GULF WAR VETERAN EXPOSURES AND STRESSORS FLOW CHART

This chart lists those exposures and stressors which overtly or subtly affected Gulf War veterans.

This chart is updated at every Gulf War Research Adviso

The following Exposures and Stressors, and their synergistic effects, are significant for understanding Gulf War Illness and utlimately treatments (NOTE 11).

EFFECTS + **RESPONSES** =

MAIN CATEGORY	1ST SUB-CATEGORY	2ND SUB-CATEGORY (NOTE 9)	3RD SUB-CATEGORY (NOTE 2)
EFFECTS			
EXPOSURE GROUPS	PROPHYLACTATES	VACCINES	SQUALENE ANTI-BODIES
			ANTHRAX (AVA)
			MULTIPLE VACCINATIONS (NOTE 3)
			ADJUVANTS
		PILLS	NAPP
			PYRIDOSTIGMINE BROMIDE (PB)
	HEAVY METALS	DEPLETED URANIUM (DU)	URANIUM SHRAPNEL
			URANIUM DUST FROM BURNING VEHICLES
			URANIUM SMOKE FROM BURNING VEHICLES
	CHEMICALS	ORGANOPHOSPHATES	SARIN (GB), CYCLO SARIN, VX (NOTES 15, 17)
		BLISTER AGENTS	LEWISITE, MUSTARD
		PESTICIDES	CARBAMATES, REPELLENTS (NOTE 4)
		OTHERS	SOLVENTS, JET FUEL, CARC (NOTE 14)
	BIOLOGICALS	VECTORS	VISCEROTROPIC LEISHMANIASIS
			SAND FLY FEVER VIRUS
		MYCOPLASMA	
		BRUCELLOSIS	IRAQI WEAPONIZED BIOLOGICAL
	ENVIRONMENTALS	PETROCHEMICAL	BURNING VEHICLES / BUNKERS
			OIL WELL FIRES AND SMOKE
			JET FUEL IN WATER BLIVETS
			PETE WATER BOTTLES EXPOSED TO HEAT
		ULTRAFINE PARTICULATES	AIRBORNE SAND, OIL WELL SMOKE
		WATER	FROM FUEL TRUCKS / LOCAL
STRESSOR GROUPS	ENVIRONMENTALS	WEATHER	RAIN, HEAT, SAND STORMS
		OIL WELL FIRES	SMOKE / PARTICULATE INHILATION
	BIOLOGICALS	FATIGUE	LACK OF OR DISRUPTIVE SLEEP
		BATTLEFIELD EXPERIENCE	SEEING THE DEAD OR KILLING PEOPLE
		GENETIC RESPONSE	POSITIVE / NEGATIVE EXPOSURES
		IMMUNOLOGICAL RESPONSE	POSITIVE / NEGATIVE EXPOSURES
	PSYCHOLOGICALS	COMBAT STRESS	TRAUMATIC STRESSORS
		DEPLOYMENT STRESS	INCLUDING FAMILY PROBLEMS
		GENERAL or OTHER STRESS	FEARS AND WORRIES
		PSYCHOLOGICAL PROBLEMS	PSYCHOLOGICAL ILLNESS

RESPONSES

SMALLER ACTIONS
- CYTOKINE DYSFUNCTION
- MICROGLIAL ACTIVATION
- MITOCHONDRIAL DYSFUNCTION
- DEGENERATIVE MYELOPATHY

LARGER ACTIONS
- GLIAL RESPONSE
- PROINFLAMATORY RESPONSE
- AUTONOMIC DYSFUNCTION
- NEUROIMMUNE DISREGULATION
- IMMUNE ABNORMALITIES
- NEUROINFLAMMATION
- NEUROTOXICITY
- NEUROPLASTICITY
- MOTOR NEURON DISEASES
- PTSD
- CNS ABNORMALITIES

NOTES

1. Under MAJOR SYMPTOMS, every possible symptom is not listed, but only those that are significant and specific to most GULF WAR Illness in relation to Desert Shield/Desert Storm.

2. Stopped at 3 sub-categories (when it could go further in some areas) to identify the important issues, but to also keep the chart understandable and less complicated.

3. Vaccines: Anthrax, Plague, Botulinum, Typhoid, Cholera, Diphtheria, Pertussis, Tetanus, Meningococcus

4. Pesticides: OP, OCI, Carbamates, Pyrethroids, Repellents - includes DEET (which is an AChE inhibitor). Some soldier uniforms were immersed in pesticides, and some camps were heavily sprayed down periodically. The carbamates identified as Pesticides Of Potential Concern include bendiocarb (sprayed powder), methomyl (fly bait crystals), dichlorvos, and propoxur (sprayed liquid).

5. LEVEL OF CONTACT (Degree of Exposure) and MULTIPLE EXPOSURES or CONFOUNDERS (2 or more) in conjunction at times and possibly with STRESSORS are factors to be considered when analyzing the symptoms in individuals. (Degree of Exposure: Verified exposures, possible and/or self-reported, unverified exposures, non-exposed).

6. **STUDY CRITERIA CONCERN:** If people were with forward deployed forces (combat/combat support), they are more likely to have multiple exposures, stressors, and higher levels of contact (see Note 12). It is important that all studies distinguish between people forward deployed from other types of deployments or the study results/outcomes might be viewed as irrelevant. Simply referencing deployed from non-deployed, leads to irrelevant data, as outcomes usually mirror the general population.

7. The following were not used but could be added to the list: Somatoform Disorders, Cognitive Problems, Neurological Problems, Sleep Disorders, Chronic Widespread Pain, Immunological Recall, Myalgia, Arthralgia, Myofacial Pain, Low Bone Density, Carcinogenic Effects, Neurotoxic Effects.

8. Research Criteria: a. Addresses one or more symptoms, or b. Addresses one or more diagnoses, or c. Addresses one or more exposure events.

9. Gulf War Illness could be caused by Multi-Combination Exposures (see Note 11) often with Medically Unexplained Symptoms.

10. There are two War Related Illness Injury Study Centers: Washington DC VA Medical Center and VA East Orange New Jersey. Center Purposes: 1. Collect and analyze data on GW vet treatments/symptom relief - ID promising therapies for further research; 2. Create good definitions for studies/outcomes; 3. Define ways of stratefying the GW vets; 4. Focus on evaluation of biomarkers and treatments; 5. Engage in pilot clinical research projects.

11. Animal studies have consistently found that these neurotoxins, in combination with one another and other Gulf War-related exposures, can have synergistic effects that exceed the effects of individual exposures.

12. Research findings reported from studies of Gulf War veterans should not be limited to results that combine all deployed veterans into a single group (ref note 6), but should include results for subgroups of Gulf War veterans defined according to veteran's locations in theater, exposures, or other deployment characteristics potentially relevant to outcomes of interest. For example: Forward deployed veterans in combat units are more likely to have higher exposures and stressors, and those who reported exposures and symptioms follow scud missile attacks.

13. There is a latency period in relation to cancers and some neurological diseases, which means a person may experience the insult to their system in the past, but not see the disease manifest itself for many years.

14. CARC - Chemical Agent Resistant Coating. The most hazardous compound in CARC is hexamethylene diisocynate (HDI) a paint hardener.

15. ORGANOPHOSPHATES include Nerve Agents and some Pesticides (see Note 17). Troops were exposed to the Nerve Agents through Munition Demolitions, SCUD Missile Attacks, and Iraqi Helicopter Dispersal during the Shiite Uprising. **VX** (O-ethyl-S-[2(di-isopropylamino)ethyl] methylphosphonothiolate) is an extremely toxic substance whose sole application is as a nerve agent. As a chemical weapon, it is classified as a weapon of mass destruction by the United Nations in UN Resolution 687. Production and stockpiling of VX was outlawed by the Chemical Weapons Convention of 1993. The VX nerve agent is the most well-known of the V-series of nerve agents and is considered an area denial weapon due to its physical properties. VX is 170 times more lethal than sarin and was, apparently, used on U.S. troops, incidentally, after the Gulf War as an after effect of the helicopter chemical spraying of the Basra uprising (see my RAC Committee briefing). I know of one soldier who entered a bunker after the war and was exposed to **Lewisite**, which smells like geraniums.

16. **[ALIBI: Before you try anything listed here, note that we, myself and these listed medical professionals, are not saying they are a cure for Gulf War illness and are not liable for any results, positive or negative. Because they are listed here is not an endorsement of their efficacy or benefit. We are just reporting what has benefited some people and those medicines/products that might be helpful. Remember, medicines/vitamins affect everyone differently, so read warning labels carefully and talk to your doctor before taking anything listed here, especially to be sure that these things do not conflict with any other medications or vitamins you are taking.]** **RP 105** targets alzheimers, parkinsons, PTSD and **RP110** targets depression, inflammation, neurogeneration. For more information on treatment options 1-4, please contact Dr Linda Watkins, University of Colorado, Boulder - Psychology and Center for Neuroscience. lwatkins@psych.colorado.edu / 303-492-7034 http://psych.colorado.edu/~watkins. For **CoQ10** vitamin supplement @ 100mg to 300mg, daily (Contact: Dr Beatrice Golomb, Assoc Professor, Internal Medicine, Univ of Calif, San Diego :: bgolomb@popmail.ucsd.edu); Do not take at bedtime, as it can disrupt sleep. Low-dose Naltrexone is used to control symptoms of Multiple Sclerosis. **NALTREXONE** - for more information, please contact Dr Bill Meggs, MD, PHD, Chief, Division of Toxicology, The Brody School of Medicine, East Carolina Univ School of Medicine, Greenville, NC 252-744-2954, meggsw@ecu.edu. Some people respond better to 9mg, but start at 4.5mg first and go from there.

17. Besides nerve agents, GA, GB, VX, and blister agents Lewisite and Mustard, that troops were exposed to during the Gulf War, other organophosphate-based pesticides included azamethiphos (fly bait red/yellow crystals), chlorpyrifos (sprayed and fogged liquid), diazinon (sprayed liquid), dichlorvos (pest strip) and malathion (sprayed and fogged liquid).

*** Please contact Joel Graves (member Gulf War Research Advisory Committee) with changes, recommendations, or updates to this chart - joelcgraves@gmail.com**

AS OF JAN 2014

ıry Committee meeting.

ILLNESSES ~ TREATMENTS PROGRAMS

MAJOR SPECIFIC CATEGORIES AND SYMPTOMS (NOTES 1, 5, 6)	TARGETS FOR TREATMENT AND POSSIBLE DIAGNOSES	TREATMENTS BASED ON SYMPTOMS SEE NOTE 16

ILLNESSES

MUSCULAR-SKELETAL
JOINT AND BODY PAIN/STIFFNESS
GENERAL MUSCLE ACHE/PAIN
TINGLING/SHAKING EXTREMITIES
LOW-IMPACT SLOW-HEAL INJURIES
MYCOPLASMA INFECTION
SWOLLEN /BURNING EXTREMITIES
CANCERS
CARDIAC MYOPATHY
PSYCHOPHYSIOLOGICAL
HEADACHES
SORE THROAT
GASTRO INTESTINAL PROBLEMS
GERD
EARS RINGING/TINITUS
HAIR LOSS
RESPIRATORY PROBLEMS
SKIN PROBLEMS
SLEEP DISORDERS
NEURO-COGNITIVE
EASILY TIRED, FATIGUED
EASILY ANGERED, IRRITABLE
COGNITIVE DYSFUNCTION
DEPRESSION
MEMORY DETERIORATION
POST-EXERTIONAL MALAISE
POOR SLEEP
BLURRED/DOUBLE VISION
LIGHT SENSITIVITY
NIGHT SWEATS
MOOD DISORDERS
HEADACHES
IMPAIRED WORD FINDING
ATTENTION/CONCENTRATION POOR
MORPHINE/OPIOID TOLERANCE
NAPHTHALENE SENSITIVITY
NEURODEGENERATIVE DISEASES
ALZHEIMERS (early onset)
PARKINSONS
ALS (Lou Gehrig's)
HUNTINGTONS
MULTIPLE SCLEROSIS
BRAIN CANCER
(NOTE 7)

GENERAL
UNDIAGNOSED DISEASE (ICD9-13840)
CHRONIC MULTISYMPTOM ILLNESS
FIBROMYALGIA
MULTIPLE CHEMICAL SENSITIVITY
CHRONIC FATIGUE SYNDROME
MULTIPLE UNEXPLAINED SYMPTOMS
NEUROLOGICAL
ALS
MULTIPLE SCLEROSIS
AUTONOMICAL
CHRONIC FATIGUE SYNDROME
PHYSIOLOGICAL
MULTIPLE CHEMICAL SENSITIVITY
IRRITABLE BOWEL SYNDROME
FIBROMYALGIA
TUMORS AND CANCERS (NOTE 13)

(NOTE 16 on Treatments 1-6)

1. Rio Pharmaceutical's RP 105, RP 110

2. Avigen's AV 411 (in phase 2 trials at Columbia Univ)

3. Xalud Therapeutic's XT 101 (intrathecal Interleukin-10 DNA therapy)

4. Adenosine Therapeutic's ATK 313 (intrathecal drug drives Interleukin-10 in pre-clinical development)

5. CoQ10 vitamin :: 300 mg=100 mg-3x's per day. If 300 mg does not work, double to 600 mg = 200 mg-3x's per day. If 600 mg does not work, go to 1200 mg = 400 mg-3x's perday. (Note 16)

6. Naltrexone low-dose (4.5 - 9mg). Available now through a compounding pharmacy with doctor prescription. See Note 16 for more info.

7. For memory loss, 1,000 mg Lecithin and 400 mg Magnesium per day::takes about two weeks to see improvement - ck with your doctor if taking other medications. I have used this since 1994.

BRAIN BANK (for ALS only right now)

GENE BANK

WASHINGTON DC & NEW JERSEY WRIISCs
(NOTE 10)

ALL DEPLOYMENT RESEARCH + Desert Storm
http://deploymentlink.osd.mil/deploymed/

RESEARCH ADVISORY COMMITTEE
http://www.va.gov/rac-gwvi

CLINICAL TRIALS
http://www.clinicaltrials.gov
Under search type in Gulf War to get list of trials.

GULF WAR REVIEW
http://www.gulfwarreview.gov

DOD CONGRESSIONALLY DIRECTED MEDICAL RESEARCH PROGRAMS
http://cdmrp.army.mil
use Search Site and type in Gulf War for specific GW research