortality; 38,410 Men

Risk of Death per Fifths of Fitness

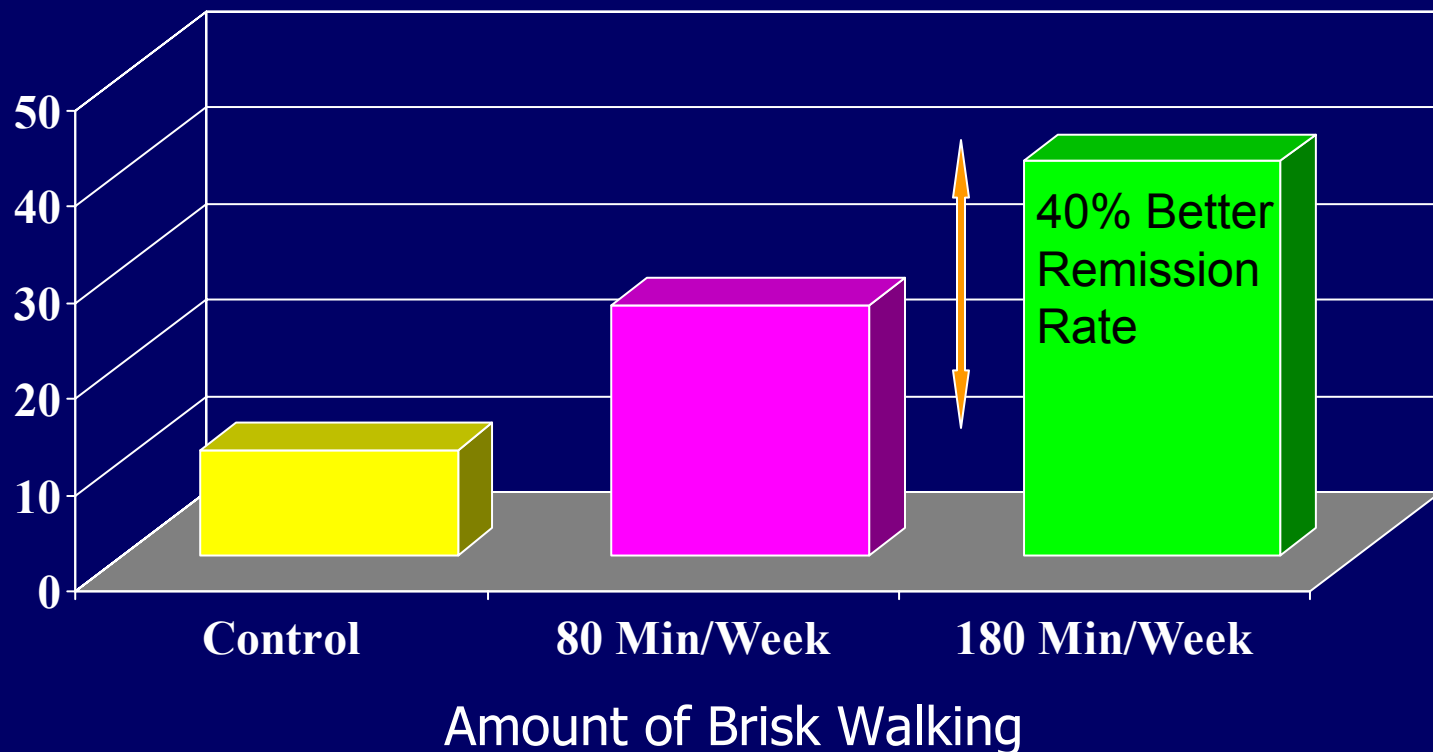


*age, smoking, exam year, baseline health status

Farrell S et al. ACSM 2006

Exercise Is As Good As Other Treatments for Clinical *Depression*

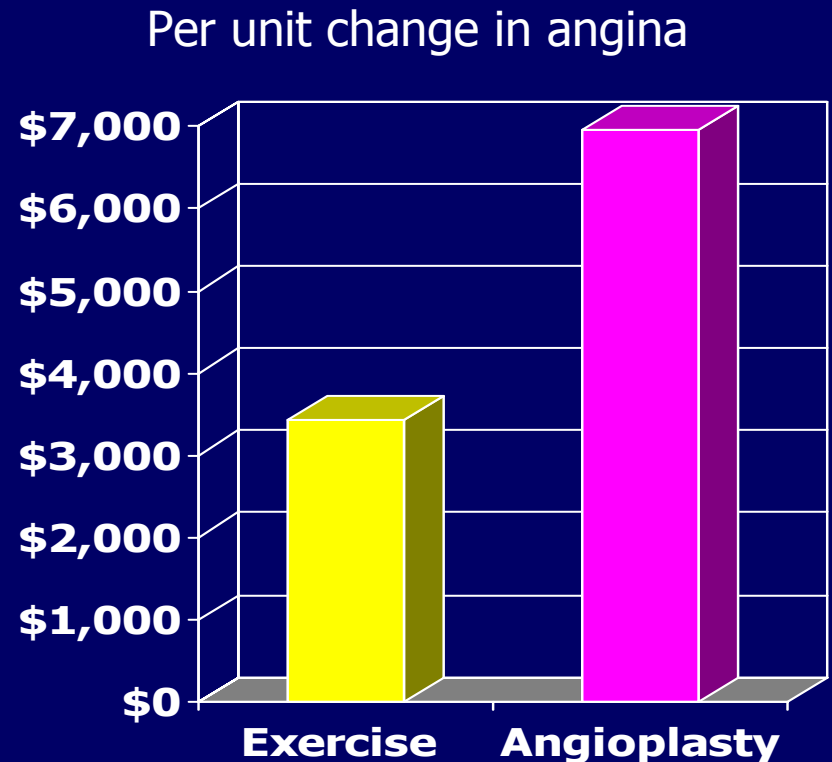
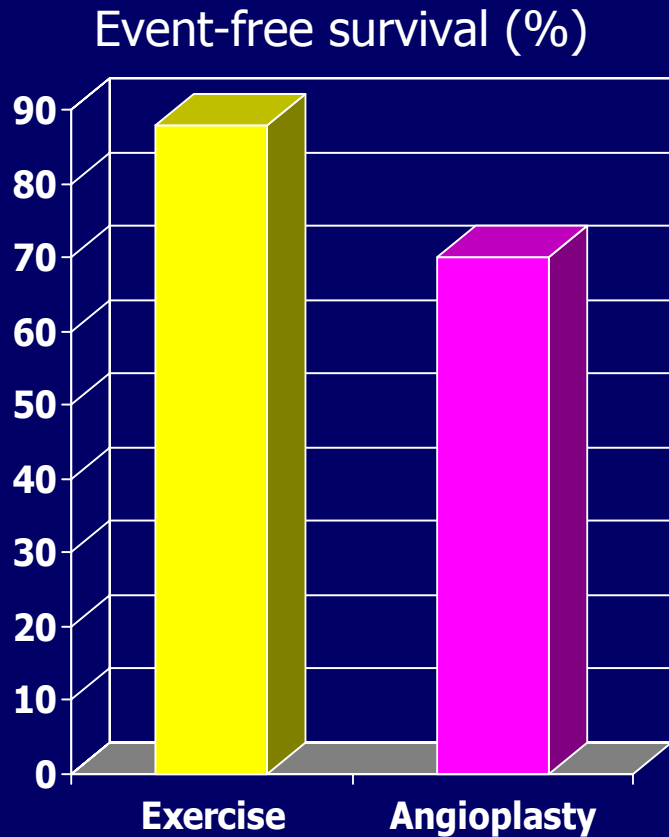
% of Patients with Remission of Depression



Drug therapy and cognitive behavioral therapy produce remission in approximately 40% of clinically depressed individuals

101 Men with Stable CAD

Exercise Training Vs Angioplasty (12 mo.)

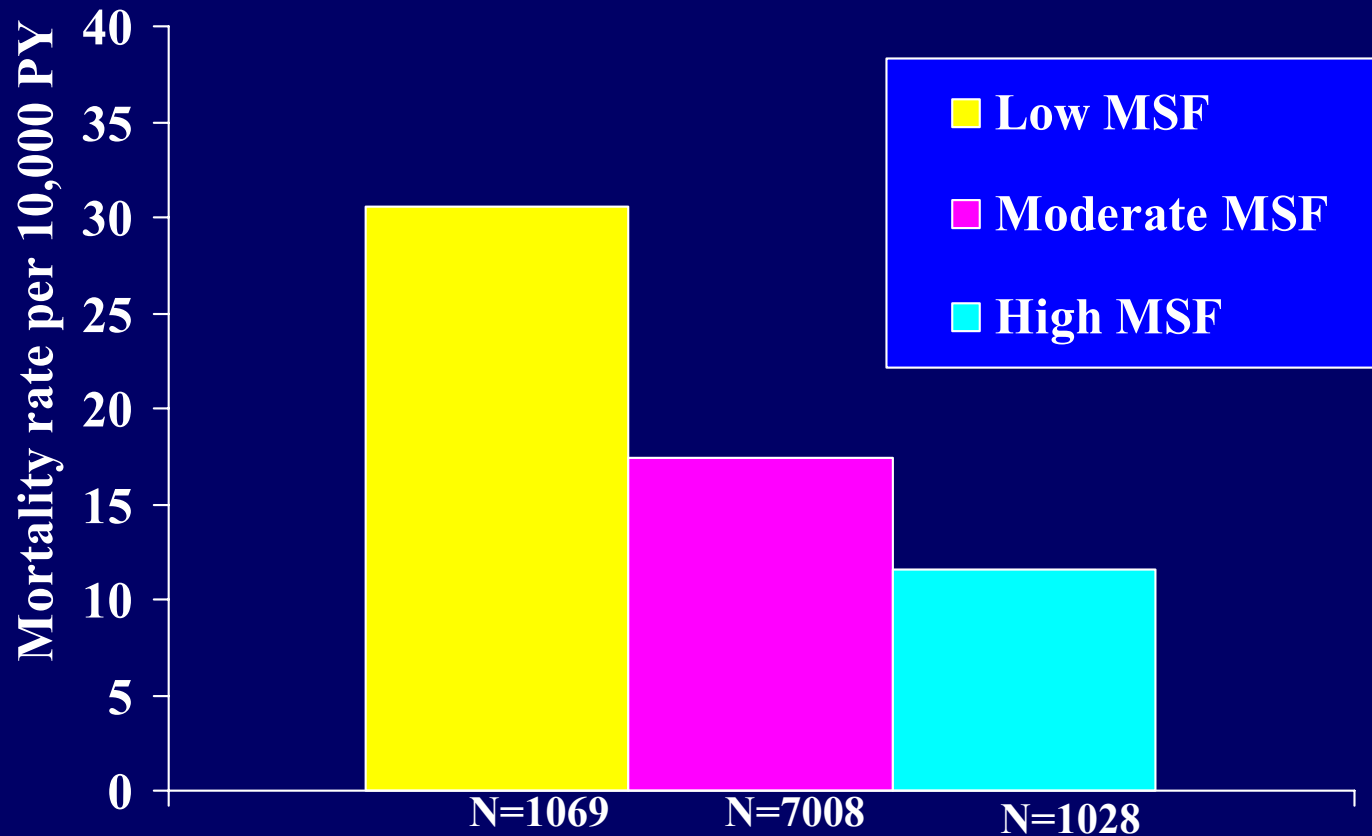


Exercise was 20 minutes/day
on a cycle ergometer

Relative Benefits of CAD *Interventions*

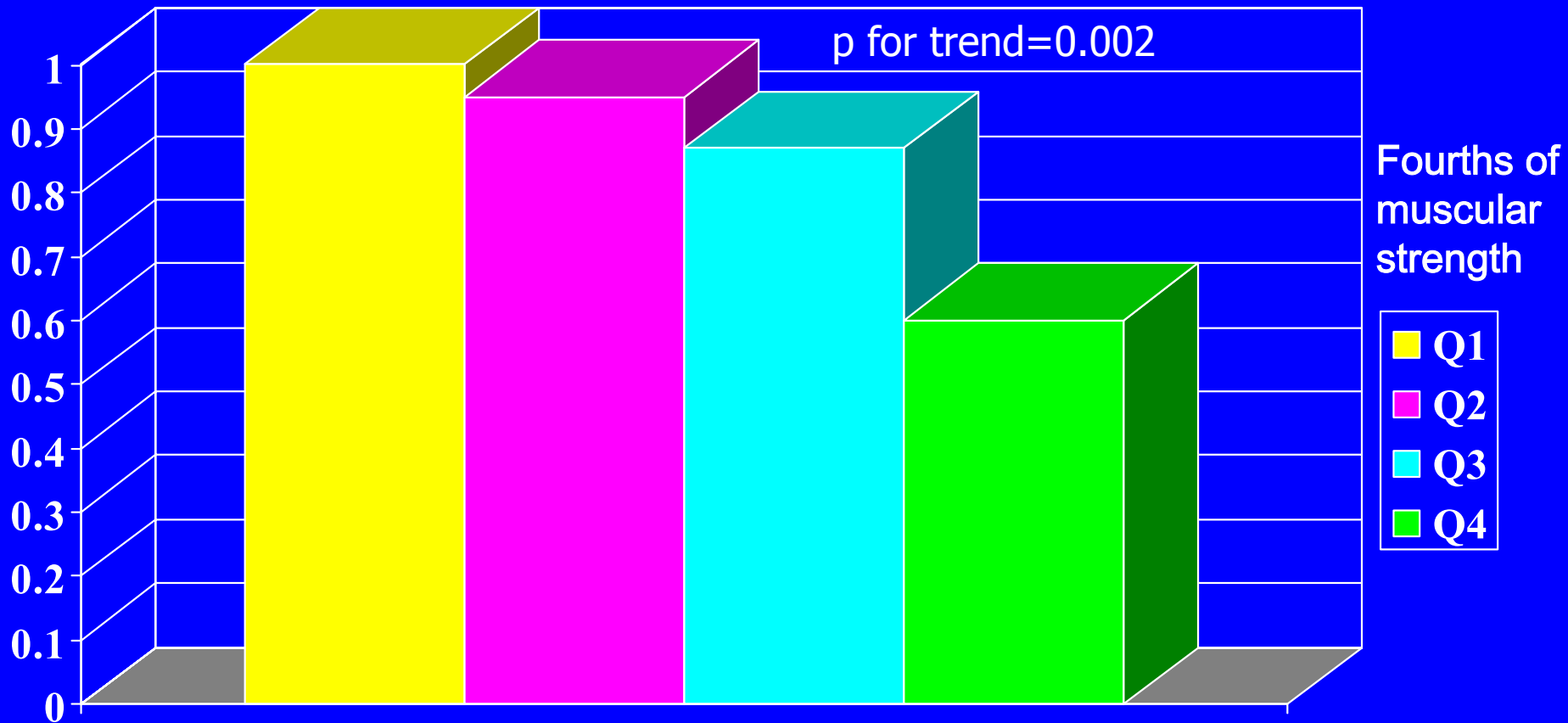
• Smoking cessation	60%
• Mediterranean diet	65%
• <i>Exercise / Wt loss</i>	50% ←
• <i>BP control</i>	42%
• <i>Lipid control</i>	25%
• <i>ASA for CAD</i>	25%
• <i>ACE for CHF / MI</i>	22%
• <i>B-Blockers for MI</i>	18%
• <i>Tight BS in DM2</i>	?
• Control of TG's / HDL	?
• Vitamins	0
• HRT	0

Mortality Rates per 10,000 Person-Years by Musculoskeletal Fitness Category



Adjusted Risk of Incident Metabolic Syndrome by Muscular Strength Groups in Men

Adjusted Risk



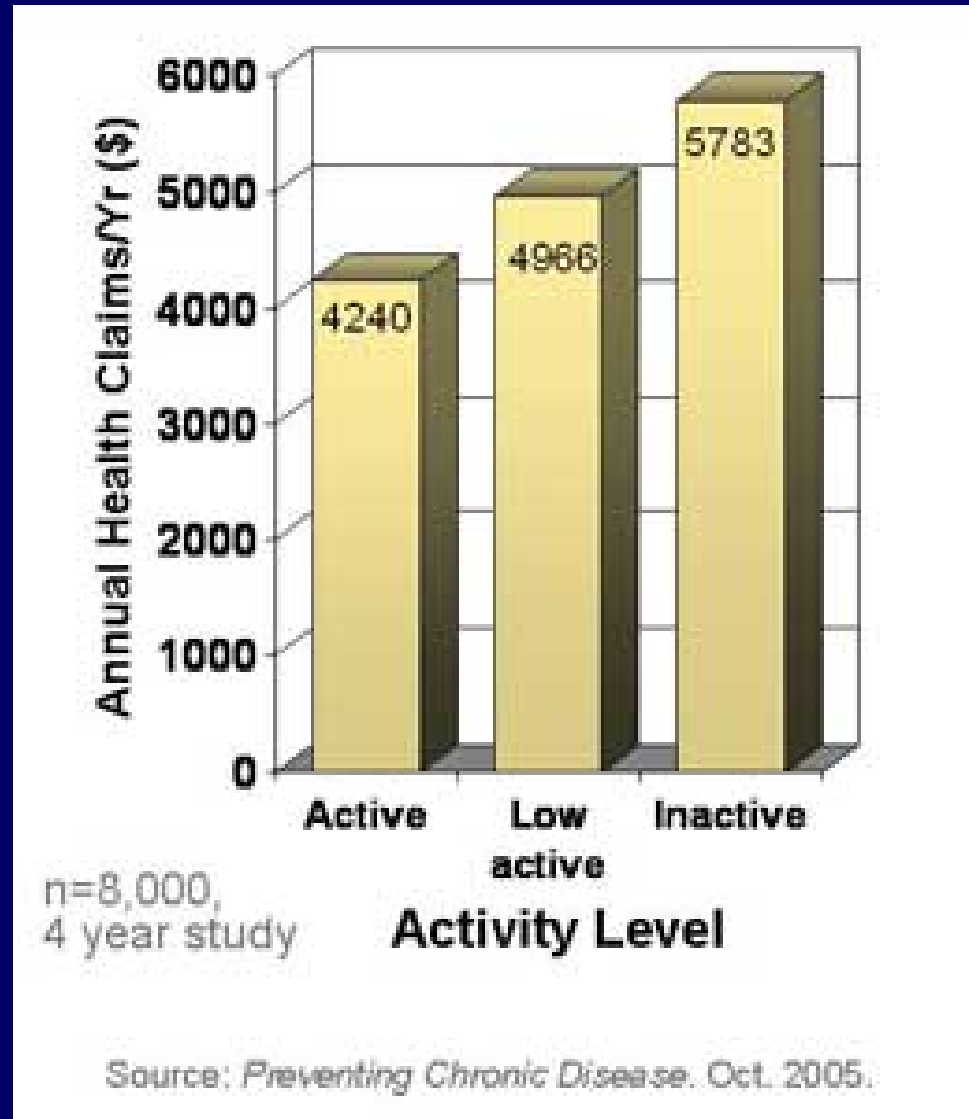
Results are similar in BMI groups (<25 & ≥25; and for all age groups)

The Cost of Inactivity

- Estimated 250,000 premature deaths annually in U.S. attributable to inactivity.
- Medical costs attributed to inactivity in California were estimated at \$29 billion yearly in 2005 (32% increase over 5 years).
- Physical activity and obesity are second only to tobacco use as the leading cause of preventable death in the U.S.
 - It follows that the “big 3” (exercise, smoking, BMI) should be assessed at every visit.

Activity Level and Health Claims

- Health claims increase as activity levels decrease.
- Compared to active persons:
 - Inactive persons cost \$1,543 per year more than active ones.



Exercise *is* Medicine

How Much Should Our Patients Take?

- CDC / ACSM Guidelines:
 - 30 min of moderate intensity physical activity (such as brisk walk) most days of the week.
- Healthy People 2010 guidelines recommend:
 - ≥ 30 min of moderate activity ≥ 5 days per week.
 - ≥ 20 min vigorous activity ≥ 3 days per week.
 - Only 25% (36% of men; 21% of women) in the U.S. met this in 2001.
- The simple recommendation is 30 minutes of moderate activity; 5 days per week.

We Have to Start Somewhere

- If advice against smoking benefits, why would think advice to exercise would not?
- No matter what intervention is finally shown effective for increasing PA, it will no doubt begin with physician advice.
 - MD credibility and authority are critical for patient behavior change.
 - In most studies, even control groups show improvement in PA.
- At minimum, physicians should advise patients to exercise; offer education material.

Components of a Fitness Program

- Cardio-respiratory fitness.
- Muscular strength and endurance.
- Flexibility.

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 patients like.
- T = Time:
 - 30 minutes.

Dog Walking and Physical Activity in the United States

- National Household Travel Survey asked about dog walking
- 65 million U.S. households with dogs; 39% of households have at least 1 dog
- Walk considered a bout of physical activity if it lasted ≥ 10 minutes
- 80.2% of dog walkers took at least 1 walk of ≥ 10 minutes
- 42.3% accumulated at least 30 minutes of dog walking/day
- *25-40% of dogs are overweight or obese*

Muscle Strength and Endurance

- 2 - 3 days per week of resistance training.
- Select 8 - 10 exercises that incorporate all major muscle groups.
- One set of 8 - 12 reps for each exercise.

Flexibility

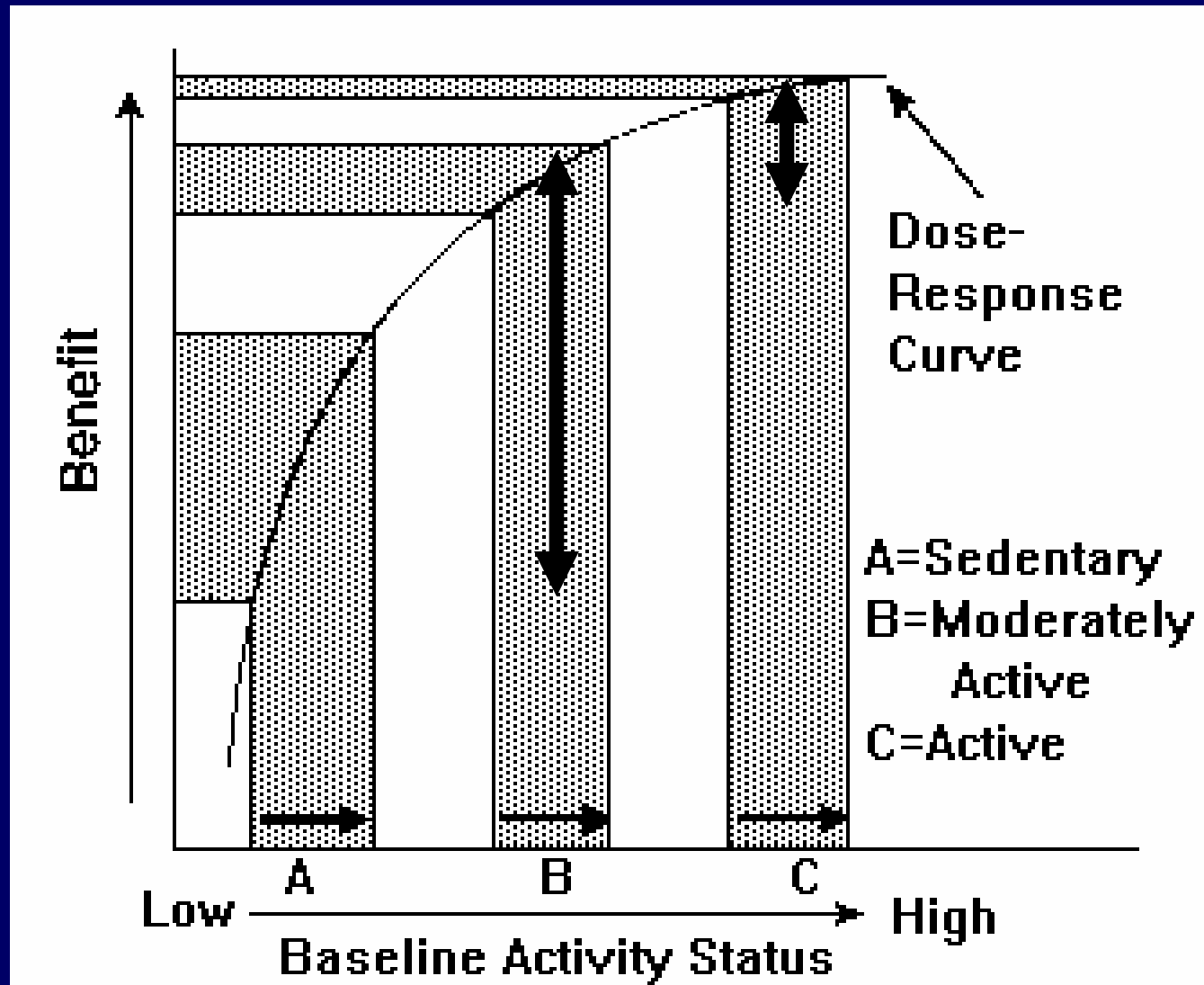
- Especially important as we age.
- Emphasis should be on developing and maintaining full range of motion.
- Stretch major muscle groups at least 2-3 days per week.

Exercise and Health

- Tremendous health benefits are seen with even low levels of exercise.
- Amount of exercise needed to benefit health is much lower than amount needed for fitness.
- Weight control is more dependent on frequency and duration of exercise than intensity.

Physical Activity and Health Benefits

Dose-Response Curve



Exercise Is Medicine: *And Everyone Should Take It!*

If we had a pill that conferred all the proven health benefits of exercise, physicians would prescribe it to every patient and our healthcare system would find a way to make sure every patient had access to this wonder drug.

What Can be Done?

- Nation wide exercise initiative:
 - Every patient; Every visit; Every treatment plan.
- Physical activity should be recorded as a vital sign and patients implored to do:
 - 30 minutes, 5 days per wk (walk, jog, bike etc).
 - Add 10 min for stretching, sit-ups and push-ups.
- Message should be the same from every provider, regardless of specialty.
- We must begin to merge the healthcare industry with the fitness industry.



- A national initiative sponsored by the ACSM and AMA.
- Had national launch this month in Washington, D.C.
- Web site:
 - exerciseismedicine.org



Governor's Challenge to CA Physicians

- Gov Schwarzenegger challenges CA physicians to prescribe exercise to every patient.
- Pledge support on Council web-site.
 - www.CalGovCouncil.org
 - *Receive* free Exercise Rx pad.
- Kaiser Permanente and “Thrive”.

Dr. John Doe Sample
Medical Center
1234 Main Street, Suite 100
Arytown, USA 12345
Tel 123.456.7890 | Fax 123.456.7890

Name _____ Age _____
Date _____

Exercise Rx

Recommended Activity: _____


Minutes per day _____

Number of days per week _____

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 poorly.

Signature _____

 Go to www.CalGovCouncil.org
for a listing of parks, sports
and activities in
your neighborhood

Sponsor
Logo



The Exercise Pill

- Benefits are enormous.
 - Treatment and prevention of chronic disease.
 - Lowering of obesity and mortality rates.
 - Improved productivity and sick leave.
 - Improved energy levels, self esteem, stress mgmt, etc.
- Why aren't physicians prescribing exercise?
 - No "big pharma" to promote.
 - Physicians not committed to prescribe.
 - Time and effort are the costs; patients are cheap.
- Side effects:
 - Overuse injuries – start low and go slow.
 - Sudden death – rare.

Do You Really Think We have a Chance Without Exercise?

- Obesity
- Coronary artery disease
- Diabetes
- Hypertension
- Cancer
- Depression and anxiety
- Arthritis
- Osteoporosis
- Etc, etc, etc...

NO!

Summary

- Evidence is overwhelming on the cost and health burden of inactivity.
- Benefits of exercise in treatment and prevention of chronic disease irrefutable.
 - Physicians cannot continue to ignore this evidence.
 - The “Big 3” (exercise, smoking, BMI) should be addressed at every visit.
- No patient should leave a physician’s office without an assessment of physical activity and proper prescription of an exercise program.