

MVP Insider

A Newsletter for Million Veteran Program Participants



MILLION
VETERAN
PROGRAM

MVP Enrolls Quarter of a Million Veterans

The Million Veteran Program is proud to announce a monumental milestone – enrollment of the 250,000th Veteran volunteer – placing MVP in the top five largest genetic and health databases in the world. Charles McGee, a Korean War Veteran who served in the Navy, enrolled at the VA Loma Linda Healthcare System in California on March 3, 2014. He stated, “I was happy to participate if anything in my genetic history can help doctors or somebody, somewhere down the line.” Charles was deployed on the USS *Erben* DD-631, a *Fletcher*-class destroyer, where he spent nearly three and a half years of his four-year enlistment period (1952-1956). His service to the nation has continued throughout his life. Charles is a former commander of an American Legion Post and is currently captain of a seven-man color guard in Palm Springs, California.

The MVP team is appreciative of each and every Veteran who has volunteered his or her time to join this ground-breaking research effort. To reflect on the history of the program: MVP enrolled the first Veteran Jan. 5, 2011. Just 10 months later, the 100,000th Veteran enrolled Oct. 17, 2012. Now, MVP is more than a quarter of a million Veteran volunteers strong. We look forward to celebrating our next enrollment milestone with all of you. For more exciting program updates, take a look inside!



“I was happy to participate if anything in my genetic history can help doctors or somebody, somewhere down the line.”

Million Veteran Program Volunteer &
Korean War Veteran Charles McGee

MVP Opens New Enrollment Sites, Plans More



Over the past year, MVP has partnered with the Philadelphia and Tampa VA medical centers (VAMCs) to open their doors for MVP enrollment. Additional VAMCs will begin enrolling Veterans this year, including Cincinnati, Madison, St. Louis, and a number of VA facilities in New England.

In addition, the VA Office of Research and

Development would like to acknowledge the MVP sites that have closed for enrollment at this time, including Baltimore, Kansas City, San Juan, and Tuscaloosa. We appreciate the significant contributions that Veterans and the local site staff made toward the program's goal of enrolling one million Veteran volunteers.

Contracts Awarded to Begin Analysis of MVP Samples

MVP is excited to announce that genomic analyses are underway with MVP samples. The Department of Veterans Affairs Office of Research and Development has awarded four contracts to small businesses to perform single nucleotide polymorphism genotyping, whole exome sequencing, and whole genome sequencing on a subset of MVP samples (learn more about these technologies on Page 5). Some samples will be randomly selected and others will be carefully chosen to compare the genetics in groups of Veterans with a specific disease or trait (e.g. posttraumatic stress disorder) to Veterans without the disease or trait. In the future, results from these genomic analyses will be securely available to approved researchers for additional studies.

Meet the MVP Team:

The VA Central Biorepository Staff



What happens to the blood sample you donate as part of participation in MVP? The VA Central Biorepository staff, part of the Massachusetts Veterans Research and Information Center (MAVERIC) Core Laboratory located in Boston, are responsible for handling all the samples collected as part of the program. Careful tracking of every MVP sample begins with uniquely barcoded blood tubes (for de-identification purposes) that are shipped from the biorepository to all participating MVP sites.

An informatics system helps track samples and allows for information from shipments processed through the United Parcel Service (UPS) to be linked to a software system used by the VA Central Biorepository known as Star Laboratory Information Management System (StarLIMS). Currently, more than 50 shipments containing approximately 500 MVP samples arrive daily from all

over the nation. When samples arrive at the biorepository, the barcodes on the blood tubes are scanned and tracked by StarLIMS. StarLIMS checks the UPS database to ensure all samples have arrived safe and sound. Once a sample has been scanned into the system, it begins the journey through several customized robots where DNA and plasma (containing proteins) are removed. The removed material is then transferred to special barcoded tubes for storage in a large robotic freezer with the capacity to hold up to four million samples. The freezer keeps the samples at -80° F to preserve the quality until they are selected to be sent out for genomic analysis.

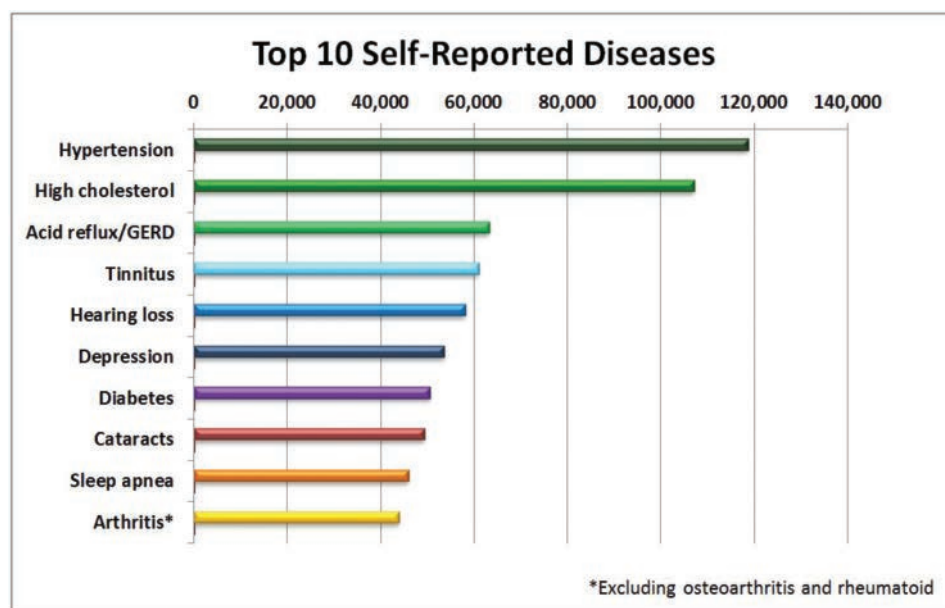
When samples are placed in deep freeze, the specific location of each sample is stored within the StarLIMS system for automated retrieval at a later date. When samples are selected for genomic analysis, the robot can find and

retrieve each sample from its stored location in the freezer. The robot is capable of locating and retrieving approximately 5,800 samples per day. As you can imagine, this process would take several weeks to accomplish by hand!

To date, the biorepository has collected and stored more than 277,000 MVP samples from Veteran volunteers. The biorepository also manages over one million samples from more than 40 different VA research studies to facilitate research in cancer, posttraumatic stress disorder, cardiology, autoimmune disorders such as rheumatoid arthritis, and many other diseases.

The biorepository's highly dedicated staff respect and value the opportunity to serve Veterans and the rest of the nation as we become part of history, together, by creating one of the largest DNA databases in the United States.

Common Health Conditions Reported Among MVP Enrollees



Initial genomic analysis on approximately 200,000 MVP samples will allow researchers to study any of the conditions represented in the large group of MVP enrollees, including the top ten self-reported diseases.

Get the Facts: Understanding Genetics

You may have heard about genes but what exactly is a gene? A gene is a long string of DNA, or the hereditary material that we inherit from our parents. DNA is made up of four chemical bases, or letters, abbreviated as A, C, G, and T. The human genome contains more than 3 billion letters organized into 20,000 sentences that scientists call genes. Taken together, genes are the instruction manual that tells our bodies how to function.

If we compare any two individuals, more than 99 percent of their genes are the

same. However, small genetic changes, or spelling errors, can increase an individual's risk of developing disease and cause a different response to the same medication or treatment. Although we can inherit genetic changes, environmental factors, such as sun exposure or tobacco usage, can also cause spelling mistakes in our genes.

How do genetic changes result in health problems? For many common conditions, like diabetes and heart disease, scientists are still working to understand this question. A complex interaction



between genes, environment, and lifestyle factors makes this challenging. To help understand the role of genes in disease, genetic and health data collected from MVP will be used to study differences between individuals with a specific disease and those without the disease.

Genes and Longevity

Meet Avera Hudson Connell, the oldest female Veteran to have enrolled in the Million Veteran Program. Avera was born in 1910 in rural Alabama. She enlisted in the Women's Army Auxiliary Corps (WAC) in 1942, serving in the South Pacific and leading more than 100 WACs under General Douglas MacArthur's regiment. Following her service, Avera worked as a nurse's aide at Henry Ford Hospital in Detroit, MI, until relocating with her husband to work on a farm in Mississippi. Avera and her husband later settled in Largo, Florida, where she continued her work as a nurse's aide for 10 years at the Bay Pines VA Hospital. Until the age of 78, Avera continued to take care of those who needed care at home or in nursing homes. Even at age 103, Avera led an active lifestyle, serving as the ambassador for new residents in her assisted living community.



Avera Hudson Connell
1910-2014

Avera had no major health issues throughout her life. Avera's niece, Patsy, reported that her aunt outlived everyone in her immediate family. Most of Avera's relatives passed away from diseases like stroke, cancer, and aneurysms. What factors were responsible for Avera's longevity? She maintained a healthy diet and stayed active, but Avera herself believed that her genes played a role in her long life, which is why she enrolled in the Million Veteran Program. Avera was one of hundreds of other Veterans over the age of 95 who have enrolled in the program to date. This group of Veterans may provide valuable clues into the genetics of aging.

LEARNING CORNER:

What is single nucleotide polymorphism genotyping, whole exome sequencing, and whole genome sequencing?

Let's begin by thinking of a genome like a book. Think about how a book is generally organized — chapter titles, followed by chapters, each with introductions, conclusions and all the paragraphs in between.

Now imagine that the chapter titles represent small, specific regions of the genome. Single nucleotide polymorphism, or SNP, genotyping would be like finding spelling errors, or polymorphisms, in just the chapter titles.

Whole exome sequencing reads a larger portion of the genome, referred to as the exomes. Exomes are the specific regions of the genome that are made into proteins; think of exomes like the introduction and conclusion of each book chapter. By reading just these sections, you can get a sense of the story, or genome, but not every detail.

Reading the entire book, cover to cover, is similar to whole genome sequencing. This technology involves identifying each of the 3 billion bases in an individual's genome. This sequence of bases can then be carefully studied by researchers to look for spelling errors, missing sentences, or other grammatical errors throughout all regions of the book, or genome.

Each of these three types of genomic analyses has unique benefits and limitations, but all three can be used to understand more about the human genome and its relationship to health.

We Need Your Help



For questions or more
information on MVP:

Visit: www.research.va.gov/MVP

Call: Toll-free 866-441-6075





This is a friendly reminder to complete the MVP Baseline Survey and MVP Lifestyle Survey if you have not already done so. You should have received these surveys in the mail or during your study visit. If you would like to request new copies, please contact the MVP Information Center toll-free at 866-441-6075. You may be wondering:

- » **Doesn't VA already have this information in my medical record?** Not necessarily. In fact, much of the information requested in these surveys is not found in your record. There are a number of questions that ask about recent health status, changes in family history, and current lifestyle choices.
- » **Why is this survey information so important?** Scientists will use your responses to the survey questions in combination with your blood sample and electronic health record to get a better picture of your health over time.

Do you have ideas, feedback, or articles you would like to see incorporated into the next MVP Insider?

The MVP team would like to make sure that we include topics of interest to you in future newsletters. Please send your suggestions our way.

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