


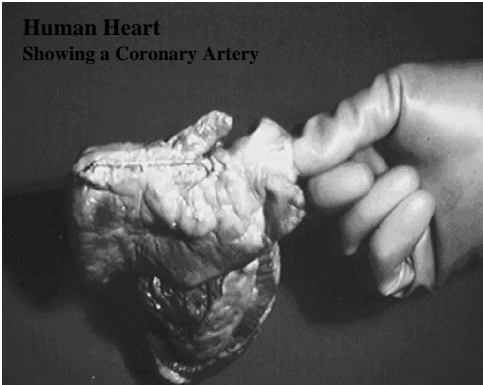
Preventing Heart Disease



Preventing Heart Disease

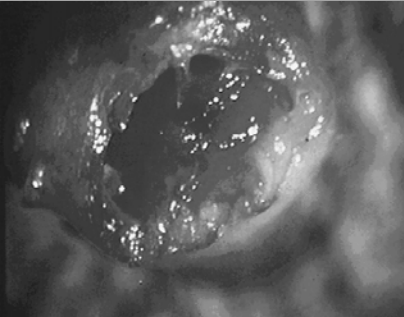
Don Hall, DrPH, CHES
Wellsourc Institute for Healthy Living
The Prevention Series

Human Heart Showing a Coronary Artery



The heart is about the size of your fist.

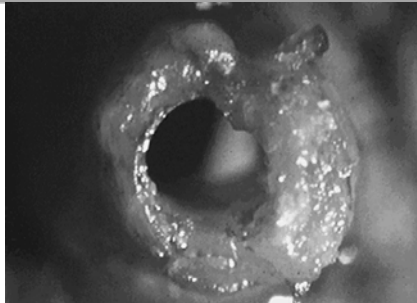
Normal Artery End view



The opening of a normal artery should be about 4 times the thickness of the artery wall.

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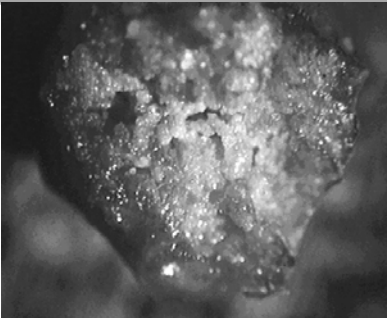
Coronary artery Moderate Atherosclerosis



There are usually no signs of disease until an artery is 90-95% plugged.

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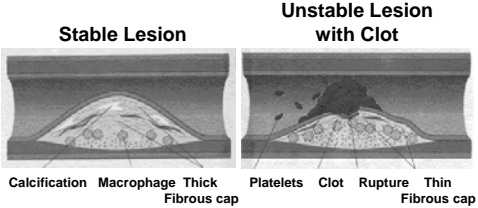
Artery Severe Atherosclerosis



This artery is 99% plugged with buildup of cholesterol and plaque.

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Artery Lesion (plaque)

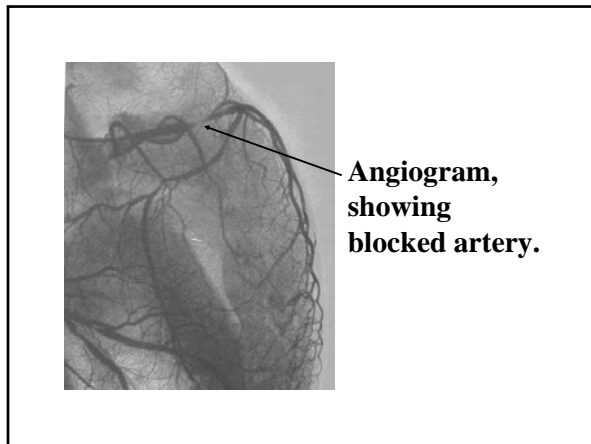


Stable Lesion
Calcification Macrophage Thick Fibrous cap

Unstable Lesion with Clot
Platelets Clot Rupture Thin Fibrous cap


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Preventing Heart Disease



Coronary Risk Factors

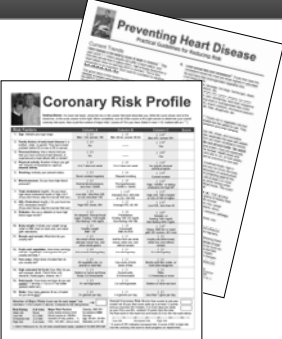
- Age
- Early family history
- Smoking
- High blood pressure
- High cholesterol and blood fats
- High blood glucose
- Inactivity
- Overweight
- Dietary factors
- Multiple factors



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Your Coronary Risks

What does your coronary risk profile look like?




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Age




Risk increases with age

- Men 45 years or older
- Women 55 years or older




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Early Family History




Heart disease in a parent, sister, or brother before the age of:

- 55 in men
- 65 in women

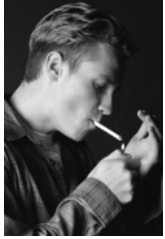


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Smoking



- Smoking damages the artery walls, initiating atherosclerosis.
- Smoking causes 82,000 fatal heart attacks yearly



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Preventing Heart Disease

Smoking and Probability of Dying Before the Age of 70



Cancer Prevention 2 Study ACS, Cancer Facts and Figures, 2003

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High Blood Pressure

Coronary Risk Indicators

Damages the artery walls initiating atherosclerosis.

- The higher your pressure, the higher your risk of a heart attack or stroke.
- The lower your pressure, the longer you will live.



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Prevalence of High Blood Pressure

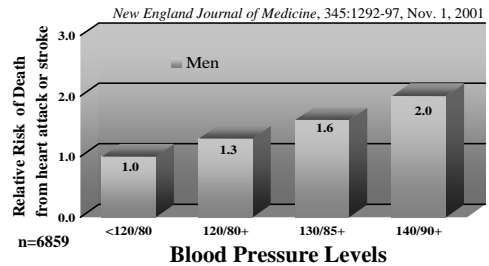


Age	Prevalence
18-29	4%
30-39	11%
40-49	21%
50-59	44%
60-69	54%
70+	64%

Source: NCHS, NHANES 3 Data

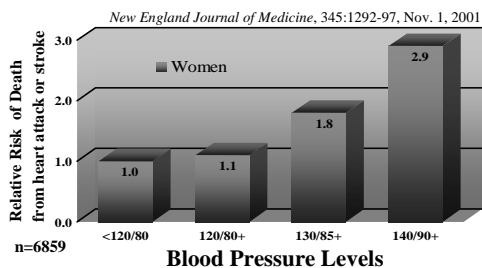
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Blood Pressure and Cardiovascular Events



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Blood Pressure and Cardiovascular Events



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Lifestyle Modifications to Prevent Hypertension

1. Achieve a healthy body weight (BMI <25).
2. Reduce dietary sodium intake to <1500 mg/day.
3. Engage in regular aerobic physical activity, 30+ min of moderate activity daily; such as brisk walking.
4. Limit alcohol consumption .
5. Choose healthy meals (DASH Diet):
 - Rich in fruits and vegetables—8-10 servings per day
 - Low fat dairy products, and reduced saturated fat intake

The JNC 7 Report, JAMA 289:2560-72, May 21, 2003

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Preventing Heart Disease

DASH Diet

- Emphasizes fruits and vegetables. Daily goal:
 - 4-5 servings of fruit
 - 4-5 servings of vegetables
- Low fat dairy products.
- Eat whole grains and nuts.
- Reduced intake of red meats, sweets, and soda pop.

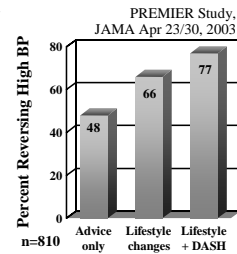


National High Blood Pressure Education Program, 2002

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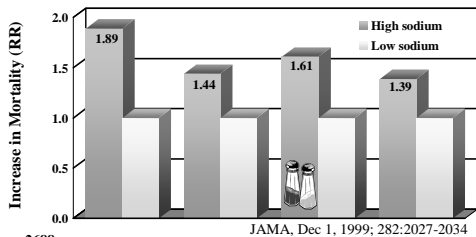
Percent of Hypertensives Who Achieved Normal Pressures

- In the lifestyle plus DASH diet group, 77% of those with high blood pressure regained normal pressure within 6 months.
- Nearly half in the advice group reached normal pressures.
- About half would be expected to reach normal pressure using medication.



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Sodium Intake and Mortality



n=2688 overweight persons, 19 yrs study

JAMA, Dec 1, 1999; 282:2027-2034

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Sodium in Selected Foods

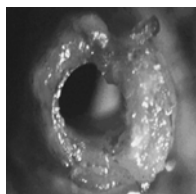
Food	Sodium mg
Green beans, ½ cup, canned	170
Green Beans, ½ cup fresh	2
Tomato, stewed, ½ cup	400
Tomato, fresh, 1 medium	11
Potato, 1 baked	8
Potato French fries, 20	216
Potato chips, 1 oz.	213

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High Cholesterol and Blood Fats



Damage the artery wall if high, and accumulate in the artery wall.

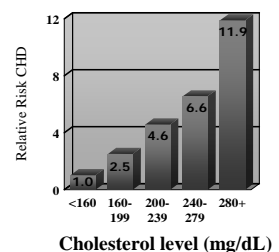


- The higher your cholesterol, the higher your risk.
- The lower your cholesterol, the lower your risk.

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Total Cholesterol and Heart Disease Mortality

- Chicago Heart Assoc. Study: 11,017 men, 25 years follow-up.
- Risk of death from heart disease in young men is 3.5 times higher if cholesterol is 240+ vs. <200.
- Persons lived up to 6 to 9 years longer with cholesterol levels of <200 vs. 240+.




JAMA 284:311-318, July 19, 2000

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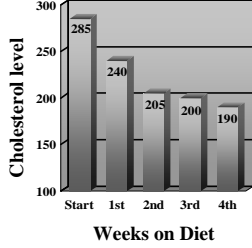
Preventing Heart Disease

Cholesterol Lowering Diet

LLU Nutrition Department



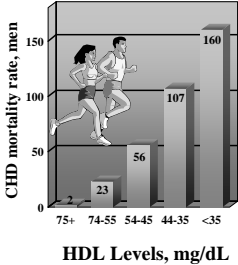
- In 4 weeks the average serum cholesterol level dropped 29%, and triglycerides dropped 40%.
- Main foods were: fruits, vegetables, legumes, whole grain breads and cereals, soy, non-fat dairy, an egg substitute.



Weeks on Diet	Cholesterol level
Start	285
1st	240
2nd	205
3rd	200
4th	190

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HDL Cholesterol



HDL Levels, mg/dL	CHD mortality rate, men
75+	23
74-55	56
54-45	107
44-35	160

Factors that improve HDL:

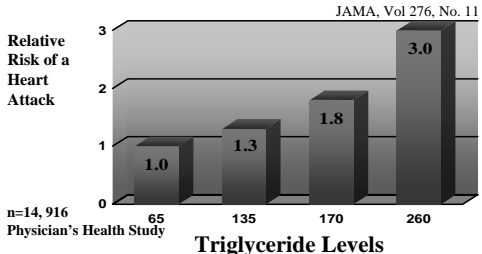
- Aerobic exercise, 12-20 aerobic miles per week.
- Achieve/maintain ideal body weight (lose 10 lbs).
- Avoid smoking.
- Avoid trans fatty acids.

Note: For every 1% you increase HDL levels, you decrease CHD by 2-3%.

Source: Framingham Heart Study

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Triglycerides and Risk of Heart Attack



JAMA, Vol 276, No. 11

n=14,916 Physician's Health Study

Triglyceride Levels	Relative Risk of a Heart Attack
65	1.0
135	1.3
170	1.8
260	3.0


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High Blood Glucose

Coronary Risk Indicators

Damages the artery walls promoting atherosclerosis

- Increases blood lipids
- Increases blood pressure
- Increases risk of coronary artery disease (damages eyes, kidney)




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Inactivity

Coronary Risk Indicators

Impairs function of heart and arteries, affecting:

- blood lipids
- blood pressure
- body weight
- diabetes risk
- inflammation
- heart muscle strength

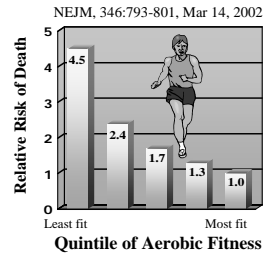


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Exercise – Best Predictor of Heart Health

In all men, peak aerobic capacity was a better predictor of mortality than:

- High blood pressure
- Smoking
- Diabetes
- Cholesterol levels
- Abnormal ECGs
- History of heart disease

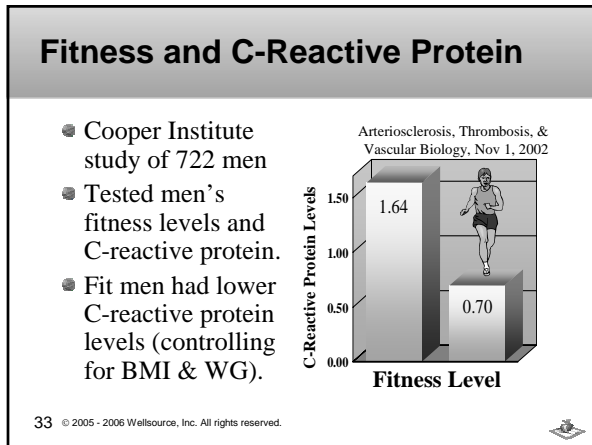
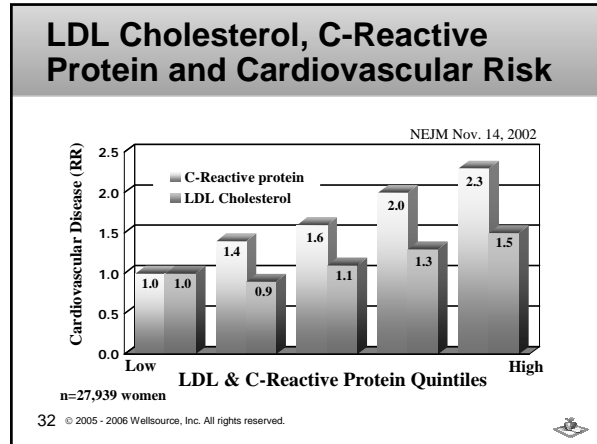
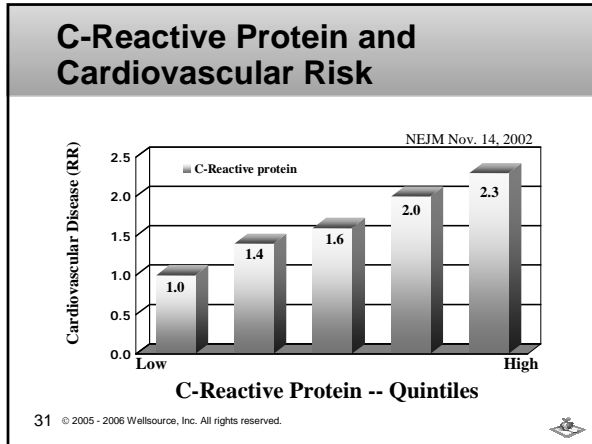


NEJM, 346:793-801, Mar 14, 2002

Quintile of Aerobic Fitness	Relative Risk of Death
Least fit	4.5
2nd	2.4
3rd	1.7
4th	1.3
Most fit	1.0

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Preventing Heart Disease



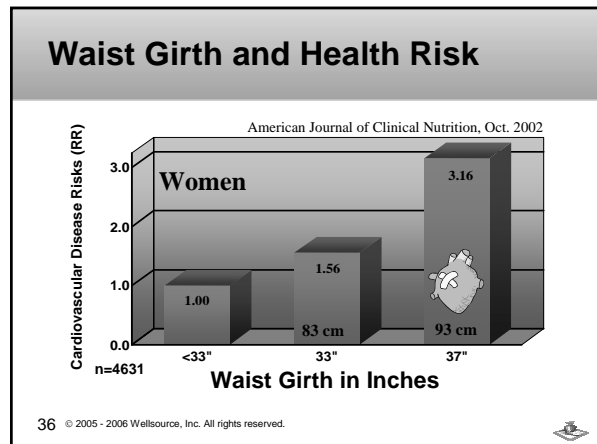
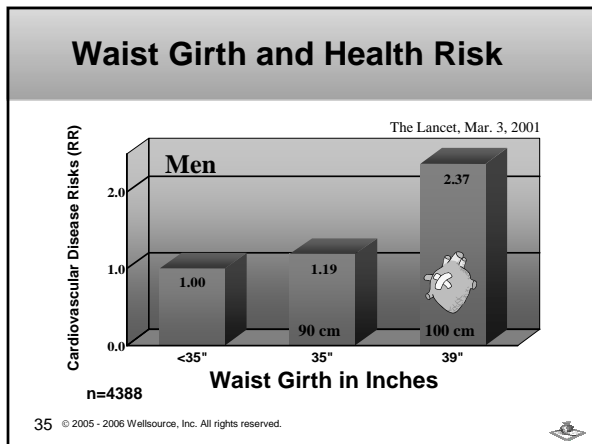
Overweight

Coronary Risk Indicators

Impairs circulation and the heart by affecting:

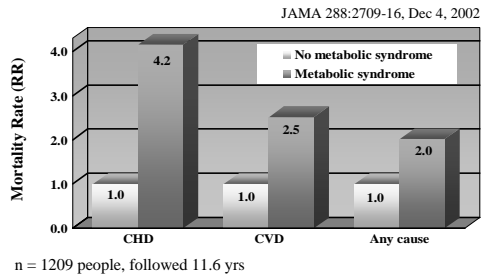
- blood lipids
- blood pressure
- diabetes risk
- inactivity

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Preventing Heart Disease

Metabolic Syndrome and Mortality Rates



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Criteria for Metabolic Syndrome

Presence of any three indicators listed below:

1. Abdominal obesity: waist girth 35+ inches in women, 40+ inches in men (37-39 inches in genetically prone men).
2. High blood fats: triglycerides 150+ mg/dL.
3. Low HDL cholesterol: men <40, Women <50.
4. Elevated blood pressure: 130/85+.
5. Elevated fasting blood sugar: 110-125 mg/dl.

NCEP, ATP 3 Report. JAMA Jan. 16, 2002, 287:356-59

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Cure for Metabolic Syndrome

- Weight loss (even a few pounds helps)
- Regular aerobic exercise
 - 30+ minutes daily
 - Such as brisk walking
- Treat the symptoms
 - BP medicine etc.

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The Good News About Weight

- If you need to lose weight, even a loss of 10-15 pounds can make big improvements to your health
 - Improved glucose levels
 - Improved blood fat levels
 - Improved blood pressure
 - Significant decrease in health risks



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Dietary Factors



- Soluble fiber and plant sterols
- Whole grains
- Nuts, healthy fats, and n-3 fatty acids
- Folic acid
- Sodium
- Water
- Antioxidants in fruits and vegetables

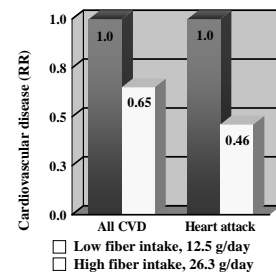


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Dietary Fiber Intake and Risk of Cardiovascular Disease

A higher fiber intake reduced the risk of cardiovascular disease (CVD) by 45% and heart disease by 54% compared to a low fiber intake.

J Am. College of Cardiology, Jan 2, 2002; 39:49-56
n=39,876, 6 year study



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Preventing Heart Disease

Soluble Fiber

Goal
Increase to 10-25 grams per day



Soluble Fiber	grams
Barley, ½ cup cooked	3
Oatmeal, 1 cup	2
Psyllium seeds, ground 1T	5
Apple, banana, peach	1
Pear, orange, grapefruit	2
Beans, cooked, 1 cup	4-6
Broccoli, ½ cup cooked	1
Brussels Sprouts, ½ cup ckd	3
Carrots, ½ cup cooked	1

Source: ATP 3 TLC Guidelines

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Plant Stanols/Sterols

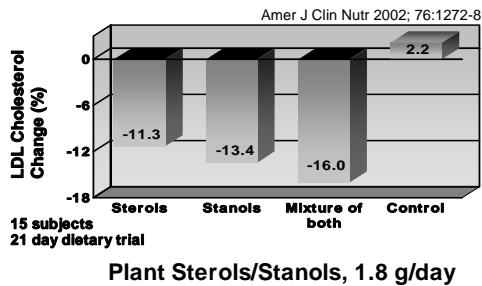
- A substance found in plants (soy beans) that lowers cholesterol.
- Put in margarine. For example:
 - Benecol
 - Take Control
- Research shows that if you eat 2 grams/day of plant stanols/sterols you can lower cholesterol by about 6-15 percent.



NCEP, ATP 3, Guide to Therapeutic Lifestyle Change

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Plant Sterols and Stanols Reduce Blood Cholesterol Levels



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Choose a Variety of Grains

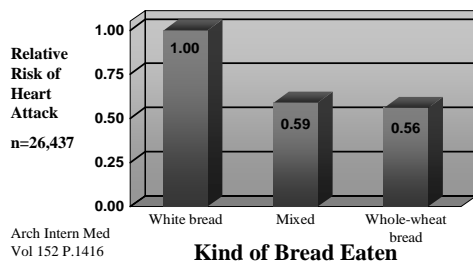
- Whole-grain breads
- Multi-grain breads
- Oatmeal breads and cereals
- Whole-grain Rye
- High fiber cereals
- Brown rice
- Pasta
- Barley cereal



Six or more servings/day recommended primarily from whole-grain sources

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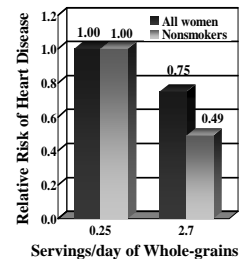
Whole-Wheat Bread and Heart Disease



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Whole-grains and Heart Disease

- Nurses Health Study: 75,521 women followed 10 years.
- Risk of coronary heart disease was reduced by 25% to 50% in those eating 3 or more servings / day of whole-grains.



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Preventing Heart Disease

Cow's Milk vs. Soy Milk on HDL Cholesterol Levels

- Study included 34 healthy men and women in 4 week cross over feeding trials:
 - Four weeks on 2% cows' milk, then
 - Four weeks on soybean product
 - Four weeks on skim milk + soy oil
- The soy product increased HDL levels by 9% and reduced LDL/HDL cholesterol by 14%.
- The skim milk + soy oil improved lipids some but not as much as the full soy product.

Clin Invest Med 1997, June; 20(3):162-70

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Soy Protein

- Soy protein is a very high quality protein and contains isoflavones which have a favorable effect on cholesterol metabolism.
- Tofu is a rich source of isoflavones, as are soy milk, tempeh, and cooked soybeans.
- Soy proteins used in place of animal proteins are helpful in lowering cholesterol levels.

"Beyond Cholesterol", Newsweek, Feb. 19, 1996

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Eat Nuts and Seeds Daily

Eat at least 5 servings per week:

- Almonds, walnuts, cashews, Brazil nuts, hazelnuts, pecans, peanuts.
- Sunflower seeds, flax seed, pumpkin seeds, sesame.
- Peanut and almond butter, tahini.

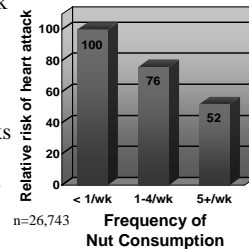


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Nut Consumption and Heart Disease

- Frequent consumption of nuts protects against risk of heart attacks.
- People who ate nuts frequently (5+ times /week) had a 51% reduction in heart attacks and a 48% reduction in death from heart attacks compared to those who seldom ate nuts.



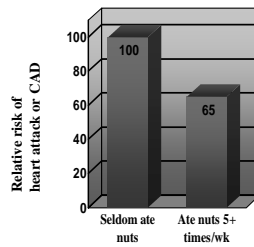
Arch Intern Med, Vol. 152, p. 1416

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Harvard Nut Study

Compared to women who seldom or never ate nuts, those who ate an ounce of nuts five times per week had a 35% lower risk of heart disease. These results held smoking, exercise, blood pressure, obesity, and diabetes constant.



British Med. Jour., Nov. 14, '98

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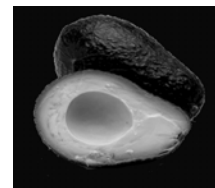
Choose healthy fat foods

Examples:

Unhydrogenated vegetable oils such as canola, soy oil, olive oil

Trans fatty acid free margarine

Olives, avocado, nuts, seeds, nut butters



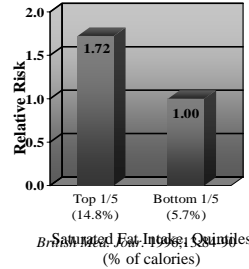
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Preventing Heart Disease

Saturated Fat Intake and Mortality from Heart Disease

- Health Professional Study: 43,757 men, free of disease at start.
- Saturated fat intake and risk of death from heart disease in six years of follow-up
- Those eating the most saturated fat had a 72% increased risk of heart disease.



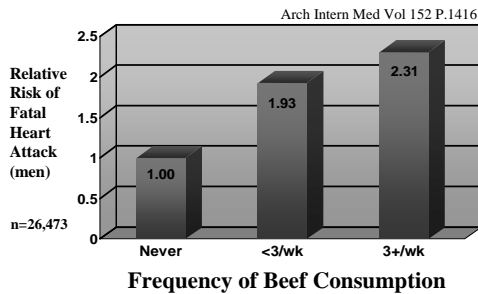
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Primary Source of Saturated Fat in the Diet

- Red meat
- Hamburgers
- Hot dogs
- Cheese, cream
- Fried chicken
- Whole milk
- Deep fried foods
- Beef tacos
- Fast foods
- Baked goods
- Snack foods
- Convenience foods with added fats
- Shortening
- Fat back
- Lard

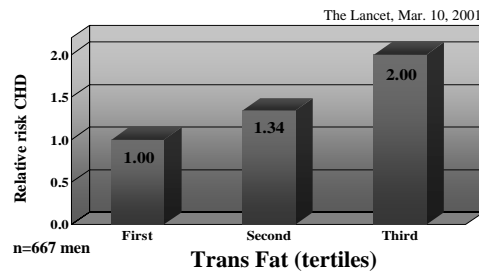
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Beef Intake and Heart Disease



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Trans Fatty Acids and Coronary Heart Disease



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The Lancet, Mar. 10, 2001

Primary Source of Trans Fats in American Diet

- Fast foods
- Baked goods
- Snack foods
- Hard stick margarine
- Vegetable shortening
- Convenience foods with added fats
- Deep fried foods

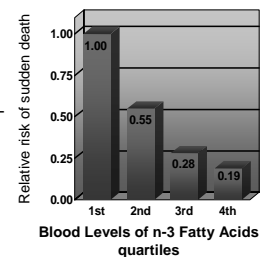
To see if foods have trans fats in them, look for these words on food labels:

“Partially hydrogenated” vegetable oils

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n-3 Fatty Acids and Sudden Death

- Physician's health study
- 17 year follow-up
- Men with the highest quartile of long chain n-3 fatty acids had an 81% lower risk of sudden death compared to those in the first quartile.



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Preventing Heart Disease

Alpha-Linolenic Acid in Foods

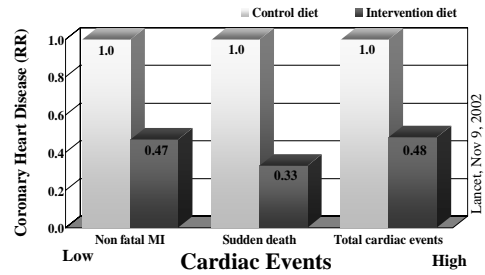
Food	(g)
Flaxseed oil, 1 T	6.9
Flax meal, 1 T	2.5
Walnuts, 1 oz	1.9
Canola oil, 1 T	1.3
Soy oil, 1 T	1.0
Mayonnaise, 1 T	0.9
Corn or olive oil, 1T	0.1
Spinach salad (60 gm)	0.1

Summary of Good Sources:

- Flax seed
- Walnuts
- Canola oil
- Soy oil
- Soy beans, tofu
- Soy milk

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Indo-Mediterranean Diet and Coronary Risk



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Three Cholesterol Lowering Diets

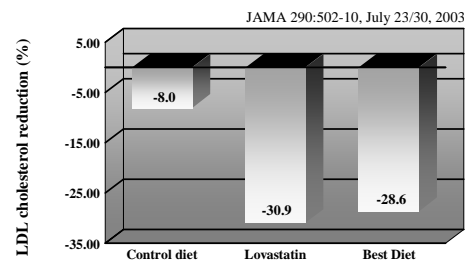
Control diet (Good diet)
 Low saturated fat/cholesterol diet (STEP 2 diet plus whole grains), nonfat milk, nonfat cheese, egg-replacer, vegetarian diet.

Control diet + Lovastatin
 "Best Diet"
 Low saturated fat/cholesterol diet (vegetarian), soy milk, soy proteins, almonds, oat fiber cereal and bread, psyllium seed (high viscous fiber).

JAMA 290:502-10, July 23/30, 2003

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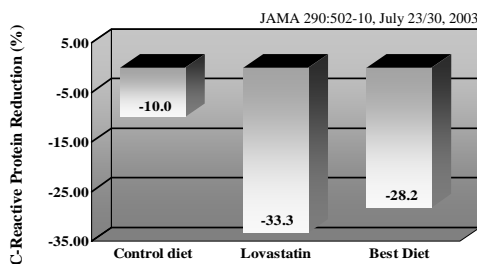
Results of LDL Cholesterol Lowering Diet vs. Lovastatin



JAMA 290:502-10, July 23/30, 2003

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Results of Cholesterol Lowering Diet on C-Reactive Protein

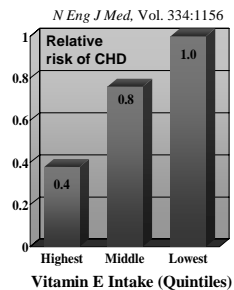


JAMA 290:502-10, July 23/30, 2003

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Vitamin E from Food

- A 7-year study of 34,486 women where the intake of vitamin E from food was inversely associated with mortality from heart disease.
- Women in the highest quintile had less than half the risk of death from CHD compared to women in the bottom quintile.



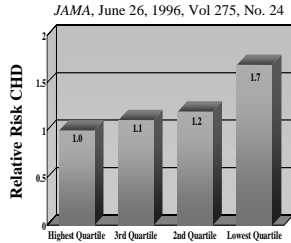
N Eng J Med, Vol. 334:1156

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Preventing Heart Disease

Serum Folate and Coronary Heart Disease

Roughly one half of all US adults on a given day consume less than the recommended dietary allowance for folate. An estimated 88% consume less than the levels needed to produce low, stable homocysteine levels.



Serum Folate Levels

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Dietary Sources of Folate

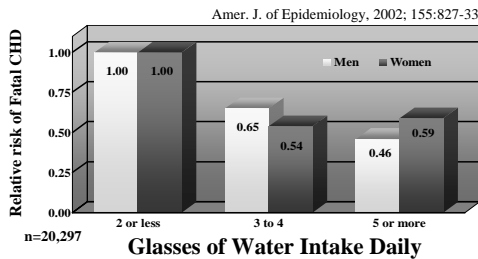
Food	Amount	mcg
Lentils, ckd	1 cup	358
Brewer's yeast	1 T	313
Garbanzo beans	1 cup	282
Baked beans	1 cup	244
Spinach, ckd	1/2 cup	131
Orange juice	1 cup	110
Broccoli, ckd	1 cup	78
Romaine lettuce	1 cup	76



Recommended Intake
400 mcg/day

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Water Intake and Heart Disease



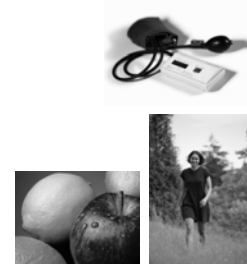
Glasses of Water Intake Daily

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Multiple Risks



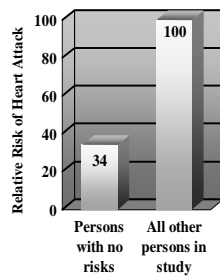
- Lifestyle factors
- Screening factors



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Lifestyle Risks and Heart Disease

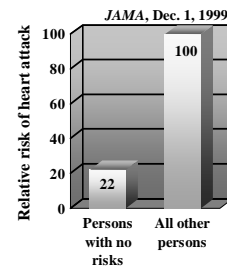
- Women's Health Study: 84,129 women, 14 year study.
- Four major lifestyle factors:
 1. smoking,
 2. healthy weight (BMI <25),
 3. physical activity for 30+ min/day,
 4. healthy eating (low trans and saturated fat, high fiber, folate, & P/S ratio).
- Women with no risks were 1/3 as likely to have a heart attack. *N Eng J Med, July 6, 2000*



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Clinical Risks and Heart Disease

- 366,559 people, 16+ years looked at 3 major risks:
 - smoking (currently),
 - cholesterol (200+),
 - blood pressure (>120/80).
- People with none of these risks:
 - were 80 to 90% less likely to have a heart attack,
 - 40-60% less likely to die from any cause,
 - lived 6 to 10 years longer than those with any risks.



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Preventing Heart Disease

End

For more information:

Wellspring Institute for Healthy Living

www.Wellspring.org



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