



Caring for Gulf War I Veterans

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Outline

Purpose

This study guide provides an overview of Gulf War experience, the Department of Veterans Affairs and the Department of Defense health programs available for Gulf War Veterans, and the common symptoms and diagnoses of these Veterans. Emphasis is placed on providing the most recent information from clinical and scientific studies of Gulf War Veterans' illnesses.

Target Audience

Department of Veterans Affairs and Department of Defense physicians, nurses, social workers and other health care professionals and leaders.

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Each faculty and planning committee member (author, facilitator, moderator) reported having no relevant * financial relationships with any commercial interest. This activity includes no discussion of uses of FDA regulated drugs or medical devices which are experimental or off-label.

*The ACCME defines "relevant financial relationships" as financial relationships in any amount occurring within the past 12 months that create a conflict of interest.

Gulf War 1 from a Veteran's Perspective

Welcome to Gulf War 1 from a Veteran's Perspective

Welcome to the Caring for Gulf War 1 Veterans course. This course consists of eight lessons that may be taken sequentially or individually in whatever order you prefer by selecting them from the Menu.

To complete this educational activity and receive Continuing Education (CE) credit participants must:

participate in 100% of the course activities;

complete the web-based training program;

complete each assessment with a minimum score of 80% or greater, if you do not pass the first time you may retake the assessment;

and complete the program evaluation.

You may exit the course at any time. The course does not need to be completed in a single sitting. A bookmark will return you to your last location when you return. The Main Menu will allow you to restart where you left off, even if you are accessing the course from a different computer, and will allow you to navigate to different lessons in the course.

A course evaluation is required to receive continuing education credit and a certificate of completion. A check mark will appear next to each lesson completed in the Menu, or you may access the Course Status page. The "Conclusion" link will remain unavailable until all lessons have been completed. All lessons must be completed to access the evaluation.

Introduction: Gulf War 1 from a Veteran's Perspective

Approximately 697,000 men and women served in operations "Desert Shield" and "Desert Storm" from August 1990 to June 1991. The Americans who served in the 1991 Gulf War were unique at the time of this conflict. Compared to any force in prior U.S. history, there was more ethnic diversity and more women, parents, and activated members of the Reserves and National Guard who were temporarily uprooted from their civilian lives. In addition this cohort of Veterans was older than any deployed force in prior US conflicts in the 20th and 21st century.



Objectives of Gulf War 1 from a Veteran's Perspective

PURPOSE: The purpose of this lesson is to familiarize clinicians with the environment, concerns and health outcomes which are unique to Gulf War 1.

After completing Gulf War 1 from a Veteran's perspective, you should be able to:

- Describe the unique characteristics of Veterans of the 1st Gulf War
- Understand the elements of the combat theater to which these Veterans were subjected
- Understand why these Veterans continue to have health concerns which are related to their service in the Gulf War



More Information, Better Understanding

This module is an update of an earlier study guide published in 2002. Since that publication there has been advancements in our understanding of the impact of this conflict on Veterans' health. We have also developed more effective ways to meet the needs of these Veterans.

This rewrite embarks upon a different approach to the education of providers regarding issues specific to the Veteran population we serve. In the words of Mr. John Gingrich, Chief of Staff, Department of Veterans Affairs, himself a Gulf War 1 Veteran: "Starting with this one (training series) you are developing a tool that will accelerate our ability to provide patient-centric care."

Simulated Dialog Box	
Gulf War 1 from a Veteran's Perspective	Perhaps the greatest progress in the understanding of the 1991 Gulf War and health is the appreciation that some deployment-related health issues may be an inevitable consequence of deployment itself. With this realization comes an appreciation of the need and the responsibility for improving our ability to diagnose and treat patients with such conditions, and to provide the appropriate and relevant training for health care providers who must respond.

Living Conditions

Although combat casualties during the war were remarkably low, [living conditions](#) (see below) for U.S. service members in the 1991 Gulf War region were far from hospitable. Operations "Desert Storm" and "Desert Shield" were quickly over, but for many U.S. service members, the war meant being stationed for months in isolation in a bleak desert environment

During preparations for war, they had few amenities and lived under arduous and austere conditions that were not always conducive to good health. The weather, initially extremely hot and humid, changed to cold and damp by the time the war actually began.

Simulated Dialog Box	
Living Conditions	<p>U.S. service members generally found themselves housed in crowded warehouses, a few local buildings, and tents. Available living quarters allowed for little privacy. Prepackaged meals were their principal diet and local produce and goods were quickly put off—limits for health reasons. Sanitation was far from ideal, and latrines and communal washing facilities were the norm. In some areas sand flies were everywhere.</p> <p>U.S. service members were also exposed to a wide range of hazardous materials. Not surprisingly, following the war, many Veterans had concerns about the health impacts of these exposures and living conditions.</p>

Early Health Problems

Within months of returning home from the 1991 Gulf War, some Veterans from the United States, Great Britain, and Canada began to report a variety of symptoms such as fatigue, headache, joint pain, sleep disturbances, and memory problems. Some had actually started to get sick while serving in the combat theater.

The Chief of Staff Mr. John R. Gingrich recounts:

“While commanding an artillery battalion during Gulf War 1, one of my soldiers suddenly became quite ill. Despite the best efforts of our medical team, they could not diagnose what made him so sick. Out of 800 soldiers under my command, no one else was that sick. Now here we are, almost 20 years later and this Veteran is still suffering – and has been since the war. I have watched him when he could barely stand up, couldn’t cross the room on his own, his legs were so weak. He has been in and out of hospitals many times, seen by some of the best doctors and yet there is still no explanation for his debilitating illness, and this Veteran is not alone.

As hard as we try, we may not be able to fix this Veteran or others like him. What happened 20 years ago and how people were treated are things we cannot change--people, experts, even many doctors, misread the situation and misread the individuals who are sick. But we can change the way we treat Veterans today and in the future. The new GWVI study is about how we prepare ourselves to ask the right questions next time, really listen to the Vets, challenge our assumptions, and try to see things from their point of view. Whether WWII, Vietnam, Gulf War 1,

OEF or OIF, we must work with the ill or injured Veterans to restore their quality of life as best we can.”

Veteran’s Perspective

“...In mid-January, my team of about 30 men was directed to begin taking PB (Pyridostygmine bromide) ... that we had been issued. We were told that we had no choice in consenting and we were ordered to take them, and that we would probably experience symptoms similar to mild nerve agent poisoning.... I experienced significant side effects, including watery eyes, runny nose, confusion, dizziness, muscle twitching, diarrhea, weight loss, and generally feeling quite ill...”

“...When the first SCUD missiles were fired, ground troops near the border like me were concerned about them hitting our locations...”

“...When more than 700 of Kuwait’s oil wells were lit on fire, Islamic and non-Islamic forces alike quietly discussed whether the midnight darkness at noon was some sort of cataclysm, before the unprecedented cause of the unnatural, midday inky blackness became known...”

“...When chemical alarms sounded or silkworm missiles came in, a denial cycle between forward and theater command levels led to the belief that the tens of thousands of alarms – even those double and triple verified as accurate – were simply faulty...”

“When we moved forward to the evacuated Kuwaiti border city of Kafdji, a nighttime missile ...killed about a dozen Sengalese troops where we had just left... Given the unexplained, severe, painful skin rash all over the exposed skin of my face and hands on one of those nights...I have long wondered about its cause and effects...”

“ When I had the honor and privilege of serving with him, Joel was he epitome of what a special operations officer should be- smart, physically and mentally fit, a respected and beloved leader...so it was all the more heartbreaking to learn that he’s now totally debilitated and disabled and at home, overcome by chronic, widespread pain that affects so many of us, and more health issues than he can name.

“...and there’s Ed from Missouri, who can barely walk due to his muscle and joint weakness and pain, and I could go on and on...”

Health Impacts of Military Deployment

Review of historical reports of health problems following previous U.S. military engagements may help us place some of the current 1991 Gulf War Veterans’ health issues in context. In fact, poorly understood "war syndromes" characterized by multiple physical symptoms have been reported since at least the U.S. Civil War.



Unexplained Illnesses

Considerable progress has been made in evaluating and treating illnesses among 1991 Gulf War Veterans. Most 1991 Gulf War Veterans are healthy today and have successfully readjusted to post-war life, or they have diagnosable health problems. Nevertheless, a considerable number of these Veterans continue to report symptoms that cannot be easily diagnosed and are in many cases debilitating.

Hearing and understanding the health concerns of Gulf War Veterans is the first step toward developing a therapeutic relationship and beginning the healing process. Recognizing their medical problems and managing them appropriately will lead to the better quality of life that these Veterans certainly deserve.

Summary of Gulf War 1 from a Veteran's Perspective

You have completed the lesson **Gulf War 1 from a Veteran's Perspective**. You should now have a general understanding about the milieu in which these Veterans served, the types of hazards to which they were exposed and the health outcomes that many of these these Veterans continue to have.

Exposure Concerns to Gulf War 1 Veterans

Introduction Exposure Concerns to Gulf War 1 Veterans

Many Gulf War 1 Veterans have concerns about one or more potentially hazardous agents to which they may have been exposed, either in preparation for or during deployment. In order for health care providers to provide the highest level of care for Veterans they must be able to ascertain what substances the Veterans were exposed to or believe they were exposed to. The providers must be able to perform a risk assessment to determine whether the exposures were of significance, in the scientific sense, for present or future health impacts. These providers should have a basic understanding of the more common exposures of concern. And finally, the providers need to be able to discuss these exposures and potential risks with the Veterans using terms that can be understood.

Purpose Exposure Concerns to Gulf War 1 Veterans

The purpose of this section is to orient VA Health Care Providers and Examiners, as well as others, including non-VA health care providers, to the assessment and discussion of combat related environmental agent exposures of Gulf War 1 Veterans. It is also to acquaint these providers with the some of the more common deployment related exposures of concern to these Veterans.

Additional Help is Available

Veterans have concerns about substances to which they may have been exposed.

Addressing exposure concerns of Gulf War 1 Veterans is very important. There is a very high level of concern about some potential exposures encountered during Operations Desert Shield/Storm. Most Veterans have never had an opportunity to discuss these concerns with their VA health care team.

If a Veteran wishes to discuss exposure issues that require in depth knowledge beyond what is contained in this training or available locally from an Environmental Health Clinician, or if they bring in new studies regarding exposure concerns and they wish to discuss them, the Veteran should be told about the War Related Illness and Injury Study Center (WRIISC). The clinician seeing the Veteran can [contact the WRIISC](#) for an informal informational discussion, the Veteran can be referred for an Exposure Consultation (by telephone if appropriate) or the Veteran may be referred for a comprehensive evaluation.

Learning Objectives Exposure Concerns to Gulf War 1 Veterans

At the conclusion of this section participants will be able to:

- Recognize the more common, deployment related exposures of concern to Gulf War 1 Veterans;
- Discuss the frequency of deployment related exposure concerns in multiple Veteran populations, and
- Recognize and discuss, for a number of substances that Gulf War 1 Veterans are frequently concerned about, the:
 - known health effects;
 - availability of confirmatory testing for exposure;
 - methods to identify and measure the health effects of exposure; and
 - appropriate recommended treatment and management strategies.

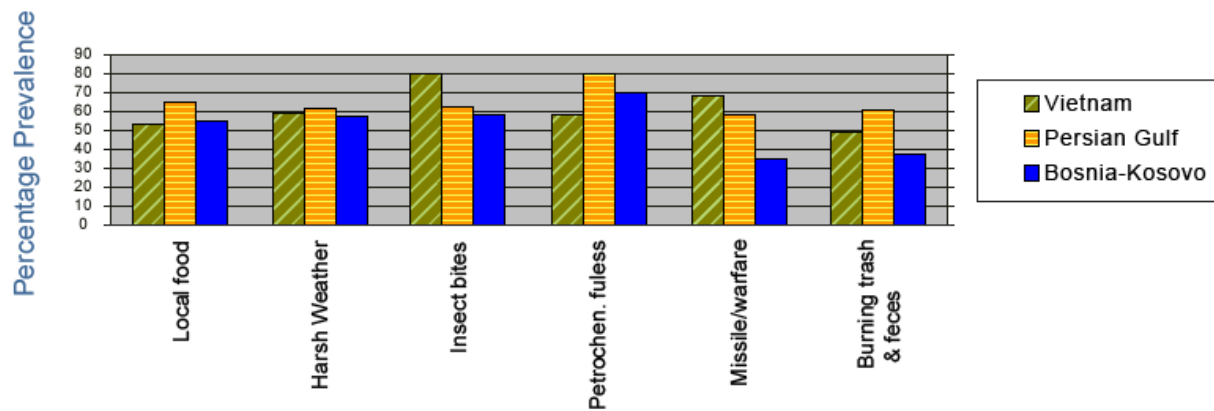
The specific exposure substances discussed in this training section include many of those most commonly raised as concerns by these Veterans, such as pesticides, nerve agents, vaccinations, oil well fires and plumes, Depleted Uranium and others.

It should take you approximately 40 minutes to complete this instruction.

Background - Exposure Concerns are Not New

Issues of environmental and other exposures have been of concern to Veterans for many years. Figure 1 demonstrates that at least as far back as the Vietnam conflict Veterans had concerns about exposures to harsh weather, insects, petrochemicals, missiles and weapons and burning trash and feces. The portion of Gulf War 1 Veterans expressing these concerns ranged from one half to three quarters.

Exposures of concern for veterans of the Vietnam War, the Persian Gulf War and the Bosnia–Kosovo peacekeeping activity



What are the Exposures of Concern?

Of Gulf War 1 Veterans seen at the War Related Illness and Injury Study Centers located at the VA Medical Centers in East Orange, NJ and Washington, DC, the top ten exposure concerns, with the percent that had this concern can be seen in the Table.

Top Ten Environmental Concerns of Gulf War 1 Veterans

1.	Protective gear/alarms	82.5%
2.	Diesel, kerosene and other petrochemicals	80.6%
3.	Oil well fire smoke	66.9%
4.	Local food	64.5%
5.	Insect bites	63.7%
6.	Harsh weather	62.5%
7.	Smoke from burning trash or feces	61.4%
8.	Within 1 mile of missile warfare	59.9%
9.	Repellants and pesticides	47.5%
10.	Paints and solvents	36.5%

Adapted from the WRIISC presentation, "Exposures of concern for veterans of the Vietnam War, the Persian Gulf War, and the Bosnia-Kosovo peacekeeping activity" by A. I. Schneiderman, A. Lincoln, M.K. Wargo, B. Curbow, and H.K. Kang at the 133rd Annual Meeting of the American Public Health Association in Philadelphia, December 14, 2005.

Categorization of Exposures

Often it is helpful to discuss exposure concerns of Veterans in terms of one of four categories: Weapons Concerns; Environmental Exposure Concerns; Disease Prophylaxis and/or Treatment Concerns; and Occupational Exposure Concerns.

Weapons Concerns:

- Missile warfare
- Nerve agents
- Depleted Uranium

Environmental Exposure Concerns:

- Oil well fire soot
- Smoke from burning trash and feces
- Poor ambient air quality
- Local food
- Insect bites
- Harsh weather
- Contaminated water

Categorization of Exposures (continued)

Disease Prophylaxis and Treatment Concerns:

- Pesticides
- Pyridostigmine Bromide
- Vaccinations
- Protective gear

Occupational Exposure Concerns:

- Diesel, kerosene, and gasoline
- Jet fuels and hydraulic fluids
- Paints
- Solvents

These are certainly not all inclusive lists. Some concerns may even fall into more than one category such as Depleted Uranium used in armor piercing shells (Weapons Concern), and in armor plating for vehicles (Prophylactic or Preventive Concern) or even concerns about the possibility of its accumulated dust on the ground (Environmental Exposure).

Specific Exposures of Concern – Introduction

Specific Exposures of Concern

The following ten segments address some of the specific exposures of concern, with a primary focus on what a clinician needs to know to discuss the exposure concern with a veteran. The covered topics are:

- Depleted Uranium
- Nerve Gas
- Oil Well Fire Smoke
- Pesticides
- Pyridostigmine Bromide
- Sandstorms
- Toxic Embedded Fragments
- Vaccinations
- Combinations of Exposures
- Other exposures

Specific Exposures of Concern – Depleted Uranium

Depleted Uranium

What is this substance?

Depleted Uranium (DU) is a by-product of the uranium enrichment process. It is the metal residue remaining after the process is completed. DU has about 50% of the radioactivity of natural uranium and is used commercially in medicine for radiation shields, in aviation as counterweights, in petroleum exploration as drilling equipment, and in space as satellite ballast. With its density, availability, and cost, the U.S. Military, and those of other countries, use DU in both armor-piercing projectiles and in armor.

Natural and depleted uranium are primarily alpha emitters. Alpha particles travel only 30 micrometers in skin and cannot penetrate glass, dead skin or paper. Therefore, DU is classified as a low level radioactive material.

Uranium is classified as a heavy metal similar to tungsten, lead and mercury. Its chemical properties and specifically heavy metal toxicity are the primary causes of concern regarding possible health effects from DU exposure.

How might a Veteran have been exposed?

When a vehicle is hit and penetrated by a DU projectile, it splits into small shards and bursts into flames. The projectile fragmentation may fill the vehicle with flying metal fragments, particles, and dust. Soldiers in the vehicles may inhale or swallow airborne particles, be injured by fragments, or have wounds contaminated by DU fragments, particles, and dust. Soldiers can have retained shrapnel imbedded in soft tissue and muscle. The largest pieces of shrapnel are removed when possible, but some shrapnel particles are too small to be safely removed without doing damage to the surrounding tissue.

Rescuers who enter vehicles damaged by DU projectiles may also be exposed to dust and airborne particles. Other Veterans may be exposed to DU dust and particles during salvage, cleaning, and reclamation operations.

The main routes of uranium uptake by the service members are inhalation, ingestion, and embedded metal fragments slowly dissolving in the body. In the general population, the major portion of the natural body burden of uranium is derived from ingestion and inhalation of the naturally occurring uranium in the air, food, and water.



What are the known health effects?

The two primary health concerns related to DU exposure are radiation and heavy metal toxicity. External radiation from DU does not penetrate very far through skin, thus is not much of a health risk. Ingested and inhaled DU particles are largely expelled through the digestive system and through exhalation. Remembering that DU is less radioactive than naturally occurring uranium, this should not be a significant source of concern.

The first organs of concern with regards to heavy metal toxicity secondary to Depleted Uranium are the kidneys. The VA is following a group of US Veterans from Gulf War 1 that have DU metal fragments (shrapnel) in their body. As of the time of this writing (2010) no significant health effect has been identified in these Veterans as a result of their embedded DU fragments.

Is there a way to test to confirm exposure?

A 24 hour urine collection for uranium may be conducted on any Gulf War 1 Veteran that so requests. If the total uranium count is elevated a fractionation may be performed to identify how much, if any, of the uranium is DU versus naturally occurring uranium. These collections are being coordinated through the Baltimore, MD VAMC. For more information please contact the [Toxic and Embedded Fragments Program at the Baltimore VA](#).

Is there a way to test for health effects?

Urinalysis looking for proteinuria and blood tests for blood urea nitrogen (BUN) and creatinine are very helpful in determining the presence of renal pathology. However, there are no tests that will specifically identify DU related renal insufficiency.

Are there specific treatments for the health effects secondary to exposure?

At this time there are no recognized adverse health outcomes of exposure to DU. However, Veterans who have exposure concerns are periodically monitored for adverse health effects through the DU follow-up program at the Baltimore VAMC. (See link above.)

Additional diagnostic resources

Veterans that still have concerns about this exposure may be referred to the VA's War Related Illness and Injury Study Center ([WRIISC](#)).

Specific Exposures of Concern – Nerve Gas

Nerve Gas

What is this substance?

Chemical warfare agents, such as nerve gas, are materials that are designed to cause immediate, debilitating and lethal effects in humans. Sarin, Soman and VX gases are all organophosphate (OP) agents.

How might a Veteran have been exposed?

It is believed that no chemical weapons were used against coalition forces during the Gulf War 1, although rumors were and are plentiful. In March 1991, following the end of the war, U.S. service members used explosives to destroy a large ammunition depot in southern Iraq, known as Khamisiyah. This site was later found to have contained chemical agent munitions, including Sarin and the closely related agent, Cyclosarin. Some amounts of these agents were released into the atmosphere during demolition.

The exact levels of exposure have been estimated to be very low or trace and no cases of acute OP poisoning were reported to have occurred during the Gulf War 1 or in the months afterwards, while US service members were still in the region. However, there is a possibility that some low level (asymptomatic) exposures may have occurred after the war.

What are the known health effects?

The OP nerve agents have chemistry and a cholinergic mode of action very similar to the OP pesticides, but are designed to be more toxic to humans. In general, once these pesticides enter the body, they are quickly metabolized and excreted in urine and feces. These agents cause inhibition of the enzyme acetylcholinesterase (AChE). AChE is crucial to normal nerve and muscle functioning. Inhibition of AChE is essentially irreversible and complete recovery involves the body's production of new enzyme over a period of days or weeks.

Acute health effects of OP poisoning include: miosis (small pupils); headache; nausea; dizziness; anxiety and restlessness. Life threatening symptoms from OP poisoning include: muscle fasciculation; weakness; tremor; incoordination; vomiting; abdominal cramps; diarrhea; sweating; salivation; and tearing. Death can occur by respiratory paralysis.

Some patients who survive severe acute OP poisoning may show subtle, chronic neurological and cognitive abnormalities that can be detected using standardized neurological and neuropsychological tests. These changes may persist for years following the acute poisoning.

**Is there a way to test to confirm exposure?**

No, there are no tests available that will specifically test for previous (18 years ago) exposure to nerve agents. The DoD, in conjunction with other Federal agencies, has done modeling of the air plume and its dispersion following the demolition at Khamisiyah. As a result over 100,000 Veterans were notified that they may have been exposed to low level or trace amounts of the chemicals discussed in this section. The models have been revised several times and there is no indication that any of these notified Veterans actually had any significant exposure.

Is there a way to test for health effects?

Neurologic and neuropsychological tests can identify neurological and cognitive deficits.

*Note that many of the symptoms described above may be the results of being in a combat theater in extreme conditions, including temperature extremes. Also cognitive deficits may also be seen in traumatic brain injury.

Are there specific treatments for the health effects secondary to exposure?

No, there are no known specific treatments for cognitive or neurologic deficits which are residuals of acute OP poisoning. Such cognitive deficits are treated the same way that the same symptoms or problems are treated when from other causes or when idiopathic. The same is true for neurologic problems.

Additional diagnostic resources

Veterans that still have concerns about this exposure may be referred to the VA's War Related Illness and Injury Study Center ([WRIISC](#)).

Specific Exposures of Concern – Oil Well Fire Smoke

Oil Well Fire Smoke

What is this substance?

During the Gulf War 1 approximately seven hundred Kuwaiti oil wells were set aflame by the retreating Iraqi army. The last of the fires was not fully extinguished until November 1991, eight months after the war ended. This resulted in a plume of smoke and soot that was visible from space. At the peak of the fires, the smoke absorbed 75 to 80% of the sun's radiation.

How might a Veteran have been exposed?

Most Veterans of the Gulf War 1 can describe where they were in relation to the smoke plume. Some saw it off in the distance and some report that the noonday sky was blackened by the plume. Service members may have been exposed to the smoke and soot by inhalation or by ingestion. The latter because the oily soot covered many things, including hands and the food being eaten.

What are the known health effects?

At the time of the destruction, the medical and environmental community feared exposure to the fires would result in catastrophic acute and chronic health effects among people exposed to the products of combustion. However, results of air monitoring studies indicated that, except for particulate matter, the amounts of air contaminants at ground level were within the limits generally considered as safe for the health of the general population. It was concluded that the fires' high combustion efficiency, the nature and amount of the smoke's contaminants, the lofting effect created by the intense heat of the fires and solar effects, and the local wind and weather conditions combined to reduce the fires' impact on military and civilian populations.

Many veterans described black nasal discharge, coughing up black mucous, eye and throat irritation, and the onset of skin rashes and shortness of breath. Some of these problems involved a worsening of an existing respiratory condition (e.g., asthma, bronchitis). High concentrations of particulate matter can provoke respiratory tract irritation and a worsening of symptoms in people with a predisposition to asthma or reactive airway disease.

**Is there a way to test to confirm exposure?**

No, there are no tests available that will specifically test for previous (18 years ago) exposure to oil well fires.

Is there a way to test for health effects?

All GULF WAR 1 Veterans with pulmonary symptoms, including shortness of breath at rest or with exertion, or with decreased exercise tolerance in the absence of other known causes, should have a base line test of pulmonary functioning, with testing both pre- and post-bronchodilator administration. A baseline chest X-ray is also recommended. The exact periodicity with which these tests should be repeated is unclear, and should be based on clinical evaluation of the patient's condition.

Are there specific treatments for the health effects secondary to exposure?

No, there are no known specific treatments for respiratory problems secondary to oil well fire smoke exposure. Pulmonary problems secondary to this exposure are treated the same way that the same symptoms or disorders are treated when from other causes or when idiopathic.

Additional diagnostic resources

Veterans that still have concerns about this exposure may be referred to the VA's War Related Illness and Injury Study Center ([WRIISC](#)).

Specific Exposures of Concern - Pesticides

Pesticides

What is this substance?

Pesticides are chemical substances designed to prevent, destroy, repel and/or reduce pests. All of the pesticides shipped from the US for use by the military during Desert Shield/Storm had been approved by the US EPA for either commercial or home use or both.

Pesticides used during the Gulf War Include:

- Carbaryl (Sevin[®])
- Chlorpyrifos (Dursban[®])
- DEET (as in OFF[®] or Cutters[®])
- Diazinon
- Dichlofos (Vapona[®])
- Lindane
- Malathion
- Methomyl (Lannate[®])
- Permethrin
- Propoxur (Baygon[®])
- Pyrethroids
- Rodenticide baits

How might a Veteran have been exposed?

Veterans may have been exposed to pesticides used during Gulf War 1 via inhalation of vapors or from skin contact and absorption. According to Department of Defense (DoD) policy in 1991 service members had permethrin in spray cans for treating clothing and DEET liquid or stick for personal protection against mosquitoes and flies. In addition, there are many anecdotal reports of service members wearing flea collars during the Gulf War 1. Other pesticides shipped were to have been applied only by trained personnel.

What are the known health effects?

In general, once these pesticides enter the body, they are quickly metabolized and excreted in urine and feces. Lindane is metabolized and excreted more slowly. As a class, the organophosphorus (OP) pesticides cause inhibition of the enzyme acetylcholinesterase (AChE). AChE is crucial to normal nerve and muscle functioning. Inhibition of AChE is essentially irreversible and complete recovery involves the body's production of new enzyme over a period of days or weeks. Methylcarbamate (MC) pesticides work the same way but reversibly inhibit AChE, so the symptoms are similar but are of shorter duration.

Acute health effects of OP poisoning include: miosis (small pupils); headache; nausea; dizziness; anxiety and restlessness. Life threatening symptoms from OP poisoning include:

muscle fasciculation; weakness; tremor; incoordination; vomiting; abdominal cramps; diarrhea; sweating; salivation; and tearing. Death can occur by respiratory paralysis.

Some patients who survive severe acute OP poisoning may show subtle, chronic neurological abnormalities that can be detected using standardized neurological and neuropsychological tests. These changes may persist for years following the acute poisoning. A similar condition has not been reported with acute MC poisoning.

Permethrin has very low human toxicity, which is why it is used in personal care products such as shampoos and lotions, or for treating clothing. Lindane also has very low acute toxicity, although after very high exposures, it can cause liver and kidney damage. In laboratory animals it is reported to cause liver cancer.

DEET, introduced in the 1950s, remains widely used in consumer brands such as OFF[®] and Cutters[®]. There are multiple products on the market to be applied directly to the skin and clothing in various forms, including aerosol and non-aerosol sprays, creams, lotions, sticks, and towelettes. DEET has a very low toxicity profile.



Is there a way to test to confirm exposure?

Because these chemicals are rapidly metabolized and excreted from the body, there are no tests available that will specifically test for previous (18 years ago) exposure to pesticides.

Is there a way to test for health effects?

Neurologic and neuropsychological tests can identify neurological and cognitive deficits.

*Note that many of the symptoms described above may be the results of being in a combat theater in extreme conditions, including temperature extremes. Also cognitive deficits may also be seen in traumatic brain injury.

Are there specific treatments for the health effects secondary to exposure?

No, there are no known specific treatments for cognitive or neurologic deficits which are residuals of acute OP poisoning. Such cognitive deficits are treated the same way that the same symptoms or problems are treated when from other causes or when idiopathic. The same is true for neurologic problems.

Additional diagnostic resources

Veterans that still have concerns about this exposure may be referred to the VA's War Related Illness and Injury Study Center ([WRIISC](#)).

Specific Exposures of Concern – Pyridostigmine Bromide

Pyridostigmine Bromide

What is this substance?

Pyridostigmine Bromide (also referred to as PB or antidote tablets) is a drug that has been used for decades in anesthesia and for the treatment of a neuromuscular disease called myasthenia gravis. The drug causes inhibition of the enzyme acetylcholinesterase (AChE). AChE is crucial to normal nerve and muscle functioning. Inhibition of AChE is essentially irreversible and complete recovery involves the body's production of new enzyme over a period of days or weeks. In the treatment of myasthenia gravis, the average dose is 120-600 mg per day (in divided doses). PB was used during the Gulf War 1 as a pretreatment for exposure to nerve agents. The drug is poorly absorbed after oral administration; peak plasma levels occur two or three hours after administration. It is eliminated almost exclusively in the urine.

How might a Veteran have been exposed?

PB was disseminated in packets containing 21 thirty-milligram tablets. When commanders determined that the risk of chemical attack was significant, the tablets were self-administered by troops — one tablet every eight hours for up to a week. About 250,000 US troops took PB at least once. There are many reports of service members taking the tablets for extended periods of time.

What are the known health effects?

Adverse side effects of PB are generally related to the large doses given to myasthenia patients. Problems noted include nausea, vomiting, diarrhea, abdominal cramps, increased peristalsis, increased salivation, increased bronchial secretions, miosis, heavy perspiration, fasciculations, and weakness.

PB often produced mild, acute gastrointestinal and urinary problems among Gulf War 1 service members. These problems were generally observed within hours of taking the initial tablet. In many instances, these effects subsided after a day or two. In other troops, the problems continued as long as the PB tablets were taken. Some troops took PB with meals to minimize gastrointestinal symptoms. Less than one percent of U.S. troops in the 1991 Gulf War 1 required a medical visit after taking PB. Less than one-tenth of one percent was advised by medical personnel to discontinue use of PB.

Concerns have been expressed about the possibility of increased health problems from PB when it is combined with other possible risk factors or exposures, including other AChE inhibitors, such as pesticides. Some researchers suggest that PB in combination with stress

may affect the central nervous system. The completed studies are far from conclusive and research is ongoing.

Is there a way to test to confirm exposure?

No, there are no tests available that will specifically test for previous (18 years ago) exposure to Pyridostigmine Bromide. The half life if the drug is under two hours, therefore the drug itself is essentially out of the body within 24 hours of the last dose.

Is there a way to test for health effects?

At this time there are no known long term side effects of PB, therefore there are no tests that are specific for health effects of taking this drug.

Are there specific treatments for the health effects secondary to exposure?

At this time there are no known long term side effects of PB, therefore there are no special treatments that are specific for health effects of taking this drug.

Additional diagnostic resources

Veterans that still have concerns about this exposure may be referred to the VA's War Related Illness and Injury Study Center ([WRIISC](#)).

Specific Exposures of Concern – Sandstorms

Sandstorms

What is this substance?

The sand in large areas of the Middle East is extremely fine, in fact, fine enough to be comparable to what many think of as dust. As a result of the winds blowing across large areas of flat terrain, such as in deserts, this sand gets picked up and creates sandstorms.

How might a Veteran have been exposed?

Anyone that has been through a sandstorm will know it. The sky typically darkens, the dust in the air becomes thick, visibility drops significantly and every mucous membrane may become irritated.



What are the known health effects?

There is very limited data regarding direct health effects of exposure to sandstorms. There is reasonably good evidence that individuals with chronic pulmonary and/or cardiac

disease are at increased risk of exacerbation during or shortly after exposure to sandstorms. There is anecdotal evidence of the development of reactive airway disease following exposure to sandstorms, with a variable time to onset. Additional investigations are continuing.

Is there a way to test to confirm exposure?

No, there are no tests available that will specifically test for previous (18 years ago) exposure to sandstorms.

Is there a way to test for health effects?

All GULF WAR Veterans with pulmonary symptoms, including shortness of breath at rest or with exertion, or with decreased exercise tolerance in the absence of other known causes, should have a base line test of pulmonary functioning, with testing both pre- and post-bronchodilator administration. A baseline chest X-ray is also recommended. The exact periodicity with which these tests should be repeated is unclear, and should be based on clinical evaluation of the patient's condition.

Are there specific treatments for the health effects secondary to exposure?

No, there are no known specific treatments for respiratory problems secondary to sandstorm exposure. Pulmonary problems secondary to this exposure are treated the same way that the same symptoms or disorders are treated when from other causes or when idiopathic.

Additional diagnostic resources

Veterans that still have concerns about this exposure may be referred to the VA's War Related Illness and Injury Study Center ([WRIISC](#)).

Specific Exposures of Concern – Toxic Embedded Fragments

Toxic Embedded Fragments

What is this substance?

In an effort to move away from Depleted Uranium a number of other heavy metals have been used for armor plating and armor piercing shells. These substances are classified as heavy metals similar to uranium. In addition, Improvised explosive devices may contain any number of metals or compounds including plastic. Their chemical properties such as those producing heavy metal toxicity are the primary causes of concern regarding possible health effects from toxic embedded fragments.

How might a Veteran have been exposed?

In some cases when a vehicle is hit and penetrated by a heavy metal alloy projectile, it splits into small shards and bursts into flames. The projectile fragmentation may fill the vehicle with flying metal fragments, particles, and dust. Soldiers in the vehicles may inhale or swallow airborne particles, be injured by fragments, or have wounds contaminated by fragments, particles, and dust consisting of these metals. Soldiers can have retained shrapnel imbedded in soft tissue and muscle. The largest pieces of shrapnel are removed when possible, but some shrapnel particles are too small to be safely removed without doing damage to the surrounding tissue.

Rescuers who enter vehicles damaged by such projectiles may also be exposed to dust and airborne particles. Other Veterans may be exposed to heavy metal dust and particles during salvage, cleaning, and reclamation operations. The main concern at this time is embedded metal fragments slowly dissolving in the body.

What are the known health effects?

What, if any, health effects are caused by toxic embedded fragments is unknown.



Is there a way to test to confirm exposure?

Embedded metal fragments, also known as shrapnel, is very easily tested for with simple radiography. Other fragments may not be detected, but usually they would be at the site of a surface wound. It requires much more sophisticated testing to determine the nature of the metal,

especially in cases where the fragments are located so that their removal is not medically easy to accomplish.

Is there a way to test for health effects?

No, because there are no known health effects of these embedded fragments there is no test that can be performed to evaluate for a specific health effect.

Are there specific treatments for the health effects secondary to exposure?

No, because there are no known health effects of these embedded fragments there is no specific treatment. Sometimes it is recommended that the fragment be removed surgically, especially if there is a lot of decomposition into the surrounding tissues. Generally, Gulf War 1 Veterans with symptoms and/or symptom clusters are treated as would any individual with similar symptoms or symptom complexes.

Additional diagnostic resources

The VA set up the Toxic Embedded Fragment Surveillance Center ([TEFSC](#)) at the Baltimore VA Medical Center to follow OEF/OIF veterans with fragments and to identify and treat potential health problems early.

Specific Exposures of Concern - Vaccinations

Vaccinations

What is this substance?

A vaccination is any preparation of killed microorganisms, living weakened organisms, noninfectious particles of organisms, etc. introduced into the body to produce immunity to a specific disease by causing the formation of antibodies.

How might a Veteran have been exposed?

Before and during deployment to Gulf War 1 all US Troops were given the standard series of inoculations against infectious diseases that would be given to any US citizen traveling to that part of the world who had a high likelihood of exposure to other than urban and tourist areas. In addition, two non-live vaccines were given against two biological warfare agents—Anthrax and botulinum toxoid. It is estimated that approximately 150,000 service members received at least one dose of the Anthrax vaccine and about 8,000 received the botulinum toxoid.

What are the known health effects?

A common reaction to many vaccinations is local erythema, swelling and tenderness, often associated with malaise and a “viral illness” like syndrome. These symptoms tend to have their onset within 12-24 hours of receiving the injection and tend to resolve within 48-72 hours of onset. These same reactions have been reported with the Anthrax vaccine. To date there are no studies that show a delayed onset of side effects to any of the common vaccinations. There is a small number of individuals that will have a serious reaction following administration of any immunization, but this number is not significantly larger for Anthrax vaccine.

Most Americans today have received multiple vaccinations on the same day. This may include Measles, Mumps, Rubella (MMR) or Diphtheria, Tetanus, Pertussis (DTP), both of which have been received by most Americans under 40 years old. Some multiple vaccination regimens can lead to suboptimal antibody responses, but there is little evidence, largely because of a lack of active monitoring, of adverse clinical or laboratory consequences beyond the transient effects discussed above.

There is a theory, that has not yet been proven or disproven, that certain combinations of vaccinations, given in certain sequences and timing schedules, given to individuals who are under significant stress (for example before and during deployment), who may be otherwise genetically susceptible, may cause immune dysregulation. However, no consistent measurable immune system abnormality has been identified.

Is there a way to test to confirm exposure?

There are blood tests that may be done to evaluate for immunity to specific infections, which may indicate prior vaccination or exposures to the native infection. However, there are no tests available that will specifically test for multiple vaccination related immune dysregulation.

Is there a way to test for health effects?

There is a variety of blood tests that can assess different components of the immune system, both in terms of quantity and function. However, since there is still no objective evidence of a specific type of immune dysregulation related to multiple vaccinations there are no tests currently recommended.

Are there specific treatments for the health effects secondary to exposure?

No, there are no specific treatments because there are no known clinical entities connected to this exposure.

Additional diagnostic resources

Veterans that still have concerns about this exposure may be referred to the VA's War Related Illness and Injury Study Center ([WRIISC](#)).

Specific Exposures of Concern – Combinations of Exposures

Combinations of Exposures

What is this substance?

There are multiple theories about the causes of symptoms in Gulf War 1 Veterans. Many of these revolve around various combinations of exposures, such as nerve agents and Pyridostigmine Bromide or multiple vaccinations and stress.

How might a Veteran have been exposed?

Many of these proposed combinations of exposures actually occurred to large numbers of service members deployed to Operation Desert Shield/Desert Storm. See Sections A-G above for more details.

What are the known health effects?

As of the time of this writing, January 2010, there have not yet been any sound, well accepted studies looking at specific combinations of exposures and specific symptom clusters or illnesses in Gulf War 1 Veterans. As a result there are no known health effects of these combinations of exposures.



Is there a way to test to confirm exposure?

No, just as there are no tests available that will specifically test for most individual previous (18 years ago) exposures, there are no tests available to assess combinations of exposures.

Is there a way to test for health effects?

No, there are no known distinct clinical entities resulting from such combinations of exposures and therefore there is no test that can be performed.

Are there specific treatments for the health effects secondary to exposure?

No, there are no known distinct clinical entities resulting from such combinations of exposures and therefore there is specific treatment for such entities. Generally, Gulf War 1 Veterans with symptoms and/or symptom clusters are treated as would any individual with similar symptoms or symptom complexes.

Additional diagnostic resources

Veterans that still have concerns about this exposure may be referred to the VA's War Related Illness and Injury Study Center ([WRIISC](#)).

Summary of Exposure Concerns of Gulf War 1 Veterans

You have completed **Exposure Concerns of Gulf War 1 Veterans**.

Glossary of Exposure Concerns of Gulf War 1 Veterans

1. Sarin: "An organophosphorus ester compound that produces potent and irreversible inhibition of cholinesterase. It is toxic to the nervous system and is a chemical warfare agent."
2. Cyclosarin (cyclohexyl methylphosphonofluoridate): The toxic agent is closely related to sarin.
3. Organophosphate: It is a generic name for organic esters of phosphoric acid.
4. Anthrax: "An acute infection caused by the spore-forming bacteria BACILLUS ANTHRACIS. It commonly affects hooved animals such as sheep and goats. Infection in humans often involves the skin (cutaneous anthrax), the lungs (inhalation anthrax), or the gastrointestinal tract. Anthrax is not contagious and can be treated with antibiotics." (from National Library of Medicine, Medical Subject Headings).

Note: Link to "Medical Subject Headings -- <http://www.ncbi.nlm.nih.gov/sites/mesh>.

5. Botulinum Toxoid: A highly poisonous substance produced by bacteria.

How to Conduct an Exposure Assessment with Veterans

Introduction of How to Conduct an Exposure Assessment with Veterans

Many Gulf War 1 Veterans have concerns about one or more potentially hazardous agents to which they may have been exposed, either in preparation for or during deployment. In order for health care providers to provide the highest level of care for Veterans they must be able to ascertain what substances the Veterans were exposed to or believe they were exposed to. The providers need to be able to discuss these exposures and potential risks with the Veterans using terms that can be understood.

Purpose of How to Conduct an Exposure Assessment with Veterans

The purpose of this section is to orient VA Health Care Providers and Examiners, as well as others, including non-VA health care providers, to the assessment and discussion of combat related environmental agent exposures of Gulf War 1 Veterans.

Learning Objectives of How to Conduct an Exposure Assessment with Veterans

- At the conclusion of this section participants will be able to conduct basic environmental exposure assessments on Veterans. The skills involved in performing these assessments include the ability to:
 - Identify and document Veterans' concerns regarding environmental exposures;
 - Determine whether the Veterans have had any clinically or scientifically significant exposures to environmental hazards during their military careers, including during their deployment(s);
 - Discuss with Veterans, applying the principles of risk communication, the known and unknown risks presented by these exposures of concern.

Throughout this lesson, comments that may be used during an exposure assessments with Veterans, to convey the message discussed on the page may be found in Emphasis Boxes.

Examples of scenarios that highlight the need to ask certain questions may be found in Emphasis boxes.

What are the Exposures of Concern?

Of Gulf War 1 Veterans seen at the War Related Illness and Injury Study Centers located at the VA Medical Centers in East Orange, NJ and Washington, DC, the top ten exposure concerns, with the percent that had this concern can be seen in the Table.

Top Ten Environmental Concerns of Gulf War 1 Veterans

1.	Protective gear/alarms	82.5%
2.	Diesel, kerosene and other petrochemicals	80.6%
3.	Oil well fire smoke	66.9%
4.	Local food	64.5%
5.	Insect bites	63.7%
6.	Harsh weather	62.5%
7.	Smoke from burning trash or feces	61.4%
8.	Within 1 mile of missile warfare	59.9%
9.	Repellants and pesticides	47.5%
10.	Paints and solvents	36.5%

Adapted from the WRIISC presentation, "Exposures of concern for veterans of the Vietnam War, the Persian Gulf War, and the Bosnia-Kosovo peacekeeping activity" by A. I. Schneiderman, A. Lincoln, M.K. Wargo, B. Curbow, and H.K. Kang at the 133rd Annual Meeting of the American Public Health Association in Philadelphia, December 14, 2005.

Discussing exposure concerns in GW I Veterans – Step 1

Step 1 - Introduction

- ❖ Display empathy and care for the Veteran to establish trust and credibility.
- ❖ Tell the Veteran upfront that you will be honest - explaining what you do and **don't know**.
- ❖ Listen actively and patiently.
- ❖ Most people, including Veterans, have never had an exposure assessment so they don't know exactly what to expect.

Emphasis Box:

"There are two schools of thought in medicine, one that says a clinician always has to have an answer and one that says it's okay to admit they don't know something. I am from the second school." In this context, those from the "second school" tend to be seen as more credible by the Veteran patient. Freely admit when you don't know something, but display earnestness in finding out answers to questions where the answers exist."

Emphasis Box:

"My objective is to have a more knowledgeable Veteran leave my office, if, in that process, the Veteran is also reassured that is great, but I promise that the answers I give you are based on the best science currently available. However there are studies ongoing, both within and outside of VA to further identify any health consequences of deployment and military related exposures"

Discussing exposure concerns in GW I Veterans – Step 2

Step 2 - Basic toxicology

Explain the need for a very basic understanding of three fundamental principles of toxicology:

- **Route of exposure** – for any substance to have an effect on the body it must have a mechanism, or route, to come in contact with and usually to enter into the body.

Emphasis Box:

“Even if there is lead in the paint and asbestos in the ceiling tiles here in my office, as long as they are not chipping or flaking they have no way to contact or enter our bodies and therefore they are not exposures in the medical or scientific sense.”

- **Temporal relationship between exposure and effect** – for any substance to have an effect on the body the exposure must have taken place before the effect occurred.
- **Dose and effect** – with most substances in our environment, both natural and man-made, the amount of exposure usually makes the difference between having an effect and not having an effect.

Emphasis Box:

“There are many substances that are critical for our survival, where too little in our body is harmful, but too much is also, examples include salt, potassium, and water. Similarly, many exposures in small quantities are felt to be harmless. The problem is that we often don’t know what the threshold is between harmless and harmful.”

These concepts can be the difference between an exposure of concern and a real exposure. In addition, understanding these concepts may make a large difference in a Veteran’s level of concern.

Discussing exposure concerns in GW I Veterans – Step 3

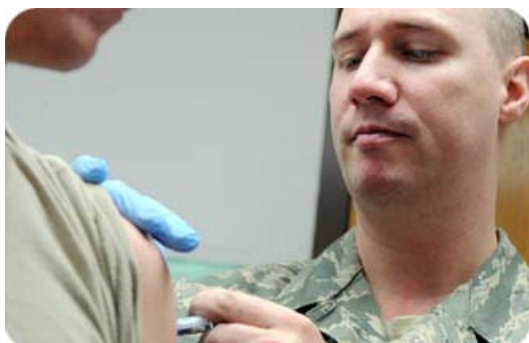
Step 3 - Exposure history of deployment(s)

- This is what the Veteran really came to talk about.
- Ask about time, duration and location of deployment(s) – be as specific as possible.
- Was the in an area of hostilities? Did he or she come under fire? Did they take or were they close to any incoming missiles?
- Did they hear any chemical alarms? Did they take any antidote tablets or PB tabs (Pyridostigmine bromide)? Did they wear Mission Oriented Protective Posture (MOPP) gear (chemically protective garments going up to MOPP 4 which is fully enclosed even a hood)?

Emphasis Box:

Studies reveal that some Veterans believe that hearing the chemical alarms and putting on the protective suits are indications that they were exposed to dangerous chemicals rather than that they were able to take proper precautions to prevent these exposures.

- Do they remember what immunizations they received before and during deployment?
- Do they have their immunization record available?
- Did they have any initial reactions to any of these immunizations?
- Were they taking any prophylactic medicines?
- Did they have any problems with these medicines?
- Did they eat only MREs and mess food and drink or did they consume local food and/or drink?
- Were they exposed to pesticides while deployed?
- Did they use any of their own pesticides during deployment?
- Did they wear a flea collar?
- Did they have a problem with any of these?
- Did they sustain bug bites during deployment?
- Did they get sick after an insect bite?
- Were they exposed to and did they have immediate health problems from:



- The oil well fire smoke and soot?
- Burn pits?
- Sand and sandstorms?
- Specific factory smoke?
- General air pollution?

Emphasis Box:

All of the above air borne particulate exposures may cause immediate irritation of the mucous membranes of the eyes, nose, mouth and upper respiratory tract. More significant immediate or rapid onset symptoms such as respiratory distress, shortness of breath requiring medical treatment, including oxygen, being evacuated from theater, etc. were very rare.

Discussing exposure concerns in GW I Veterans

- Did they have direct contact with POWs?
- Did they handle or have direct contact with human remains?
- Did they sustain any blood or body fluid exposures?
- Did they have or use personal protective equipment, e.g., gloves, masks, etc.?
- What did they do during the deployment?
- Were they using any chemicals, solvents, petrochemicals, lubricants, etc.?
- Did they have any health problems with these exposures?
- How many hours per day and how many days per week did they perform their occupational tasks?

Emphasis Box:

Truck, heavy equipment and aircraft mechanics in civilian life typically work a 40 hour work week and then go home, bath and change their clothes. These same occupations when deployed to a combat theater may work 12-14 hour days, seven days per week, with no opportunity to bathe. Therefore their level of exposure to the same substances may be significantly greater, even though they are doing the same job.

Discussing exposure concerns in GW I Veterans

- In March 1991, following the end of the war, U.S. service members used explosives to destroy a large ammunition depot in southern Iraq, known as Khamisiyah. This site was later found to have contained chemical agent munitions, including Sarin and the closely related agent, Cyclosarin.
- Were they near the Khamisiyah depot when it was blown up in March 1991?

Emphasis Box:

Here is an example of when temporal relationship becomes important. The dates of the demolition of the munitions depot at Khamisiyah were March 4 and March 10, 1991. Any Veteran that was already back in Kuwait or en route back to the US by those dates could not have sustained an exposure to the **Sarin** or **Cyclosarin** nerve agents believed to have been detonated there on those dates.

- Did they sustain any traumatic injuries during deployment? Did they get sick during deployment? If so, what was the timing and their location at the time?
- A temporal history of the Veteran's deployment activities can be crucial in determining whether the Veteran has had any environmental exposures that might be impacting his or her health.

Discussing exposure concerns in GW I Veterans

If time permits and/or if the Veteran raises concerns regarding exposures that did not occur during their military deployment(s), see Step 4.

Otherwise, continue to Step 5.

Step 4 - Exposure history pre-deployment, between deployments and post-separation

- Ask about any potentially significant exposures or related illnesses that may have occurred pre-enlistment, during basic training, during later training exercises or between deployments. Were there any lingering effects of which they are aware?
- Ask about any potentially significant exposures or related illnesses that may have occurred since leaving the service. Were there any lingering effects of which they are aware?

Emphasis Box:

Many Veterans go on extended worldwide travel after leaving the military. Sometimes to places with known significant endemic diseases.

- Many Veterans become government contractors with the same types of exposures as when they were active duty.
- Many Veterans learn extremely marketable skills in the military and then find employment in the civilian world utilizing these skills. Sometimes these employment opportunities involve

applying these skills without the benefit of personal protective equipment or proper precautions.

Emphasis Box:

Service members who learn a trade in service, such as welders, pipefitters, mechanics, etc., often have access to full personal protective equipment while performing their duties in service. However, after return to civilian life they may take positions doing the same work, in companies without much regard for such protections. The Veteran may not feel secure enough in the job to even raise the issues.

Step 5 - Specific exposure concerns

- At this point in the process it is important to repeat back to the Veteran those exposure concerns that you heard raised.
- Ranking the degree of concern can be helpful.
- The goal is to demonstrate that you were listening and that the evaluation is a dialogue.

Ask a Question:

“Okay, so it sounds like you have some concern about potential exposure to A, B and C. Is that correct? How would you rank them in importance so that I know in which order to speak about them?”

- Regardless of how long it has been since the Veteran’s deployment this is likely to be the first time anyone has specifically asked about exposure concerns.
- Ask about anything you may have missed. This also reinforces that the Veteran is a partner in the process and not just a passive participant.

Ask a Question:

“Aside from A, B and C, are there any other exposure related concerns that you have that I either missed when you said it or that I didn’t ask about at all?”

- An important Risk Communication principle is to identify someone’s concerns and provide information that addresses those concerns.

Discussing exposure concerns in GW I Veterans – Step 6

Step 6 - Education and risk communication

- ❖ The principles and concepts of risk communication must be integrated throughout Steps 1-5. A fuller understanding of these concepts may be found in Lesson 8 of this program Risk Communication.
- ❖ Honest information from a knowledgeable and credible source is the key to the assessment.
- ❖ Don't talk down to the Veteran. Address the Veteran's concerns honestly but in terms that are likely to be understood.

Note:

Acknowledge uncertainty!

Discussing exposure concerns in GW I Veterans – Step 6

- **Remember that risk perception is not misperception, but a different perception.** Often one's perception will not be affected by factual disputation; however that does not relieve you of the responsibility to keep your educational statements based in fact.
- Comparisons can be helpful but be careful. These can easily backfire and make the Veteran less likely to accept anything that you say. More about this can be found in Section 8.
- Make sure you listen to what is being told to you, verbally and otherwise, including the underlying concerns. Often the Veteran does not know how to put their concerns into words they are comfortable using. Sometimes their body language says much more than their words. You must be aware and on the lookout for non-verbal cues.

Note:

Risk communication is a two-way street, it is not risk speaking, it requires a dialogue.

Summary of How to Conduct an Exposure Assessment with Veterans.

You have completed **How to Conduct an Exposure Assessment with Veterans.**

Undiagnosed and Unexplained Illnesses

Introduction: Chronic Multi-symptom Illness (Undiagnosed and Unexplained Illnesses)

Very soon after returning from the combat theater, Gulf War 1 Veterans of US, British and Canadian coalition forces began complaining of multiple symptoms which could not be easily characterized into known disease entities or clinical syndromes. Despite many attempts to relate these problems to a variety of potentially hazardous exposures in the theater of operations, the cause of these symptoms remained elusive.

Purpose of Undiagnosed and Unexplained Illnesses

The purpose of this section is to familiarize clinicians with the nature of Undiagnosed and Unexplained Illnesses including clinical recognition, diagnostic categories, available treatment, referral resources and special compensation benefits for Gulf War 1 Veterans who suffer from these undiagnosed and unexplained illnesses.

Objectives of Undiagnosed and Unexplained Illnesses

By completing this section you will be able to:

- Identify those symptoms and groups of symptoms that are recognized as “Undiagnosed Illnesses” and therefore presumptively connected to service in the Gulf War,
- Identify the “Unexplained Illnesses” that are presumptively connected to service in the Gulf War,
- Utilize the VA’s Clinical practice guidelines to diagnose and treat Chronic Fatigue Syndrome, Fibromyalgia and Irritable Bowel Syndrome (IBS),
- Understand the special compensation benefits available to Gulf War Veterans suffering from these conditions, and
- Be able to refer Gulf War 1 Veterans to the proper offices and clinical programs for continued diagnostic work-up, treatment and claims processing.

Chronic Multi-symptom Illness

Of the almost 700,000 military personnel who deployed to the first Gulf War (August 1990 to July 1991), varying reports show that between 25% and 35% complain of chronic multi-symptom illness. Many of these symptoms are also seen in non-deployed troops and in the general population. However, it is well documented that these symptoms occur in much higher prevalence in troops deployed to this conflict. In November 2008, a report issued by the VA's Research Advisory Committee on Gulf War Illness concluded that these symptoms were due to the combined effects of exposure to Pyridostigmine Bromide and pesticides. A review of the supporting research by the most recent Institute of Medicine Committee (IOM), which was released in April 2010, on Gulf War and Health could not reach the same conclusion. The symptoms are so varied and the constellations in which they occur are so numerous that one etiology for all is difficult to imagine. The good news is that we are finally starting to elucidate some of the pathophysiologic mechanisms leading to some of the symptoms.

Note: April 2010 can be linked to:

<http://www.iom.edu/Reports/2010/Gulf-War-and-Health-Volume-8-Health-Effects-of-Serving-in-the-Gulf-War.aspx>

Chronic multi-symptom illness is not "Gulf War Syndrome." **Gulf War Syndrome is not utilized by VA in that it presumes a single case definition and therefore a single etiology.** Chronic multi-symptom illness may be one disorder with one etiology; one disorder with multiple etiologies or multiple disorders with multiple etiologies. Unfortunately 20 years after this conflict, we do not have an answer. What we do know is that chronic multi-symptom illness is real and cannot be reliably ascribed to any known psychiatric disorder. Specifically it cannot be ascribed to somatiform disorder, PTSD (Post Traumatic Stress Disorder) or depression. Only 25% of Veterans with chronic multi-symptom illness are also diagnosed with PTSD.

Simulated Dialog Box	
Special Rules for Undiagnosed Illnesses	Mere exposure to various agents, environmental hazards, or medicines in the 1991 Gulf War does not automatically qualify Veterans for compensation. Payments are based on disabilities, and those disabilities must be associated with military service. Many 1991 Gulf War Veterans who were exposed to a wide range of potentially dangerous substances during their military service do not have any disabling conditions. Nevertheless 36% of Gulf War 1 Veterans complain of symptom complexes which fit no diagnostic category, or chronic multi-symptom illnesses which are defined, but have no clear etiology.

Undiagnosed Illness

In 1995 VA implemented the "Persian Gulf War Veterans' Act," by adding 38 CFR §3.317. This section defines qualifying Gulf War service, establishes the presumptive period and denotes certain signs and symptoms that may be manifestations of what we now call Chronic Multi-

Symptom Illness. These signs and symptoms include: hair loss, headache, muscle pain, joint pain; as well as neurologic, respiratory and cardiac signs or symptoms, abnormal weight loss and menstrual disorders.



Unexplained Multi-symptom Illness

In addition three defined multi-symptom illnesses; fibromyalgia, irritable bowel syndrome and chronic fatigue syndrome are currently recognized by the statute. In view of recent legislation new rulemaking is underway to expand VA's regulations to include any chronic multisystem disorder that has no known etiology.

Chronic Disability	
"Objective Indications of Chronic Disability"	<p>This refers to "both signs in the medical sense of objective evidence perceptible to an examining physician and other non-medical indicators that are capable of independent verification."</p> <p>Disabilities are chronic if they have:</p> <ul style="list-style-type: none"> Existed for at least six months, and Exhibited intermittent episodes of improvement and worsening over a six-month period. The six-month period is measured from the earliest date that the signs and symptoms manifested.
Claim	<p>In a claim by a 1991 Gulf War Veteran for service-connected benefits for an undiagnosed illness, VA requires submission of evidence of all of the following:</p> <ul style="list-style-type: none"> Active military, naval, or air service in the Southwest Asia theater of operations during the 1991 Gulf War, Manifestations of signs and symptoms of undiagnosed illness, Objective indications of a chronic disability to a degree of 10% or more within the specified period, and A connection or link between the chronic disability and the undiagnosed illness.

Legislation Information

For additional information regarding disability compensation for 1991 Gulf War Veterans experiencing undiagnosed illness, see Title 38, United States Code, Section 1117, and Title 38, Code of Federal Regulations, Section 3.317.

Chronic Fatigue Syndrome

The Centers for Disease Control and Prevention provide the definition for Chronic Fatigue Syndrome:

A diagnosis of chronic fatigue syndrome requires the presence of both of the following:

- Clinically evaluated, unexplained, persistent or relapsing chronic fatigue that is of new or definite onset (that is, it has not been lifelong), is not the result of ongoing exertion, is not substantially alleviated by rest, and results in substantial reduction in levels of occupational, educational, social or personal activities. Clinical evaluation includes medical history, physical examination, laboratory studies and psychiatric assessment.
- Concurrent occurrence of four or more of the following, which have persisted or recurred during 6 or more consecutive months of illness and must not have predated the fatigue: self-reported impairment of short-term memory or concentration severe enough to cause substantial reduction in levels of occupational, educational, social or personal activities; sore throat; tender cervical or axillary lymph nodes; muscle pain; multijoint pain without joint swelling or redness; headaches of a new type, pattern or severity, unrefreshing sleep; and postexertional malaise lasting more than 24 hours.

Fibromyalgia and Chronic Widespread Pain

According to the American College of Rheumatology, fibromyalgia is characterized by widespread muscle and skeletal pain in combination with point tenderness at numerous soft tissue sites. Fibromyalgia cannot be confirmed through pathologic or laboratory tests, and thus the diagnosis is determined by clinical examination.

The case definition requires both widespread pain (pain on both sides of the body, above and below the waist and including the axial skeleton) lasting for at least three months and pain (not just tenderness) in at least 11 of 18 tender point sites on palpation with a force of approximately 4 KG. The presence of a second clinical disorder does not exclude the diagnosis of fibromyalgia.

Chronic widespread pain is a self-reported disorder in which the sufferer complains of widespread pain as seen in fibromyalgia but the criteria of the case definition for fibromyalgia have not been met.

Functional Gastro-intestinal Disorders (FGIDs)

Digestive disorders can be structural, functional or a combination of both. The functional Gastro-intestinal disorders, such as irritable bowel syndrome and functional dyspepsia, are syndromes – they are recurrent or prolonged clusters of symptoms that occur together. They result from known disturbances in GI functioning and central dysregulation of this GI function. They are specifically different from manifestations of psychiatric disorders such as somatization disorder. The FGIDs range in severity from occasional mild episodes to more persistent and disabling symptoms with impaired health-related quality of life. Genetic or early environmental predisposing factors include early trauma or abuse history in many cases coupled with exposure to acute GI infection can precipitate or the clinical expression of FGIDs, causing them to manifest as disturbed motility or visceral hypersensitivity.

Relevant to this situation is the concept of post-infectious IBS. In this case the FGID is triggered by exposure to infectious agents, which normally cause acute gastro-enteritis, but with co-existent stress such as seen in deployment to the Gulf War, the symptoms are sustained. The pathophysiology of the FGIDs relate specifically to dysregulation of neural pathways between the brain and the gut that produce motility and sensory disturbances, dysregulation of the hypothalamic-pituitary – adrenal axis, altered corticolimbic pain modulation, and inflammation of the bowel mucosa associated with altered bacterial flora.

Diagnosis of FGID

The diagnosis of an FGID is made by the demonstration of standardized symptom- based criteria (Rome Criteria) for a minimum period of time, usually six months:

Symptoms of recurrent abdominal pain or discomfort and a marked change in bowel habit for at least six months, with symptoms experienced on at least three days of at least three months. Two or more of the following must apply:

- Pain is relieved by a bowel movement.
- Onset of pain is related to a change in frequency of stool.
- Onset of pain is related to a change in the appearance of stool.

Post-infectious IBS

There also is compelling evidence that exposure to enteric pathogens during deployment leads to the development of post infectious IBS. This evidence has been strengthened in recent years by the following:

- The incidence of acquiring acute gastroenteritis in deployed Veterans is higher (as much as 50% higher) than in non-deployed Veterans,
- Deployed Veterans or other individuals experiencing war trauma who are exposed to an infectious gastroenteritis are at greater risk of being diagnosed with IBS,
- Deployed Veterans that have IBS symptoms have increased microscopic inflammatory changes in bowel mucosa,

- Microscopic inflammation in IBS is associated with increased cytokine activity and mast cell degranulation that produces visceral hypersensitivity and abdominal pain, and
- Post infectious IBS symptoms are facilitated by psychological distress via central nervous system effects on mucosal inflammation and enhanced pain.

Conclusion of Undiagnosed and Unexplained Illnesses.

Chronic multi-symptom illness, whether undiagnosed (i.e., symptoms that are not referent to a known multi-symptom illness) or unexplained (i.e., currently fall within the criteria for one or more of the defined multi-symptom illnesses) such as fibromyalgia, chronic fatigue syndrome or irritable bowel syndrome are real, and occur in much higher prevalence in Veterans deployed to the 1990-1991 Gulf War. They cannot be explained by any known psychiatric diagnosis.

Special disability compensation is statutorily authorized for those Gulf War 1 Veterans who meet the criteria for chronic multisymptom illness. They do not need to provide medical proof that their illness is related to their service. They only have to prove that they were deployed during the conflict period and that their disease is manifest within the presumptive period to a rating of 10% or more.

Summary of Undiagnosed and Unexplained Illnesses.

You have completed **Undiagnosed and Unexplained Illnesses**.

Infectious Diseases

Introduction to Infectious Diseases

Deployment to a combat theater often results in exposure to infectious agents endemic to the combat region. Combat may also involve exposure to biological warfare agents. Certain of these exposures are known to sometimes lead to delayed health effects. Gulf War Veterans often have concerns about the health effects of infectious agents to which they may have been exposed. In March 2010 VA published a notice of proposed rule for the establishment of presumptive service connection for nine Infectious diseases.

Purpose of Infectious Diseases

The purpose of this section is to acquaint VA Primary Care Providers, Compensation and Pension Examiners, Environmental Health Clinicians, Clinical Specialists, and others, including non-VA health care providers, with the deployment-related infectious diseases that are covered under the presumption. Providers should also be able to address Veterans concerns about exposures to infectious agents in the combat theater regardless of established diagnosis.

Objectives of Infectious Diseases

At the conclusion of this section, participants will be able to:

- describe infectious agents to which military personnel may have been exposed during the Gulf War;
- Identify which infectious diseases endemic to Southwest Asia are covered by the presumption of service connection;
- recognize delayed health effects that may have been caused by exposures to these infectious agents; and
- develop an approach to managing Gulf War 1 Veterans with infectious exposure concerns.

Background of Infectious Diseases to Which Gulf War Veterans May Have Been Exposed

The National Academy of Science's (NAS) 2007 "Gulf War and Health: Infectious Diseases" Report identified **nine** infectious diseases that are of special relevance to Gulf War Veterans because they are:

- Are endemic to SW Asia,
- Have been diagnosed among US or other troops serving in the Gulf, and
- Are known to sometimes cause long-term health problems.

The Secretary of Veterans Affairs has established a presumption of service connection for the primary diseases when they have been diagnosed within the recognized presumptive period. With three exceptions all of the diseases must have become clinically apparent within one year of service in the SW Asia theatre of operations. None of the secondary sequelae, despite level of association noted in the IOM report, are presumptively service connected by VA. These secondary sequelae can be compensated under the direct service connection process.

Nine Infectious Diseases Have Presumptive Service Connection

These infectious diseases (agents) are:

- Brucellosis (*Brucella* spp.),
- *Campylobacter*,
- *Salmonella*,
- *Shigella* spp.,
- Q fever (*Coxiella burnetii*),
- Leishmaniasis (*Leishmania* spp.),
- Tuberculosis (*Mycobacterium tuberculosis*),
- Malaria (*Plasmodia* spp.), and
- West Nile fever (West Nile Virus).

National Academy of Science Rating Scale to Describe Strength of Association Between Acute Infections and long-term Residuals

Based upon an extensive review of the scientific literature, the NAS Committee rated the strength of associations between primary infections and specific long-term outcomes of these diseases as follows:

- Sufficient evidence of a causal relationship,
- Sufficient evidence of an association,
- Limited or suggestive evidence of an association,
- Inadequate or insufficient evidence to determine whether an association exists, and
- Limited or suggestive evidence of NO association.

Note:

With the exception of tuberculosis, it is unlikely that delayed health effects would occur without symptomatic initial infection. However, it is important to keep in mind that documentation of specific etiologies of mild to moderate febrile illnesses in these Veterans may not exist.

What Clinicians Need to Know to Address Infectious Disease Concerns in Gulf War Veterans

The following segments address specific infectious diseases of concern, with a focus on what clinicians need to know for these purposes:

- To discuss potential infectious exposures and disease manifestations,
- To identify any potential long-term health effects for which there is sufficient evidence of a causal relationship or association with these exposures,
- To develop a clinical assessment and treatment plan, if indicated, and
- To advise the Veterans regarding the possibility of VA Compensation and Pension benefits related to their exposures.

Diarrheal diseases

Insect-borne diseases:

- Leishmaniasis
- West Nile fever
- Malaria

Zoonotic diseases:

- Brucellosis
- Q fever

Tuberculosis

Other diseases and infectious agents of concern to Gulf War Veterans:

- Al Eskan Disease
- Mycoplasmas

- Biological Weapons

Diarrheal Diseases

Were diarrheal diseases common in the Gulf War? Which agents caused diarrheal diseases in Gulf War personnel? How did acute diarrheal diseases present in the Gulf War, and how were they treated?

[Answer]

Acute gastrointestinal illness, which includes diarrheal diseases and viral gastroenteritis, was the leading cause of infectious morbidity in Gulf War personnel. *Campylobacter* spp., *E. Coli*, *Salmonella* spp., *Shigella* spp., Norovirus, and Rotavirus were among the documented pathogens. There were no laboratory-confirmed cases of the more severe illnesses of cholera, typhoid fever, amoebic dysentery, or giardiasis. Symptoms of acute diarrheal illness included abdominal pain, fever, and bloody or non-bloody diarrhea lasting 2-5 days. Treatment was supportive and also included antibiotics for certain bacterial infections.

Of these diarrheal diseases *Campylobacter jejuni* may be presumptively service connected if it occurred within one year of service in SW Asia.

Is there evidence of delayed health effects from diarrheal diseases? What are the specific delayed health effects, what is their timing of presentation?

[Answer]

The NAS committee concluded that there is sufficient evidence for a causal association between certain delayed health effects and diarrheal illnesses caused by *Campylobacter* spp., *Salmonella* spp., *Shigella* spp. (Table). These delayed health effects include: 1) Guillain Barre Syndrome, occurring within two months of a *Campylobacter jejuni* infection; 2) reactive arthritis, occurring within three months of a *Campylobacter jejuni*, nontyphoidal *Salmonella* spp., or *Shigella* spp. infection; and 3) hemolytic uremic syndrome, occurring within one month of a *Shigella* spp. infection. The possibility for delayed sequelae of these infections should be kept in mind when evaluating Gulf War Veterans presenting with these conditions.

Insect-Borne Diseases: Leishmaniasis

Leishmaniasis

Which agents cause leishmaniasis and what is the vector? How common was leishmaniasis in the Gulf War? How did acute leishmaniasis present during the Gulf War, and did cases respond to treatment?

[Answer]

Leishmaniasis is a generic term for a family of parasitic diseases transmitted by the bite of a sand fly. There are several forms of infection including cutaneous, diffuse cutaneous, mucocutaneous, visceral (kala-azar), and viscerotropic leishmaniasis. In the Gulf War, there were approximately 20 reported cases of the cutaneous form. Most skin lesions in Gulf War personnel with cutaneous leishmaniasis resolved spontaneously. Twelve cases of visceral leishmaniasis were diagnosed in Gulf War Veterans who presented with fever, fatigue, malaise, cough, intermittent diarrhea and/or abdominal pain, and these cases responded to treatment. Only the visceral form of leishmaniasis is presumptively service connected. Visceral leishmaniasis can be diagnosed at any time after service in SW Asia for the Veteran to qualify for the presumption.

Is there evidence of delayed health effects from leishmaniasis? What are the specific delayed health effects, what is their timing of presentation?

[Answer]

The NAS committee concluded that there is sufficient evidence for association between exposure to the parasite that causes visceral leishmaniasis and three main categories of delayed health effects (Table). First, delayed presentation of visceral leishmaniasis can occur, manifesting as constitutional symptoms, anemia, and/or hepatosplenomegaly, years after exposure. Second, visceral leishmaniasis can be reactivated at any time of immune-suppression. Third, post-kala-azar dermal leishmaniasis, which usually presents with a generalized papular or nodular rash, can develop within two years after the visceral infection, even if the infection was treated. The possibility for delayed presentation of leishmaniasis should be considered in Gulf War Veterans presenting with these signs and symptoms.

Insect-Borne Diseases: West Nile Fever

West Nile Fever

Which agent causes West Nile fever and what is the vector? How common was West Nile fever in the Gulf War? How does West Nile fever typically present? Is there a treatment for West Nile fever?

[Answer]

West Nile fever is a mosquito borne febrile illness caused by viruses of the *Flavivirus* genus. West Nile virus has been reported in SW Asia, but there was only one reported case of West Nile fever during the Gulf War. West Nile fever usually presents with a nonspecific febrile illness lasting 3-6 days and may be self-limited or progress to meningitis, encephalitis, or acute flaccid paralysis. There is no known effective treatment for West Nile virus infection aside from supportive care.

Is there evidence of delayed health effects from West Nile Fever? What are the specific delayed health effects of West Nile Fever, and what is their timing of presentation?

[Answer]

The NAS Committee concluded that there is sufficient evidence of causal associations between acute West Nile virus infection and variable levels of physical, functional, or cognitive disability that may persist for months, years, or permanently (Table).

Insect-Borne Diseases: Malaria**Malaria**

Which agents cause malaria and what is the vector? How common was malaria in the Gulf War? How does malaria typically present, and what are treatment considerations?

[Answer]

Malaria is a mosquito borne disease caused by infection with parasites of the genus *Plasmodium*. Malaria is endemic to certain regions of SW Asia. *Plasmodium vivax* malaria was present in the Euphrates River Valley in Southern Iraq during the Gulf War, and *P. vivax* and *P. falciparum* are endemic to other areas of SW Asia theater, including Saudi Arabia. Seven cases of vivax malaria were reported in US troops who crossed into Southern Iraq. Symptoms of malaria include flu-like symptoms, cyclic fevers, and anemia. Malaria can be treated, although drug resistance patterns must be considered when evaluating treatment options.

Is there evidence of delayed health effects from malaria? What are the specific delayed health effects of malaria, and what is their timing of presentation?

[Answer]

The NAS Committee concluded that there is sufficient evidence of a causal relationship between prior malaria infection and delayed health effects affecting multiple organ systems (Table). These delayed health effects include delayed presentations and relapses of cyclic fevers and anemia occurring weeks to years after a primary infection. Splenic rupture may occur weeks to months after vivax malaria infection. Renal effects include delayed immune-complex glomerulonephritis years to decades after plasmodium malaria infection and nephrotic syndrome weeks to months after malaria infection. Retinal hemorrhage and scarring can be recognized months to years after an initial malaria infection. Finally, there is limited or suggestive evidence of an association between vivax and falciparum malaria and demyelinating polyneuropathy and Guillain-Barre syndrome, and between falciparum malaria and neurologic and/or neuropsychiatric disease months to years after acute infection. The possibility for delayed sequelae of malaria should be kept in mind when evaluating Gulf War Veterans presenting with these conditions.

If malaria is suspected or diagnosed any time after service in the Gulf, the Veteran may qualify for presumptive service connection. Infectious disease consultation is warranted for clinical management. Assistance from social work for initiation of the claims process should be requested.

Zoonotic Diseases: Brucellosis

Brucellosis

Which agent causes brucellosis and how is it spread? How common was brucellosis in the Gulf War? How does brucellosis typically present? How is brucellosis usually treated?

[Answer]

The zoonotic disease brucellosis is caused by *Brucella* spp., which is endemic in SW Asia and found in a number of mammalian reservoirs. Among US military deployed to the Gulf War and OEF/OIF, only one case of Brucellosis has been reported. Brucellosis is spread through ingestion of unpasteurized dairy products, inhalation of infected aerosols or inoculation of infected aerosols into mucous membranes, and through direct contact between infected secretions and cut or abraded skin. Acute infection results in a non-specific febrile illness, which may also be accompanied by hematologic abnormalities, occurring 2-4 weeks following infection. Brucellosis can be treated with antibiotics.

Is there evidence of delayed health effects from brucellosis? What are the specific delayed health effects of brucellosis, and what is their timing of presentation?

[Answer]

The NAS Committee determined that there is sufficient evidence of causal associations between prior brucellosis and delayed health effects affecting multiple organ systems (Table). These delayed health effects include arthritis or spondylitis, occurring within or beyond twelve months of acute illness, granulomatous hepatitis, uveitis, chronic meningitis, meningoencephalitis, and nervous system infection. There is also sufficient evidence of a causal association between prior brucellosis and delayed orchioepididymitis, local genitourinary infections, vascular infections including endocarditis, and respiratory system infections. The NAS determined that there is limited or suggestive evidence of the casual association between prior brucellosis and myelitis-radiculoneuritis, demyelinating meningovascular syndromes, deafness and sensorineural hearing loss, Guillain Barre Syndrome, papilledema, optic neuritis, episcleritis, nummular keratitis, multifocal choroiditis, and cognitive symptoms and depression. The possibility for delayed presentation of brucellosis should be considered in Gulf War Veterans presenting with these signs and symptoms.

Zoonotic Diseases: Q Fever

Q Fever

Which agent causes Q Fever and how is it spread? How common was Q Fever in the Gulf War? How does Q Fever typically present, and what are treatment considerations?

[Answer]

Another zoonotic disease endemic in SW Asia is Q fever, a nonspecific febrile illness caused by the bacterium *Coxiella burnetii*. Among US military personnel, three cases of Q fever were reported during the Gulf War. The main reservoirs of the disease are cattle, sheep, and goats. *C. burnetii* can infect humans who inhale infected aerosolized body fluids or consume infected unpasteurized milk. Acute Q fever usually presents 10-17 days after exposure with a nonspecific febrile illness, pneumonia, and/or hepatitis. Acute infection is often self-limited, although antibiotics can reduce the duration of symptoms and the risk of long-term complications.

Is there evidence of delayed health effects from Q Fever? What are the specific delayed health effects of Q Fever, and what is their timing of presentation?

[Answer]

The NAS Committee concluded that there is sufficient evidence of a causal relationship between prior *C. burnetii* infection and four main delayed health effects (Table). These delayed health effects include: 1) vascular infections years after primary infection; 2) endocarditis years after primary infection; 3) chronic hepatitis years after primary infection; and 4) osteomyelitis. There is limited or suggestive evidence of an association between *C. burnetii* infection and post-Q fever chronic fatigue syndrome years after primary infection. Because delayed illnesses may occur after initial Q fever infection, *C. burnetii*-associated health effects should be considered in the differential diagnosis of Gulf War Veterans who present with these conditions.

Tuberculosis in Gulf War Veterans

Tuberculosis

What agent causes tuberculosis? Was tuberculosis common in the Gulf War? How does tuberculosis usually spread? How does tuberculosis commonly present, and what are treatment considerations?

[Answer]

Tuberculosis (TB) is a chronic necrotizing granulomatous infection caused primarily by the acid-fast bacillus *Mycobacterium tuberculosis*. TB is highly endemic in SW Asia. Although some Gulf War personnel developed latent TB after returning from deployment, no cases of active TB were identified in Gulf War personnel. TB is transmitted mostly through exposure to airborne *M. tuberculosis* and can manifest with pulmonary or extra-pulmonary disease. Pulmonary TB symptoms include fevers, night sweats, and productive cough. Hemoptysis may also occur. Extra-pulmonary tuberculosis can occur in the lymph nodes, pleura, bones and joints, meninges, genito-urinary tract, and peritoneal cavity. Disseminated extrapulmonary tuberculosis, or miliary, TB can also occur. TB can be treated, although drug resistance patterns must be considered when evaluating treatment options.

Is there evidence of delayed health effects from tuberculosis? What are the specific delayed health effects of tuberculosis, and what is their timing of presentation?

[Answer]

Delayed health effects of TB can occur through delayed presentation of acute TB, reactivation of disease, and chronic effects of initial infections. The NAS Committee concluded that there is sufficient evidence of a causal relationship between prior TB infection and delayed health effects affecting several organ systems (Table). These delayed health effects include delayed presentation of active infection months to decades after primary infection. There is also sufficient evidence for late pulmonary and extra-pulmonary manifestations of prior severe *M. tuberculosis* infection. These late manifestations include lung scarring and secondary infection, bronchiectasis, bronchopleural fistulas, pulmonary dysfunction, meningitis, neurologic disability, and skeletal disease. The possibility for delayed sequelae of TB should be kept in mind when evaluating Gulf War Veterans presenting with these conditions.

Other Diseases and Infectious Agents of Concern to Gulf War Veterans: AI Eskin

AI Eskin Disease

What is AI Eskin Disease, and is it associated with long-term health effects?

[Answer]

In 1992, an outbreak of a febrile illness among US military personnel stationed in AI-Eskin village in Riyadh, Saudi Arabia, was reported. The illness was manifested by chills, fever, sore throat, hoarseness, nausea and vomiting, and malaise followed by cough with or without sputum. Although there has been speculation that "AI Eskin Disease" was caused either by an infectious agent or as a result of a direct or immune-mediated response to sand and dust, the etiology has not been established. No data links AI Eskin disease to any specific pulmonary or other chronic conditions.

Other Diseases and Infectious Agents of Concern to Gulf War Veterans: Mycoplasmas

Mycoplasmas

What are mycoplasmas, and are they associated with long-term health effects?

[Answer]

Mycoplasmas are the smallest known free-living organisms and may asymptotically colonize or cause disease in humans. It was proposed that the *Mycoplasma fermentans* and *penetrans* species were responsible for some of the chronic, persistent, and unexplained symptoms in certain Gulf War Veterans, and that these veterans should be treated with antibiotics. The NAS Committee felt, after review of the scientific literature, that evidence for this theory was not sufficiently strong to establish an association between *Mycoplasma* and symptoms in Gulf War Veterans. In addition, a large well-conducted randomized placebo-controlled treatment trial showed that doxycycline did not improve the health status of GW Veterans with unexplained symptoms and apparent mycoplasma infection.

Other Diseases and Infectious Agents of Concern to Gulf War Veterans: Biological Weapons

Biological Weapons

What are examples of biological warfare agents, and are they associated with long-term health effects?

[Answer]

Although biological warfare agents, including aflatoxin, botulinum toxin, *Bacillus anthracis*, and ricin were reported as having been weaponized for use against US forces in the Gulf War, there is no strong evidence that biological weapons were deployed during the conflict or that health concerns in GW Veterans are attributable to exposures to such agents.

Delayed Health Effects

Common presentations of delayed health effects for which there is sufficient evidence of a causal relationship, as determined by the 2007 NAS Report, are presented in the Table. The Table is organized by organ system/health effect to aid in the incorporation of these entities into existing differential diagnostic frameworks for specific symptoms and signs in Gulf War Veterans.

In the final section, an approach to managing Gulf War Veterans with infectious exposure concerns will be discussed.

Table: Characteristics of Delayed Effects of Infectious Exposures to which Gulf War Veterans May Have Been Exposed**			
Organ System	Common Presentation	Timing	Associated Infection
Hematologic/ Reticuloendothelial	Constitutional symptoms, anemia, hepatosplenomegaly	Delayed (years) presentation of acute clinical syndrome Reactivation at any time of immune-suppression (e.g. HIV with CD4 <200/ μ L)	Prior visceral leishmaniasis
Hematologic/ Reticuloendothelial	Flu-like symptoms, cyclic fevers, anemia	Months to years after initial symptomatic or asymptomatic infection Months to years after initial infection Weeks to months after primary infection (inadequate therapy)	Prior of <i>P. vivax</i> or <i>P. ovale</i> infection (relapse) Prior <i>P. malariae</i> infection (late presentation) Prior <i>P. falciparum</i> infection (recrudescence)
Hematologic/ Reticuloendothelial	Anemia Splenic rupture	Weeks to months after initial infection	Prior <i>P. vivax</i> infection Prior <i>P. falciparum</i> infection
Hematologic/ Renal	Hemolysis, thrombocytopenia, renal dysfunction (hemolytic uremic syndrome)	Within one month after infection (usually within ten days of infection)	Prior <i>Shigella</i> infection
Renal	Immune-complex glomerulonephritis	Years to decades after initial infection	Prior <i>P. malariae</i> infection
Renal	Nephrotic syndrome	Weeks to months after initial infection	Prior malaria infection
Renal/Genitourinary	Orchioepididymitis Local genitourinary infections (e.g. pyelonephritis, renal abscess)	Weeks to years after acute infection	Prior brucellosis
Cardiovascular	Vascular infection* Endocarditis*	Within years of acute infection	Prior <i>C. burnetii</i> infection Prior <i>C. burnetii</i> infection or brucellosis
Dermatologic	Generalized papular or nodular cutaneous rash	Two years after initial infection (infection may have been treated)	Post-kala-azar dermal leishmaniasis (<i>L. donovani</i>); Prior visceral leishmaniasis
Neurologic	Ascending flaccid paralysis (Guillain-Barre Syndrome)	Within two months after initial infection	Prior <i>Campylobacter jejuni</i> infection
Neurologic	Physical, functional, or cognitive disability	May persist from months to years after initial infection	Prior West Nile Virus infection
Neurologic	Chronic meningitis, meningoencephalitis, nervous system infection	Weeks to years after acute infection	Prior brucellosis
Neurologic	Meningitis, neurologic disability	Months to decades after acute infection	Prior severe extra-pulmonary <i>M. tuberculosis</i> infection

* May present with constitutional symptoms.

** Only health effects with sufficient evidence of a causal relationship, as determined by the National Academy of Science's (NAS) 2007 Report, are included in this table.

Table continued: Characteristics of Delayed Effects of Infectious Exposures to which Gulf War Veterans May Have Been Exposed**			
Organ System	Common Presentation	Timing	Associated Infection
Musculoskeletal	Constitutional symptoms, asymmetric additive arthritis (reactive arthritis)	Within three months of infection	Prior <i>Campylobacter jejuni</i> , nontyphoidal <i>Salmonella</i> , or <i>Shigella</i> infection
Musculoskeletal	Arthritis: Infectious (peripheral, monoarticular, large joint) or reactive (polyarticular or pauciarticular); sacroillitis Spondylitis	Within twelve months of acute illness Within or beyond twelve months of acute illness	Prior brucellosis
Musculoskeletal	Osteomyelitis* Skeletal tuberculosis*	Weeks to months after acute infection	Prior <i>C. burnetii</i> infection Prior severe extra-pulmonary <i>M. tuberculosis</i> infection
Ophthalmologic	Retinal hemorrhage and scarring	Months to years after initial infection	Prior malaria infection
Ophthalmologic	Uveitis	Weeks to years after acute infection	Prior brucellosis
Gastrointestinal	Granulomatous hepatitis	Within years of acute infection	Prior brucellosis or <i>C. burnetii</i> infection
Pulmonary	Respiratory system infections (pneumonia, lung abscesses)	Weeks to years after acute infection	Prior brucellosis
Pulmonary	Constitutional symptoms, productive cough, hemoptysis (may also include extrapulmonary symptoms) Lung scarring, secondary infection, bronchiectasis, bronchopleural fistulas, pulmonary dysfunction	Months to decades after primary infection (delayed active infection) Months to decades after acute infection (late manifestations)	Prior <i>M. tuberculosis</i> infection Prior severe pulmonary <i>M. tuberculosis</i> infection

* May present with constitutional symptoms.

** Only health effects with sufficient evidence of a causal relationship, as determined by the National Academy of Science's (NAS) 2007 Report, are included in this table.

Supporting Gulf War Veterans with Infectious Exposure Concerns

The following general approach is recommended for the management Gulf War Veterans with infectious exposure concerns:

- 1) Identify infectious exposure concerns and/or potential long-term health effects/concerns associated with infectious exposures in Gulf War Veterans. Identification of exposures can occur in one or a combination of the following ways:
 - The Veteran spontaneously volunteers concerns about infectious exposures.
 - Infectious exposure concerns are identified during a formal exposure assessment (please review, “Taking an Exposure History”).
 - Potential long-term health effects of infectious exposures (Table) are appropriately included in the differential diagnosis of a Veteran’s symptoms and signs.
- 2) Document any infectious exposure concerns and potential long-term health effects/concerns.
- 3) Educate Veterans about any infectious exposures and potential long-term health effects of concern, including available evidence for causal relationships between infectious exposures and long-term health effects as described in this section (please review, “Risk Communication”).
- 4) Consult with an Infectious Diseases specialist, as appropriate, if evidence of infection or potential sequelae of prior infection is present.
- 5) Inform Veterans of benefits for relevant infectious diseases (please review, “Health Care and Other Benefits for Gulf War Veterans”) and ensure they have the information and support necessary to access them.

Presumptive Service Connections

Active tuberculosis (manifested within three years from the date of separation from the service) and leishmaniasis and malaria (manifested within one year from the date of separation from the service or at a time when standard accepted medical treatises indicate that the incubation period commenced during such service) had been previously recognized as presumptively service connected among certain Veterans. Chronic long-term health effects associated with these infectious diseases could either be compensable in the rating assigned to the primary infection or would be considered proximately due to that disease and rated separately.

Based upon the NAS report and other supportive evidence, the following presumptive service connections were established in 2008:

- Diagnosis of brucellosis, Q-fever, West Nile fever, or *Campylobacter*, *Salmonella* or *Shigella* infection, in cases that manifest within one year of military service in SW Asia
- Malaria, in cases that manifest within one year of military service in SW Asia or at a time when standard accepted medical treatises indicate that the disease commenced during such service
- Tuberculosis and visceral leishmaniasis, in cases that manifest at any time following military service in SW Asia

Summary of Infectious Diseases

You have completed **Infectious Diseases**.

Gender Specific Health Concerns

Introduction to Gender Specific Health Concerns

Reproductive health is a concern for both women and men; there may be distinct differences in various exposures and manifestation of diseases between women and men. Reproductive health in women includes topics related to fertility, pregnancy losses, birth defects, urogenital cancers and sexually transmitted infections. It includes the ability to conceive children, have healthy full term pregnancies, and healthy infants. In women, reproductive health also encompasses gynecologic concerns. Service members may express concern that their job exposure may have adversely impacted their reproductive health. There can be direct and indirect exposures that impact reproductive health. Specific military service may have also increased exposures to potential toxic materials including environmental stressors; medical interventions (i.e. vaccines and prophylactic medications); sexually transmitted infections; and alcohol or tobacco use. Though mental health is not specific to reproductive health, it will be briefly discussed in this lesson from the perspective of military sexual trauma, which can affect both women and men. Women Veterans who were deployed to the Gulf have an increased frequency of adverse health conditions than non deployed GWV (Gulf War Veteran) and male GWV.



A General Accounting Report from 1994 identified 21 potential reproductive toxins and teratogens present during Gulf War 1 (1). Some Veterans believe that Gulf War 1 exposures affected their health and that of their children. There are studies that have been performed that address reproductive outcomes. Birth defects, fetal loss and infertility are the three most commonly studied adverse outcomes among Gulf War Veterans. Gulf War 1 was the first to see a substantial fraction of women in the military (2). Approximately 7% of the military personnel serving were women (2). Moreover, 71% of women had at least one combat exposure during the first Gulf War (2). Women also reported exposure to environmental agents, such a diesel fuel and smoke from oil-

well fires, at similar rates as men. Outpatient use patterns differ from men in that women have significantly more outpatient visits and inpatient care than men five years after the war (3). The following sections review key aspects of the literature related to reproductive health in Gulf War 1 Veterans. Women and men may present with some of these concerns to their providers. It is important to note that many studies lack statistical significance or power to determine a population effect.



Objectives of Gender Specific Health Concerns

In this section we have the following objectives:

1. Recognize reproductive concerns in Gulf War 1 Veterans.
2. Discuss limitations in studies of birth outcomes, infertility, sexual dysfunction and gynecologic outcomes in Gulf War 1 Veterans.
3. Identify two gynecologic conditions women Veterans are predisposed to due to severe deployment environments.
4. Understand appropriate assessment for gender specific issues and military sexual trauma in Gulf War 1 Veterans.
5. List three important strategies in preconception care for women Veterans.



Birth Defects

Many Gulf War 1 Veterans are concerned about the possibility of birth defects in their children. The 2008 *VA Gulf War Research Advisory Committee Report* (RAC) noted that concerns have been raised regarding a possible increase in birth defects in Gulf War Veterans' children and unusual health outcomes in their family members (4). Overall studies are very difficult to interpret because of the small sample size and documentation of timing of exposure (2). Moreover, birth defects can occur as chromosomal abnormalities, birth defect syndromes or structural defects (2). Approximately 3% of live births result in birth defects (2). Thus, the sample size available for study can be very small when trying to determine exposure risks in a segment of the population.

Some studies have pointed to urinary tract defects, kidney defects or heart valve defects. Other studies pointed to Goldenhar Syndrome, a rare birth defect characterized by abnormal prenatal development of craniofacial structures (1). One case control study by Werler et al in 2005 revealed an increased association of Goldenhar syndrome to army service in Gulf War 1, however this was not statistically significant (5). The numbers of cases were small in these studies to enable meaningful statistical comparisons for this rare anomaly (6).

There is no consistent evidence of a strong association between Gulf War deployment of service-men and the appearance of major defined birth defects among infants conceived after the war (1). Low numbers for service-women in most studies make conclusions difficult and overall there is little evidence of a major effect (1). Additionally, the 2010 Institute of Medicine Report (IOM) concluded that there is inadequate evidence to determine whether an association exists between deployment to the Gulf War and specific birth defects (2).



Miscarriage and Stillbirth

Miscarriage (spontaneous abortion) is defined as fetal death before 20 completed weeks of gestation. Stillbirth is defined as fetal death at or over 20 weeks of completed gestation. Studies evaluating association of fetal death and Gulf War exposure are limited by the following:

1. Early spontaneous abortion can go unrecognized or unreported
2. Not all women who have a spontaneous abortion will seek medical treatment and evaluation
3. Registries for spontaneous abortion or stillbirth are limited
4. All studies rely on self-report which can result in recall bias

5. Data on miscarriages and spontaneous abortions are typically incomplete, making it difficult to achieve sufficient statistical power for rare reproductive events, such as congenital anomalies.

Several studies have researched the prevalence of spontaneous abortion, stillbirths and ectopic pregnancies in deployed and non deployed GWV. Unfortunately, the numbers of female GWV and the statistical power of these studies are low. The results of these studies did not reveal an increased association of stillbirths in males and the data in females is sparse (1). Additionally, there is no effect of gulf war service on the risk of miscarriages in pregnancies reported by female GWV (1), (2). The Institute of Medicine committee concludes that there is inadequate evidence to determine whether an association exists between deployment to the Gulf War and adverse pregnancy outcomes such as miscarriage and stillbirth (2).

Infertility

The epidemiologic evidence of Gulf War service on fertility is limited due to reasons of statistical significance and power (1). However, evidence from animal studies suggests that sperm damage from toxicant exposure may be plausible (1). This possibility is strengthened by studies in GWV fathers in the UK having an increased time to conception and the previously mentioned finding of increased association of miscarriage in partners of male GWV (1). There is no evidence to suggest an effect on male reproductive hormones when comparing deployed and non deployed Gulf War Veterans (2). Additionally, self reports subject the data to recall bias as previously suggested. There are also limited studies in female Veterans exploring this issue. Given these reasons, there is also inadequate evidence to determine an association between infertility and Gulf War deployment (2).



Gynecological Conditions Unrelated to Pregnancy or Conception

Deployment and severe environments in general are challenging to women serving in the military (1). These challenges can be related to limitations in access to acceptable medical services and possibly access to sanitary equipment to women in theatre. These environments can also predispose to gynecologic related conditions such as urinary tract infections or bacterial vaginosis (1).

Approximately 50,000 U.S. service women were deployed to the Gulf War and little information is available on their gynecological health. Abnormal uterine bleeding was a common reason for ambulatory visits during the Gulf War (7) (8) Postal survey data from Gulf War Veterans in Pennsylvania and Hawaii showed no differences in self-reported menstrual problems among Gulf War Veterans compared to non-deployed women Veterans (9).

The ten year follow-up survey of VA's *National Health Survey of Gulf War Era Veterans and Their Families* revealed that, in comparison with their peers, higher percentages of Gulf War 1 women Veterans reported serious premenstrual mood changes and difficulty conceiving when compared with Gulf Era women controls (10).

Women in the Air Force who were deployed to the Gulf War reported a significant increase of lumps or cysts in their breasts and abnormal Papanicolaou smear results compared to their non-deployed peers (11). Evaluation of discharge diagnostic data from military hospitals indicated that women Gulf War Veterans had an increased risk of hospitalization after 1991 from genitourinary infections and inflammatory disease of the ovary and fallopian tube (12).

Sexual Dysfunction

Published reports on sexual dysfunction among Gulf War Veterans are scarce and limited to those reporting symptoms similar to seminal plasma hypersensitivity called "burning semen syndrome" (13). Symptoms include penile burning and pain, and localized vaginal burning and pain after seminal contact. Postal survey results from a random stratified sample of U.K. Veterans showed a twofold excess of self-reported sexual problems among male Gulf War Veterans compared to era controls, and Bosnia conflict Veterans (14).

Self-reported data from male and female Gulf War Veterans in Iowa showed a statistically significant excess of "symptoms of sexual discomfort," compared to non-deployed Veterans. Further, female sexual partners of male Gulf War Veterans reported more frequent symptoms of sexual discomfort compared to female partners of non-deployed Veterans (5 percent vs. 2.4 percent among regular military personnel; 5.4 percent vs. 2.1 percent among National Guard and Reservists) (15).

The IOM Committee suggests caution with interpreting survey studies of self-reported symptoms because of concerns of selection bias and reporting bias (2). The only study that assessed direct exposures of Gulf War service described that there was no association between an exposure to a nerve agent and sexual problems (2). Thus the IOM committee concluded that there is limited evidence of an increased prevalence of sexual dysfunction in this population (2).

Difficulties in Studying Gulf War Veteran Reproductive Health

It is difficult to obtain accurate data regarding reproductive history and exposures. Human reproductive health problems are common, but the causes are not well understood. A multitude of hazardous exposures may lead to damage to the ova, sperm, and zygote or contribute to hormonal imbalance prior to conception or during gestation. Pregnancy losses are extremely common (approximately 33% of all pregnancies) and difficult to track. Additionally, the causes of

the majority of birth defects are unknown. National registries are important moving forward in tracking outcomes.



Military Sexual Trauma

Both men and women can experience military sexual trauma. However women are more likely to be subject to this behavior and experience (2). The perpetrator can be of the same or opposite gender. Screening for Military Sexual Trauma is an important component of any initial visit. VA clinicians may care for women and men who suffer from the physical and mental consequences of sexual harassment and/or sexual assault which may have occurred in a military setting. Thus it is important to screen for this at every encounter with a female or male Veteran (16). This is especially important for female Veterans deployed to the Gulf War because they have an increased prevalence of mental health disorders when compared to men and their non deployed counterparts (2).

Among both men and women in the active duty military, sexual harassment is associated with poorer psychological well-being, more physical problems and lower satisfaction with health and work. Female Veterans who use VA healthcare and report a history of sexual trauma while in the military also report a range of negative outcomes, including poorer psychological and physical health, more readjustment problems following discharge and a greater incidence of not working due to mental health problems. Studies of sexual assault identify posttraumatic stress disorder (PTSD) and Major depressive disorder (MDD) as common reactions following sexual assault. Victims of sexual trauma may report anger, shame, guilt and problems in interpersonal relationships, including difficulties with trust, difficulties engaging in social activities or sexual dysfunction. Male victims of sexual trauma may also express concern about their sexuality or their masculinity (16).

A method of screening involves two general questions (16):

1. While you were in the military did you ever experience any unwanted sexual attention, like verbal remarks, touching, or pressure for sexual favors?
2. Did anyone ever use force or the threat of force to have sex with you against your will?

Public Laws authorize counseling to female and male Veterans to overcome psychological trauma resulting from military sexual trauma. Universal screening of all Veterans for a history of military sexual trauma is important.

Recommendations for Providers

The US Military established the DoD Birth and Infant Health Registry in 1998 to monitor some reproductive health outcomes of military families. Patients may want to receive information on this surveillance registry. The study team can be contacted at 619-553-9255 or email NHRC-birthregistry@med.navy.mil. The primary objective of the Registry is to increase the understanding of the reproductive health effects of military service through systematic surveillance of DoD beneficiary births and scientifically rigorous research of infant health outcomes.

Veterans with exposure history or concerns may need referral to a complete VA Post Deployment Health Clinics evaluation at one of the War Related Illness and Injury Study Center) centers for a full assessment to address exposures and options for further evaluation.

Comprehensive care for all women Veterans is critical to the provision of quality care. A complete history and physical must include questions about military service, possible exposures, sexual trauma, mental health concerns, and history of deployment.



The majority of pregnancies are unplanned, thus a discussion of desired fertility, medications, exposures, contraception, immunizations should be initiated at their visit. General evaluations in women of childbearing age should include questions related to pre-conception care.

Preconception health is a woman's health before she becomes pregnant. All providers should ensure that women of childbearing age undergo an assessment of their preconception health. It is important to know a woman's intention for pregnancy and how health conditions and risk factors can affect the women or her baby if she becomes pregnant. Coordination of care and optimizing pre-existing health conditions may help improve pregnancy outcomes.

Providers can recommend to female and male Veterans that they can optimize their preconception health by:

- Consuming adequate folic acid (400 mcg daily) to decrease risk of certain birth defects (more required if history of certain birth defects)
- Testing and protection (using condoms or abstinence) from sexually transmitted infections.
- Up to date screening for cervical cancer
- Up to date immunizations, including counseling for HPV and seasonal flu vaccines
- Avoidance of smoking or drinking alcohol (discuss smoking cessation programs)
- If has co-morbid conditions, discuss medications and identify potential teratogens
- Optimizing medical conditions before pregnancy (i.e. weight loss, normalize blood pressure, normalize blood sugars etc.)
- Encourage physically active, caring for teeth and gums,
- Assess for domestic violence or intimate partner violence.

Preconception care also affects Men. Discussions with males during initial session should also include desire for fertility. In addition men should be counseled in:

- Testing and Protection from STIs (condoms use)
- Avoidance of smoking and reduction of alcohol consumption
- Avoidance if possible of certain exposures, foods, habits, and medicines that may be harmful.
- Optimizing pre-existing health conditions such as diabetes.

Primary Resources

1. *Reproductive health of Gulf War veterans.* **Doyle P, Maconochie N, Ryan M.** 1468, 2006 Apr 29, *Philos Trans R Soc Lond B Biol Sci.*, Vol. 361, pp. 571-84. 16687262.

2. **Institute of Medicine Report.** *Committee on Gulf War and Health: Gulf War and Health: Volume 8. Update of Health Effects of Serving in the Gulf War.* Washington, D.C. : National Academies Press, 2010.

4. **Research Advisory Committee on Gulf War Veteran Illnesses.** *Gulf War Illness and the Health of Gulf War Veterans: Scientific Findings and Recommendations.* Washington, D.C. : <http://www1.va.gov/RAC-GWVI/>, November 2008.

Secondary Resources

3. *Self-reported illness and health status among Gulf War Veterans: A population-based study.* **Group., Iowa Persian Gulf Study.** 1997, Vol. 277, pp. 238-45.

5. *Gulf War Veterans and hemifacial microsomia.* **Werler MM, Sheehan JE, Mitchell AA.** 1, 2005, *Teratology*, Vol. 73, pp. 50-2.

6. *Goldenhar Syndrome Among Infants Born in Military Hospitals to Gulf War Veterans.* **Araneta MRG, Moore CA, Olney RS, EdmondsLD, Karcher JA, McDonough C, Hiliopoulos KM, Schlangen KM, Gray GC.** 1997, *Teratology*, Vol. 56, pp. 244-51.

7. *Ambulatory Health Care Needs of Women Deployed with a Heavy Armor Division during the Persian Gulf War.* **JF, Hines.** 1992, *Military Medicine*, Vol. 157, pp. 219-21.

8. *Female Health Care during Operation Desert Storm: The Eighth Evacuation Hospital Experience.* **Markenson G, Raez E, Colavita M.** 1992, *Military Medicine*, Vol. 157, pp. 610-3.
9. *Physical health symptomatology of Gulf War-era service personnel from the states of Pennsylvania and Hawaii.* **Stretch RH, Bliese PD, Marlowe DH, Wright KM, Knudson KH, Hoover CH.** 1995, *Military Medicine*, Vol. 160, pp. 131-136.
10. *Health of US Veterans of 1991 Gulf War: a follow-up survey in 10 years.* **Kang HK, Li B, Mahan CM, Eisen SA, Engel CC.** 4, 2009, *Journal of Occupational Environmental Medicine*, Vol. 51. 19322107.
11. *Physical and emotional health of Gulf War Veteran women.* **PF, Pierce.** 1997, *Aviation, Space, and Environmental Medicine.*, Vol. 68, pp. 317-321.
12. *The Postwar Hospitalization Experience of U.S. Veterans of the Persian Gulf War.* **Gray GC, Coate BD, Anderson CH, Kang HK, Berg SW, Wignall S, Knoke JD, Barrett-Connor E.** 1996, *New England Journal of Medicine*, Vol. 335, pp. 1505-13.
13. *Specific Antibody Responses in Civilian Couples With Seminal Plasma Protein Hypersensitivity and Gulf War Couples with Burning Semen Syndrome.* **Bernstein JA, Perez AS, Frazier KM, Floyd R.** Arlington, VA : s.n., June 23-25, 1999. *Proceedings - Conference on Federally Sponsored Gulf War Veteran's Illnesses Research.* p. 22.
14. *Health of U.K. Servicemen who served in Persian Gulf War.* **Unwin C, Blatchley N, Coker W, Ferry S, Hotopf M, Hull L, Ismail K, Palmer, David A, Wessely S.** 353, 1999, *Lancet*, pp. 169-178.
15. *Self-reported illness and health status among Gulf War Veterans: A population-based study.* **Group., Iowa Persian Gulf Study.** 1997, Vol. 277, pp. 238-45.
16. *Military Sexual Trauma: Issues in Caring for Veterans.* **Street A, Stafford J.** National Center for PTSD. <http://www.ptsd.va.gov/professional/pages/military-sexual-trauma.asp>. Accessed 4/11/2010.

Mental Health and Psycho-social Concerns

Introduction to Mental Health and Psycho-social Concerns

In Gulf War 1 there were only four days of classical ground combat, however there were numerous other life-threatening experiences and exposures including threat of exposure to chemical and biological weapons, anticipation of combat, witnessing traumatic injury of others, and living in a hostile and foreign environment. Additional psychosocial stressors of war are the disruption of the fabric of the Veteran's life and relationships. There are financial challenges, vocational impacts, and disruption of social networks. For the first time larger numbers of women and parents were deployed, and members of the Reserves and National Guard were activated, profoundly affecting family dynamics, complicating these Veterans' return to civilian lives.

Objectives of Mental Health and Psycho-social Concerns

At the conclusion of this lesson participants will be able to:

- identify unique psychological and psychosocial stressors which have or are impacting Gulf War 1 Veterans;
- identify persistent mental health concerns of Gulf War 1 Veterans;
- develop an appropriate treatment plan for Gulf War 1 Veterans with health concerns;
- describe the evidence based care for the treatment of these conditions; and
- identify VA resources available to support clinicians as well as to support Gulf War Veterans and their families with concerns related to post-deployment mental health concerns.

Post Traumatic Stress Disorder (PTSD)

In 1991 more than 700,000 military personnel were deployed to Gulf War 1. Many of these individuals continue to seek care for combat related health concerns. Although there were few casualties associated with the conflict, many Veterans returned with unexplained medical symptoms and illnesses that continue to cause long-term adverse health effects in Gulf War Veterans today. The most common mental health concerns noted in Gulf War Veterans are post traumatic stress disorder (PTSD), depression, and anxiety. Kang et al. (2003) noted a significantly higher prevalence of PTSD in Gulf War Veterans (12%) compared with non-Gulf Veteran controls. The prevalence of PTSD increased with stress intensity in this population.

<http://www.ncbi.nlm.nih.gov/pubmed/12522021>

Note: This links to the Kang article (see above). This is same approach used by Dr. Hunt, as Toomey article (see below). By the way, this is not on the website (p. 159).



Work by [Toomey \(2007\)](#) again found elevated rates not only of PTSD but also of depression and other anxiety disorders. Ten years following the war the rates of depression and anxiety disorders remained elevated; PTSD, while still somewhat elevated, no longer reached statistical significance.

Survey Results

Recent research has focused on the health status of a cohort of 1991 Gulf War Veterans. Using a survey to collect information among population-based samples of 30,000 Veterans (15,000 Gulf War Veterans and 15,000 Gulf Era Veterans) [Kang et al. \(2009\)](#) has found increased frequencies of all seven mental disorders assessed in the survey.

<http://www.ncbi.nlm.nih.gov/pubmed/19322107>

- PTSD (15.2%)
- Other anxiety orders (11.1%)
- High somatic symptom severity (16.1%)
- Major depressive disorder (14.9%)
- Panic disorder (9.0%)
- Other depressive disorder (6.5%)
- Probable alcohol abuse (16.4%)
- Taking med for anxiety/stress/depression (15%)
- Multi-Symptom Illness (MSI) (36.5%)
- CFS-like Illness (9.4%)

These results are similar to those noted in the 1995 [National Health Survey of Gulf War Era Veterans and their Families \(Kang et al., 2000\)](#) and emphasize that Gulf War Veterans continue to have significant mental health needs.

Institute of Medicine (IOM) Survey Results

Recent reports by the Institute of Medicine (IOM) have evaluated the long-term effects of deployment-related stress (Health Effects of Serving in the Gulf War). Of all the long-term health effects reviewed, the strongest findings pertained to psychiatric disorders, including PTSD, anxiety, and depression. Alcohol abuse, suicide and accidental death in the early post-deployment years and marital and family conflicts also appear to be adverse consequences of deployment-related stress. The IOM report found limited but suggestive evidence of an association between deployment-related stress and many of the Gulf-related symptom based syndromes.



Mental Health Support for Gulf War Veterans

The previous references outline the mental health concerns with which Gulf War Veterans continue to live and it should be emphasized that practitioners must be attentive to these. There is a clear need for practice recommendations for health care providers that stress the use of evidence-based treatments for diagnosable conditions that will offer ongoing mental health support for Gulf War Veterans. Clinical practice guidelines currently exist for separate conditions noted in Gulf War Veterans: post traumatic stress disorder, major depressive disorder, and medically unexplained symptoms ([These clinical practice guidelines are available](#) on the VA website).

Effective treatments for PTSD exist ([see PTSD 101 courses](#)). Two types of cognitive-behavioral therapy (CBT) called prolonged exposure (PE) and cognitive-processing therapies (CPT) are currently recognized as the best-evidence based treatments available for PTSD. Both PE and CPT are being rolled out through trainings to PTSD specialty clinicians in VA.

Note:

PE Therapy

In the largest study to date in women Veterans with PTSD, VA researchers found PE therapy, in which patients are helped to recall their traumas in a safe, controlled environment, to be more effective than supportive counseling that does not involve trauma recall.

Note:

CPT

CPT is a cognitive-behavioral treatment that focuses on thoughts and feelings for PTSD and related conditions. It is effective in treating PTSD across a variety of populations, including Veterans. CPT has worked well for Veterans who have experienced combat, sexual or childhood trauma, as well as other types of traumatic events.

Medications, including the class of antidepressants known as selective serotonin reuptake inhibitors (SSRIs) may be effective for PTSD, either by themselves or in combination with psychotherapy. For more information, see the [National Center for PTSD Web Site](#). As research continues to shed more light on PTSD and its prevention, diagnosis, and treatment, VA is working to translate research findings into advancements in care.

VA researchers are also working to develop new telehealth models of PTSD treatment that take advantage of communication technologies and are especially important for Veterans with PTSD who live in rural areas.

Resources

VA Mental Health services: <http://www.mentalhealth.va.gov/>

VA Facility Locator: <http://www1.va.gov/directory/guide/home.asp?isFlash=1>

PTSD care: <http://www.ptsd.va.gov> with information for Veterans and for Providers

Vet Centers: www.va.gov/rcs

Military OneSource: www.militaryonesource.com/

Post Deployment Health Service Member and Family Support Services:
<http://www.pdhealth.mil/hss/smfss.asp>

Wellness resources for the military and Veteran community: <http://www.afterdeployment.org>

Health Care and other Benefits for Gulf War 1 Veterans

Introduction to Health Care and other Benefits for Gulf War 1 Veterans

The purpose of this lesson is to provide the learner a fundamental understanding of Gulf War Veteran eligibility requirements, an overview of becoming service connected for Veterans Benefits Administration purposes, as well as an overview of registry programs and other related services available to the Gulf War Veteran.

Objectives of Health Care and other Benefits for Gulf War 1 Veterans

At the conclusion of this section participants will be able to:

1. Gain a working understanding of eligibility criteria Department of Veterans Affairs benefit programs for Persian Gulf Veterans,
2. Understand what a registry exam consists of, what their purpose is, which ones are available to Persian Gulf Veterans and why they are important to the overall care of the Persian Gulf Veteran,
3. Understand the different types of service connections for Department of Veterans Affairs benefit programs purposes, and
4. Access and research a list of resources for many of the benefits available to the Persian Gulf Veteran.

Eligibility Criteria

According to the Code of Federal Registry (CFR), CFR 38 § 3.2, the Persian Gulf War is defined as August 2, 1990, through date to be prescribed by Presidential proclamation or law.

Therefore, references contained in the following text that refer to the Gulf War, include not only "Persian Gulf War 1", but also the present conflicts and all others in between, that have taken place in the Southwest Asia Theater of Operations . The Southwest Asia Theater of Operations includes Iraq, Kuwait, Saudi Arabia, the neutral zone between Iraq and Saudi Arabia, Bahrain, Qatar, the United Arab Emirates, Oman, the Gulf of Aden, the Gulf of Oman, the Persian Gulf, the Arabian Sea, the Red Sea, and the airspace above these locations.

The rules relating to eligibility of a Veteran or condition to be considered service connected is specified in CFR Title 38: Pensions, Bonuses, and Veterans' Relief, [PART 3—ADJUDICATION Subpart A—Pension, Compensation, and Dependency and Indemnity Compensation](#) Ratings and Evaluations; Service Connection. To be considered eligible for being service connected for Gulf War related illnesses or injuries, the veteran must have served 90 consecutive days in active military service during the Gulf War time period.

Eligibility Criteria / Principles Relating to Service Connection

§ 3.303 Principles relating to service connection.

(a) *General.* Service connection connotes many factors but basically it means that the facts, shown by evidence, establish that a particular injury or disease resulting in disability was incurred coincident with service in the Armed Forces, or if preexisting such service, was aggravated therein. This may be accomplished by affirmatively showing inception or aggravation during service or through the application of statutory presumptions.

This section discusses that service connected conditions are those that either began while in service, were aggravated while in service or fall into the category of presumptively service connected. Further, that each condition's service connection will be considered on all available evidence.

(b) *Chronicity and continuity.* With chronic disease shown as such in service (or within the presumptive period under §3.307) so as to permit a finding of service connection, subsequent manifestations of the same chronic disease at any later date, however remote, are service connected, unless clearly attributable to intercurrent causes.

This section discusses that when chronic conditions are found to be service connected, future exacerbations, flares and gradual worsening of these conditions are also considered service connected, regardless of how remotely the exacerbation occurs. The rule specifically states that it does not include recurrences of acute illnesses or illnesses within an organ system simply because a problem with that system occurred while in service.

(c) *Preservice disabilities noted in service.* There are medical principles so universally recognized as to constitute fact (clear and unmistakable proof), and when in accordance with these principles existence of a disability prior to service is established, no additional or confirmatory evidence is necessary.

This section discusses that there are some conditions that predate military service even if they were not diagnosed prior to enlistment. These will not be considered service connected.

(d) *Postservice initial diagnosis of disease.* Service connection may be granted for any disease diagnosed after discharge, when all the evidence, including that pertinent to service, establishes that the disease was incurred in service.

This section discusses that there are conditions that may be diagnosed after military service that based on the nature of the condition or the manifestations of early signs of the condition during military service, may be considered service connected.

Presumptive verses Direct Service Connections

Presumptive Diagnosis

A Veteran can become “service connected” for a condition generally by one of two basic scenarios:

Direct service connection: a condition which can be demonstrated to be due to, or as a result of, or permanently aggravated by the Veteran’s time in service, or

Presumptive service connection: These are conditions which are presumed to be due to having been in a specific theater of combat.

These “presumptive conditions” are legally mandated and determined by the Secretary of the Department of Veterans Affairs, after careful review of the available scientific information.

Many clinicians are already aware of some of the [presumptive conditions](#), which have been mandated for presumed Agent Orange exposure during the Vietnam conflict; with diabetes mellitus type II probably being one of the best known. If a Veteran was on the ground or in brown water in Vietnam, and at any time thereafter is diagnosed with diabetes mellitus type II, it is “presumed” that the condition is due to exposure to Agent Orange in theater. The Veteran does not have to prove anything other than he/she was in Vietnam and the VA is obligated to grant service connection for the condition.

There is also a list of presumptively service connected conditions for [Gulf War 1 Veterans](#). To date, greater than 3,400 Gulf War Veterans have received service connection for their undiagnosed or difficult- to-diagnose illnesses under the authority of the presumptive diagnosis.

Presumptive Diagnosis Verses Direct Service Connection

According to 38 U.S.C. 1117(d):

(a)(1) The Secretary may pay compensation under this subchapter to a Persian Gulf Veteran with a qualifying chronic disability that became manifest - (A) during service on active duty in the Armed Forces in the Southwest Asia theater of operations during the Persian Gulf War; or (B) to a degree of 10 percent or more during the presumptive period prescribed under subsection (b). (2) For purposes of this subsection, the term "qualifying chronic disability" means a chronic disability resulting from any of the following (or any combination of any of the following): (A) An undiagnosed illness. (B) A medically unexplained chronic multi-symptom illness (such as chronic fatigue syndrome, fibromyalgia, and irritable bowel syndrome) that is defined by a cluster of signs or symptoms. (C) Any diagnosed illness that the Secretary determines in regulations prescribed under subsection (d) warrants a presumption of service-connection. (b) The Secretary shall prescribe by regulation the period of time following service in the Southwest Asia Theater of Operations during the Persian Gulf War that the Secretary determines is appropriate for presumption of service connection for purposes of this section.

This section discusses that there are undiagnosed illnesses or chronic multi-symptom illnesses that may be granted service connection in Gulf War 1 Veterans, even if a specific diagnosis is not made.

(d)(1) The Secretary shall prescribe regulations to carry out this section. (2) Those regulations shall include the following: (g) For purposes of this section, signs or symptoms that may be a manifestation of an undiagnosed illness or a chronic multi-symptom illness include the following: (1) Fatigue. (2) Unexplained rashes or other dermatological signs or symptoms. (3) Headache. (4) Muscle pain. (5) Joint pain. (6) Neurological signs and symptoms. (7) Neuropsychological signs or symptoms. (8) Signs or symptoms involving the upper or lower respiratory system. (9) Sleep disturbances. (10) Gastrointestinal signs or symptoms. (11) Cardiovascular signs or symptoms. (12) Abnormal weight loss. (13) Menstrual disorders.

This section discusses the types of signs and symptoms that may be manifestations of an undiagnosed illness or chronic multi-symptom illness that may be granted service connection even without a definitive diagnosis.

Direct Service Connection

As the name implies, this is not a presumed condition, and in order for the alleged illness or condition to become service connection it must pass the burden of proof that it is **at least as likely as not** due to the Veteran's time in military service. In general, the Veteran will file a claim with regards to an illness or injury experienced while in active service, and will go through the Compensation and Pension process.

Undiagnosed Illnesses

With regards to the Gulf War, there are also a variety of presumptive diagnoses, most of which fall into the category of "undiagnosed illnesses". Please note, that although many people will refer to a single complex of conditions as "Gulf War Syndrome", this is not a legally approved term as well as being inaccurate. In reality, there is no single syndrome, or consistent cluster of symptoms, that can be attributed to the Persian Gulf Conflict. Instead, there are increased rates of occurrence of many symptoms and numerous individual presumptive diagnoses attributed to the Gulf War, which probably more accurately fall under a heading such as Gulf War Related Illnesses or Gulf War Related Undiagnosed Illnesses. Please refer to the unit on Undiagnosed Illnesses for a more detailed discussion of specific undiagnosed illnesses which are referable to the Gulf War.

How to Apply for VA Disability Compensation

Like other Veterans, Gulf War Veterans with service-connected illnesses or injuries, which are disabling, are eligible for monthly payments called disability compensation. The condition must have been incurred or aggravated during active military service. Furthermore, the military service of the Veteran must have been terminated through separation or discharge under conditions that were other than dishonorable.

Disability compensation varies according to the degree of disability and the number of dependents. Benefits are not subject to Federal or state income tax. Receipt of military retirement pay, disability severance pay, and separation incentive payments, known as SSB and VSI (Special Separation Benefits and Voluntary Separation Incentives), affect the amount of VA compensation paid.

Disability Ratings Range

Disability ratings range from 0 to 100 percent (in increments of 10 percent). For example, in 2009, a Veteran with a disability rating of 10 percent receives \$123 per month; a Veteran with disability rating of 50 percent gets \$770 per month; and a Veteran with no dependents who is totally disabled and evaluated at 100 percent receives \$2,673 monthly. Veterans with disability ratings between 30 and 100 percent also are eligible for monthly allowances for each dependent. (The amount depends on the disability rating.)

In addition, Veterans rated a total of **xx%** or greater are eligible for lifetime health care from the VA with no co-payments regardless of the Veteran's income.

Additional Disability Benefits

A Veteran who either is in need of regular aid and attendance of another person (including the Veteran's spouse), or who is permanently housebound may be entitled to additional benefits. VA must make that determination before the Veteran can get these benefits.

GULF WAR REVIEW

For Veterans, their families and providers, a wealth of information regarding eligibility criteria and services available to the Veteran of the Gulf War, may be found in the newsletter: [GULF WAR REVIEW, INFORMATION FOR VETERANS WHO SERVED IN DESERT SHIELD/STORM AND THEIR FAMILIES](#). The Review also contains information about VA health care and other benefits, and new research results are regularly mailed to more than 400,000 Gulf War Veterans.

Gulf War Registry Program

Even before the 1991 Gulf War cease-fire, VA personnel were concerned about potential health problems of U.S. service members resulting from exposure to clouds of smoke from oil well fires. In response, VA developed a clinical registry called the VA Gulf War Registry Health Examination to help the department evaluate any health problems and to provide better health care for returning U.S. service members. Officially authorized by Congress on November 4, 1992, by the "Persian Gulf War Veterans Health Status Act," all Gulf War Veterans are eligible for participation in the Registry.

The Gulf War Registry examination is an instrument VA uses to track the special health concerns and health status of Veterans who may have been exposed to any of a number of substances in the Gulf (see Chapter 2 – Exposures of Concern to Gulf War 1 Veterans). This service is available at all VA medical centers. It is free, personalized and comprehensive. It includes a history, physical examination, and any medically indicated testing such as blood work, urinalysis, chest x-ray and EKG. The results of the health registry examination are maintained in the Veteran's medical record. This health registry exam provides the Veteran an opportunity to enroll in the VA healthcare system. However, Veterans do not have to enroll in the VA System to receive their registry examination.

All demographic information, exposure history, reported symptoms and diagnoses are included in a computerized database located at the Austin Information Technology Center in Austin, TX. If a Veteran has any new health concerns that develop after their initial registry exam, s/he may request and receive follow-up registry exam.

Registry Eligibility

Any Veteran who served in the Gulf War, and who has a concern relating to environmental

exposures, may participate in the Registry. Spouses and children of Veterans are not eligible for this examination. Eligible Veterans who want to participate in this program should contact the Environmental Health Coordinator at their nearest [VA medical facility](#) for an appointment.

Depleted Uranium/ Toxic Embedded Fragments

For Gulf War Veterans with concerns regarding exposure to Depleted Uranium (DU), the DU Follow-up Program and the Toxic Embedded Fragment Study Center at the Baltimore VA Medical Center was established in 1993 to monitor the health of Veterans who had retained DU fragments in wounds. In 1998, this program was expanded to offer DU screening for any Veteran concerned about possible DU exposure, and not just those with possible retained DU fragments or other types of high-exposure risks. There is also a separate registry for Depleted Uranium (DU) exposure. The DU registry program involves only the DU urine testing. Following the examination the Veteran may be given the results of the physical exam and laboratory tests either face-to-face or in a follow-up letter. Veterans also automatically receive or have access to VA's newsletters with updates or special information on health care and other benefits for them.

These centralized clinical databases allow the VA to communicate with Veterans and provides a mechanism to catalogue prominent symptoms, reported exposures and diagnoses. The registry examination is often an access point to VA clinical care for Gulf War Veterans.

War-Related Illness & Injury Study Centers

Specialized Health Care for Combat Veterans. In 2001, as part of VA's overall health response on behalf of Veterans returning from the 1991 Gulf War, the Department of Veterans Affairs established War Related Illness and Injury Study Centers (WRIISC) at the Washington, DC, and East Orange, NJ VA Medical Centers (VAMCs). A third Center is now operational at the Palo Alto, CA VAMC. Today, these three centers provide specialized health care for combat Veterans from all deployments who experience difficult-to-diagnose or undiagnosed-but-disabling illnesses. The WRIISCs work to assess and anticipate concerns about unexplained illness after virtually all deployments, including Operations Enduring Freedom and Iraqi Freedom, and is building on its understanding of such illnesses.

Transition Assistance Program for Veterans (TAP)

The U.S. Department of Labor's (DOL) Transition Assistance Program (TAP) for Veterans website provides career information for active duty service members, National Guard, Reserves, and spouses of service members separating or retiring from the military. The Web site provides tools and information to use during transition from military life to civilian life. Those interested in more information can find it online at: <http://www.dol.gov/vets/programs/tap/main.htm>

Other Benefits

In addition to the compensation program described above, individual Veterans may be eligible for the full range of other benefits offered by VA, including education and training, vocational rehabilitation, home loan guaranties, life insurance, pension, burial benefits, and more.

Gulf War Veterans seeking disability compensation for illnesses incurred in or aggravated by military service can contact a Veterans Benefits Counselor at the nearest VA Regional Office or health care facility at 1-800-827-1000, or call the VA Gulf War Information Helpline at 1-800-PGW-VETS (1-800-749-8387). Claims may also be made [online at http://vabenefits.vba.va.gov/vonapp/main.asp](http://vabenefits.vba.va.gov/vonapp/main.asp).

Gulf War Veterans interested in learning about the wide range of benefit programs administered by VA should contact a Veterans Benefits Counselor at the nearest VA regional office or health care facility at 1-800-827-1000, or call the VA Gulf War Information Helpline at 1-800-PGW-VETS (1-800-749-8387).

Representatives of Veterans Service Organizations, including the American Legion (1-800-433-3318), Veterans of Foreign Wars of the United States (1-800-VFW-1899 or 1-800-839-1899), Disabled American Veterans (1-877-426-2838), and others have been very helpful to Gulf War Veterans, especially those seeking disability compensation. The organizations listed are examples; there are many other excellent organizations and VA does not endorse or recommend any one group over another.

Contact the VA

The following websites can provide Veterans with a wealth of information on these registries and related topics:

- [Hazardous Exposures](#)
- [Veterans Health Initiative](#)
- [War Related Illness and Injury Study Center \(WRIISC\)](#)

VA also provides several hotlines and contact numbers for Veterans covering these topics:

■ **VA's** national toll-free telephone number, staffed by Veterans service representatives, provides information about disability compensation benefits as well as vocational rehabilitation and education programs available to Veterans: **1-800-827-1000**

■ **The Special Health Issues Helpline** is also a source of valuable information: **1-800-749-8387**

- For VA Health Eligibility/Enrollment: **1-877-222-8387**.

Risk Communication

Introduction to Risk Communication

One of the legacies of the Vietnam War is that Veterans returning from war often are skeptical, at best, of government, including government health care providers that are perceived as minimizing their health concerns. Historically, this began at about the same time that individuals and society in general became more cognizant of the potential health impacts of environmental exposures.

One of the legacies of the traditional American medical and allied health professionals' education systems is that most health care providers are not well versed in understanding their patients' concerns or in dealing with unknowns and uncertainties.

This combination of factors results in many health care providers being unfamiliar with the basic principles of risk communications and inadequately skilled to address their patients' risk perceptions.

There is a rich and deep science on how and why experts such as health professionals often perceive risks differently from so-called non-experts. The science shows that risk perception is not misperception – it is real and, can often be predicted. A Veteran's perception of risk needs to be understood and recognized as valid.

Some of these perceptions are based on:

- what the Veteran has heard from the media, friends, and others;
- what the Veteran has read in the lay press, in governmental publications, the scientific literature and increasingly on the internet; and
- what the Veteran has seen, or believes that they have seen.

Some of these information sources are accurate and others less so. All of this input is processed and colored by the Veteran's prior experiences, by their core belief systems and by a variety of other factors.

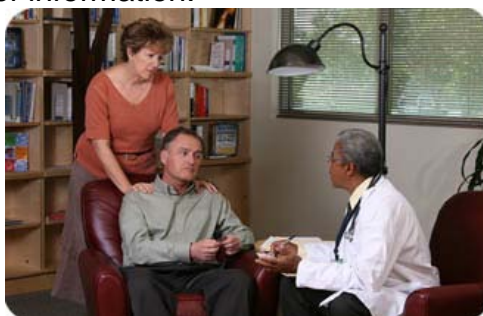
Note:

Perceptions of risk may be based on faulty, incorrect information, but that does not make the perception wrong. The science shows that risk perception is not misperception – it is real and can often be predicted.

Definition of Risk Communication

Risk communication is “an interactive process of exchange of information and opinions among individuals, groups, and institutions.” “... that express concerns, opinions or reactions to risk messages... as well as information on what to do to control/manage the (health) risk.” (National Research Council, 1989)

By its very definition, risk communication is more than the one way provision of information. It is at least two-way and often it is multi-directional with multiple sources and channels of information.



Risk Communication is the science of being able to identify, understand and discuss risk related information; taking into account already established opinions, values, concerns and risk perceptions, while being able to communicate the scientific facts that are known at the time about the hazard or exposure. Effective risk communication involves listening to a Veteran’s account of their experiences, exchanging additional information upon which to base opinions, and acknowledging uncertainty, while also discussing what is being done to reduce those uncertainties.

Objectives of Risk Communication

Where identifiable risks exist for present or future health effects clinicians should ensure that proper steps are taken to monitor health and mitigate potential adverse impacts. In many instances the clinician may be able to reassure the Veteran regarding the level of risk faced. However, in a substantial number of instances, science is not able quantify

the risk of an exposure or a combination of exposures and the job of the clinician is to give the Veteran the best information available. Based on this information and the Veteran's description of their exposure(s) the goal is to identify whether there are, in fact, potential health risks and if so what they are and how they can be managed to improve or prevent harm to the Veteran's health.

The focus of your risk communication efforts should not be on "changing someone's beliefs but rather understanding their perceptions so you can address them before these beliefs become fixed. Once they are fixed and firmly held providing established scientific information does little to alter them. Instead, establishing trust and listening to and understanding the Veteran's perceptions can go a long way to arriving at some common ground with the Veteran.

Purpose and Learning Objectives

Purpose- The purpose of this section is to give health care providers a brief overview of some of the principles and some of the science of Risk Communication.

Learning Objectives- At the conclusion of this section, participants will be able to:

- recognize and discuss what factors determine a Veteran's perception of risk;
- recognize and utilize the fundamental principles of Risk Communication to explain risks of events and/or exposures to Veterans with concerns about the effect of those events and/or exposures; and
- utilize these principles to better communicate with Veterans about their health risks while remaining honest, objective and acknowledging the uncertainty in many applicable scenarios.

Why worry about Risk Communication?

Exposures and events that our service members have experienced or suspect that they have experienced often cause a high level of concern. These exposures frequently occurred in a combat theater with high unit cohesiveness and trust. Once the person leaves military service that trust and cohesiveness is lost and a Veteran's opinions may be altered based on social networks and information sources that are perceived as trustworthy regardless of their independence or expertise.

The fact that these exposures occurred within a setting of strict hierarchal levels of power and little autonomy can help lead to their perception as high risk. The exposure concerns facing Veterans are frequently complex and

there is a high level of uncertainty and not uncommonly disagreement among experts. Risk communication is particularly important in situations like these of high concern and/or low trust or where there are hierarchal relationships of power.

Note:

The exposure concerns facing Veterans are frequently complex and there is a high level of uncertainty.

Effective Risk Communication

Effective Risk Communication requires that you:

- identify and understand your patient's experiences, beliefs, concerns, and perceptions;
- listen to and validate the Veteran's accounts of their experiences;
- recognize that trust and credibility are key;
- structure the provider-Veteran communication to respond to the Veteran's concerns; and
- exchange information to facilitate shared decision-making.

Note:

Good risk communication requires a two-way dialogue – It is not risk speaking

Risk Perception and the Importance of Trust and Credibility

Risk perceptions are related to health behavior, medical-decision making, and the processing of health information. Risk perception is influenced by a wide variety of cognitive, motivational, and affective factors. These psychological processes often shape risk perception. As stated above "information does not cure "wrong" perceptions", but may allow for the development of new, more effective ways of framing and addressing concern and risk.

Perception is reality and an individual's perceptions of risk frequently differ from "expert's" perceptions. Health care providers need to acknowledge and accept that the differing perceptions are valid and must understand that their own perceptions and opinions may have to change along with those of the Veteran.



Determining Factors

There are many factors which determine how an individual determines the risk of an event, exposure or behavior.

Improved clinical risk communication may alleviate unnecessary patient distress and physical health concerns, and reduce frustration and tension in the doctor–patient relationship. Most importantly, it may help patients simplify the daunting task of identifying the significance of and stratifying the multiple potential health risks. Research confirms that simply giving someone “the facts” will not necessarily alter perception of risk.

However, there are things that a provider can do to both better understand the Veteran’s perception of risk and how to more effectively share the information you have. There have been at least 15 dimensions or attributes of a risk shown by research to effect how “risky” someone, including a Veteran, is likely to judge it. Below is a partial list of those factors showing the extent to which the factor increases or decreases perception of risk.

Understanding Risk Perception

Select each of the items below to view an explanation and example.

Understanding Risk Perception	
Less Risky	More Risky
Voluntary	Involuntary
Individual Control	Controlled by Others
Familiar	Unfamiliar
Low Dread	High Dread
Affects Everybody	Affects Children
Naturally Occurring	Human Origin
Little Media Attention	High Media Attention
Understood	Not Understood
High Trust	Low Trust
Consequences Limited/Known	Catastrophic Consequences
Benefits Understood	Benefits Unclear
Alternatives Available	No Alternatives

Presented by the [VA New Jersey War Related Illness and Injury Study Center \(WRIISC\)](#)

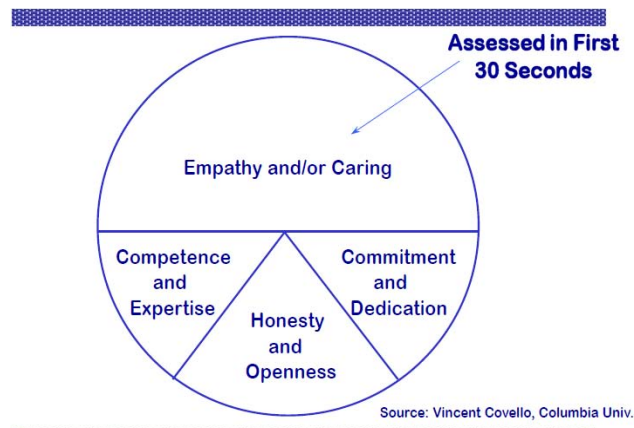
What makes a source credible?

Of all the factors affecting risk perception, the trust and credibility of the source of information can have the greatest impact. As a provider, this is one risk perception characteristic you can influence! There are four characteristics, or dimensions, that determine how credible a source is believed to be:

1. Empathy and Caring;
2. Competence and Expertise;
3. Honesty and Openness; and
4. Commitment and Dedication.

Some research suggests that the first of these is assessed within the first 30 -60 seconds of the provider-patient encounter and accounts for fifty percent (50%) of the patient's perception of trustworthiness and source credibility. Each of the other three account for 15-20%. Thus, a health care provider's education, training, experience and knowledge, account for less than a quarter of the patient's perception of credibility.

WHAT MAKES A SOURCE CREDIBLE



The professionalization process in medicine sometimes promotes the image of the physician as the detached and objective scientist over that of the warm and interpersonally connected confidante. Clinicians interested in improving their communication skills should keep in mind that their capacity to be caring, empathetic, honest, and open is the primary determinant in the effectiveness of their communication.



Who the Public Perceives as Credible

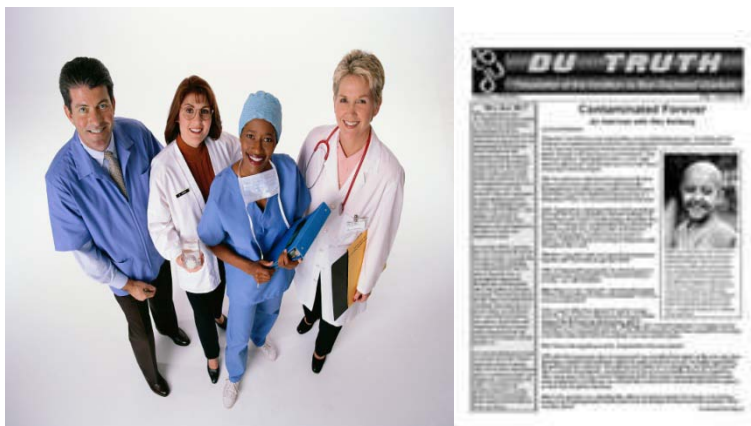
Many studies have looked at who the public perceives as credible in terms of health, safety and environmental information. Health care providers remain in the top tier of trusted sources. It is interesting to note that Veterans sometimes distinguish their trust for their health care providers from that of trust in the organization. Part of this relates to perceptions of the provider having a patient's interests at heart versus the organization's interests.

Following is a list of “Who the Public Perceives as Credible”. The Most Credible down to the Least Credible.

Most Credible

- Local citizens perceived as neutral, respected, informed about the issue
- Health/safety professionals (nurses, physicians, firefighters)
- Professors/educators (especially from respected local institutions)
- Clergy
- Non-profit organizations
- Media
- Environmental/advocacy groups
- Federal government
- State/local government
- Industry
- “For profit” consultants

Least Credible



Presented by the VA New Jersey WRIISC

Suggested Communication Strategy

One commonly relied upon risk communication strategy that can be used during Veteran-provider dialogue, involves four steps:

1. Begin with a statement of compassion.
2. Offer a brief "sound-bite" conclusion. What is the main point you hope to convey? This should be framed in as positive terms as possible. For example, in case of fire use the stairs vs. in case of fire don't use the elevators or the effects of this exposure have been shown to be short lived vs. there will be no long lasting effects of this exposure. State no more than two pieces of supporting data for your key point.
3. Repeat your main point.
4. Describe the actions both you and the Veteran can take in response to the situation.

The first and last components frame your message. The step that Veterans' are frequently most concerned about is action. Patients must to be reassured that their concerns have been heard and appropriate clinical action will be taken.

Case Example

A patient has been seeing you for fatigue, diffuse pain, and difficulty concentrating. After an appropriate medical evaluation and work up you have been unable to determine a clear medical etiology. The patient says, "Look doc, several men in my unit have all had symptoms like this. The way I look at it, this has got to be from some chemical we were exposed to in during War." I am afraid this might get worse. Is this something I could die of?

One response might be, "Mr. Smith, I know this must be frustrating, confusing and perhaps even frightening for you. We see many Gulf War Veterans with symptoms like this and it is also frustrating for us as clinicians. There are many studies that show that 1991 Gulf War Veterans have poorer health than expected, with symptoms like yours, though the cause is not clear. Most of these symptoms tend to fluctuate – sometimes they are better and sometimes worse and some may even go away completely. What we do know is that there is no increased risk of death from them. Although we don't know their causes, we do know there are several things that can be done to treat the symptoms and minimize their impact and interference with daily life. We have already conducted the laboratory and other tests that allow us to be sure that you don't have any of the life threatening conditions that can cause similar symptoms. Some of the useful treatments include Graded Exercise programs and Cognitive Behavioral Therapy or CBT. In addition to beginning some of these specific treatments, I suggest that you contact your service representative or the Regional Office to file a claim for Compensation and Pension for these unexplained symptoms. I would like to see you again in a month, so we can review how you are doing."

Summary of Risk Communication

You have completed **Risk Communication**.

Resources

[Improving Risk Communication](#), *Committee on Risk Perception and Communication, National Research Council, 1989.*