

# Update in Cardiac rehabilitation

Assist. Prof. Dr. Wilawan Thirapatarapong  
Division of Cardiopulmonary Rehabilitation  
Department of Rehabilitation Medicine,  
Siriraj Hospital  
Mahidol University

# Disclosures

- None

## Case Presentation

- 45 year old male, in for office visit
- Father had myocardial infarction at 52
- Brings list of things that he has heard will help him keep his heart healthy
- Are they fact or fiction?

# Lists

- Lower fat diets lower CVD risk best?
- Chocolate lowers CVD risk?
- Eggs raise CVD risk?
- Coconut oil/milk lowers CVD risk?
- Walking /Running has the same benefit?
- “Talk Test” is accurate to guide exercise intensity?
- Slow / Rapid weight loss is better?
- Chelation therapy reduces CVD risk?

# What is the truth? Where does that truth come from?



# Examine Level of Evidence!

- **Type and Level of Evidence:**
  - **Randomized, controlled studies**
  - **Non-randomized, controlled studies**
  - **Observational studies**
  - **Case reports**
  - **Opinion**

# Update in CR -- Nutrition

## Question 1: Nutrition

Which of the following has been shown in randomized, controlled trials to lower mortality rates in patients with CAD?

- A. Very low fat diet
- B. Mediterranean diet
- C. High protein diet
- D. All of the above
- E. None of the above



**Lower fat diets lower CVD risk best ?**

Dietary Plan	Total Fat (% cals)	Sat Fat (% cals)	Protein (% cals)	Carb (% cals)
Western	35%	15%	15%	50%
Very Low Fat	10%	3%	30%	60%
High Protein	35%	20%	50%	15%
Mediterranean	40%	7%	25%	35%

Dietary Plan	Weight Loss	Lipid Rx	CVD Mortality	Total Mortality
Western	No	No	Increase	Increase
Very Low Fat	Yes	LDL	?	?
High Protein	Yes	TG/HDL	?	?
Mediterranean	Yes	All	Decrease	Decrease

- **PREDIMED Study**
  - 7447 people, high CVD risk
  - Randomized to 3 groups
    - Med Diet + Olive Oil
    - Med Diet + Nuts
    - Control Diet
  - Early termination
  - 30% reduction in CVD events (MI, stroke, CVD death)

# Lyon Heart Study

- 423 patients randomized post-MI 1988-92
- Mediterranean diet vs “prudent diet” prescribed by patients’ physicians
- Planned 5-year follow-up
- Study terminated early (4 years) due to favorable interim analysis

de Lorgeril et al: Circ 99:779, 1999

# Lyon Heart Study

## Primary endpoints

- Cardiac death, nonfatal MI

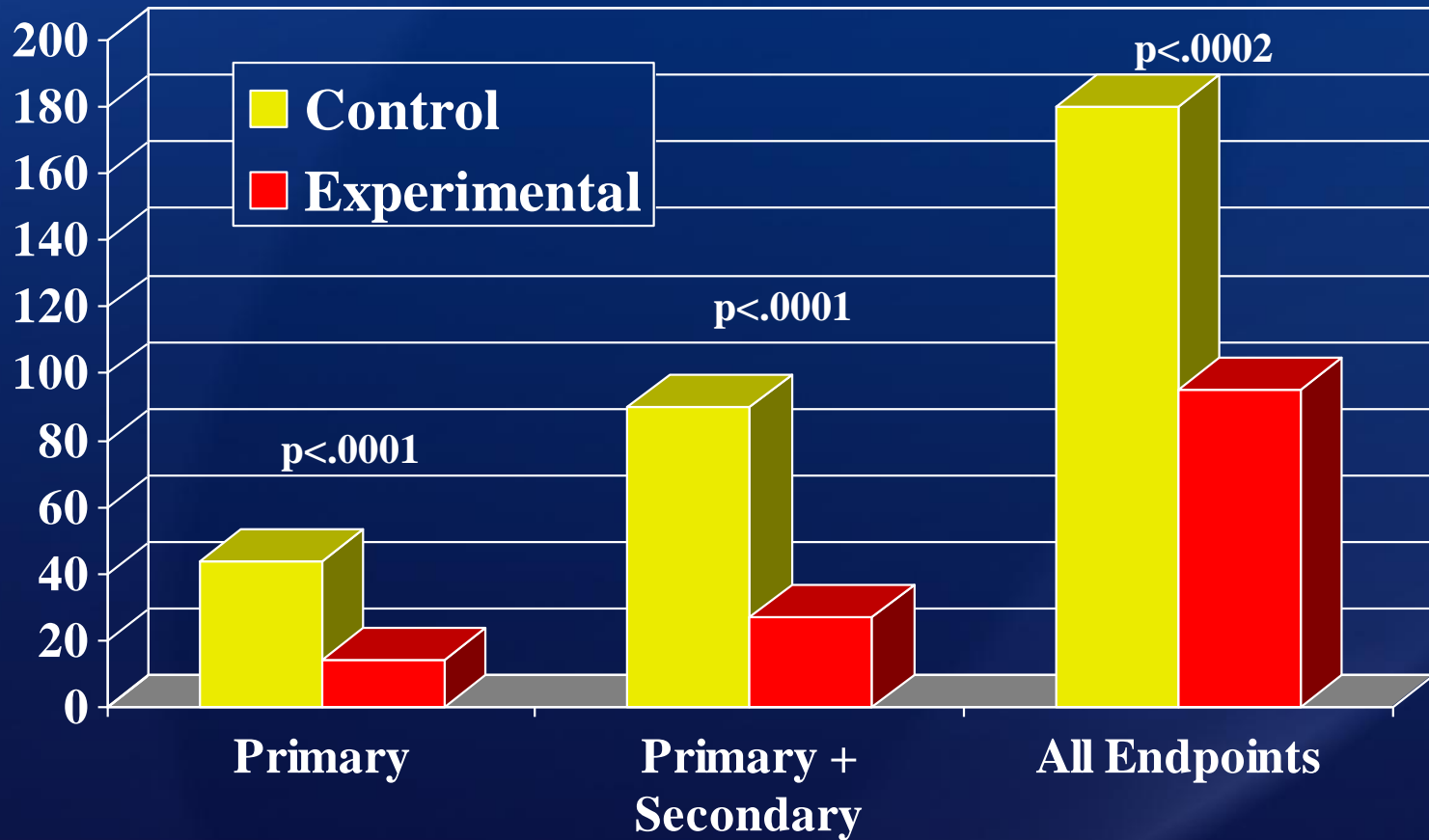
## Secondary endpoints

- Peri-procedural MI, unstable angina, CHF, stroke, pulmonary or peripheral embolism

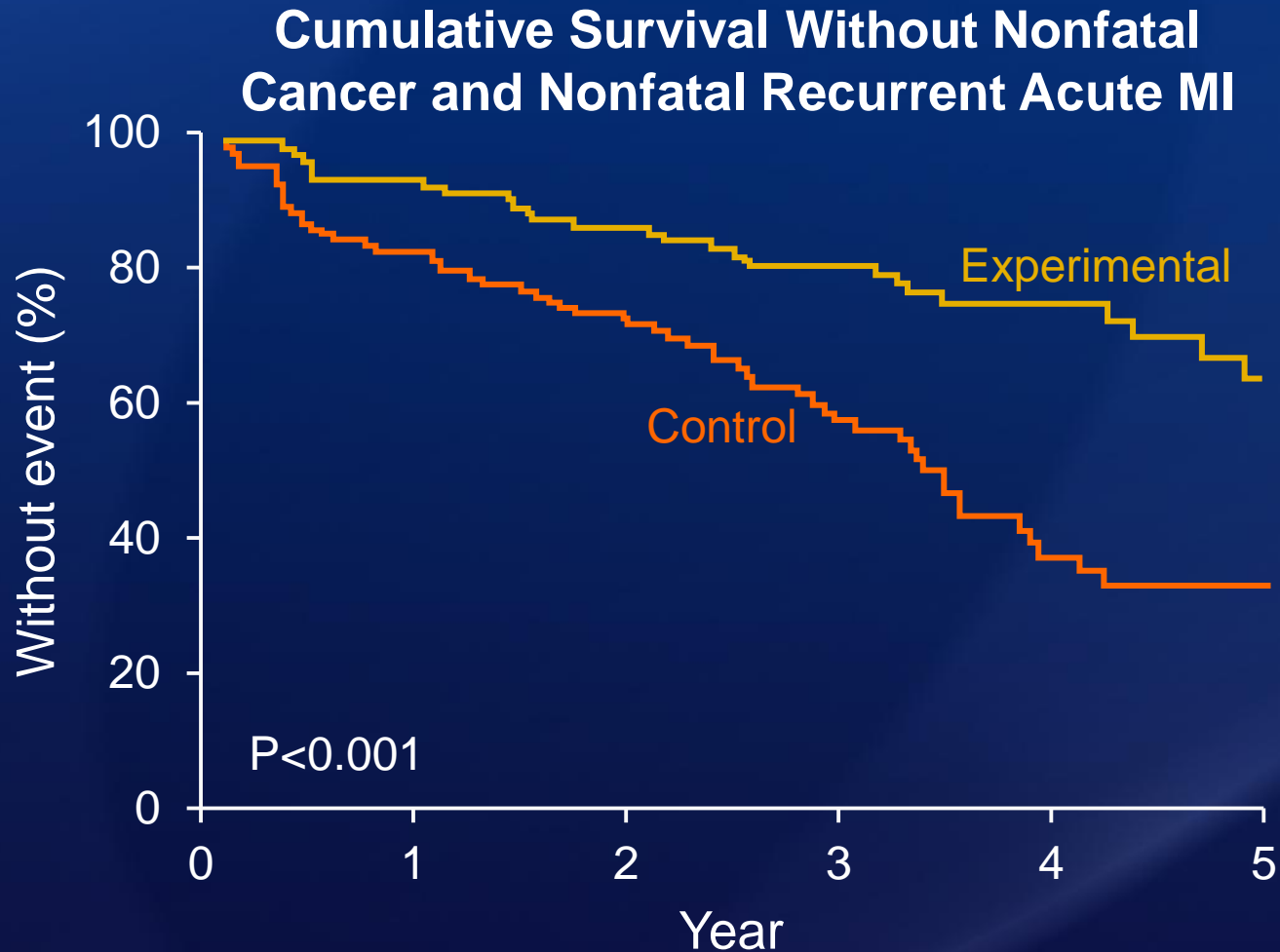
## Tertiary endpoints

- Stable angina, elective revascularization, post-PTCA restenosis, thrombophlebitis

# Lyon Heart Study



# Mediterranean Diet and Survival



Arch Intern Med 158(11):1181, 1998



# **Mediterranean Diet**

- Low in saturated and polyunsaturated fats
- Low in cholesterol
- High in monounsaturated fats (olive oil)
- Moderately high in fiber
- Fish primary protein source
- Low in beef and pork
- Lots of fresh fruits and vegetables, pasta

## Question 1: Nutrition

- Which of the following has been shown in randomized, controlled trials to lower mortality rates in patients with CAD?
  - A. Very low fat diet
  - B. Mediterranean diet
  - C. High protein diet
  - D. All of the above
  - E. None of the above

**Lower fat diets lower CVD risk best?**

**We don't know!**

**Low saturated fat intake is the key  
dietary step in CVD prevention**

**Lower fat diets lower CVD risk best?**

**We don't know!**

**Mediterranean Dietary Pattern  
Has Strongest Evidence (RCT)**

**Question 2:**  
**Chocolate lowers CVD risk?**



Am J Clin Nutr Feb 1, 2012, doi:10.3945/ajcn.aaa.023457  
BMJ 2012;344:33657

- **Chocolate lowers CVD risk**

- **Probably yes!**
- RCT of chocolate, cocoa
- Improvements in:
  - Dose independent
    - Insulin sensitivity, Endothelial function
  - Dose dependent ( $>50$  mg epicatechin/day)
    - Diastolic BP, MAP, LDL, HDL
- Observational, and modeling studies
  - Reduction in CVD events



**Question 3:**  
**Eggs raise CVD risk?**



BMJ 2013;346:e8539

- Eggs raise CVD risk

- Probably no!

- Lower dose

- Probably yes!

- Higher dose and in DM

- Meta-analysis, cohort studies

- One egg per day or less

- No increase in MI, Stroke

- More than one egg/day, and in DM patients

- Increased risk of MI, Stroke





**Question 4:**  
**Coconut oil/milk lowers CVD risk?**



# Coconut oil/milk lowers CVD risk?



- Probably no!
- Coconut oil/milk is high in saturated fat
- Increases total cholesterol levels
  - *Arch Int Med 1958;102:173-8 (small RCT)*
- Increases HDL?, reduces waist circumference?
  - *Lipids 2009;44:593-601 (small RCT)*
- Current American Dietetic Association Guidelines
  - Limit saturated fats
  - *J Am Diet Assoc 2007;107:1599-1611*

# Update in CR -- Exercise

# Exercise

## What Is **MANLY STRENGTH?**

What Is Snap and Vim?

What Is Nerve Force?

What Is Business Push?

What Is Strength and Energy?

What Is Health and Vigor?



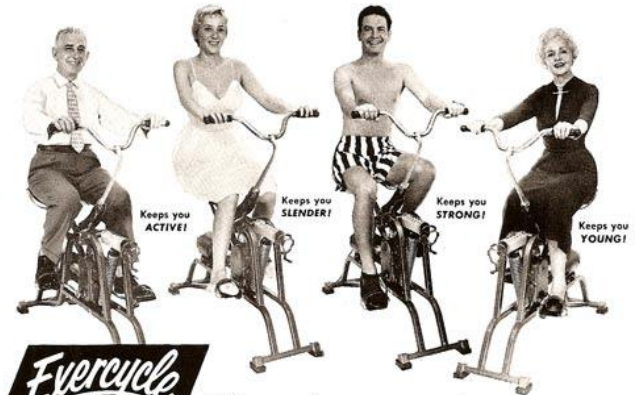
In fact, what is Life itself but **ELECTRICITY**? Does not all living authority tell us that they are so closely allied that none can say where one leaves off and the other begins? Who can dispute that they are not the same? The Strong, Healthy Man is **ALWAYS FULL OF ELECTRICITY**, and the weakling is **ALWAYS LACKING IT**. What is more natural, then, than that Electricity should cure whenever nerve strength and life are needed, as in Debility, Exhaustion, etc.? There is no question about it, for it is a fact that it does, as I have demonstrated by curing nearly 100,000 men in my 30 years of ceaseless labor in this field. The whole secret is simply to give the treatment right, and my success answers that, as can be judged by going over any of the prominent papers in the United States for the past 30 years, or call and see the evidence in my hands. Has there ever been such another record? I have perfected a great improvement in the **DR. SANDEN ELECTRIC BELT**, which is now, and always has been, the best. My new appliance is the

## HERCULEX BODY BATTERY

with suspensory attachment. Simply wear it at night, remove on rising, and while you sleep an easy, soothing current of **NEW LIFE** is applied directly to the centres of nervous strength. Keep this up for 60 or 90 days and you will again have your **NEW STRENGTH**, your **NATIVE VITALITY**—because you will have supplied the nervous energy which has been wasted. If you are passing this office, call in and consult me. I am cheerfully willing to talk over your case—it will cost you nothing; or, if not convenient to call, I will personally answer your letters. Ask me to send my new illustrated book for men, called "**Health in Nature**," sent free by mail, in plain, sealed envelope.

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"RUNS BY ITSELF"

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There's no form of ordinary exercise that can "burn up" calories faster than an EXERCYCLE. This remarkable instrument handles a 300-pounder as easily and gently as if he were a baby. EXERCYCLE is a favorite among overweight people all over the world.

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EXERCYCLE is a complete home gymnasium in itself. No form of artificial stimulation such as massages, baths, vibrations, slenderizing or reducing techniques can match its overall efficiency. Once you own an EXERCYCLE, you have solved your exercising problems for a lifetime. Start now to turn back the clock and add many happy years to *your* life.

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EXERCYCLES are made for both normal and handicapped adults in need of exercise, regardless of age, weight, size or sedentary condition, and at a price you can afford to pay. Easy terms to suit your budget.



**WONDERFUL FOR THE AGED!**  
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**SIZE OF A TRAVEL CASE!**  
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EXERCYCLE is so unbelievably silent and smooth-running that you can ride it while others sleep. This is why many users keep it in their bedroom where they can ride it upon arising or just before retiring.

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City \_\_\_\_\_  
State \_\_\_\_\_

Mention the National Geographic—It identifies you

## Question 5:

- Walking /Running has the same benefit?





## Walking = Running:

- **Caloric expenditure**
  - Walk one mile = Run one mile?
- **Reducing CVD risk factors**
  - Walking = Running?

# Caloric Expenditure

**Walking one mile burns as many calories as running one mile?**

- Walking one mile burns 334-340 kcal
- Running one mile burns 480-481 kcal

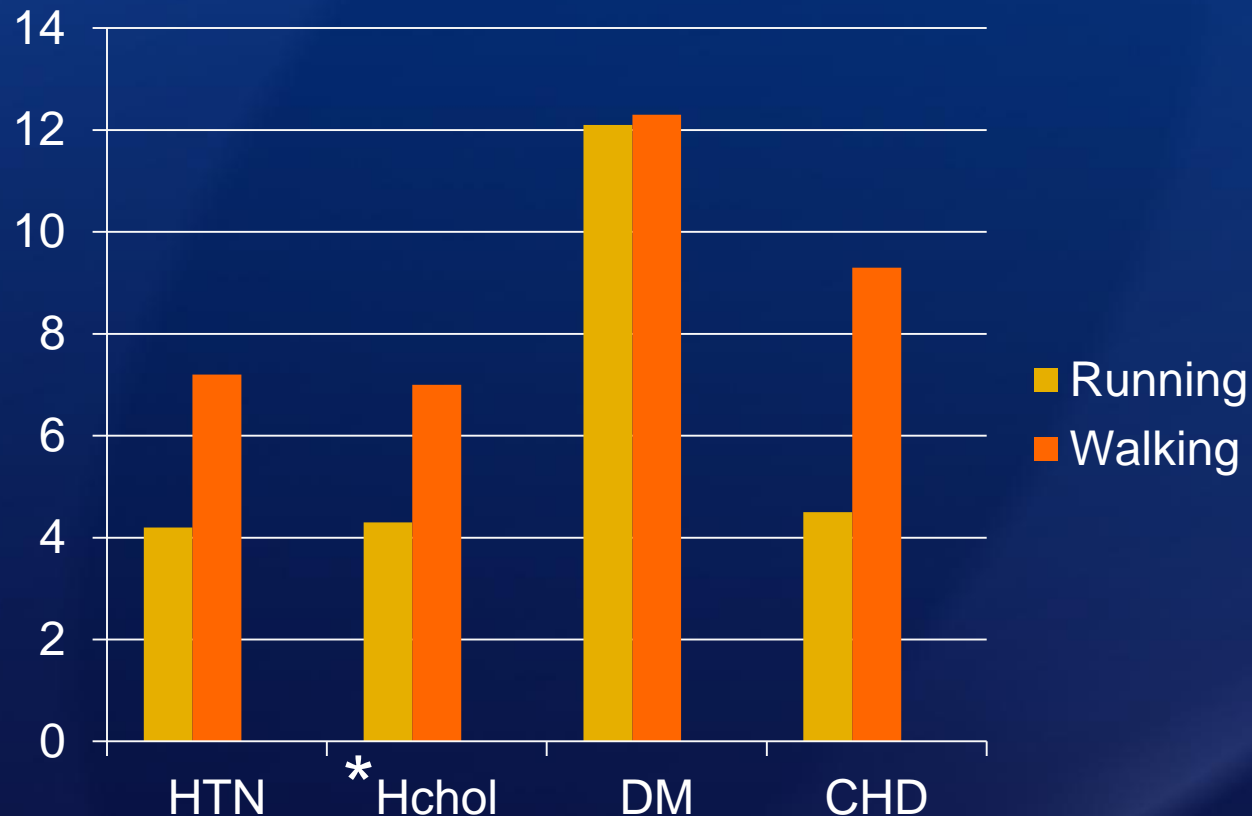
# CVD Risk Factor Reduction

## Walking = Running?

- 33,060 from National Runners Survey
- 15,945 from National Walkers Survey
- Walkers older than runners, more likely to be female
- 6.2 year follow-up
- Incident HTN, Hypercholesterolemia, DM



# Walking versus Running: % Reduction per MET h/d



\*  $p = 0.06$

Arterioscler Thromb Vasc Biol 2013;33:1088-93

Question 6:

**“Talk Test”**

is accurate to guide exercise intensity?

# “Talk Test” is accurate to guide exercise intensity?

- **Yes!**
- “Talk Test” = Exercise to the point of you are short of breath but can still speak in short sentences between breaths
- Similar to recommended HR or RPE range

# Update in CR -- Obesity

NO DIET - NO BATHS  
NO EXERCISE!

# FAT

the ENEMY that is shortening Your Life

## BANISHED!

HOW?  
with  
SANITIZED  
TAPE  
WORMS

Jar Packed  
FRIENDS FOR  
FAIR FORM

Easy To  
Swallow

No Ill  
Effects!

Proposed By  
W. E. BRIDGE, Chm.  
New York

SEND NO  
MONEY  
PARTICULARS  
MAILED  
FREE

# WASH AWAY FAT AND YEARS OF AGE

## With La-Mar Reducing Soap

The new discovery. Results quick and amazing—nothing internal to take. Reduce any part of body desired

For 1940 —  
*Be Fit & Slim*

Every woman wants to look better, to feel better in the year ahead. Slenderness is the way to health, beauty and fitness. A couple of Bile Beans taken nightly enables you to "slim while you sleep"—surely and safely.

These fine vegetable pills do more than disperse unwanted fat—they purify and enrich the blood, tone up the entire system and make you feel better in health in every way.

So start with Bile Beans to-night and make sure of looking and feeling your best in 1940.

By Taking  
**BILE BEANS**

OLD EVERYWHERE

[APRIL 27, 1878.]

# ANTI-FAT

## The Great Remedy for Corpulence

### ALLAN'S ANTI-FAT

is composed of purely vegetable ingredients, and is perfectly harmless. It acts upon the food in the stomach, preventing its being converted into fat. Taken in accordance with directions, it will reduce a fat person from two to five pounds per week.

"Corpulence is not only a disease itself, but the harbinger of others." So wrote Hippocrates two thousand years ago, and what was true then is none the less so to-day.

Before using the Anti-Fat, make a careful note of your weight, and after one week's treatment note the improvement, not only in diminution of weight, but in the improved appearance and vigorous and healthy feeling it imparts to the patient. It is an unsurpassed blood-purifier and has been found especially efficacious in curing Rheumatism.

CERTIFICATE.—I have subjected Allan's Anti-Fat to chemical analysis, examined the process of its manufacture, and can truly say that the ingredients of which it is composed are entirely vegetable, and cannot but act favorably upon the system, and is well calculated to attain the object for which it is intended.

W. R. DRAKE, Analytical Chemist.

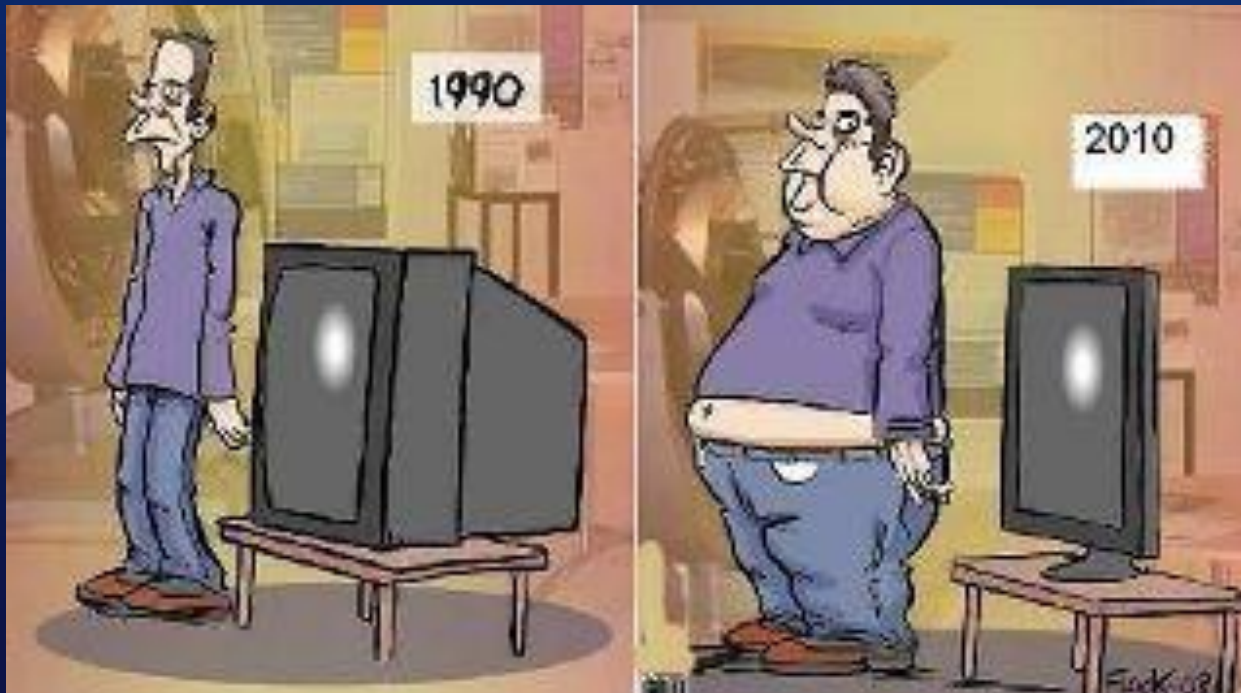
Sold by all druggists, or sent, by express, to any address, upon receipt of \$1.50; quarter dozen \$4.00, or half-dozen for \$7.50. Address,

© Science BOTANIC MEDICINE CO.,



## Question 7:

**Large, rapid weight loss is associated with poorer long-term weight outcomes than is slow, gradual weight loss?**



## Question 7:

- Large, rapid weight loss is associated with poorer long-term weight outcomes than is slow, gradual weight loss?
- Studies suggest rapid weight loss is associated with either similar or better long-term weight loss than slow weight loss
- Obes Rev 2000;1:17-9.
- Int J Behav Med 2010;17:161-7.


**Myth!**

NEJM 2013;368:446-454


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amazing—  
**SNAKE OIL**  
**LINIMENT**  
and  
**Banjo Salve**  
**THE GREAT REMEDY**  
Foot in Mouth disease, Frog Hair Restorer, String  
Fever, Banjo Breath, Gumps, Gaiter  
Glut, Mandolin Mumps, Whacks,  
Lackanookie, Gollyweasles, and  
The Cold Robbies.  
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MAGNO-ELECTRIC  
**VITALIZER**  
has an unparalleled record as a reliable  
remedy for Locomotor Ataxia, Par-  
alysis, Rheumatism,  
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Vitalizer costs only  
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How the Magno-Electric Vitalizer  
is Worn.



The New Appliance for the  
direct treatment of Catarrh.

## New Kind of Hat Worn 10 Minutes a Day Grows Hair in 30 Days —or No Cost

No matter how thin your hair may be, this remarkable new scientific invention is absolutely guaranteed to give you a brand new growth of hair in 30 days—or it costs you nothing. Don't send a cent. Just mail coupon below.

By ALOIS MERKE  
Founder of Famous Merke Institute, Fifth Ave., N. Y.

I HAVE perfected a new invention that I absolutely guarantee will give you a new head of hair in only 30 days—or the trial costs you nothing.

This new invention—the result of an experience gained in treating thousands of cases of baldness—is in the form of a new kind of hat. It is worn on the head just 10 minutes a day. No unnecessary fuss of any kind. Just put the hat on your head. Wear it 10 minutes. And that's all there is to it.

Sounds impossible, doesn't it? All right. Then let me emphasize this fact. I don't care how thin your hair is. I don't care how many treatments you have taken without results. Unless my discovery actually produces a new growth of hair on your head in 30 days, then all you need do is tell me so. And without asking one question, I will instantly—and gladly—mail you a check refunding you every penny you have paid me.

### How It Works

My invention proves that in a big percentage of hair roots are NOT dead, but

lary measures failed to restore ey merely treated the surface skin. My new invention gets right to the cause of most of hair troubles—the starving dormant roots.

Your hair grows just as a tree grows—from the roots. To make a tree grow you wouldn't rub "growing fluid" on the bark. Instead you would nourish the roots. And my invention provides, at last, not only an efficient way of stimulating these dormant roots, but of giving them the nourishment they need to grow hair again.

### No Risk of Any Kind

At the Merke Institute, Fifth Avenue, N. Y., which I founded, stage and social celebrities have paid as high as \$500 for the results secured through personal treatments. Yet now, through my new invention, these results may be secured in any home where there is electricity—for just a few cents a day!

Remember—I don't ask you to risk a cent. I realize that my treatment will not grow hair for EVERYBODY. There are some extreme cases of baldness that nothing in the world can help. But my new invention has already grown new hair for so many hundreds of others who had long ago given up hope that I am willing to let you try it entirely at my risk, and if it fails then I lose—not you.

### Free Booklet Explains Invention

If you will merely fill in and mail the coupon below I will gladly send you—without cost or obligation—an interesting 32-page booklet, "The New Way to Make Hair Grow," describing my new invention in detail.

This booklet contains much helpful information on the care of hair—and, in addition, shows what my treatment is doing for thousands of others.

No matter how nearly bald you are—no matter how many treatments you have tried without results—this booklet will prove of deepest interest to you. So mail the coupon now—and it will be sent you by return mail. ALLIED MERKE INSTITUTES, Inc., 512 Fifth Avenue, Dept. 166, New York City.

ALLIED MERKE INSTITUTES, Inc.  
Dept. 166, 512 Fifth Ave., New York City.

Please send me, without cost or obligation on my part, a copy of the new booklet, "The New Way to Make Hair Grow," describing in full detail the Merke Institute Home Treatment.

Name..... (State whether Mr., Miss or Mrs.)

Address.....

City..... State.....





# Question 8:

## Toning pants work?



American Council on Fitness Nov 2012;1-3

## Toning pants work?



“Like burning the equivalent  
of half a peanut M&M....  
(J. Porcari, principal investigator)



**Question 9:**  
**Chelation therapy reduces CVD risk?**

# PATCH Trial

JAMA. 2013;309(12):1241-1250.

- 84 patients
- >21 years old
- Known CAD, ischemia on ETT
- Randomized Trial
  - **Chelation vs Placebo**
    - Infusions twice weekly x 15, then monthly x 3
    - EDTA
    - Multivitamin for both groups
- Primary outcome measure:
  - **Change from baseline to 27-week follow-up**
  - **Time to ischemia**

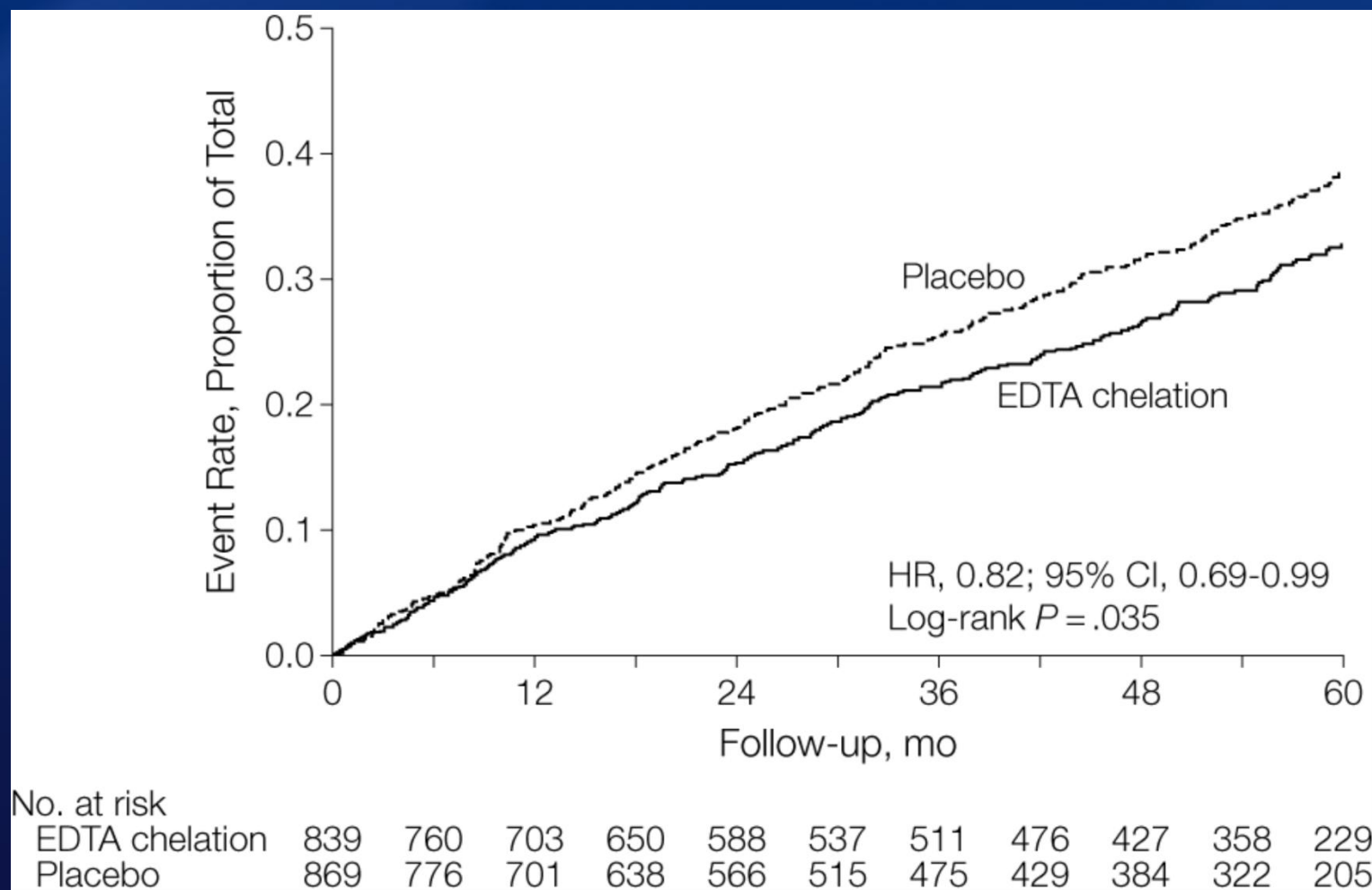
No significant difference in primary outcome

# TACT Trial

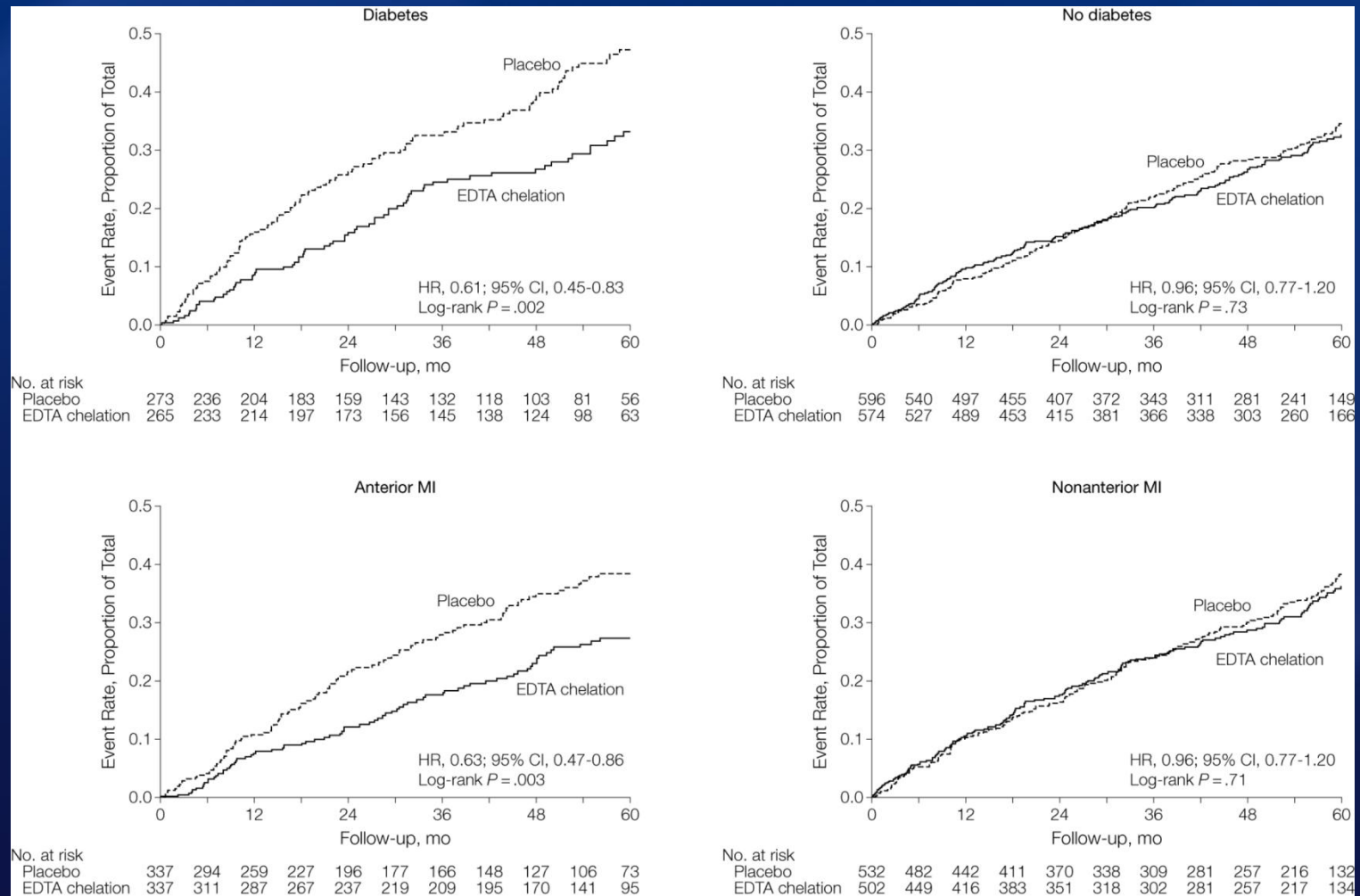
JAMA. 2013;309(12):1241-1250

- 1708 patients
- >50 years old
- Previous MI >6 wks before
- 2x2 factorial design
  - **Chelation vs Placebo**
    - 40 infusions, weekly x 30, every 2-8 wks x 10
    - EDTA, ascorbate, B vitamins, electrolytes, procaine, heparin
  - **Vitamin vs Placebo**
- Composite endpoint:
  - **Mortality, recurrent MI, stroke, coronary revascularization, or hospitalization for angina**

# TACT Trial



# TACT Trial



# TACT Trial

- Concerns about reliability of study
  - 60% of patients enrolled in Alternative Health Centers
  - 18% lost to follow-up
    - More in placebo group
    - More in Alternative Health Centers
    - Suggests unmasking at Alternative Health Centers
  - Sponsors (NHLBI) were unblinded
  - Majority of endpoints were “soft” (318/483)
    - Revascularization, angina
  - Due to slow enrollment, design was changed

*JAMA*. 2013;309(12):1293-1294.  
doi:10.1001/jama.2013.2778



# Chelation therapy reduces CVD risk?

We don't know!

Latest RCT suggests possible benefit secondary prevention, but there are significant limitations to the study

## Question 10: Exercise Training

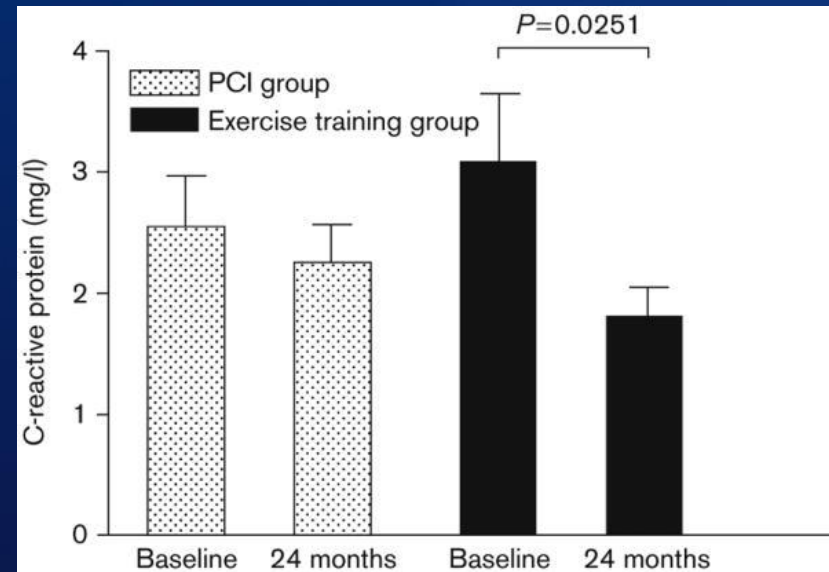
Randomized, controlled trials of which of the following treatments have been shown to reduce mortality in CAD patients?

- A. Exercise Training
- B. Smoking Cessation
- C. Both A and B
- D. None of the above

# Exercise is Strong Medicine

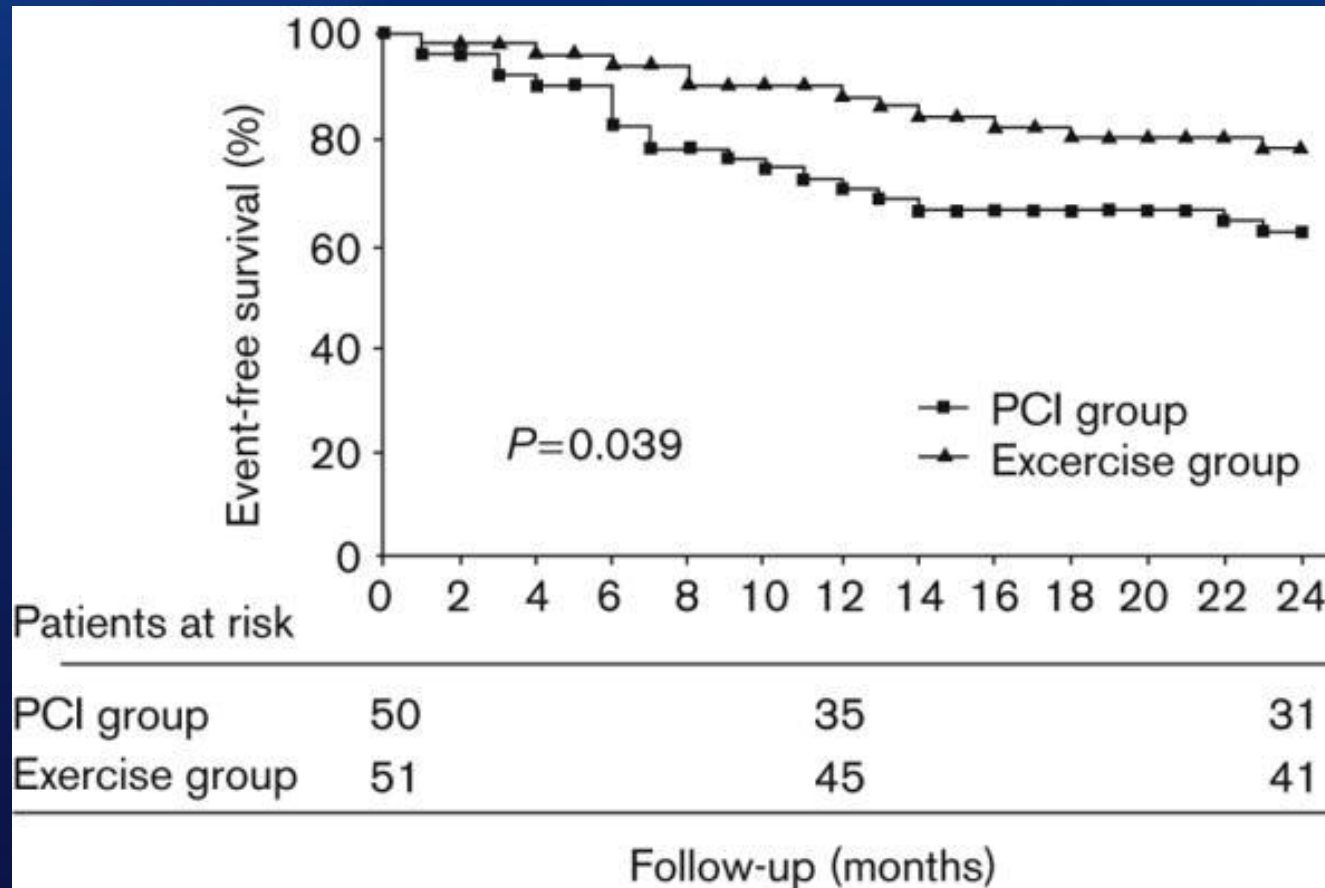
## Change in hsCRP in PCI and Exercise Training Groups

- 101 Men, Germany
- Stable CAD
- Randomized to
  - Percutaneous Coronary Intervention
  - Exercise Therapy
    - 70% maximum HR
    - 20 min/day plus one 60 min session/wk
- 24 month follow-up
- Outcomes
  - Inflammatory markers
  - Recurrent CAD events



# Exercise is Strong Medicine

## 24 month event-free survival: PCI and Ex Training Groups



# Smoking Cessation and Secondary CAD Prevention

- At time of CVD event
  - 40% are current smokers at time of CV event
  - 50% quit smoking after event
  - 20% continue to smoke, have 60% increase in mortality
- Among those who quit
  - 36% reduction in total mortality
  - 32% reduction in recurrent CV events

Am J Cardiol. 2013 Jan 15;107(2):145-50

Eur Heart J. 2006 Jan;27(1):35-41

Circulation 2012;125:e2-e220

Cochrane Database Syst Rev. 2012 Feb 15;2:CD003041

## Question 10: Exercise Training

Randomized, controlled trials of which of the following treatments have been shown to reduce mortality in CAD patients?

- A. Exercise Training
- B. Smoking Cessation
- C. Both A and B
- D. None of the above

## Question 11: Preventive Medications

Randomized, controlled trials of which of the following treatments have been shown to reduce morbidity and mortality in CAD patients?

- A. Aspirin
- B. Statin therapy
- C. Fish oil
- D. B and C
- E. A and B

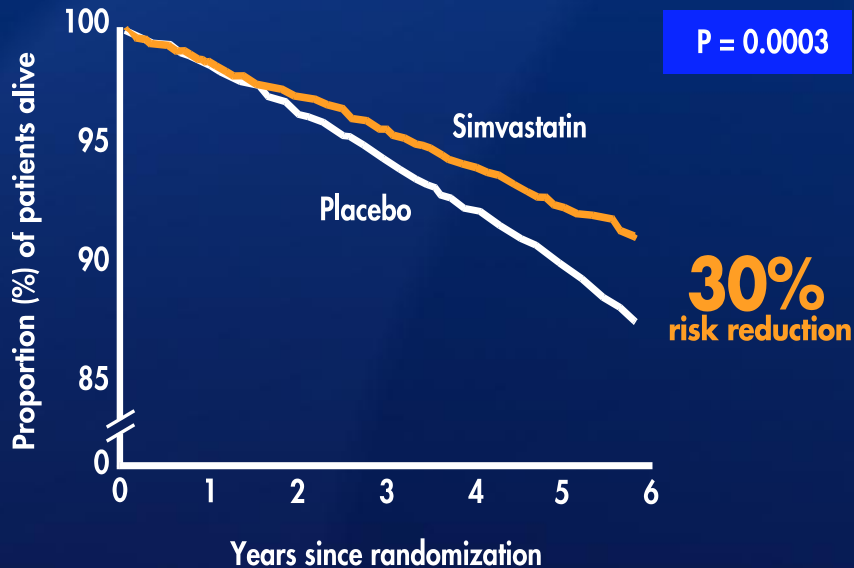
# Aspirin and Secondary CAD Prevention

- Meta-analysis of secondary prevention trials
- 20% reduction in cardiac events
- Non-significant increase in hemorrhagic stroke

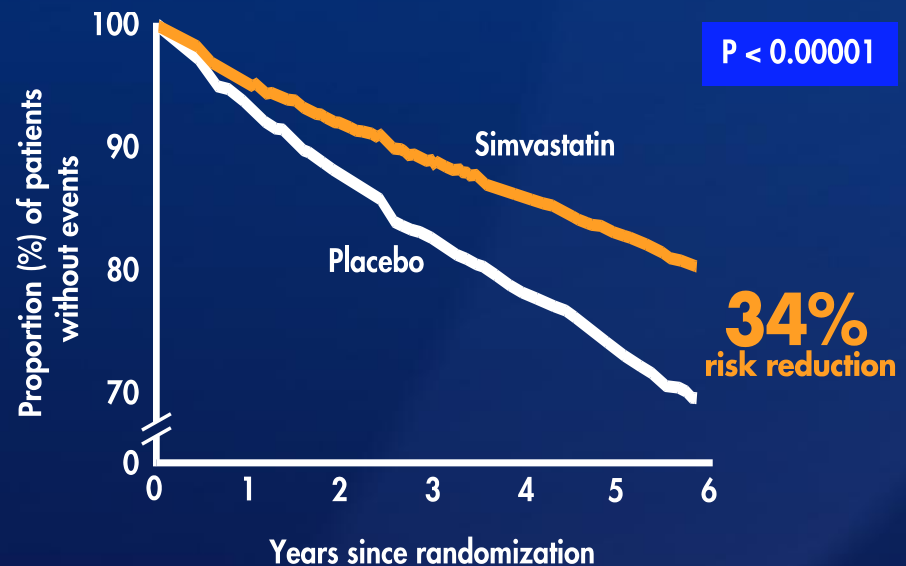
Lancet. 2009 May 30;373(9678):1849-60.



# 4S Study



Total Mortality



Coronary Death and  
Non-fatal MI

The Scandinavian Simvastatin Survival Study - Lancet 344, 1994

# Fish Oil and Secondary CAD Prevention

- Meta-analysis of randomized trials
- No significant impact on total mortality, CVD events, heart failure, TIA/stroke
- No difference by dosage

Arch Intern Med. 2012 May 14;172(9):686-94

## Question 11: Preventive Medications

Randomized, controlled trials of which of the following treatments have been shown to reduce morbidity and mortality in CAD patients?

- A. Aspirin
- B. Statin therapy
- C. Fish oil
- D. B and C
- E. A and B

## Question 12:

Which of the following is an AHA/ACCF class IA recommendation for secondary CAD prevention?

- A. Statin therapy
- B. Cardiac rehabilitation
- C. Weight loss, in patients with obesity
- D. A and B
- E. A and C

# Class Recommendation

## Level of evidence

- I – Randomized control trial
  - IA – established effective, ineffective, harmful
  - IB – probably effective, ineffective, harmful
- II – Non-randomized control trial
  - Case control, Cohort
- III – Studied with no control group
  - Observational study
- IV – Consensus or expert opinion

# Secondary CAD Prevention

## Class IA Recommendations

**JACC 2011;58:2432-46**

- Smoking Cessation
- Anti-Hypertensive Therapy
- Lipid Lowering Therapy with TLC + Statin
- Antiplatelet Therapy
- ACE/ARB Therapy with EF  $\leq 40\%$
- Beta-blocker Therapy post-MI or with EF  $\leq 40\%$
- Aldosterone Blocker post-MI with EF  $\leq 40\%$
- Cardiac Rehabilitation

# Secondary CAD Prevention

## Class IB Recommendations

- Physical Activity
- Exercise testing for risk assessment
- Weight management
- Diabetes: TLC, BP and lipid control
- Influenza vaccine yearly

## Question 4: The ABC's of Prevention

Which of the following is an AHA/ACCF class IA recommendation for secondary CAD prevention?

- A. Statin therapy
- B. Cardiac rehabilitation
- C. Weight loss, in patients with obesity
- D. A and B
- E. A and C



# ABC's of Effective CHD Prevention Therapies

**A**

Antiplatelet Rx, ACE/ARB, Aldo Blocker

**B**

Beta blocker, blood pressure, body fat

**C**

Cholesterol control, cardiac rehabilitation

**D**

Dietary therapy, diabetes Rx, depression Rx

**E**

Exercise therapy, end smoking

**F**

Follow-up

“....The “last frontier of cardiovascular health” is the translation and application of our knowledge to improve the cardiovascular health of all people.”

-Claude Lenfant