Health and the Deepwater Horizon Gulf Oil Spill

JSOST Deepwater Horizon Oil Spill Principal Investigator (PI) Conference
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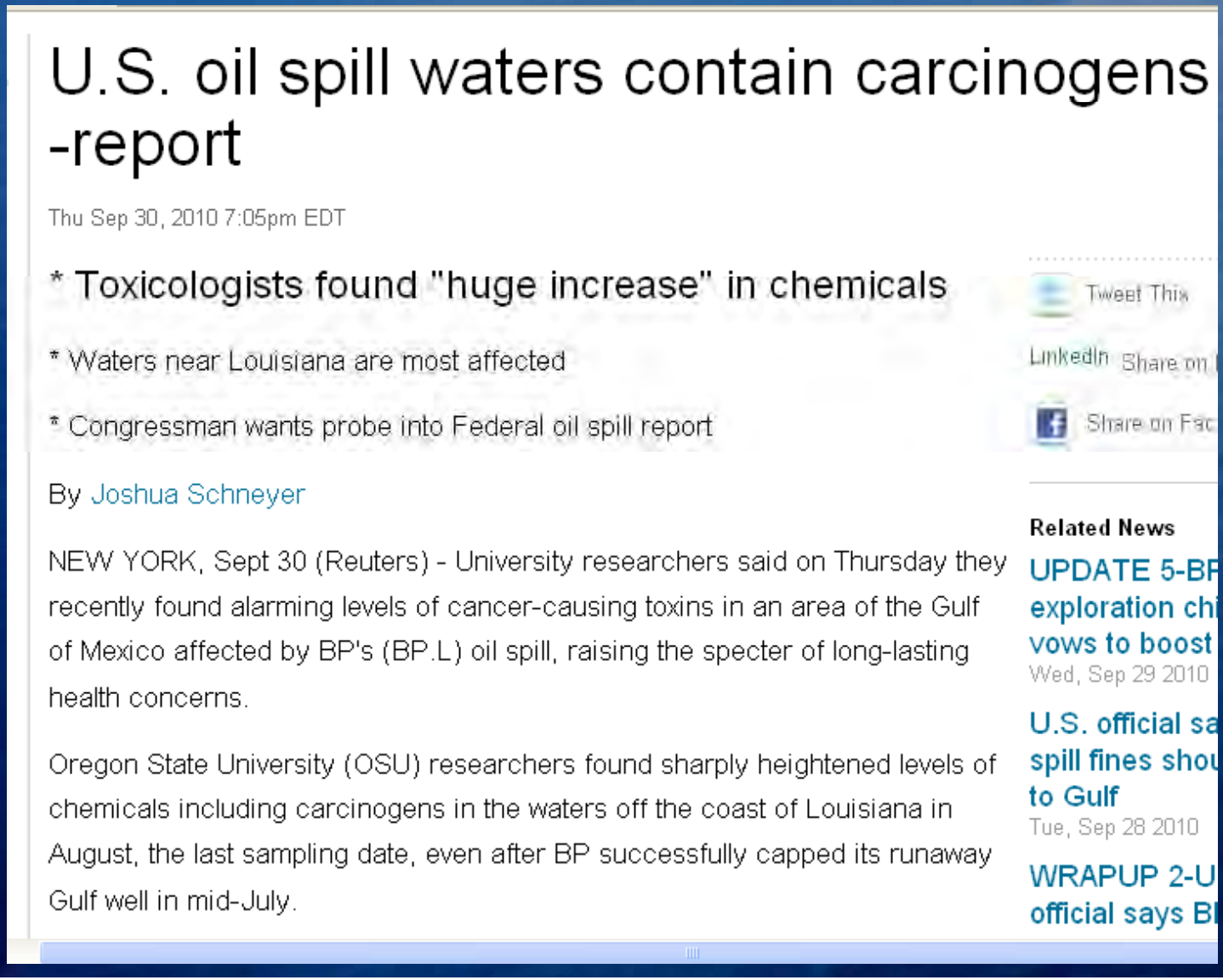
Edward J. Trapido, Sc.D., F.A.C.E.
Associate Dean for Research
LSUHSC School of Public Health
Professor and Wendell Gauthier
Chair for Cancer Epidemiology

Coordinator of Gulf Oil Spill Research
LSU Health Sciences Center- New Orleans
Deputy Director, Stanley S. Scott Cancer Center
Co-Director, Gulf Health Consortium

Photo: 6/26/10

Still in Our Headlines



U.S. oil spill waters contain carcinogens -report

Thu Sep 30, 2010 7:05pm EDT

* Toxicologists found "huge increase" in chemicals

* Waters near Louisiana are most affected

* Congressman wants probe into Federal oil spill report

By Joshua Schneyer

NEW YORK, Sept 30 (Reuters) - University researchers said on Thursday they recently found alarming levels of cancer-causing toxins in an area of the Gulf of Mexico affected by BP's (BP.L) oil spill, raising the specter of long-lasting health concerns.

Oregon State University (OSU) researchers found sharply heightened levels of chemicals including carcinogens in the waters off the coast of Louisiana in August, the last sampling date, even after BP successfully capped its runaway Gulf well in mid-July.

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Still In Our Community:
"Art for Art's Sake" 10-02-10" (53 Barrels)

Oil Analytes of Interest

Anthracene	**Fluoranthene**	**Phenanthrene**
Benzo (a) Anthracene	**Fluorene**	C-1 Phenanthrene
Benzo (a) Pyrene	C-1 Fluorene	C-2 Phenanthrene
Benzo (b) Fluorene	C-2 Fluorene	C-3 Phenanthrene
Benzo (e) Pyrene	C-3 Fluorene	C-4 Phenanthrene
Benzo (g,h,i) Perylene	**Hopanes**	**Pyrene**
Benzo (k) Fluorene	**Indeno (1,2,3-cd) Pyrene**	C-1 Pyrene
Chrysene	**Naphthalene**	C-2 Pyrene
C-1 Chrysene	C-1 Naphthalene	C-3 Pyrene
C-2 Chrysene	C-2 Naphthalene	C-4 Pyrene
C-3 Chrysene	C-3 Naphthalene	**Saturate Hydrocarbons**
C-4 Chrysene	C-4 Naphthalene	(nC_{10}-nC_{35})
Dibenzo (a,h) Anthracene	**Naphthobenzothiophene**	**Steranes**
Dibenzothiophene	C-1 Naphthobenzothiophene	**Triterpanes**
C-1 Dibenzothiophene	C-2 Naphthobenzothiophene	
C-2 Dibenzothiophene	C-3 Naphthobenzothiophene	
C-3 Dibenzothiophene	**Perylene**	

OSHA's Concerns

- Benzene (crude oils high in BTEX, benzene, toluene, ethylbenzene, and xylene),
- Benzo(a)pyrene (a polycyclic aromatic hydrocarbon reproductive , formed when oil or gasoline burns),
- Carbon dioxide (inerting atmosphere, byproduct of combustion),
- Carbon monoxide (byproduct of combustion) Ethyl benzene (high in gasoline),
- Hydrogen sulfide (oils high in sulfur, decaying plants and animals),
- Methyl tert-butyl ether (MTBE) (octane booster and clean air additive for gasoline, or pure MTBE)- potentially carcinogenic in humans; carcinogenic in animals
- Polycyclic aromatic hydrocarbons (PAHs) (occur in crude oil, and formed during burning of oil),
- Sulfuric acid (byproduct of combustion of sour petroleum product),
- Toluene (high BTEX crude oils), Xylenes (high BTEX crude oils).

NOAA: A More Positive View

- Chemical nature of the oil Mississippi Canyon Block 252 (MS252) oil is a South Louisiana sweet crude oil (crude oil is termed *sweet if it is* low in sulfur). MS252 oil is a complex mixture of thousands of chemical compounds. Compared with other crude oils, MS252 oil is relatively high in *alkanes.*
- *Because* alkanes are made up of single-bonded carbon chains that microorganisms can readily use as a food source, MS252 oil is likely to biodegrade more readily than crude oils generally.
- MS252 oil is less toxic than crude oils generally because it is relatively much lower in *polyaromatic hydrocarbons (PAHs). PAHs are highly toxic* chemicals that tend to persist in the environment for long periods of time, especially if the spilled oil penetrates into the substrate on beaches or shorelines.
- Like all crude oils, MS252 oil contains *volatile organic compounds (VOCs) such as benzene, toluene, and xylene. Some VOCs are acutely toxic but because they* evaporate readily, they are generally a concern only when oil is fresh.

Characteristics and Effects are Time Dependent

OIL TYPE	DESCRIPTION	CHEMICAL CHARACTERISTICS	ENVIRONMENTAL & HEALTH HAZARDS	CLEANUP PROTOCOLS
Fresh oil	Black or dark brown, thick, sticky liquid with petroleum odor. On open water, floats and spreads quickly. In intertidal zone, may pick up silt and sediment and sink. On beach, may release sheen when washed by tides or waves. May penetrate beach substrate.	Mixture of 1,000s of chemical compounds. Some compounds evaporate quickly, others can persist for years. High in alkanes, VOCs; flammable. MC252 oil is low in sulfur and relatively low in PAHs.	Smothering of plants, birds, and animals is major concern. PAHs are toxic to fish eggs, larvae. Human health hazard via inhalation, skin contact, and (less likely) ingestion. VOCs are acutely toxic.	On water: disperse, skim, burn On land: sorbent pads, manual recovery, flushing with water, possible use of chemical shoreline cleaning agents
Mousse (emulsified oil or oil/water mixture)	Brown, rust, or orange in color. Pudding-like, sticky. May de-emulsify on beach in hot sun, releasing fresh oil which could penetrate substrate. If not de-emulsified, unlikely to penetrate substrate. Little odor.	Consists of various percentages of water in emulsion with fairly fresh oil. Reduced VOC content. Water content reduces ignitability & biodegradability.	Sticky, can smother plants, birds, and animals. Human health hazard via inhalation, skin contact, and (less likely) ingestion. VOCs are acutely toxic.	On water: skim On land: sorbent pads, manual recovery
Sheen	Very thin layer of fresh oil. May be transparent, rainbow, grey, or silvery in color. May be associated with adjacent fresh oil or mousse.	Most VOCs evaporated. Low levels of PAHs may be present.	Light sheens will degrade quickly. Heavier sheens may concentrate on shorelines. Human health hazard from skin contact, inhalation, and (less likely) ingestion.	Light sheens very difficult to recover. Heavier sheens may be picked up with sorbent boom or sorbent pads.
Tarballs	MC252 oil will weather to form small, hard, floating, black pellets or chunks of oil. May be highly persistent and travel long distances. On beach, may soften in hot sun. In intertidal waters, may pick up sediment or silt and sink.	Asphalt-like tar. VOCs evaporated. PAHs still present.	May soften in hot sun, posing hazard to birds and animals. Prolonged skin contact may cause allergic reaction or rash. May be a concern for recreational shorelines.	On water: snare boom On land: snare boom, manual removal, beach cleaning machinery
Burn residue (floating or on land)	Brittle, hard, asphalt-like, typically mixed with unburned fresh oil. May be mistaken for tarballs.	Asphalt-like tar. VOCs evaporated. PAHs still present.	Little or no acute aquatic toxicity. Very localized smothering impacts. Because controlled burning is conducted well offshore, human health concern on land is minimal.	Collect residue manually from water or land

Dispersants

- Oil is toxic at 11 ppm while Corexit 9500 is toxic at only 2.61 ppm; Corexit 9500 is four times as toxic as the oil itself.
  - Dispersants are a relatively common product used to clean and control oil spills in the ocean.
  - On a basic level, dispersants work the same way dishwashing liquid works on grease: they break up the oil into tiny droplets by attaching to the oil which then becomes diluted in the water.
  - Corexit, the dispersant BP used, contains a surfactant and a solvent. Surfactants are long molecules that are hydrophilic (water-seeking) on one end and oleophilic (oil-seeking) on the other.
    - One end grabs an oil molecule, the other, a water molecule. By reaching across the oil-water boundary, the surfactant lowers the tension that keeps the two substances separate.
  - Smaller, dispersed droplets are less threatening for two reasons: they present more surface area to the water, so ocean bacteria can degrade the oil faster; plus, the small droplets are much slower to rise to the surface, keeping the oil at sea instead of in coastal wetlands and giving the bacteria more time to do their magic.
- On the other hand, sprayed subsurface, they do not allow a true picture of the amount of oil there was.

Corexit

- Estimated amount used in the Gulf- 2 million gallons
- The components of COREXIT 9500 and 9527 are:

CAS Registry Number	*Chemical Name*
57-55-6	1,2-Propanediol
111-76-2	Ethanol, 2-butoxy-*
577-11-7	Butanedioic acid, 2-sulfo-, 1,4-bis(2-ethylhexyl) ester, sodium salt (1:1)
1338-43-8	Sorbitan, mono-(9Z)-9-octadecenoate
9005-65-6	Sorbitan, mono-(9Z)-9-octadecenoate, poly(oxy-1,2-ethanediyl) derivs.
9005-70-3	Sorbitan, tri-(9Z)-9-octadecenoate, poly(oxy-1,2-ethanediyl) derivs
29911-28-2	2-Propanol, 1-(2-butoxy-1-methylethoxy)-
64742-47-8	Distillates (petroleum), hydrotreated light

*Note: This chemical component (Ethanol, 2-butoxy-) is not included in the composition of Corexit 9500.

Corexit 9527

- Corexit 9527 includes 2-butoxy-ethanol, which according to the N.J. Dept. of Health "may be absorbed through the skin; should be handled as a CARCINOGEN -- WITH EXTREME CAUTION; can irritate the skin and eyes with possible eye damage; can irritate the nose and throat; can cause nausea, vomiting, diarrhea and abdominal pain. can cause headache, dizziness, lightheadedness, and passing out and may damage the liver and kidneys.

EPA Air Monitoring

- EPA has been monitoring the air at multiple sites on shore along the Gulf Coast. The purpose is to see if spill-related pollutants are present in the air at levels that might cause health problems for people onshore in the Gulf region. EPA has been monitoring for pollutants that:
- can evaporate from fresh crude oil;
- can evaporate from weathered oil;
- came ashore from burning oil out at sea
- EPA has also monitored onshore air to determine whether chemicals in the dispersants used offshore are reaching onshore air

EPA Water Testing

To date, no chemicals have exceeded human health benchmarks. However, people should heed warnings from their local health officials regarding oil-impacted beaches and water. As an added safety precaution, if people see or smell oil in the water or beach area, they should avoid the oil-impacted area.

Human Health Benchmark Values by Chemical

Human health benchmarks are based on potential cancer and non-cancer risks associated with exposure to oil-contaminated water in the Gulf. Where applicable, the benchmarks account for both skin contact and incidental ingestion of water by a child swimmer, assuming 90 hours of exposure. These benchmarks were developed by EPA in coordination with the US Department of Health and Human Services.

CHEMICAL	CAS Number	Human Health Benchmark Child Swimmer µg/L	Toxicity	Citation
Volatile Organic Compounds, µg/L				
Benzene	71-43-2	380	C	1
Cumene	98-82-8	20,000	N	1, 4
Ethylbenzene	100-41-4	610	C	1, 2, 3
Total xylene^	108-38-3	18,000	N	1
Toluene	108-88-3	120,000	N	1, 2
Semivolatile Organic Compounds, µg/L				
2-Methylnaphthalene	91-57-6	170	N	1, 2
Polyaromatic Hydrocarbons (PAHs) µg/L				
Naphthalene	91-20-3	1,800	N	1
Acenaphthene	83-32-9	2,500	N	1
Fluorene	86-73-7	12,000	N	1, 4
Anthracene	120-12-7	22,000	N	1, 2
Fluoranthene	206-44-0	UD		
Pyrene	129-00-0	4,100	N	1, 2
Benzo(a)anthracene	56-55-3	UD		
Chrysene	218-01-9	UD		
Benzo(b)fluoranthene	205-99-2	UD		
Benzo(a)pyrene	50-32-8	UD		

Seafood Safety

3. ***Every seafood sample from reopened waters has undergone rigorous testing for oil and dispersants – and every sample from reopened waters has passed those tests.***

Federal seafood safety experts have implemented a rigorous, risk-based sampling regime.

- **Sampling from Areas Considered for Reopening:** Samples are collected from closed fishing areas and are brought to shore for immediate testing before those areas are reopened. NOAA has also collected baseline specimens and has sampled outside the closure.
- **Sensory Testing**: Seafood samples undergo rigorous sensory testing by expert panels at NOAA's seafood testing laboratory in Pascagoula, Miss. These experts can detect down to one part oil in 1 million parts seafood. Once the samples pass the sensory test, they are sent for chemical testing.
- **Chemical Analysis**: Both NOAA and the FDA are performing chemical testing on seafood products from the Gulf at labs across the country. This analysis tests for hydrocarbon compounds and ensures that seafood products caught in the Gulf are safe for the consumer.
- **Dockside Sampling**: In an effort to add an additional level of screening, NOAA has implemented a targeted sampling program that tests fish as they are brought into the docks from commercial fishing vessels.
- **Risk-Based Seafood Processor Monitoring**: FDA has implemented a risk-based surveillance sampling program targeting seafood products at Gulf Coast seafood processors – targeting oysters, crabs and shrimp, which could retain contaminants longer than finfish. This sampling provides verification that seafood on the market is safe.

Small amounts of Corexit-oil have already been detected in crabs and oysters. The chemical and toxic compound will naturally climb up the food chain since the process cannot be stopped or reversed.

http://www.deepwaterhorizonresponse.com/external/content/document/2931/886523/1/gulf%20seafood_FINAL.pdf

Washington Post 9-06-2010

- If Alaska is any indication, the first year after a spill is not the hardest. It's the years afterward when the environmental, cultural and societal consequences really surface.

2 longitudinal studies, maximum of 4 years f-up, and they were on Mental Health

Journal of Applied Toxicology

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

Ship name	Date	Location	Spill size (t)
MV Braer	5 January 1993	Southwest Shetland islands, UK	85,000
Sea Empress	15 February 1996	Milford Haven, UK	72,000
Prestige	19 November 2002	Galicia, Spain	63,000
Exxon Valdez	24 March 1989	Bligh ref, Prince William, Alaska, USA	37,000
Tasman Spirit	26 July 2003	Karachi, Pakistan	37,000
Erika	12 December 1999	South Penmarch, Brittany, France	20,000
Nakhodka	2 January 1997	Northeast Oki Island, Sea of Japan, Japan	>6,000

IN VITRO STUDIES AND STUDIES ON THE EFFECTS CAUSED BY TRANSFERENCE TO THE FOOD CHAIN

Table 2 displays a summary of the studies included in this section. All of them analyzed effects induced by oil spilled from *Erika*. Amat-Bronnert *et al.* (2007) performed an *in vitro* study in two human cell lines, one from hepatoma and another one from bronchial epithelium, treated with an *Erika* fuel extract. DNA adducts performed by ^{32}P-postlabelling method were only

The studies presented in this section show evidence for the bioaccumulation of oil compounds and their transference to the food chain in oil-contaminated marine food, and demonstrate the induction of DNA damage by the products generated by metabolic enzyme activity transforming many polluting agents into even more toxic intermediaries. In this regard, Bro-Rasmussen (1996) indicated that toxic chemicals at low concentrations will not immediately kill humans; however, depending on their potential to bioconcentrate when climbing the food chain, persistent chemicals may create a human hazard in the case of chronic ingestion. For this reason, *in vitro* and *in vivo* studies that consider

http://niehs.nih.gov/news/releases/2010/gulf-study.cfm

http://www.iom.edu/~/media/Files/Activity%20Files/PublicHealth/FedResponseOilSpill/SandlerDale.pdf

Gulf Oil Spill Health Study

Primary Aims

- Assess short-and long-term health effects associated with oil spill clean-up
- Create a resource for future collaborative research
  - Focused hypotheses
  - Specific subgroups

NIEHS
National Institute of Environmental Health Sciences

Scientific hypotheses

Controlling for other factors, exposure to oil, dispersants, and/or oil-dispersant mixtures is associated with adverse health effects

- There is a dose-response relationship between exposures and health effects (using qualitative and semi-quantitative measures)
- Biomarkers of potentially adverse effects are associated with chemical exposures

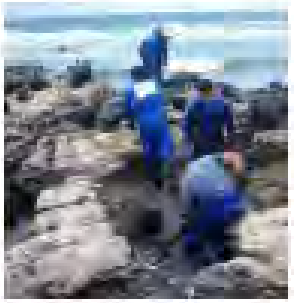
Workers from the gulf region will be at greater risk for mental health outcomes than workers and controls from other regions

Potentially Exposed

- Potential participants will be identified from the NIOSH Roster (N~100,000), which is believed to contain a large majority of the workers who engaged in clean-up activities, and supplemented with the larger Petroleum Education Council (PEC) list of individuals who completed one or more safety training modules as well as other known lists of individuals involved in clean-up activities (e.g. parish responder lists, BP contractor payroll, Coast Guard roster).

NIEHS
National Institute of Environmental Health Sciences

Study Design



Approach ~75,000 from master list

- Maximize Gulf states, higher exposures, complaints

Enrollment questionnaire (~ 30 minutes, phone or in-person)

- Health, lifestyle, usual occupation, socioeconomic factors, demographics
- Clean-up activities, living accommodations
- Spill-related health effects (rashes, respiratory problems, neurological symptoms)
- Stress, depression, anxiety, perceived risk

➢ Cohort size 55,000 with 70% response rate

NIEHS
National Institute of Environmental Health Sciences

Active and passive follow-up cohorts

Recruit 27,000 for active participation in long-term clinical study – ***Active Cohort***

- All clean-up job categories (~20,000 exposed)
  - Oversample higher exposed and/or smaller job categories
- 7,000 unexposed controls
  - 4,000 local
  - 2,000 non-local
  - 1,000 Federal
- Maximize or limit to 5 gulf states

Follow remainder via record linkage – ***Passive Cohort*** (~28,000)

NIEHS
National Institute of Environmental Health Sciences

Biomedical Surveillance Sub-cohort

Collaborations with researchers in the Gulf area; common protocol with some variation

- Select ~ 5,000 from active cohort
- Clinical assessment – years 1 and 3
  - Biological and environmental samples
  - Comprehensive pulmonary function tests
  - Neurological/neurobehavioral testing
  - Mental health screening
  - Reproductive function
  - Laboratory tests

NIEHS Gulf Study: Health Outcomes Of Interest

Based on scant research on previous spills

Address health complaints associated with BP spill

Studies of other groups with exposure to compounds in oil, dispersants, heat, or disaster-related stress

- Respiratory
- Cardiovascular
- Hematologic
- Mental Health
- Cancer
- Neurologic (function and peripheral neuropathy
- Liver
- Immunologic
- Renal
- Dermatologic
- Reproductive

Context of Conducting Studies

- Major employers: harvesting seafood, oil rig work, maintaining boats, tourism
- Willingness to talk to researchers, give biological specimens
  - Community weary of being studied and are highly stressed: Hurricanes Cindy, Katrina, Rita, Economic Recession, Deepwater Horizon
    - Need to be able to answer concerns
    - Community Participatory Research
- Lack of trust of outsiders
- In LA: Cajun; Croatian; Vietnamese; Hispanic; African American; White, non-Hispanic, non-Cajun; Islanos

Context of Conducting Studies

- Federal: USCG, White House, Unified Command, US Navy, EPA, NOAA, FDA, CDC, NIOSH, OSHA, NIEHS. US Congress, MMS, DOI, NIDA, SAMHSA
- Companies: BP, Halliburton, Transocean
- National: ASTHO
- Lobbyists for Industries, Tourism
- Trial Lawyers
- Regional: Ocean, Gulf, University Consortia
- State: State Health Departments, Governor's Office, Tourist Boards
- Local: Counties/Parishes, NGOs, Faith-based groups, Community Associations, Environmental Groups, Public Relations Offices, Chambers of Commerce,
- Journalists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Populations

- Oil Rig Workers
- Clean-up Workers on/in Gulf, Shore
- Corexit Sprayers
- Families of workers
- Workers at municipal dumps
- Wildlife cleaners
- Persons whose income on fish, shellfish
- Communities
- Visitors to local beaches
- Special Populations
  - Pregnant women, Children, Immunocompromised, persons with other health conditions or exposures

Epidemiologic Issues: Assessing Exposure of Workers

- Direct, indirect
- Time dependent
- Use of protective gear
- Exposure may have occurred before and after
- Exposure- to oil, to dispersant, on/in water, in air, flaring of natural gas
- Weather- heat related inhalations
- Biological specimens will be substantially after major exposures
- Oil is already in Gulf; compounds in dispersant in common use
- Mississippi river contents
- Environmental samples

Oil Spill Occupational Risks

- Biological (e.g., plants, animals, insects, remediation materials)
- Drowning
- Noise
- Electricity
- Slips and Trips
- Biohazardous debris (e.g., syringes on shoreline)
- Ergonomic Stresses (e.g., repetitive strain, low back pain)
- Sunburn
- Confined Spaces
- Underwater Diving
- Falls
- Unguarded Equipment
- Cranes
- Fatigue
- Vehicles (e.g., aircraft, boats, cars, trucks)
- Cutting and Welding
- Fire and Explosion
- Degreasers
- Heat or Cold Stress
- Dispersants
- In-Situ Burning Particles
- Psychological Stress

American Association of Poison Control Centers

- As of **Monday**, 9/27 U.S. poison centers have taken the following number of calls regarding the Gulf Oil spill:
- 1172 exposure calls (calls that involve someone being exposed to an oil-spill related toxin, be it oil, dispersant, food contamination or other associated toxin.)
- 681information calls (calls that involve people who have questions about the medical impact of the oil spill.)
- Poison centers have taken exposure calls from the following states or countries: Alabama, Alaska, Arkansas, California, Florida, Georgia, Illinois, Louisiana, Massachusetts, Michigan, Mississippi, Missouri, Nebraska, New York, North Carolina, Oklahoma, South Carolina, Tennessee, Texas and Virginia.
- Of those, Alabama has received the most calls: 286, followed by Louisiana (274) Mississippi (261) and Florida (258).
- Most exposures so far have been via inhalation, though dermal exposure is also commonly reported. Most common symptoms reported have included: headaches, nausea, vomiting, diarrhea, throat irritation, eye pain, coughing/choking and dizziness.

Depression up 25 percent on Gulf Coast after oil spill, Gallup poll reveals

Published: Tuesday, September 28, 2010, 9:52 AM Updated: Tuesday, September 28, 2010, 9:59 AM

The Associated Press
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A **Gallup survey** released Tuesday of almost 2,600 Gulf Coast residents showed that depression cases are up more than 25 percent since an **oil rig explosion** killed 11 people and unleashed a three-month **oil spill** into the Gulf in April that ruined many livelihoods. The conclusions were consistent with trends seen in smaller studies and witnessed by mental health workers.

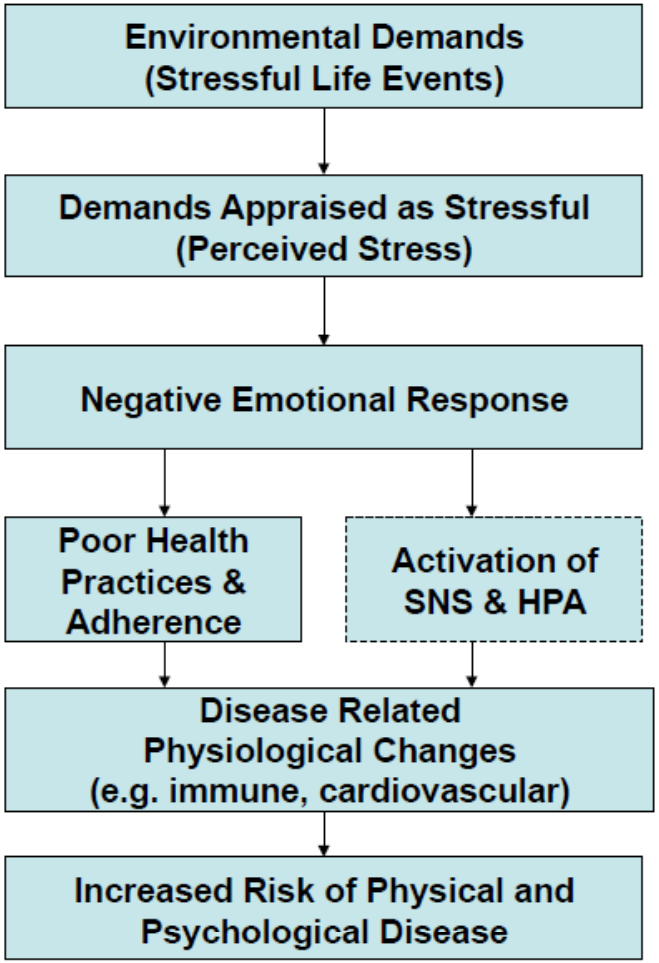
Dave Martin / The Associated Press

Margaret Carruth goes through her belongings after attending a public hearing to voice her concerns about her BP oil spill claim in Orange Beach, Ala., earlier this month. Carruth is living in her pickup truck after losing her home in Orange Beach after being unable to pay bills after the gulf oil spill.

Before the BP oil spill, the Gulf Coast was a place of abundant shrimping, tourist-filled beaches and a happy if humble lifestyle. Now, it's home to depression, worry and sadness for many.

People just aren't as happy as they used to be despite palm trees and warm weather. A "well-being index" included in the Gallup study said many coastal residents are stressed out, worried and sad more often than people living inland, an indication that the spill's emotional toll lingers even if most of the oil has vanished from view.

Margaret Carruth is among those fighting to hang on.



HPA= hypothalamus-pituitary- adrenal
SNS=sympathetic nervous system
Sheldon Cohen

Stressful Events Related To Psychological Stress

- Threats to ***self-esteem (job loss)***
- Threat or loss of ***purpose and meaning in life*** (career aspirations, family businesses)
- Loss of feelings of ***control over important*** outcomes (supporting families, protecting environment)
- Perceptions of ***unfair treatment (reimbursement for*** loss)
- Damage to ***social networks (loss of close*** others, conflict within family and network)

Who Is Most at Risk for Mental Health Problems?

- People with chronic illnesses
- Lower levels of income and education
- Lack close social ties
- Histories of poor coping
- Children (including stress-transmission)

Stress and Physical Health

- Exacerbations of Chronic Diseases
- HIV/AIDS progression among HIV+ men
- Oral and Genital Herpes Exacerbations
- Rheumatoid Arthritis Flare-ups
- Asthma Exacerbations (includes children)


682312

WHO-Social Determinants of Health

"…the circumstances in which people are born, grow up, live, work and age, and the systems put in place to deal with illness. These circumstances are in turn shaped by a wider set of forces: economics, social policies and politics"

(see Satcher, D. *Public Health Reports* 125:6-7, 2010

Resiliency and Recovery

- Resiliency can be defined as the capacity to thrive despite adversity such as poverty and social risk factors such as job loss;
- Recovery can be defined as the ability to thrive and have well-being despite the presence of illness, such as depression or trauma-related psychological distress.

Resilience

- The social environment
- Economic development
- Information and communication
- Community competence

Environmental Justice

- There are more environmental hazards in disadvantaged communities
- There are more individuals with poor health in disadvantaged communities
- Individuals with poor health tend to be more susceptible to environmental pollutants

Policy Issues

- Water, Air, Marshes, Beaches, Disposal
- Ecosystem
- Drilling
- Worker Protection
- Public Health Protection
- Public Health Preparedness
- Coordination: Who Sets Policy during spill, clean-up, after spill
- Economic Implications

Communications and Education

- About what?
- By whom (who is trusted)?
- To whom
- Role of media
- Use of technology
- Conflicting Information
- Competing agendas

Economic Effects

- Lost jobs- seafood, tourism, oil
  - Not all local
  - Supporting businesses and businesses who are supported
- Health effects
  - Short and long term
  - On workers, families communities
- Clean-up and containment costs
- Mitigation Claims
- Damage Claims
- Civil Penalties
- Criminal Penalties
- Loss of Productivity

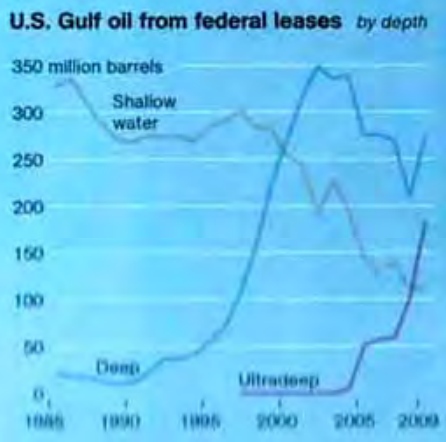
NATIONAL GEOGRAPHIC

SIGSBEE PLAIN

Gulf of Mexico

A GEOGRAPHY OF OFFSHORE OIL

For the past half century, oil has driven the economy of the Gulf of Mexico. A third of U.S. oil production flows from nearly 3,500 platforms in the Gulf, with thousands of miles of pipeline delivering oil and natural gas to shore. Since the first Gulf well was drilled off Louisiana in 1938, in less than 15 feet of water, close-in reserves have been depleted and exploration has marched off the continental shelf, onto the continental slope, and beyond. Today Gulf oil is deep oil; the bulk of U.S. production draws from wells in more than a thousand feet of water. U.S. Gulf oil reserves are estimated at 44.9 billion barrels, but as the *Deepwater Horizon* disaster showed, the challenges of deep drilling are formidable.



The Times-Picayune

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SECTION E

Sunday, October 3, 2010

ECONOMIST SEES OIL SPILL IMPACT LINGERING

It will continue to rob state of jobs in fishing, tourism, he says

By Kimberly Quillen
Business writer

Job losses associated with the BP oil spill and the ensuing drilling moratorium could hurt the Louisiana economy as it pulls out of the national recession, the chief economist of Regions Bank said this week.

Unemployment rates in Louisiana have compared favorably with the national rate, often coming in well below the national average in recent years.

"I think that favorable comparison is going to diminish

Business owners say they're reluctant to hire after sp

OIL SPILL *from E-1*

Allsbrook believes the long-term impact of those secondary job losses — including tourism and fishing — is underappreciated on a national level. He also believes Louisiana needs to mount an aggressive national advertising campaign to combat the lingering image of soiled seafood and damaged tourism attractions in the wake of the spill.

"Louisiana really needs to do the best job it's ever done in advertising its assets to tourists. They really need to step it up," Allsbrook said.

Though the recession is now officially over, Allsbrook expects the United States will experience years of slow economic growth, with the national unemployment rate staying above 9 percent this year and next.

Allsbrook said many of the small to medium-sized businesses he communicates with throughout the region aren't interested in hiring workers.

"What these business owners tell me is they're very reluctant to hire," Allsbrook said. Many of these firms are uncertain about the future demand for their goods and services. They also have learned how to get by with fewer workers and are still trying to gauge what their health care costs will be next year, he said.

A reluctance to hire isn't the only factor that will keep the national unemployment rate up.

The unemployment rate measures the percentage of the local workforce that reports itself as being out of work, and as discouraged workers who dropped out of the workforce during the recession resume job searches and are counted again as part of the workforce, they could push up the unemployment rate if not hired immediately.

Low employment levels also further discourage consumers, who have already battened down their spending.

The recession forced consumers — whose spending collectively accounts for two-thirds of all economic activity — to make long-term changes in their financial behavior.

Families have begun reining in spending and whittling down their debt.

"Consumers just don't feel like spending. There are a lot of reasons why. They're very confused and very worried," Allsbrook said. "Consumers are largely thinking about how to get down their monthly (credit card) payments."

"We are not spending. We're not using increasing debt to fuel growth. We're reducing debt and raising savings."

That pull-back in spending, according to Allsbrook, will keep economic growth slow for years to come.

"We've been saying since the start of this recession that we have a new reality here," Allsbrook said.

"Our message to individuals, businesses, nonprofits, is that if they're operating their plans the way they did two years ago, it's extremely important that they move quickly to re-evaluate those" because the economic environment has changed, he said.

Regions Bank is based in Birmingham, Ala., but operates branches in Louisiana.

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Kimberly Quillen can be reached at kquillen@timespicayune.com or 504.826.3416.

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ROBERT ALLSBRO
chief economist
of Regions Bank

Gulf States Oil Release Health Studies Consortium

(Gulf Health Consortium)

26 June 2010

Co-Directors

Edward J. Trapido, Sc.D., F.A.C.E.
Associate Dean for Research
LSUHSC School of Public Health
Coordinator of Gulf Oil Spill Research
LSU Health Sciences Center- New Orleans
Professor and Wendell Gauthier
Chair for Cancer Epidemiology

Scott Lillibridge, M.D.
Assistant Dean – Houston
Professor of Epidemiology & Biostatistics
School of Rural Public Health
Clinical Professor
Family and Community Medicine
College of Medicine
Texas A&M Health Science Center

Gulf State University Health Science Consortium Partners

LSU Health Sciences Center/School of P.H.

Texas A &M School of Rural Public Health

Tulane University

Xavier University-NO

University of Texas

University of Southern Mississippi

University of Alabama – Birmingham

University of South Alabama

University of Miami

Florida State Univ.

Rand Corporation

Map of Gulf States and Partners

Louisiana State University Health Sciences Center (LSU)

Texas A&M (A&M)

Tulane

Xavier University-New Orleans (XUNO)

University of Texas (UT)

University of Southern Mississippi (USM)

University of Alabama - Birmingham (UAB)

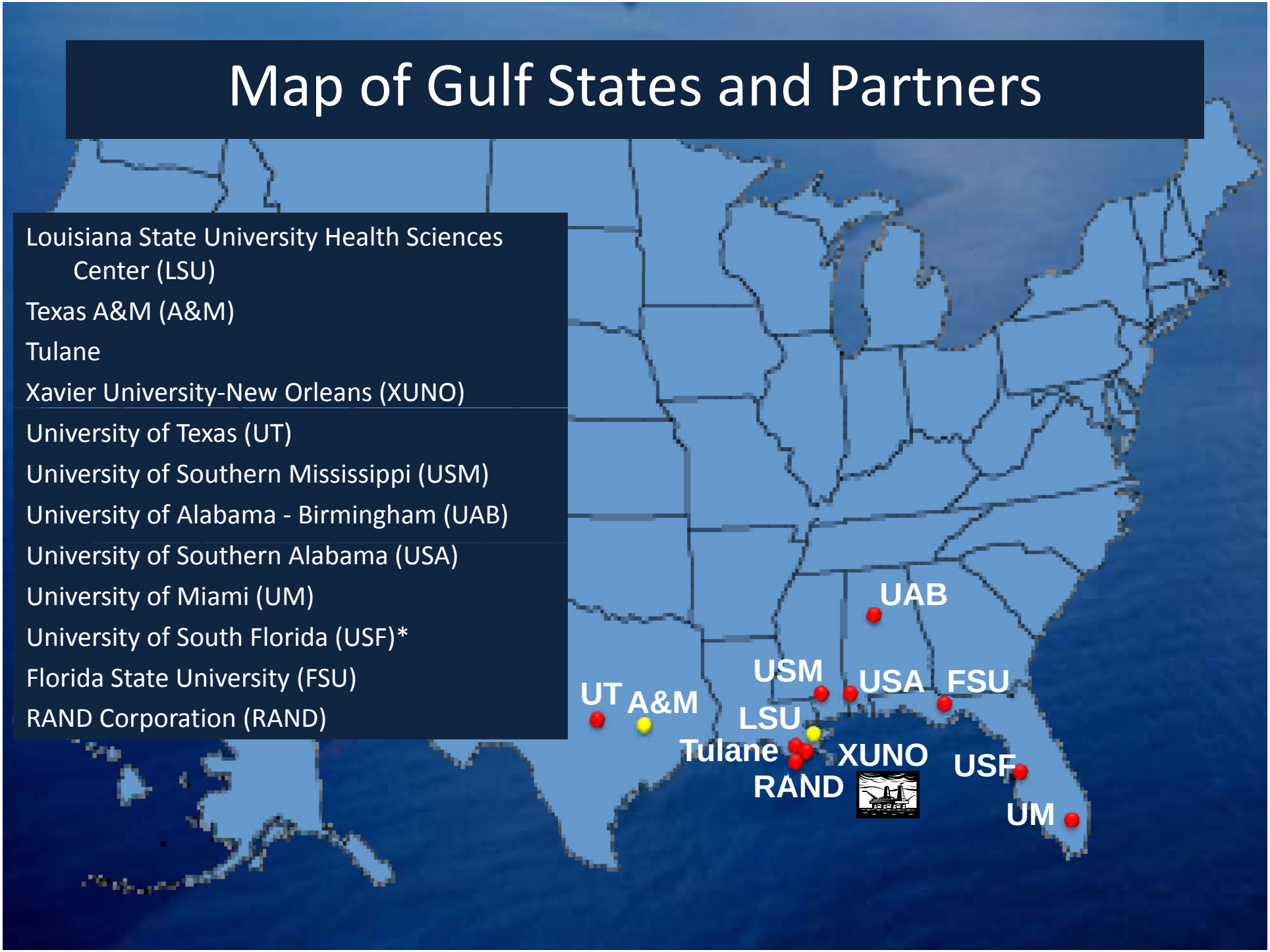
University of Southern Alabama (USA)

University of Miami (UM)

University of South Florida (USF)*

Florida State University (FSU)

RAND Corporation (RAND)



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