

# MESA Messenger



## MESA Wears Red

*MESA Project Office, NHLBI*



*The study-wide MESA team met in Washington, DC on National Wear Red Day.*

Once a year, MESA investigators from across the country meet to discuss study operations and to share scientific ideas and presentations. The most recent meeting took place on National Wear Red Day in Washington, DC. National Wear Red Day, observed the first Friday in February, raises awareness that heart disease is the number one killer of women and is largely preventable. National Wear Red Day uses the symbol of a red dress to remind women to protect their heart health and to take action to lower their heart disease risk.

To make women more aware of the dangers of heart disease, the NHLBI sponsors a national campaign called The Heart Truth® in partnership with many national and community organizations. The program's goal is to raise awareness about heart disease and its risk factors among women. It also works to educate and motivate women to take action to prevent the disease and control its risk factors. A number of other national efforts are promoting heart health in women as well. The American Heart Association's Go Red For Women campaign also raises awareness of the risks of heart disease in women. This year, Go Red For Women partnered with the NHLBI to present The Red Dress Collection 2014 Fashion Show as part of New York Fashion Week.

The Million Hearts initiative, sponsored by the Centers for Disease Control (CDC), is a national campaign to prevent 1 million heart attacks and strokes in men and women by 2017. Million Hearts works with communities, local health departments, federal agencies, and other organizations to spread the word about heart healthy lifestyles, improving access to good health care, and improving use of effective treatments.

MESA is one of the studies that are vital to improving our understanding of cardiovascular disease risk factors. Studies like MESA also help to shape awareness and prevention efforts including those described above. Through continued follow-up of our participants, MESA researchers learn about new trends, risks, and prevention strategies for cardiovascular disease. Please continue to provide health and contact updates when MESA representatives call. And remember to join us in wearing red next February 7! ❤️



*The Heart Truth is a registered trademark of HHS. Million Hearts is a registered trademark of HHS. Go Red For Women is a registered trademark of AHA. National Wear Red Day is a registered trademark of HHS and AHA.*

# Cholesterol Gene Doubles Risk for Calcium Deposits on the Aortic Valve in the Heart

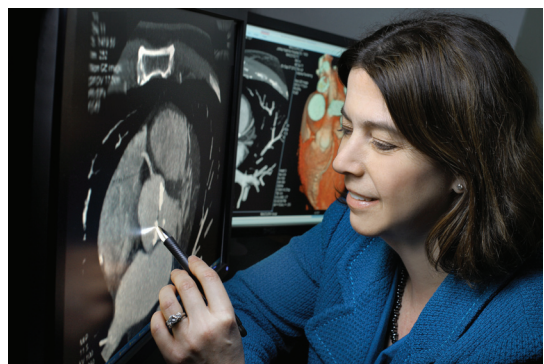
Wendy Post, MD, MS

Principal Investigator, Johns Hopkins University Field Center

As we get older, calcium tends to deposit on our heart valves. Each time the main pumping chamber of the heart beats, a valve opens to allow the blood to reach the rest of the body. This valve is called the aortic valve. When we are born, this valve is paper thin, soft and pliable. As we get older, it becomes stiffer and calcium can collect on it. In some people calcium builds up more quickly and can prevent the valve from opening well. This is a condition called aortic valve stenosis. When aortic valve stenosis is severe, it can lead to symptoms such as chest pain, shortness of breath or fainting. In these cases, surgery may be needed to replace the valve.

Researchers know a lot about what causes heart attacks and what we can do to reduce that risk. But they know relatively little about what causes aortic valve stenosis and how to prevent it. Aortic stenosis is the most common form of heart valve disease and, as the US population is aging, it is becoming an even more important medical problem.

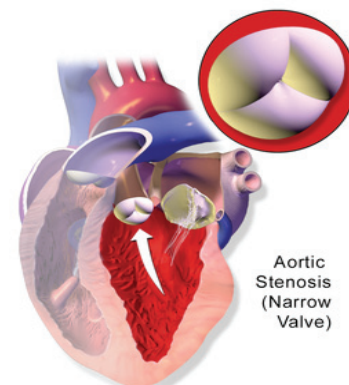
A team of MESA researchers decided to study genes that may predict calcium build up on the aortic valve. Genetic studies of this type require a large number of research participants, so we collaborated with other studies. We studied the DNA of almost 7,000 men and women of European descent in MESA, the Framingham Heart Study and the Age, Gene-Environment Susceptibility (AGES)-Reykjavik Study. We studied 2.5 million DNA variants in each person and tested to see which ones were associated with having calcium on the aortic valve. We could tell which participants had calcium on their valves from a CT scan of the heart. We found that one DNA variant in the gene for a special type of cholesterol doubles the chance of having calcium on the aortic valve.



Author and researcher Wendy Post points out a valve with stenosis on this image.

We found the same results in Blacks and Hispanics in MESA, but the variant was very rare in Chinese. Two studies from Europe have also found that this DNA variant increased the risk of having aortic stenosis and needing surgery by more than 50 percent. The cholesterol particle is called lipoprotein (a) or Lp(a). The levels of this kind of cholesterol are determined by genetics and not by diet and exercise.

These results were published in the *New England Journal of Medicine* in February 2013. It is the first study to prove a strong genetic link to aortic valve calcium build up and aortic stenosis. This research helps scientists to understand more about what causes aortic stenosis. High levels of Lp(a) that are related to this genetic variant cause calcium to develop on the aortic valve. Statin medications are often used to lower cholesterol in people at risk of heart disease. Unfortunately, these drugs do not lower Lp(a) in the blood. Some studies have shown that they do not reduce calcium buildup on the aortic valve either. Since there are no medicines to reduce this calcium buildup, it is our hope that this finding will lead to new drugs to reduce Lp(a) in the blood. More research is also needed to prove if reducing Lp(a) levels reduces calcium buildup and the need for aortic valve surgery. This research in MESA gives a useful direction for ways doctors could reduce the need for expensive and difficult surgeries in the future. ❤️



Aortic Stenosis

This picture shows where the aortic valve is in the heart. When calcium accumulates on the valve it can cause aortic stenosis. By Bruce Blaus (Own work), via Wikimedia Commons

# Lung Studies in MESA: Working to Prevent a Major Cause of Death in the US and Globally

*Graham Barr, MD, DrPH  
MESA Co-Investigator, Columbia University Field Center*

MESA and other large cohort studies have greatly advanced our understanding of clinical and subclinical heart disease. Understanding and treating the known risk factors for heart disease has led to large drops in deaths from heart disease in the United States and other countries over the last few decades. Among these risk factors are smoking, high blood pressure, diabetes, and high cholesterol. But as deaths from heart disease have dropped, deaths from lung disease have been going up. In fact, lung disease is now ahead of stroke as the third leading cause of death in the US, and is the fourth leading cause of death globally.

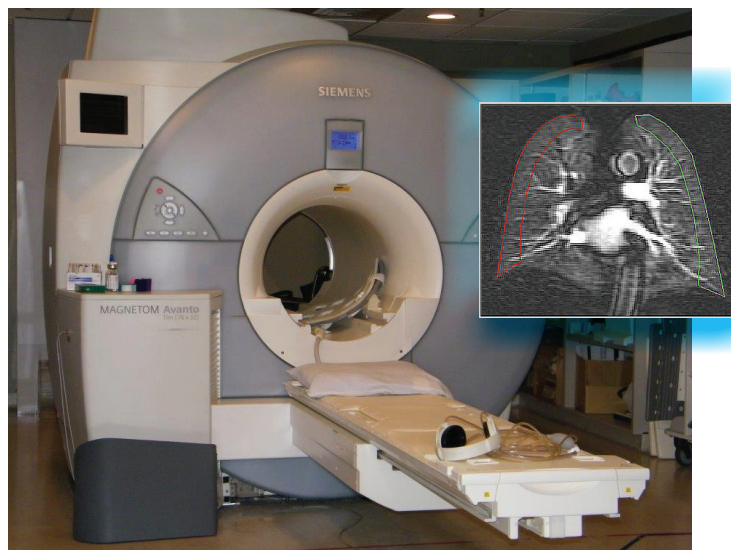
The major chronic lung diseases in adults are chronic obstructive pulmonary disease (COPD) and emphysema. COPD is defined as constant obstruction of airflow into and out of the lungs. This is different from asthma, which only sometimes reduces the flow of air. These two conditions are very similar, though, and can be hard to tell apart. Emphysema is a loss of lung tissue, which can be measured by biopsy or CT scanning. COPD and emphysema often overlap. But one of the important findings of the MESA Lung Study is that they are not the same thing and often occur in different people.

The causes of COPD and emphysema include older age, smoking, and exposure to second-hand smoke. People’s jobs and genetics can also put them at risk. The biggest risk factor for COPD is the number of years that a person smoked. Even a person who quit smoking may still be at risk for COPD late in life if they smoked for many years earlier in their life. Smoking is also a risk factor for some — but not all — types of emphysema. Smoking can affect a person’s risk for heart disease and lung disease differently. Current smoking is a very important risk factor for heart disease. After about 5 years of quitting smoking, however, risk for heart disease drops to about that of someone who has never smoked. This is one of the reasons that lung disease is going up and heart disease is going down: people who quit smoking lower their risk for heart disease but their risk for lung disease stays the same.

MESA has been a leader in research on the connection between heart and lung disease by including measures of lung function and structure in the study. You may be among the many MESA participants who took part in the MESA Lung Study, which measured lung function using a standard breathing machine (called a spirometer) and lung structure on CT scan. The MESA Lung and smaller MESA COPD Studies are investigating more risk factors for COPD and emphysema.

These studies are designed to understand changes to the lungs caused by these diseases as well as how lung disease affects heart function. In the MESA COPD study we revised how we did MRIs in MESA Exam 5 to allow us to measure the lung’s blood vessels (see the picture, right). We found very large decreases in blood flow through the lungs among

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*MRI images such as this from MESA COPD allow us to study blood vessels in the lung.*

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participants with COPD and emphysema. This explains why heart function is reduced in COPD and emphysema (since all the blood flows through the lungs to get from one side of the heart to the other). This finding also suggests that changes to the lung's blood vessels may be important in the development of COPD and emphysema.

We recently received additional funding for MESA COPD to bring participants in this project (but not MESA Lung yet) back for a visit in which we would repeat the MRI and CT scan. This follow-up visit will allow us to understand if loss of tissue in a part of the lung contributes to emphysema in

that part of the lung 5 years later. If this is the case, it would allow investigation of new drugs that may treat and potentially reverse COPD and emphysema. We hope participants in MESA COPD will once again volunteer their time to be part of this important work. Thank you!



**Visit the MESA Participant Website:**  
<http://www.mesa-nhlbi.org/ParticipantWebsite>

**Check out our updated Field Center pages!**  
**Find lots more MESA News and Discoveries!**

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