

The MESA Messenger

Newsletter of the Multi-Ethnic
Study of Atherosclerosis

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Is Stress Bad for Your Heart?

By Ana V. Diez-Roux, MD, PhD, University of Michigan

The main objective of MESA is to understand how and why people develop early atherosclerosis, so that we can develop better ways to prevent cardiovascular disease (CVD). Several of the risk factors for CVD are familiar: smoking, a high fat diet, high blood pressure, being overweight, and lack of exercise. But what about *stress*? We've all heard stories of people who have had heart attacks after experiencing a strong emotion or because they lead very stressful lives. Are these stories true? Can stress really cause CVD? Scientists are still debating and researching these questions, and MESA is looking for answers, too.

There are many ways in which stress might be related to heart disease. It could contribute to the development of subclinical atherosclerosis; somehow trigger a heart attack or a stroke in a person who already has a certain amount of atherosclerosis; or make people more likely to smoke, not exercise, and not eat a healthy diet.

Stress also causes the body to produce certain types of hormones that help us deal with life's normal stresses. But if the hormone levels stay elevated over very long periods, they could have unhealthy effects on, for example, blood pressure or the way in which fat is handled and stored in the body.

Your blood pressure, weight, or even the amount of calcium in your arteries is relatively easily and precisely measured. But stress is much harder to measure, which makes it difficult to study. The only way we can learn about how, why, and when you experience stress is to ask you questions—lots of questions!—about your life,

job, relationships, feelings, worries, burdens, and support. We ask these types of questions on the Health and Life form, which you have filled out at every clinic visit. By combining your responses to the many questions on this form, we get a more accurate measure of your stress levels than if we simply ask, "How stressed do you feel?" A better measurement makes us much more confident of results that show a link between stress and CVD.

At two MESA sites (New York and Los Angeles) we are also doing a more in-depth study of stress. Some of you may have been invited to participate in this study, called MESA Stress. In this study we ask participants to collect samples of saliva and urine, in order to measure stress hormone levels. As MESA Stress participants know, this process is very labor intensive. Because levels of stress hormones change over the day, we must measure them at specified times each day for several days. MESA Stress participants also fill out several diary-type questionnaires, to tell us how they feel each day they collect the samples. We also perform additional tests of their blood samples, to find out if stress hormones relate, for example, to levels of inflammation or to how well the blood coagulates.

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MESA logo here

If stress does turn out to be an important factor in CVD, reducing stress or helping people cope with stressful experiences may be an important way to prevent disease. This is why we think it's so important to study stress in MESA. Thank you once again for your patience and

dedication in filling out our many questionnaires! And thanks also to our MESA Stress participants for all the care and time you put into the study. We hope to be able to share some of our results with all of you soon. ❤️

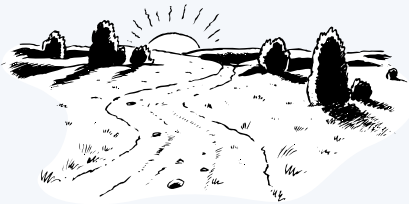
What's on the Horizon for MESA?

By Diane Bild, MD, MPH, MESA Project Officer

Many of you have asked about the future of MESA. An excellent question! Although we originally designed MESA as a 10-year study that would end after Exam 4, there are good reasons to believe that MESA will continue its important research for several more years. We won't know for a few months if MESA will be continuing; but, in the meantime, we can at least answer a few questions you might have:

Why would an extension of MESA be valuable?

The conditions MESA studies—changes in subclinical cardiovascular disease and the development of clinical disease, particularly heart attacks and strokes—take many years to develop. Important changes have occurred in the MESA participant population in just the past few years of observation, and we believe that still more important changes will occur in the future and will be valuable to measure.



Why is there any doubt about the future of MESA?

MESA is funded by US tax dollars administered by the National Institutes of Health (NIH), and the federal budget has many competing priorities.

What can participants expect in the future, if MESA continues? We would continue contacting you—this would be the most important next step—to obtain information about your health status. We would also ask you to participate in another examination in 3–4 years, to obtain additional measurements related to health and cardiovascular disease.

Regardless of the future, your participation in MESA has been and continues to be invaluable. As of this writing (early June), MESA investigators have published 40 papers in scientific journals and given 47 presentations at scientific meetings. Many more publications are in the works—ask about them at your field center the next time you visit! ❤️

Tagged MRI: A Look at How Individual Areas of Your Heart Are Functioning

By João A. Lima, MD, Johns Hopkins University

Most of you have had magnetic resonance imaging (MRI) of the heart. MRI shows us a great deal of information about the structure and function of the heart. We also use MRI to measure how much blood your heart pumps out of the *left ventricle* with each contraction (heartbeat) and to evaluate the presence and severity of atherosclerosis in the heart's arteries.

During standard MESA MRI, a radiologist watches an image

The left ventricle is the chamber of the heart that pumps oxygen-rich blood into the aorta, where it begins its journey through the body.

of your beating heart on a computer screen, to evaluate its movement and function. As amazing as this is, it shows only the "big picture" of how your heart is functioning. So, in addition to standard MRI, about a quarter of you had what is called *tagged MRI*.

During tagged MRI, the image of your heart is divided into grid-like sections. As the heart muscle contracts, the radiologist can evaluate your *regional cardiac function*—that is, the movement and function of each individual section of the gridded heart.

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News & Information:

The Johns Hopkins University Field Center

Air Sampling in the Johns Hopkins Neighborhood

By the Staff at the Johns Hopkins Field Center

Thanks to your ongoing participation in MESA, the study continues to collect extremely valuable health information. The information you provide allows researchers to learn about the possible causes of diseases and how best to prevent and treat them. Although the primary focus of MESA is on heart disease, the study investigators are interested in other aspects of health, as well. The information you have provided so far has given researchers a golden opportunity to examine possible

causes of a wide variety of diseases, from diabetes to kidney disease to osteoporosis and broken bones. This is one reason why it is important that we continue to collect information about more than just cardiovascular disease. We don't know where the next discovery will come from, or what it will be. But we do know that your contribution to the MESA Study makes these discoveries possible. Thank you. ❤️

Your Privacy and MESA

By Norma Dermohd, Data Management Director, MESA Coordinating Center, Seattle

When you come in for your MESA visit, we collect a lot of important and valuable information about your health, and we ask your permission to review your medical records. We also call you between visits, to gather information about any hospitalizations or changes in your health since your last clinic visit. All of this information is sent to the Coordinating Center, in Seattle, and stored in a large database.

One of our highest priorities is protecting your privacy. But what does that mean? Here are some of the steps we take to ensure your information is safely transmitted, stored, and used.

- 🌀 **Require Strict Oversight:** A group made up of scientists and non-scientists must approve all study plans, to ensure that the rights and welfare of study participants are protected.
- 🌀 **Protect Charts:** We keep your data forms in locked file cabinets and/or locked rooms.
- 🌀 **Remove Identifiers:** Sometimes we need to review your medical records, to determine if you have had,

say, a heart attack or other condition. Before these documents leave your clinic, we black out everything that could personally identify you. This includes your name, address, phone number, social security number, birth date, and birth place.

- 🌀 **Encrypt Data:** Before your data is sent to the Coordinating Center, via the Internet, it is encrypted. This is a way of scrambling the numbers and letters so that they look like nonsense. Only the Coordinating Center has the decoding key to unscramble the data. So, even if somebody could intercept the transmission, they could not read the information.
- 🌀 **Use De-identified Data:** We provide combined data from all MESA participants to MESA investigators (and, later, to other scientists) so they can analyze it and learn from it. But before we do this, we "de-identify" the data. This means that, in addition to not including personal information, unique data values, such as an extremely low or high weight or date of

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birth, are adjusted to ensure they cannot be associated with any individual. We never give investigators any personal information that could identify you.

🌀 **Certificate of Confidentiality:** Because medical research is so important to our country, Congress has passed a law that protects information about re-

search volunteers. It says that we cannot release any information about you to any person or agency without your permission, even if the courts demand it.

At all times, MESA personnel at every center are aware of your valuable contributions to the study and of their special responsibility to protect your privacy. ❤️

JHU Staff Bio: Ann Martz



Ann Martz,
MESA Air Technician

I've worked for Johns Hopkins since 1992, first as a secretary, then, for the last eight years, as a researcher. I've collected events data and clinic data for two studies involving older people and for an ancillary study of dementia.

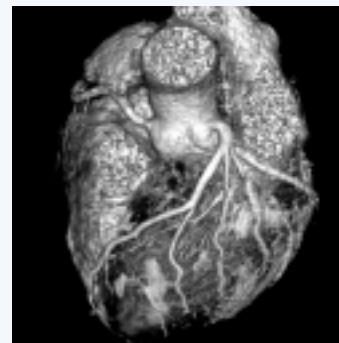
I enjoy decorating my home, gardening, hiking, biking,

golfing, billiards, and playing poker with my friends. Being a transplant from the Midwest, I really enjoy the mountains and water around Baltimore—it's a great place! And having a bachelor's degree in oil painting, I'm looking forward to painting the wonderful landscapes around the area! ❤️

Coronary Artery MRI

Some participants at the Johns Hopkins Field Center are having a coronary artery MRI (magnetic resonance imaging) during Exam 4. This type of MRI takes pictures of the blood vessels that supply the heart with blood, oxygen, and nutrients. We're doing this MRI to measure

the coronary arteries and to determine if there is a relationship between the coronary arteries and other cardiac risk factors such as cholesterol or high blood pressure.



The heart and its blood vessels, as "seen" by the coronary artery MRI.

With coronary artery MRI, MESA researchers get a lot of great information *and some fantastic pictures, too!* ❤️

FIRECRACKER SHRIMP

This shrimp is spicy and vibrantly flavored with a fiery almond pesto made from cilantro, jalapeños, and scallions. It's a quick flash in the pan before you're ready to enjoy this delicious dish. Try serving it with steamed basmati rice.

1/3 cup sliced or whole almonds
2 jalapeño peppers, seeded and halved
1 bunch cilantro, stems removed
6 scallions, cut into 2-inch lengths
3 cloves garlic
2 tsp cumin
1/8 cup olive oil
1/4 cup water
2 lb medium to large shrimp, peeled and deveined
1 tbsp olive oil
1/8 cup lemon juice
sea salt, to taste

1 small avocado, thinly sliced
6 sprigs fresh cilantro
6 cherry or grape tomatoes, halved

To prepare the firecracker spice mash, place the almonds, jalapeño peppers, cilantro, scallions, garlic, cumin, 1/8 cup olive oil, and water in a food processor or blender and blend for 1 minute, until a smooth paste is formed. Mix with the shrimp. Put the shrimp in a covered container and refrigerate for at least one hour.

Heat 1 tbsp olive oil over moderate heat in a large sauté pan. Sauté the shrimp, stirring continuously, for 4 minutes, until pink and opaque. Deglaze the pan with the lemon juice, and season the shrimp with the salt.

Garnish the shrimp with the sliced avocado, cilantro sprigs, and cherry tomato halves. Enjoy!

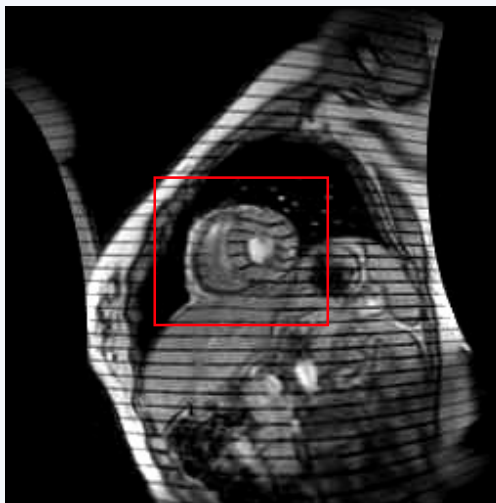
Nutrition Info: Per Serving: calories 320; calories from fat 160; calories from saturated fat 25; protein 33g; carbohydrate 8g; total fat 18g; saturated fat 2.5g; cholesterol 230 mg; sodium 240 mg.

From *The Whole Foods Market Cookbook*.

The information we obtain from the tagged images has provided us important insights about changes in regional cardiac function in different situations. We are also discovering associations between regional cardiac function and subclinical cardiovascular disease.

For example, many people with high blood pressure develop an abnormal thickening of the muscle of the left ventricle; and, in some of them, the shape of the ventricle changes.

Tagged MRI showed that, in these people, regional myocardial function was decreased in the left ventricle; it also showed that men and women had different degrees of decrease in regional cardiac function.



Tagged MRI of the heart (inside the box)

These findings are interesting, but we're still just learning about what they mean. We can say, for instance, that there is "an association" between changes in the left ventricle and decreased regional cardiac function; but we don't know how the two are related or if one causes the other. So our work continues!

In MESA, we learn about the causes of cardiovascular disease by observing changes that occur in the body over time. For this reason, it's so important to re-assess regional

cardiac function by doing a follow-up tagged MRI. If you've had a tagged MRI, help us continue to explore the causes of cardiovascular disease by agreeing to have another. Thanks! ❤️

MESA Researchers Learning about Cardiovascular Diseases ~ and More

By Aaron Folsom, MD

Over the past few years, you have graciously allowed MESA staff to examine, question, and scan you many times and in many ways. We've collected a huge amount of information about you and your fellow participants. We do this because MESA researchers want to see how all of that information relates to how, when, and why people develop (or don't develop) cardiovascular diseases. Our ultimate goal is to learn as much as we can about what factors might cause cardiovascular diseases and what strategies might help prevent them.

MESA staffers also call you periodically to find out if you've been hospitalized or diagnosed with a new cardiovascular condition since the last follow-up call. If you have, we request written permission from you to look at your medical records, to verify the new diagnosis or the reason you were hospitalized.

It probably wouldn't surprise you if we asked for permission to look at the records for, say, that time last month when you were hospitalized for chest pain. But it probably would surprise you to know that we're interested in other hospital stays as well. Why? Two reasons:

- ④ In the hospital records of, say, your hip surgery, doctors might have recorded information that could be valuable to MESA researchers. For instance, a cardiovascular test might have been done prior to your surgery, and we would definitely want to know the results.
- ④ MESA researchers may someday be able to use the information they've collected to study the causes of cancer, fractures, dementia, kidney disease, and other chronic conditions. MESA was designed to collect information about atherosclerosis and cardiovascular diseases, but that same information might also help us contribute to the study of other serious conditions.

If we request your permission to look at your medical records, please do feel free to ask us why we need them; we'll be happy to answer your questions any time. If you're satisfied that our request is reasonable, please help us out by returning the permission forms as quickly as you can. Thank you! ❤️

Your MESA Blood Samples: The Gifts That Keep on Giving

By Mary Cushman, MD, MSc, University of Vermont

Have you ever wondered what we do with all that blood we collect from you at your MESA clinic visits? Well, here's the answer, just in case the question's been keeping you awake at night:

First, a small sample of your blood is sent to a MESA laboratory in Minneapolis, Minnesota. There we check it for risk factors, such as high cholesterol and elevated blood sugar, that we know are related to cardiovascular diseases, and we send you the results. Although these tests are pretty "run of the mill"—the type you might have done at your doctor's office—they tell us a lot about the chances of different people developing different types of cardiovascular diseases.

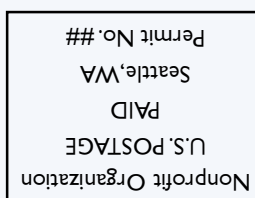
Meanwhile, somewhere in Vermont (at the University of Vermont, in Burlington, to be exact), the rest of your blood sample is in storage. It waits there until MESA scientists are ready to use it for some not-so-standard research tests—we've done over 40 of them, so far—that help us learn about cardiovascular disease. Some of the tests are done on blood from all participants, and others are done on blood from specific smaller groups of participants. These research tests help us understand why and how subclinical (without symptoms) disease gets

worse over time and why and how it becomes a real problem for some people.

For example, we are very interested in tests that give us information about inflammation in the body (see last summer's *MESA Messenger* for the story about C-reactive protein, or CRP). We are also using blood samples to learn about the body's blood clotting system, infections that have no symptoms, and the health of the cells that line blood vessels. And, when we compare the results of research blood tests to findings of other MESA tests and questionnaires, we learn even more, such as how your diet affects inflammation, and how inflammation relates to calcium in your heart's arteries. It's amazing what we are learning from a few drops of blood!

At this time, MESA researchers are working on dozens of scientific papers based on information from your blood samples. And, thanks to your continuing participation in the clinic visits and follow-up telephone calls, there will be many more! Even though you have been active in the study for several years, we feel like we are just beginning to discover the most important things that the MESA study will teach us. Thanks! ❤️

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