



SAMHSA-HRSA Center for Integrated Health Solutions

Understanding High Cholesterol

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High Cholesterol

Cholesterol is a normally occurring molecule in the blood and is necessary for normal cell membrane function.

It is the precursor to all steroid molecules

In a standard “lipid panel” we measure total cholesterol (TC), high density lipoprotein (HDL), low density lipoprotein (LDL), and triglycerides.

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Normal Lipid Values

Total Cholesterol	<200
LDL Cholesterol	<129
HDL Cholesterol	>40
Triglycerides	<150

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Lipid Subtypes and Cardiovascular Risk

Total Cholesterol	Higher levels correlated with higher risk
LDL Cholesterol	Same
HDL Cholesterol	Higher levels associated with lower risk
Triglycerides	Weakly correlated- risk of pancreatitis above 500

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Cardiovascular Risk Factors

High blood pressure	Diabetes
Smoking	Proteinuria
Obesity BMI>30	Renal disease
Physical inactivity	Age
High Cholesterol (TC)	Family history

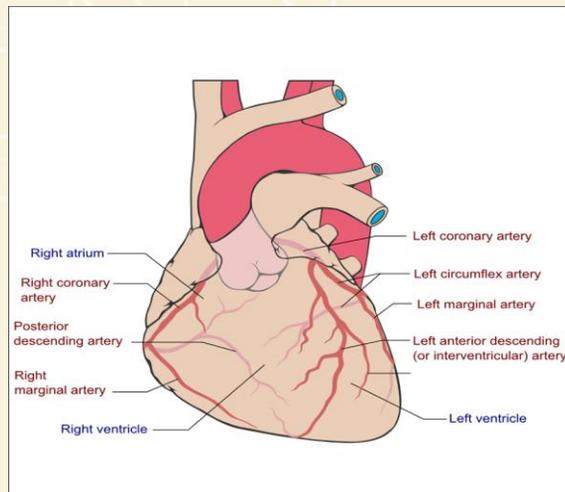
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Heart of the Matter



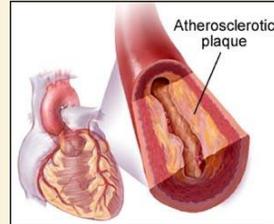
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Atherosclerosis and Inflammation

- *Atherosclerosis (“hardening of the arteries”) once believed to result from lipid accumulation in arterial walls
- *Now known that inflammatory processes are the driving force behind atherosclerotic plaque development

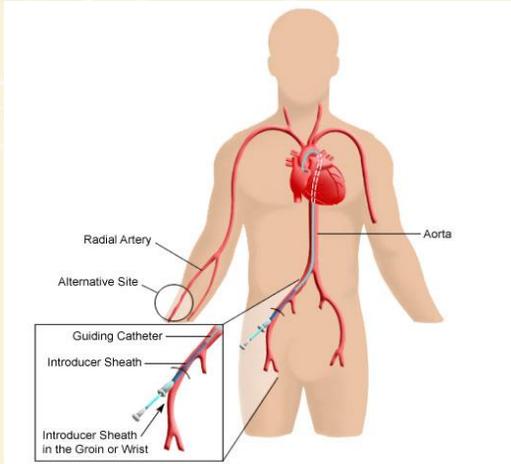


Inflammation Leads to Plaque Formation and Arterial Damage

- *Cardiovascular risk factors such as cigarette smoking, hypertension, and diets rich in trans fat stimulate cells within the artery wall to release a sticky protein which in turn causes white blood cells to bind in the arterial intima
- *The continued depositing of white blood cells stimulates the release of pro-inflammatory cytokines, ultimately leading to plaque formation and instability, and increasing the risk of aneurysm, stroke and heart attack

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Cardiac Cath



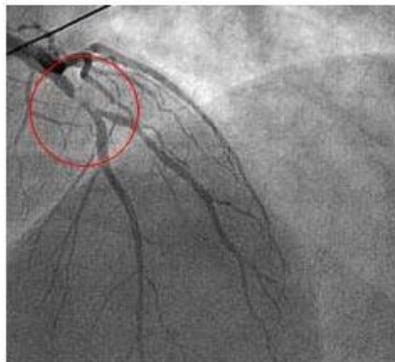
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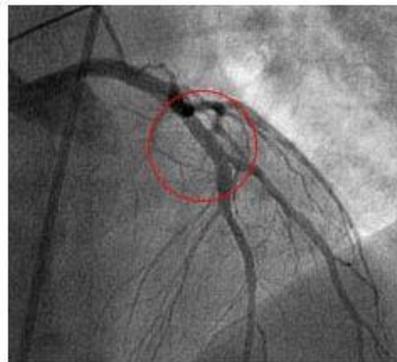
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Left Anterior Descending Artery



Before
99% proximal left anterior descending artery (LAD) stenosis



After
Status post stent of proximal left anterior descending artery (LAD)

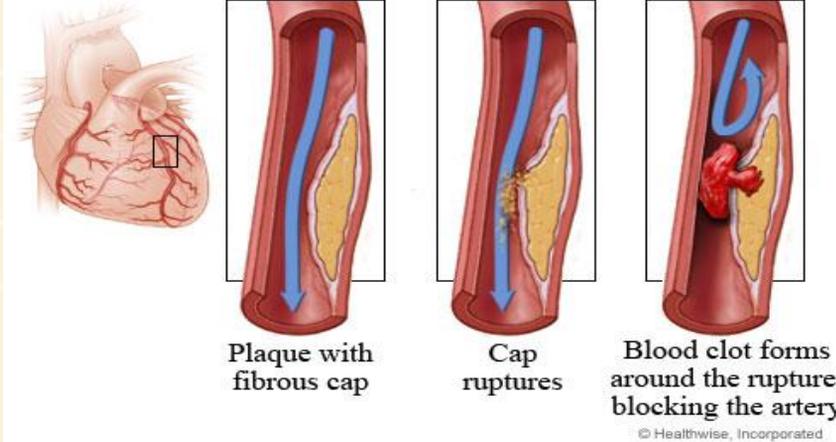
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Inside diseased arteries



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Lifestyle Modifications for Treating Hyperlipidemia

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Nutritional Guidelines for Treating Hyperlipidemia



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GOOD FATS
vs.
BAD FATS



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Cholesterol – What is it?

- Waxy substance made by the body; liver produces 75% of the cholesterol that circulates in the blood
- The other 25 % comes from food (egg yolks, shellfish, organ meats, fatty red meats)



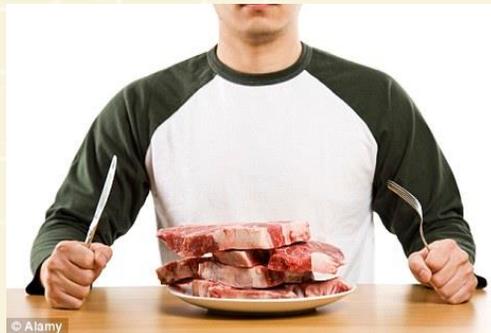
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Saturated Fats – Raise Serum Cholesterol, LDL levels



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Trans fats lower HDL cholesterol, raise LDL cholesterol; “partially hydrogenated” oils



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Monounsaturated Fats(MUFA) can lower cholesterol, triglycerides



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Finding Fat Facts on Food Labels

Amount Per Serving		% Daily Value*
Calories 100	Calories from Fat 100	
Total Fat 11g		17%
Saturated Fat ** 4g		20%
Polyunsaturated Fat 3.5g		
Monounsaturated Fat 3.5g		
Cholesterol 0mg		0%
Sodium 115mg		5%
Total Carbohydrate 0g		0%
Protein 0g		
Vitamin A 6%		
Not a significant source of dietary fiber, sugars, vitamin C, calcium and iron		
* Percent Daily Values are based on a 2000 calorie diet.		
**Includes 2g trans fat.		



Amount Per Serving		% Daily Value*
Calories 260	Calories from Fat 130	
Total Fat 15g		23%
Saturated Fat 9g		44%
Trans Fat 0g		
Cholesterol 60mg		20%
Sodium 80mg		3%
Total Carbohydrate 28g		9%
Dietary Fiber 1g		3%
Sugars 23g		
Protein 4g		
Vitamin A 10%	Vitamin C 0%	
Calcium 15%	Iron 4%	

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.



Amount/Serving		%DV*	Amount/Serving		%DV*
Total Fat 0g	0%	Total Carb. 16g	9%		
Saturated Fat 0g	0%	Dietary Fiber 0g	0%		
Trans Fat 0g		Sugars 16g			
Cholesterol 0mg	0%	Protein 0g			
Sodium 0mg	0%				
Calories 60		Vitamin A 0%	Vitamin C 20%	Calcium 0%	Iron 0%
Fat Cal. 0					

INGREDIENTS: WATER, SUGAR, BLUEBERRY PUREE, ACAI PUREE, CITRIC ACID, CORN SYRUP, NATURAL FLAVORS, GUAR GUM, LEMON JUICE CONCENTRATE, CAROB BEAN GUM, SOY LECITHIN, PECTIN, ASCORBIC ACID (VITAMIN C).

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Omega-3 Fatty Acids can lower serum triglycerides, raise HDL, anti-inflammatory



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Vegetarian sources of Omega-3 fats = Alpha linoleic acid

Walnuts

Ground Flaxseed Meal
(add 1-2 Tbsp to yogurt, oatmeal
smoothies)



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Incorporate Plant Sterols/Stanolols to lower LDL Cholesterol by 12-17%

- Naturally found in fruits/vegetables, legumes (soybeans)
- Compete with cholesterol for absorption in the gut
- Consume with meals
- Available as table spreads (similar to tub margarines)



Mediterranean-style diets associated with a reduced risk of CVD



PREDIMED Study

(N Engl J Med 2013; 368:1353-1354)

Conducted in Spain; randomly assigned 7447 persons at high risk for cardiovascular disease to one of three groups:

- 1) Participants who received advice on a Mediterranean diet and provision of extra-virgin olive oil (rich in MUFA and polyphenols)
- 2) Participants who received advice on a Mediterranean diet and provision of mixed nuts (rich in MUFA, alpha-linoleic acid)
- 3) Those who received advice to reduce dietary fat (control diet)

PREDIMED Study

- The primary end-point was a composite of major cardiovascular events (MI, stroke, or death from cardiovascular causes)
- Interim analyses prompted early termination of the trial
- As compared with the control group – the two groups that received advice on the Mediterranean diet reduced risk of cardiovascular disease by ~30%; impressive

PREDIMED Study

- The most striking differences between the randomized resulted from the supplemental foods, not the dietary advice
- The amount of extra-virgin olive oil and nuts provided to participants and their households was significant (1 liter of olive oil per week and 30 gms of mixed nuts per day)
- The reduction in CVD was most evident for stroke, an outcome dependent on blood pressure
- The group receiving the extra-virgin olive oil and the group receiving the mixed nuts had substantially lower blood pressure after 3 months on the study

PREDIMED Study

Changes in diet can have powerful, beneficial effects!



Saturated fat, carbohydrate and CVD

Am J Clin Nutr; 91:502-9,2010



For a large proportion of the population a **high carb diet** – especially those high in refined carbs (white flour, white sugar, white rice, white pasta) coupled with the rising incidence of obesity and overweight – **creates a metabolic state that favors a worsening of blood lipids, characterized by elevated triglycerides, reduced HDL cholesterol and increased concentrations of small, dense LDL particles**

Practical Nutrition Suggestions for Your Patients

- Boost consumption of fruits and vegetable (aim for 4-5 per day, different colors for antioxidants)
- Cook with **extra-virgin olive oil** (1Tbsp/day) and use it to make a quick and easy salad dressing with balsamic vinegar, minced garlic, fresh herbs 
- Snack on **walnuts, almonds, or other nuts** instead of chips
- Eat 4 oz. of fatty fish (salmon, tuna, sardines) 2-3 times/week; less red meat (grass-fed is better but more expensive)
- Consume only reduced-fat dairy products (yogurt, milk, cheese)
- Eat fewer fast foods – suggest ordering a grilled chicken sandwich or a salad with a vinaigrette dressing instead of burger/fries

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Practical Nutrition Suggestions for Your Patients (continued)

- Eat a whole grain cereal such as oatmeal for breakfast, and replace refined grains with **whole grains**, such as brown rice for white rice, 100% whole wheat bread for white or wheat bread
- Replace white potatoes with sweet potatoes; limit all starch portions to ½-1 cup at meals
- Avoid sweetened drinks such as juice, soda, punch, lemonade
- Eat more lentils and beans – **soluble fiber** will lower LDL, cholesterol



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ARIC

**The Atherosclerosis Risk in Communities Study
(ARIC)**

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The Power of Making Four Healthy Lifestyle Changes

Can decrease risk of MI, CVA (stroke), and fatal cardiovascular events by 40% over a period of 4 years!



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Lifestyle Change #1: Quitting Smoking (and avoiding 2nd and 3rd hand smoke)

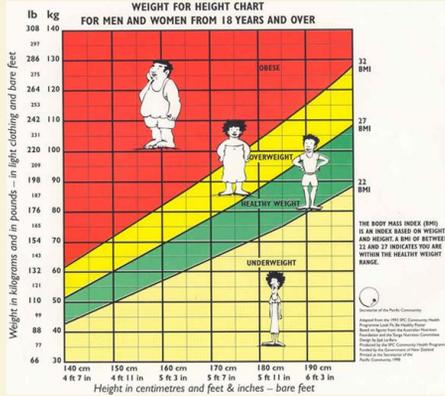


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Lifestyle Change #2: BMI under 30...close to 25

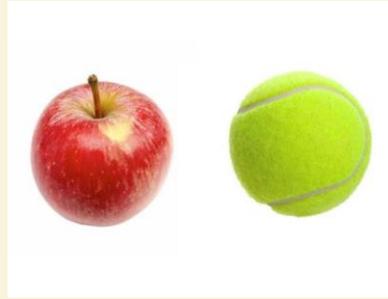


Practice Portion Control – Give Your Patients a “Handy Tool”:



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Lifestyle Change #3: Eat 5 servings of fruits and vegetables a day



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Lifestyle Change #4: Exercise vigorously for 150 minutes per week

Key: Work up a sweat!



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Short on time? Interval Training x10-15 minutes/day

What is interval training?

It's not as complicated as one might think. Interval training is simply alternating bursts of intense activity with intervals of lighter activity.

Take walking. If you're in good shape, you might incorporate short bursts of jogging into your regular brisk walks. If you're less fit, you might alternate leisurely walking with periods of faster walking.

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Benefits of Interval Training

- Burns 1/3 more calories
- More vasodilatation
- Get in shape faster
- Increase HDL ("good" cholesterol)
- Lose weight faster

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Encourage Exercise...it ALL counts

Just go for a walk!
Even a short walk
is better than NO walk!



Work-out without going to the gym: gardening, dancing, housework (vacuuming, mopping, lifting laundry baskets), taking the stairs instead of the elevator, walking errands, getting off bus 1-2 stops earlier, etc.

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Request an Exercise Prescription from your patient's/client's Primary Care Provider!



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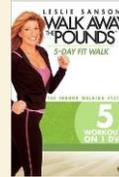
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Exercise Toolkit for Clients/Patients

Pedometers



Fitbits



Leslie Sansone "Walk Away the Pounds" DVDs

Community Rec Centers, parks

Form walking clubs, pair up walking or gym buddies

Offer incentives: t-shirts, sport bottles, prizes

Stress Management and Sleep Tips

- Ask patients to try to schedule at least 10-15 minutes of relaxation time each day (turn off computer, ignore cell phone)
- Suggest mindfulness meditation, guided imagery (provide recordings), reading, walking in a park
- Encourage getting 7-8 hours sleep daily; research supports that less than 6 hours of sleep can result in more inflammation, increase risk of heart attack in older adults with elevated blood pressure

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Dean Ornish “Spectrum” Program



- Integrates comprehensive lifestyle changes: diet, exercise, yoga, meditation, human connections/groups
- Ranked #1 US News and World Report for Heart Disease Diet Plans
- Very low fat diet, vegetarian, plant-based (extreme for many)
- Research supports heart disease reversal is possible

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Making Lifestyle Changes...



*Small, incremental steps



*Do small things on a daily basis

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Remind your patients/clients that *any* small change is a *good thing!*

Any amount of weight loss

! Any increase in fruit and vegetable intake

Any reduction in number of cigarettes

Any increase in physical activity



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New Cholesterol Treatment Guidelines – December 2013

Identified 4 groups likely to benefit from medical (drug) treatment

Only drug class that should be used are the “statins” e.g. lovastatin, atorvastatin

Based on risk group recommend either “moderate or high intensity” treatment

Eliminates all numerical targets for cholesterol levels with treatment

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Avoid Over Treatment with Medications

The young – children, teens, otherwise healthy adults under 40

Most women under 50-55

Patients with severe non cardiac illness e.g active metastatic cancer

Patients with a short life expectancy

Patients over 75 who do not have preexisting heart disease, stroke, or peripheral vascular disease

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Patients Likely to Benefit From Statins

Patients with existing heart, cerebrovascular disease, or peripheral vascular disease- high intensity

Patients between 40-75 with an LDL level of over 190- high intensity

Diabetic patients between 40-75 and LDL 70-190 moderate- high intensity

Patients between 40-75 and a calculated 10 year risk >7.5% moderate to high intensity*

*Using a new risk scoring table

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Statins The Only Proven Class

Moderate Intensity

30-49% reduction in LDL

Atorvastatin 10 or 20 mg \$

Rosuvastatin 5 or 10 mg\$\$\$

Simvastatin 20 or 40 mg \$5

Pravastatin 40 or 80 mg \$4

Lovastatin 40 mg \$4

High Intensity

50% reduction in LDL

Atorvastatin 40 or 80 mg

Rosuvastatin 20, 40 mg\$\$\$

Rosuvastatin should only be used if intolerant of atorvastatin

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Newest Cardiac Risk Scoring Table

Can be found here

http://my.americanheart.org/professional/StatementsGuidelines/PreventionGuidelines/Prevention-Guidelines_UCM_457698_SubHomePage.jsp

Is the source of controversy around new guidelines

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Statin Side Effects

Muscle aches and muscle inflammation – can be serious

Liver irritation- usually not serious and resolves with stopping the drug

Increased risk of developing diabetes

Certain Patients Should Not take Statins

Pregnant women

Patients on hemodialysis

Patients with severe heart failure

Be cautious in patients over 75 and Asian patients

Do We Treat Other Lipid Abnormalities?

Medication guidelines apply to total and LDL Cholesterol

Low HDL -treat with lifestyle- smoking cessation, diet, exercise

Elevated triglycerides above 500 can cause pancreatitis so I would start treatment for that reason, not prevention of cardiovascular disease

Summary High Cholesterol

The primary treatment for abnormal lipids/high cholesterol are lifestyle changes

These are safe, effective, and can be applied to the entire population

Drug treatment is targeted at higher risk groups in whom the benefit is the greatest

This includes patients with heart or other existing vascular disease, patients age 40-75 with an LDL > 190, diabetics 40-75 years old with an LDL 70-189, and patients age 40-75 with a 10 year risk over 7.5%

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Thank you!



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