



cogitativo

Biohealth Intelligence

Revealing and Mitigating the Effects of Toxic Exposures in Individual Veterans

More than 3.5 million Veterans who have served globally have been exposed to toxic materials with known links to chronic and life-threatening diseases.

For instance, according to the Institute of Medicine (IoM), Veterans exposed to Agent Orange and other herbicides in Vietnam are at increased risk for: ¹

- Parkinson's disease
- Diabetes mellitus (type 2)
- Ischemic heart disease
- Non-Hodgkin's lymphoma (NHL)
- Hodgkin's disease
- Multiple myeloma
- Prostate cancer
- Other diseases

BACKGROUND

Millions of Veterans are ill due to toxic exposures suffered during their service.

UNMET NEED

We lack tools to elucidate each Veteran's post-exposure health risks and provide guidance on how to rapidly intervene to mitigate harm and improve health outcomes.

SOLUTION

New technology that combines the power of artificial intelligence (AI) with the information embedded in large and growing biological datasets will allow evidence-driven care to begin immediately following toxic exposures and to be tailored continuously according to each Veteran's specific needs.

ASK

With access to existing federal data assets containing Veterans' biological information, Cogitativo will have the substance required for its platform to reveal relationships between biological signatures in those exposed to toxic materials and eventual disease onset.

IMPACT

Armed with these new insights, the VA will have the opportunity to rapidly predict each Veteran's risks for relevant illnesses and to provide insight on how to produce clinically meaningful results.

It is also well-established that exposures to burn pits in Afghanistan and Iraq and to other toxic materials in the post-9/11 era are associated with dire health consequences, including a variety of chronic, debilitating, and life-limiting diseases.²⁻⁵ Furthermore, there are early indications that Air Force pilots have a higher risk of cancers from exposure to electromagnetic waves.⁶

Catching and treating these diseases early significantly improves outcomes. Unfortunately, early detection is hindered because the nature of exposure that each Veteran undergoes is unclear, and conventional tools cannot accurately predict Veterans' health risks without this information.



AI capabilities combined with scientific expertise and unique biomarkers can foresee acute conditions resulting from environmental hazards

1

Unique use of existing VA biomarker assets – gut biomes and DNA

2

Link unique biomarkers with existing VA clinical data warehouse

3

Tune existing deployed VA/ Cogitativo AI models to predict future clinical risks resulting from gut biomes and DNA polymorphisms

The PACT Act highlights Congressional commitment to providing Veterans with needed care

The Promise to Address Comprehensive Toxics (PACT) Act provides unprecedented healthcare access to U.S. Veterans struggling with the health consequences of exposure to toxins.⁷

It has been hailed as the most significant care expansion in the Department of Veterans Affairs (VA) history and is expected to cost \$300 billion over a decade.

The PACT Act provides economic benefits by expanding on the conditions presumed to be caused by toxic exposures during military service and extending the presumptive exposure locations. These changes remove critical coverage barriers and demonstrate motivation to help Veterans exposed to toxic materials get the care they need.

While the PACT Act requires the VA to offer toxic exposure screenings to those enrolled, the results are not specifically actionable without additional testing and clinic visits. We are proposing AI-predictive insights that can be gained from existing data sources, along with the screenings, that would improve VHA's ability to detect toxin-related illnesses early – even for Veterans who have not yet contacted the VA. This approach will lead to a better understanding of future disease risks.⁸

The benefits of the PACT Act can be amplified with AI capabilities that elucidate each Veteran's risks

Though not yet practiced, improving health outcomes based on immediate post-exposure assessment is feasible if this assessment provides information on the individual's risk of developing relevant conditions. Combining AI with large volumes of biological data from Veterans provides this opportunity, as AI can recognize patterns between these biological data and disease onset. These insights can be used to predict each Veteran's likelihood of developing acute and chronic diseases, based on their individual biology.

Medical records and blood and urine samples can enable models that predict each Veteran's post-exposure health risks and guide clinical decision-making following exposure to toxic materials. Other valuable biological sample types include:

- **Mutational signatures:** Toxins cause mutational signatures in the blood that can be used to predict health outcomes
- **Polymorphisms:** These mutations in an individual's DNA can reveal their vulnerabilities to specific toxins.^{9,10}

- **Gut biome:** The gut biome can provide information on the integrity and functioning of several of their bodily systems, as variations in gut biome are associated with chronic diseases such as respiratory, neurological, cardiovascular, metabolic, and autoimmune conditions.^{11,12}

Cogitativo can train a toxic exposure-specific model using existing VHA and DoD data assets

Cogitativo has trained a fully functional AI model that predicts disease progression for select chronic diseases through our work with the Veterans Health Administration (VHA) Innovation Ecosystem. This validated model has scored over 8 million Veterans for the probability of their specific disease(s) advancing during the following 12 months.

By linking VHA and DoD datasets, including the Million Person DNA data bank and VHA's gut biome repository, to Cogitativo's Precision Health platform, the VA can gain unique, targeted clinical insights into the effects of toxic exposures at a Veteran level within months. This information will enable the VA to address the health effects of toxic exposures rapidly and comprehensively in their Veterans and active-duty personnel.

Takeaway

By partnering with Cogitativo to combine a high-powered AI platform with large biological datasets, the VA can provide our Veterans a proactive approach that:



ACCURATELY PREDICTS future acute and chronic conditions resulting from environmental hazards



LOWERS the acuity and cost of care due to advanced screening and prophylactic interventions based on predicted clinical risks



IMPROVES the quality of life for Veterans



ADVANCED positioning of VA clinical resources based on future predicted needed services

The existing Cogitativo/VA-proven AI capability can illuminate Veteran-specific clinical vulnerabilities while engineering tomorrow's Veteran health outcomes, today.

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