



World Heart Day

Insert Date

At **U**niversity of **A**griculture

In association with **N**utrition **C**are **C**linic Faisal **H**ospital, Faisalabad.

Dr. Ayesha **R**amazn?

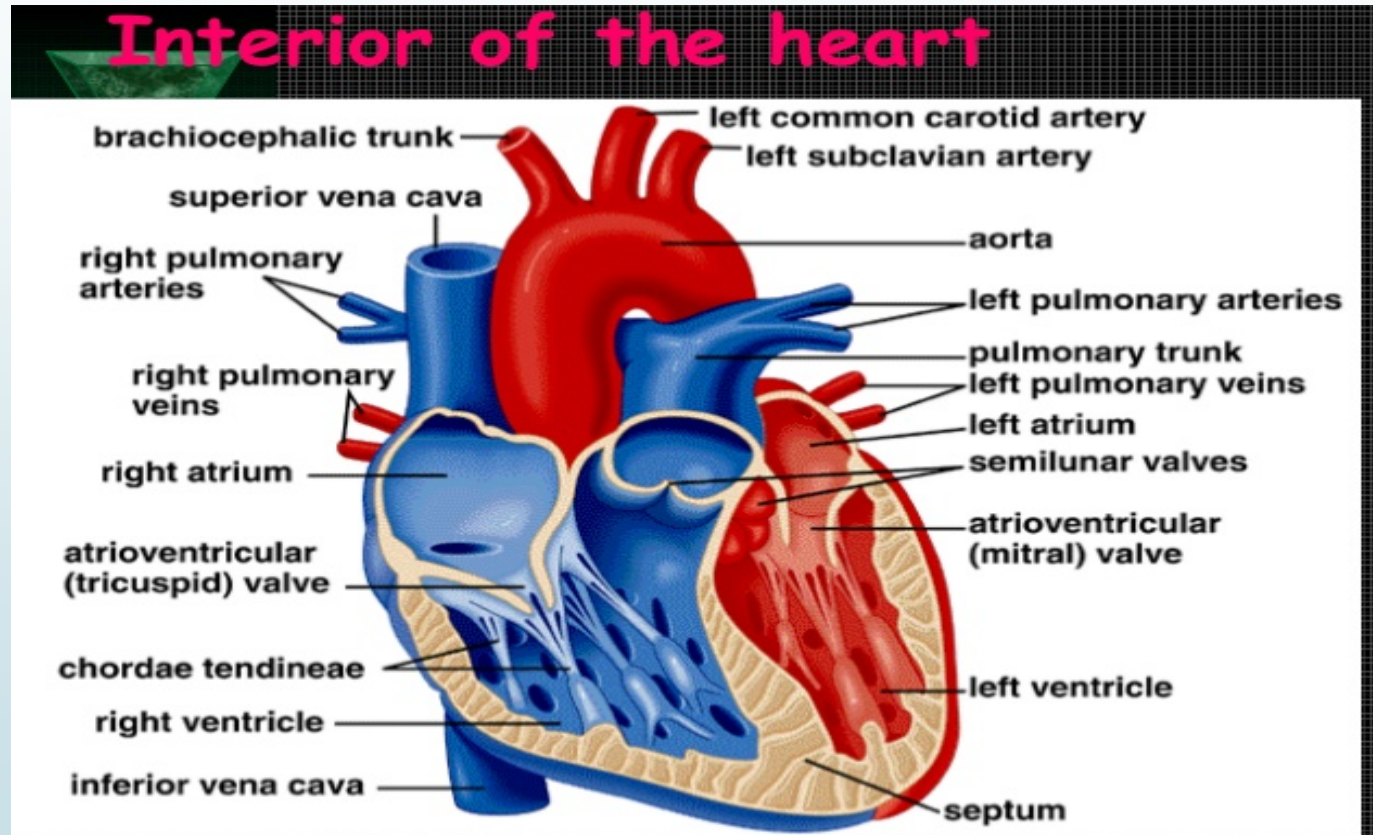
Consultant **N**utritionist

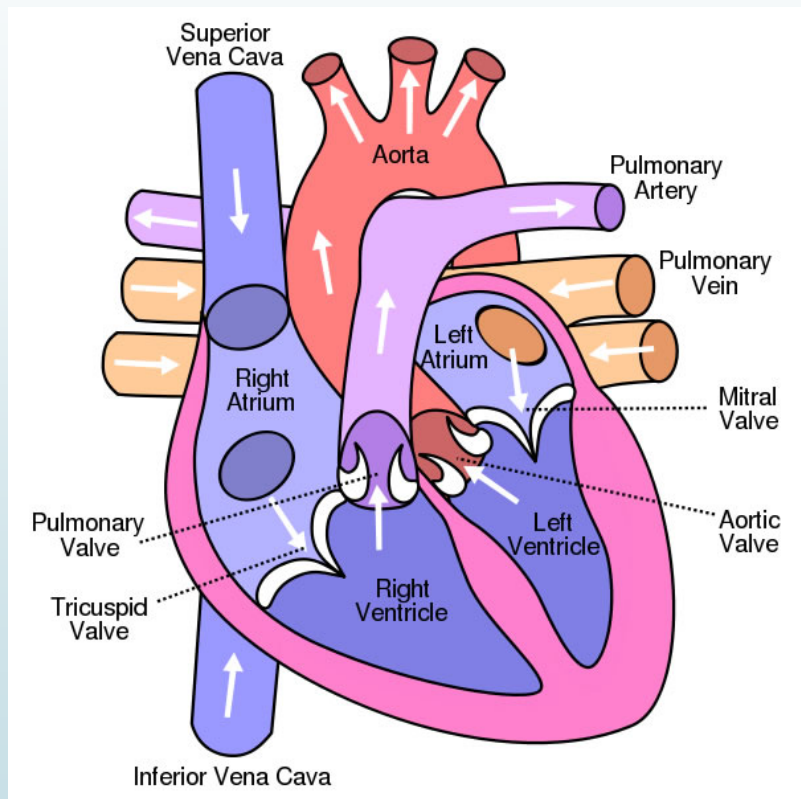


**Aging and cardiovascular
disease**

**cardiovascular disease
and nutrition metabolism**

Structure of the heart



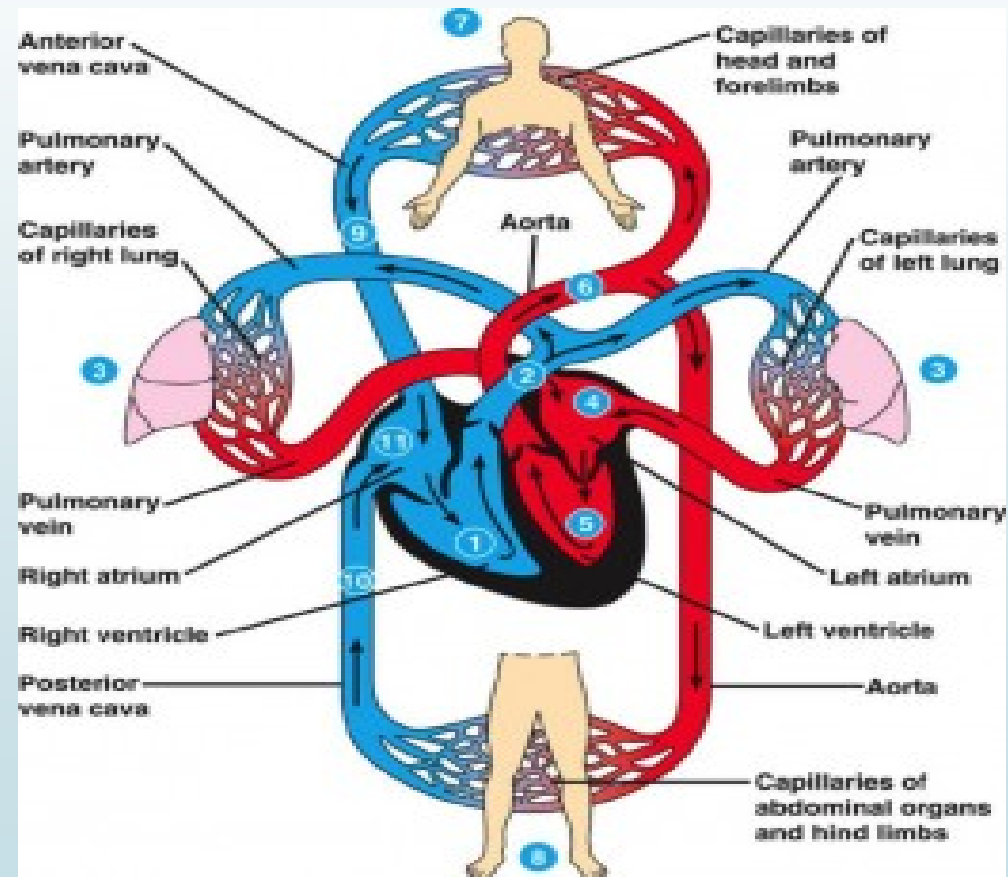




Chambers:

- ▶ Heart is divided by **spectrum** into two halves.
- ▶ Halves are in turn divided into two chambers.
- ▶ Upper two chambers are called **atria**.
- ▶ Lower two chamber are called **ventricles**.

Blood circulation:



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Diseases of heart:

Heart consist of:

- ▶ Muscle that pumps blood
- ▶ Arteries that supply blood to the heart muscle
- ▶ Valves that ensure that the blood within the heart is pumped in the correct direction.
- ▶ Problems can arise in any of these areas.
- ▶ Like cardiovascular disease, heart disease is a term that's some what loose and broad, and it's often used that way.

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Different types of heart disease:

- ▶ Coronary heart disease.
- ▶ Coronary artery disease.
- ▶ Ischemic heart disease.
- ▶ Cardiovascular disease.
- ▶ Hereditary heart disease.
- ▶ Hypertensive heart disease.
- ▶ Inflammatory heart disease.
- ▶ Valvular heart disease.
- ▶ Congenital heart disease.
- ▶ Heart failure.



Coronary heart disease:

- ▶ A disease of heart itself caused by accumulation of atheromatous plaques within the walls of arteries that supply the myocardium thus resulting in ischemia.

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Ischemic heart disease:

- ▶ Another disease of the heart itself, characterized by reduced blood supply to organ

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Hypertensive heart disease:

- ▶ Heart disease caused by high blood pressure, especially localized high blood pressure.

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Pericardial disease:

- ▶ These are diseases of sac that encase the heart (pericardium).
- ▶ Pericardium disorders include inflammation (pericarditis), fluid accumulation and stiffness (constrictive pericarditis).
- ▶ Pericarditis can occur after heart attack and lead to pericardial effusion or chest pain.

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Heart failure:

- Often called congestive heart failure, is a condition in which heart can't pump enough blood to the body's organ and tissues.
- It doesn't means heart has failed and can't pumps blood at all.
- With this less effective pumping vital organ don't get enough blood, causing such sign and symptoms as shortness of breath.
- Cardiovascular conditions that have damaged **or** weakened the heart, such as coronary artery disease may result in heart failure ~~or cardiomyopathy~~.

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Congenital heart disease:

- ▶ This disease develop before birth (congenital).
- ▶ Congenital heart disease is broad term and include a wide range of diseases and conditions.
- ▶ These disease can effect the formation of heart muscles or its chambers or valves.
- ▶ They include such condition as narrowing of a section of the aorta (coarctation) or holes in the heart (atrial or ventricular septal defect).
- ▶ Some congenital heart defects may be apparent right at the time of birth, while others may not be defected until later in life.



Stroke:

- ▶ It is sudden loss of brain function.
- ▶ Its occur when blood flow to the brain is interrupted or when blood vessels in the brain rupture.
- ▶ These in turn cause the death of brain cell in the effected area.
- ▶ Stroke often thought of as neurological disorder because of many complications it causes.

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Modifiable Risk Factors for Heart Disease

- ▶ Diabetes
- ▶ Hypertension or high blood pressure
- ▶ Dyslipidemia
- ▶ Inactivity
- ▶ Smoking
- ▶ Dietary factors
 - Amount and type of fats in the diet
 - Antioxidants
 - Fiber
 - Dietary patterns

Dietary Factors that Affect Blood Lipids





Saturated Fatty Acids

- Elevate blood cholesterol in all lipoprotein fractions (LDL and HDL) when substituted for CHO or other fatty acids
- Dose-response between SFA and LDL-C
 - For every 1% of energy intake increase in *sfa*, plasma cholesterol increases 2.7%
- Most hyper cholesterolemic sfas are lauric (C12:0) myristic (C14:0) and palmitic (C16:0) (palmitic is 60% of sfa intake)
- Stearic (C18:0) is neutral



Saturated Fatty Acids

- ▶ The most hyper cholesterolemic fats are palm kernel, coconut and palm oils, lard, and butter
- ▶ SFAs also associated with CAD progression: milk, cheese, butter, lamb, bakery goods, fast foods, snacks
- ▶ Average American intake is 11% of kcals



~~Polyunsaturated Fatty Acids~~ Omega 3 Fatty Acids

- ▶ Found in fish oils, fish oil capsules, and ocean fish (eicosapentaenoic and docosahexaenoic acid)
- ▶ Do not affect TC; may ↑ LDL-C (5-10%) and decrease TG (25-30%) especially in patients with high TG
- ▶ Anticoagulant effect
- ▶ Decrease vasoconstriction
- ▶ Improve endothelial dysfunction
- ▶ Reduce inflammation

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Omega-3 Fatty Acids: ALA

- ▶ Alpha-linolenic acid
- ▶ An essential fatty acid
- ▶ Shorter-chain found in various plant sources such as flax, canola, walnuts, and soy
- ▶ Benefits less clear; may protect against CVD by reducing inflammation



Omega-3 Fatty Acids

- ▶ Consumption of fish and fish oils rich in EPA, DHA will lower cholesterol, LDL, and TG and reduce sudden cardiac death
- ▶ One fatty fish meal/week resulted in 50% decrease in risk of cardiac arrest
- ▶ 1 g supplement of omega-3 daily reduced risk of CVD, nonfatal MI, nonfatal stroke

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Cis-Monounsaturated Fat

- ▶ Naturally occurring monounsaturated fat
- ▶ Found in olive oil, canola oil, avocado, olives, pecans, peanuts, and other nuts
- ~~▶ Oleic acid is the most prevalent MFA in the US diet~~

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Cis-Monounsaturated Fat

- ▶ When fat is replaced by CHO, it lowers HDL as well as LDL-C
- ▶ When **sfa** is replaced by **mfa**, lowers LDL-C without lowering HDL-C
- ▶ When substituted for carbohydrate, **mfa** reduces serum triglyceride levels
- ▶ Can recommend a higher fat diet if much of the fat comes from **mfa**

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Cis-Monounsaturated Fat

- ▶ Mediterranean diet: high in fat, especially MFA (olive oil), fish, nuts, low in red meat associated with ↓ risk of CVD
- ▶ Emphasizes fruits, root vegetables, flax, canola
- ▶ High fat diets should be used with caution



Mediterranean vs Standard AHA Low Fat Diet

- ▶ Subjects: 202 post-MI patients
- ▶ 50 put on AHA lowfat diet (30% fat)
- ▶ 51 on Mediterranean (40% fat; fish 3-5 times/week, olive oil, avocado)
- ▶ Both limited to 7% SFA and 200 mg cholesterol/day
- ▶ Both groups received two individual diet counseling sessions in the first month and six group sessions over the next two years.
- ▶ 101 controls given advice in the hospital
- ▶ **Slides 26 and 27 can be omitted and at the end just summarize the recommendations**



Mediterranean vs Standard AHA Low Fat Diet

- ▶ After 4 years 83% of those on either therapeutic diet had survived without problems; cholesterol profile improved in both groups
- ▶ People on either diet had one-third the risk of suffering another heart attack, a stroke, death or other heart problem as controls
- ▶ Those on Mediterranean diet found it harder to stick to (↑ fish, olive oil)
- ▶ 53% of control patients survived without problems; cholesterol profile did not improve

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Trans-Monounsaturated Fats

- ▶ Produced in the hydrogenation process
- ▶ Commonly used in the food industry to harden unsaturated oils and soft margarines
- ▶ 50% of trans-fatty acids come from animal foods (beef, butter, milk fats)
- ▶ Major foods sources in US are stick margarine, shortening, commercial frying fats, high fat baked goods

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Margarine vs Butter

- ▶ The combined amount of saturated fat and trans fat in butter is higher than that in margarine
- ▶ Soft or liquid margarine is the preferred spread
- ▶ Average intake of trans fats is 7-8% of total fat intake
- ▶ Choose low fat desserts, dairy products, meats will lower trans fatty acid intakes

Total Fat Content of Diet

- ▶ High fat diets are associated with obesity, which increases the risk of CHD
- ▶ Low fat diets (<25% of kcals from fat) raise triglycerides and lower HDL; however these changes are not associated with ↑ risk
- ▶ Low fat diets lower LDL only when they are low in **sfa**
- ▶ AHA: total fat <30% of kcals
- ▶ ATP III: 25%-35% of kcals from fat

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Dietary Cholesterol

- ▶ Dietary cholesterol raises total and LDL-cholesterol, but less than **sfa**
- ▶ A 25 mg increase in dietary cholesterol raises serum cholesterol 1 mg/dl
- ▶ At 500 mg intake, increments are even less; appears to be a threshold for response
- ▶ TLC guidelines: <200 mg/day
- ▶ AHA guidelines: <300 mg/day



Fiber

- ▶ Soluble fibers (pectins, gums, mucilages, algal polysaccharides, some hemicelluloses) in legumes, oats, fruit and psyllium lower serum cholesterol and LDL-C
- ▶ Quantity needed varies by food (more legumes than pectins or gums)

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Fiber

- ▶ Average decline in LDL-C is 14% for hyper cholesterolemics and 10% for normocholesterolemics when soluble fiber is added to a low fat diet
- ▶ Fiber may bind bile acids, which lowers serum cholesterol to replete the bile acid pool



Fiber



- ▶ Insoluble fibers have no effect **on lipid levels** (celluloses and lignin)
- ▶ Of total fiber (25-30 grams) 6 to 10 grams should be from soluble fiber
- ▶ Can be achieved with 5 or more servings of fruits or vegetables a day and 6 or more servings of whole grains and high-fiber cereals



Coffee

- ▶ Mixed results in studies on effect of coffee on lipids
- ▶ Heavy intake of regular coffee (720 ml) causes minor increases in TC (9 mg/dl) LDL-C (6 mg/dl) and HDL-C (4 mg/dl)
- ▶ Boiled coffee (European) produces greater elevations than filtered coffee

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Coffee

- ▶ Large population studies have failed to find associations between coffee consumption and CHD incidence or mortality
- ▶ Coffee drinkers consume more saturated fat and cholesterol, smoked more cigarettes, and were less likely to exercise

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Antioxidants

- ▶ Antioxidants have been studied for possible role in preventing oxidation of LDL-C
- ▶ Epidemiological studies suggest vitamin E and carotenoids are inversely related to CVD, but randomized trials have not supported this
- ▶ Vitamin E: no primary or secondary prevention trials show positive effect
- ▶ B-carotene supplements appear to have no benefits
- ▶ Use food sources such as vegetables and fruits

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Calcium DELETE

- ▶ Supplementation produces small decreases in LDL-C in hypercholesterolemic men
- ▶ May form insoluble soaps with fatty acids



Soy Protein DELETE

- ▶ Substituting soy protein lowers TC (9%) and LDL-C (13%) and TG (11%) with no effect on HDL-C
- ▶ Effect in addition to a Step 1 diet; occurs only in persons with hypercholesterolemia
- ▶ Dose response
- ▶ Daily intake of 25 g of soy will lower LDL-C by 4 to 8% in hypercholesterolemic persons



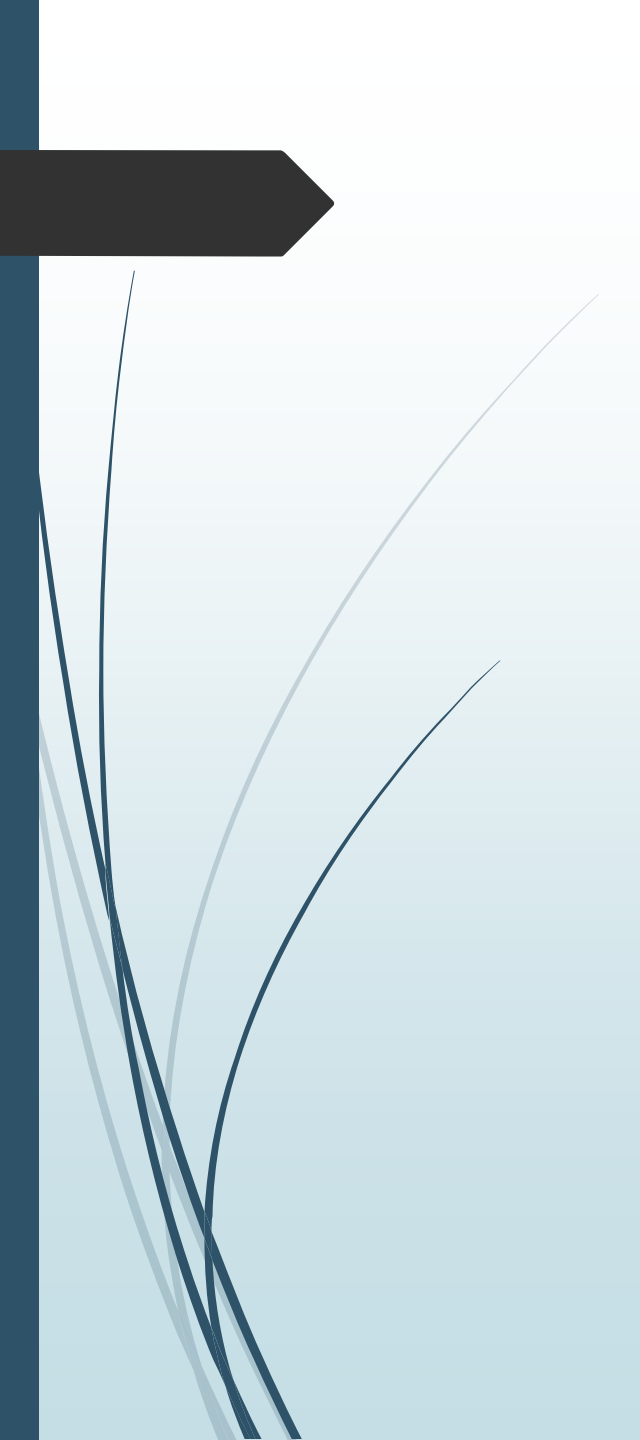
Therapeutic Lifestyle Changes in ~~LDL-Lowering~~ Therapy

- ▶ TLC Diet
 - ▶ Reduced intake of cholesterol-raising nutrients (same as previous Step II Diet)
 - ▶ Saturated fats <7% of total calories
 - ▶ Dietary cholesterol <200 mg per day
 - ▶ LDL-lowering therapeutic options
 - ▶ **Plant stanols/sterols (2 g per day)**
 - ▶ Viscous (soluble) fiber (10–25 g per day)
- ▶ Weight reduction
- ▶ Increased physical activity



Therapeutic Lifestyle Changes (TLC) REPEAT OF 40

- ▶ TLC Diet
 - ▶ Saturated fat <7% of calories, cholesterol <200 mg/dal
 - ▶ Consider increased viscous (soluble) fiber (10-25 g/day) and plant stanols/sterols (2g/day)
- ▶ Weight management
- ▶ Increased physical activity



Define the steps to
prevent
cardiovascular
disease



Thanks.