Deepwater Horizon Oil Spill: Public and Occupational Health Surveillance

Clinician Outreach and Communication Activity (COCA) Conference Call

December 7, 2010

Office of Public Health Preparedness and Response
Division of Emergency Operations

Objectives

At the conclusion of this hour, each participant should be able to:

- Identify acute health effects potentially associated with Deepwater Horizon oil spill exposure
- Discuss approaches to conduct surveillance to assess health effects associated with the potential environmental exposures from Deepwater Horizon oil spill
- Discuss the range of occupational hazards facing responders involved in the Deepwater Horizon response
- Discuss the patterns of injuries and illnesses that were evident based on occupational health surveillance conducted during the Deepwater Horizon response

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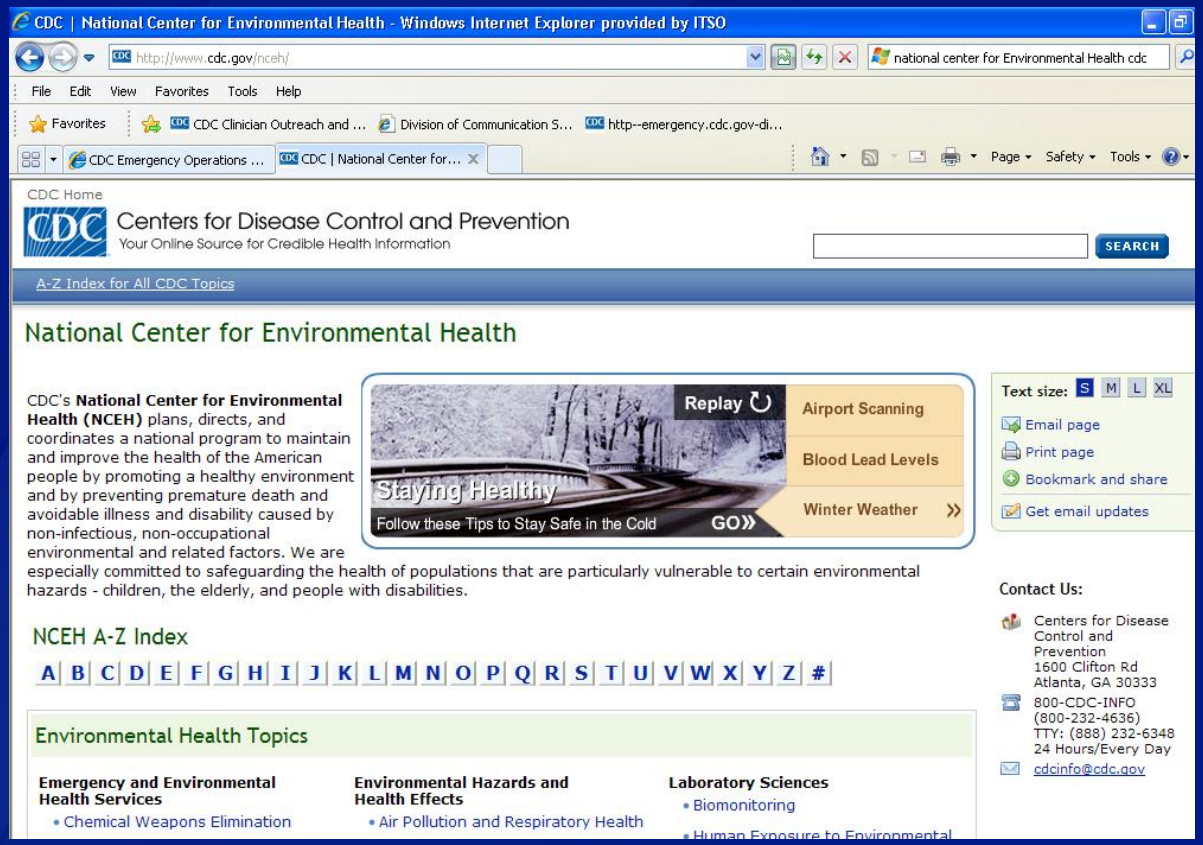

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Public Health Surveillance

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Deepwater Horizon Oil Spill

- **April 20, 2010:**
  - Explosion of the Deepwater Horizon Mobile Offshore Drilling Unit (MODU) 40 miles south of Louisiana coast
  - 11 deaths reported

- **May 4:**
  - CDC hosted call with five state epidemiologists (FL, AL, MS, LA, TX)
  - Designed surveillance approach
- **May 6:**
  - CDC Emergency Operations Center (EOC) activated
  - NCEH/ATSDR led EOC Epidemiology / Surveillance Desk

Gulf Oil Spill Surveillance

Objectives:

- **Monitor for health threats that are possibly related to exposures to the oil spill**
- **Provide health authorities with early indications of health impacts on populations most likely to be exposed**

Previous Oil Spill Events

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

Deepwater Horizon 20 April 2010 Gulf of Mexico 668,000,000

Aguilera et al., 2010

Symptoms and Complaints

Organ System	Symptoms/Complaints (examples)
Respiratory	Worsening of asthma, COPD Cough Shortness of breath
Cardiovascular	Chest pain
Ocular	Eye irritation
Gastrointestinal	Nausea Vomiting
Dermal	Rash Skin irritation
Neurological	Headache

Additional Considerations

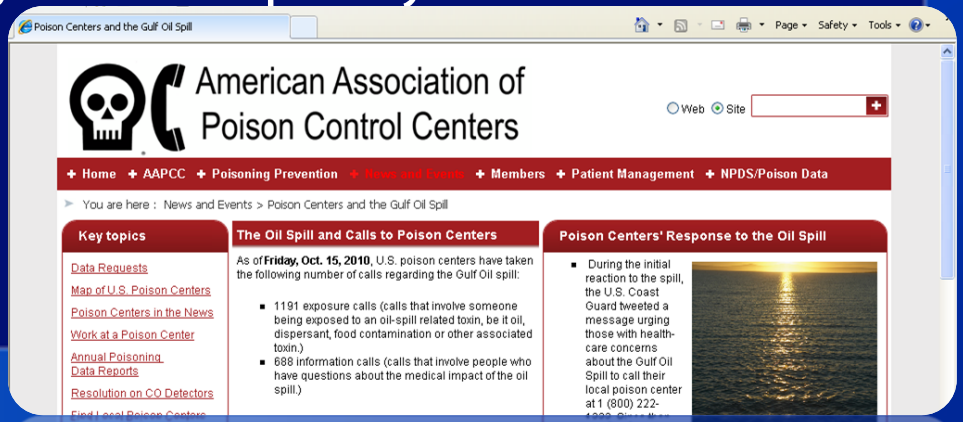
- **Burning of Oil**
  - Potential exposures to particulate matter (PM) and volatile organics (VOCs)
  - Exposure may exacerbate existing respiratory and cardiovascular conditions
- **Dispersants**
  - Detergent-like surfactants used to break up oil
  - Potential dermal, ocular, ingestion, and inhalation exposures especially among those who directly handle the material
- **USEPA monitored levels to environmental exposures**

- **Seafood Consumption**
  - Concerns regarding safety of seafood harvested from impacted area
- **FDA and NOAA monitored safety of seafood**

Surveillance Plans: National Systems

- **BioSense**
  - Electronic syndromic surveillance system
  - Monitors chief complaint and final diagnosis syndromes
  - 86 coastal facilities (VA, DoD, civilian) in 5 Gulf States
  - Provided daily reports to Gulf States

- **National Poison Data System (NPDS)**
  - Tracks calls to 60 Poison Control Centers (PCC) in 50 states (7 PCCs in LA, MS, AL, FL)
  - Calls related to oil spill assigned a temporary code
  - Generated state-specific summary data to each Gulf State



Surveillance Plans: State-based Approach

Implemented in coastal hospitals in affected, and most likely affected, areas in LA, MS, AL, FL:

- Enhanced state-based emergency room (ER) surveillance
- Targeted drop-in health care surveillance (e.g., ER, urgent care centers)
- Poison Control Center surveillance
- Syndromic surveillance (e.g., BioSense, EARS)

State	Surveillance activity	Description
FL	ESSENCE (syndromic) FL Poison Information Center Network (FPICN)	-Monitored in 6 coastal counties
AL	Drop-in, ED surveillance	-Collected data in coastal EDs and urgent care facilities among patients indicating oil exposure
MS	Drop-in, sentinel surveillance	-Collected data in 5 coastal EDs using a modified ILI tool -Collected oil exposure data
LA	Line list and questionnaire, EARS (syndromic), PCC, hotline calls	-Conducted surveillance on patients who indicate oil exposure and follow-up with questionnaire -Queried EARS for "oil"

CDC | 2010 Gulf of Mexico Oil Spill

Page ▾ Safety ▾ Tools ▾

Emergency Preparedness and Response

2010 Gulf of Mexico Oil Spill

Hurricanes and the Gulf of Mexico Oil Spill

What will hurricanes do to the oil slick in the Gulf?
CDC is monitoring potential health threats or conditions across the five Gulf States that may arise as a result of human exposure to the oil spill. In the case of a hurricane or tropical depression in the Gulf of Mexico, here are quick facts that families can take to protect their health after the storm.

CDC Response to the Gulf of Mexico Oil Spill

UPDATE: This information is current as of August 31, 2010 at 4:00pm EDT

CDC and the U.S. Department of Health and Human Services recognize the importance of responding to potential public health issues related to the Deepwater Horizon Oil Spill in the Gulf of Mexico. CDC's National Center for Environmental Health (NCEH) initiated the agency's response on April 20th. CDC activated its Emergency Operations Center (EOC) on May 6th as part of the federal response to the environmental disaster.

Health Surveillance

UPDATE: This information is current as of September 29, 2010 at 1:00pm EDT

The Gulf Coast Oil Spill has the potential to affect human health in addition to the effects already seen on animal and marine life. CDC, along with the affected Gulf Coast states, has developed a plan to track the potential short-term health effects related to the oil spill in the affected communities.

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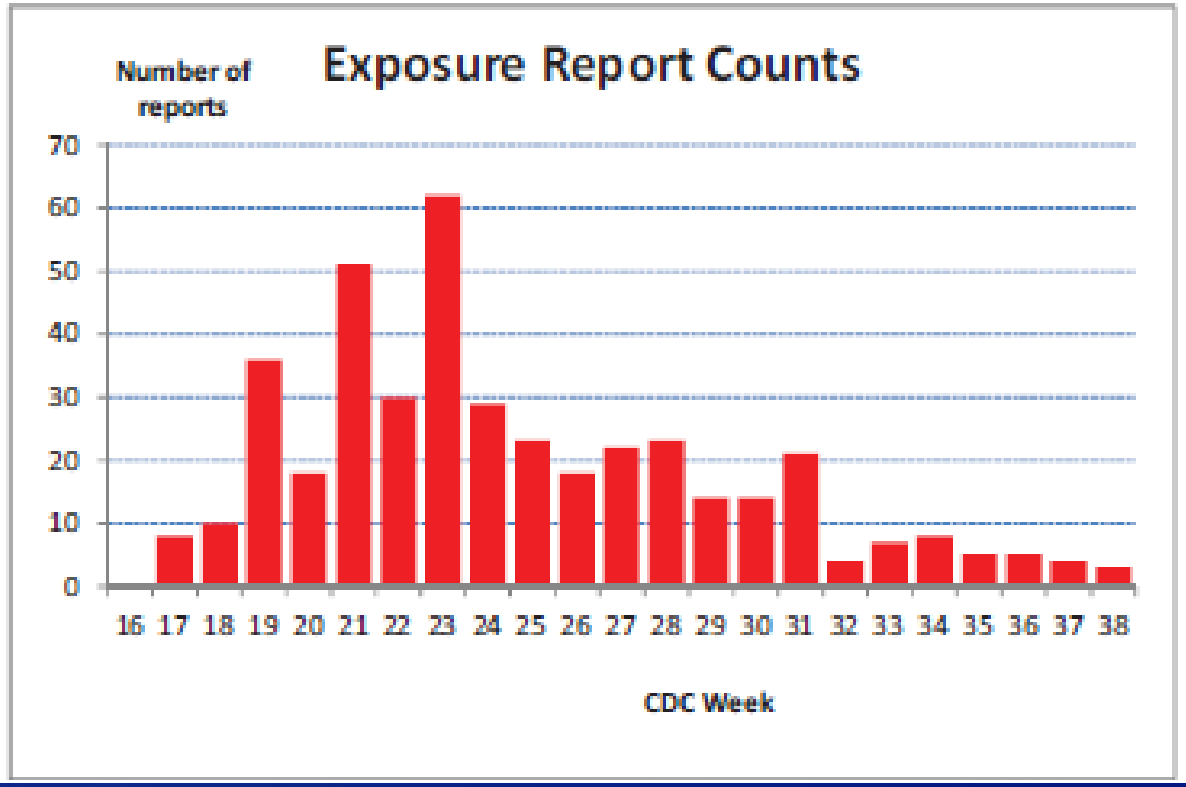
GULF OF MEXICO

Louisiana Department of Public Health: Surveillance Summary

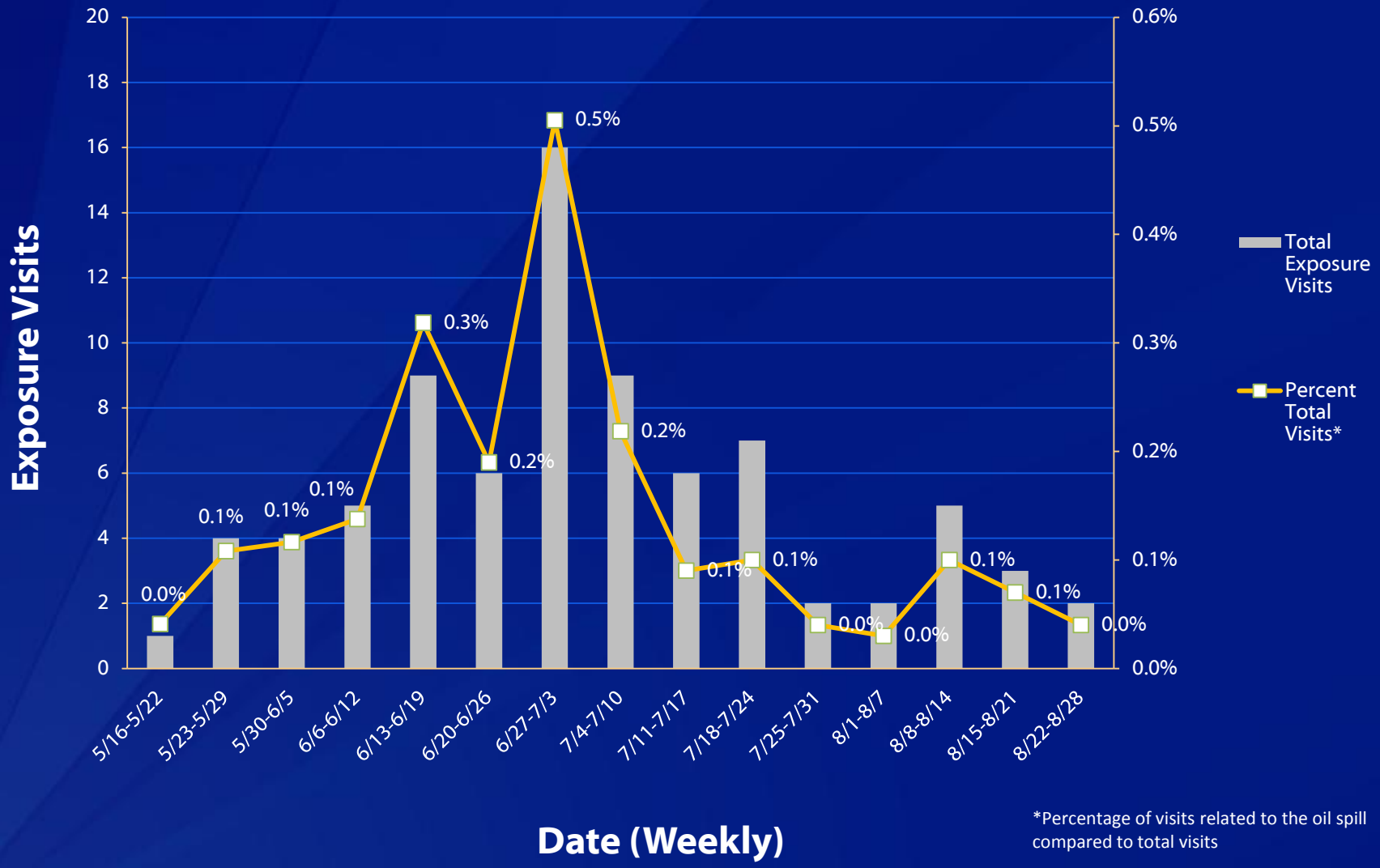
This graph shows the number of reports for conditions perceived to be related to exposure to the oil spill. This type of data is based on a patient's report and does not necessarily reflect a confirmed health effect from the oil spill.

Total numbers	Reports	415	Workers	329	General Population	86



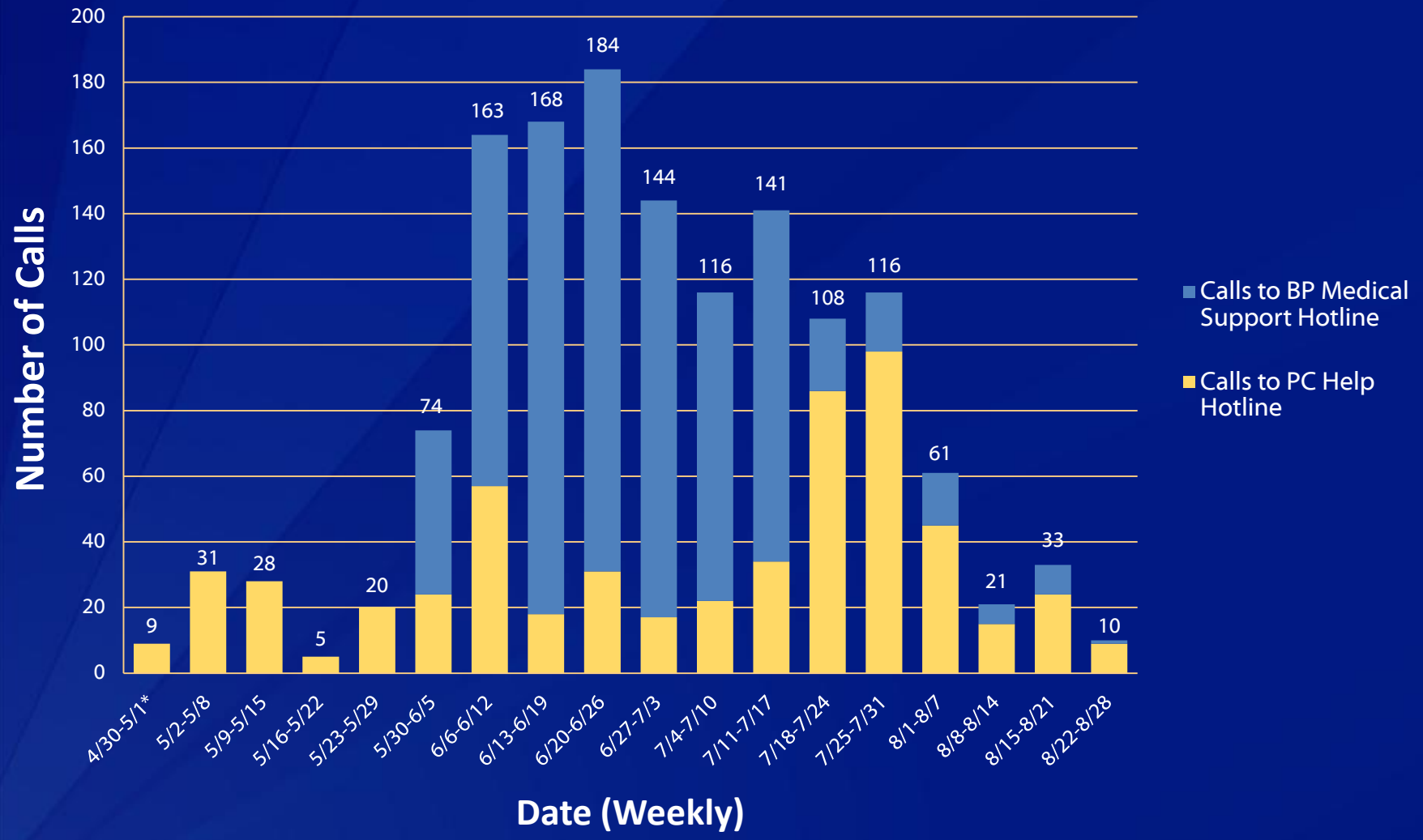
First day of the week	CDC Week	Report
04/18/10	16	0
04/25/10	17	8
05/02/10	18	10
05/09/10	19	36
05/16/10	20	18
05/23/10	21	51
05/30/10	22	30
06/06/10	23	62
06/13/10	24	29
06/20/10	25	23
06/27/10	26	18
07/04/10	27	22
07/11/10	28	23
07/18/10	29	14
07/25/10	30	14
08/01/10	31	21
08/08/10	32	4
08/15/10	33	7

Total Exposure-related Visits to Participating Facilities: Alabama
May 16 – August 28, 2010



*Percentage of visits related to the oil spill compared to total visits

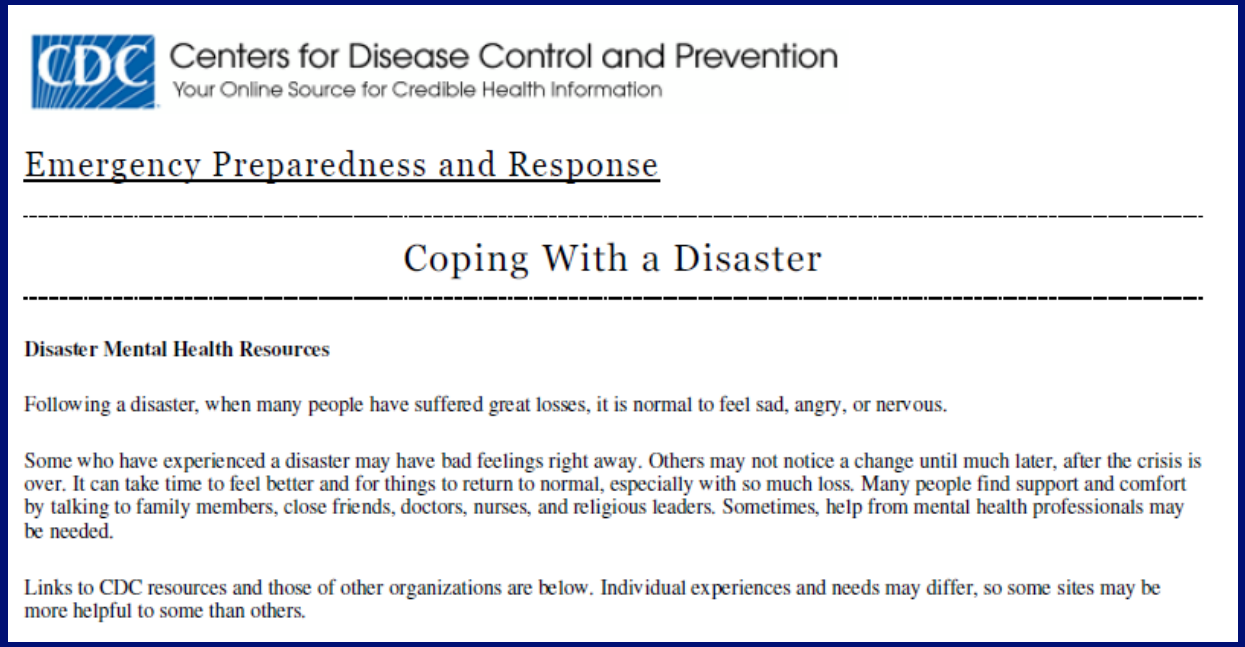
Total oil spill-related calls to the PCCs in the Gulf States
April 30 – August 28, 2010



*Gulf Oil Spill call surveillance started on April 30, so the first bar represents data only for April 30 to May 1

Addressing Mental Health Concerns

- CDC's Behavioral Risk Factor Surveillance System (BRFSS) program partnered with state and local public health officials to document mental health, mental illness, and associated conditions on an ongoing basis in the impacted Gulf States



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Coping With a Disaster

Disaster Mental Health Resources

Following a disaster, when many people have suffered great losses, it is normal to feel sad, angry, or nervous.

Some who have experienced a disaster may have bad feelings right away. Others may not notice a change until much later, after the crisis is over. It can take time to feel better and for things to return to normal, especially with so much loss. Many people find support and comfort by talking to family members, close friends, doctors, nurses, and religious leaders. Sometimes, help from mental health professionals may be needed.

Links to CDC resources and those of other organizations are below. Individual experiences and needs may differ, so some sites may be more helpful to some than others.

Community Assessment for Public Health Response (CASPER)

- **Epi-Aid requests made by Alabama and Mississippi in August 2010**
- **Objective: Assess potential mental health issues resulting from the oil spill**
- **Methods:**
  - Surveyed a representative sample of households in coastal counties in each state
  - Conducted questionnaire on exposures and physical, behavioral and mental health symptoms
- **Found increase in negative quality of life indicators and social context outcomes when compared to most recent state and national BRFSS surveys**

Strengths and Limitations

Strengths

- **Rapid detection of possible exposures among groups of people with symptoms**
- **Surveillance using national and state-level systems provides a more comprehensive picture of population**

Limitations

- **Exposures are self-reported**
- **Broad spectrum of potential health effects possible:**
  - Common exposures to multiple and ubiquitous sources
  - Different and multiple exposure routes can result in a broad spectrum of health effects

Evaluation Considerations for Future Events

- **Signs and symptoms**
  - Influenced by type and route of exposure(s), and dose
  - Symptoms related to behavioral and mental health (e.g., anxiety, depression) seen in previous oil spill disasters
- **Surveillance data**
  - Clinical surveillance activities assist in identifying potential populations at risk
  - Information helps to identify groups with common symptoms enabling state and local public health officials to follow up as needed

NIOSH Occupational Health Surveillance during the Deepwater Horizon Response

John Halpin MD, MPH
Medical Officer, NIOSH EPRO

COCA call
December 7, 2010

National Institute for Occupational Safety and Health
Emergency Preparedness and Response Office

Occupational Hazards in the Gulf

Occupational Hazards Overview

DEEPWATER HORIZON RESPONSE

Summary of Potential Hazards to Deepwater Horizon Response Workers

Potential Hazard	Risk Assessment	Evaluation Criteria	Recommendation
Cardiovascular Disease	Pre-placement physical: BMI*, BP, pulse	Physician's evaluation	For excess risk, assign to light duty, low demands, air conditioned environment
Heat Stress	Temperature, humidity, work load	Health surveillance	Training program, acclimatization, monitored hydration, work-rest regimen
Traumatic Incident Stress	Mental and emotional health	Physical complaints, thinking problems, changes in behavior, mood, irritability	Maintain adequate nutrition, hydration, rest; work in pairs to look out for buddy
Fatigue	Work hours and schedules	Management of hours worked	Shifts < 10 hours; 2 rest days after 3 12-hour shifts or 4 10-hour shifts or 5 8-hour shifts; frequent rest breaks
Chemicals	Air sampling, monitoring symptoms	OELs, reported symptoms, irritation	Organic vapor cartridge respirators, protective clothing, protective eyewear
Particulate	Air sampling, monitoring symptoms	OELs, visual observation, reported symptoms	P100 air-purifying respirators, protective eyewear
Odor	Sense of smell	Workers bothered by odors	Voluntary use of carbon-impregnated P95 filtering facepiece respirator

Occupational Hazards Overview

- **Musculoskeletal injuries (beach cleanup and waste management)**
  - Slips, trips and falls
- **Cuts and scratches (wildlife cleanup)**
- **Environmental Exposures**
  - UV exposure
  - Lightning strikes
- **Motor vehicle incidents (on-shore and off-shore)**
- **Insect bites and stings (bees & mosquitos)**
- **Noise**

Sources of Occupational Surveillance Data

- **BP/Unified Command incident safety data**
  - A collaborative effort between NIOSH, Unified Command, and the BP safety team
  - NIOSH and HHS involved in development of Safety Incident report forms used in the field by Safety officials
  - Data abstracted into electronic format by BP
  - Used to produce:
    - Internal daily reports to the UC
    - Periodic reports to stakeholders, including the public (CDC website)
- **NIOSH Health Hazard Evaluations**
  - Injury and Illness surveys of target worker populations

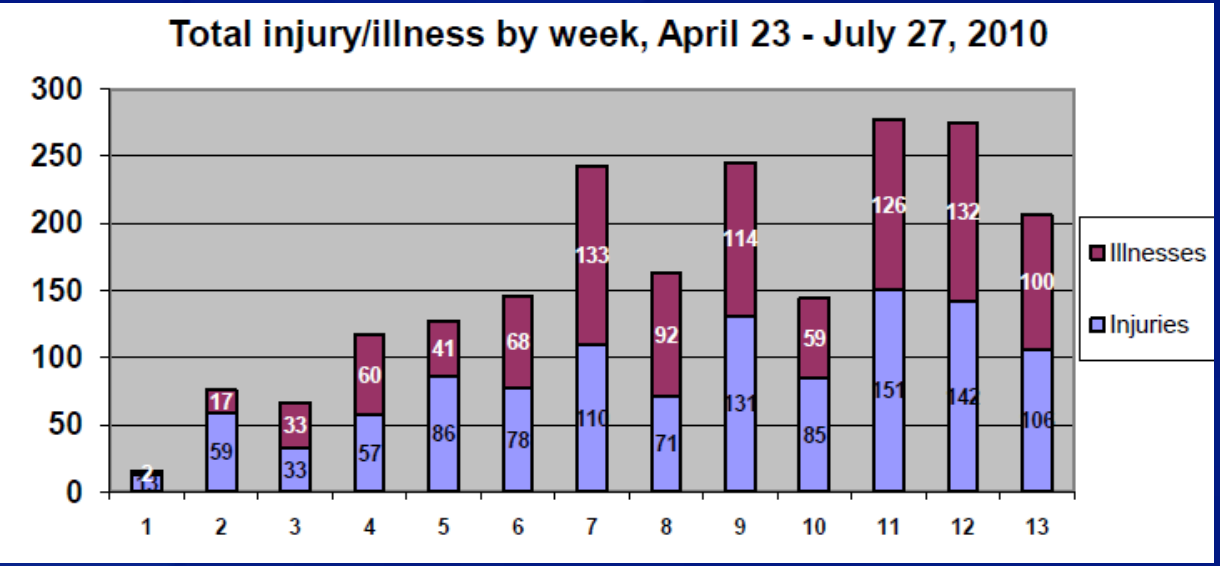
Methodology for NIOSH reports

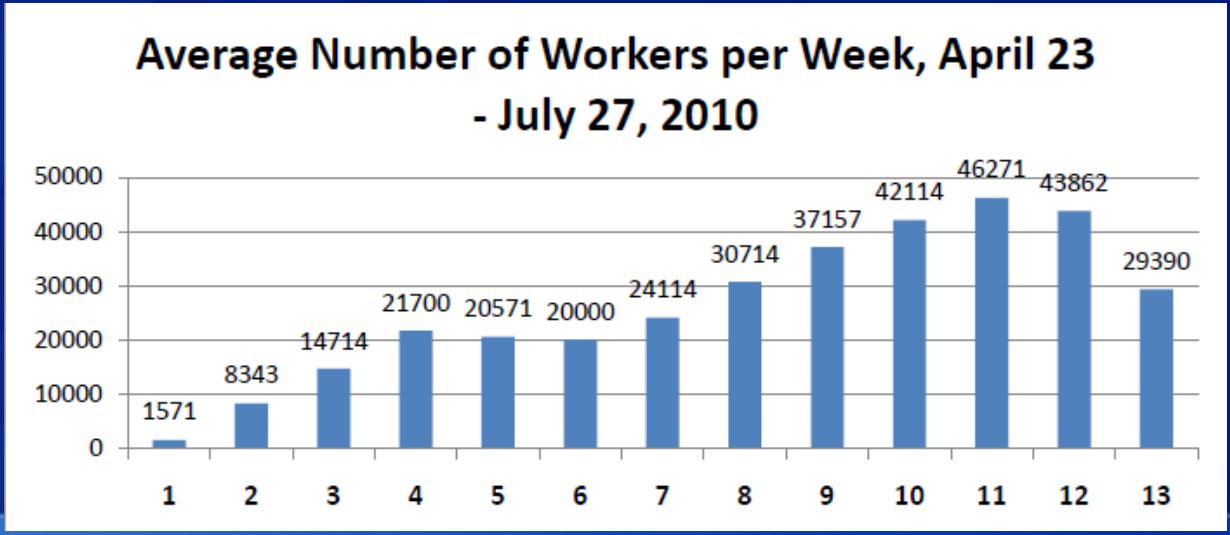
- **Data reviewed for inconsistencies and errors**
  - Example: Removal of duplicate entries, clarifying multi-person incidents
- **Data coded per "OIICS" coding system rules**
  - "**O**ccupational **I**njury and **I**llness **C**lassification **S**ystem"
  - Codes for:
    - Part of Body
    - Nature of Injury/Illness,
    - Source of injury,
    - Event leading to injury
  - Events assigned an OSHA-recordable status
- **Coded data arranged into tables, graphs, and trend analysis (descriptive analysis)**

OIICS system

- **Developed by the Bureau of Labor Statistics (BLS) in the early 1990's**
- **Systematic characterization of occupational injuries and illnesses used by the Bureau of Labor Statistics (BLS):**
  - Survey of Occupational Injuries and Illnesses (SOII)
  - Census of Fatal Occupational Injuries (CFOI)
- **Hierarchical structure of the OIICS encourages coding to varying levels of specificity depending upon the level of detail available**

NIOSH Report of BP Injury and Illness Data

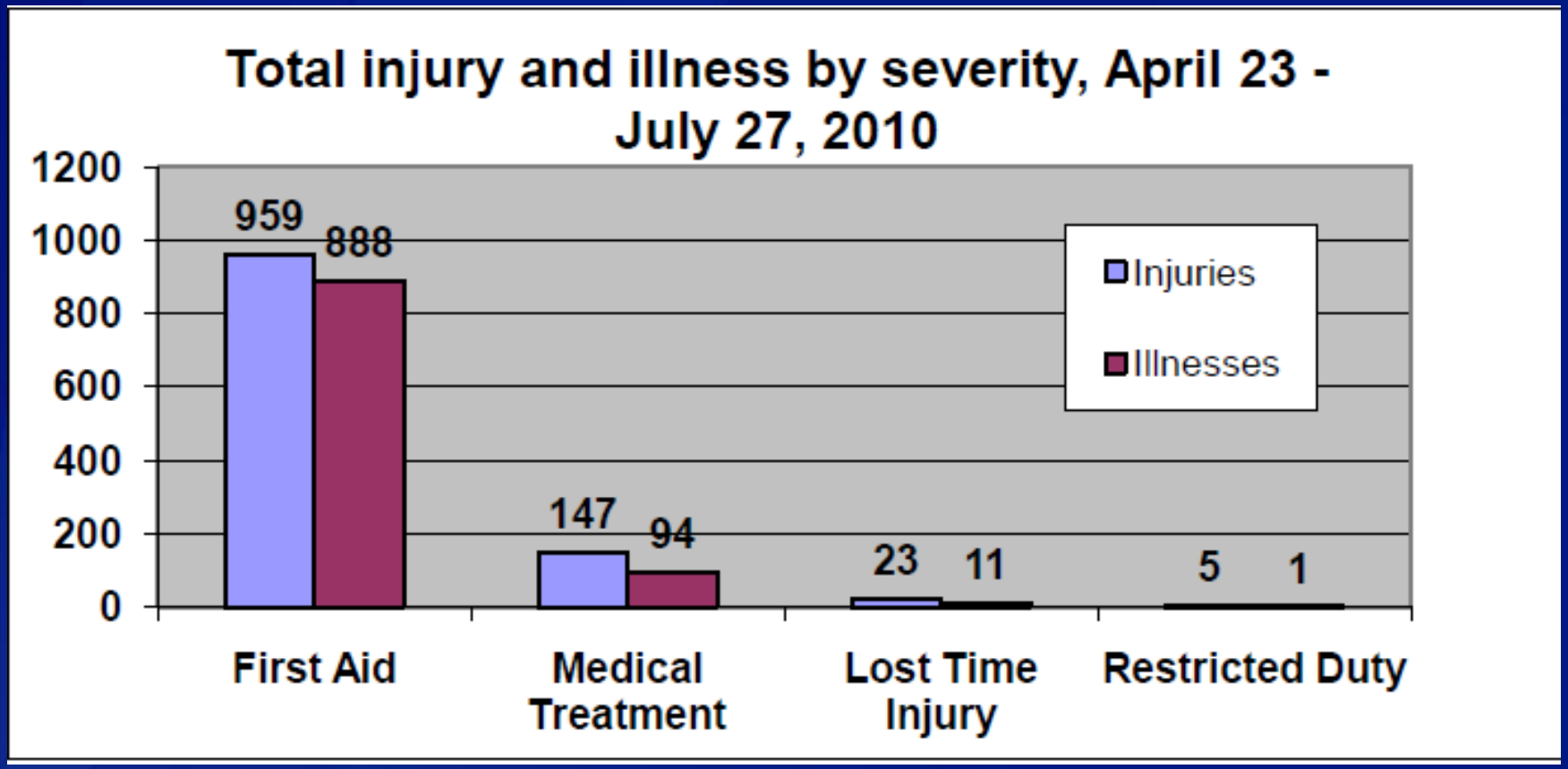




NIOSH Summary Table

Summary of injuries and illnesses, April 23 – July 27, 2010					
Characteristic	Injuries		Illnesses		Total
	Number	%	Number	%	
Total[a]	1136	53.3	994	46.7	2130
First Aid cases	959	51.9	888	48.1	1847
OSHA-recordable cases[b]	175	62.3	106	37.7	281
Missed or Restricted Duty cases	28	70.0	12	30.0	40
Worker Type					
BP employee	6	60.0	4	40.0	10
Contractor	1090	53.2	960	46.8	2050
Federal/State/Local	32	64.0	18	36.0	50
Volunteer	0	0.0	1	100.0	1
Unspecified/To be determined	8	42.1	11	57.9	19
Age Group[d]					
18-25	99		121		220
26-35	148		118		266
36-45	94		68		162
46-55	76		49		125
56-65	35		15		50
66-75	2		0		2

NIOSH Report of BP Injury and Illness Data



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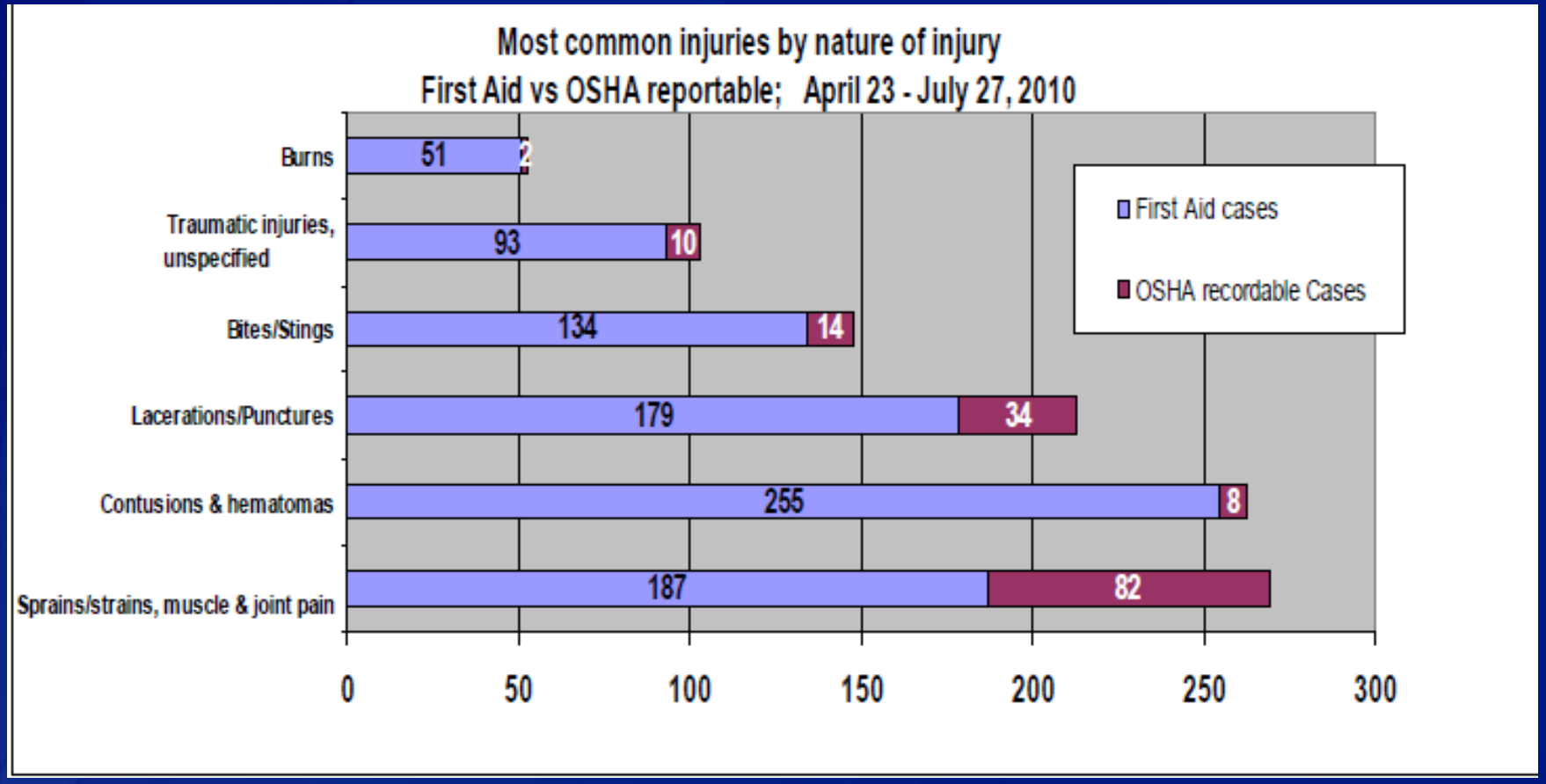

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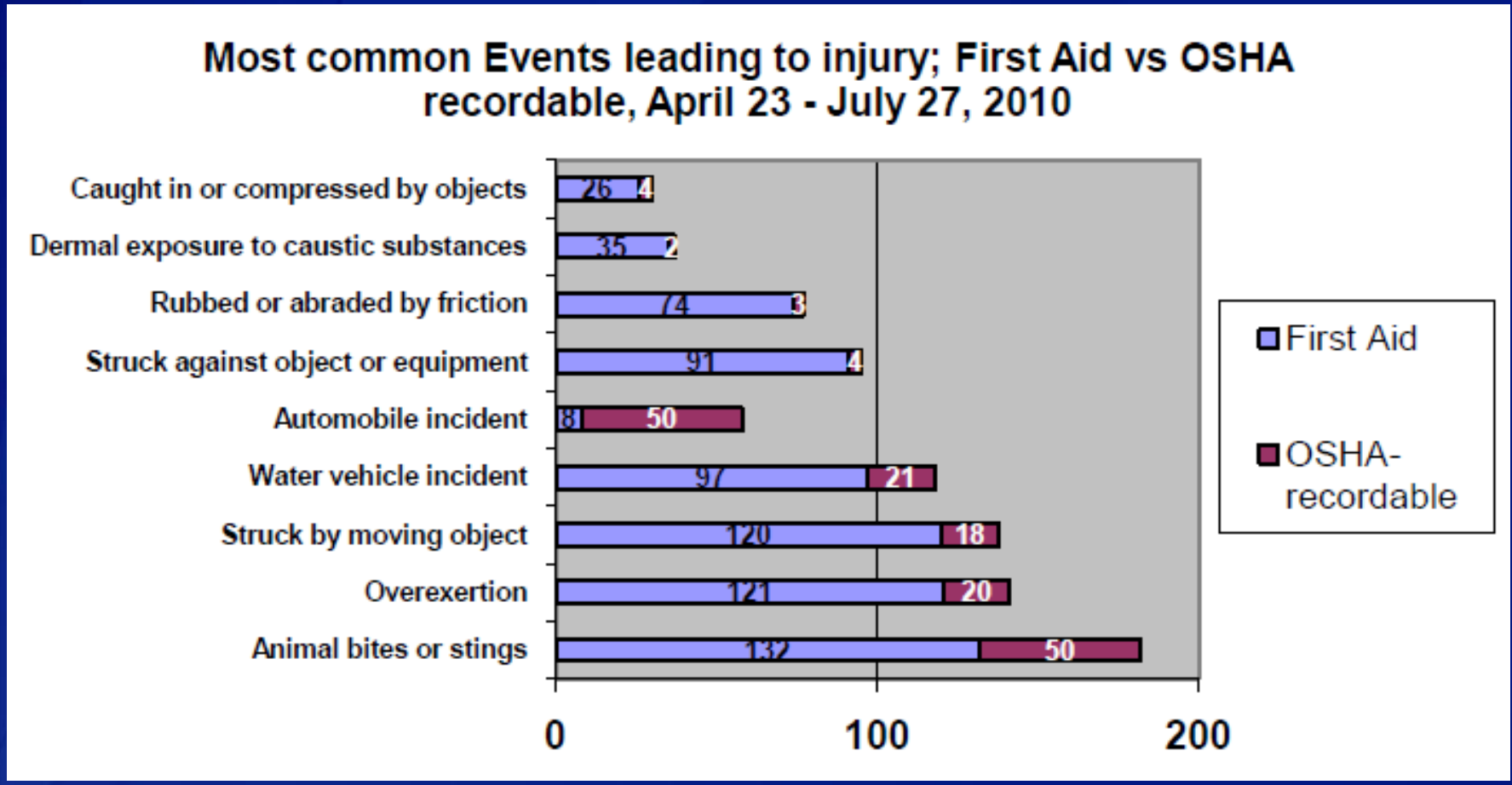

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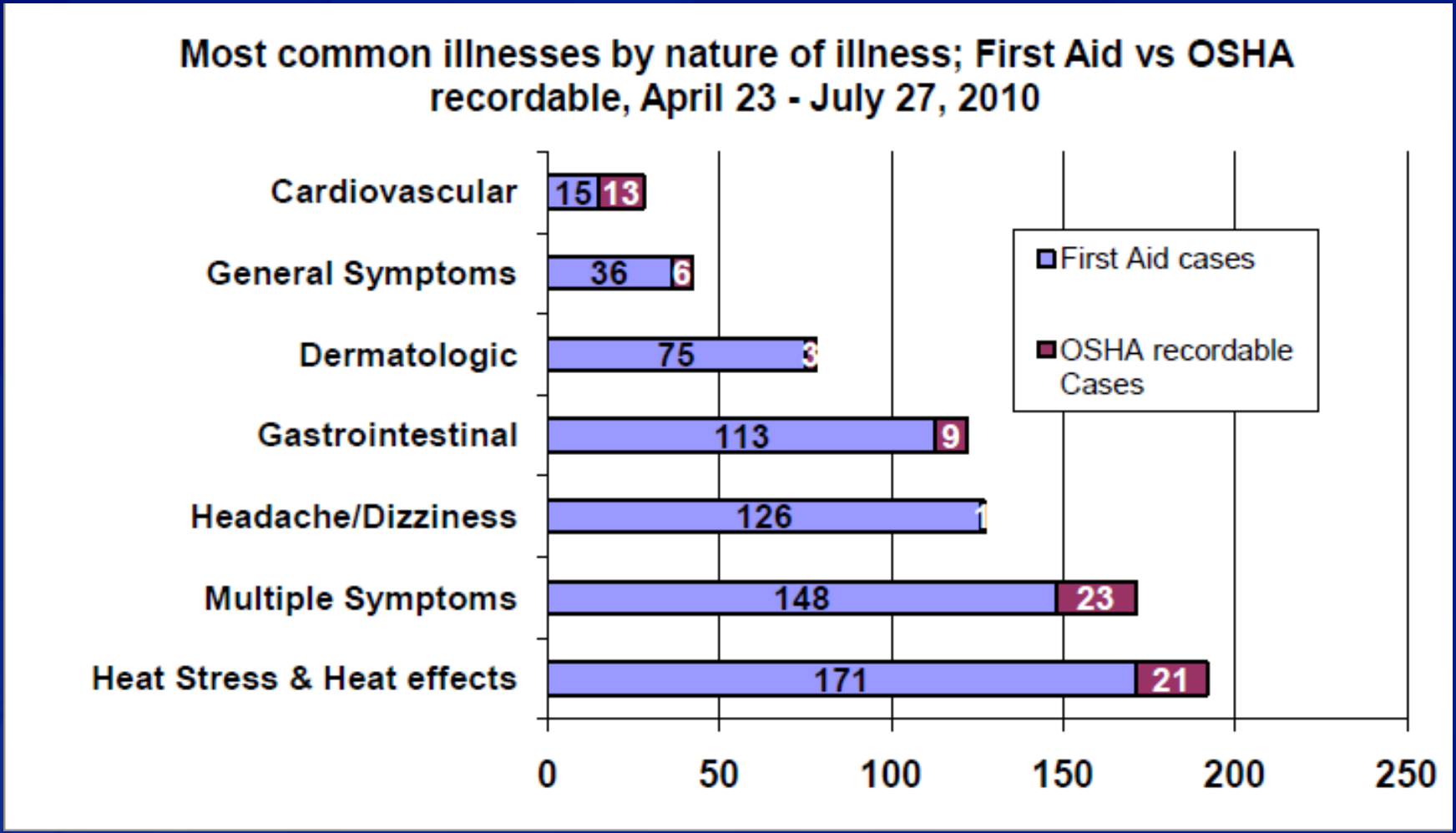
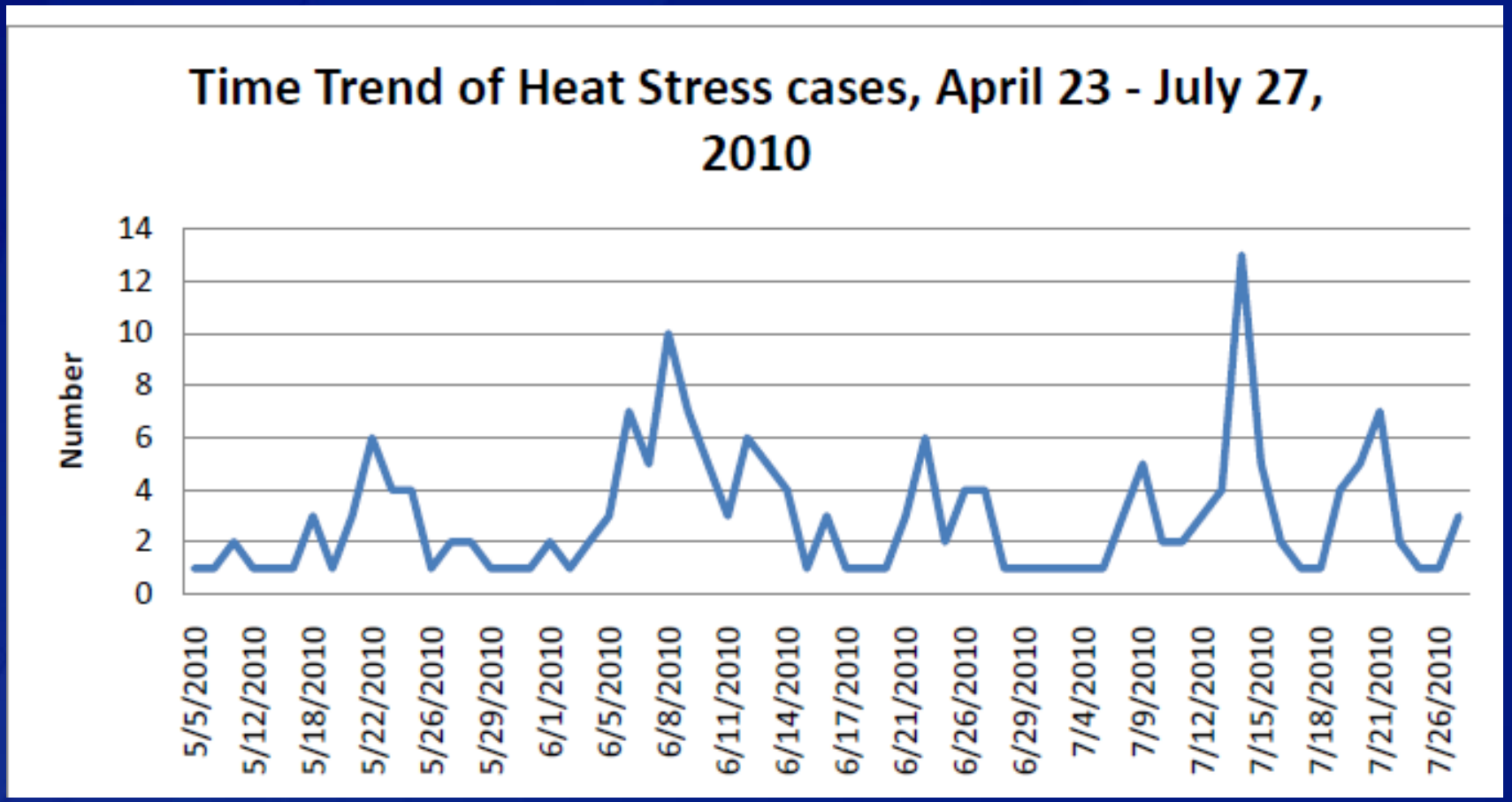
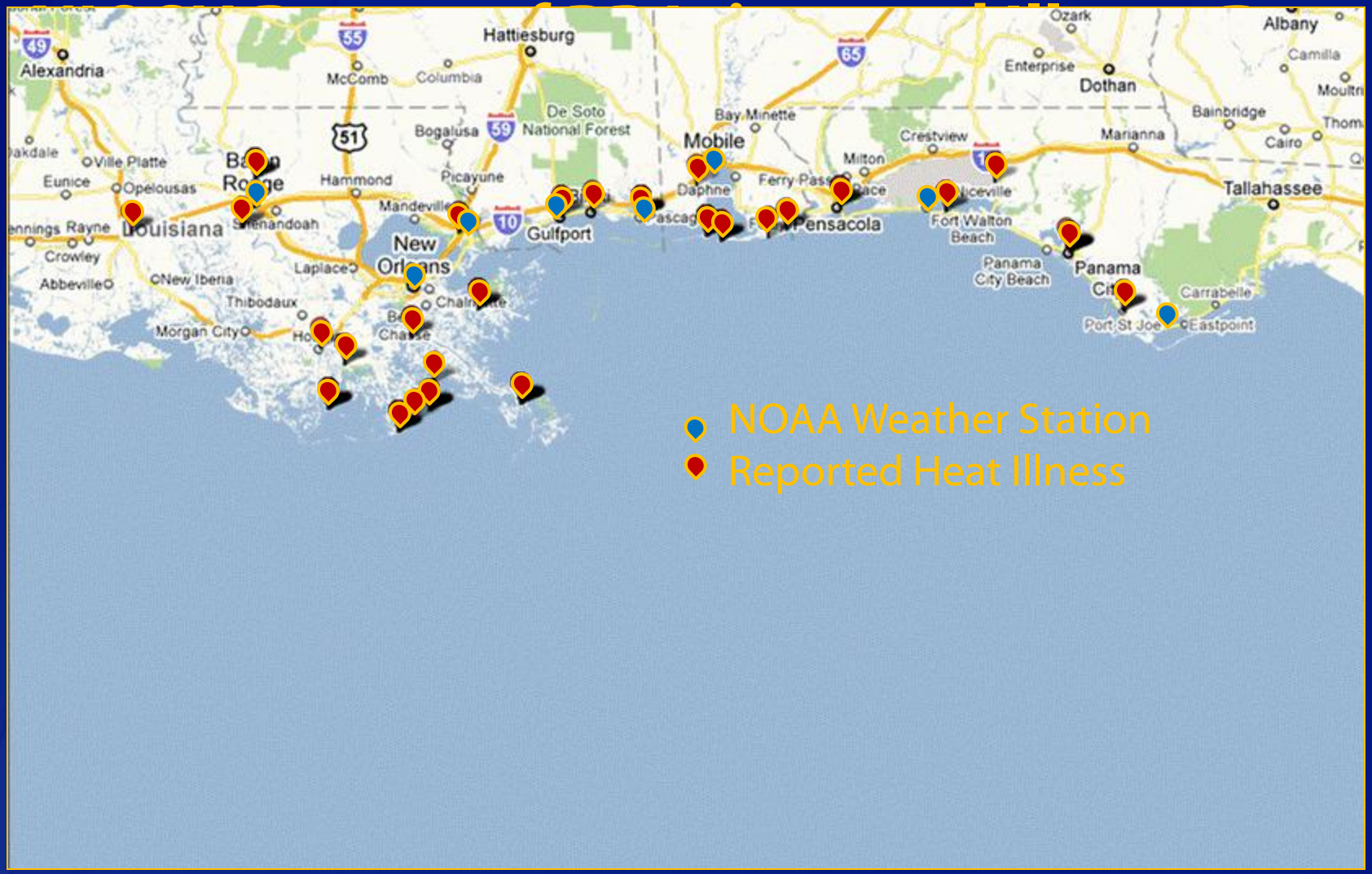


Onshore vs. Offshore location

Breakdown of injuries and illnesses by location, April 23 – July 27, 2010					
Characteristic	**Onshore**		**Offshore**		**Total**
	Number	%	Number	%	
Total[a]	1450	68.1	679	31.9	**2129**
Injuries[b]					
First Aid Cases	601	62.7	357	37.3	**958**
OSHA-recordable cases	115	65.7	60	34.3	**175**
Illnesses					
First Aid cases	654	73.6	234	26.4	**888**
OSHA-recordable cases	79	74.5	27	25.5	**106**
Command Center[c]					
Houma	797	58.9	555	41.1	**1352**
Mobile	633	88.0	86	12.0	**719**
Houston/New Orleans	15	100.0	0	0.0	**15**
Source	0	0.0	37	100.0	**37**
Selected Injuries/Illnesses					
Heat Stress	141	73.4	51	26.6	**192**
Multiple Symptoms	133	77.8	38	22.2	**171**
Lacerations/Punctures	109	51.1	104	48.9	**213**
Sprains/Strains & Muscle Pain	197	73.2	72	26.8	**269**

NIOSH Report of BP Injury and Illness Data

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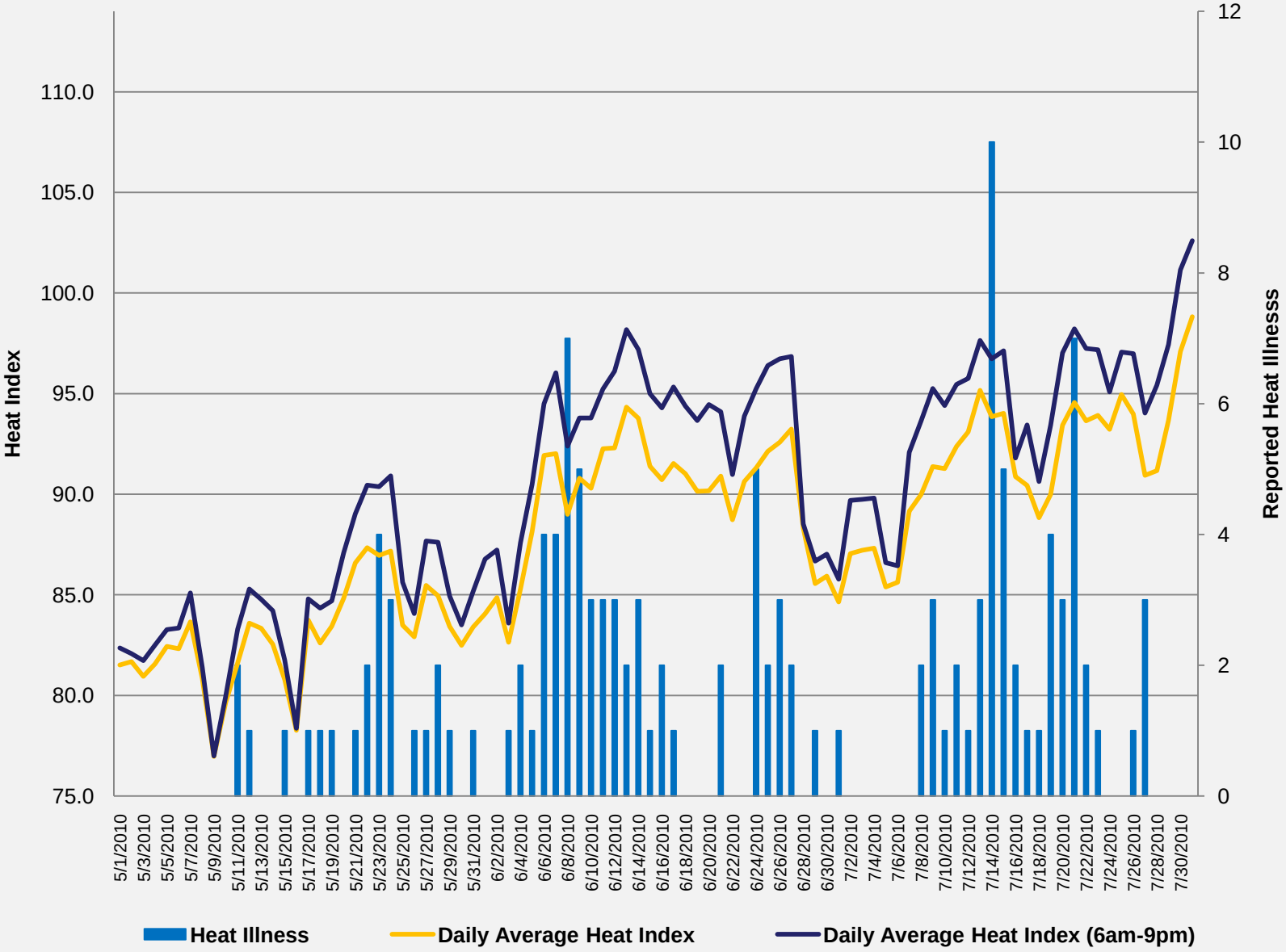
Louisiana
Ville Platte
Eunice
Opelousas
Crowley
Abbeville
New Iberia
Thibodaux
Morgan City
Laplace
New Orleans
NOAA Weather Station
Reported Heat Illness

Time Trend of Heat Illness cases vs Heat Index



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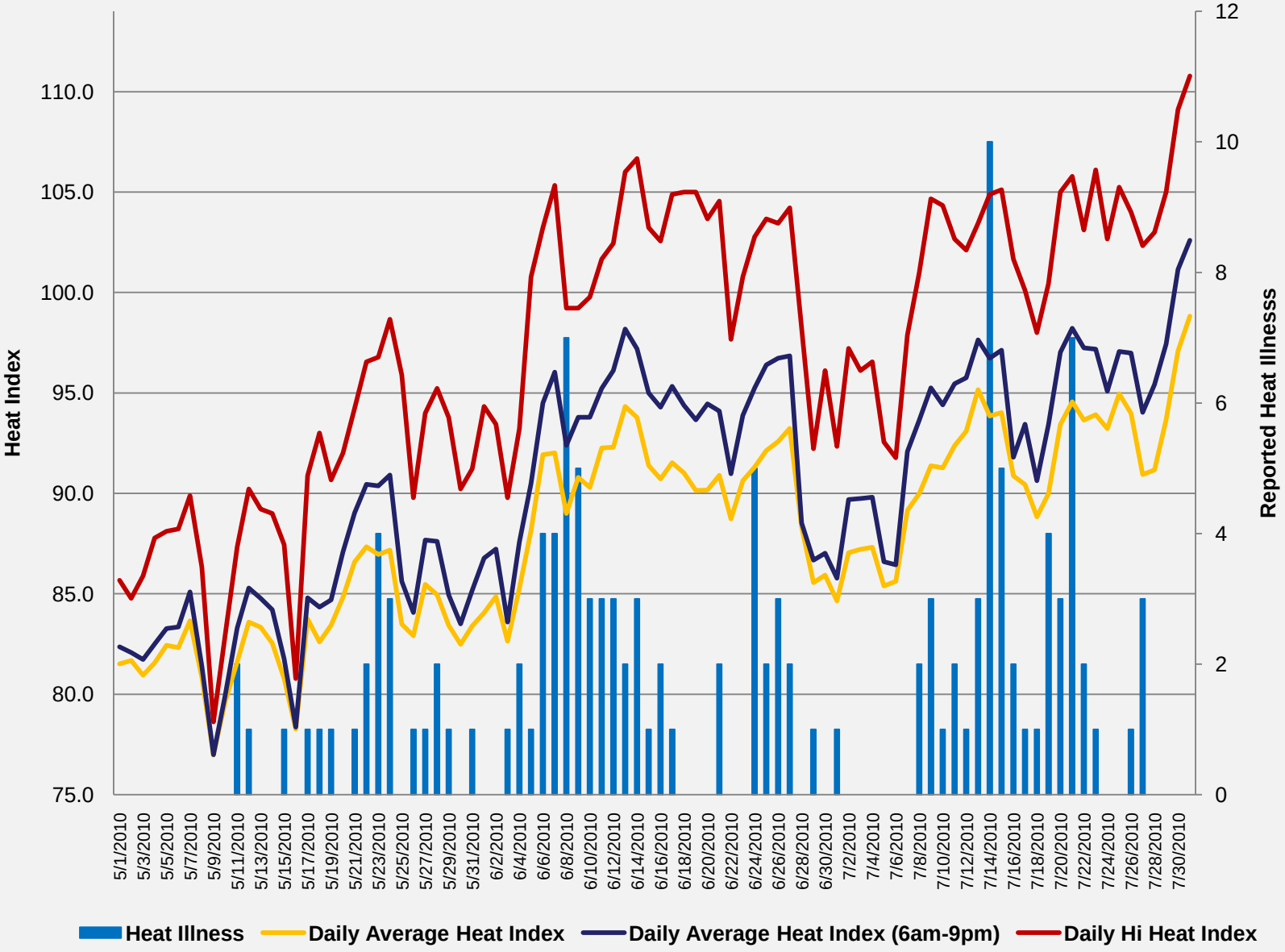


HHE Symptom Survey: Dispersant Operations

- Very few workers reported illness, injury, or behavioral health issues
- Some workers testing the water reported headaches, fatigue, and skin symptoms.
- Reported symptoms of those on the vessels were similar to symptoms reported by a comparison group of response workers not exposed to chemicals

HHE Symptom Survey: In situ Burn Operations

- Symptoms reported by workers surveyed were similar to those reported by response workers who were not exposed to hazards related to in-situ burning
- Surveyed workers involved in the burn operations reported a higher frequency of symptoms.

HHE Symptom Survey: Shore Operations

- 1899 workers at 36 shore cleaning sites completed the health symptom survey
- Comparison group: 103 workers at Venice operations center with no shore work exposures
- PPE utilized: safety glasses, hats, gloves, rubber-toed boots, variable use of Tyvek suits
- Symptoms reported most frequently were:
  - Headaches, coughing, musculoskeletal ache (hand, shoulder, back)
  - Psychosocial symptoms: worried, pressured, depressed

HHE Symptom Survey: Shore Operations

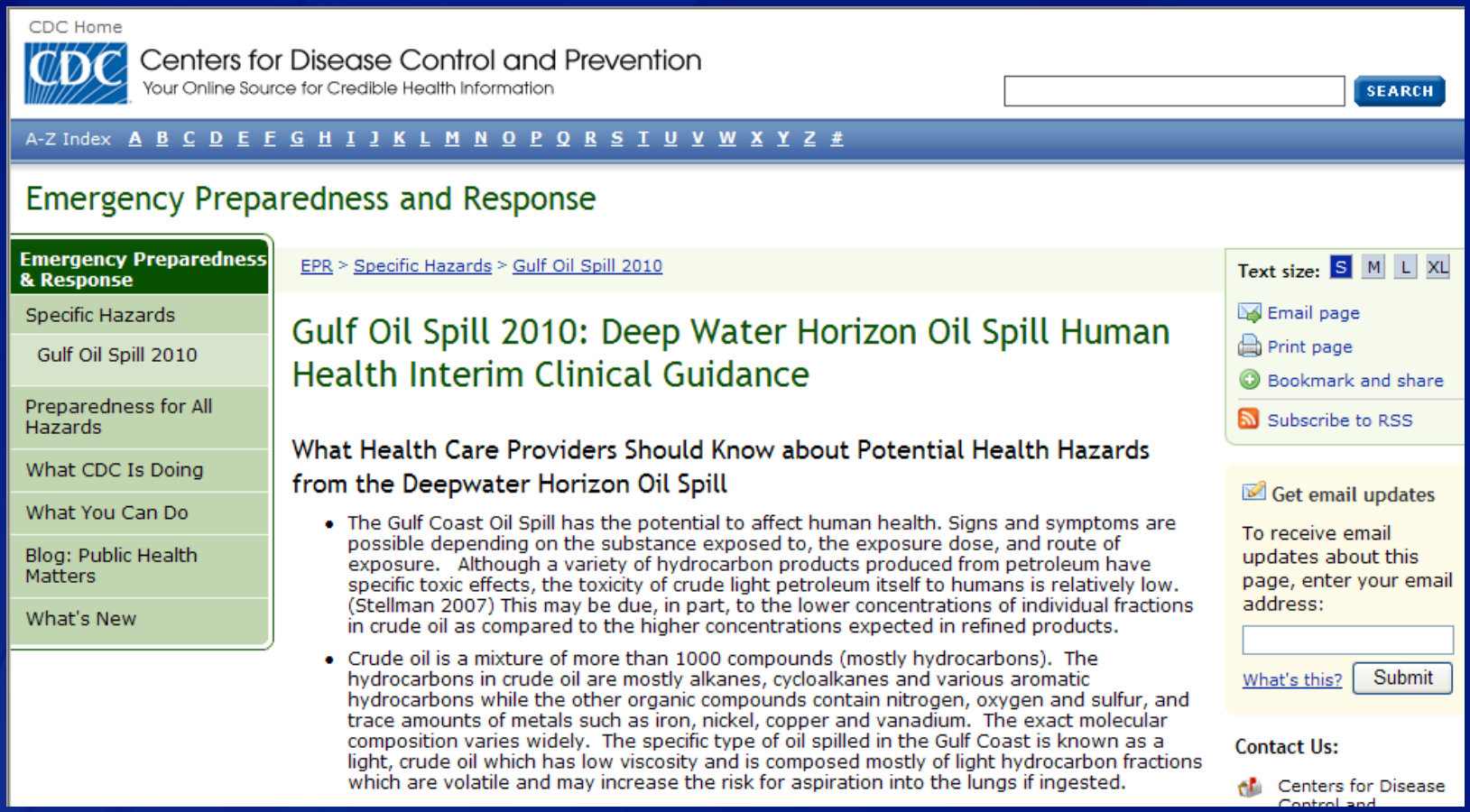
Table 4. Health symptom survey—reported injuries and symptoms by group

	Shore Cleaning Workers (n=1899)	Unexposed* (n=103)
	No. (%)	No. (%)
Injuries		
Scrapes or cuts	136 (7%)	11 (11%)
Burns by fire	6 (0.3%)	1 (1%)
Chemical burns	9 (0.5%)	0
Bad Sunburn	187 (10%)	8 (8%)
Constitutional & respiratory symptoms		
Headaches	535 (28%)	5 (14%)
Feeling faint, dizziness, fatigue or exhaustion, or weakness	409 (22%)	13 (13%)
Itchy eyes	190 (10%)	5 (5%)
Nose irritation, sinus problems, or sore throat	457 (24%)	16 (16%)
Metallic taste	31 (2%)	0
Coughing	362 (19%)	8 (8%)
Trouble breathing, short of breath, chest tightness, wheezing	166 (9%)	4 (4%)

HHE Symptom Survey: Shore Operations

Cardiovascular & gastrointestinal symptoms		
Fast heart beat	41 (2%)	1 (1%)
Chest pressure	31 (2%)	0
Nausea or vomiting	123 (7%)	3 (3%)
Stomach cramps or diarrhea	167 (9%)	7 (7%)
Skin & musculoskeletal symptoms		
Itchy skin, red skin, or rash	284 (15%)	8 (8%)
Hand, shoulder, or back pain	328 (17%)	6 (6%)
Psychosocial Symptoms		
Feeling worried or stressed, pressured, depressed or hopeless, short tempered, or frequent changes in mood	345 (18%)	7 (7%)
Heat stress symptoms†		
Any	710 (37%)	21 (20%)
4 or more symptoms	130 (7%)	3 (3%)

CDC guidance for Healthcare Providers



http://www.bt.cdc.gov/gulfoilspill2010/oilspill_clinical.asp

CDC guidance for Healthcare Providers

- What providers should know about health hazards
- What to consider when providing clinical care
- What providers should know from the results of environmental and health surveillance
- Review of Federal efforts to support health and medical needs of for local residents and responders
- Links to further resources

http://www.bt.cdc.gov/gulfoilspill2010/oilspill_clinical.asp

Thank you

For more information please contact Centers for Disease Control and Prevention

1600 Clifton Road NE, Atlanta, GA 30333
Telephone, 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348
E-mail: cdcinfo@cdc.gov Web: www.cdc.gov

Centers for Disease Control and Prevention, Atlanta GA

Continuing Education Credit/Contact Hours for COCA Conference Calls

Continuing Education guidelines require that the attendance of all who participate in COCA Conference Calls be properly documented. All Continuing Education credits/contact hours (CME, CNE, CEU, CECH, and ACPE) for COCA Conference Calls are issued online through the CDC Training & Continuing Education Online system http://www2a.cdc.gov/TCEOnline/.

Those who participate in the COCA Conference Calls and who wish to receive CE credit/contact hours and will complete the online evaluation by **Jan 14 2011** will use the course code **EC1648**. Those who wish to receive CE credits/contact hours and will complete the online evaluation between **Jan 15, 2011** and **Jan 14, 2012** will use course code **WD1648**. CE certificates can be printed immediately upon completion of your online evaluation. A cumulative transcript of all CDC/ATSDR CE's obtained through the CDC Training & Continuing Education Online System will be maintained for each user.

Thank you for joining!
Please email us questions at coca@cdc.gov