Genetics of osteoarthritis
Researchers are exploring how genetics affect the prevalence and progression of osteoarthritis. They are looking for genetic predictors of the disease. The researchers believe that understanding how gene variance is related to knee and hip arthritis could lead to new treatments both before and after surgery. The study is also looking at how genetics affect the success of hip or knee joint replacement.

“Genetics of osteoarthritis and joint replacement recovery: Key to precision rehabilitation.”
Principal investigator: Marcas Bamman; Birmingham VA Medical Center.

Genes related to tinnitus
Researchers are studying how genes relate to tinnitus. Tinnitus is ringing in the ears with no external source. It has been the number-one disability for Veterans for more than a decade, being reported in more than 30 percent of the population. The study aims to identify genes associated with tinnitus from different causes, such as noise, blast, traumatic brain injury, and age. Identifying these genes will direct research into ways to measure tinnitus and new drug treatments.

“Genome-wide association study of tinnitus in the Million Veterans Program with emphasis on traumatic brain injury.”
Principal investigator: Allen Ryan; VA San Diego Healthcare System.

Among other studies, researchers are using MVP data to learn about the genes that may affect whether combat Veterans develop PTSD.

Gulf War Illness risk factors
Researchers are studying how genes relate to Gulf War illness (GWI) in Gulf War-era Veterans. GWI is a chronic illness affecting many Veterans from that era. It can include fatigue, headaches, joint pain, indigestion, insomnia, dizziness, respiratory disorders, skin problems, and memory problems. The researchers are comparing men and women with GWI to those without the condition. They are also looking at how different genes and self-reported Gulf War environmental exposures relate to GWI rates. The findings could lead to better treatments to help these Veterans.

“Gulf War Illness (GWI) risk factors.”
Principal investigators: Drew Helmer, Dawn Provenzale; VA New Jersey Healthcare System, VA Cooperative Studies Epidemiology Center.

Genetics of schizophrenia and bipolar illness
This research project is studying what genes make it more likely for people to have schizophrenia or bipolar disorder. It is also looking at the problems with thinking and day-to-day function that come with these conditions. Researchers are comparing participants with the two conditions to those who do not have the condition in the MVP database. The findings could help Veterans and others with serious mental illnesses.

“Functional disability in schizophrenia and bipolar illness.”
Principal investigator: Philip Harvey; Miami VA Healthcare System.

Genetic vulnerability to substance abuse
Researchers are studying genetic risk factors for chronic alcohol, tobacco, and opioid use. Past studies have suggested genes play a role in these unhealthy habits. The team hopes to use the findings to advance screening, diagnosis, and treatment of alcohol, tobacco, and opioid abuse.

“Genetic vulnerability to substance abuse.”
“Genetic vulnerability of sustained multi-substance use in MVP.”
Principal Investigators: Daniel Federman, Amy Justice, Henry Kranzler; VA Connecticut Healthcare System, Philadelphia VA Medical Center.

Heart disease risk factors
This study is exploring the role of genetics in obesity, diabetes, and abnormal lipid levels as drivers of heart disease. The knowledge gained through this research may lead to new therapies that are safe, effective, and personalized. Heart disease is the No. 1 cause of death among Veterans.

“Genetics of cardio-metabolic diseases in the VA population.”
Principal Investigators: Philip Tsao, Kyong-Mi Chang; VA Palo Alto Health Care System, Philadelphia VA Medical Center.

How genes affect kidney disease
This study is focusing on how genes affect the risk and progression of kidney disease, a condition common in people with diabetes. It is examining differences in how people with diabetes respond to the drug metformin (the most common treatment for diabetes) and what role genes play in these differences. The project is also looking at people with high blood pressure, a major risk factor for kidney disease, to determine whether genes play a role. The work may help doctors personalize kidney disease treatment.

“Pharmacogenomics of risk factors and therapies outcomes for kidney disease.”
Principal Investigator: Adriana Huong; VA Tennessee Valley Healthcare System.

Genetic risk for macular degeneration
Past studies have shown that macular degeneration (an eye condition that causes vision loss) is related to specific genes. However, these studies have included mostly Caucasian volunteers. Our researchers are now looking at whether similar genes are carried by African Americans. This study will help to develop better treatments for kidney disease to slow or stop vision loss.

“Genetic risk for AMD in diverse Veteran populations.”
Principal Investigators: Eric Konicki, Neal Peachey; Louis Stokes Cleveland VA Medical Center.

Genetic risk for suicide
This research project is studying genetic variants that increase Veterans’ risk for suicidal behavior. Past studies have suggested that some people are at higher risk of suicide because of their genes. The research goals of this study will lead to improved approaches to suicide prevention by finding new ways to identify Veterans at high risk for suicide. On average, 20 Veterans die by suicide in the U.S. each day.

“Genome-wide association study of suicidal behavior in the Million Veteran Program.”
Principal Investigators: Jean Beckham, Nathan Kimbrell; Durham VA Medical Center.

Predicting breast cancer risk for women Veterans
Researchers are using MVP data to build a new screening strategy for breast cancer. The team is studying genetic and clinical markers to predict breast cancer risk. They will use this information to develop more personalized screening strategies for individual women, rather than relying, say, on age alone to plan screening. They are also looking at how military experience and race might affect breast cancer risk. Most current screening plans are based on studies of civilian, Caucasian women.

“Predicting the breast cancer risk for women Veterans.”
Principal Investigators: Shuhi-Wei Louch, Sally Haskell, Cynthia Brandt; VA Portland Health Care System, VA Connecticut Healthcare System.

New computer algorithm to search database
Researchers are testing how efficiently a new computer algorithm can automatically find data on people with specific diseases within the MVP database. The algorithm, called APHRODITE, will be used to link diseases to inherited DNA changes within participants. If the algorithm proves successful, it will allow researchers to quickly match data on diseases with related DNA characteristics. APHRODITE should be able to identify individuals with a condition in a fraction of the time it takes to search the database using current methods.

“Efficient electronic phenotyping using APHRODITE in the Million Veteran Program.”
Principal Investigator: Pangaitou Rousos; James J. Peters VA Medical Center.