

REPORT OF THE COUNCIL ON SCIENCE AND PUBLIC HEALTH

CSAPH Report 3-I-10

Subject: Gulf Oil Spill Health Risks: Update on AMA Involvement

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Referred to: Reference Committee K
(Michael M. Miller, MD, Chair)

1 Policy D-135.981, “Public Health Lessons from the Massive Oil Spill in the Gulf of Mexico,”
2 (AMA Policy Database) directed (in part) that the American Medical Association (AMA) report
3 back at the 2010 Interim Meeting on efforts to protect human and environmental health from the
4 massive oil spill in the Gulf of Mexico.

5
6 Accordingly, this report briefly reviews current monitoring efforts and highlights some health
7 effects related to the Gulf oil spill. Various organizational efforts and resources related to the oil
8 spill, including relevant AMA activities, are highlighted. Proceedings from a June 2010 meeting of
9 the Institute of Medicine (IOM) on the health effects of oil spills, relevant government and
10 association Web sites, and a limited number of other relevant publications also were consulted for
11 this report.

12 BACKGROUND

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14
15 On April 20, 2010 the Deepwater Horizon oil rig exploded and sank in the Gulf of Mexico
16 triggering a massive oil spill at the drill site. Subsequently, an estimated 4.9 million barrels of oil
17 leaked into the Gulf of Mexico, making this the largest oil disaster in U.S. history. The
18 implications of this oil spill are potentially dire for human populations, marine life, and the
19 ecosystem in the region. Disruptions in commercial fishing, tourism and other industries have been
20 extensive, and the extent of the devastation on marine ecology is unknown.

21 CURRENT AMA RESPONSE AND ACTIVITIES

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23
24 The AMA has developed communication pieces and programs to inform physicians and the general
25 public about the health implications of the oil spill. Soon after the explosion and subsequent oil
26 leak, the AMA developed a dedicated Web page ([http://www.ama-assn.org/ama/pub/physician-
27 resources/public-health/center-public-health-preparedness-disaster-response/gulf-oil-spill.shtml](http://www.ama-assn.org/ama/pub/physician-resources/public-health/center-public-health-preparedness-disaster-response/gulf-oil-spill.shtml)).
28 The information is organized into three content areas: Information for Physicians, Information for
29 Patients, and Information for Coastal Residents. Each section of the Web site is populated with
30 narrative text, fact sheets, and links to additional resources and information. Current clinical
31 guidance on the Web page is updated as additional information becomes available from the Centers
32 for Disease Control and Prevention (CDC), the National Institute of Environmental Health
33 Sciences (NIEHS), the Occupational Safety and Health Administration (OSHA), and other relevant
34 agencies so that physicians and gulf residents have access to the most current information.

1 On June 22-23, 2010, staff from the AMA's Center for Public Health Preparedness and Disaster
2 Response represented the AMA at the IOM conference on the health effects of the Gulf oil spill.
3 This meeting was requested by the U.S. Department of Health and Human Services and addressed
4 five objectives:

- 5
- 6 • Review the current knowledge about the effects on human health of exposure to oil,
7 weathered oil products, and dispersants, and identify gaps in this knowledge;
- 8 • Identify and discuss the populations most at risk for health problems as a result of the oil
9 spill;
- 10 • Review and assess ways to monitor the spill's potential negative effects on health in the
11 short- and long-term;
- 12 • Explore methods and strategies for gathering data to further our understanding of the risks
13 to human health; and
- 14 • Consider effective ways to communicate with those at risk for health problems, taking
15 culture, understanding of health information, language, technology, and geography into
16 account.

17

18 The meeting summary (<http://www.nap.edu/catalog/12949.html>) was released on August 10, 2010.
19 The workshop report summarizes public health concerns relating to the oil spill, discusses toxicity
20 monitoring systems, and provides information relevant to special populations based on the
21 anticipated health risks from oil and the dispersants used in containment and clean-up. In addition,
22 the report addressed research approaches that may be needed to best evaluate how the spill has
23 affected human health.¹

24

25 AMA staff also participated in other meetings and advisory boards, including the CDC's Agency
26 for Toxic Substances and Disease Registry (ATSDR) advisory team and a Gulf Oil Summit in
27 Houston, sponsored by universities in the Gulf region (Texas A&M, Louisiana State University,
28 and the University of Texas at Houston).

29

30 The AMA also is developing a new module of the Citizen Ready™ program on mental health
31 issues and disasters. Citizen Ready™ is designed to help the U.S. population prepare for disasters
32 by providing basic life-saving and support information for public health emergencies. The
33 program also is designed to help build physical and mental health resilience in the community by
34 empowering citizens with knowledge.

35

36 The AMA also hosted a webinar entitled "Helping Physicians in the Gulf: Recognizing Mental
37 Health and Behavioral Health Issues" on September 14. The faculty included Lawrence Palinkas,
38 Ph.D., and Howard Osofsky, MD, Ph.D. Dr. Palinkas is a professor of social work and preventive
39 medicine at University of Southern California and an expert in mental health aspects of extreme
40 environments and situations. Dr. Osofsky is Chairman of the Department of Psychiatry at
41 Louisiana State University Health Sciences Center in New Orleans and is recognized as a leader for
42 his efforts to help children and families exposed to disasters, violence, terrorism, and warfare. The
43 webinar and the content can be viewed at:
44 http://eventcenter.commpartners.com/se/Meetings/Playback.aspx?meeting_id=722647. A
45 document of state-by-state mental health resources that physicians can use as a referral tool also is
46 available.

47

1 Health Effects of Oil

2
3 Oil is primarily a hydrocarbon mixture that partially evaporates based on its surface-to-volume
4 ratio and how it is dispersed. When evaporated, oil releases volatile organic compounds (VOCs).
5 Oil will float or sink in water depending on the density of these liquid phases. As oil is exposed to
6 light, waves, oxygen, and microorganisms, it “weathers” and is broken into smaller components.
7 Some of these may attach to particulate matter in the ocean and sink, while some form “tar balls,”
8 small globules of oil that may sink into sediments or wash ashore. Sunlight can degrade oil based
9 on ambient temperature and other factors.²

10
11 *Sources of Oceanic Oil*

12
13 Oil enters the ocean from a variety of sources, including anthropogenic contributions such as
14 offshore exploration and production platforms, tanker spills, and natural oil releases (seeps), all of
15 which contribute millions of gallons of oil to the world’s marine waters annually.³ Natural marine
16 oil seeps are found worldwide and vary in the amount of oil that they release. Most often found on
17 fault lines, these seeps release 600,000 metric tons of oil annually, according to one estimate.⁴

18
19 *Acute and Chronic Health Effects of Oil Spills*

20
21 Acute adverse health effects of the Gulf oil spill consist of respiratory health problems from
22 burning oil, rashes and skin irritation from oil and skin contact, as well as nausea, vomiting, and
23 headaches from chemical irritations or sensitivities. Relief workers and those who treat people
24 directly affected by the spill also are prone to these effects. Both residents and relief workers are at
25 increased risk for acute, as well as chronic, stress and mental health disorders. Generally, most of
26 the health effects from oil spills are acute, although the extent of chronic and long-term health
27 problems is relatively unknown because of the lack of long-term studies.^{1,2,5}

28
29 *Clean-Up Workers*

30
31 OSHA has identified several health problems in workers involved in clean-up activities, including
32 problems from heat and sun exposure, injuries caused by earthmoving or other heavy equipment,
33 injuries due to lifting and carrying, cuts, sprains, exhaustion from long work hours and noise, and
34 deaths from drowning. In addition, injuries from insects, snakes, rodents, and even alligators have
35 been reported. Skin and eye irritation or rashes (dermatitis) can occur from contact with
36 “weathered” oil.⁶

37
38 *Dispersants*

39
40 In addition to the effects of the oil itself, concern exists about the toxicity of chemical dispersants
41 used to clean up the oil spill. Dispersants are used to emulsify the oil in order to speed degradation
42 by natural pathways. The most commonly used dispersant has been COREXIT 9500;
43 approximately 1.5 million gallons of this substance had been applied through June 2010. The
44 manufacturer (Nalco) asserts that the product is not toxic and does not bioaccumulate.

45
46 Below are the ingredients of COREXIT 9500 and their common household uses:

- 47
48
49
50
- Sorbitan, mono-(9Z)-9-octadecenoate: (skin cream, body shampoo, emulsifier in juice);
 - Sorbitan, mono-(9Z)-9-octadecenoate, poly(oxy-1,2-ethanediyl) derivatives: (baby bath, mouth wash, face lotion, emulsifier in food);

- 1 • Sorbitan, tri-(9Z)-9-octadecenoate, poly(oxy-1,2-ethanediyl) derivatives: (body/face
2 lotion, tanning lotions);
- 3 • Butanedioic acid, 2-sulfo-,1,4-bis(2-ethylhexyl) ester, sodium salt (1:1): (wetting agent in
4 cosmetic products, gelatin, beverages);
- 5 • Propanol, 1-(2-butoxy-1-methylethoxy): (household cleaning products); and
- 6 • Hydrotreated light petroleum distillates: (air freshener, cleaner).

7
8 In-vivo analysis by the Environmental Protection Agency (EPA) on the cytotoxicity of 8 chemical
9 dispersants and their derivative compounds found some cytotoxic activity in three mammalian cell
10 types.⁷ However, androgen receptor responses appear to be lacking and only a few substances
11 exhibited weak estrogen receptor activity.⁸ Dispersants are designed to break down oils. A recent
12 commentary in *JAMA* noted that “skin contact with oil and dispersants causes defatting, resulting in
13 dermatitis and secondary skin infections. Some individuals may develop a dermal hypersensitivity
14 reaction, erythema, edema, burning sensations, or a follicular rash. Some hydrocarbons are
15 phototoxic.”⁹

16
17 More information on COREXIT 9500 can be obtained at the manufacturer’s Web site
18 (<http://nalco.com/news-and-events/4297.htm>). Additional information on this and other dispersants
19 used in the Gulf oil spill can be found at:
20 http://emergency.cdc.gov/gulfoilspill2010/dispersants_hcp_info.asp.

21 22 PUBLISHED HEALTH EFFECTS OF PAST OIL SPILLS

23
24 Several studies have examined the effects of large oil spills on ecosystems and aquatic species, but
25 few published studies have examined human health outcomes. Studies on human health effects are
26 generally regional- or population-specific following an oil tanker leak. A review article published
27 in February 2010 identifies the seven major oil tanker accidents for which health effect studies
28 have been published (Table 1).⁵

29
30 Although it is not the most recent or even the largest previous oil spill incident, the Exxon Valdez
31 spill has been the common reference point for comparison during the Deepwater Horizon
32 catastrophe. Mental health disorders, such as generalized anxiety disorder, posttraumatic stress
33 disorder, depression, and alcohol and drug misuse, were elevated in exposed populations one year
34 following the Exxon Valdez leak compared with unexposed populations. Women and Alaskan
35 American natives had disproportionately higher responses for these conditions and behaviors.^{10,11}

36
37 Similar results were demonstrated in Spain following the sinking of the Prestige oil tanker.
38 Affected individuals, including those who were closer to the oil-spill zone, exhibited a clinical
39 pattern characterized by increased psychopathological symptoms (e.g., somatization, anxiety, and
40 hostility) and a lower self-reported perception of physical health and functional capacity. Similar
41 to the Alaskan studies, the prevalence of women with such symptoms was higher than men in the
42 surveyed population.¹²

43
44 Although respiratory health problems are frequently cited as an adverse health effect of oil spills,
45 the published literature is limited, and comparison of existing studies is difficult. One study
46 showed a higher prevalence of lower respiratory tract symptoms in workers one year after the
47 Prestige oil spill. The likelihood of having symptoms correlated with the number of hours worked
48 per day and total days worked on clean up.¹³ Meo, et al. found limited lung function for people
49 exposed to polluted air in comparison with their matched controls.¹⁴ However, a study of

1 children's peak expiratory rate following the Braer shipwreck did not find anything out of the
2 ordinary.¹⁵

3 4 GOVERNMENT RESPONSE AND COMMUNICATION

5
6 The official federal Web site of the Gulf oil spill is: www.restorethegulf.gov. The site provides
7 information on the submission of claims data and relief efforts and state resources and provides a
8 detailed timeline of the response effort, chronicled daily. OSHA, EPA, the National Oceanic and
9 Atmospheric Administration (NOAA), NIEHS, and others also have developed comprehensive
10 Web sites to provide information for those who are affected by the oil spill, including those who
11 are involved in oil containment and capture; or have occupations affected by the spill; or are caring
12 for individuals, pets, and other species affected by the oil spill.

13
14 Several monitoring and research studies are planned to assess or analyze the potential health
15 impacts of the oil spill on human populations. In addition, some real time monitoring of oil
16 chemical concentrations and dispersants is in place. The EPA has dedicated resources to air, water,
17 and sediment testing related to the oil spill. As of the end of August 2010, sediment and water
18 samples taken from various monitoring stations have not found evidence of significantly elevated
19 oil concentrations or dispersant materials. Monitored airborne levels of ozone and particulate
20 matter have been found to be a "normal" or "elevated for sensitive populations," according to EPA
21 monitoring data.

22
23 In addition to monitoring, the EPA also has conducted toxicity testing of eight commercial
24 dispersants alone, and when used in an oil-dispersant mix, to determine their potential toxicity on a
25 representative species of marine life. These tests involved the two species, *Americamysis bahia*
26 (mysid shrimp) and *Menidia beryllina*, (inland silverside fish). Results indicated that the
27 predominant dispersant used in gulf region to dissolve the oil (COREXIT 9500) was no more or
28 less toxic than other dispersants.

29
30 A prospective study on health and the Gulf oil spill is planned by the NIEHS's Division of
31 Epidemiology.¹⁶ The NIH has invested \$10 million to study health effects in exposed populations.
32 The study will be implemented jointly by the U.S. Department of Health and Human Services,
33 research universities, and federal and community partners. In addition, the National Toxicology
34 program is compiling current data on toxic and hazardous substances that may affect Gulf workers.

35
36 The NIESH Web site also refers to an "Interagency Oil Spill Health Monitoring and Research
37 Workgroup." Its charge is to "coordinate and facilitate public health monitoring for human health
38 effects related to exposures associated with the Gulf oil spill." The workgroup consists of
39 representatives from NIEHS, National Institutes of Health, National Institute for Occupational
40 Safety and Health, ATSDR, CDC, Substance Abuse and Mental Health Services Administration,
41 and the U.S. Department of Health and Human Services Assistant Secretary for Preparedness and
42 Response. Five work groups (Stakeholder Interests, Toxicology, Human Health Problems,
43 Surveying Tools, and Biomedical Monitoring) have been formed to meet the three objectives
44 outlined below:

- 45
- 46 • Create an interagency working group to coordinate public health monitoring for human
47 health effects related to exposures associated with the Gulf oil spill;
 - 48 • Plan, coordinate, and facilitate both short-term and longer-term efforts for human health
49 response monitoring and research; and
 - 50 • Identify and engage other stakeholders, including federal, state, and local agencies;
51 academia; and relevant non-governmental organizations.

1 The CDC monitors adverse health effects related to the spill through the National Poison Data
2 System (NPDS) and Biosense, a national health surveillance and reporting system in the states of
3 Alabama, Florida, Louisiana, and Mississippi. All surveillance systems are tracking specific health
4 conditions that may be related to the Gulf oil spill. The NPDS receives calls from 60 poison
5 centers and then returns relevant data to the affected Gulf states. Biosense tracks data from 86
6 health care facilities in the Gulf region (reported daily). The CDC summarizes current state
7 surveillance data on its Web site as follows: “As of August 7, 2010, states had reported a few
8 complaints of respiratory symptoms, nausea, and headache in people who had possible oil
9 exposures. Surveillance reveals no trends of public health concern related to the oil spill.”²

10
11 A recent perspective in the *New England Journal of Medicine* calls for increased surveillance on
12 mental health indicators as well as physical ones. Using the H1N1 monitoring infrastructure as a
13 model, monitoring of emotional distress and other indicators is under study. Likewise, state and
14 local public health agencies, in coordination with the Substance Abuse and Mental Health Services
15 Administration and the CDC, are providing a coordinated response to the increased need for mental
16 health services in the Gulf region.¹⁷

17
18 COMMENT

19
20 Although a permanent cap has now been placed on the well in the Gulf, the volume of oil released
21 will continue to be problematic for years to come. Twenty years after the Exxon Valdez spill,
22 which was substantially smaller than the Deepwater Horizon disaster, several species are struggling
23 to recover. The impact on the marine ecosystem will be extensive based on the effects of previous
24 oil spill disasters. Approximately 26% of the oil released during the disaster is quantified as
25 “residual” and remains in the ecosystem; and almost 50% of the oil (2.45 million barrels) has been
26 left to degrade naturally (Table 2).¹⁸

27
28 RECOMMENDATION

29
30 The Council on Science and Public Health recommends that the following statements be adopted
31 and the remainder of the report be filed:

32
33 That our American Medical Association continue to monitor health effects and public health
34 surveillance activities related to the Gulf oil spill, and provide relevant information and
35 resources as they become available. (Directive to Take Action).

36
37 That the Council on Science and Public Health report back at A-13 on the results of studies
38 examining the health effects for the Gulf oil spill. (Directive to Take Action).

Fiscal Note: Less than \$500

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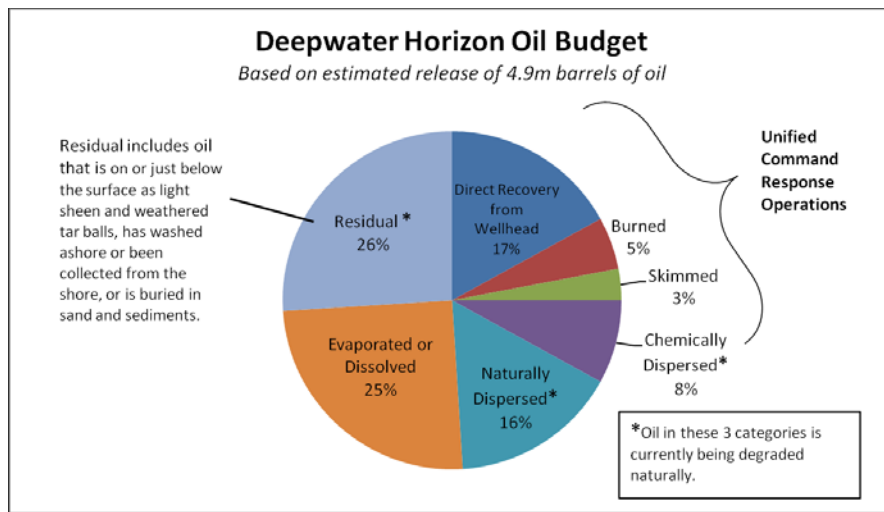
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Table 1. Oil spills for which epidemiological studies on the effects on human health were reported (ordered by spill size).³

Ship name	Date	Location	Spill size (tons)*
MV Braer	5 January 1993	SW Shetland islands, UK	85000
Sea Empress	15 February 1996	Milford Haven, UK	72000
Prestige	19 November 2002	Galicia, Spain	63000
Exxon Valdez	24 March 1989	Bligh ref Prince William, Alaska	37000
Tasman Spirit	26 July 2003	Karachi, Pakistan	37000
Erika	12 December 1999	South Penmarch Brittany, France	20000
Nakhodka	2 January 1997	Northeast Oki Island, Sea of Japan	>6000

*1 metric ton equals approximately 7 barrels of oil.

Table 2.¹⁴



APPENDIX 1
Gulf Oil Health Effects Information

AMA Gulf Oil Information

<http://www.ama-assn.org/ama/pub/physician-resources/public-health/center-public-health-preparedness-disaster-response/gulf-oil-spill.shtml>

Official Federal Administration Website:

<HTTP://WWW.RESTORETHEGULF.GOV/>

Centers for Disease Control and Prevention

<http://emergency.cdc.gov/gulfoilspill2010/cdcreponds.asp>

National Institute of Environmental Health Sciences (NIEHS)

<http://www.niehs.nih.gov/about/od/programs/gulfspill.cfm>

Environmental Protection Agency

<http://www.epa.gov/bpspill/>

British Petroleum Gulf Oil Response

http://www.bp.com/bodycopyarticle.do?categoryId=1&contentId=7052055&nicam=USCSBaselineCrisis&nisrc=Bing&nigrp=Branded_Crisis_Management-General&niadv=General&nipkw=bp_oil_spill

American Academy of Pediatrics Information on the Oil Spill Affecting the Gulf Coast

<http://www.aap.org/disasters/oil-spill.cfm>

Occupational Safety and Health Association

http://www.osha.gov/oilspills/oil_directreading_bysite.html

U.S. Food and Drug Administration: Gulf of Mexico Oil Spill Update

<http://www.fda.gov/Food/ucm210970.htm>