Winded Warriors

Iraq and Afghanistan
War Lung Injury

Curt Lenz

- Class of 2019 University of Missouri Respiratory Therapy Program.
- United States Army: Combat (Infantry) Medic
  - Active Duty: 1-24 IN BN " Deuce Four", 1st Stryker Brigade, 25th Infantry Division 2008 to 2012.
  - Iraq: Sept. 2008 thru Sept. 2009
  - Afghanistan: April 2011 to April 2012

Perspective: The Army, The Soldier, The Disease.

- We can’t understand the ailments until we understand contributing factors.
  - “Needs of The Army”
  - “Known Unknowns”…
  - Disease Processes/Etiologies
  - Patient Alpha
  - Where do we go from here?

Needs of The Army:

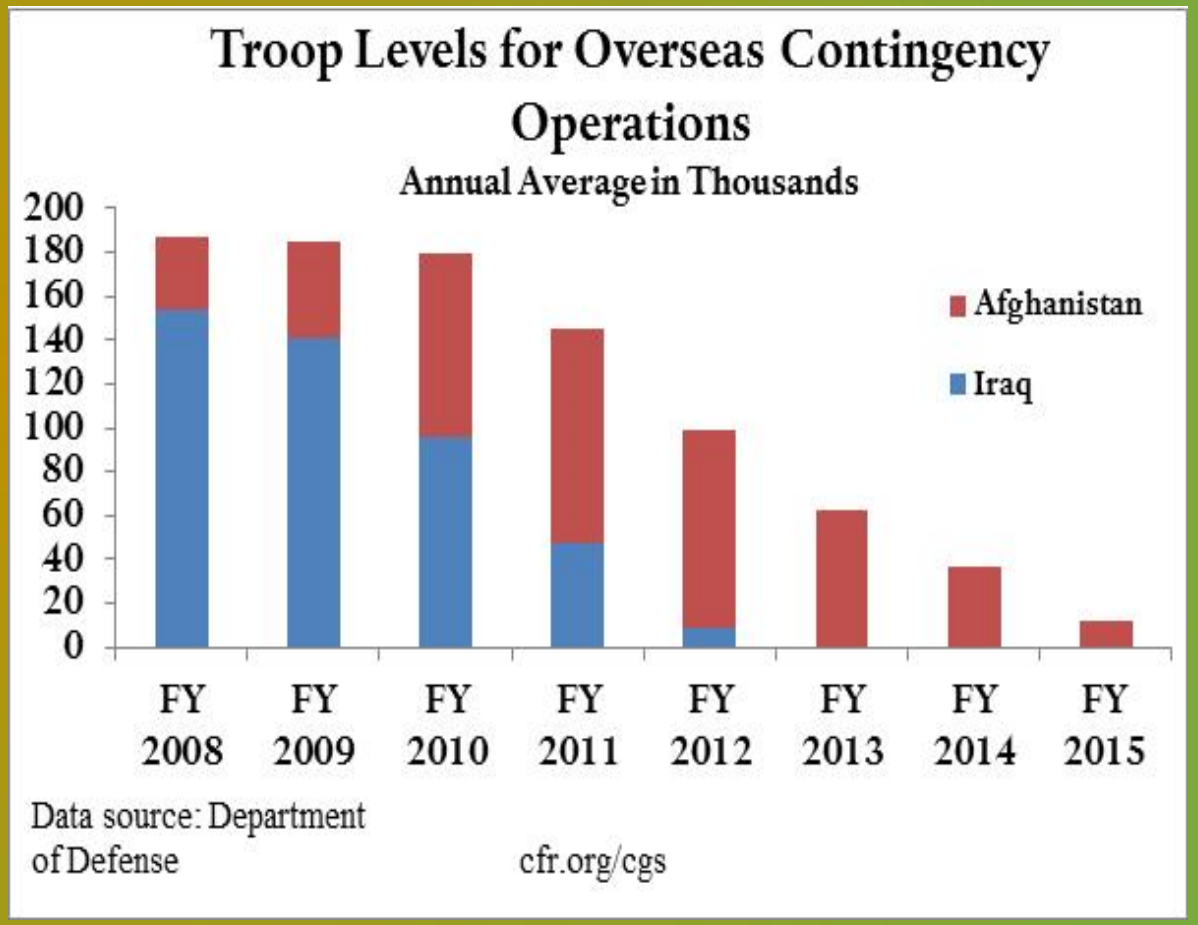
- Global War On Terrorism:
  - War in Afghanistan: 2001 to Present.
    - Rose from 13,000 to 68,000 by 2009.
    - Pres. Obama orders surge; Troops levels rise to approx. 100,000 service members in 2011.
  - War in Iraq: 2003 to 2012.
    - 248,000 troops participating in the invasion.
    - 2007: Surge announced: Troop levels peak 190,000.
      - Combat deaths doubled to >3 per day during first 8 weeks of the surge.
      - Deployment extensions mandated to 18 months or more.

U.S. Army's Pre/Post Deployment Health Assessments:

- Pre Deployment:
  - General health
  - Medical/Dental issues
  - Pregnancy
  - Mental health
- Post Deployment
  - Changes in physical health status
  - EENT, orthopedic, dermatological, or cognitive issues.
  - Scope of combat*
  - Exposure to environmental hazards.
  - Provider follow-up

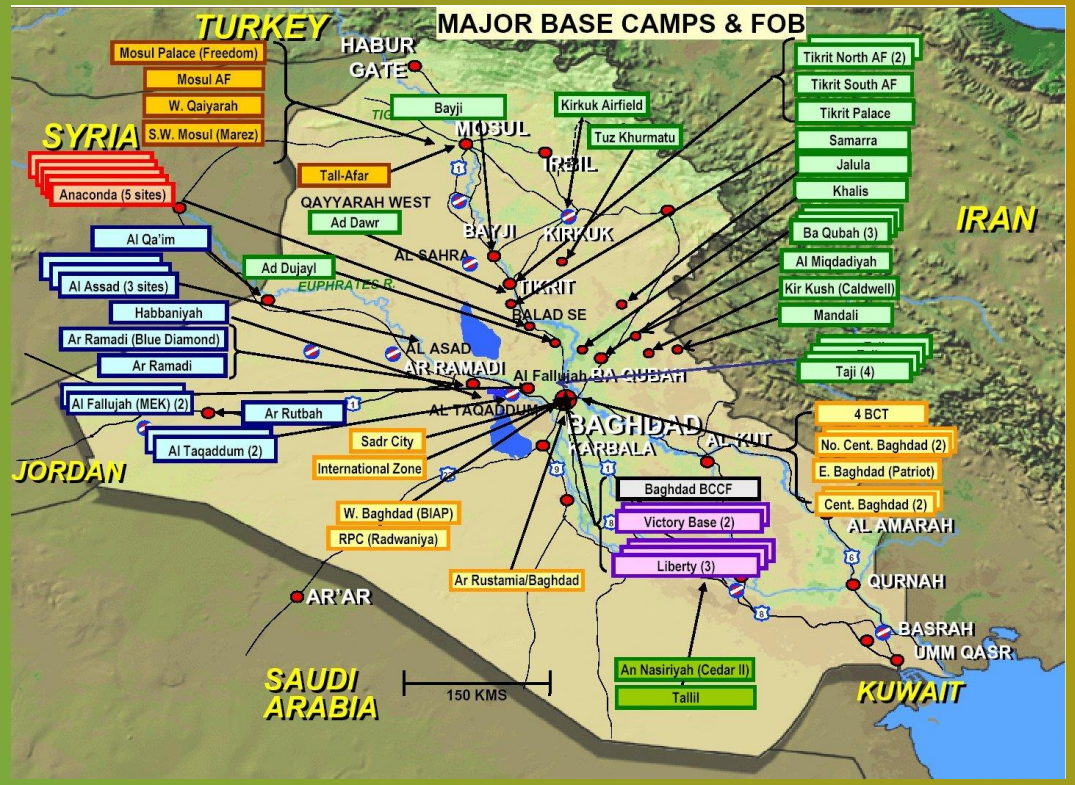
The Army's Presence Grew Rapidly:

- Our military's mission was to fight terrorist extremism and regain stability.
- Private DOD contractors
  - Sanitation
  - Food and water
  - Facilities and maintenance

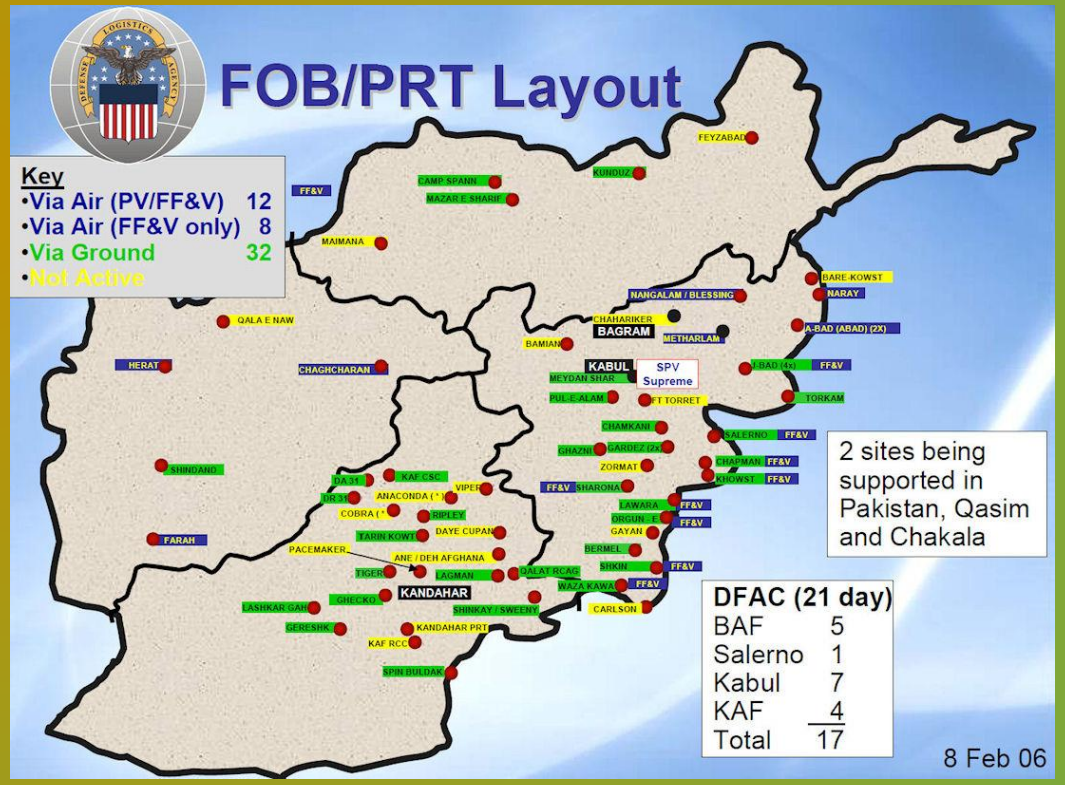


Many more FOBs and COPs were built, and existing bases were expanded.

Iraq



Afghanistan



Environmental Exposures[1]

- Massive sandstorms
  - Consisting of sharp, respirable, metal-laden geoparticulate matter.
- Improvised explosive devices
  - Create blast pressure which create a shearing force on tissues and aerosolize metals.
- Aeroallergens
  - *Aeroallergens* such as *Prosopis* and C*henopodia* are common in Middle East.
- Burn pits
  - Ignited with JP8 fuel
  - Virtually no regulation of contents burned; medical waste, human waste, chemicals, electronics, tires, etc.

Known Unknowns…

- "Just because there's an **absence of evidence** does not always mean there's an **evidence of absence.**"
- Knowns:
  - IAV's were exposed to toxins from burn pits, dust storms, regional allergens, and metallic PM from explosives.
  - Veterans returning from CENTCOM are suffering from lung disorders to include; Bronchiectasis, Chronic Bronchitis, Emphysema, Asthma, and more…[3]
- Known Unknowns:
  - Extent and severity of acute and chronic lung diseases in deployed military personnel.
  - How many IAV's affected?

IAW-LI Articles

Most agree that:

- IAV's were exposed to a greater amount of toxic PM compared to U.S. air quality standards.
- More longitudinal data must be gathered.
- Longer, more extensive studies are warranted.

- Disagree:
  - Burn-pit and toxic PM causing acute/chronic pulmonary disorders.
  - The military's role in causing respiratory disorders in IAV's.

STAMPEDE Results[2]:

- "This study…determines that airway hyperreactivity is the most common finding identified in this population."
- "It may be difficult to establish a specific diagnosis in some patients; additional testing and close follow-up is warranted."

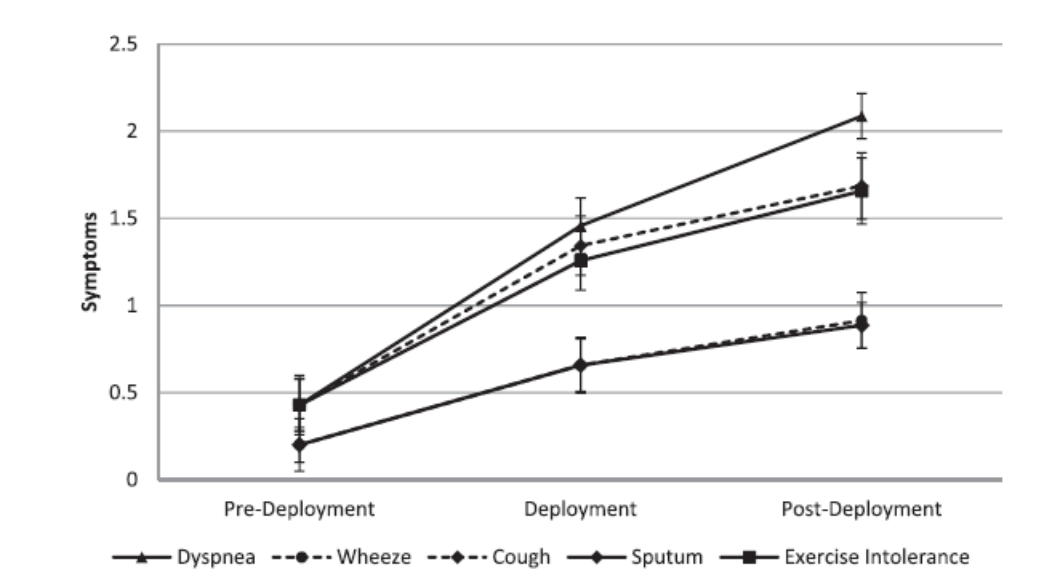
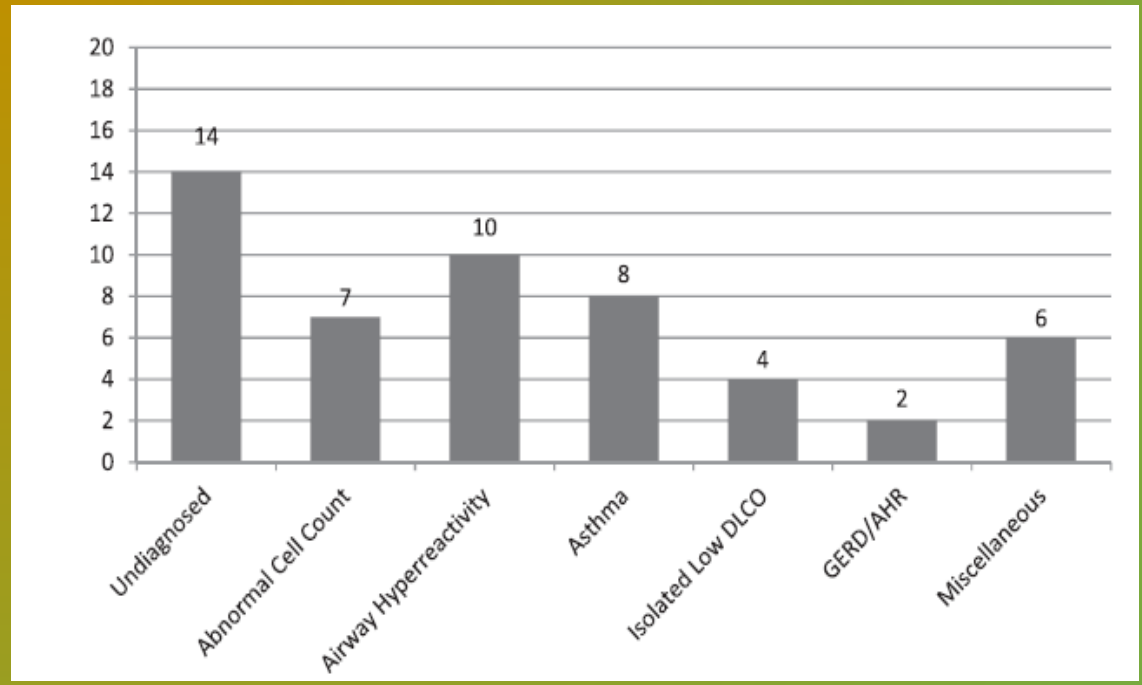


Figure 1. Frequency of self-reported symptoms predeployment, during deployment, and post-deployment reported on the following scale: 0 = never, 1 = up to 2 times weekly, 2 = 2–5 times weekly, 3 = daily.



Military Medicine, 2016[3]

- Details:
  - Retrospective study of VA encounters to identify trends in COPD, asthma, and ILD's in veterans.
  - Used VA and DOD to identify sociodemographic, affiliation, and clinical characteristics of persons with and without chronic lung diseases.
  - Controls for tobacco use.
  - Much larger study; 2003 to 2011.

Military Medicine (2016) Results[3]:

- “The increasing prevelance of COPD, asthma was statistically significant even after controlling for demographics, tobacco use, and TBI.”
- Army IAV’s were more likely to be diagnosed with COPD.
- Those with multiple deployments were less likely to be diagnosed with chronic lung disease vs. single deployment.
- Case studies also found cases of bronchiolitis and acute eosinophilic infiltration of the lung.

Military Medicine (2016)[3]

- Chronic lung diseases identified:
  - Bronchiectasis
  - Chronic Bronchitis
  - Emphysema
  - COPD
  - Asthma
  - Post Inflammatory Pulmonary Fibrosis
  - Sarcoidosis
  - Pulmonary Eosinophilia

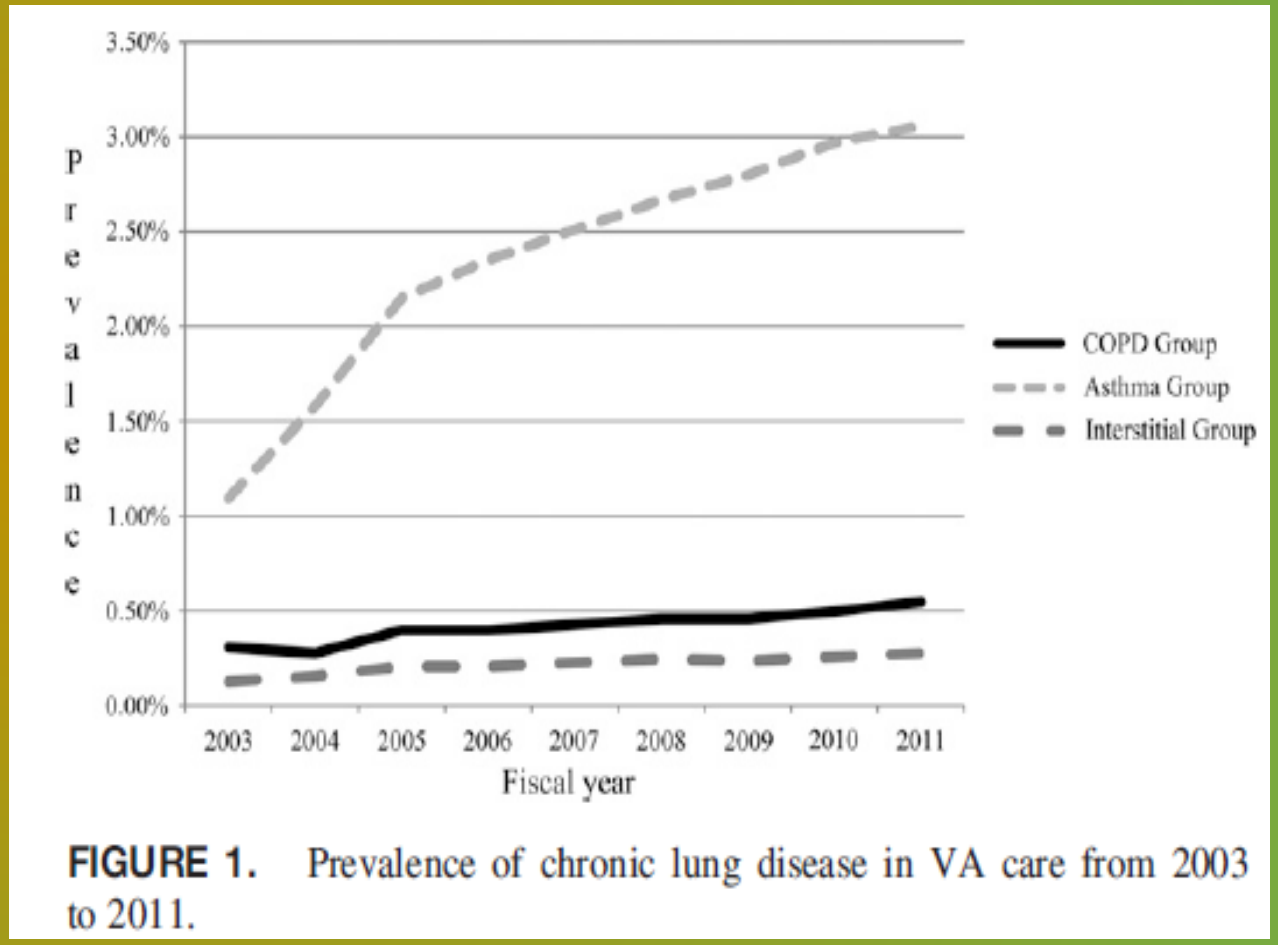


FIGURE 1. Prevalence of chronic lung disease in VA care from 2003 to 2011.

Patient “Alpha”

- 27 y/o white female, Active Duty Army:
- Enlisted: 2007.
- Medically discharged 2012.
- Deployments:
  - Iraq: 2008-2009, FOB Warhorse; worked in a brigade aid station.
  - Afghanistan: 2011-2012, Kandahar Airfield; Level 2 trauma center.
- Patient Perspective:
  - “In Iraq, our aid station was less than 100m away from the pit.”
  - “When the wind blew right, ash rained down.”
  - “We used to run past the burn pit and motorpool during PT.”
  - When we got back, I couldn’t run anymore, couldn’t pass a APFT.”

Pt. Alpha: September, 2014[4]:

- Admitted to HSTVA;
- Pt Hx: Reactive airway disease, Factor V Leiden, DVT/PE.
- Admitted Sept 22, 2014: A&O X 3, mild distress, dyspneic, speaks in broken sentences. HR 108 RR 24 BP 153/111 SpO2 92%.
- Sept 23: HR 83 RR 18 BP 162/101 SpO2 89%.
- Sept 24: bedside spirometry performed:
  - Comments: Peak flow first attempt was 3.20 (43% pred), 2nd attempt was 2.36 (32% pred)
  - FEV1
  - 1st: 1.08 L
  - 2nd: 1.08 L
  - Pred: 3.42 L

FVC
1st: 1.33 L
2nd: 1.33 L
Pred: 3.91 L

Pt. Alpha cont'd (reminder; she's a 27 y/o)[4]:

- Bedside FEV1 and FVC's suggest possible Asthma/COPD.
- O2 Eval: SpO2 @ rest: 88%...corrected to 95% w/ 2 L/min NC
  SpO2 w/exertion: 85%...corrected to 91% w/ 2 L/min NC.
- Treatments:
  - Duoneb; Q4H X 5 days
  - Symbicort; 2 puffs BID
  - Lovenox; 40mg/0.4ml SQ Qday for DVT prophylaxis
  - Montelukast tab 10 mg PO QPM
  - Prednisone tab 60 mg PO Qday to suppress immune response
  - Oxygen via NC 2 L/min w/humidity

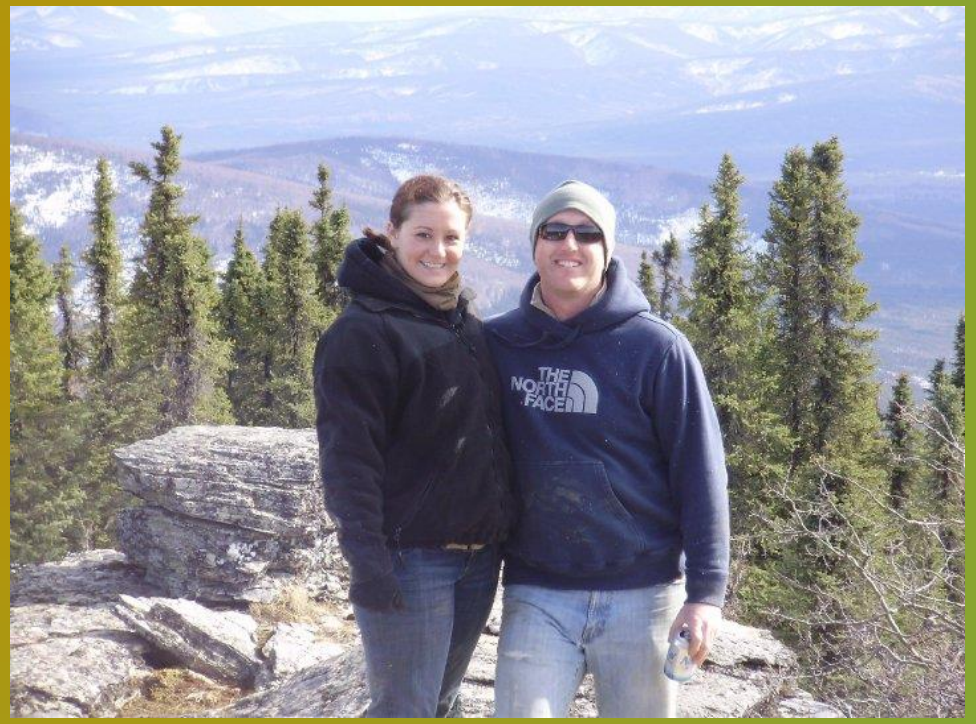
Pt. Alpha[4]

- Prognosis (Sept. 2014):
  - Patient released on Sept 27, 2014.
  - 2 L/min home O2 continuous via concentrator and portable delivery system (again, only 27 yrs old).
  - Taper prednisone.
  - Continue Montelukast, Duoneb, Symbicort @ home.
  - Monitor SpO2.
  - F/U with pulmonology as scheduled.

Moving Forward:

- U.S. Military and VA response to exposure:
  - Will IAW-LI issues languish as Agent Orange issues?
- The true impact of burn pits and PM is still unknown.
  - Large numbers of U.S. troops were possibly impacted.
  - “Tip of the iceberg?”
- IAW-LI has often been overlooked in comparison to other veteran’s issues.
- Increased awareness through unbiased medical research and government transparency is needed.

Pt. “Alpha”



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