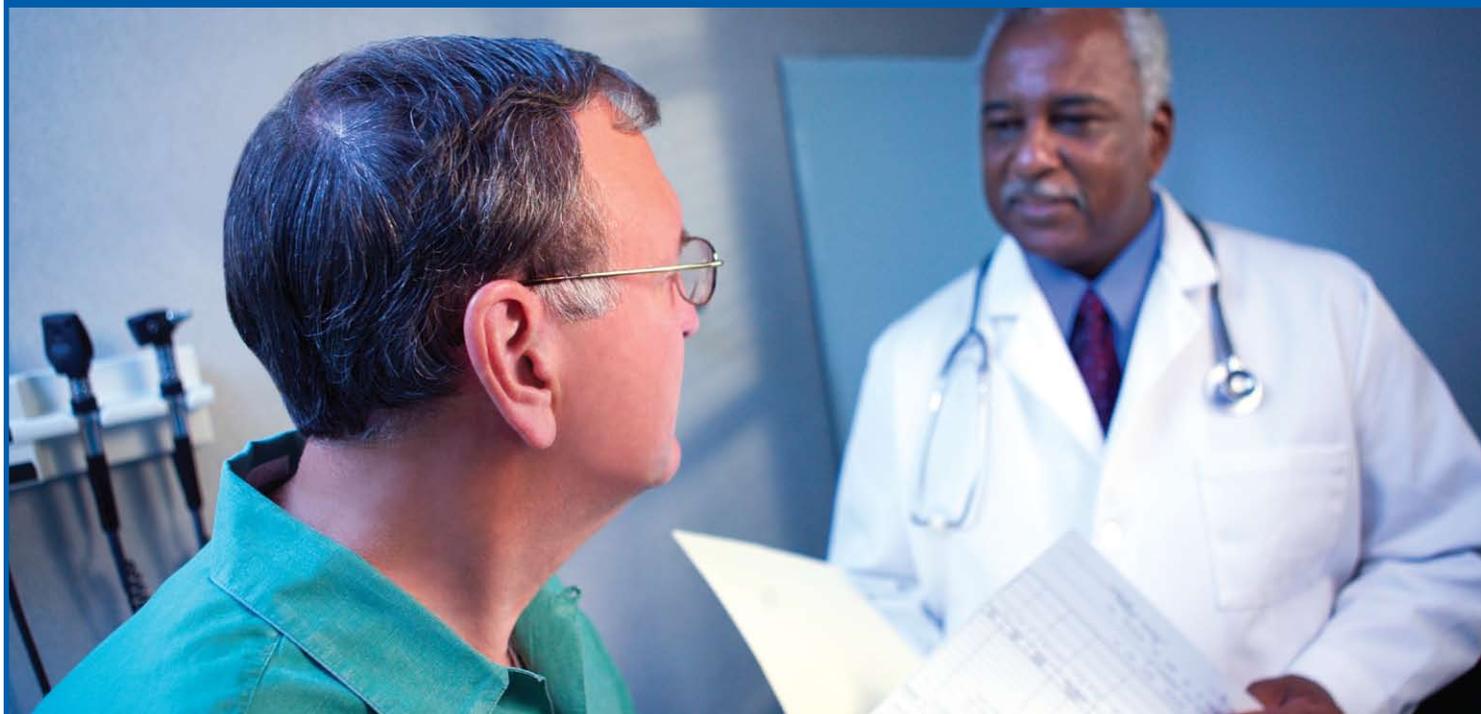


Yellowstone River 2011: Silvertip Pipeline Spill Human Health Interim Clinical Guidance



What Health Care Providers Should Know about Potential Health Hazards from Crude Oil Spills

- Crude oil discharges have the potential to affect human health. Signs and symptoms are possible depending on the substance exposed to, the exposure dose, and route of exposure. Although a variety of hydrocarbon products produced from petroleum have specific toxic effects, the toxicity of crude light petroleum itself to humans is relatively low. (Stellman 2007) This may be due, in part, to the lower concentrations of individual fractions in crude oil as compared to the higher concentrations expected in refined products.
- Crude oil is a mixture of more than 1000 compounds (mostly hydrocarbons). The hydrocarbons in crude oil are mostly alkanes, cycloalkanes and various aromatic hydrocarbons while the other organic compounds contain nitrogen, oxygen and sulfur, and trace amounts of metals such as iron, nickel,

copper and vanadium. The exact molecular composition varies widely. The specific type of oil spilled in the Yellowstone River is known as a light, crude oil which has low viscosity and is composed mostly of light hydrocarbon fractions which are volatile and may increase the risk for aspiration into the lungs if ingested.

- However, these light hydrocarbon fractions, such as benzene, xylene, toluene, and ethyl benzene generally evaporate into the air in the first 24-48 hours of a spill into a fast moving river, such as the Yellowstone. The medium and heavy parts (consistency much like motor oil) are the focus of cleanup operations on the land, along and near river banks. This is also called “weathered” crude oil or “mousse.”
- Because of the weathering process, inhalation hazards from the lighter, toxic volatile components of crude oil, such as benzene, are greatly reduced. The “weathered” crude substance, remaining after evaporation and biological degradation, is still of concern as a potential dermatitis hazard. Potential remaining higher molecular weight fractions may cause irritation by dissolving the natural protective oils on the surface of the skin. In addition, known polycyclic aromatic hydrocarbon skin carcinogens





may remain in the “oil soup” or “mousse oil” after the weathering process. However, the risk of “weathered” crude as a skin cancer-causing agent is not known due to variability of compounds in the “weathered” oil mixture.

- Limited studies from previous oil spill disasters showed that common reported acute symptoms were due to irritant effects on mucus membranes, upper airway, and the skin. (NIOSH 1991).
- Symptoms related to mental or behavioral health such as anxiety, stress and depression have been frequently seen in previous oil spill disasters (Aguilera 2010). Thus, these conditions should be considered during the evaluation of patients throughout this oil spill. Please see the resource section for more information.
- Although risk of chemical uptake to fish is small under current conditions, a fish with oily residue should be not be eaten. Currently no fish consumption advisory has been issued. The U.S. Fish and Wildlife Service will be examining the risk of fish contamination in further detail when river conditions permit sampling. Similarly, biologists from Montana Fish, Wildlife, and Parks will be examining the spill’s impact to fish and fisheries.

What the Provider Should Consider When Delivering Patient Care:

- Patients with respiratory, dermal, or other signs and symptoms should be treated and managed according to standard clinical protocols guided by the presentation of the patient.
- Clinical evaluation should include taking an exposure history (http://www.atsdr.cdc.gov/csem/exp/history/ehcover_page.html) and consideration of environmental etiologies in the differential diagnosis.
- The chemical makeup of “weathered” crude oil does not require laboratory testing for specific chemicals to guide the delivery of routine clinical care, therefore it is not recommended at this time. <http://www.cdc.gov/niosh/hhe/reports/pdfs/1989-0200-2111.pdf>
- Counsel/Advise patients to
 - » Limit exposures to potential air contamination, especially those with chronic respiratory conditions (e.g., asthma or COPD) by

- Staying indoors in an air-conditioned room and setting the air conditioner to the “recirculation” mode, if possible
- Some homes in close proximity to oil deposition or with deposition beneath the home may not have air conditioning. If people living in homes without air conditioning experience symptoms, they should try to limit time inside their homes, especially during the heat of the day as the material evaporates.
 - » Return for additional medical evaluation if symptoms such as shortness of breath, nausea or other medical issues persist
- Avoid contact with water or sediments that may potentially be contaminated. If exposure has occurred, immediately wash with soap and water (do not use gasoline, solvents, or industrial cleaners). Baby oil or tanning lotion may be used to remove oily, tar-like residues. Advise patients to avoid direct exposure to oil or sludge as much as possible, especially pediatric patients, their parents and pregnant women. Children should be restricted from playing in or around contaminated areas, and they should not be involved in cleanup efforts. The current river conditions (fast flow and flooding) are hazardous.
- Report health effects potentially related to the oil spill to your local or regional Poison Control Center. For more information regarding your local or regional Poison Center call 1-800-222-1222 or online at: <http://www.aapcc.org/dnn/About/FindLocalPoisonCenters/tabid/130/Default.aspx>
- Patients may experience stress and related behavioral symptoms during and after environmental disasters, both natural and human-caused. Patients are at risk of physical and emotional responses to stress from what mental health professionals refer to as a traumatic incident. These stress responses are normal reactions to traumatic events. The term traumatic is used because of an unexpected and troubling change in the natural order of things, such as the untimely death or injury of oil-covered wildlife and longer-term impacts on the environment and affected communities such as fishing and tourism.
- It is important that patients continue to monitor their health and well-being during the disaster and even months after the response has ended. Any patient who is having difficulty functioning or who appears to be unduly depressed or distressed should be encouraged to see a mental health professional for evaluation.
- Recommendations to help manage stress during and after a disaster can be found on the Substance Abuse and Mental Health Services Administration’s (SAMSHA) website at <http://samhsa.gov/Disaster/>, and on the CDC website at <http://emergency.cdc.gov/masscasualties/copingpro.asp> and <http://emergency.cdc.gov/mentalhealth/>

Environmental Testing :

- Air:
 - » EPA and Exxon are monitoring worker exposure to hydrogen sulfide, carbon monoxide, volatile organic chemicals (VOCs) and benzene. EPA is collecting air samples with passive air samplers in residential areas and along roads in Laurel, Montana; however, analytic results are not available at the publication of this guidance.
- Drinking Water:
 - » The cities of Billings and Laurel, as well as the Lockwood community, completed testing of its municipal water supply, and all compounds were within federal drinking water standards (i.e., Safe Water Drinking Act Maximum Contaminant Levels). Laboratory analysis of testing of downstream municipal water systems with intakes along the Yellowstone is currently underway. The intakes were shut down during the initial stages of the spill. There is currently no reason to avoid consuming or bathing in water from municipal water supplies.
 - » Testing of residential wells in the flood plain potentially is anticipated.
- River Sediments:
 - » Sampling of river sediments is anticipated.

For information about ongoing and future environmental testing, please visit: www.epa.gov/yellowstoneriverspill

Resources:

Oil Spill Surveillance and Public Health Recommendations

- Environmental Protection Agency (EPA) updated public health recommendations: www.epa.gov/yellowstoneriverspill
- National Library of Medicine (NLM): <http://sis.nlm.nih.gov/dimrc/oilspills.html>
- Occupational Safety and Health Administration (OSHA)
- <http://www.osha.gov/oilspills/index.html>
- <http://www.osha.gov/Publications/3172/3172.html>
- National Institute of Environmental Health Sciences (NIEHS)
- <http://tools.niehs.nih.gov/wetp/index.cfm?id=2495>

Clinical

- American Academy of Pediatrics (AAP) <http://www.aap.org/disasters/oil-spill.cfm>
- Pediatric Environmental Health Specialty Units (PEHSU) <http://www.pehsu.net/facts.html>
- Association of Occupational and Environmental Clinics (AOEC) <http://www.aoec.org/>
- American College of Occupational and Environmental Medicine (ACOEM) <http://www.acoem.org/>
- American College of Medical Toxicology (ACMT) <http://www.acmt.net/>
- American Academy of Clinical Toxicology (AACT) <http://www.clintox.org>



Mental Health

- Substance Abuse and Mental Health Services Administration (SAMHSA) <http://www.samhsa.gov/Disaster>
- National Institute for Occupational Safety and Health (NIOSH) Traumatic Incident Stress: Information for Deepwater Horizon Response Workers and Volunteers (<http://www.cdc.gov/niosh/topics/oilspillresponse/traumatic.html>)

Citations

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