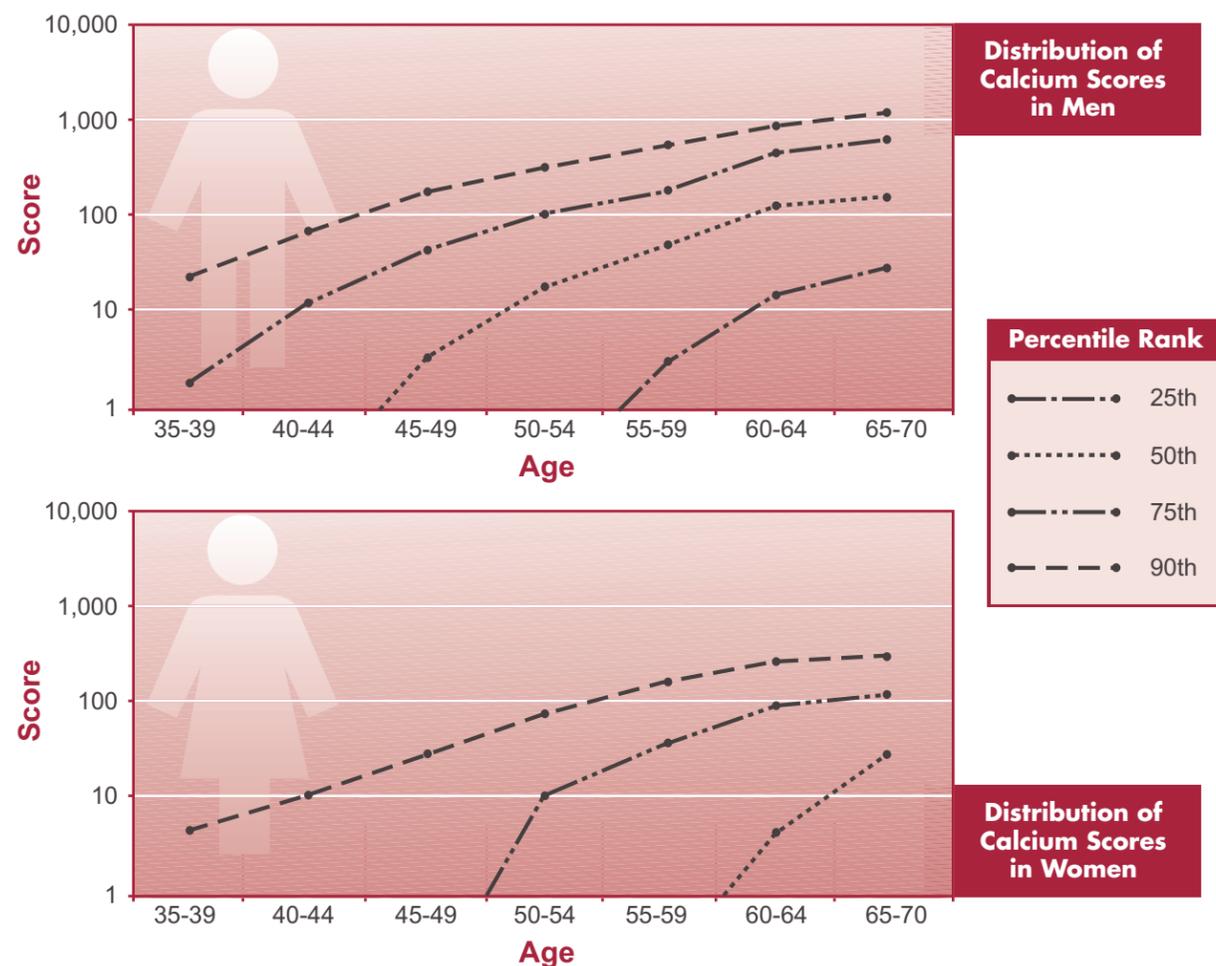


## CORONARY ARTERY CALCIUM SCORING

WHITE-WILSON MEDICAL CENTER

# Cardiac Imaging Group & Preventive Cardiology

Distribution of Calcium Scores by percentile rank in Asymptomatic Men and Women



**Calcium scores <11** are associated with a low likelihood (<1%) of any CAD and have excellent prognosis. Please follow the general health guidelines for primary prevention of CV disease: reduce dietary fat intake, exercise regularly, stop smoking, treat hypertension if it exists. See your primary physician for information or help. Repeat CACS scan in 2-5 years.

**Scores between 11 and 400** are associated with a significant (>2% per year) risk of future cardiac events, especially with scores above 100. Put simply, a calcium score of more than 10 indicates the presence of Coronary Heart Disease and requires a reduction of LDL cholesterol to less than 100 mg%. See your primary physician for information and help.

**Calcium scores >400** indicate extensive CAD and a high likelihood (>90%) of at least one significantly obstructed coronary vessel (>70% stenosis). You are at increased risk for the development of symptomatic cardiac disease (4.8% per year) and may need additional testing. Please see your primary physician.

**If you do not have a primary physician or wish to discuss the implication of your Coronary Calcium Score, please call Ms. Cherie Penas, ARNP, for a Preventive Cardiology consultation at White-Wilson Medical Center Department of Cardiology, 850-863-8294.**

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& Preventive Cardiology

## INFORMATION REGARDING CORONARY ARTERY CALCIUM SCORING

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## CORONARY ARTERY CALCIUM SCORING

Analysis of the amount of calcium in coronary arteries has only recently been possible with the advent of ultra-fast CT scanning. CT scanners that can image 16x per second essentially “stop” the beating heart and allow us to see whether there are specks of calcium in the coronary arteries. Coronary arteries lie on the surface of and supply blood to the heart. If they become obstructed, the result is coronary artery disease (CAD) or heart disease, which can lead to a heart attack.

The process that results in a heart attack begins with damage to the lining of the blood vessel walls and continues over a long period of time. There are a number of “risk factors,” genetic and otherwise, that can increase one’s chances of developing coronary artery disease: age, sex, high blood pressure, diabetes, cigarette smoking, high cholesterol.

### What does a Coronary Calcium study tell us?

First, the presence of any calcium in the coronary arteries is indicative of atherosclerosis (hardening of the arteries) or heart disease. Over the years, the lining of the arteries goes through several stages of damage and repair. Ultimately, the repair process results in calcium deposits in the coronary arteries, also known as plaque. Plaque deposits may be large or small, and over time they can build up and block an artery, resulting in the disease atherosclerosis.

### Atherosclerosis is the only process that results in the deposition of calcium within the wall of an artery.

Atherosclerosis is an active process. Although it is associated with aging, arterial calcification is *not* a degenerative process and is *not* related to aging. As arteries become increasingly blocked, less blood passes through to the heart, resulting in symptoms such as chest pain or heart attack.

Now, with **Coronary Artery Calcium Scoring**, we can detect the presence of atherosclerosis long before a patient experiences any symptoms. Using the newest generation of CT scanners, we are able to generate detailed computer images of

your heart and arteries. We analyze these images and determine the amount of calcium present, then convert our findings to a Cardiac Calcium Score.

Second, while the Coronary Calcium Score provides an evaluation of overall coronary atherosclerotic amount, it does not tell us anything about how blocked a particular artery might be. That is, the calcium score does not indicate where or to what degree blockage is present. However, the calcium score does directly correlate with the risk of cardiac events, such as heart attacks. The higher the score, the more atherosclerosis is present, the greater the risk.

### How does the Coronary Calcium Scoring work?

For individuals without symptoms who want to know if they have atherosclerosis, a calcium score of 0 indicates absence of detected calcium with an extremely low likelihood (<1%) of any Coronary Artery Disease (CAD). In most studies, scores <11 have similar clinical implications and are considered as negative tests. Thus, if your score is below 11, you do not presently have coronary atherosclerosis.

Population studies have found the odds of developing symptomatic cardiovascular disease to be as follows:

Coronary Calcium Score	Cardiovascular Disease Likelihood
50-100	7:1
100-159	20:1
160 and above	35:1

Thus, if your score is above 50, you do have atherosclerosis of the coronary arteries, but you are not necessarily at risk for a heart attack. You should, however, seek advice regarding methods to halt progression of the disease, and you may need a stress test to ensure there is no significant narrowing of the coronary arteries. Alternatively, you may want to obtain a Preventive Cardiology consultation at White-Wilson’s Department of Cardiology.

## CORONARY ARTERY CALCIUM SCORING

### Patients with no symptoms:

Calcium Score	Plaque Burden	Probability of Significant CAD	Annual Cardiac Event Rate*	
0-10	No identifiable plaque or insignificant plaque burden	Very unlikely, <1%	0.11% per year	Repeat scan in 2-5 years, depending on family history and other risk factors
11-100	Mild to moderate atherosclerotic plaque burden	Non-obstructive CAD most likely	2.1% per year	Institute risk factor modification. Consider exercise testing. Daily ASA, Statins. Repeat scans annually.
101-400		Non-obstructive CAD likely, although obstructive disease possible	4.1% per year	
>400	Extensive atherosclerotic plaque burden	High likelihood of at least one significant coronary stenosis	4.8% per year	Institute risk factor modification. Consider exercise testing. Daily ASA, Statins. Repeat scans annually.

Finally, you should be aware that the presence of detectable coronary calcium is also associated with an increased rate of atherosclerotic events at other locations in the vascular tree. Researchers in Rotterdam in the Netherlands studied 2,013 patients over the age of 55. Subjects with calcium scores between 101 and 500 experienced strokes at twice the rate of the reference group. Those with scores above 500 had three times the number of strokes as the reference group.

Coronary artery calcification scanning with the ultra-fast CT scanner at White-Wilson Medical Center is a breakthrough test that affords the opportunity to determine very accurately whether or not coronary artery disease is present in asymptomatic individuals, allowing us to estimate the associated risk of coronary events over time.

The coronary calcium scoring exam does not define the severity of any particular blockage and is not a substitute for stress testing or cardiac catheterization. The evaluation of the amount of obstruction of the coronary arteries continues to require stress testing or angiography.

Individuals with coronary calcium scores over 11 have coronary heart disease and should receive treatment according to the secondary prevention guidelines of the American Heart Association. Patients with significant coronary calcium deposits, especially those with scores over 400, should be considered for further evaluation. Individuals with chest pain and calcium scores over 400 have an extremely high (~15%/yr) cardiac event rate and should consider coronary angiography.

To understand the significance of your particular score, it is important to put it into the context of normals for your age. The thinking is that plaque which occurs prematurely in younger individuals is more aggressive and hence more prone to lead to a heart attack than plaque which develops slowly with age. Hence a 70-year-old man with a coronary calcium score of 150 (about average for that age group) has slower growing, more stable plaque than a 40-year-old woman with a score of 150 (above the 90th percentile for that age group). The latter has a more aggressive plaque forming process and will need to be treated accordingly.