

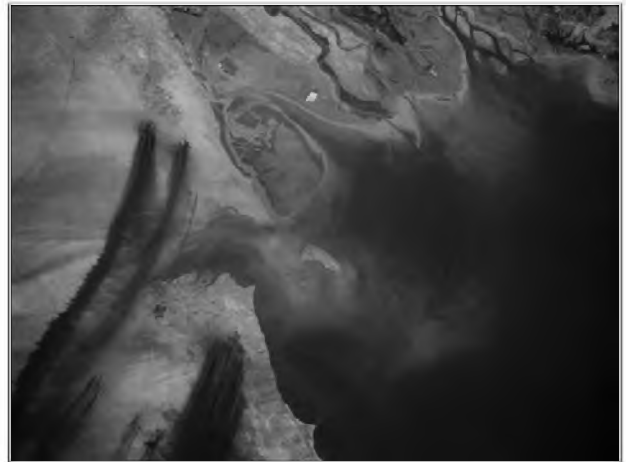
Presentation 2 – Lea Steele

**What Do We Know About Oil Well Fires
and the Health of Gulf War Veterans?**

Overview and Review

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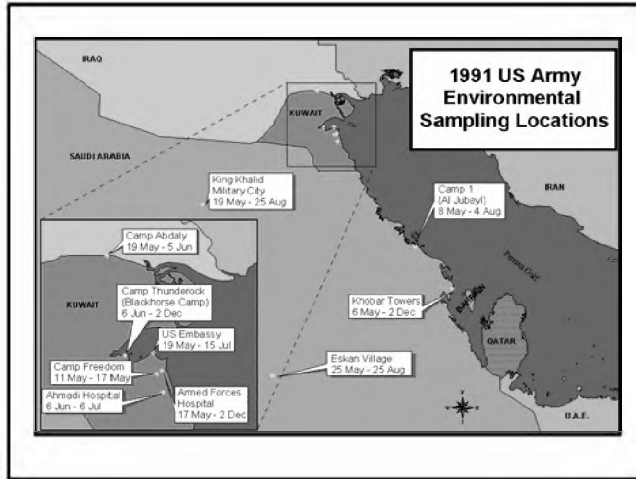


Toxicants Found in Oil Fire Smoke

- Ozone (O₃)
- Nitrogen Dioxide (NO₂)
- Sulfur Dioxide (SO₂)
- Carbon Monoxide (CO)
- Hydrogen Sulfide (H₂S)
- VOCs: Volatile organic compounds (*benzene, toluene, etc*)
- PAHs: Polycyclic aromatic hydrocarbons (*anthracene, pyrene, etc*)
- Metals (*cadmium, chromium, lead, nickel, mercury, vanadium*)
- Acidic gases/aerosols (*hydrochloric acid, nitric acid, sulfuric acid*)
- Particulate matter (*PM₁₀, PM_{2.5}, ultrafine particles*)

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Exposure to Oil Well Fire Smoke: **Symptom Complexes**

Study	Exposure	Outcome	Findings
Iowa Study, 1997 (1,886 Iowa vets)	slr smoke, combustion products	cogn dysf symps FMS symps depression symps	sign prev diff (p<0.001) sign prev diff (p<0.001) sign prev diff (p<0.001)
Haley, 1997 (249 Navy vets)	slr oil smoke scaled smoke exposure	any of 3 syndromes Syndrome 2	ns p = 0.02
Nisenbaum, 2000 (1,163 Air Guard vets)	slr	mild-mod CMI severe CMI	OR = 1.29 (0.92-1.81) OR = 1.62 (0.79-3.35)
Spencer, 2001 (1,119 OR, WA vets)	eye irritation from burning oil wells	CMI	1-5 days: OR = 2.64 (1.34-5.20) 6+ days: OR = 4.47 (2.07-9.63)

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Exposure to Oil Well Fire Smoke: **Symptom Complexes**

Study	Exposure	Outcome	Findings
Unwin, 1999 (3,284 UK vets)	slr	CMI	OR = 1.8 (1.5-2.1)
Wolfe, 2002 (945 Army vets)	slr oil fire smoke odor	CMI	OR = 2.1 (1.4-3.2)
Gray, 2002 (11,868 Seabees)	modeled self-report	GWVI	bivariate: OR = 1.54 (1.31-1.80) multivar: OR = 0.44 (0.26-0.73) bivariate: OR = 2.22 (1.85-2.66) (slr) multivar: OR = 1.23 (0.91-1.65) (slr)
Kang, 2002	consumed food contaminated with oil, smoke	Neuro symp factor	73% cases vs. 21% controls

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Exposure to Oil Well Fire Smoke: **Diagnosed Conditions**

Study	Exposure	Outcome	Findings
Gray, 2002 (11,868 Seabees)	CHPPH modeb	self reported medical diagnoses	Asthma OR = 1.82 (1.23-2.69) Bronchitis OR = 1.49 (1.18-1.87)
Cowan, 2002 (873 cases, 2664 controls from CCEP)	slr and CHPPH modeb	clinically diagnosed	Asthma OR = 1.4 (1.1 - 1.8)
Lange, 2002 (1,560 Iowa veterans)	slr CHPPH modeb	symptoms of asthma, bronchitis	Asthma ORs = 1.77-2.83 (slr) Bronchitis ORs = 2.14-4.76 (slr) Asthma, Bronchitis: ORs = 0.77-1.26
Kelsall, 2004 (1,456 Australian vets)	slr exposure to "SHOIL"	self-reported medical diagnoses	Asthma OR = 1.82 (1.23-2.69) Bronchitis OR = 1.49 (1.18-1.87)

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Summary of Epidemiologic Findings: General Points

- Results differ by how exposure is assessed
 - > Self reported: yes/no vs. graded exposures
 - > Self-reported exposure vs. modeled exposure
 - > Unadjusted vs. adjusted estimates (possible confounding)
- Results differ by health outcome of interest
 - > Respiratory symptoms, other defined symptoms types
 - > Multisymptom illness complexes
 - > Diagnosed medical conditions

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Summary of Epidemiologic Findings

- 65-80% of Gulf vets report some exposure to oil fire smoke during deployment; duration and intensity vary
- 30% report eating food contaminated with oil or smoke

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Summary of Epidemiologic Findings

- Among veterans who served in the Gulf War, exposure to oil fire smoke associated with:
 - > Short-term respiratory symptoms
 - > Diagnosed and self-reported asthma (ORs~1.4 - 2.8)
 - > Chronic multisymptom conditions (ORs~1.5 - 4.5) (possible dose-response effect—proximity and duration)

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Oil Well Fires and the Health of Gulf War Veterans: Remaining Questions

- Is Gulf War-related multisymptom illness linked to exposure to smoke from oil well fires?
 - > *As single exposure?*
 - > *As a result of interaction with other exposures?*
- Are increased rates of asthma or other diagnosed conditions associated with exposure to oil well fire smoke?
- Are there additional health concerns for military personnel located very close to burning wells for an extended period?

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