

# **NIOSH Disaster Science Research Initiative to Enhance Responder Safety and Health**

**Enabling Public Health Research During Disasters**

**13 June 2014**

**Natcher Conference Center  
National Institutes of Health**

**John Howard  
National Institute for Occupational Safety and Health  
Centers for Disease Control and Prevention  
Washington, D.C.**

# Occupational Safety and Health Act

To assure safe and healthful working conditions for working men and women.



# NIOSH: Statutory Authorities

- Occupational Safety and Health Act of 1970
- Mine Safety and Health Amendments Act of 1977
  - MINER Act of 2006
- Energy Employees Occupational Illness Compensation Program Act of 2000
- The Zadroga 9/11 Health and Compensation Act of 2010



4TH GRADE  
GREENDALE SCHOOL  
FRANKLIN PARK NJ 08852



SENATOR DASCHLE  
509 HART SENATE OFFICE  
BUILDING  
WASHINGTON D.C. 20510

20510/4103







Best  
Re

NY

NY  
RESCUE

ids







# Intramural Disaster Science Research

- Kitt MM et al. Protecting workers in large-scale emergency responses: NIOSH experience in the Deepwater Horizon response. *JOEM* 2012;53(7):711-718.
- King BS & Gibbons JD. Health hazard evaluation of Deepwater Horizon response workers. *NIOSH*, August 2011 <http://www.cdc.gov/niosh/hhe/reports/pdfs/2010-0115-0129-3138.pdf>
- Michaels D & Howard J. Review of the OSHA-NIOSH response to the Deepwater Horizon oil spill: protecting the health and safety of cleanup workers. *PLoS Currents: Disasters* 2012; July 18 <http://currents.plos.org/disasters?s=Deepwater+Horizon>
- NIOSH. Lessons Learned from Deepwater Horizon Response. December, 2011. <http://www.cdc.gov/niosh/docs/2012-117/>
- Decker JA et al. Recommendations for biomonitoring of emergency responders: focus on occupational health investigations and occupational health research. *Military Medicine* 2013; 178(1): 68-75(8) <http://www.ingentaconnect.com/content/amsus/zmm/2013/00000178/00000001/art00025>
- Decker JA et al. Recommendations for conducting responder health studies following large disasters. *Am J Disaster Med* 2013 Jan/Mar; 8(1):25-33.

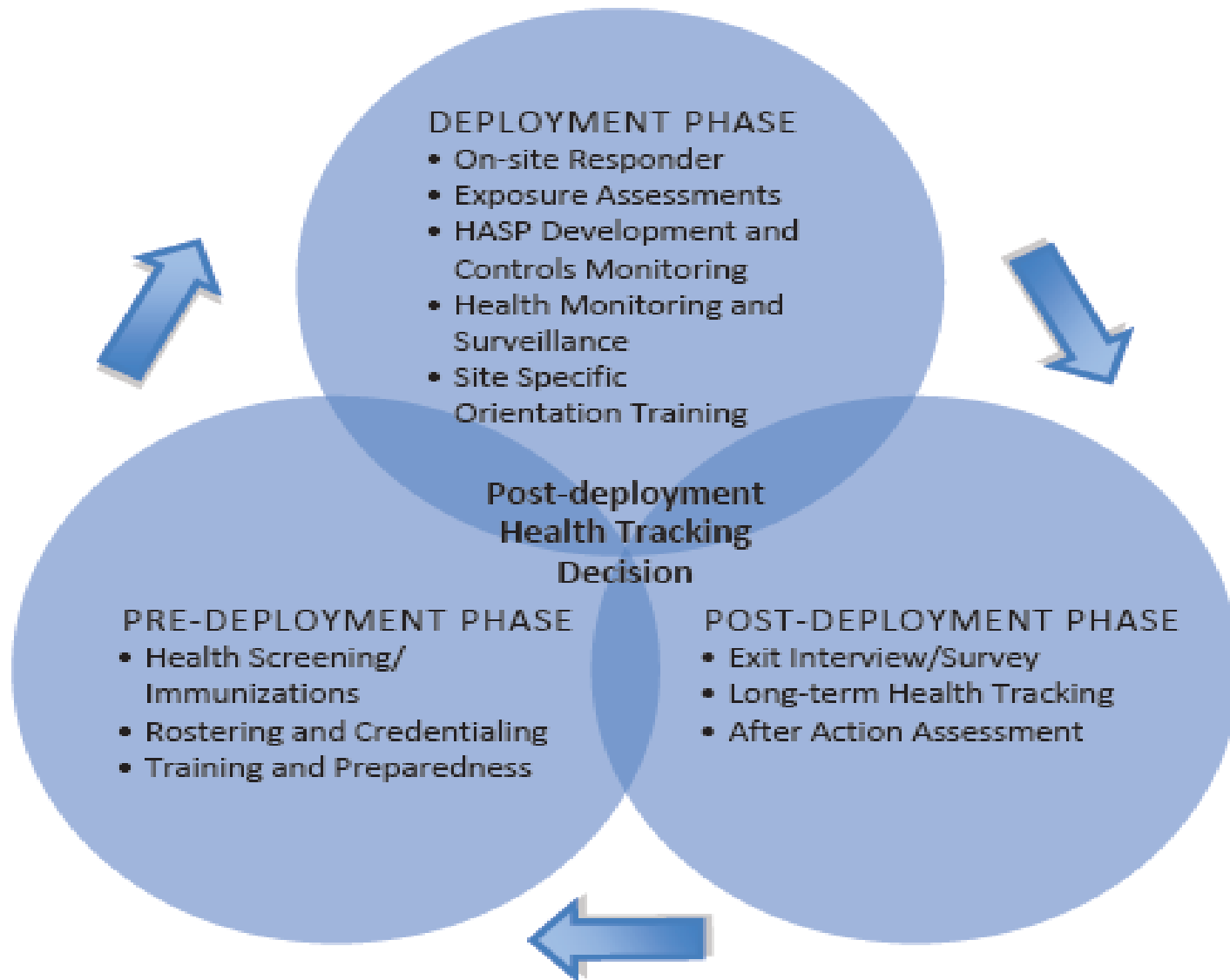
# Extramural Disaster Science Research

- Over \$100 million awarded
  - Investigator-Initiated
  - Request for Applications
- All disaster science topics relating to responder safety and health

# Emergency Responder Health Monitoring & Surveillance System

- Cover systematically all phases (pre-deployment, during deployment, and post-deployment)
- Ensure only qualified, trained, and properly equipped personnel (employees, contractors, and *volunteers*) are selected for deployment
- Ensure all receive sufficient health and exposure monitoring
- Determine whether longer-term monitoring or surveillance is needed
- Address longer-term health effects of responders

# ERHMS: A Comprehensive Approach





# Emergency Responder Health Monitoring and Surveillance

National Response Team Technical  
Assistance Document (TAD)

January 20, 2012



Chair



Vice Chair



Member Agencies

- Approved by the National Response Team (17 Federal agencies)
- Target audience: Incident commanders, emergency managers, agency heads
- NRT Technical Assistance Document (TAD)
  - Available at:  
ERHMS.nrt.org and  
[www.cdc.gov/niosh/topics/erhms](http://www.cdc.gov/niosh/topics/erhms)

# ***Disaster Science Research Initiative to Enhance Responder Safety and Health***

- NIOSH launched the initiative in January 2014
- Hosted by NIOSH Office of Emergency Preparedness and Response
- Focus on developing a framework for an approach to timely, scalable, scientifically sound research
- Allows for research to be started quickly at the beginning, during and after the response to a large scale disaster.

# Some DSRI Research Questions

- What are the *primary questions* needing research considering the possible types of responses and the responders involved?
- Where are the *major gaps* in our understanding of exposures and other factors influencing responder health?
- What are the *major barriers* to disaster science research to enhance responder safety and health?
- How does disaster research to ensure responder safety and health *best fit* into existing national response policies and systems?

# Some DSRI Lines of Investigation

- Responder Demographic Ascertainment
- Exposure Assessment
  - Direct Reading and Sensor Technology
  - Real Time, Continuous Air Monitoring
  - Bio-monitoring
  - Analytics
- PPE Use and Effectiveness
- Responder Mental Health and Resiliency



# Exposure Science & Quantified Responder

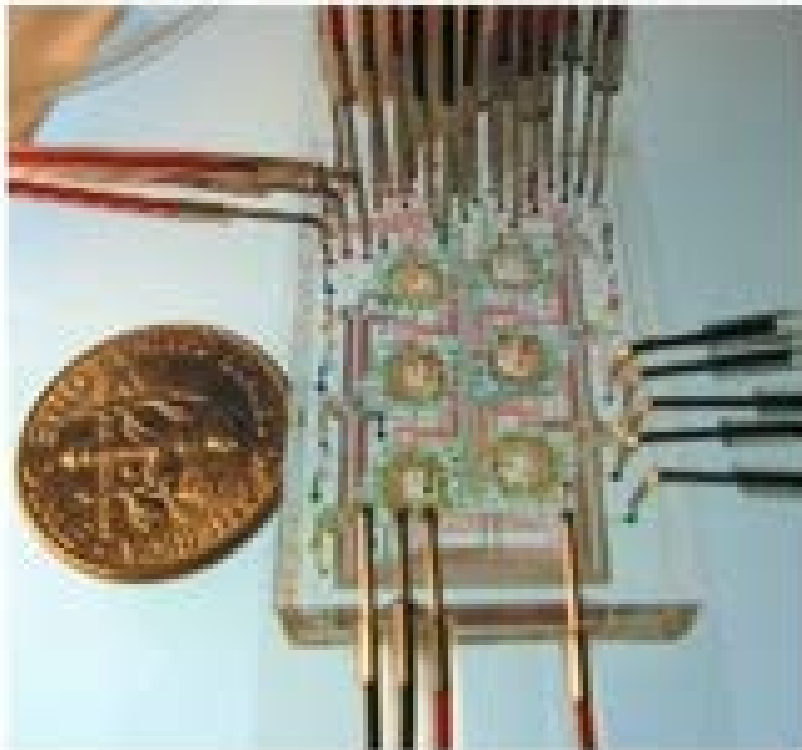
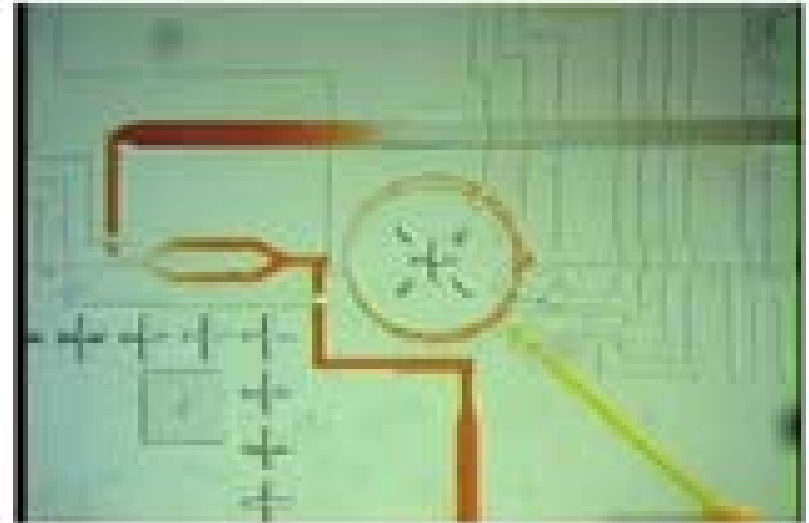
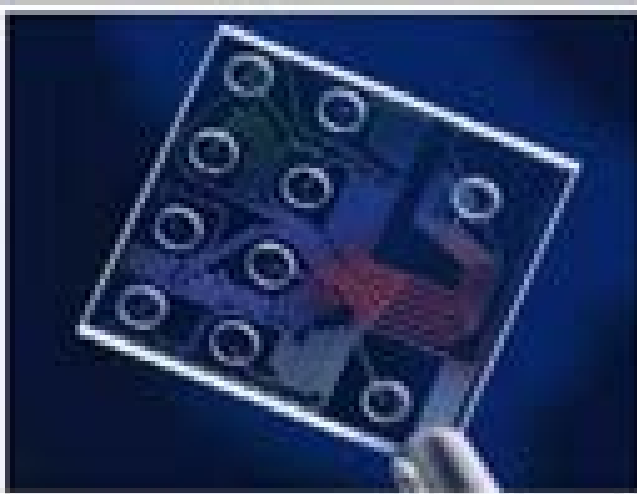
- Work environment
  - Direct-reading instruments
  - Personal Dust Monitor
  - Explosibility Meter
- Biologic environment
  - Biomarkers of exposure
  - Biomarkers of effect
  - In-dwelling monitors enabled by nanosensors that circulate sending data back to a central database

**PARADIGM SHIFT: GOING DIGITAL...**

**Biomedicine + Information Technology + Wireless**



# LAB ON A CHIP



Quake lab, Stanford



# Biological Monitoring

- Determining when biological monitoring should be conducted can be difficult:
  - May not be clear whether a **scientific rationale** exists for biological monitoring in a given situation, or whether the monitoring results can provide meaningful and/or reliable information regarding health impact.
  - How such information would **ultimately benefit the worker**, a fundamental tenet in the decision to recommend biological monitoring for public health investigations, as opposed to research studies.

# Personal Protective Equipment

- Research during a response is needed to better understand
  - Effectiveness of PPE used during a response
  - What steps can be taken to improve PPE effectiveness
  - Selection and use of appropriate PPE
  - Parameters that determine PPE usage by responders
  - Ways to minimize barriers to PPE usage

# Longer Term Health Studies?

- On the basis of clear, pre-event scientific criteria, the need for longer-term studies should be assessed *early* in the course of the event by a panel of independent scientists.
- Initial criteria should then be *periodically revisited* because worker job activities, safety hazards, exposures and response events may change significantly during the course of the event
- NIOSH framework for decision-making about when to do longer term studies:
  - Decker JA et al. [2013] Recommendations for conducting responder health studies following large disasters. *Am J Disaster Med* Jan/Mar; 8(1):25-33.

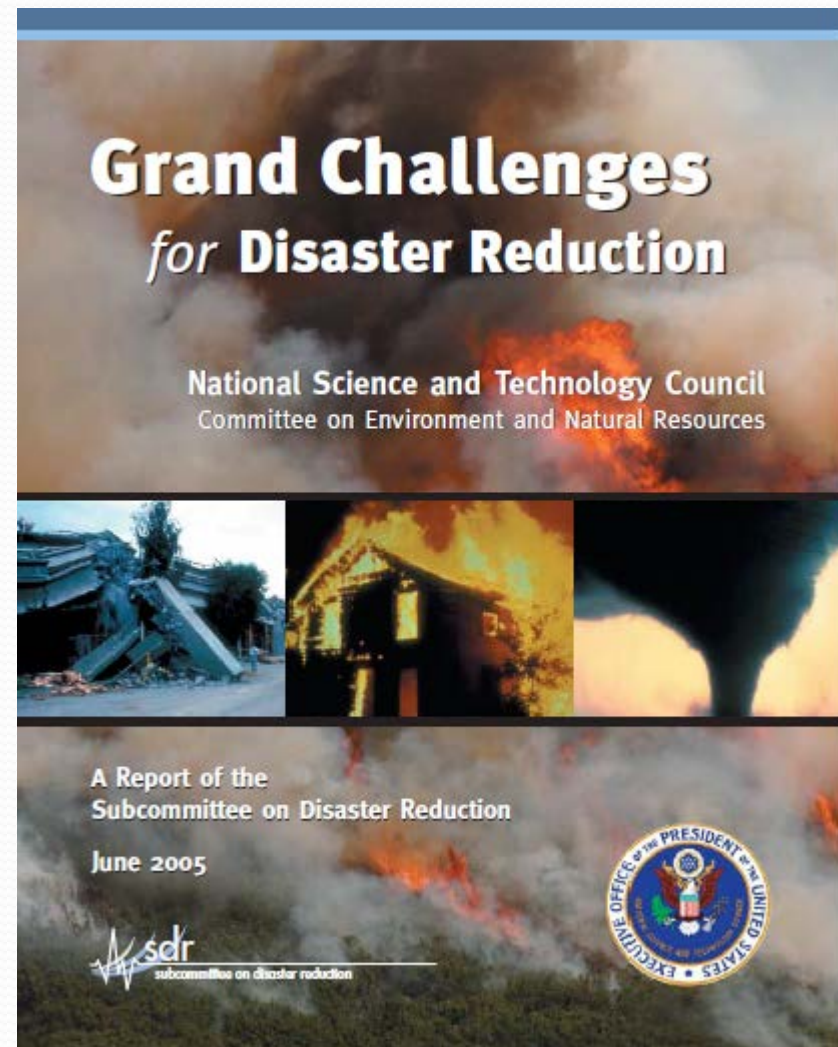
# What is Responder Resilience?

- Ability to rapidly adjust to adversity without physiological or psychological adverse effect
- Tied to mission success and productivity
- An element of organizational culture
- An integral component of health and safety

Reissman, Kowalski-Trakofler & Katz, 2011 (Resilience and Mental Health)  
Reissman, Schreiber, Shultz, & Ursano, 2008 (Disaster Medicine)

# Towards a Disaster Resilient Nation

- Provide disaster information when and where it is needed
- Understand processes that produce hazards
- Develop strategies and technologies to reduce the impact of extreme events on the built environment and vulnerable ecosystems
- Reduce vulnerability of infrastructure
- Develop ways to measure disaster resilience
- Promote risk-wise behavior



# Occupational Safety and Health Administration

- **Emergency Response and Preparedness**
- Notice of Stakeholder Meeting
  - OSHA invites interested parties to participate in an informal stakeholder meeting on emergency response and preparedness. OSHA plans to use the information obtained at the stakeholder meeting as it considers the development of a proposed standard for emergency response and preparedness.
- July 30, 2014, at 9:00 a.m., Frances Perkins Building, Washington, DC.



# DSRI Partnerships

- NIOSH invites partner participation in the *Disaster Science Research Initiative* by all those interested in ensuring the safety and health of responders before, during, and after a disaster through research.
- For more information on DSRI or to participate in this research:

CAPT Margaret Kitt at [ajy8@cdc.gov](mailto:ajy8@cdc.gov)

or

CDR Lisa Delaney at [lkd2@cdc.gov](mailto:lkd2@cdc.gov)