Coronary Heart Disease is the most common form of heart disease in this country and the primary cause of heart attacks. It is the single largest killer of American men and women resulting in more premature deaths than any other illness, more than cancer and accidents combined. In men, the first symptom of heart disease is commonly a heart attack and 50 percent of first-time heart attacks are fatal causing more than 550,000 deaths each year commonly in the prime of life. Almost everyone has heard a story of some strong vital hard-working man who suddenly drops dead just as he was settling into retirement or finished paying off his mortgage. This man most likely had no symptoms prior to the attack, that was caused by sudden plaque rupture of mild cholesterol deposits in the walls of his coronary arteries. Women develop coronary artery disease somewhat later in life and “catch up” with men by 65 to 70 years old when deaths due to coronary heart disease are comparable to or greater than men.

The Weatherhead PET Imaging Center for Preventing and Reversing Atherosclerosis is dedicated to the primary prevention of death and disability from heart disease. We accomplish this in two steps: First, detecting heart disease early with PET imaging, the most sensitive and accurate noninvasive test for finding early heart disease. Second, by educating people and implementing lifestyle changes and medications to correct the causes of heart disease in the people at highest risk for it.

This edition will focus on the next generation and what they can do to prevent disease. The people at highest risk are the sons and daughters, and grandchildren of patients with known coronary artery disease. We will review the scientific data that shows when heart disease starts, what causes it, and how intense lifestyle modification and medications can make a difference.

When does heart disease start?
Numerous scientific studies report the beginnings of coronary atherosclerosis at a relatively young age. Of young trauma victims and war casualties of Korea and Vietnam (between twenty-two and twenty-six years old at death) examined for coronary atherosclerosis, 45% to 76% were found to have cholesterol deposits or plaques in the coronary arteries. In another study, early coronary atherosclerosis was found in 41% to 72% of people that died of other causes. Based on this data, 25% to 35% of middle-aged men have coronary atherosclerosis of potential clinical significance that began to develop in their twenties or thirties. This large population with coronary atherosclerosis without symptoms is the source of most heart attacks or sudden death, most of which occurs without prior warning symptoms.
What Causes It?

Coronary artery disease is a diffuse process of cholesterol deposition, scarring and calcification (hardening of the arteries) throughout the major coronary arteries supplying blood flow to heart muscle. Cholesterol builds up in pockets (plaques) embedded in the walls of coronary arteries beneath their inner lining. Coronary heart disease is caused by a complicated interplay of factors, each of which increases the risk of atherosclerosis. Some of these risk factors are:

- Smoking
- Abnormally high blood levels of LDL (bad) cholesterol and triglycerides
- Abnormally low blood levels of HDL (good) cholesterol
- Elevated blood pressure
- Family history of cardiovascular disease
- Diabetes
- Excess body weight
- Presence of atherosclerosis elsewhere in the body
- Dietary fat

Now it has been well documented scientifically that the majority of heart attacks occur in patients who have only mild to moderate or no coronary narrowing (50% or less) before the heart attack. In an artery without a significant narrowing, the thin fibrous cap over the cholesterol plaque may break open. This plaque rupture lets blood mix with the cholesterol in the wall of the artery that causes it to clot, blocking off the artery completely. Therefore, most heart attacks occur in people with no prior significant narrowing of the coronary arteries and symptoms of heart disease.

This knowledge is the basis for diagnostic cardiac imaging that detects this early build-up of cholesterol in the coronary arteries, thereby indicating vigorous treatment to prevent plaque rupture and associated heart attack. Positron Emission Tomography (PET) is the most accurate noninvasive test for identifying the mild cholesterol build-up or diffuse coronary vascular disease that is responsible for most heart attacks. Although an arteriogram (heart cath) is useful in identifying severe blockages, it routinely misses the mild diffuse build-up of cholesterol throughout the arteries.

What can be done for the next generation?

A comprehensive vigorous lifestyle management program including cholesterol lowering medications, low-fat diet, and management of other risk factors actually reduces the amount of cholesterol in the walls of the artery. This removal of cholesterol from the walls of the artery occurs over an 18-24 month period associated with decreased severity of narrowings. The walls of the arteries stabilize, thereby reducing the risk of plaque rupture, heart attacks, cardiac death, unstable chest pain and need for bypass surgery or balloon dilation.

The next generation needs to make the lifestyle changes required to prevent coronary heart disease before the symptoms appear. Multiple published scientific articles have shown the benefits of medications and lifestyle modification in preventing heart attacks. An article by our group including first author, Stefano Sdringola, MD was published in the Journal of the American College of Cardiology in 2003. This study is the first to demonstrate with long-term follow-up that intense risk factor treatment combining very low-fat food, weight control, and regular exercise plus lipid active drugs dosed to target goals markedly reduces heart attacks, deaths, revascularization procedures, and size/severity of blood flow abnormalities in the heart.

“\textbf{The real lesson of the study is that there's a certain effect with a lifestyle change and there's a certain effect with medication, but when you put the two together, there's a profound benefit on survival, much greater than}........
either of these steps alone” says K. Lance Gould, M.D.

Patients with known coronary heart disease need to discuss cardiovascular risk factors with their adult children. Your sons and daughters need to be aware that there are genetic and lifestyle components to the disease. Although, they are not doomed by their genes, (See Don’t Blame your Genes, pg 2) controlling other risk factors is very important in addition to blocking genetic effects by medications. Many of our patients have given their children, the “gift” of a PET scan and consultation with Dr. Gould, as a unique yet practical meaningful way to show how much they mean to them. Young healthy people generally are not too concerned about health problems until they either experience a problem or have a close friend or co-worker suffer a heart attack or die suddenly. Our goal at the Weatherhead PET Center is to prevent such adverse events and to help the next generation live long healthy productive lives.

Lessons Learned from Family Groups

In the Cardiology journal, CIRCULATION in 2001, we published the “Family Study” that was a summary of our data up to that point. Although family history of coronary artery disease has been considered an independent risk factor for heart disease, coronary blood flow in relatives of people with coronary heart disease had not been studied. Cardiac PET imaging in this study documented quantitative, significant early abnormalities in over 50% of apparently well, symptom free persons (average age 44) with a parent or sibling with coronary artery disease. Our study was the first to document cardiac PET for identifying early pre-clinical disease in families before symptoms or heart attack.

More recently, we analyzed absolute coronary blood flow in young healthy volunteers with no risk factors for vascular disease. These people were less than 40 years old, “healthy” and volunteered to have PET scans for the study. The results were astonishing and raised the question of how early should risk factors or incipient coronary atherosclerosis be treated in young people. The first observation was that these young people knew very little about their family medical history, even the medical problems of their own parents and grandparents. The results showed that over 30% of the volunteers had unexpected abnormal cholesterol levels and or coronary calcification associated with mildly abnormal PET scans. Thus, one third of these young, so-called “healthy” volunteers already had the precursors to heart disease.

Finally, a re-analysis of data from one of the first “statin” research studies (The West of Scotland Coronary Prevention Trial) from 1992 shows some interesting new follow-up information. The patients in the original study were randomized to receive statin drugs or placebo for a 5-year period to see if the drugs made a difference in the outcome. The patients who had taken the statin drugs had better outcomes – fewer heart attacks and deaths. The new information came from additional patient follow up over the next 10 years. The patients who had taken the statins the longest during the initial 5 years as well as the next 10 years continued to have fewer events and better outcomes than those starting treatment after the initial 5 year study. Even though 35-40% of the patients taking placebo eventually crossed over and started taking the statin drug in the follow up 10 years, the group that had taken the drug the longest had the fewest events and better outcomes. This data implies that the earlier the drugs are started, the better the patients will fare.

These studies, in addition to many other published research reports show that coronary heart disease starts very early, can be identified by PET and that treatment with good lifestyle and medications make a real difference.
Tips for Thanksgiving Dinner
By: Patricia Mendoza Registered Dietician

After all the hard work you’ve put into your diet this year, don’t let Thanksgiving deter you from your goals. You can still enjoy a great tasting, low-fat Thanksgiving dinner by sticking to some general guidelines.

1. First, if you’re celebrating Thanksgiving later in the day, don’t skip breakfast or lunch. Have something light, such as egg white omelet or yogurt and fruit.
2. While you’re waiting for the Thanksgiving meal to start, keep vegetable trays handy as appetizers.
3. When it’s time to eat, don’t forget your portion sizes. Use smaller plates so you don’t over serve yourself.
4. Your serving of turkey shouldn’t be any larger than a deck of cards. Eat the turkey breast without the skin.
5. Use cranberry sauce made with fresh whole berries instead of gravies.
6. For side dishes, make green salads with fat free dressing and have grilled or sautéed vegetables.
7. Instead of the candied sweet potatoes, try baking sweet potatoes with cinnamon.
8. And don’t forget to get in at least 30 minutes of exercise!

Pumpkin Pie

2 cups canned pumpkin
1 1/2 C. skim evaporated milk
1/2 C egg substitute
10 heaping tsp. Splenda
1 tsp. vanilla
1 tsp. pumpkin pie spice

Crust is optional but if you have to have it MAKE IT WITH LOW FAT GRAHAM CRACKERS

Mix all ingredients and put in a 9’ pie plate sprayed with non-stick cooking spray. Bake at 350 degrees for 50-60 minutes. Top with sugar free/ fat free cool whip.

Pie without the crust or cool whip topping

Serving size - 1/8th pie
Calories per 1/8th pie- 60
Fat per serving- 1 gram
Carbohydrate 10 gram
Sugar- 7 grams
Protein- 5 grams