



BE PART OF THE ANSWER

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Genetic Studies May Enhance Health Care

WHEN YOU JOINED the Women's Health Initiative many years ago, you may recall providing blood samples at your clinical center visits. By the end of the original phase of the study, over 3 million blood samples had been collected and stored in freezers! Those specimens are adding to our knowledge



about women's health and disease in many important new ways. One of the most significant ways may come from using those stored blood samples as part of a **Genome**

Wide Association Study, or "GWAS" for short. A GWAS is a study that looks at the DNA of WHI participants by using the specimens of those who consented to having their blood used in genetic studies. These studies (which do not link your blood to your identity) may help scientists find out what genetic factors are associated with diseases such as diabetes, hypertension, heart disease, osteoporosis, cancer, and dementia.

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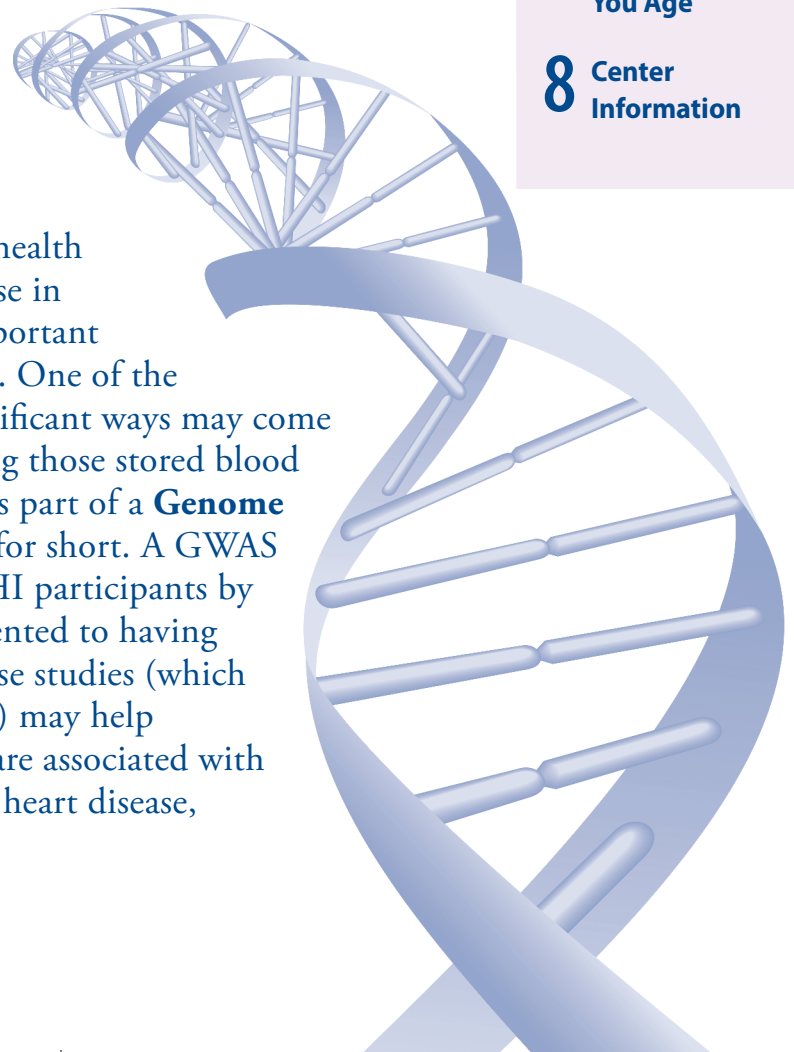
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GENETIC STUDIES MAY ENHANCE HEALTH CARE

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What is the purpose of a GWAS?

The WHI GWAS examines the genome, which is the individual's complete set of DNA, of women who have participated in WHI to see if there are genetic variations associated with a particular disease. To do this, the genomes of women with a particular disease are compared to similar women without the disease. If certain genetic variations are seen in participants with the disease compared to those without, the variations are said to be "associated" with the disease. The genetic variations themselves do not necessarily cause the disease, but may put individuals with the variant at increased risk. Other influences (diet, smoking, environment) may also be important factors that work along with genetic variations to influence risk. Once new genetic associations are identified, it may be possible to use the information to detect, treat, and prevent the disease. We hope to learn much more about this using the WHI blood samples.

Is each person's genome unique?

Humans come in many shapes and sizes, but we're all very similar at the genome level. In fact, the genomes of any two people are more than 99% the same. However, the tiny fraction of the genome that varies among humans is what makes each person unique, for example, in terms of characteristics such as eye, skin, and hair color. These types of variations also influence the risk for developing certain diseases. We hope to learn more on how these variations influence which women get certain diseases and which women do not.

Is everything determined by my DNA?

No, DNA is just one piece of the puzzle. When it comes to your health, lifestyle and environmental factors, such as the food you eat and pollutants in the air you breathe, may also play a role. Once we learn more about how genomes interact with these lifestyle and environmental factors to cause disease, we may be able to change our lifestyle habits or adapt our environment to lower our risk.

Since we get our DNA from our parents, risk of certain diseases and other characteristics run in families. For most common diseases, such as cancer, diabetes, and heart disease, researchers are finding that multiple genes—along with lifestyle and environmental factors—work together to determine the risk of these and other disorders.

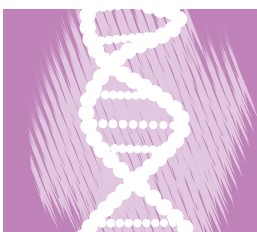


What will genome research mean for me?

Over time, genetic tests may become available to predict risk for developing many common health conditions. Based on the information contained in a person's genome, healthcare providers may be able to develop strategies that are more specific to you for detecting, treating, and preventing disease. For example, if a genetic profile shows that you are at increased risk for colon cancer, you might undergo more frequent colonoscopy screening or be asked to make certain dietary changes.

What types of studies are being done?

The WHI GWAS is contributing to this exciting new line of research by studying the genomes of thousands of women from WHI to better



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understand the link between genes and certain diseases. This research is in progress, and already includes health studies looking at genetic variations associated with:

- the health of African American and Hispanic women who joined WHI
- the health outcomes of women who were in the Hormone Therapy program
- risk of hip fractures
- risk of pancreatic and other less common cancers
- risk of colorectal cancer
- risk of strokes
- gene-environment interactions
- memory and memory decline

“The WHI GWAS is contributing to this exciting new line of research by studying the genomes of thousands of women from WHI to better understand the link between genes and certain diseases.”

As time goes on, many other associations will be tested, including those factors associated with healthy aspects of aging. The blood samples you provided early in the study, as well as the information you provided over the years and continue to provide annually through the mailed questionnaires, are helping scientists make major contributions to this growing area of research. We really appreciate all you've given and continue to give as an ongoing participant in the WHI!

Upcoming WHI Opportunities

WHI researchers are always thinking of new ways to increase knowledge and understanding of factors that influence women's health. Some of these ideas involve new add-on studies that will increase what we are already learning from the data being collected from WHI participants. As a WHI participant, you may be asked if you would be interested in joining one or more of these studies. Many of you have already joined some of these studies, which have covered topics including memory and macular degeneration (eye disease). Several other new studies are being developed that you may be invited to join, including one that involves collecting additional blood specimens and physical function data at an in-person visit that may be conducted in your home, and another that looks at use of Vitamin D supplements.

If you are ever invited to join a study related to WHI, we will ask for your consent to join. We certainly welcome your participation, as having many women helps make the results apply to a broader group of women. However, please be assured that you always have the right to say no if you do not wish to join these additional studies. Whether you join or not, it will have no impact on your current participation in the WHI. The contributions you are already making have had a huge impact and will continue to lead to additional answers about women's health!



Focus on Findings

AS OF THE SUMMER OF 2011, over 600 WHI papers have been published in scientific journals, with hundreds more presented at scientific meetings. Because of the importance of these findings, many of these results have been reported in the national media, including newspapers, magazines, and television and radio news programs. Here are brief summaries of just a few of the many recent findings published using the valuable data provided by WHI participants.

■ Placebo and Health Outcomes

(Medical Care, March 2011)

Taking your medicine as prescribed may suggest that you're more likely to engage in other healthy behaviors, since people who follow health recommendations in one area may be more likely to follow them in other areas. To see if this was the case in WHI, Jeffrey Curtis, MD, MPH, and other WHI scientists looked at the association between placebo adherence (taking study medications regularly) and the risk of various health outcomes in participants in the Hormone Therapy trials. A placebo is a blank pill used in studies as a comparison to the active drug being tested. They found that women in the placebo group who took their study pills on a regular basis had lower rates of hip fracture, heart attack, cancer death, and other causes of death. This finding may be because these women were more likely to follow other recommendations related to their health, helping to prevent these health outcomes. Additional analyses confirmed that this might be the case, in that women with low adherence to the placebo pills were also 20% more likely to have



low adherence to other medications (for example, osteoporosis medications) that had been prescribed by their physicians.

■ Smoking and Breast Cancer Risk

(British Medical Journal, March 2011)

Juhua Luo, PhD, and her colleagues recently looked at the association between active and passive smoking and risk of invasive breast cancer. They studied women enrolled in the WHI Observational Study, including 3520 women who developed invasive breast cancer in the 10 years after joining WHI. Compared with those who had never smoked, breast cancer risk was 9% higher for former smokers and 16% higher in current smokers. Significantly higher breast cancer risk was found in smokers who had both high daily rates and longer term duration of smoking, as well as with those who started smoking in the teenage years. The highest breast cancer risk was found in women who had smoked for ≥ 50 years compared with women who had never smoked or had any exposure to passive smoking (exposure to smoking of other people). For women who had ever smoked, an increased risk of breast cancer persisted for up to 20 years after quitting smoking. Among women who had never smoked, those with the most exposure to passive smoking (10+ years as a child, 20+ years as an adult at home, or 10+ years as an adult at work) had a 32% increased risk of breast cancer compared with those with no exposure to passive smoking.



■ Physical Activity and Breast Cancer Survival

(Cancer Prevention Research, April 2011)

Although studies have shown that physically active breast cancer survivors have lower mortality (death) rates, the impact of changing physical activity after diagnosis is not clear. To help understand this issue, Melinda Irwin, PhD, MPH, and her associates looked at physical activity levels before and after a breast cancer diagnosis, changes in physical activity levels before and after, and mortality (death) rates in 4643 WHI participants who were diagnosed with breast cancer. Physical activity from recreation and walking was collected when women first joined the study (before diagnosis) and again at the follow-up clinic visits (after diagnosis). Women who had higher rates of physical activity before diagnosis had lower death rates (from any cause) compared with inactive women. Women who had high rates of physical activity after diagnosis had lower breast cancer mortality, as well as lower mortality from other causes. Women who increased or maintained physical activity after their diagnosis had lower mortality from any cause, even if they were inactive before diagnosis. This study indicates that high levels of physical activity may improve survival in postmenopausal women with breast cancer, even among those reporting low physical activity prior to diagnosis. The authors suggest that women diagnosed with breast cancer should be encouraged to initiate and maintain a program of physical activity.

■ Smoking and Depression in Women

(Nicotine & Tobacco Research, April 2011)

Noting that very little research on smoking in older women has been done, Carole Holahan, PhD, and other WHI researchers looked at the relationship between smoking and depression in women in the WHI Observational Study. They found that women who were found to have depressive symptoms based on questionnaires completed when they joined the study were more likely to be smokers than non-smokers. In terms of later smoking behavior, they found that women who had symptoms of depression at the beginning were less likely to have quit smoking 1-year after joining the study or by the end of the study, compared to those who were not depressed. Aside from depression, they also noted that lighter smokers were twice as likely as heavier smokers to quit smoking. Additional research in this area may help lead to the development of better programs for helping women quit smoking.

■ Fish Consumption and Risk for Heart Failure

(Circulation: Heart Failure, May 2011)

In a newly published study on WHI Observational Study participants, Rashad Belin, PhD, and his colleagues looked at the association between fish intake and the risk for heart failure in postmenopausal women. Intakes of baked/broiled fish and fried fish were assessed using the WHI Food Frequency Questionnaire. The researchers found that a higher intake of baked/broiled fish was associated with a lower risk for heart failure, while a higher intake of fried fish was associated with an increased risk for heart failure. This research suggests that the way food is prepared may impact our health.



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FOCUS ON FINDINGS

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■ Arthritis Increases Fracture Risk

(Journal of Rheumatology, May 2011)

Nicole Wright, MPH, and other WHI scientists examined the relationship between arthritis and risk for bone fractures (breaks) by looking at 3 groups of women: those with no arthritis when they joined WHI, those with osteoarthritis, and those with rheumatoid arthritis. After nearly 8 years of follow-up, over 24,000 total bone fractures were reported. For each type of broken bone (e.g., hip, spine), rates of fracture were highest in the women with rheumatoid arthritis and lowest in the women with no reported arthritis. Having arthritis was associated with an increased risk for spine, hip, and other fractures, although the risk for having a hip fracture was not significantly increased in the osteoarthritis group compared to the no arthritis group. This increase in fracture risk confirms the importance of fracture prevention in patients with arthritis.

Letters: We'd love to hear feedback on the newsletter. We regret that we cannot answer questions about individual medical conditions.

Send a letter to:

WHI Matters

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Enhancing Health as You Age

KEEPING MENTALLY AND PHYSICALLY FIT while growing older can be a challenge.

Incorporating the ideas below, which are beneficial at any age, can improve the way you feel and help prevent certain diseases as you age.



- **Try to manage stress** with meditation, exercise, or support groups. Try to identify stressors that you can get rid of, or at least minimize.
- **Exercise regularly.** Walking each day can help reduce the risk for certain illnesses and may decrease the need for medications for some health conditions, such as high blood pressure.

- **Get regular checkups** and talk with your health care provider about which health screenings and vaccinations are recommended and right for you. Be sure to bring a list of ALL the medications you are taking for your health care provider to review.





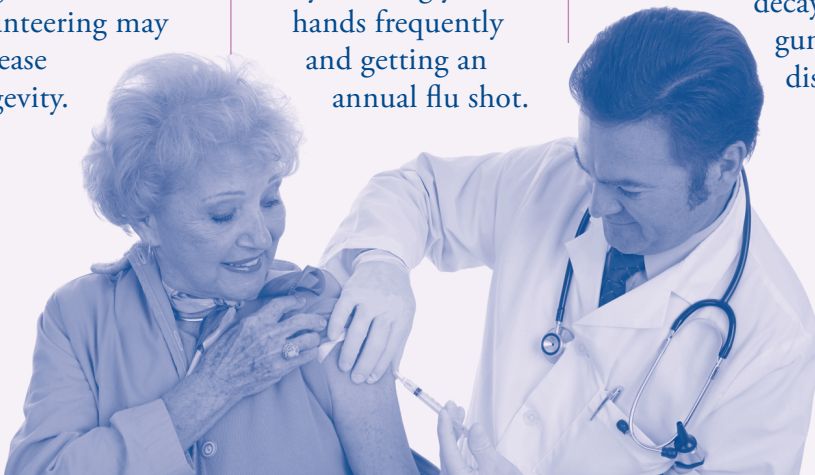
- **Join a senior community** for access to resources and information. If this resource isn't available in your local community, online groups, such as AARP.org/community, can be a great source of information.
- **Get together with family and friends.** Frequent social interaction can improve your sense of well-being and health.
- **Volunteer.** Studies suggest that volunteering may increase longevity.

- **Get plenty of sleep.** The body needs more quality sleep to help relax and repair itself as we age. Regular sleep helps our minds and bodies work most efficiently.
- **Take care of your eyes** by getting regular exams, since the risk for common conditions, such as glaucoma, cataracts, or macular degeneration, increases as we age.
- **Try to prevent infectious illnesses** by washing your hands frequently and getting an annual flu shot.



- **Eat healthfully.** Eat a variety of nutrient-rich low-fat foods by enjoying plenty of whole grains, vegetables, and fruits each day.
- **Eliminate unhealthy habits,** such as smoking or excessive alcohol use.
- **Visit the dentist on a regular basis** and brush and floss your teeth daily, to help prevent tooth decay and gum disease.

- **Adopt a pet.** Caring for an animal may offer emotional and physical benefits.
- **Maintain a healthy body weight.** Being overweight or underweight can be associated with serious health risks. Also, unintended changes in your body weight are important. If this occurs, be sure to let your health care provider know.
- **Keep mentally fit** by challenging your mind with new activities – for example, working on puzzles (jigsaw, crosswords, Sudoku) playing games (Scrabble, cards), or learning a new skill.





Stay in Touch } Please call your Regional Center if your address or phone number changes.



To locate your Regional Center, find the name of your WHI clinic center on the list below. The Regional Center and phone number for each center is shown in the right-hand column.

WESTERN REGIONAL CENTERS

Kaiser Permanente/Bay Area Clinic, Oakland, CA	Stanford University (650) 725-5307
South Bay WHI Program, Torrance, CA	
Stanford University/San Jose Clinical Center, Palo Alto, CA	
UCLA Center for Health Sciences, Los Angeles, CA	
University of California, Davis, CA	
WHI-UC Irvine Clinical Center, Orange, CA	
Center for Health Research, Portland, OR	University of Arizona (520) 321-7440 (800) 341-7672
University of Arizona, Phoenix, AZ	
University of Arizona, Tucson, AZ	
University of Hawaii School of Medicine, Honolulu, HI	
University of Nevada, Reno, NV	
UC San Diego Clinical Center, Seattle, WA	Fred Hutchinson Cancer Research (800) 514-0325
Seattle Clinical Center, Seattle, WA	

MIDWESTERN REGIONAL CENTERS

Evanston Hospital (Northwestern University), Evanston, IL	Ohio State University (614) 688-3563 (800) 251-1175
Northwestern University, Chicago, IL	
Medical College of Wisconsin, Milwaukee, WI	
Rush-Presbyterian-St. Luke's Medical Center, Chicago, IL	
Ohio State University, Columbus, OH	
University of Cincinnati College of Medicine, Cincinnati, OH	University of Iowa (515) 241-8989 (800) 347-8164
Berman Center for Outcomes and Clinical Research, Minneapolis, MN	
University of Iowa, Davenport, IA	
University of Iowa, Des Moines, IA	
University of Iowa, Iowa City, IA	
University of Wisconsin, Madison, WI	Univ. of Pittsburgh (412) 624-3579 (800) 552-8140
Detroit Clinical Center, Detroit, MI	
University of Pittsburgh, Pittsburgh, PA	

NORTHEASTERN REGIONAL CENTERS

New Jersey Medical School, Newark, NJ	University of Buffalo (855) 944-2255 (716) 829-3128
UMDMJ – Robert Wood Johnson Medical School, New Brunswick, NJ	
Albert Einstein College of Medicine, Bronx, NY	
School of Medicine, SUNY, Stony Brook, NY	
University of Buffalo, Buffalo, NY	
Brigham and Women's Hospital, Chestnut Hill, MA	Brigham and Women's Hospital (617) 732-9860 (800) 510-4858
Charlton Memorial Hospital, Fall River, MA	
Memorial Hospital of Rhode Island, Pawtucket, RI	
UMASS/FALLON Women's Health, Worcester, MA	
George Washington University, Washington, DC	WHI of the Nation's Capital – Medstar (301) 560-2924
WHI of the Nation's Capital – Medstar, Hyattsville, MD	

SOUTHEASTERN REGIONAL CENTERS

UNC Women's Health Initiative, Chapel Hill and Durham, NC	Wake Forest University School of Medicine (336) 713-4221 (877) 736-4962
Women's Health Initiative of the Triad, Greensboro, NC	
Women's Health Initiative, Winston-Salem, NC	
University of Tennessee, Germantown, TN	
University of Tennessee – Medical Center, Memphis, TN	
Baylor College of Medicine, Houston, TX	University of Florida, Gainesville (352) 294-5211 (800) 944-4594
University of Texas Health Science Center, San Antonio, TX	
University of Alabama, Birmingham, AL	
Emory University, Decatur, GA	
University of Florida Clinical Center, Gainesville, FL	
University of Florida Clinical Center, Jacksonville, FL	University of Miami School of Medicine, Miami, FL
University of Miami School of Medicine, Miami, FL	

WHI CLINICAL COORDINATING CENTER

Fred Hutchinson Cancer Research Center, Seattle message line (800) 218-8415



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