



CHEMICAL AND BIOLOGICAL WARFARE AGENTS - FREQUENTLY ASKED QUESTIONS (FAQs)

A RESOURCE FOR VETERANS, SERVICE MEMBERS, AND THEIR FAMILIES

To help WRIISC best respond to the concerns of Veterans and health care providers, we've compiled a list of frequently asked questions.

WHAT ARE CHEMICAL AND BIOLOGICAL WARFARE AGENTS?

- Use of military chemical warfare agents has been reported since World War I.
- Biological and chemical warfare agents include a wide variety of substances that are typically defined as being toxic or harmful to the human body.
- Examples of chemical warfare agents include nerve agents like sarin and soman; blister agents like sulfur mustard; and toxic industrialized chemicals such as chlorine or ammonia that are released by using a weapon. Examples of biological warfare agents may include anthrax and viruses that cause disease such as smallpox.
- These "warfare" agents are intentionally released into the environment with the goal of causing harm to humans. The toxicity or degree of harm from these substances varies greatly. Health effects can differ and are dependent on many factors like the toxicity and volatility of the warfare agent, the amount and duration of exposure, the route of exposure, and environmental conditions.
- People who experience acute toxic symptoms at the time of exposure that are consistent with a high exposure dose are at greater risk for long term health effects compared to people who do not.

WHAT CHEMICAL AND BIOLOGICAL WARFARE AGENT CONCERNS HAVE BEEN REPORTED BY VETERANS?

- Some Veterans have reported concerns about military studies and testing. From 1955 to 1975, some Veterans participated in medical studies at Edgewood Arsenal, Maryland and other military facilities.

These were classified medical studies that the Department of Defense (DoD) did to evaluate the impact of low-dose chemical warfare agents on military personnel and to test protective clothing and pharmaceuticals.

- The National Academies of Science (NAS) reviewed the potential for long term health effects and did not find any significant long term physical harm except for Veterans exposed to larger doses of mustard agents. These studies were published in "Possible Long-Term Health Effects of Short Term Exposure to Chemical Agents." In a follow-up study, NAS reported that post-traumatic stress disorder (PTSD) could occur as a result of "perceived exposure to biochemical warfare agents."
- Project 112/Project SHAD, or Shipboard Hazard and Defense, was another series of tests conducted by DoD from 1962 to 1973. The purpose of these tests was to determine potential risks to U.S. warships and American forces from chemical and biological warfare agents.
 - In a report by the Health and Medicine Division of the National Academy of Sciences, Engineering, and Medicine, there was no evidence of specific, long term health problems with participation in Project SHAD, but the report was limited to available scientific and medical data.
- After the 1991 Gulf War cease-fire, rockets filled with sarin and cyclosarin mixes were found at a munitions storage depot in Khamisiyah, Iraq, that was demolished by U.S. Service Members. This demolition may have exposed some U.S. units to low levels of chemical warfare agents.

This document was developed by the War Related Illness & Injury Study Center (WRIISC)
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- At the time, there were no reports of Service Members showing acute symptoms of nerve agent poisoning such as convulsions, paralysis, or loss of consciousness that are consistent with high levels of sarin exposure.
- If low level exposure occurred, scientific and medical evidence indicates that symptoms would have been mild. According to the Centers for Disease Control and Prevention (CDC), mildly exposed people usually recover completely. VA is continuing to explore health concerns of these Veterans.
- During Operation Iraqi Freedom and Operation New Dawn, Service Members who demolished or handled explosives may have been exposed to chemical warfare agents such as blister agents (mustard agent) or nerve agents (sarin).
 - For mustard agents, long-term health effects are not expected after a low level exposure that did not cause immediate symptoms or require medical attention, such as a small blister on the skin from a mustard agent. High level mustard agent exposure such as to the whole body or airways and lungs may result in cancers or other health problems.
 - For nerve agents, symptoms of acute, low-dose exposure may include runny nose, chest tightness, "pinpoint" or abnormally constricted pupils, excessive salivation and sweating, muscle twitching, visual disturbances, headache, slurred speech, nausea, hallucinations and confusion.
 - Symptoms of acute, high-dose exposure may include loss of consciousness, seizures, paralysis, and coma and potentially death from respiratory/nervous system failure.

WHAT HEALTH EFFECTS ARE LINKED TO CHEMICAL AND BIOLOGICAL WARFARE EXPOSURE?

- Depending on the agent and amount of exposure, biological and chemical warfare agents may cause acute, toxic symptoms at the time of exposure especially if the exposure was high. Veterans with high levels of exposure often have significant acute

symptoms at the time of exposure (usually symptoms that require emergency, medical attention) and are at greatest risk for potential long-term health problems. These Veterans may require surveillance for long-term health effects.

- In the absence of health symptoms that require immediate treatment at the time of exposure, most Veterans make a quick and complete recovery.

WHAT ARE POTENTIAL LONG TERM HEALTH EFFECTS OF BIOLOGICAL AND CHEMICAL WARFARE AGENTS?

- Veterans with high levels and/or documented levels of exposure to nerve agents may need periodic health assessments and follow-up. Depending on the nature of the exposure, they may need specific neurologic and neuropsychological testing.
- Veterans with inhalation injuries may be at risk for long-term respiratory conditions, such as reactive airway disease. These Veterans may need ongoing follow-up by primary care or specialty physicians. For Veterans who smoke, they need to be aware that the health risks of exposures and tobacco use combined are much worse than either of these risks alone.
- Veterans who experienced chemical burns after exposure may be at risk for skin pigmentation changes and skin cancer. They should be encouraged to seek ongoing follow-up by their primary care providers and dermatologists for regular skin checks. Skin and sun protective measures are extremely important to decrease longterm health risks.
- Veterans with ingestion injuries (injuries occurring from swallowing a toxic substance) may need ongoing follow-up by their primary care providers, depending on the nature of the exposure and injury. If certain foods aggravate symptoms associated with the initial injury, a nutrition consult may help.
- Veterans with eye injuries resulting from exposure may be at risk for developing later eye problems (such as keratitis) and need regular eye exams.
- Other potential long-term health effects depend on the nature of the symptoms and disease at the time of the exposure. Health surveillance assessments are targeted towards symptoms related to the exposure.

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- In general, biological and chemical warfare agent exposure does not result in increased cancer risk. Among military chemical weapons, mustard gas is the only known agent shown to increase the risk of later cancers. Some toxic chemicals used in weaponized attacks can cause cancer, with DoD using personal protective equipment and surveillance to try to minimize these risks. The risk of developing cancer later in life is not thought to increase significantly following a one-time unintended exposure.
- Through the Registry programs, the DoD and VA aim to identify potentially harmful military exposures and ensure appropriate surveillance of service members and Veterans.

DO BIOLOGICAL OR CHEMICAL WARFARE AGENTS CAUSE GULF WAR ILLNESS (GWI)?

- During Operation Desert Shield and Desert Storm (ODSS), Service Members reported using M9 chemical agent detection paper, hearing chemical alarms, and being in Mission Oriented Protective Posture (MOPP) gear. When some Veterans reported medically unexplained symptoms like fatigue, headaches, joint pain, indigestion, and memory problems after this conflict, there was concern that low-level sarin exposure may be the cause of these symptoms.
- Research has shown that some Gulf War Veterans do have medically unexplained illnesses - VA refers to this as Gulf War illness (GWI) or chronic multi-symptom illness because symptoms often vary from individual to individual.
- To date, after twenty-five years of research, the cause of GWI remains unclear and poorly understood. There have been no consistent links between a specific exposure, like biological or chemical warfare agents, and GWI. GWI most likely is related to many different factors from ODSS. More information on GWI - <https://www.publichealth.va.gov/exposures/gulfwar/medically-unexplained-illness.asp>

WHAT ARE RECOMMENDED NEXT STEPS IF I HAVE A CONCERN?

- If you have exposure concerns, talk to your primary care provider to see if further evaluation is needed. More information is available at - <https://www.publichealth.va.gov/exposures/categories/warfare-agents.asp>.
- VA also has Environmental Health Registry programs for Veterans with military exposure concerns including
 - VA’s Gulf War Registry Program for Operation Desert Shield/Desert Storm and Operation Iraqi Freedom/New Dawn Veterans
 - VA's Airborne Hazards and Open Burn Pit Registry for Operation Desert Shield/Desert Storm, Operation Iraqi Freedom/New Dawn, and Operation Enduring Freedom Veterans
- These VA registry exams are free. The purpose of these registry exams is to alert Veterans to possible long-term health problems that may be related to environmental exposures during their military service. The registry data also helps VA understand and respond to these health problems more effectively. See more at - <https://www.publichealth.va.gov/exposures/benefits/registry-evaluation.asp>
- For Veterans exposed to chemical warfare agents during Operation Iraqi Freedom or New Dawn, DoD has a Chemical Warfare Agent Hotline (1-800-497-6261) where Veterans can speak to health care providers to identify, document, and follow-up on their exposure concerns. See more at - <https://www.publichealth.va.gov/exposures/chemical-warfare-agents-oif.asp>
- VA’s War Related Illness and Injury Study Center (WRIISC) conducts specialized environmental exposure assessments – these assessments typically are done after the initial VA Registry exam where exposure questions persist and/or are complicated in nature.
- Keep up-to-date with recommended health screenings like skin checks, regular history and physical examinations, and recommended cancer screenings. Engage in healthy lifestyle activities like regular exercise, eating a well-balanced diet, protecting your skin and eyes from the sun, good sleep habits, tobacco cessation, and avoiding heavy alcohol consumption. Keep a healthy weight and stay up to date with recommended immunizations.
- Try to avoid future harmful exposures. If using chemicals, use as directed and make sure you are using the appropriate protective measures and following recommended engineering and administrative practices (for example, making sure you have good ventilation if airborne exposures are a concern). In some cases, periodic health surveillance may be required.

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WHERE CAN I FIND MORE INFORMATION ON CHEMICAL AND BIOLOGICAL WARFARE AGENTS?

VA Resources

- Chemical Warfare Agents in Operation Iraqi Freedom - <http://www.publichealth.va.gov/exposures/chemical-warfare-agents-oif.asp>
- Post-9/11 Vet Newsletter- Exposure to Chemical Warfare Agents - <https://www.publichealth.va.gov/exposures/publications/oef-oif-ond/post-9-11-vet-fall-2015/chemical-warfare-agents.asp>
- Chemical and Biological Weapons during the Gulf War - <https://www.publichealth.va.gov/exposures/gulfwar/sources/chem-bio-weapons.asp>
- Warfare Agents - <https://www.publichealth.va.gov/exposures/categories/warfare-agents.asp>
- Environmental Health Registry Evaluation for Veterans - <https://www.publichealth.va.gov/exposures/benefits/registry-evaluation.asp>
- War Related illness and Injury Study Center (WRIISC) - <https://www.warrelatedillness.va.gov/>

Department of Defense Resources

- Chemical Warfare Agent Exposure during Operations Iraqi Freedom and New Dawn - Department of Defense –U.S. Army Public Health Command - <https://phc.amedd.army.mil/topics/envirohealth/em/Pages/CWA.aspx>
- Long-Term Effects of Exposure to Sulfur Mustard – Service Members and Veterans – U.S. Army Public Health Command - https://ephc.amedd.army.mil/HIPECatalog/Uploads/DownloadableProds/750_four_panel_mustard%20gas.pdf

- Long-Term Effects of Exposure to Sarin – Service Members and Veterans – U.S. Army Public Health Command - https://ephc.amedd.army.mil/HIPECatalog/Uploads/DownloadableProds/756_Sarin_trifold.pdf
- U.S. Demolition Operations at the Khamisiyah Ammunition Storage Point, Final Point– April 25, 2002 - Office of the Special Assistant for Gulf War Illnesses - https://gulflink.health.mil/library/kham_infojsp.shtml

Other Resources

- Agency for Toxic Substances and Disease Registry Blister Agents: Sulfur Mustard Agent H/HD, Sulfur Mustard Agent HT - <https://wwwn.cdc.gov/TSP/ToxFAQs/ToxFAQsDetails.aspx?faqid=926&toxid=191>
- Centers for Disease Control and Prevention: Facts about Sarin - <https://emergency.cdc.gov/agent/sarin/basics/facts.asp>
- Department of Homeland Security – Chemical Attack Fact Sheet: Warfare Agents, Industrial Chemicals, and Toxins - <https://www.dhs.gov/publication/chemical-attack-fact-sheet>
- Institute of Medicine. 2004. Gulf War and Health: Updated Literature Review of Sarin. Washington, DC: The National Academies Press - <https://www.nap.edu/catalog/11064/gulf-war-and-health-updated-literature-review-of-sarin>
- National Academies of Sciences, Engineering, and Medicine. 2016. Assessing Health Outcomes Among Veterans of Project SHAD (Shipboard Hazard and Defense). Washington, DC: The National Academies Press - <https://www.nap.edu/catalog/21846/assessing-health-outcomes-among-veterans-of-project-shad-shipboard-hazard-and-defense>

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