Learning Objectives

- At the conclusion of the session, the participant will
- 1. Be able to list the hallmark injury of the Mideast deployment trauma related injuries
- 2. Be able to list the 6 Environmental Health Registries
- 3. Describe the difference between a presumptive condition and civilian workers’ compensation occupational injury/illness
- 4. List three barriers to return to work in post deployment veterans.

Veterans by % Period of Service

Projected % of Total Veteran Population by Period of Service, 2000-2080

National Center for Veterans Analysis and Statistics
10/13/2014
Accessed 02/25/2015
http://www.va.gov/vetdata/docs/quickfacts/population_quickfacts.pdf
Environmental
- Dusts, particulate matter (PM) burn pits, vaccinations (anthrax, botulinum), physostigmine bromide,

Infectious Disease
- Malaria, brucellosis, Campylobacter jejuni, Coxiella burnetti (Q fever), M.Tb, nontyphoid Salmonella, Shigella, Visceral Leishmaniasis, West Nile Virus

Occupational
- Solvents, noise, asbestos, lead, radiation, PCBs, vibration, CARC paint

Exposures of concern—Gulf War/ OEF/ OIF/ OND

- Protective gear/alarms 82.5%
- Petrochemicals 80.6%
- Oil well fire smoke 66.9%
- Local food 64.5%
- Insect bites
- Harsh weather 52.5%
- Smoke from burning feces, garbage
- Within 1 mi missile warfare 59.9%
- Repellants and pesticides 47.5%
- Paint/solvents 36.5%

Top 10 Environmental Exposures in Gulf War Veterans

See Teichmann R. Health hazards of exposures during deployment to war. JGEM 2012 Vol54(6):655-58
### Presumptive Conditions

- Presumptive conditions are defined by conflict era and location for purposes of disability compensation.
- Requirements:
  - Veteran must have a diagnosis of one or more "presumptive" conditions.
  - Veteran must have served in active duty military service at a specific conflict location within a specified time period.
- Then, it is "presumed" that the condition results from military service – without proof of exposure.
  - for purposes of disability and compensation.

### Service Connected conditions and Compensation and Benefits (C & P)

- A medical condition that arose during military service or a pre-existing condition that was worsened (aggravated) during service connected activities.
  - Can be any illness not recognized as present upon entry into military service.
- It is considered a benefit.
- The condition is reviewed by C & P physicians and determined whether the condition was more likely than not caused, arose or worsened by the Veteran’s tour of duty and activities.

### Workers' Compensation

- OSHA: an injury or illness to be work-related if an event or exposure in the work environment either caused or contributed to the resulting condition or significantly aggravated a pre-existing injury or illness. Work-relatedness is presumed for injuries and illnesses resulting from events or exposures occurring in the work.
- No-fault insurance
  - Generally accepted if the work factors were considered to be > 50± 1% causative factor (probable cause).
Environmental Health Registries

- 1. Agent Orange
- 2. Gulf War Registry (Include OEF/OIF)
- 3. Ionizing Radiation
- 4. Depleted Uranium Follow-up program
- 5. Toxic Embedded Fragment Surveillance Center
- 6. Hazardous Airborne Substances and Open Burn Pit—new as of 2014
- Does not include Honoring America’s Veterans and Caring for Camp Lejeune Families Act of 2012–VA Implementation of Section 102

Environmental Health Registry exams do:

- Evaluation and testing on individual level
- Keep veteran in touch with and policy and program changes.
- No direct benefit to veteran but would allow contact of veteran for relevant new information
- Allow evaluation of condition or finding at no cost to the individual

Further steps after evaluation

- Advise and counsel veteran if a health condition is identified where to go for further evaluation if a condition
- 37% of Active Duty and 33% demobilized National Guard/Reserve report “definite or probable exposure to environmental hazards” during military service per DOD 2010 National Survey of Veterans.

  - Source: Paul Ciminera MD, MPH Director, Post 9/11 Environmental Health Program
  - Charge to the IOM Committee on Assessment of Dept. VA Airborne Hazards and Open Burn Pit Registry
Gulf War Registry Eligibility

- Veterans who served in the Gulf during the 1990–1991 Gulf War, Operation Desert Shield, Operation Desert Storm, Operation Iraqi Freedom, or Operation New Dawn are eligible for the Gulf War Registry exam.
- Can also enter Airborne Hazards Open Burn Pit Registry
  http://www.publichealth.va.gov/exposures/gulfwar/benefits/registry-exam.asp#sthash.mh1LE0xN.dpuf

Gulf War Presumptive Conditions

- Included are medically unexplained chronic multi-symptom illnesses defined by a cluster of signs or symptoms that have existed for six months or more, such as:
  - Chronic fatigue syndrome
  - Fibromyalgia
  - Irritable bowel syndrome
  - Any diagnosed or undiagnosed illness that the Secretary of Veterans Affairs determines warrants a presumption of service connection.

  Signs or symptoms of an undiagnosed illness include:
  - Fatigue, skin symptoms, headaches, muscle pain, joint pain, neurological symptoms, respiratory symptoms, sleep disturbance, GI symptoms, cardiovascular symptoms, weight loss, menstrual disorders.

Most frequent conditions reported

- The most frequently reported codes in this category, in order of magnitude are: General Symptoms (ICD–9–CM 780), Symptoms Involving Head and Neck (ICD–9–CM 784), and Symptoms Involving Respiratory System (ICD–9–CM 786).
Longitudinal Health changes In Gulf War Veterans

- 10 yr. follow-up of 29,607 living members of original 30,000 member panel.
- Deployed veterans were less likely to recover from any prior functional impairment, limitation of activities, or PTSD that they had in 1995 and more likely to report new onset of these adverse health outcomes in 2005 compared with non-deployed veterans.
- Deployed veterans reported more new onset of the chronic diseases surveyed (arthritis, hypertension, asthma, and coronary heart disease):
  - Significantly increased adjusted incidence risk ratios ranged from 1.15 (95% confidence interval: 1.02, 1.29) for hypertension to 1.61 (95% confidence interval: 1.17, 2.23) for coronary heart disease
  - Li B, et al 2011

Eligibility: Hazardous Airborne Exposures/Open Burn Pit Registry Eligibility

- VA will determine eligibility for the Airborne Hazards and Open Burn Pit Registry based on deployment information from the Department of Defense (DoD). To be eligible, you must be a Veteran or Service member who deployed to contingency operations in the Southwest Asia theater of operations at any time on or after August 2, 1990 (as defined in 38 CFR 3.317(e)(2)), or Afghanistan or Djibouti on or after September 11, 2001. These regions include the following countries, bodies of water, and the airspace above these locations:
  - Iraq
  - Afghanistan
  - Kuwait
  - Saudi Arabia
  - Bahrain
  - Djibouti
  - Gulf of Aden
  - Gulf of Oman
  - Oman
  - Qatar
  - United Arab Emirates
  - Waters of the Persian Gulf, Arabian Sea, and Red Sea

Respiratory Exposure Issues

- Exposure to burn pits
  - Rubber, plastics, electronics, petroleum, metals, solvents
  - Gradually phased out in 2009 but still 197 in Afghanistan in 2011
  - Smoke from open burn pits contained an unknown mixture of substances that may have short- and long-term health effects, especially for those who were exposed for longer periods or those more prone to health effects such as individuals with asthma or other lung or heart conditions.
- Industrial fires
- Particulate Matter (PM) from desert dust storms
  - Samples show levels above guidelines values for PM
  - Primary sources: geological dust, burn pits, lead-zinc smelter and battery processing facilities
  - Lead, arsenic, cadmium, antimony, zinc
  - Several months of storms spring and summer
Are burn pit exposures related to respiratory symptoms?

- Millennium Cohort Study surveys participants every 3 years during active duty and following separation until 2022
- Looked at 22,284 servicemen with possible exposures of 2, 3, 5 miles from burn pits from 2004–2006 and 2007–2008
- Multi-variate logistic regression showed no statistical significance with 3 or 5 mile distance and possible exposure with respiratory outcomes.
- 2 mile possible exposure showed increased respiratory symptom reporting but marginally significant with no trend identified
  - Smith B, et al 2012

National Academy of Sciences Institute of Medicine (IOM) Reports

- "Gulf War and Health, Volume 8". The two relevant summary findings from this report are as follows:
  - "insufficient/ inadequate evidence to determine whether an association exists between deployment to the Gulf War and respiratory diseases" and
  - "limited/suggestive evidence of no association between deployment to the Gulf War and decreased lung function in the first 10 years after the war" (page149).

National Academy of Sciences Institute of Medicine (IOM) Reports

- "Long-term Health Consequences of Exposure to Burn Pits in Iraq and Afghanistan (Oct 2011)
  - Conclusion 1: Limited/suggestive evidence of an association between exposure to combustion products and reduced pulmonary function in the populations studied; and
  - Conclusion 2: Inadequate/insufficient evidence of an association between exposure to combustion products and cancer, respiratory diseases, circulatory diseases, neurologic diseases, and adverse reproductive and developmental outcomes in the surrogate See VA notice in Federal Register, 78 FR 7860, February 4, 2013.
  - Source: Paul Cimpaner, MD MPH, Director, Post 9/11 Environmental Health Program; Post-Deployment Health Strategic Healthcare Group
Ongoing Studies

- Both efforts include but not limited to respiratory exposures
- National Health Study for a New Generation of U.S. Veterans
  - 30,000 OEF/OIF Veterans with a control of 30,000 Veterans who served elsewhere
- Millennium Cohort Study
  - DOD study since 2001
  - 150,000 participants
- Study of Active Duty Military for Pulmonary Disease Related to Environmental Dust Exposure (STAMPEDE)
  - Prospective study of soldiers deployed from Fort Hood, Texas comparing baseline (pre-deployment) screening tests with serial testing (post-deployment)

Respiratory conditions of concern

- Asthma
- Constrictive bronchiolitis
  - AKA bronchiolitis obliterans
  - Fixed airways obstruction and fibrosing bronchioles with extrinsic narrowing bronchiolar lumen.
- Acute eosinophilic pneumonia
  - Rose C, et. JOEM 2012.
- Smoke from open burn pits contained an unknown mixture of substances that may have short- and long-term health effects, especially for those who were exposed for longer periods or those more prone to health effects such as individuals with asthma or other lung or heart conditions.
  - Paul Ciminera MD, MPH 2015

Proposed Post-deployment Respiratory Case Definitions

- Deployment related asthma
  - Post-deployment onset of persistent respiratory symptoms
  - Reversible airway obstruction on pre- and post bronchodilator PFTs
  - Positive MCT
- Deployment related constrictive bronchiolitis
  - Post-deployment onset of persistent respiratory symptoms and at least two of the following:
    1. Fixed airway obstruction on pre- and post bronchodilator PFTs with no other explanation
    2. Mosaic attenuation/air trapping on expiratory HRCT
    3. Clinically significant gas exchange abnormalities or abnormal maximum oxygen consumption on exercise tolerance testing with no other explanation
    4. Surgical lung biopsy findings consistent with constrictive bronchiolitis as determined by an experienced pulmonary pathologist
When to refer in Postdeployment veterans

- > 3 month unexplained cough, SOB, or wheezing/chest tightness
- Any abnormal spirometry pattern < lower limit of normal
- Excessive decline in FEV1 or FVC defined as a >15% decrease in either between pre-and postdeployment testing, even if in normal range
- > 10% decline comparing pre- and postdeployment spirometry if new respiratory symptoms reported
- Excessive decline in Physical Readiness Test compared with predeployment testing
- SW Asia deployment

Agent Orange

- Two active ingredients
  - 2,4 dichloropheoxyacetic acid (2,5-D)
  - 2,4,5-trichlorophenoxyacetic acid (2,4,5-T)
- 2,3,7,8-tetrachlorobenzo-p-dioxin (TCDD)
- Agent of concern
  - Most toxic of chlorinated di-benzo-p-dioxins (CDDs)
  - By-product of production
  - Classified as a human carcinogen
  - ATSDR ToxFaq

Agent Orange Exposure Presumptive Conditions

- Type 2 diabetes mellitus
- Chloracne
- Porphyria cutanea tarda
- Soft-tissue sarcoma, Hodgkin’s disease, non-Hodgkin’s lymphoma
- Multiple myeloma
- Respiratory cancers
- Prostate cancer
- Acute and subacute peripheral neuropathy
- Chronic lymphocytic leukemia
- Spina bifida in children
- Ischemic heart disease
- Parkinson’s disease

17.6 million gallons of herbicides over 3.6 million acres from 1962-1971
Ionizing Radiation Presumptive Conditions

- All forms of leukemia (except for chronic lymphocytic leukemia)
- Solid tumors: thyroid, pancreas, brain, ovary
- Bronchoalveolar carcinoma
- Multiple myeloma
- Non-Hodgkin’s lymphomas
- Primary liver cancer

Toxic Embedded fragments and Depleted Uranium

- Shrapnel is a common term to describe the toxic fragments from improvised explosive devices (IEDs), bombs, mines and shells. Some of the fragments may contain depleted uranium (DU) –
  - DU contains 40% less radiation than enriched uranium
  - DU was used in munitions to for increased armor penetrating capacity

See more at: http://www.publichealth.va.gov/exposures/toxic_fragments/index.asp#sthash.sChIk0VS.dpuf

Credit: Joanna Gaitens, PhD, MSN/MPH, RN
Health concerns of TEF

- Local effects
- Risk of the development of tumors at the fragment site
- Systemic effects
  - Risk of target organ effects arising from chemicals released from fragments
- No recognized health effects from exposure apart from direct trauma as of yet.
  - 399 veterans since 1993 evaluated as of end of 2013
  - Source: Train the Trainer, 9/20/2013 Joanna Gaitens, PhD, MSN/MPH, RN

Types of injuries

- Polytrauma was termed by VA to describe injuries to multiple body parts and organs occurring as a result of blast-related wounds seen in Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF)
  - Polytrauma is defined as a serious injury to two or more body systems which result in physical, cognitive, or psychological impairments that limit a person's ability to function.
  - Traumatic Brain Injury (TBI) frequently occurs in polytrauma
  - TBI includes variety of effects, such as an inability to concentrate, an alteration of the senses (hearing, vision, smell, taste, and touch), difficulty speaking, and emotional and behavioral changes.
  - Polytrauma/TBI system of care
    http://www.polytrauma.va.gov/understanding-tbi/

Health Effects of Combat

- PTSD 9–31%, ranging from serious functional impairment to mild. Alcohol misuse or aggressive behavior in approximately half.
  - Thomas JL, et al. 2010
- Polytrauma triad: Co-occurrence of TBI, PTSD, chronic pain
  - Reissinger HS, et al. 2012
- Polytrauma triad contributes to sleep disturbances
  - Worse with PTSD + stress
  - High prevalence (93%) in chart review of 200
  - Mild TBI alone not a significant predictor of sleep disturbance
TBI severity 2000–2014 in armed services

320,344 total cases of TBI
80% non-deployment

Defense and Veterans Brain Injury Center
http://www.dvbic.org/dod-worldwide-numbers-tbi

Chronic Pain and TBI

- 23 studies of 4206 patients.
- Prevalence of chronic pain greater in patients with mild TBI, prevalence 75% compared with moderate or severe TBI 32%.
- 20 Studies of TBI yielded a chronic pain prevalence of 51.5%
- 3 studies of TBI among 917 veterans yielded pain prevalence of 43%
- Conclusion: chronic pain is common complication of TBI and independent of psychological disorders

Costs

- Direct medical costs and indirect costs (e.g., lost labor productivity) from TBI injuries and other mental disorders (e.g., PTSD) are estimated to range from $22 billion (Adler et al., 2011; Burnett-Zeigler et al., 2011; Fadil & McPherson, 2009) to $60 billion in the United States (Thornhill et al., 2000).
- Labor earnings of wounded service members are also grossly affected; those who returned from combat between 2001 and 2006 experienced an earnings loss of $556 million through 2010 (Heaton et al., 2011).
- More than $2.3 billion in disability compensation have been issued by the DoD, the VA, and the Social Security Administration (SSA) to injured service members including reservists, who deployed between 2001 and 2006; rates of compensation have sometimes exceeded 100 percent of an average service member’s household earnings (Heaton et al., 2011).
- Other social costs of injuries include a decreased quality of life for wounded service members and their families. Spouses or children may reduce their employment to provide care for the wounded service members.
Driving issues

- Mild TBI (mTBI) typically resolve within a few weeks or months of the injury, a small percentage of people continue to experience symptoms for several months or even years.
- These symptoms are seen in post concussion syndrome (PCS), typically include cognitive difficulties such as memory and concentration impairment, somatic complaints (i.e., headache, dizziness), and emotional disturbance including irritability, depression, and anxiety.
  - Ryan LM and Warden DL. 2003

Post deployment and driving

- 93 percent of participants self-reporting increased anger or impatience, general driving difficulties, near misses.
- Sayer et al. found that OIF/OEF veterans with probable PTSD experience anger (though not necessarily while driving), engage in dangerous driving upon returning home, and generally struggle more with reintegration than veterans without PTSD.
- Injury due to motor vehicle crashes is one of the leading causes of preventable morbidity and mortality across all branches of the military.
- Motor vehicle crashes are the leading cause of death in veterans in the early years after returning from deployment. Observed in both Gulf war and Vietnam veterans.
  - Lew et al. 2011

Issues in return to Work

- Individual capacity
  - Strength, flexibility, endurance
- Tolerance
  - Ability to tolerate work or activity at a given level
  - Psychophysiological
  - Pain and fatigue limiting factors
- Risk
  - Chance of harm to the veteran, co-workers, general public
  - Little scientific literature on real-world risk of working with known medical conditions
  - Talmage JR, McRorey JM, Hyman NH. AMA Guides to the Evaluation of Work Ability and Return to Work. 2nd Ed. AMA 2011. Chicago, IL.
Barriers in return to work–Rand Report

- Feeling overwhelmed by less-structured work environments
- Lack necessary accommodations for their injuries
- Unaware of the types of vocational assistance available to them
- Employers lack of commitment or overt negative attitudes in hiring those with disabilities
- An individual veteran’s internal motivation to seek available and utilize available resources
- Lack of knowledge of providers in making the veteran aware of programs
- Lack of collaboration between the various agencies and programs.
  - Recognized poor coordination among existing programs which typically do not link an individual’s health care needs to vocational services

Communication as a barrier

- Veterans generally not comfortable discussing disability issues with Human Resources.
- Uncomfortable being revealed to co-workers
- Noise also bothers significant number of veterans
- Veterans may leave without discussing issues with HR.
  - Source John Merdalet PhD, Minneapolis VAHCS Transition Work Experience Counselor, personal communication

Low Intensity Programs

- Definition: Encourage RTW through on-line resources or information
- Data bases, accommodation suggestions, legal advice
- May be employer focused
  - Job Accommodation Network of the DOL Disability Employment Policy or:
  - Wounded Warrior Project
  - Hire Heroes USA
  - National Resources Directory, VETS match veterans with employment opportunities
Medium Intensity

- Focus on pre-employment training, workplace accommodation, and job placement or matching
- Job Preparation
  - Army Wounded Warrior Program—for severely wounded
  - Warrior Transition Units
- Entrepreneurial Boot camp for Veterans
  - Small business and entrepreneurship training
- Workplace accommodation
  - Coaches
  - Physical and workflow adjustments
  - Access to adaptive technology
  - Training on how to use equipment at the worksite

High intensity

- On the job training and assistance
- Focus on rapid competitive job placement and long-term on the job support
- Matches skills, interests, capabilities
- Provides a job coach, individualized training until competency reached and then follow-up as needed
- Spinal Cord Injury Vocational Reintegration Program
  - Focuses on integration of employment services with medical rehabilitation services
  - Ottomanelli L et al 2009

High Intensity

- Veterans Employment Services Office. Focuses on recruiting, hiring, and retaining severely injured veterans who served in OEF/OIF and are employed by the VA.
- Recent study examining supported employment among individuals with spinal cord injuries found that veterans receiving supported employment were anywhere from two to 11 times more likely to obtain competitive employment within a year than were veterans at treatment-as-usual sites
  - Ottomanelli L et al., 2012
Incentive Therapy Compensated Work Therapy

- Need to be work ready with disability controlled
- No felonies, disability claim, or in active rehab program
- Must have ended or almost completed to minimize time away from work

Referrals

- Primary Care and Mental Health Social Workers are a good place to start
- Refer to Transitional Work Experience in Mental Health
- Will provide assistance in:
  - Back to school,
  - Employment,
  - Work issues:
    - supervisory concerns, job performance, ADA

Future directions

- Assessment of resources for RTW
- There are more low- and medium-intensity resources than high-intensity resources and, as more individual return with polytrauma and complex injuries, it is important to understand whether existing resources are sufficient for these conditions
- Individuals with less-severe injuries, more prior job experience, and more motivation to return to work may benefit most from low-intensity resources, while those requiring more rehabilitation or intensive training may benefit most from high intensity resources
Military service, particularly deployment in active duty/combat situations is a unique occupational exposure.
Post-deployment veterans have "invisible" illnesses and symptoms that can impact return to work in civilian life.
An understanding of the military exposure by the evaluating/treating provider is essential in assessing for occupational fitness and success as well as return to work.

References
References