



EXECUTIVE BRIEF

Advancing Pharmacogenomics with Real-World VA Patient Data

B 1 T S  O P 1 C

The pharmacogenomics (PGx) field, which studies how an individual's genetic makeup influences their response to medications, transforms healthcare by enabling personalized treatment plans that enhance efficacy while minimizing adverse effects.

For veterans, who often face multiple complex health challenges, PGx offers a promising path to more effective and safer care. The average veteran receives care for several chronic conditions, resulting in 7 to 9 medications prescribed per patient.¹

This increased medication load heightens the risk of adverse drug reactions (ADRs), making PGx essential for personalized and safer treatment plans.

The U.S. Department of Veterans Affairs (VA) has been at the forefront of integrating these advancements through initiatives like the Pharmacogenomics Testing for Veterans (PHASER) program.² With the rising demand for precision medicine, the VA's adoption of cutting-edge technologies becomes critical in improving veteran care.

One such innovative solution is PraediGene, a clinical report-generating system designed to enhance the VA's capabilities in precision medicine. By integrating advanced genetic screening and high-resolution data into the VA's existing healthcare infrastructure, PraediGene is poised to improve veterans' healthcare outcomes significantly.

The potential impact of PGx on veteran care is substantial, and PraediGene's innovative technology can make precision medicine available throughout the VA.

Pharmacogenomic Testing for Veterans (PHASER) Fast Facts



Clinical program
launched in 2019



Partnership
between the VA
and Sanford Health



Provides multi-gene
pharmacogenomic (PGx)
testing for up to 250,000
veterans at about 50 sites



Veterans are tested for 11 different
genes that affect medications for
mental health, pain, cardiovascular,
and inflammatory conditions



Goal: Optimize the use of nearly
40 medicines by adjusting
prescriptions to a veteran's profile

Source: U.S. Dept. of Veterans Affairs

Understanding Pharmacogenomics and Its Benefits

PGx marks a seismic shift in healthcare, moving away from a one-size-fits-all approach to medication.

Instead, it customizes drug treatments based on individual genetic profiles, allowing healthcare providers to optimize drug efficacy and minimize ADRs. This personalized approach is particularly beneficial in veteran care, where the management of complex health conditions is common. PGx testing is especially important as ADRs account for 6.7% of hospital admissions in the general population,³ and veterans, due to their complex medication regimens, are at an even higher risk.⁴

A 2023 study showed that PGx testing can reduce ADRs by 30%,⁵ significantly improving patient safety. A 2020 study reported⁶ that PGx reduces rehospitalization by 52%, emergency department visits by 42%, and mortality by 85% for polypharmacy home health patients.

In addition to clinical benefits, PGx has clear economic advantages. PGx testing led to \$7,000 per patient in savings on direct medical costs, amounting to \$37 million in cost reductions over 32 months.⁵

This underscores the dual benefit of PGx: enhancing patient safety while significantly reducing healthcare expenses.

Adverse drug reactions (ADRs) account for

6.7%

of hospital admissions in the general population

There can be a

30%

reduction in ADRs with pharmacogenomic (PGx) testing

For polypharmacy home health patients, PGx reduces

rehospitalization

52%

emergency department visits

42%

mortality

85%



\$7,000

PGx testing led to \$7,000 savings per patient on direct medical costs⁵



\$37 million

Amounting to \$37 million in cost reductions over 32 months⁵

Medication Optimization and Clinical Effectiveness

The application of PGx is particularly impactful in optimizing medication regimens, especially in areas like mental health, pain management, and cardiovascular care, where the potential for trial-and-error prescribing is high.

PGx testing is particularly valuable in managing complex medication regimens, which are common among veterans. [A 2023 study⁷](#) highlights that while about 70% of individuals over 70 years old can benefit from PGx testing, the application of these insights is even more critical in populations with a higher risk of adverse drug events.

Due to their multifaceted health needs and polypharmacy, veterans are especially poised to benefit from PGx testing to optimize medication effectiveness and reduce the incidence of adverse drug events, improving both safety and therapeutic outcomes.



Potential Benefit of Pharmacogenomic Testing

70%
of individuals
over 70 years old
can benefit from
PGx testing⁷



PraediGene's Role in Advancing Pharmacogenomics in Veteran Care

PraediGene stands out as a critical tool in advancing PGx across VA healthcare facilities in alignment with the VA's precision medicine initiatives. The PHASER program, which incorporates PGx testing, aims to test up to 250,000 veterans across 50 VA healthcare sites.⁸

PraediGene can pivotally support this initiative by automating the integration of genetic screening results into veterans' health records. From DNA collection to analysis, PraediGene ensures that genetic insights are easily accessible to clinicians, streamlining workflows and reducing the potential for manual entry errors.

PraediGene's core functionalities include automated clinical report generation and personalized treatment plan development.

By leveraging predictive models, especially valuable for veterans with complex medical profiles, PraediGene applies insights from machine learning to optimize COVID-19 diagnostics. Our 2020 study demonstrated the model's effectiveness, achieving 86.4% accuracy, 86.8% specificity, and 82.4% sensitivity by analyzing 20 routine lab tests, complementing traditional molecular testing and aiding rapid diagnostic confirmation.⁹

Integrated within PraediGene's advanced reporting, these predictive capabilities enhance diagnostic precision, making it easier to deploy targeted, data-driven interventions. Additionally, the model supports an equitable healthcare approach by responding to diverse health indicators across populations, reinforcing the VA's mission to provide comprehensive, responsive care for veterans in need.



Clinical Infectious Diseases

- **Title:** A Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) Prediction Model From Standard Laboratory Tests
- **Publication:** Clinical Infectious Diseases Volume 73, Issue 9, 1 November 2021
- **Cohort size:** 75,991
- **Findings:** The model demonstrated a high accuracy (86.4%), specificity (86.8%), and sensitivity (82.4%) in identifying COVID-19 cases among veterans, suggesting it can complement molecular tests to confirm infection and identify cases that molecular tests might miss.⁹

Precision Medicine Through Advanced Genetic Screening

One of PraediGene's standout features is the ability to automate several functions in the genetic screening process.

This automation:



Minimizes manual data entry errors



Significantly improves VA laboratories' efficiency



Reduces turnaround times

PraediGene enables healthcare providers to identify disease markers and genetic predispositions with greater precision by transforming raw genetic data into comprehensive, easy-to-understand reports.

This capability is precious in the early detection of conditions such as cancer and genetic disorders, allowing for proactive healthcare strategies.

The system's integration with the VA's Veterans Health Information Systems and Technology Architecture (VistA) ensures that genetic findings are quickly communicated to healthcare providers. This seamless flow of information enhances clinical decision-making by allowing personalized care plans to be developed more efficiently.

PraediGene's use of Clinical Decision Support Systems (CDSS) also provides clear, actionable insights based on genetic test results, facilitating a better understanding of health conditions for clinicians and patients.





Enhancing Operational Efficiency Through Integrated Data Management

Operational efficiency is a critical concern among lab directors, especially in large and complex systems like the VA.

PraediGene addresses this challenge by streamlining data management through its integration with:



Electronic Health Records (EHRs)



Laboratory Information Systems (LIS)

The system automates the generation of clinical data from laboratory tests, turning complex information into digestible reports that ensure consistency across the board.

This streamlined approach improves communication between clinicians and patients while accelerating decision-making processes, ultimately enhancing the quality of care within the VA. For instance, PraediGene's implementation at the Orlando VA significantly reduced the turnaround times for genetic test reports, resulting in faster clinical interventions.

Future Potential and Innovations in Pharmacogenomics

The field of PGx is rapidly evolving, with trends moving toward more comprehensive genetic profiling through the integration of multi-omics analysis. This approach combines genomics, proteomics, and metabolomics data to offer a more detailed understanding of a patient's health.

PraediGene's robust platform is designed to support these types of advancements, positioning it at the forefront of future innovations in global health applications.

As precision medicine initiatives like the VA's Million Veteran Program (MVP) continue to grow, having enrolled over 950,000 veterans,¹⁰ tools like PraediGene will become even more essential in delivering personalized, data-driven care.

High Resolution Data for Improved Healthcare Outcomes

PraediGene supports a transformative leap in the application of PGx within the VA healthcare system.

By automating clinical report generation and supporting the development of personalized treatment plans, PraediGene turns the promise of precision medicine into a reality for veterans. Its seamless integration with existing VA systems ensures that these benefits are delivered efficiently, enhancing both patient care and operational efficiency.

The future of veteran healthcare is increasingly data-driven, and PraediGene is at the forefront of this shift. As PGx continues to advance, tools like PraediGene will be instrumental in translating genetic insights into actionable care strategies, ultimately improving the quality of life for veterans.

For healthcare providers and administrators within the VA, adopting PraediGene offers the opportunity to see more, do more, and achieve more in the realm of precision medicine.

Request a demo today to discover how PraediGene can improve healthcare results for your patients through precision and personalized treatment strategies.

References

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