



Provider Awareness of Patients with Environmental/Occupational Chemical Exposures



Oil spill response workers and volunteers may be exposed to many different chemical and environmental hazards. The specific chemicals and concentrations will vary depending on the location of the oil, length of time since the oil was released into the environment, type and stage of response, materials used during spill remediation, climate conditions, use of personal protective equipment (PPE), and the workers' specific tasks.

CRUDE OIL is a complex mixture of chemical constituents including various alkanes (butane, pentane, and hexane); aromatic hydrocarbons (benzene, ethyl benzene, toluene, and xylenes); cycloalkanes; other nitrogen, oxygen, and sulfur compounds (hydrogen sulfide); and trace metals such as iron, nickel, copper and vanadium. Some constituents of crude oil can have significant toxicity.

HYDROCARBON EXPOSURE from crude oil constituents will vary based on its exposure to the atmosphere, time in the marine aquatic and coastal environment, treatments with dispersants and interaction of the chemicals, wave action and heat. Generally, the more "aged" or "weathered" crude oil is (by mixing with seawater and traveling long distances from the source), the lower are the concentrations of volatile organic compounds (VOCs). Although it generates less VOCs, weathered crude oil still contains harmful chemicals which can cause skin irritation and other irritant reactions. (<http://www.cdc.gov/niosh/topics/oilspillresponse/protecting/#effects>)

DISPERSANTS are usually applied directly to the spilled oil by spraying from an airplane, helicopter, or vessel. Although dispersants are manufactured by many companies and their ingredients may differ, most contain a detergent and a solvent. The solvent allows the detergent to be applied. The detergent helps to break up the oil on the water surface into very small drops. These tiny oil drops are then able to easily mix with the water and be diluted.

Based on the information provided to NIOSH, two dispersants have been used for the Deepwater Horizon response. Both COREXIT® EC9527A and COREXIT 9500 were utilized. Both products are made by the Nalco Company in Naperville, Illinois. Both products contain 10-30% sulfonic acid salt (detergent) and 1-5% propylene glycol, which are regarded as non-hazardous substances. In addition, COREXIT 9500 contains between 10-30% of petroleum distillates (solvent) and COREXIT EC9527A contains between 30-60% of 2-butoxyethanol (solvent).

Protocols to follow when examining oil response workers/volunteers



1. Take an environmental and occupational health history.

- Take a basic environmental and occupational history to determine if a temporal relationship exists between exposure and symptoms.
- Ask patients as a minimum the following questions:
 - (Occupation) Describe what you do for work.
 - (Activities and Cause) Are there any physical activities that you do – at work or away from work – that you feel are harmful to you?
 - (Substances/Physical Hazards and Cause) Are you exposed to chemicals, fumes, dusts, noise, and/or high heat at your work or away from work? Do you think these are harming you?



2. Recognize the signs and symptoms of chemical exposures and appropriately manage or refer patients.

- Recognize the signs and symptoms of chemical exposures (both acute and chronic).
 - Headaches, dizziness, nausea, vomiting, cough, respiratory distress, and chest pain
 - Eye, nose, or throat irritation
 - Dermatitis, secondary skin infections, hypersensitivity reaction, erythema, edema, burning sensations, or a follicular rash.
- Diagnose chemical-related health conditions using appropriate testing procedures and treat chemical exposures.
 - Physical exams focus on the skin, respiratory tract, and neurological system documenting any signs that could be associated with oil-related chemicals
- Treat and manage health conditions associated with chemical exposure or refer patients to appropriate specialists and resources, and follow up appropriately.



3. Identify risk factors for chemical exposure and resulting health effects.

- Identify risk factors for chemical exposure (e.g. occupation, location of home, susceptible populations such as children).
- Identify environmental factors that may possibly be linked to patient illness to ensure that chronic exposures are addressed.



4. Take steps to report chemical exposure and support surveillance efforts.

- Recognize that others may be ill (co-workers, family) and get a timeline of health problems for these or consult public health authorities for help in evaluating exposures.
- Report cases involving chemical exposures as required.
- Be able to access and report data for local, regional, and national surveillance programs.
- Report concerns about chemical exposures to the appropriate authorities, such as local and state health departments, EPA, NIOSH, federal OSHA, state OSHA or state departments of labor, or departments of agriculture.



5. Provide prevention guidance/education to patients.

- Provide guidance to patients on how to prevent chemical exposures.
- Advise patients and provide basic education about chemical exposure.
- Address the whole patient in the context of his/her life and/or community (e.g., link to social services, etc.).

