



Predictive Analytics for US Armed Forces Veterans Exposed to Toxins



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Bottom Line Up Front

Toxic exposures endured by the veterans of the United States Armed Forces has been subject to significant public outrage, especially given that litigation related to Vietnam Veterans' exposure to Agent Orange continues nearly half a century after the war ended. The same toxic exposure concerns are rampant among post 9/11 era veterans, but due to different sources (burned waste, PFAS, depleted uranium, etc). Unfortunately, the Department of Veterans Affairs (VA) still relies on the same antiquated healthcare model which entails veterans waiting until they have developed cancer or other serious illnesses, at which point they can file for service connected disability and *may* receive top-priority VA healthcare treatment. In order to modernize this process and curtail unnecessary suffering, researchers at the VA must be granted access to DoD personnel records. Once granted, they can study cohorts of veterans who may be at increased risk of serious diseases and conduct early interventions. This type of research may be construed as “predictive analytics”, and it would spare a new generation of veterans from enduring another “Agent Orange” scenario that lasts half a century or longer.

Vietnam Veterans continue to fight for benefits and coverage from Agent Orange exposure, nearly 50 years after the war ended. Post 9/11 veterans are facing a similar fate.

Predictive Analytics holds the key to identifying victims of toxic exposure, and enabling early intervention for serious diseases.

Background

There is a historical precedent for veterans of the United States Armed Forces suffering exposures to toxic substances, the most notorious being Vietnam veterans' exposure to Agent Orange. Litigation against the VA continues to this day regarding responsibility to treat illnesses that Vietnam era veterans are still enduring from ostensible Agent Orange exposure.¹ Despite decades of litigation and political battles, the Department of Defense (DoD) has ostensibly failed to synthesize lessons learned from Agent Orange.

Post 9/11 era veterans and veteran service organizations (VSOs) have voiced significant concern regarding health implications from toxic exposures, with the most prominent concern arising from exposure to toxic trash being burned on military installations in combat zones (“burn pits”). Research regarding post 9/11 veterans healthcare concerns have largely relied upon data from a VA database which relies on optional participation²; as a result, there is a pervasive concern that the studies are not adequately reflecting potential health consequences from toxic exposures due to lack of data.

Objectives

The overall objective of the paper is to accompany a concise 1-page memorandum that crystallizes a highly complex issue and compels the reader into action. To accomplish this, this paper also has the following supporting objectives:

- Provide the reader with a preliminary understanding of toxic exposures in the military.
 - This is addressed in the *Background* and *Problem Statement* sections.
- Explain the methodological challenges with existing toxic exposure studies

¹Shinseki, E. (2010, August 30). Agent Orange and Veterans: A 40-Year Wait. Retrieved June 22, 2020, from <https://obamawhitehouse.archives.gov/blog/2010/08/30/agent-orange-and-veterans-a-40-year-wait>

²“VA’s Airborne Hazards and Open Burn Pit Registry.” *Public Health*, U.S. Department of Veterans Affairs, 29 July 2020, www.publichealth.va.gov/exposures/burnpits/registry.asp.

- This is addressed in the *Problem Statement and Core Challenge #1* section.

Problem Statement

The United States government has persistently refused to take full accountability for Vietnam veterans' health implications resulting from Agent Orange exposure. When the Agent Orange Act of 1991 was finally passed, it entitled veterans to healthcare and compensation for a select list of illnesses; it continued to rely on a broken retrospective healthcare model of waiting for veterans to become ill and file a claim. Despite knowing that veterans were exposed to this toxic carcinogenic substance, the VA continues to rely on a model that waits until veterans are sick or dying and file a claim, to grant them compensation. Not only does the VA rely on a reactive approach to healthcare, but in 2020 (45 years after the end of the Vietnam war), the Department continued to dispute scientific findings from a National Academies of Sciences study which linked bladder cancer and certain diseases to Agent Orange³.

Given the historical context of the VA's actions toward veterans and toxic exposures, it should come as no surprise that post 9/11 era veterans have expressed numerous concerns regarding toxic exposures and how the VA is addressing the issue. Formerly healthy servicemembers are now speaking out to the media and VSO's as they suffer from rare cancers that they attribute to toxic exposures while serving. Instead of the VA taking a preemptive approach by monitoring the health of veterans with known or suspected exposure to toxins, veterans must monitor their own health and file a claim for service connected disability once they are diagnosed with an illness.

One of the most fundamental challenges with the VA's approach to addressing toxic exposure concerns stems from the fact that the VA is not given robust personnel records of all servicemembers from the Department of Defense. This lack of data constrains VA and external researchers from conducting ongoing longitudinal studies of cohorts or clusters of veterans. One of the earliest and most comprehensive studies on the health implications of burn pits was the

³ Kime, P. (2020, January 28). VA disputes science panel's findings on proposed Agent Orange diseases; decision not expected until late 2020. Retrieved June 22, 2020, from <https://www.militarytimes.com/news/pentagon-congress/2020/01/28/va-disputes-science-panels-findings-on-proposed-agent-orange-diseases-decision-not-expected-until-late-2020/>

Long-Term Health Consequences of Exposure to Burn Pits in Iraq and Afghanistan (hereafter referenced as “IOM 2011”). Rather than conducting studies of clusters of veterans with known exposure, the researchers conducted random sampling from veterans within a 3-5 mile radius of known burn pits. The report specifically states that the research committee did not ask the DoD for personnel data for those who worked in close proximity to burn pits⁴.

The limitations identified in the IOM 2011 study raise significant concerns regarding random sampling from an overly large geographic area. Although burned toxins may travel distances of miles, more geographically focused studies would allow researchers to study clusters who were in more direct proximity to the burning waste.

Perpetual longitudinal studies of specific cohorts of veterans may accelerate the timeline for identifying anomalous rates of illness among veterans. The reliance on a voluntary database underscores the necessity to augment the Airborne Hazards and Open Burn Pit Registry so as to include DoD personnel data. This DoD data would form the foundation of knowledge regarding identification of cohorts of veterans who may have had similar toxic exposures.

Other recently surfaced toxic exposure concerns have underscored an ongoing disconnect between the DoD and the VA with sharing personnel data for healthcare studies. In early 2020, a Congressional request for information regarding potential toxic exposure at the Karshi-Khanabad Air Base in Uzbekistan (known as “K2”) was not satisfactorily responded to by the DoD and the VA^{5,6}. At the prodding of Congress, the VA recently obtained a personnel roster from the DoD and intends on completing a longitudinal study

⁴ Institute of Medicine 2011. *Long-Term Health Consequences of Exposure to Burn Pits in Iraq and Afghanistan*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/13209>

⁵ Kime, P. (2020, February 27). Post 9/11 veterans attribute deadly cancers to contaminants at US base in Uzbekistan. *Military Times*. Retrieved June 14, 2020, from <https://www.militarytimes.com/news/pentagon-congress/2020/02/27/post-911-veterans-attribute-deadly-cancers-to-contaminants-at-us-base-in-uzbekistan/>

⁶ US Congress House of Representatives Committee on Oversight and Reform. (January 13, 2020). *Memorandum directed to Mark Esper*. Carolyn Maloney. <https://oversight.house.gov/sites/democrats.oversight.house.gov/files/2020-01-13.CBM%20SFL%20to%20Esper%20-DOD%20re%20K2%20Contamination.pdf>

by approximately late 2021⁷. Although a step in the right direction, in that the VA procured the personnel roster for those who served at the base, the difficulties in procuring the personal data underscores the persistent disconnect between the VA and the DoD

Legislators and VSOs must be apprised of how a complete dataset of all servicemember personnel records is the critical missing cornerstone needed to identify health implications of toxic exposures. These groups must be informed of how random sampling (especially of overly broad populations) is an inferior mechanism for studying the health consequences of toxic exposures; a complete dataset of all personnel can be broken down into progressively smaller cohorts/clusters, such that an affected population for a study can be identified and “noise” outside of that geographic area can be excluded. By informing legislators and VSOs of these considerations, they will better understand how such a methodology can support predictive analytics and empower the VA to conduct proactive outreach to high-risk groups.

Core Challenges

This section will describe the fundamental challenges that are hindering the application of predictive analytics for VA toxic exposure healthcare. There are also limitations in addressing these challenges. First, the referenced medical research studies contain caveats regarding the data and the fact that they rely on random sampling and voluntary database participation; the existence of these acknowledgements makes it increasingly difficult to delegitimize studies conducted by the National Academies of Science which have passed peer review. Second, information is sparse and obtuse when found with regard to status of VA technological and data projects underway. Third, the legislative environment is outside of the purview of the VA, and the VA will be inherently reactive to legislation. Lastly, the innerworkings of the VA make the health study process appear to be intentionally lagging or recalcitrant when it is at likely that the challenges are at least partially due to bureaucratic constraints.

⁷ BEYNON, STEVE. “DOD Knew K2 Troops Were Exposed to Cancer-Causing Toxins; VA Continues to Deny Care.” *Stars and Stripes*, 9 July 2020, www.stripes.com/news/veterans/dod-knew-k2-troops-were-exposed-to-cancer-causing-toxins-va-continues-to-deny-care-1.636961.

Challenge # 1 – VA researchers have incomplete data.

Results from studies frequently yield inconclusive results; these studies rely on improper sampling techniques due to incomplete datasets.

- As mentioned above, the bedrock research on the issue of burn pits has been the IOM 2011 study which relied on random sampling from a broad geographic range (3-5 miles from the toxic exposure source)⁸. Furthermore, subsequent studies have relied on sampling from an optional registry that the VA administers; this gives rise to methodological concerns regarding how representative the data is for all veterans.
- The VA points to long overdue and costly solutions, without providing substantive information about how it will help this issue for retroactive exposures.
 - The VA has pointed to the development of an Individual Longitudinal Exposure Record (ILER), which would help researchers study veterans' toxic exposure concerns; the website was last updated in 2019 and contains sparse detail about how cohorts/clusters would be used for analysis⁴. The VA has also embarked on a 10-year, 16 billion dollar overhaul of its electronic healthcare records, but communication regarding delays and status of development have been obtuse and are becoming subject to scrutiny by the Department's Inspector Generals⁹.

⁸ Institute of Medicine 2011. Long-Term Health Consequences of Exposure to Burn Pits in Iraq and Afghanistan. Washington, DC: The National Academies Press. <https://doi.org/10.17226/13209>.

⁹ Ogrysko, N. (2020, February 26). <https://federalnewsnetwork.com/veterans-affairs/2020/02/whats-driving-vas-ehr-delay-congress-igs-begin-oversight-in-earnest-this-week/>. *Federal News Network*. Retrieved June 14, 2020, from <https://federalnewsnetwork.com/veterans-affairs/2020/02/whats-driving-vas-ehr-delay-congress-igs-begin-oversight-in-earnest-this-week/>

Challenge # 2 – The VA is reactionary to toxic exposure concerns and continues to resist calls to action, even regarding toxic exposures that occurred decades ago

- Legislators are ineffectively addressing the issue, due in part to the volume of legislation proposed.
 - There have been dozens of proposed bills put forth in the House of Representative and Senate. Many of the proposed bills merely create churn and have estimates of a 3% chance of passage¹⁰.
- It often takes significant political/legislative pressure to get the VA to move forward on studies. There competing political pressures in D.C., and the VA has taken a posture that many actions are not within it's purview unless mandated via legislation.
 - The VA recently yielded on litigation pertaining to veterans persistent advocacy that their cancers were related to Agent Orange exposure while serving in the Navy during the Vietnam war. The VA has resisted providing compensation to ill veterans until the President signed the Blue Water Navy Vietnam Veterans Act of 2019; and yet the VA has still delayed making decisions on related claims by veterans¹¹.

Limitations

There is a confluence of factors which pose an inherent challenge to this issue. The lack of data regarding what toxins existed, who was exposed, for what duration, and at what intensity all hinder advocates on the issue. There is also an inherent conflict of interest, in that the United States government is being challenged to take accountability for toxic exposures that it forced its own service members to endure.

¹⁰ Advanced Search for Legislation. (n.d.). Retrieved June 14, 2020, from <https://www.govtrack.us/congress/bills/browse?text=burn+pit>

¹¹ Wentling, N. (2019, July 22). <https://www.stripes.com/lawsuit-filed-against-va-secretary-over-delaying-benefits-for-blue-water-navy-vets-1.591432>. *Stars and Stripes*. Retrieved June 14, 2020, from <https://www.stripes.com/lawsuit-filed-against-va-secretary-over-delaying-benefits-for-blue-water-navy-vets-1.591432>

Furthermore, the proposed solution is proprietary in nature and not widely understood in the circles studying this topic. The proposed solution is the confluence of technology from a separate industry (banking) and merged with healthcare, so there is no apparent written body of knowledge to reference.

Lastly, there are inherent power dynamic challenges within the issue. The DoD is the largest government agency and wields tremendous clout; the VA is also one of the largest agencies and engages in a close-knit relationship with the DoD. There seem to be significant resistance to exposing potential missteps or wrong-doing at the DoD, and the VA seems deferential to the DoD on the issue. With these two agencies providing resistance on the issue, making significant progress on the data aspect of the conversation has been unyielding.

Recommendations

The fundamental recommendations from this paper are as follows:



Recommendation for the President of the United States of America

- The issue of toxic exposures endured by our post 9/11 veterans will continue to tarnish the public's image of the United States government, until the government gets ahead of the issue. The only way to get ahead of the issue is with predictive analytics; identify veterans at risk of disease and nudge them to monitor their health. This can only be

accomplished by compelling the DoD to give the VA researchers the proper personnel data, and by making improvements to the VA's Airborne Hazards and Open Air Burn Pit registry.

Recommendation for Congress

- Congress must compel the Department of Defense to provide personnel records to the Department of Veterans Affairs, otherwise VA researchers will never be able to proactively get ahead of toxic exposures. Once the historical personnel data is obtained from the DoD, the VA must be compelled to make meaningful changes to the Airborne Hazards and Open Air Burn Pit registry.

Recommendation for Veteran Service Organizations

- Veteran Service Organizations must focus on data-driven solutions. There must be a collective acknowledgement that the data the researchers are using is not comprehensive which risks continuing to yield inconclusive results. Proper data utilization will support the broadly desired “presumptive illness” result.

Recommendations for Future Research by The Department of Veterans Affairs

Research Recommendation # 1 – Identify specific cohorts/clusters of veterans who endured very significant exposure to toxins.

- Attempt to procure the personnel data on targeted cohorts and ascertain the rates of illness in this cluster. This is the prototype for the proposed solution, and if any cancer clusters are found, it may solidify support for implementation of the methodology proposed.

Research Recommendation # 2 – Contrast VA toxic exposure research against methodologies used from civilian toxic exposure incidents, such as PFAS in Parkersburg, West Virginia or health monitoring of 9/11 first responders.

- Determine similarities to how researchers found a probable causation with illnesses and exposure based on a comprehensive database.

Conclusion

As we approach two decades after the invasion of Afghanistan and Iraq, veterans and VSOs are increasingly decrying their toxic exposures as the modern day “Agent Orange”. Despite over a dozen of the largest VSOs forming a coalition on the issue of toxic exposures¹², there is still tremendous legislative churn and pervasive disconnect between the DoD and VA. The legislative churn gives the appearance that there are conflicting goals; achieving presumptive illness status for certain illnesses, and compelling enhanced studies. These goals are truly one and the same.

Empower VA researchers with a complete dataset to facilitate early interventions and identify groups of veterans who are at higher risk of serious illness due to toxic exposure.

This will save countless lives and curtail a tremendous amount of unnecessary suffering.

¹² Kime, Patricia. “A New Coalition Is Fighting for Vets Sickened by Environmental Hazards.” *Military.com*, 12 June 2019, www.military.com/daily-news/2019/06/12/new-coalition-fighting-vets-sickened-environmental-hazards.html.

Appendix

Draft Memorandum for Distribution to United States Congress and VSOs

MEMORANDUM

To:

From: Chad J. Baer

Subject: Predictive Analytics for veterans' toxic exposures

Date:

Burn Pits || Karshi-Khanabad Air Base ("K2") || Agent Orange || PFAS || ...

*A formerly healthy 39 year old veteran develops lung cancer and dies, with all the energy he can muster he attributes the cancer to burn pit exposure. Does the VA monitor the health of his platoon? **No.** A year later, the first sergeant from that same platoon dies of lung cancer. Does the VA advise the rest of the platoon to monitor for symptoms? **No.** A third soldier develops cancer, is the cohort monitored? **No.***

Veterans are continuing to die from toxic exposures, and the United States government continues to force them into an antiquated healthcare model where they must wait to find out they are sick to receive compensation and treatment.

How do we get ***ahead of these cancers and diseases?***

Predictive analytics. Our banking transactions are monitored and triaged for fraud based on algorithms. Google knows what you are going to search before you have completed the thought. Predictive analytics is a proven methodology used in many sectors, even the VA has experimented with it for anti-suicide efforts. Yet, we are leaving our veterans who suffered toxic exposures to wait until they develop cancer and are dying until they receive proper care.

Why? The VA has incomplete data.

1. The VA's database must be predicated on personnel records from the DoD.
2. The burn-pit registry must be overhauled to be a toxic exposure registry. It must capture meaningful data entries in formatted text fields which support large scale data analytics.
3. The VA must use this improved data to monitor clusters/cohorts of veterans.

With this path forward we can stop the unnecessary suffering and deaths of countless veterans. We can catch the cancers in stage 1, not stage 4. We can avoid our post 9/11 veterans suffering another "Agent Orange".

Prior legislation has fallen short and failed. Strong leadership is required to bring this to fruition, please join as a co-sponsor on the Burn Pit Enhanced Analytics Repository Act of 2020.

Draft Verbiage For Proposed Federal Legislation

A Bill

To direct the Secretary of Defense to supply the Department of Veterans Affairs with personnel records for current and former service members. To direct the Secretary of Veterans Affairs to revise the Airborne Hazards and Open Burn Pit Registry to enable researchers to study cohorts of veterans in ongoing longitudinal studies.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

Section 1. Short Title.

This Act may be cited as the “Burn Pit Analytics Enhanced Repository Act of 2020”.

Sec. 2. Data Sharing Between the Department of Defense and the Department of Veterans Affairs.

- (a) Transfer of historical personnel data. –
 - (1) In General.- Not later than one year after the date of enactment of this Act, the Secretary of Defense shall –
 - (A) Establish secured connectivity between the Department of Defense and the Department of Veterans Affairs, such that personnel records are available to researchers at the Department of Veterans Affairs;
 - (B) Include all personnel records dating back to November 1, 1955.
 - (2) In General. – Not later than one year after the date of enactment of this Act, the Secretary of the Department of Veterans Affairs shall –
 - (A) Create a public facing registry portal which is accessible to all veterans of the United States Armed Forces;
 - (B) Revise data entry fields within the Airborne Hazards and Open Burn Pit Registry to include formatted data fields regarding
 - (i) Materials exposed to

- (ii)Duration of exposure
- (iii)Frequency of exposure
- (iv)Physical proximity to exposure
- (v)Location of exposure;

(C) Permit immediate relatives of deceased veterans to submit entries to the Airborne Hazards and Open Burn Pit Registry;

(D) Permit participants to submit supporting documentation from non-VA healthcare providers.

(c) Definitions.- In this section:

(1) The term “Airborne Hazards and Open Burn Pit Registry” means the registry established by the Secretary of Veterans Affairs under section 201 of the Dignified Burial and Other Veterans’ Benefits Improvement Act of 2012 (Public Law 112-260; 38 U.S.C. 527 note).