

Lessons for Study of the Health Effects of Oil Spills

1. [David A. Savitz](#), PhD; and
2. [Lawrence S. Engel](#), PhD

[±](#) Author Affiliations

1. *From Brown University, Providence, RI 02912, and Memorial Sloan-Kettering Cancer Center, New York, NY 10065.*

Each environmental disaster is unique, with health consequences that depend on the intersection of the event, the geographic setting, and the characteristics of the local population. Yet, all environmental disasters require the identification of health consequences and strategies to mitigate them and provide lessons for how to do better in future disasters ([1–6](#)). The *Prestige* oil spill and the rigorous health effects research that has followed ([7–9](#)) have direct relevance for the affected population but are also part of the broader body of disaster epidemiology that includes study of chemical explosions in Bhopal, India, and Seveso, Italy; the Chernobyl nuclear disaster; and the World Trade Center attack. In this issue, the report by Rodríguez-Trigo and colleagues of health effects in fishermen who helped clean up the *Prestige* oil spill ([7](#)) provides an opportunity to consider practices that will facilitate study of health effects among the 50 000 workers and others exposed during the 2010 Deepwater Horizon spill and future incidents.

Recommendation 1

Collect exposure and medical histories from workers as early as possible.

Ideally, investigators studying health effects of environmental disasters would collect biological samples and histories from workers before the start of clean-up work, but such data are seldom available. Consequently, these data should be obtained as early as possible after the work begins and preferably before any work-related symptoms appear. Rapid field data collection requires partnerships among various stakeholders, including workers, industry, local universities, and government agencies.

An essential first step in the collection of these data is to identify clean-up workers and others who may have been exposed. It can be particularly challenging to identify volunteer workers, who may have different safety training, access to protective equipment, and exposure opportunities than hired workers. Identifying and including workers no longer engaged in clean-up activities when a study commences is also important because such workers may have stopped because of exposure-related health effects. A study need not include all targeted workers; sampling may be more efficient, but it should be representative. To assess representativeness of the persons studied, it helps to collect as much information as possible from workers who do not enroll in studies.

Recommendation 2

Conduct detailed exposure assessment.

The urgency of immediate needs (such as saving lives and containing oil) can hamper efforts to methodically assess exposure, and opportunities for exposure assessment in the Deepwater Horizon spill are now largely retrospective. Developing job- or task-exposure matrices that encompass the broad spectrum of clean-up activities will help epidemiologists more accurately estimate exposure. Exposure assessment would benefit from collection of detailed spill-related work histories from the workers and their employers, information on use and effectiveness of protective equipment and worker safety training, and incorporation of area and personal exposure measurement data from government and private entities. Comparing health outcomes by exposure level among workers is likely to be the most informative, but it is also desirable to identify an appropriate unexposed comparison group.

Recommendation 3

Consider a broad range of health issues.

Studies should focus on health effects of the oil spill rather than solely on the health effects of the oil. Previous epidemiologic studies of oil spills have primarily focused on acute physical effects and psychological sequelae ([10–14](#)). Increasing evidence, largely from the *Prestige* oil spill, suggests that clean-up workers may also experience long-term respiratory effects and chromosomal damage ([7–9](#)). Studies in the Gulf of Mexico should investigate acute symptoms reported previously as well as delayed conditions such as cancer. Leukemia, multiple myeloma, and melanoma are of particular interest, on the basis of evidence from occupational studies of petrochemical workers ([15, 16](#)). Evidence of genotoxicity and chromosomal damage from the *Prestige* spill ([7](#)) demonstrates the importance of examining biomarkers, such as genetic, epigenetic, immune, and inflammatory alterations because some diseases, including cancer, have a long latency. Mental health and domestic violence will also be important to investigate, given that the oil spill disrupted the region's economy.

Recommendation 4

Plan research to guide immediate public health interventions and advance science.

Researchers should strive to generate information of immediate value to the affected community. Opportunities to identify health service needs, suggest interventions to ameliorate the ongoing effects of the disaster, and to disseminate clear information need to be pursued. For example, data on the relationship between work practices and toxicant exposure can lead to modifications that can minimize exposure during remaining clean-up activities. Early data on the presence of elevated rates of acute psychiatric problems can be very valuable to those who provide health care services in the region. In the face of disaster, researchers must strive not only to advance science but also provide information with potential immediate benefit.

Recommendation 5

Recognize and work within the political context.

Controversy, litigation, and economic consequences follow most environmental disasters, and data from research on the health effects of the disaster will be used as ammunition in the battles that ensue. In the Deepwater Horizon spill, tension has already developed between the desire to fully investigate the health consequences of the spill and the desire to provide reassurance that will reinvigorate the region's tourism and seafood enterprises. In the face of such conflicts, results will inevitably be seen as supportive of one view and counter to another. Researchers need to be aware of this context and ensure that the scientific evidence is generated and disseminated in an objective, transparent manner. The funding and oversight of the research need to be carefully configured, with inclusion of external scientific, community, and worker advisory boards to ensure quality, credibility, and acceptability of the findings.

Disaster epidemiology advances one disaster at a time, and the most recent report on the *Prestige* oil spill is a notable step forward. It reminds us of the importance of incorporating measurement of both biomarkers and clinical outcomes. As the research about the health effects of the Deepwater Horizon spill begins, we have seen improved efforts to provide safety training to clean-up workers and a deeper appreciation that the scope of such disasters includes psychological and economic effects on health (17). As researchers assume their rightful place among the responders to the Deepwater Horizon oil spill, they must be aware that their studies will provide much-needed information for the affected communities as well as for future communities who experience similar calamities.

David A. Savitz, PhD

Brown University

Providence, RI 02912

Lawrence S. Engel, PhD

Memorial Sloan-Kettering Cancer Center

New York, NY 10065

Article and Author Information

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- **Requests for Single Reprints:** David A. Savitz, Department of Community Health, Brown University, Box G-S-121-2, Providence, RI 02912; e-mail, david.savitz@mssm.edu.

- **Current Author Addresses:** Dr. Savitz: Departments of Community Health, Brown University, Box G-S-121-2, Providence, RI 02912.
- Dr. Engel: Department of Epidemiology and Biostatistics, Memorial Sloan-Kettering Cancer Center, 307 East 63rd Street, 3rd Floor, New York, NY 10065.

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