Total Care for the Athlete at Heart
June 23, 2013

Endurance Heart Health
Justin Levisay, MD
NorthShore University HealthSystem

“What if there was one prescription that could prevent and treat dozens of diseases, such as diabetes, hypertension and obesity?”

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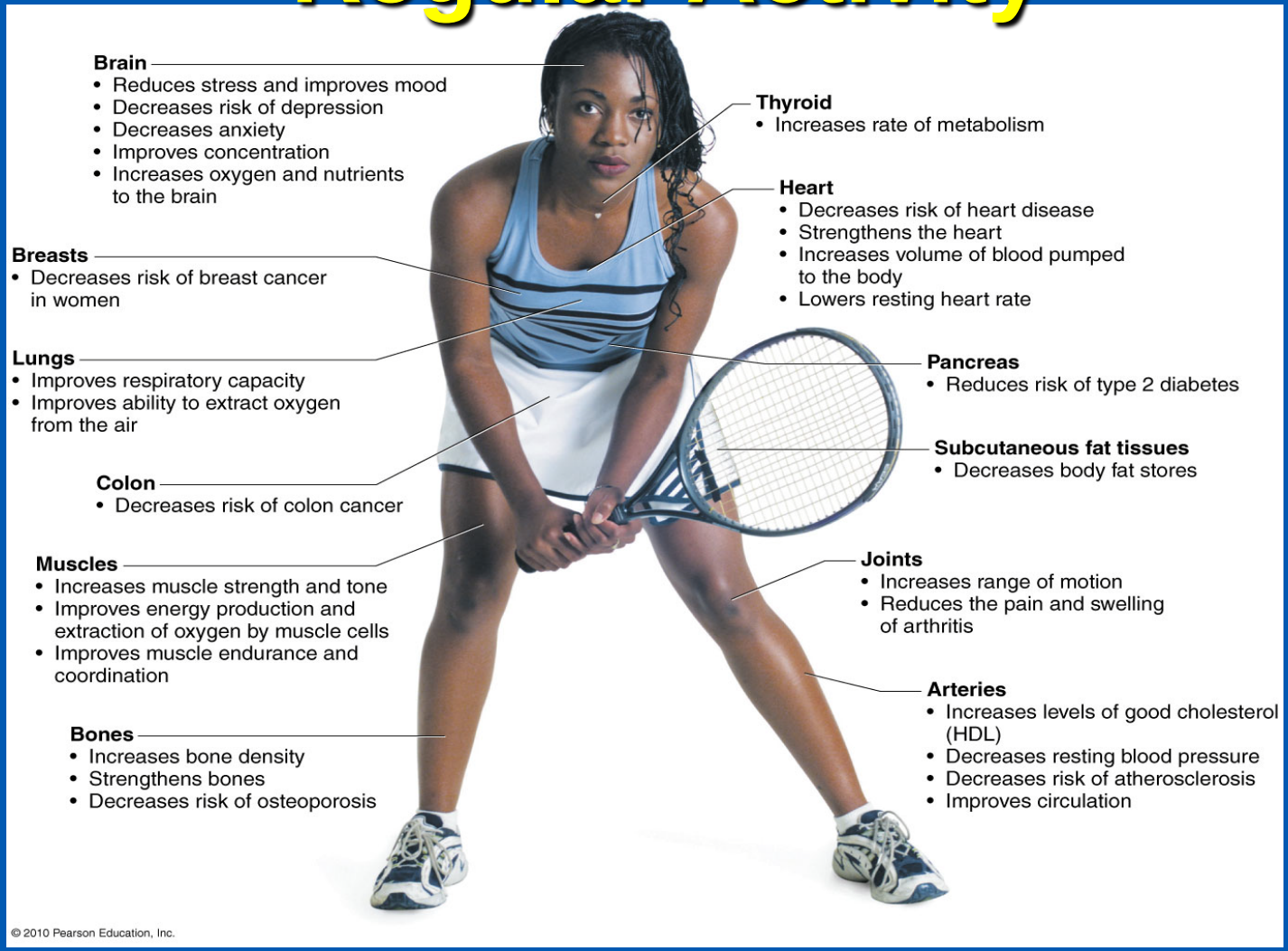
Some Health Benefits of Regular Activity



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Aerobic Fitness Program

- Frequency: exercise should be performed at least three times per week.
- Intensity: Use your target heart rate or the rating of perceived exertion scale.
  - Target heart rate, lower = (220 – age) · 0.50
  - Target heart rate, upper = (220 – age) · 0.70
- Duration: vigorous activities for 20 minutes; moderate for 30 minutes

Exercise and Aging

- Functional capacity peaks between 20 and 30 years of age and decreases with advancing years.
- Active people show 25% higher functional capacity at any age over sedentary counterparts!
- Physical capacity will decline w/ age, but older people can still improve!

Exercise and Aging

- Cardiovascular System Responds to Training at any AGE!!!
  - Adaptations (%) similar to those seen in younger individuals.
  - Decline may be 2X's faster however.
- Body Composition
  - Exercise diminishes increase in BF% seen with aging

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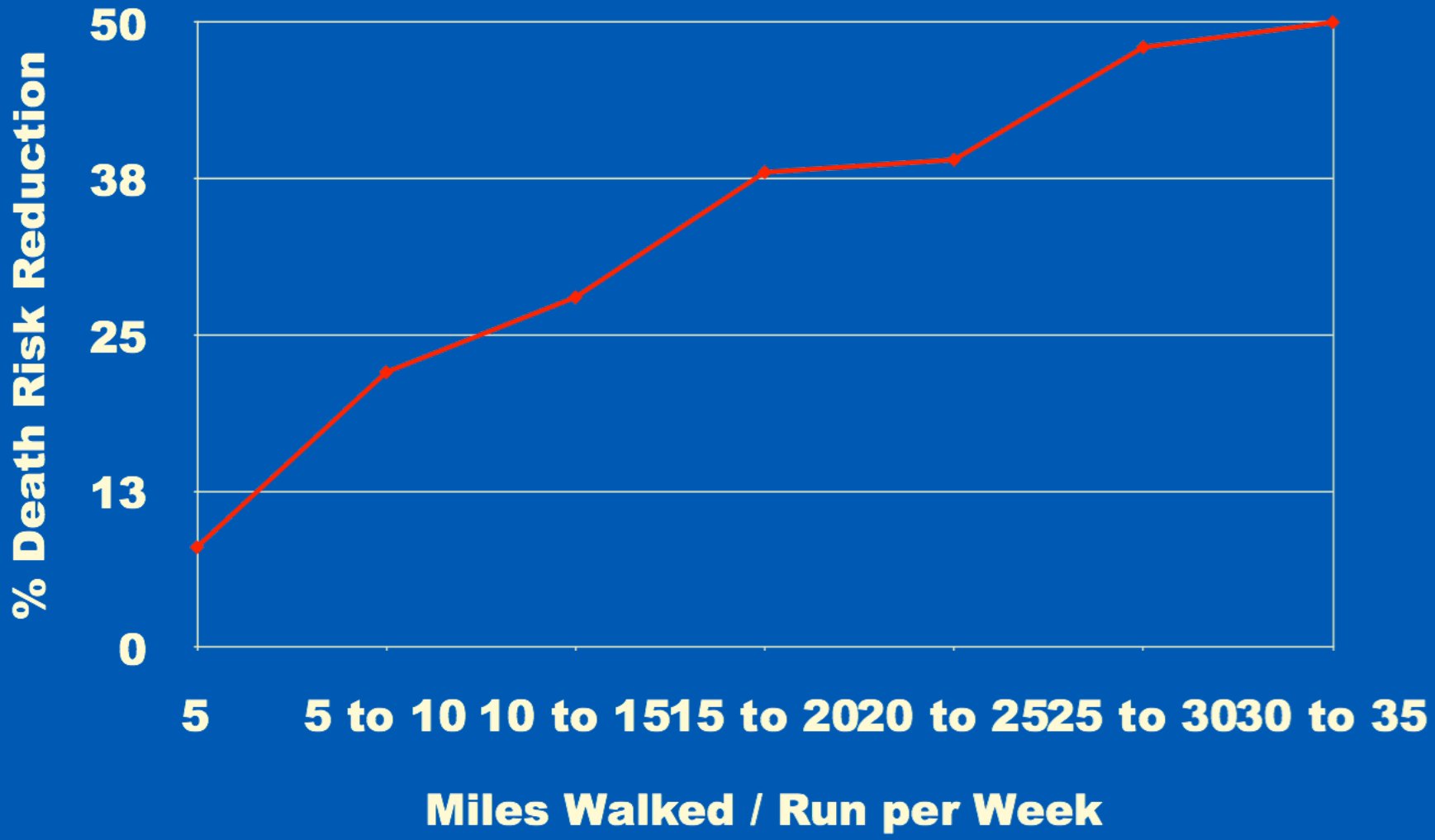
Harvard Alumni Study



Exercise to Improve Health and Extend Life

- Epidemiological evidence
  - Studies have shown a cause - effect relationship between physical inactivity and CHD (sedentary person = 2X's risk)
  - Protective association just as strong as hypertension, smoking, and high cholesterol.
  - Physical inactivity is the GREATEST risk factor for heart disease...more people are physically inactive than possess ALL other CHD risk factors!

Cardiovascular Diseases

- Cardiovascular diseases can lead to myocardial infarction (heart attack), stroke, embolisms, aneurysms, etc.
  - Incidence of deaths from heart disease have declined since 1970 (due to advances in technology, not decrease in CHD incidence)
- Annual costs over 120 billion dollars!

CAD Begins Early

- Fatty streaks are common in children as young as 5 yrs.
- Studies examining autopsy results of Vietnam casualties (avg. age 19 yrs.) showed significant CAD in majority of men.

Risk Factors for CAD

- Modifiable
  - Obesity
  - Sedentary life
  - Blood lipids
  - Diet
  - Hypertension
  - Smoking
  - Diabetes
  - Tension & stress
  - Education

- Non-Modifiable
- GENETICS *
- Family History*
- Race
- Sex

- Age

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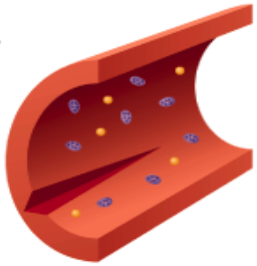
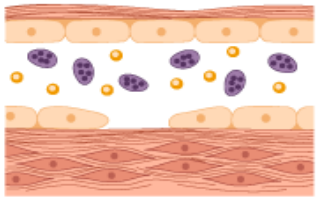
DEVELOPMENT OF ATHEROSCLEROSIS

a



A blood-borne irritant injures or scratches the arterial wall exposing the underlying connective tissue.



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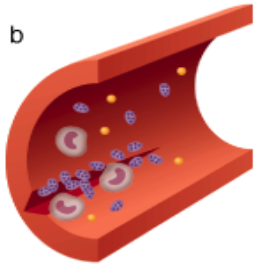
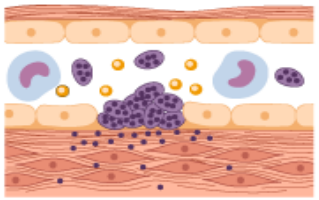


Blood platelets and circulating immune cells known as monocytes are then attracted to the site of the injury and adhere to the exposed connective tissue. The platelets release a substance referred to as platelet-derived growth factor (PDGF) that promotes migration of smooth muscle cells from the media to the intima.



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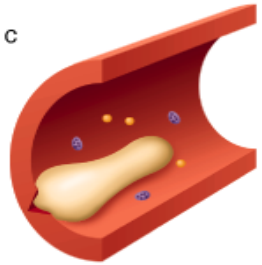
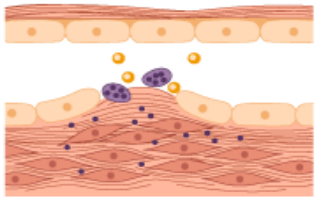


A plaque, which is basically composed of smooth muscle cells, connective tissue, and debris, forms at the site of injury.



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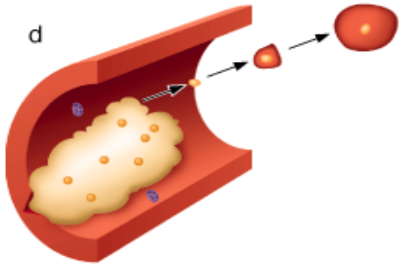
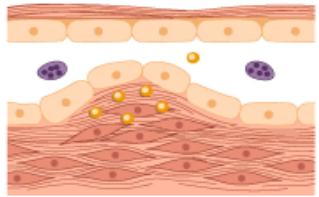


As the plaque grows, it narrows the arterial opening and impedes blood flow. Lipids in the blood, specifically low-density-lipoprotein cholesterol (LDL-C), are deposited in the plaque. When pieces of the plaque break loose they can start clots that lodge in other parts of the vessel.

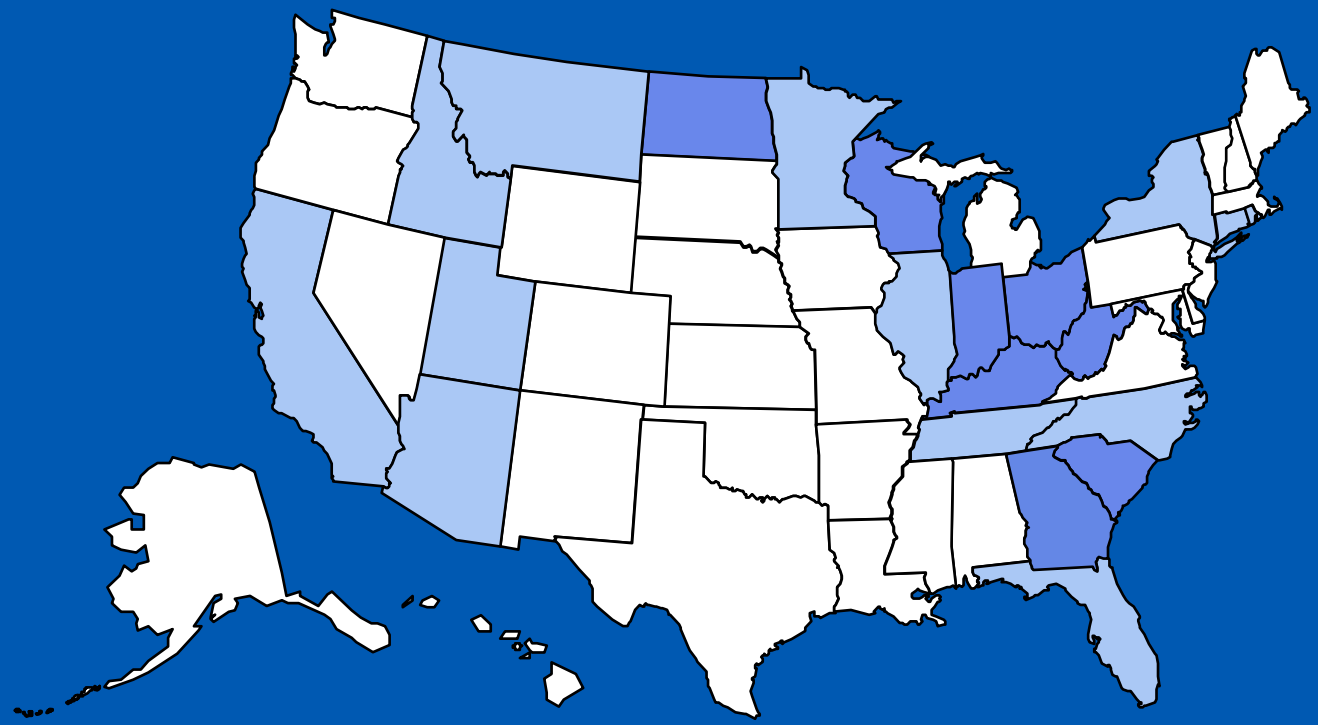


Source: Behavioral Risk Factor Surveillance System, CDC

Obesity Trends* Among U.S. Adults

BRFSS, 1985

(*BMI ≥30, or ~ 30 lbs overweight for 5’ 4” woman)



No Data | <10% | 10%–14% | 15%–19% | 20%–24% | ≥25%

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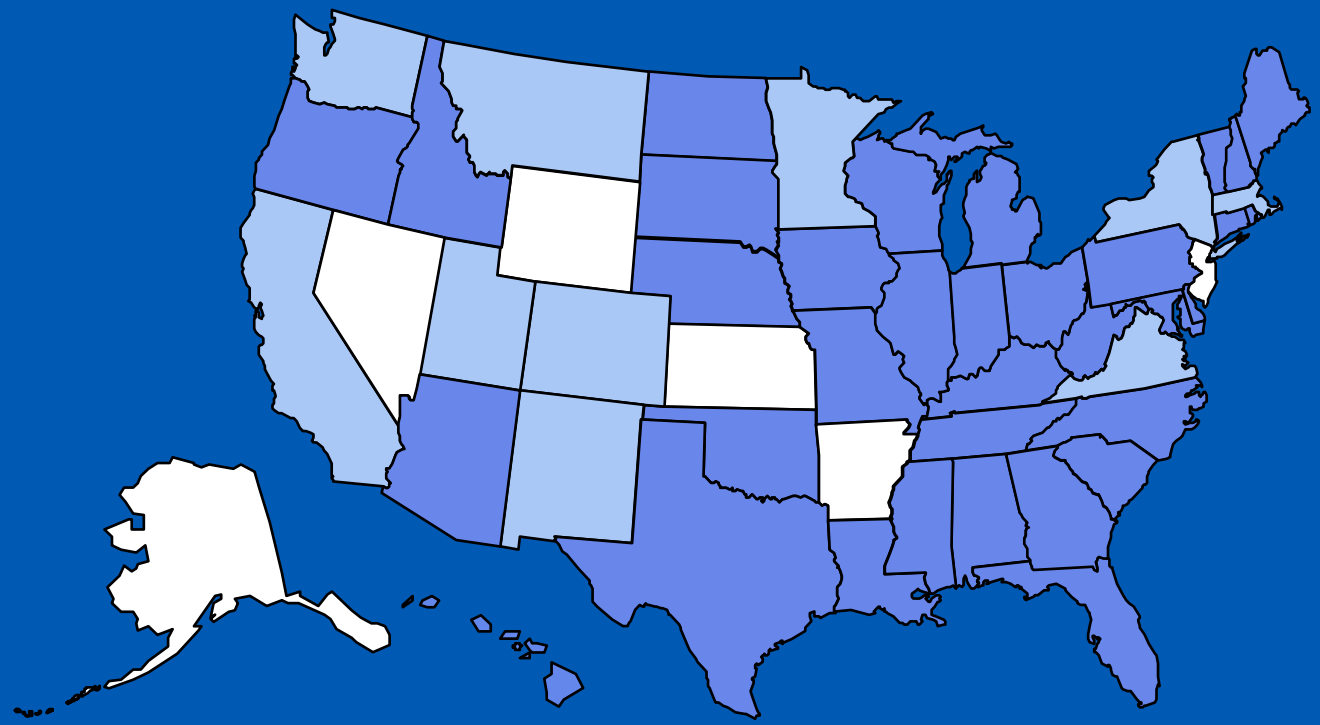
Source: Behavioral Risk Factor Surveillance System, CDC

Obesity Trends* Among U.S. Adults

BRFSS, 1990

(*BMI ≥30, or ~ 30 lbs overweight for 5’ 4” woman)



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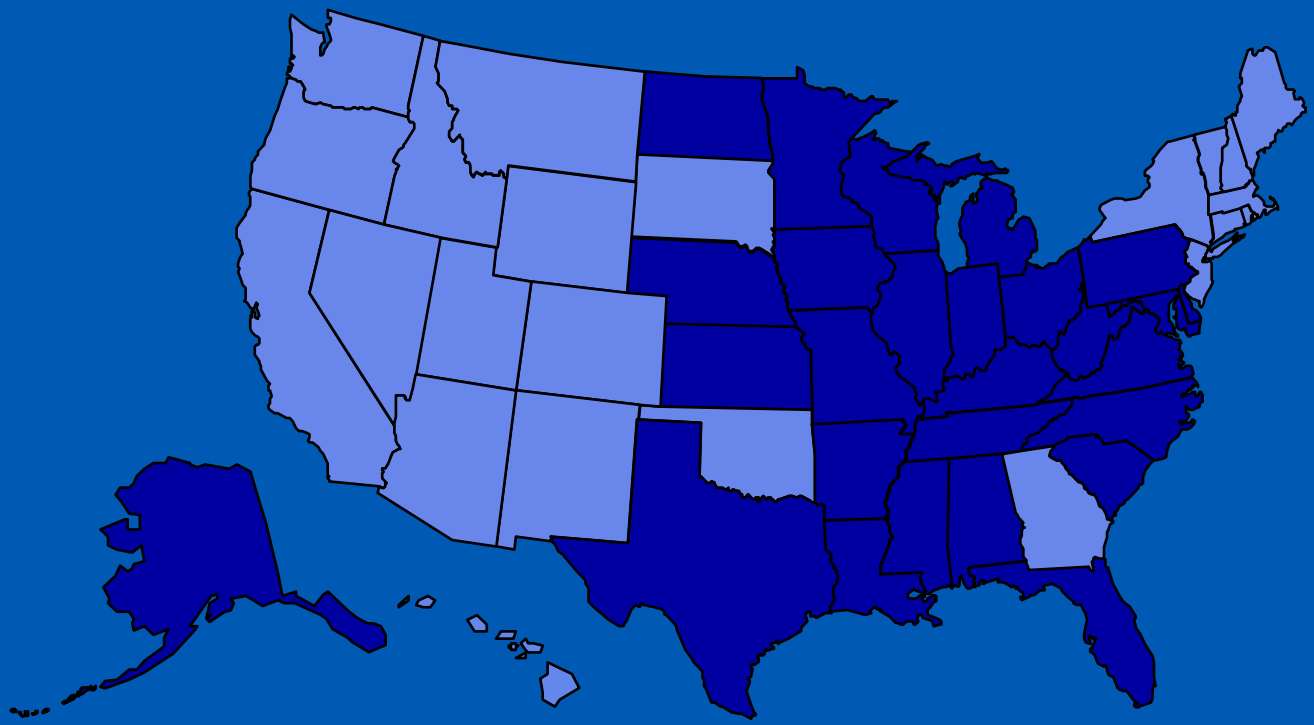
Source: Behavioral Risk Factor Surveillance System, CDC

Obesity Trends* Among U.S. Adults

BRFSS, 1995

(*BMI ≥30, or ~ 30 lbs overweight for 5’ 4” woman)



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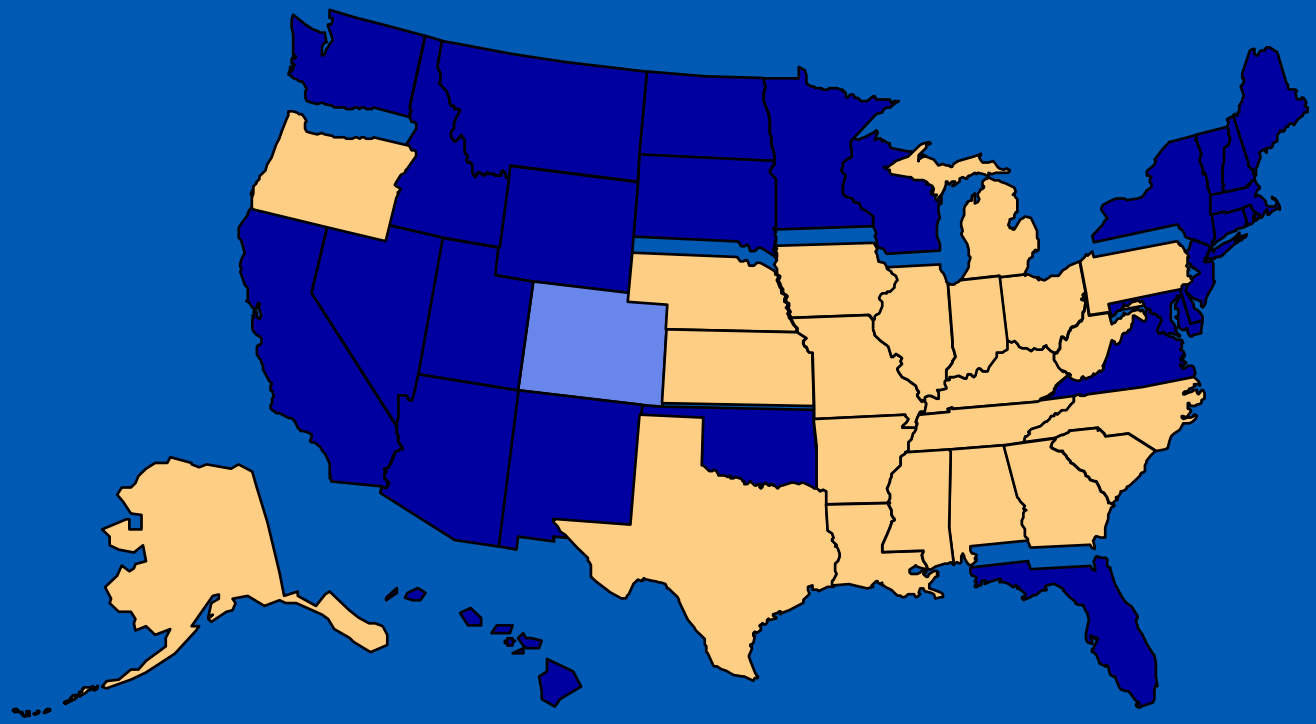
Source: Behavioral Risk Factor Surveillance System, CDC

Obesity Trends* Among U.S. Adults

BRFSS, 2000

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



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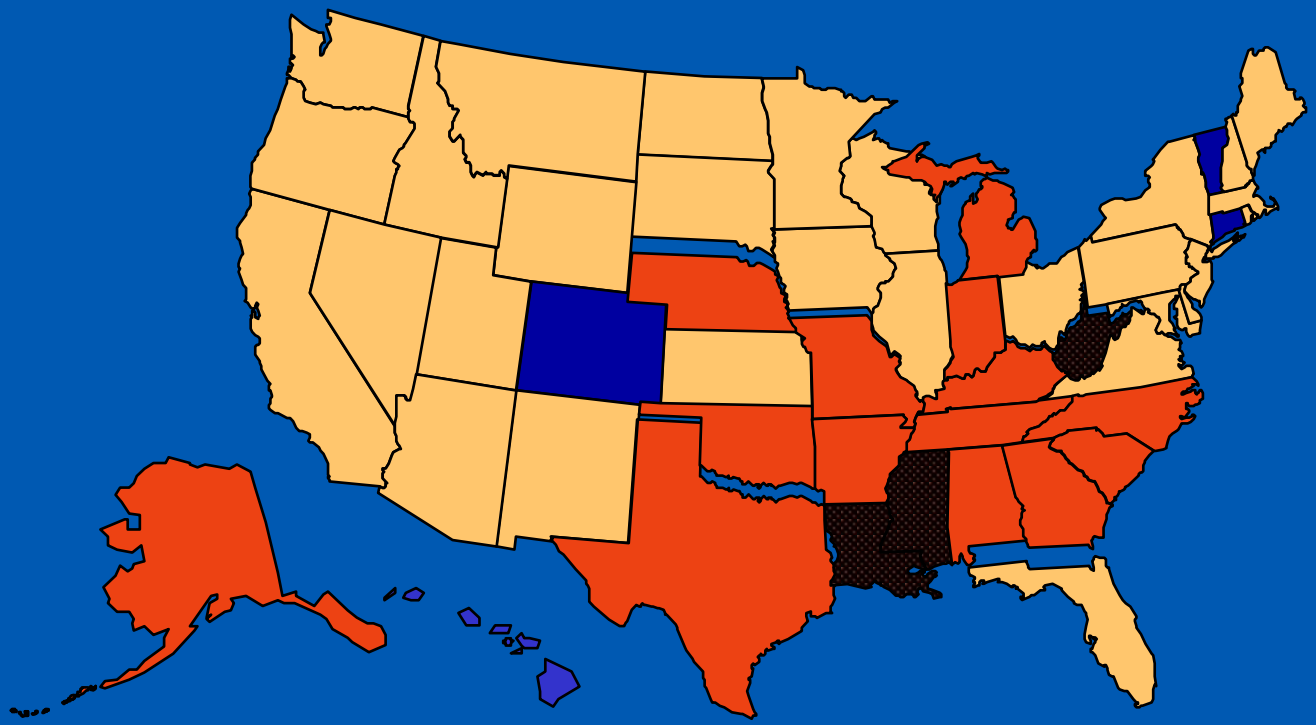
Obesity Trends* Among U.S. Adults
BRFSS, 2005

(*BMI ≥30, or ~ 30 lbs overweight for 5’ 4” person)



No Data <10% 10%–14% 15%–19% 20%–24% 25%–29% ≥30%

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Starting an Exercise Program

- If you have cardiac risk factors consult with you Doctor!
- Slow and steady wins the race!

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MAYO CLINIC

UNDER EMBARGO UNTIL JUNE 4, 2012, 12:00 AM ET

REVIEW

Potential Adverse Cardiovascular Effects From Excessive Endurance Exercise

James H. O'Keefe, MD; Harshal R. Patil, MD; Carl J. Lavie, MD; Anthony Magalski, MD; Robert A. Vogel, MD; and Peter A. McCullough, MD, MPH

Abstract

A routine of regular exercise is highly effective for prevention and treatment of many common chronic diseases and improves cardiovascular (CV) health and longevity. However, long-term excessive endurance exercise may induce pathologic structural remodeling of the heart and large arteries. Emerging data suggest that chronic training for and competing in extreme endurance events such as marathons, ultramarathons, ironman distance triathlons, and very long distance bicycle races, can cause transient acute volume overload of the atria and right ventricle, with transient reductions in right ventricular ejection fraction and elevations of cardiac biomarkers, all of which return to normal within 1 week. Over months to years of repetitive injury, this process, in some individuals, may lead to patchy myocardial fibrosis, particularly in the atria, interventricular septum, and right ventricle, creating a substrate for atrial and ventricular arrhythmias. Additionally, long-term excessive sustained exercise may be associated with coronary artery calcification, diastolic dysfunction, and large-artery wall stiffening. However, this concept is still hypothetical and there is some inconsistency in the reported findings. Furthermore, lifelong vigorous exercisers generally have low mortality rates and excellent functional capacity. Notwithstanding, the hypothesis that long-term excessive endurance exercise may induce adverse CV remodeling warrants further investigation to identify at-risk individuals and formulate physical fitness regimens for conferring optimal CV health and longevity.

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Regular exercise is one of the cornerstones of therapeutic lifestyle changes for producing optimal cardiovascular (CV) and overall health. Physical exercise, though not a drug, possesses many traits of a powerful pharmacological agent. A routine of daily physical activity (PA) stim-

Similarly, a 15-year observational study of 52,000 adults found that runners had a 19% lower risk of all-cause mortality compared with nonrunners, with U-shaped mortality curves for distance, speed, and frequency. Running distances of about 1 to 20 miles per week, speeds of 6 to 7 miles per hour, and frequencies

From Mid America Heart Institute of Saint Luke's Hospital of Kansas City, MO (J.H.O., H.R.P., A.M.); John

coronary heart disease rate during a two-year follow-up was significantly higher in marathon runners than in controls

12% of apparently healthy marathon runners had evidence of patchy myocardial scarring

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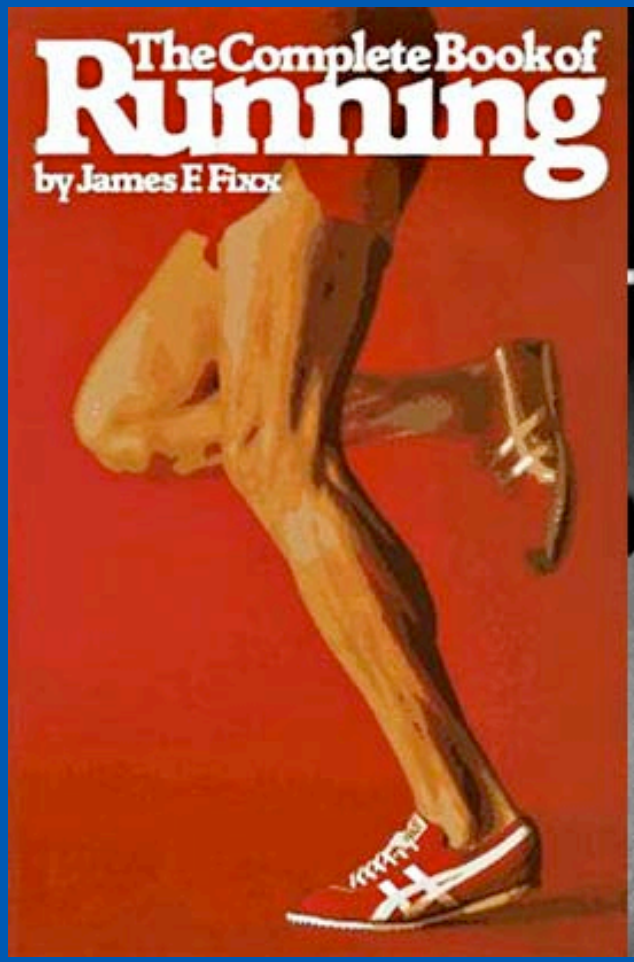
- Exercise DOES NOT CONFER IMMUNITY from heart disease



Take Home Points

- Exercise improves both quantity and quality of life
- Exercise prevents, or mitigates, various diseases
- Like all things in life, excess is usually bad
- Exercise, though protective, does not confer immunity, listen to you body!