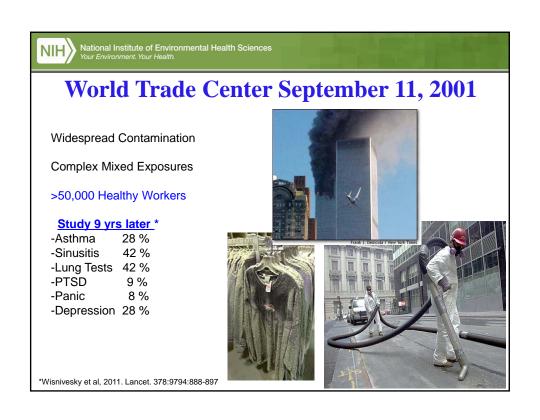


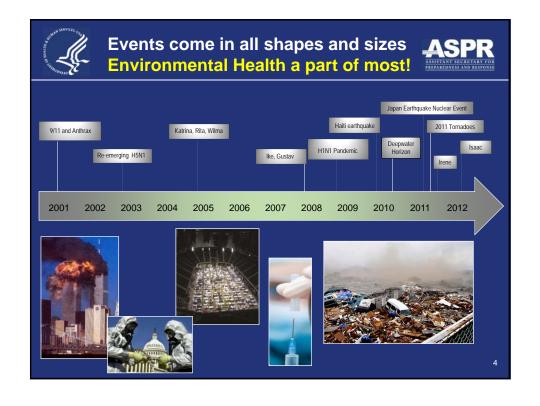
NIEHS Disaster Research Response: Recent Lessons & Future Steps

Environmental Disasters Data Management Workshop

September 16, 2014









Common Themes Across Disasters

- What are the health, including mental health, implications of the exposures & stressors, not just acute but long term?
 - Especially among those most vulnerable.
- Are the impacted areas safe for communities to live and work?
- What do we need to know to: help protect the public, address community concerns, and prepare for the future?

KATRINA John Steman Steman Steman Steman Steman John Steman Steman Steman Steman Steman John Steman Steman Steman Steman Steman John Steman Steman Steman Steman Steman Steman John Steman Steman

Getting information in a useful & timely way?



NIH National Institute of Environmental Health Sciences Your Environment. Your Health.

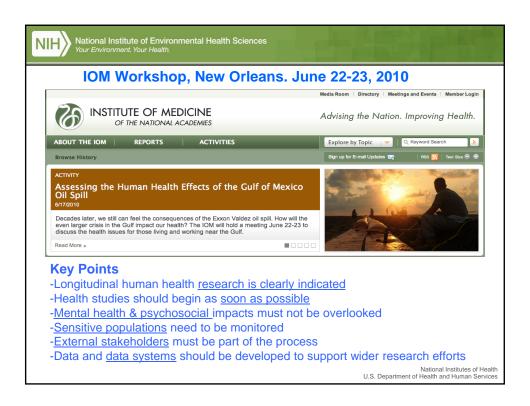
Deepwater Horizon Oil Spill, April 2010

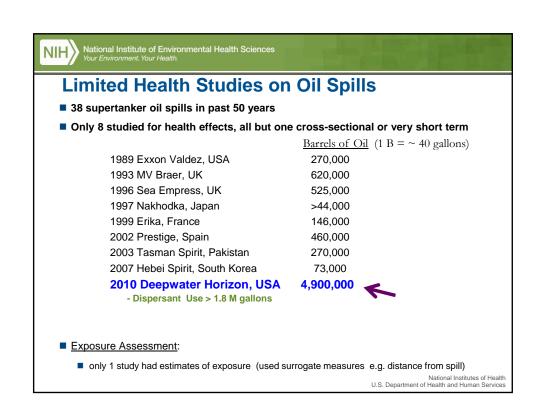
- Interagency Research Work Group (May 2010)
 -NIEHS, NTP, NIOSH, ATSDR, SAMHSA, HHS/ASPR
- NIEHS & CDC: Coordinated & facilitated assessment of data gaps and research needs related to spill & exposures



- Seed Funding by NIH Director
- Dr. Collins: \$10M support for research June 2010
- Focus on health effects among those involved in various clean-up activities







· Health Concerns from Previous Studies of Oil Spills

- Acute
 - Dermal, Eye, Respiratory Irritation
- Longer-term health effects
 - · Pulmonary Symptoms and Abnormalities
 - Genotoxicity
 - Generalized Anxiety, Post Traumatic Stress Disorder, Depressive symptoms
- GOS health findings though August 27th (NIOSH Report August 13, 2010)
 - Injuries and Illness through July 27th
 - N=2130 (1136 injuries (53%) 994 illnesses (47%))
 - For illnesses about 75% Onshore vs Offshore
 - 192 Heat stress
 - 171 Multiple Symptoms (more than one organ system with no specific underlying cause)
 - 127 Headache / Dizziness
 - 122 Gastrointestinal
 - 78 Dermatologic
 - 42 General Symptoms (malaise, fatigue, non-specified allergic reactions)
 - 28 Cardiovascular

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Exposures of Concern

Crude Oil

- Polycyclic Aromatic Hydrocarbons (PAHs)
- Volatile Organic Compounds (VOCs) (benzene, napthalene, toluene, xylene)
- Heavy Metals (cadmium, nickel, lead, zinc)

Dispersants

- Detergents (sulfonic acid salts)
- Solvents (2-butoxyethanol, propylene glycol)
- Petroleum Distillates (paraffins, PAHs)



Burning

- PAHs, respirable particulate, hydrogen sulfide, sulfur dioxide
- Other: Heat Stress, Physical Hazards, Mental Health



NIH Funded Gulf Oil Spill Research





Intramural Research



Toxicology Research

Deepwater Horizon Research Consortia: Health Impacts & Community Resiliency

Extramural Research

National Institutes of Health U.S. Department of Health and Human Services



GuLF STUDY (Gulf Long-term Follow-up Study)

 Prospective study of 32,762 adults involved in oil spill clean-up or support



- Enrolled Mar 2011 to Mar 2013
 - Baseline telephone interview on clean-up jobs, symptoms, health
 - In-home clinical assessment and biospecimen collection 11,210 from Gulf states
- Followed 10 or more years
 - Telephone interview every 2-3 years
 - Subgroup with repeated mental health and resiliency assessments
 - · Linkage to vital records and cancer registries
- Comprehensive clinical exam (~4,000 from AL, LA) started 8/14



Deepwater Horizon Consortium

- 5-year \$25.2 M program
- Four university/ community partnerships
 - Tulane
 - LSU
 - Univ. of Florida
 - Univ. of Texas
 Medical Branch
- Steering group leadership
 - Includes GuLF STUDY
 - Input from NTP

- Distinct populations & foci
 - Women and children
 - Pregnant women
 - Cultural/ethnic minorities
 - Seafood safety

Shared approaches

- Seafood
- Resiliency
- Population studies
- Community outreach & dissemination

Funding: NIEHS, NCI, NHLBI, NIMH, NIMHD, NINR, NCATS, OBSSR

National Institutes of Health U.S. Department of Health and Human Services



Characterizing Spill Exposures to Understand Health

- Identify chemical profiles of different crude oils
- Better characterize changes in exposure impact due to weathering and degradation
- Conduct research on chemical mixtures
- Characterize background ambient exposures as a baseline to evaluate impact of future spills





- Study Populations: Workers and Volunteers
 - Use of NIOSH roster & combining multiple lists (BP, national guard)
- Study Development Process
 - IRB, OMB, & Certificates of Confidentiality
- Baseline Data for Comparison
 - Available only for small fraction of cohort (e.g., Coast Guard)
 - Health information, biospecimens, relevant tests ??
 - Environmental baselines & monitoring (seafood, water, air, etc.)
- Exposure Reconstruction
 - Methods, sensitivity/specificity, time/location, area vs. personal samples, etc.
 - Multiple databases that need to be integrated
 - Available data difficult to use to reconstruct exposures
- Timeliness of Extramural Awards & Initiation of Studies

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Oil Spill Research: Lessons Learned

- · Atypical workers involved in disaster responses:
 - fisherman & others who lost jobs, unemployed from other areas
- Rapid and ongoing communication with stakeholders
- Need better capabilities to rapidly understand exposures & evaluate toxicity of exposures







Elk River WV Chemical Spill, Jan. 2014 *Is it really safe?*

- ~10,000 gallons of 4 methylcyclohexane methanol (MCHM) + polyglycol ethers (PPH) leaked into Elk River
- No water for over 300,000 residents, affecting some for more than a week
- About 500 patients seen in response
- · Limited toxicology and health data available
- · Missed opportunity to assess exposures and health impacts
- Currently: CDC looking at surveillance opportunities and NIEHS/NTP developing toxicology studies

NTP Executive Committee examining new role & strategies to support HHS for future incidents



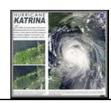
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Disaster Environmental Health Research Issues

- Ad-hoc, convenience based sampling
- Non-systematic collection of health information
- Late Data: Missing baseline & longitudinal health data
- Exposure data not measured to understand effects
- High risk groups: pregnancy, elderly, pre-existing illness
- Lack of toxicity / health data for exposures
- Minimal community engagement









Disaster Research Response (DR2) Project Genesis

- National Biodefense Safety Board Recommendations (Apr, 2011)
- Sep. 2012 NIH/ASPR Federal Partners Meeting: Identified Areas of Concern

Funding, IRB/OMB, Data collection tools, trained research workforce, infrastructure support, & community engagement

- Deployment of research too slow & Data is perishable!
 - H1N1 Response- treatment research, IRB issues
 - DWH Oil Spill- 9 months to start GuLF Study
 - Hurricane Sandy- 11 months to fund extramural efforts

"Timely research is critical to prevent injury & illness and support recovery"

Lurie, Manolio, Patterson, Collins, Frieden. NEJM Mar 2013:

National Institutes of Health U.S. Department of Health and Human Services

NIH National Institute of Environmental Health Sciences Your Environment. Your Health.

NIH Disaster Research Response (DR2) Project

NIEHS & NLM: Project Timeline Aug. 2013 - Sep. 2014

Pilot project to help galvanize and accelerate needed infrastructure as part of a larger HHS Effort

Objectives

- 1. Central repository data collection tools & research protocols
- 2. NLM public website: "Disaster Research Responder"
- 3. Rapid Data Collection Capability: baseline epi., clinical, & biospecimens
- 4. Environmental Health Research Response Network (EHS Network)
- 5. Training intra/extramural disaster researchers
- 6. Share & Integrate: HHS/federal response & recovery frameworks



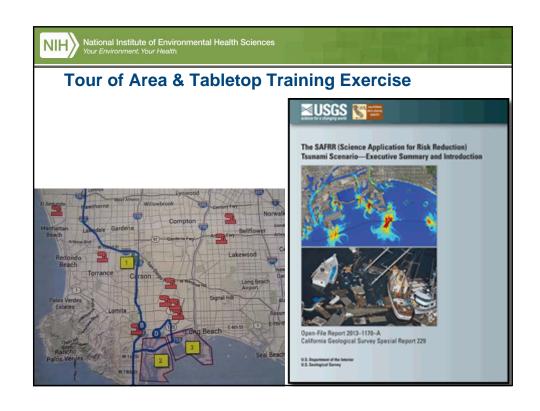
Research Responder Training & Education

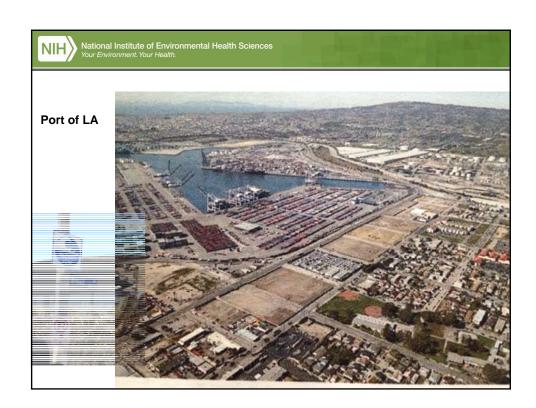
- Training & Education
 - 1. National response plans & HHS mechanisms
 - 2. Training on DR2 Project & EHS emerging issues
 - 3. Health & Safety issues relevant to the disaster/situation
- Training Exercises on identified scenarios & issues

4/7 Port of Los Angeles Training Exercise

- USGS Tsunami Scenario
- 140 involved: fed, state, academia & community
- Evaluate DR2 Project concepts & support
- Discussion: integration, issues of concern









Day 15

- A storage tank at a local oil refinery has caught fire resulting in a large plume of smoke and leakage into the coastal waters
- Local hospital ED's and poison centers are experiencing increased complaints of respiratory, gastrointestinal, and neurologic symptoms
- Refinery workers and clean-up workers experience similar symptoms





NIH ASPR CDC IOM

Disaster Research Response Workshop: June, 2014*

Enabling Public Health Research During Disasters

- Build a broader network
- Frame a national research agenda & action items
- Integrate research into existing response structures
- Identify critical research needs & priorities
- Identify obstacles & barriers to research
- Discuss structures & strategies needed for deployment
- Share ideas, innovations, technology to support research
- Explore data collection tools & sharing mechanisms

*IOM Report available by November 2014



NIEHS Disaster Research Response Looking Forward

- 1. Build on DR2 Repository & NLM Website, Training, & Integration
- 2. RAPIDD Protocol for health data collection (IRB & OMB approvals / issues)
- Expand "EHS Network" & collaborations with federal, state, academia, & communities
- Exercises to further test research response strategies, protocols, fieldimplementation, and training.
- 5. Rapid collection of environmental data to go with health data!
 - Explore role of new technologies, social media, & "citizen science" in research





THANK YOU! QUESTIONS?

For more information contact: CAPT Aubrey Miller, MD, MPH miller.aubrey@nih.gov

Or email the DR2 Staff at: dr2@niehs.nih.gov

Project Webpage http://disasterinfo.nlm.nih.gov/dimrc/dr2/disasterresearch.html

