MVP-CHAMPION: Partnering to Deliver Better Outcomes

America is home to 20 million veterans, a population that suffers from a disproportionate number of health problems. Caring for our men and women who served is a national priority, and the US Department of Veterans Affairs (VA) is partnering with the US Department of Energy's (DOE's) Oak Ridge National Laboratory (ORNL) to revolutionize the health care of veterans, and by extension all Americans, via advanced data analytics and high-performance computing.

The VA–ORNL effort is a natural partnership. The VA is home to the Million Veteran Program (MVP), which is gathering critical medical information from 1 million veteran volunteers and contains the world's largest collection of genotypic data. ORNL is home to Summit, the nation's most powerful computer for open science, and some of the best and brightest minds in big data and data analytics. Together, they form MVP-CHAMPION (Computational Health Analytics for Medical Precision to Improve Outcomes Now).

The Data

The VA's Veterans Health Administration is the largest integrated health care system in the United States, with more than 1,200 inpatient and outpatient facilities that serve nearly 9 million veterans each year. Nearly 600,000 veterans have volunteered their genomic and lifestyle data, as well as their medical histories, as part of MVP, and the volumes of data are now ripe for analysis. The VA Corporate Data Warehouse, which houses the complete health history of more than 22 million veterans, is also available to MVP-CHAMPION researchers.

A sophisticated analysis of the data holds great potential for improving care and expediting service delivery for veterans and the larger population, but the relationships and correlations inherent in such data are highly complex. The VA lacks the resources needed to properly analyze this unprecedented data. ORNL solves this problem by providing powerful computing facilities and data science expertise.

22.5 million
Individual health records in the VA Corporate Data Warehouse

1,200+
VHA facilities gathering data

825,000
Veterans enrolled in MVP program

2.8 petabytes
MVP-CHAMPION storage capacity

"We are applying advanced computing and data analytics to care for America's veterans."

Jeremy Cohen,
Principal Investigator

Partnering for Veterans

The first phase of the MVP-CHAMPION partnership is focused on the three health problems affecting the greatest number of veterans: prostate cancer, cardiovascular disease, and mental health issues. This initial research will pave the way for an enhanced understanding of diseases, from detection to treatment, and improve outcomes and operations at VA facilities nationwide via the analysis of clinical, environmental, and genetic data.

Infrastructure and Analysis

ORNL's global leadership in computing and big data, as well as its demonstrated ability to analyze protected health information on a large scale, made it a natural choice for the analysis of the VA's vast data stores.

To properly analyze such a massive dataset, however, ORNL researchers are developing advanced algorithms and data mining techniques and a novel data infrastructure that is consistent, regularly updated, flexible, and easily accessible. These efforts tackle the country's most complex health challenges while advancing the state of the art in data analysis and computing, a win–win for VA and DOE and, of course, the nation's veterans.

The project will also enable future endeavors by:

- Broadening, simplifying, and accelerating the process of medical and scientific discovery;
- Preparing researchers for a future project for the Centers for Medicare and Medicaid Services;
- Paving the way for protected health information computing on upcoming exascale systems such as ORNL's Frontier;
- Creating a comprehensive user facility; and
- Enabling an enhanced understanding of health care operations.

ORNL is the only facility housing VA data outside of the VA itself.

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