



# → labnotes

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## New Risk Factors for Artery Disease

"I keep reading about new risk factors for heart disease," your client says. "We already have to keep track of blood pressure, cholesterol, HDL and LDL, and someday we'll be tested for something that signals inflammation in the arteries, and also for a chemical called homocysteine that's been linked to plaque buildup. Do you know how these are affected by exercise and lifestyle?"

The buildup of plaque in the arteries is a complex process. Researchers have identified literally hundreds of "risk factors," variables that are associated with risk of developing artery disease and its consequences, such as heart attack or stroke. Some of these risk factors are out of our control, such as age and family history.

factors that have been making their way into our vocabulary.

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### C-reactive protein

The immune system plays an important role in the buildup of arterial plaque. This buildup appears to be a type of inflammatory response, in which immune cells respond to signals of arterial injury. Unfortunately, the inflammation increases, rather than decreases, plaque buildup. Certain immune cells involved in the inflammatory process increase the likelihood that cholesterol and other substances will adhere to the artery lining. They also cause the cells that line the artery to proliferate, which leads to more plaque buildup.

Not all arterial plaques cause serious harm. The ones that cause a heart attack or stroke appear to do so because they have ruptured. The type of plaque most likely to rupture is called unstable plaque, and this type of plaque has a greater level of active inflammation than stable plaque. When unstable plaque ruptures, blood clots form that may block blood flow, thus causing heart attack, stroke or other vascular disasters.

Others may be modified by lifestyle and/or drug therapy. Most of your clients are probably familiar with the major risk factors: smoking, high blood cholesterol, high blood pressure, diabetes, obesity and a sedentary lifestyle. Here are some other risk

A chemical called C-reactive protein (CRP) is produced during the process of arterial inflammation. Researchers have found that blood levels of CRP provide some information regarding the progression of artery disease, especially in people already known to be at an elevated risk for this disorder, such as people who have already suffered a heart attack. At this point, routine testing for CRP in apparently healthy people is not advised, since the test is expensive and may not provide helpful information beyond that given by other tests, such as blood pressure and blood lipid profile.

Several lifestyle factors have been found to be associated with CRP. Cigarette smoking and weight gain increase CRP, while exercise and a heart-healthy diet appear to decrease CRP.

### Homocysteine

Homocysteine is an amino acid that is derived from the breakdown of another amino acid, methionine, found in dietary protein. Laboratory studies have found that high levels of homocysteine may play a role in plaque buildup, perhaps by inducing the oxidation of low-density lipoprotein (LDL) cholesterol (this process accelerates artery disease) or increasing the tendency of the blood to form clots. Like CRP, homocysteine levels in the blood do not appear to accurately predict risk in healthy adults at this time, although this may change as the blood tests improve and scientists learn more about this variable.

High levels of homocysteine decrease in response to an adequate intake of the B vitamins folate, B6 and B12. Diets high in fruits and vegetables, whole grains and low-fat dairy products help to prevent high levels of homocysteine.

### Syndrome X

Syndrome X, or metabolic syndrome, refers to a cluster of symptoms triggered by a form of poor blood sugar control known as insulin resistance, where the cells of the body do not respond appropriately to the hormone insulin. Insulin resistance is characterized by elevated blood sugar, and often develops into type 2 diabetes. Insulin resistance is like "borderline high blood sugar," and, while not as dangerous as diabetes, still increases heart disease risk. Other symptoms of syndrome X include visceral obesity (extra fat around the abdominal organs), high blood pressure and a risky blood lipid profile that includes high triglyceride and low HDL levels.

PREVENT HIGH LEVELS OF HOMOCYSTEINE





Syndrome X responds well to lifestyle changes, especially to an increase in physical activity. Substantial amounts of physical activity (at least 45 to 60 minutes a day) may even correct insulin resistance, reduce hypertension, improve blood lipid levels and even lead to a reduction in visceral fat stores. A heart-healthy diet low in refined carbohydrates also helps correct the symptoms of syndrome X.

### High-normal blood pressure

“High-normal” blood pressure does not sound too serious, but recent studies found that people with high-

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normal blood pressure have twice the risk of heart attack, stroke and heart failure as people with normal blood pressure. Normal blood pressure refers to a systolic reading of less than 130, and a diastolic reading of less than 85. Systolic readings of 130 to 139 and diastolic readings of 85 to 89 fall into the high-normal range.

High-normal blood pressure can often be corrected by regular physical activity, a little weight loss (if the person is overweight) and a heart-healthy diet. An eating plan that includes plenty of fruits and vegetables (9 or 10 servings a day), low-fat dairy products and whole grains is especially effective.

### Emotional health

Someday doctors will figure out a simple and accurate way to measure emotional health. Can you imagine finding out you are too high on the anger or depression scale? These two emotions have been strongly linked to artery disease in many studies. High levels of emotional stress have also been linked to physiological variables that increase heart disease risk, including hypertension, increased risk of visceral adiposity and high cholesterol levels. Emotional stress can also increase risky behaviors, such as smoking and overeating, and interfere with plans to exercise regularly.

One of the best strategies for improving emotional health is regular

physical activity. Regular exercise reduces risk for depression and other emotional health problems. Regular physical activity increases daily energy level, gives people a sense of control and helps turn those mountains back into molehills. **FM**

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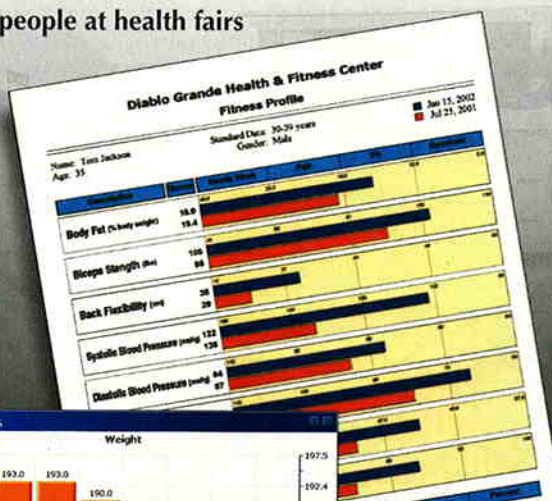
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