# The MESA Messenger

Newsletter of the Multi-Ethnic Study of Atherosclerosis

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## Ancillary Studies in MESA

• Diane Bild, MD, MPH MESA Project Officer

From the start of your enrollment in MESA, you have been invited to participate in "ancillary studies." Ancillary studies are ones that are added on to the main MESA study for more focused research in a specific area.

While MESA is collecting a large amount of data on cardiovascular risk factors and subclinical cardiovascular disease, the ancillary studies dig deeper and greatly enrich the overall study. Examples of MESA ancillary studies include:

- MESA Air Pollution – a study of the relationship between exposure to different types of air pollution and cardiovascular disease
- MESA Family – a study of genetics in MESA, which has also enrolled brothers and sisters of many of the original MESA cohort members
- MESA Lung – a study of asthma, emphysema, and other chronic obstructive pulmonary disease (COPD) which is the 3rd leading cause of death in the United States
- Neighborhoods and CVD – a study of how characteristics of neighborhoods, including safety, access to high quality food, and other social conditions, relate to cardiovascular disease risk factors and conditions.

Along with these large ancillary studies, there are dozens of smaller studies that are examining blood samples, CT scans, blood flow to the heart muscle, genetics, sex hormones, carotid artery disease detected by ultrasound, coronary artery wall thickness detected by MRI, fat deposits in different regions of the body, kidney function, diabetes, and other areas.

The MESA investigators and the NHLBI are extremely pleased that these studies have expanded the research value of MESA. They have allowed many different research areas to be studied at the same time – a great use of taxpayer dollars.

The results have been outstanding: MESA has now published over 300 scientific articles, about half of which have resulted from these ancillary studies.

In the Exam 5, you will again be asked if you will participate in ancillary studies, which will again include measures of lung function, air pollution, MRI of the heart, and other measures. The value of these ancillary studies is enormous, so I hope you will consider participating.

Diane Bild, MD, MPH MESA Project Officer

## Air Pollution and Heart Disease – Why are we interested and why is MESA important?

By Joel Kaufman, MD, MPH

MESA participants know that we've been paying a lot of attention to understanding their exposure to air pollution. That's because a number of studies have recently pointed to an important relationship between air pollutants and the development of heart disease---especially atherosclerosis (A condition in which fatty material collects along the walls of arteries), which is being studied carefully in MESA.

A recent study from Southern California highlights the reason for this interest. The researchers put together information from five small studies in which volunteers had repeated measurements of the common carotid artery wall thickness (IMT). This is the same measurement we collect from you in MESA, when we take ultrasound images of the arteries in your neck. They then compared the change in artery wall thickness over time with estimates of air pollution where the people lived. The research was published in an online journal called PLoS One ("Ambient Air Pollution and the Progression of Atherosclerosis in Adults"; Künzli et al. 2010; 5(2):e9096.doi:10.1371). These researchers found a relationship between the estimated air pollution exposure and the amount that the artery wall thickened over time. That is, the arteries of people who lived in more polluted areas got thicker faster than those living in cleaner areas. This suggests that air pollution might contribute to the acceleration of the artery problems (atherosclerosis) that cause most heart attacks and strokes. In other words, this research hints that the more pollution that is in the air you breathe, the greater your risk of a heart attack or stroke. The MESA Air Pollution Study is looking at the same kinds of things, but the information we are collecting in "MESA Air" – including in Exam 5 – will give us a much better picture of the effects of air pollution.

In the study just published, the volunteers were not as representative of the general population as MESA participants are, and were only followed for about 2 years. Also, the estimates of air pollution exposure were not nearly as sophisticated as the measurements in MESA Air.

In the MESA Air study, we are interested in the development of heart disease, just like the previous research group. But thanks to the time and cooperation of MESA participants, we are setting a new standard for research on the effects of the environment on health. After Exam 5, we will be able to assess the impacts of air pollution in the diverse setting of MESA, with participants from six states, several races and ethnic groups, and an unprecedented set of information on both health and environmental exposure. Also, MESA Air collected air pollution measurements at the homes of more than 700 participants all across the study cities. We also collected thousands of additional samples throughout your communities, and some of you even wore air monitors in backpacks for several weeks! All of this work should allow us to come up with the best possible understanding of the quality of the air you breathe.

Your participation in MESA and in MESA Air makes it possible for us to understand how the environment might influence heart disease, even if you never develop heart disease. When you come back for Exam 5, it will help us to know more than ever before about what levels of air pollution are safe, and what levels are too high.

# Greetings From Johns Hopkins University

MESA clinic visits for exam 5, started in April and are in full swing. The team has grown with the addition of nine members in both the Clinic and the Field Center, including a new manager Dr. Imene Benayache. As participants in this study, you have a critical role in making MESA a success, advancing research in cardiovascular diseases and prevention. We will be on this journey together with exam 5 continuing until November 2011, but of course we'll stay in touch for follow-ups at least once a year until 2015 or longer.

We have made some changes to make participation in the MESA study as convenient as possible for you. All visits and procedures are now completed at Johns Hopkins Hospital. We will provide transportation if needed, or parking, and there is a reimbursement for your time spent performing this exam.

Dr.Wendy Post remains the Principal Investigator for Johns Hopkins MESA, a position she held since 2008. Dr. Wendy Post had previously been the Principal Investigator for the MESA Family Study which was completed in conjunction with the MESA Study. Many of you participated in MESA Family along with your brothers, sisters, and even some parents. She is an accomplished cardiologist and associate professor at Johns Hopkins University and is very involved with the MESA team.

We started two new ancillary studies "MESA SLEEP", which includes home sleep studies, with Dr. Naresh Punjabi as the Principal Investigator and "MESA STRESS" with Dr. Sherita Golden as the Principal Investigator.

Whether you choose to participate only in exam 5 or in the ancillary studies as well, your involvement is much appreciated. In addition, you are helping yourself and future generations.

As Albert Pike (attorney, soldier, and writer) once stated:

"What we have done for ourselves alone dies with us; what we have done for others and the world remains and is immortal."

Thank you and we look forward to seeing you very soon. Please contact us with any questions.

MESA Field Center
925 Fell Street, Second floor
Baltimore, MD 21231

Phone: 410-614-2488
Fax: 410-614-2502
Email: mesa@jhmi.edu

# MESA - Eye Examination

ByTien Yin Wong, MD, PhD • Ronald Klein, MD, MPH • Barbara Klein, MD, MPH

At the MESA 2 examination, we had the opportunity to take a photograph of the back of your eyes (retina). For many years, scientists have been puzzled by the role of small blood vessels in the development of stroke and heart attack. Part of the problem is that it is difficult to evaluate these tiny blood vessels in the brain and heart. In the eyes the situation is different. We have the ability to directly examine the tiny blood vessels and measure changes occurring in them by taking a retinal photograph. Over the past few years, we have measured changes in the small blood vessels in the retina (Figure 1 shows a normal retina and Figure 2 shows one with narrowed arteries, and red and yellow spots due to leaky blood vessels). We have analyzed how these changes may be associated with heart disease, diabetes and high blood pressure. We have found, for example, that narrowed retinal arteries are related to higher blood pressure and stiffening of the large arteries arising from the heart.

In contrast, we have reported that people with diabetes are more likely to have dilated retinal veins. Furthermore, we have linked leaky eye blood vessels with higher calcium levels in the heart. Finally, we have also reported on the relationship of heart disease with another eye condition, age-related macular degeneration or AMD, which is a common cause of vision loss in America.

These investigations provide further clues to the early changes that may occur in heart disease, and the link between disease of the small blood vessels (eye) and larger arteries (heart). The MESA-Eye team is now investigating how eye changes may provide information on future risk of heart disease, stroke and other conditions.

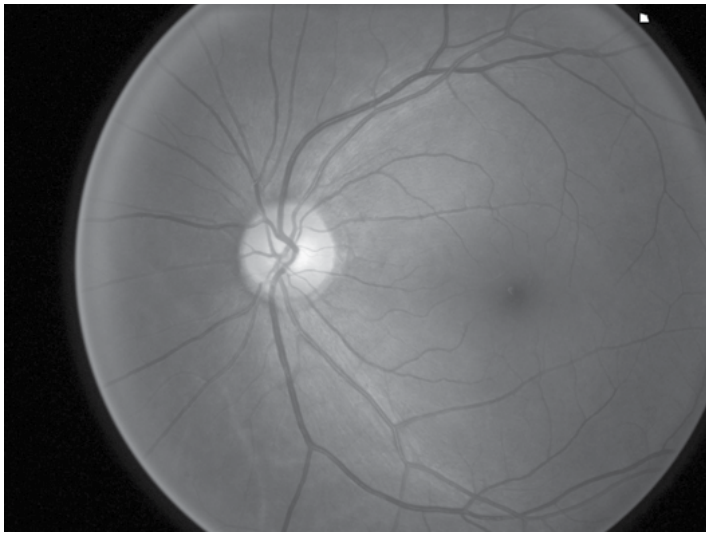

Figure 1. Normal Retinal Photograph

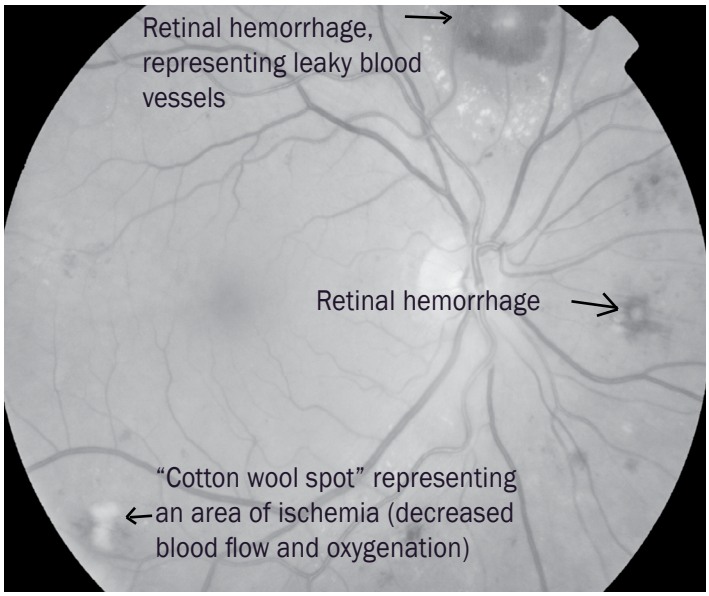


Figure 2. Abnormal Retinal Photograph.

# MESA Elasticity Study

By David Jacobs, MD • Daniel Duprez, PhD

High blood pressure is a critical risk factor for heart attack, stroke, kidney disease and vascular disease. Blood pressure changes from moment to moment during each heart beat as the heart pumps the blood out into the arteries and the heart relaxes to be refilled. However, to decide to prescribe blood pressure lowering pills, physicians use only systolic blood pressure (the highest number) and diastolic blood pressure (the lowest number). Knowing the numbers between the systolic and diastolic blood pressures could make better diagnoses of risk.

In the MESA Elasticity ancillary study, we register the pulse at the artery of the wrist. We are getting 250 blood pressure numbers during each heart beat. This information will allow us to go beyond systolic and diastolic blood pressures. Specifically, we estimate the stiffness of the arteries. By participating in MESA Elasticity you contribute enormously to understanding blood pressure, aging of blood vessels, and effects on heart, brain, and kidneys.

*Wake Forest:*
*Catherine Nunn, RN – (336) -716-6650*

*Columbia:*
*Cecilia Castro – (212) 305-9932*

*Johns Hopkins:*
*Imene Benayache*
*(410) 614-2488*

*UCLA:*
*Anthony Sosa or Sameh Tadros*
*(626) 979-4920*

*Minnesota:*
*Christine Dwight – (612) 625-8560*

*Northwestern:*
*Grace Ho – (312) 503-3298*

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