

# STRONG HEART STUDY

INVESTIGATING CARDIOVASCULAR DISEASE  
IN AMERICAN INDIANS

## newsletter

[strongheart.ouhsc.edu](http://strongheart.ouhsc.edu)

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### Strong Heart Study Brochures

The Strong Heart Study (SHS) investigators are committed to giving back the information that has been learned to the participants, the community, the medical providers and the scientific community. This is done in a variety of ways:

**Referrals** – participants who came through the study were given the results of the tests that they participated in. If the participant wanted the results to be shared with their medical provider, the SHS staff sent them to the doctor and facility requested. Sometimes, the results were already known to the participants and their providers but other tests which are not commonly done were made available. This information contributed to the patient's knowledge of their health and their baseline health data.

**Report to Tribal health committees and medical staff** – The information that has been gathered is used to answer questions by many different medical investigators. The SHS data cannot be connected to any one person. Instead it is the overall results of all the data. The data sets can be sorted by certain age groups, genders, locations, or medical conditions but never by name. The data can be used by Tribal communities or medical providers to address specific public health concerns facing communities. It can be compared to similar communities in other areas to see if health outcomes are comparable.

**Publications in peer reviewed journals**- Scientists have an obligation to be certain that the data that they are working with are given back to the community. This includes both the community they are gathering the data in and the scientific community. Why is it important that they publish in peer reviewed journals? Just like small communities everywhere, scientists work within a community of other individuals who are doing similar work. When new information is



learned, it is sent to journals that are reviewed by editors and then published. Through this process, other scientists all over the world can learn from the information and do similar studies to see if they get the same result. This process, known as scientific rigor, makes sure data are accurate.

**Data publications** – You may already have seen some new information from the SHS in the public waiting rooms, nutrition centers or schools in your area. The SHS investigators publish the results of the study in a variety of ways. This includes a data book that was distributed to the Tribal and Indian Health providers, Tribal health committees, area colleges, schools and libraries. Posters on specific topics have been developed to address some of the issues that the investigators have researched. Most recently, the investigators have developed 8 brochures on topics of critical interest to improving health. These include brochures about **genetics, metabolic syndrome, high blood pressure, physical activity, diet, diabetes and cardiovascular disease, and kidney disease**. These brochures explain what has been learned through the SHS research and ways to improve health based on these findings.

The SHS investigators are proud to work with the data that were created by the SHS participants. Through the amazing commitment of the SHS participants, data are available that can and will make a difference in the health of this and future generations.

## Progress Report on the Strong Heart Stroke Study

The Strong Heart Study discovered that strokes are more common among American Indians than in the general U.S. population. This discovery led to a new study called the Strong Heart Stroke Study (SHSS). The new study is currently in progress in our field centers in Arizona, Oklahoma, and South Dakota. Strokes occur when the blood supply is reduced or cut off to part of the brain. Strokes may cause death or disability. Common symptoms of stroke include slurred speech, confusion, loss of memory, and paralysis of one side of the body. Strokes can cause damage to large parts of the brain or to very small areas of brain tissue. Small strokes are often called silent or mini strokes because the person may not be aware that a small stroke has occurred. Even when a stroke is undetected, mental and physical functioning may be harmed, and small strokes may lead to bigger strokes later on.

The goal of the SHSS is to learn more about these smaller, silent strokes in our American Indian communities. The Strong Heart Study made great progress in helping us understand heart-related diseases. The SHSS builds on this knowledge by studying the brain. That is why the SHSS is including participants who are in the Strong Heart Study. The SHSS will study several topics: how to measure the damage caused by a stroke, in order to help people who have already had a stroke; how strokes affect mental and physical functioning; and how to predict strokes. The SHSS will also learn more about silent strokes that have not been detected. This includes learning how silent strokes may lead to future strokes, and how silent strokes affect mental and physical functioning. The SHSS hopes to be able use this new knowledge to develop programs that can prevent strokes and can give people better treatment when a stroke occurs. The overall goal of the SHSS is to learn how to improve the quality of life for American Indian elders.

The SHSS plans to enroll 1000 participants who were in the original Strong Heart Study. It is very important to build on the knowledge gained from the Strong Heart Study. For this reason, the SHSS will include only Strong Heart Study participants who had their first exam between 1989 and 1992. The SHSS study examination includes magnetic resonance im-

aging (MRI) of the brain, physical functioning, blood pressure, electrocardiogram (ECG), blood tests, brain functioning (for example, memory), and a test for depression. The MRI is a safe and painless way to get an image of the brain without using radiation. Participants have the MRI at a medical center with the SHSS staff. The examination takes about 3 to 4 hours (plus travel time) and it can be completed in 1 or 2 sessions. To pay for time and travel, each participant will receive \$200 for completing the SHSS examination.

Each of the 3 field sites in Arizona, Oklahoma, and South Dakota will enroll 333 participants. As of mid-September 2011, the SHSS has enrolled 495 participants (almost half the number needed). We are ahead of our schedule for this 5-year study, and we are very pleased with this effort. If you feel you are eligible for the study, please contact our study staff. We will ask questions to make sure you are eligible, because certain medical conditions might prevent you from participating in the SHSS.

### To volunteer for the stroke study, please contact the study staff at:

#### **Oklahoma:**

Oklahoma Strong Heart Stroke Study  
Lawton Indian Hospital  
1515 N.E. Lawrie Tatum Road  
Lawton, OK 73507  
Phone: (580) 248-7715 or (888) 231-4671 ext. 46725  
Please leave your name and phone number on the answering machine if a staff member is unavailable.

#### **Arizona**

Arizona Strong Heart Stroke Study  
MedStar Research Institute  
1616 East Indian School Road  
Suite #250  
Phoenix, AZ 85016  
Phone: (602) 277-0488

#### **Dakotas:**

Dakota Strong Heart Stroke Study  
Missouri Breaks  
HCR 64 Box 52  
Timber Lake, SD 57656  
Phone: (605) 964-3418  
Eagle Butte: (605) 964-1260

## Lifestyle and Diabetes Development

Diabetes is common in American Indian communities. In order to prevent diabetes, researchers are studying what causes diabetes in Indian country. Does eating healthy foods, getting plenty of physical activity, and maintaining a healthy weight lower your risk of developing diabetes?

At the first Strong Heart Family Study clinic visit in 2001-2003, participants were weighed and asked questions about what kinds of food they eat. Participants were also given a pedometer and asked to write down the number of steps they walk each day. Then, at the 2007-2009 clinic visit, participants were tested for diabetes.

There were 208 participants diagnosed with diabetes. Participants who developed diabetes walked less,

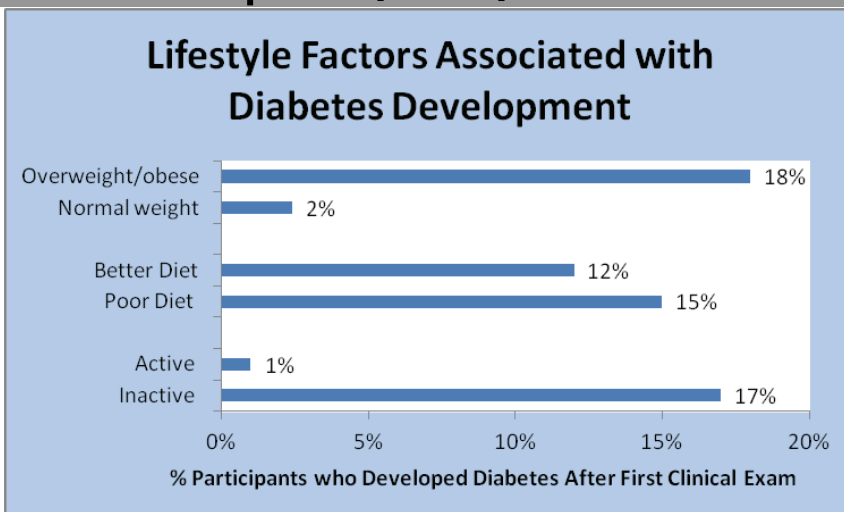


## Lifestyle and Diabetes Development (cont'd)

ate more unhealthy foods, and were more likely to be overweight/obese. Participants who took at least 3,500 steps per day had a 33% lower risk of diabetes compared to participants who were less active. Participants who ate less than 2 servings of processed meat per week or ate at least 4 servings of nuts, peanut butter or beans, had a 15% lower risk of diabetes compared to participants with less healthy diets. Additionally, participants with a healthy weight had a 75% lower risk of developing diabetes when compared to participants who were overweight/obese.

This study shows that being physically active, eating healthy foods, and maintaining a healthy weight may prevent diabetes.

Community-based efforts to increase physical activity and promote healthy eating are needed.



## Newly Funded Sub-studies of SHS

Since the Strong Heart Study (SHS) has collected the largest amount of health-related information on American Indians, testing new ideas using SHS data will very likely be of future benefit to the communities. When a test of any new research idea is proposed by other investigators seeking to use SHS data and resources, the SHS investigators carefully review it to make sure that the new research is focused on cardiovascular disease, diabetes, or lung disease or their risk factors, that the study has an excellent chance of benefiting the communities, and that it will be done strictly in accordance with the consent provided by the study participants. If the SHS investigators approve a proposal as being scientifically sound and worthwhile, the request must then be reviewed and approved by the tribes and the institutional review boards before the research is conducted. The following two articles are on the newly funded sub-studies of SHS that are on the new areas of research that promise to help improve our understanding of the risk factors for cardiovascular disease.

### Sex Hormones and Diabetes, Stroke and Heart Attack

It has been predicted that heart attacks and strokes, together, will continue to be the #1 killers in the U.S. for the next 100 years. Type 2 diabetes and obesity are common conditions that frequently lead to heart attacks and strokes and have reached epidemic proportions, even among younger adults and especially in American Indians. Understanding why and how some people, young or old, have heart attacks and strokes, while others do not, is crucial to preventing heart attacks and strokes from continuing to affect and kill millions of people.

Men are at especially high risk for heart attacks and strokes: men experience a 3-fold higher risk compared to women, and men tend to die 5-10 years earlier from heart attacks and strokes than do women. The standard explanation for these differences between men and women is that women have more estrogens (the 'female' hormones) than men for much of their life. Estrogens in women have been thought to give some protection against heart attacks and strokes, at least until women reach menopause around age 50 years, the time that their estrogen amounts decrease dramatically. But this long-held belief is likely too simple an explanation.

Men have not only androgens (the 'male' hormones, like testosterone) but also, in smaller amounts, estrogens (the 'female' hormones). Likewise, women have not only estrogens, but also in smaller amounts, androgens. These sex hormones (estrogens and androgens) help to keep in balance the body's fat, muscle, and sugar metabolism, as well as control blood pressure, cholesterol levels and prevent cholesterol blockage in the blood vessels in the heart and brain. When these factors are not well controlled, type 2 diabetes, heart attacks and strokes can occur. Previous studies suggest that women with higher amounts of androgens (the 'male' hormones), primarily testosterone, have a higher chance of type 2 diabetes and heart attacks. Also, previous studies suggest that the amounts of estrogen (the 'female' hormones) in men influence their chances of getting type 2 diabetes, heart attacks and strokes.

In this NIH funded study, we are interested in knowing why the risks of type 2 diabetes, heart attacks and strokes are different between men and women and ask the question: Could it be due to differences in estrogens



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**Strong Heart Study**

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## **Sex Hormones and Diabetes, Stroke and Heart Attack (cont'd)**

and androgens during men and women's lifetime? We will determine if levels of estrogens and androgens, and their changes in levels over different parts of one's lifetime (youth, mid-age, and older), contribute to the chances of type 2 diabetes, heart attacks, and strokes, in men and women, young and old, who participate in the Strong Heart Study and Strong Heart Family Study. We aim to find out whether the 'male' hormones (androgens) in women and the 'female' hormones (estrogens) in men are related to the development of type 2 diabetes, heart problems, and obesity, leading to heart attacks and strokes. In the long run, this study will help providers understand which levels of estrogens and androgens are harmful. This knowledge will help us determine hormone treatments that will improve a person's chance of avoiding type 2 diabetes, a heart attack or a stroke.

## **Telomere Length and Diabetes in American Indians**

We know that DNA is the genetic material we inherit from our parents. *DNA* is tightly packaged *into chromosomes*. At the ends of chromosomes are telomeres, which are protective caps that are similar to the plastic caps at the ends of a shoelace. As the plastic ends shred, and the shoelace becomes damaged, so too the shortening of our telomeres can leave our cells vulnerable to damage.

Telomeres shorten during each cycle of cell division, and when they become too short after a number of cell divisions, the cell dies. Therefore, telomeres are considered an index of cell aging and are like a clock of the cell's lifespan. **The 2009 Nobel Prize in Medicine was awarded to researchers who studied telomeres.**

Recent study shows that people with shorter cell telomeres die earlier than people with longer telomeres. Shorter telomeres are also associated with many human diseases, such as cardiovascular disease, diabetes, cancer, osteoporosis, arthritis and Alzheimer's disease. On the flip-side, longer telomeres are related to healthy aging and longevity. Therefore, telomere length can be used as a marker of lifespan or longevity.

Different people have different telomere length, and this is thought to be inherited from their parents. However, there is hope for people with shorter telomeres. Recent research suggests that we can lengthen our telomeres through regular exercising, stopping smoking and eating a healthy diet. So it appears that there are many things we can do to protect our own telomeres and thus improve our health status.

It is important to remember that if you have short telomere length, this is not a diagnosis. This is just a risk factor for your chance to get diseases, similar to learning that your cholesterol is higher than average, which increases your risk for heart disease. The good news is that telomere length can change in response to one's lifestyle. Therefore, finding factors that would influence telomere length will provide useful information for intervention or prevention of human diseases. The major goal of this NIH-funded study is to identify genetic and lifestyle factors that are associated with telomeres in the strong heart family study so that there will be information about telomeres in American Indians to guide health care providers.

