

# Disaster Epidemiology:



## Partnering with Epidemiologists During Disasters

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# Objectives

1. Define disaster epidemiology (DE) and its role in planning, response, and recovery phases.
2. Demonstrate how DE methods are being applied at local, state, tribal & national levels.
3. Discuss the role of the epidemiologist during a disaster and how epidemiologists can partner with emergency management.

# Background

- Epidemiology applied in disaster settings is called **disaster epidemiology (DE)**
- DE provides **reliable** and **actionable information** to incident commanders, planners, and **decision-makers**
- Emergency managers across the country are partnering with epidemiologists
- Foundational capability under **ESF-8** public health planning and response

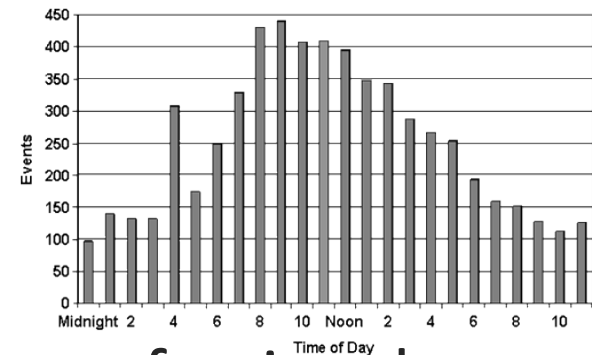
# Background

## ➤ Origins of DE

- 1980s: Description of epidemiologist roles in disaster response
- 1990s: Public health and epidemiologic methods in disaster response published
- 2010: Systematic use of “*disaster epidemiology*” helped establish the discipline as a formal subset of epidemiology with broad application

# Background

- Integrating DE across disciplines and agencies
  - Public Health and PHEP
  - Hospitals/clinicians
  - Academic partners
  - Industrial hygiene and safety professionals
  - Emergency managers
  - Responders
  - Regulators
  - Business community



# Background

- DE was originally applied in response to large scale emergencies, and encompasses:
  - Rapid needs assessment, Surveillance, Tracking, Research and Evaluation and Registries
- Goal is prevention
- Incident Command System:
  - Link DE to Medical Unit



# Conceptual Framework

- Framework created the applications of epidemiology in disaster settings
- Developed by:
  - Centers for Disease Control & Prevention (**CDC**)/  
National Center for Environmental Health (**NCEH**)  
and
  - Council of State and Territorial Epidemiologists  
(**CSTE**)



# Disaster Epidemiology Activities

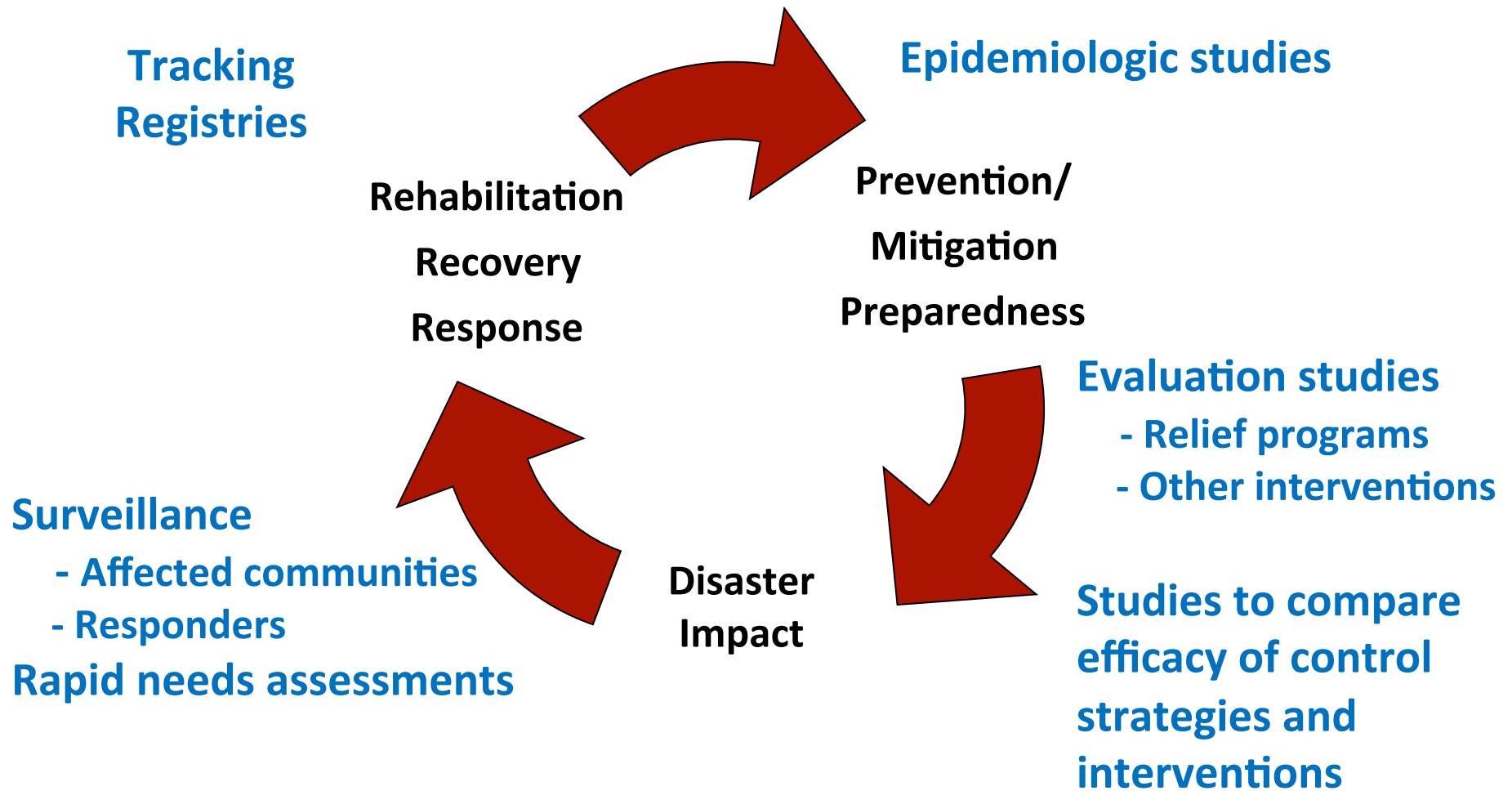




# Disaster Epidemiology Activities

*The Disaster-Management Cycle*

*Humanitarian Action* ↔ *Sustainable development*



# Disaster Epidemiology Tools

- Rapid Needs Assessments
- Surveillance
- Tracking changes in communities
- Registries for long-term follow-up
- Descriptive and analytic studies
- Evaluation and impact studies

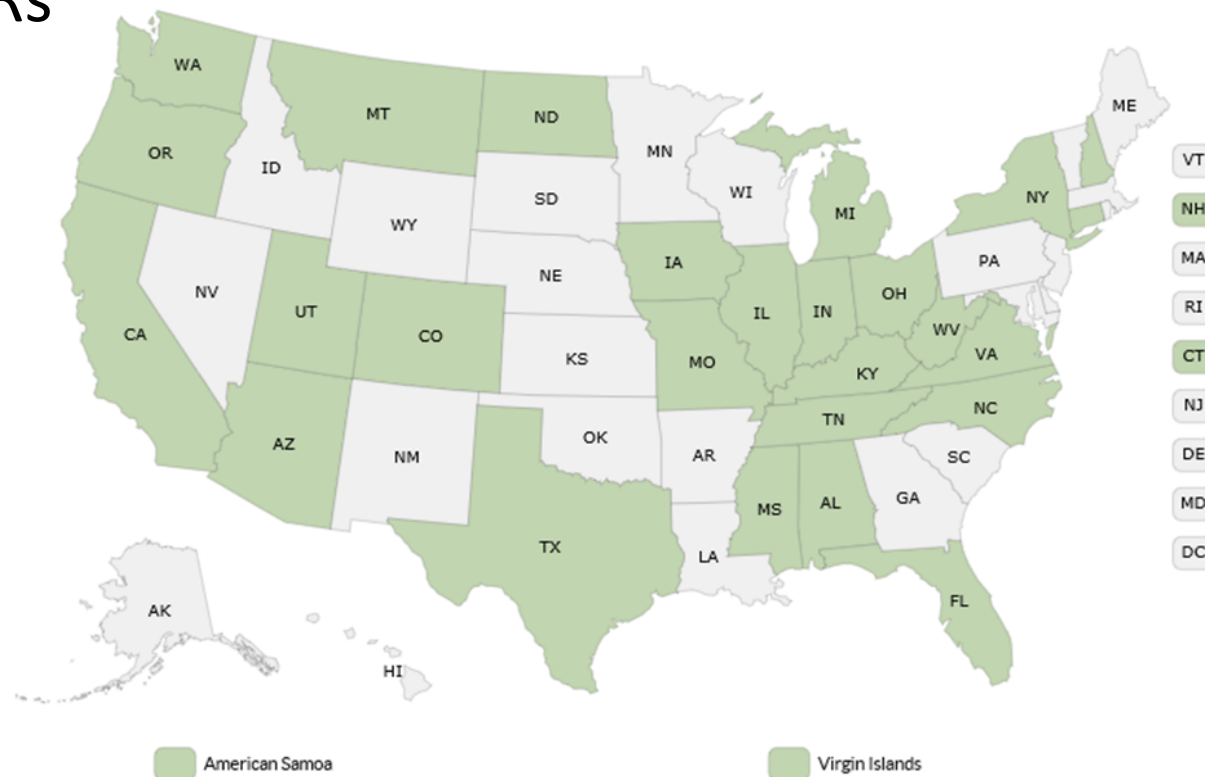


# Rapid Needs Assessment

- Launched early in response phase
- Identifies needs of affected communities in a systematic, timely, and statistically valid manner
- Provides basis for appropriate response
- **Community Assessment for Public Health Emergency Response (CASPER)** – tool developed by CDC
  - <https://www.cdc.gov/nceh/hsb/disaster/casper/default.htm>
  - Two-staged cluster sampling
- Door-to-door household survey with 7 interview teams in 30 clusters for 210 surveys

# Current Scope of CASPER in the U.S.

- Over 125 CASPERs conducted in states across the US
- Increase in number of preparedness and non-disaster CASPERs



# Surveillance of Health-Related Outcomes

- Describes the health burden of an affected community
- Quantifying mortality and morbidity in affected communities and first responders and residents



# Surveillance

- Identify intra-disaster outbreaks or clusters of conditions
- Characterize burden of incident on sub-populations
- Characterize pressures on health care service system



# Types of Surveillance

- Descriptive analysis of injuries and fatalities
  - Syndromic Surveillance
  - Death Reporting Systems
- Health surveillance in shelters
- Health monitoring and surveillance among responders to assure the health and safety during response and recovery

# Syndromic Surveillance used for Disaster Response



Flooding



Tornados



Drought



Wildfires

Extreme Heat

Extreme Cold

Poor Air Quality

-Lung health Disease

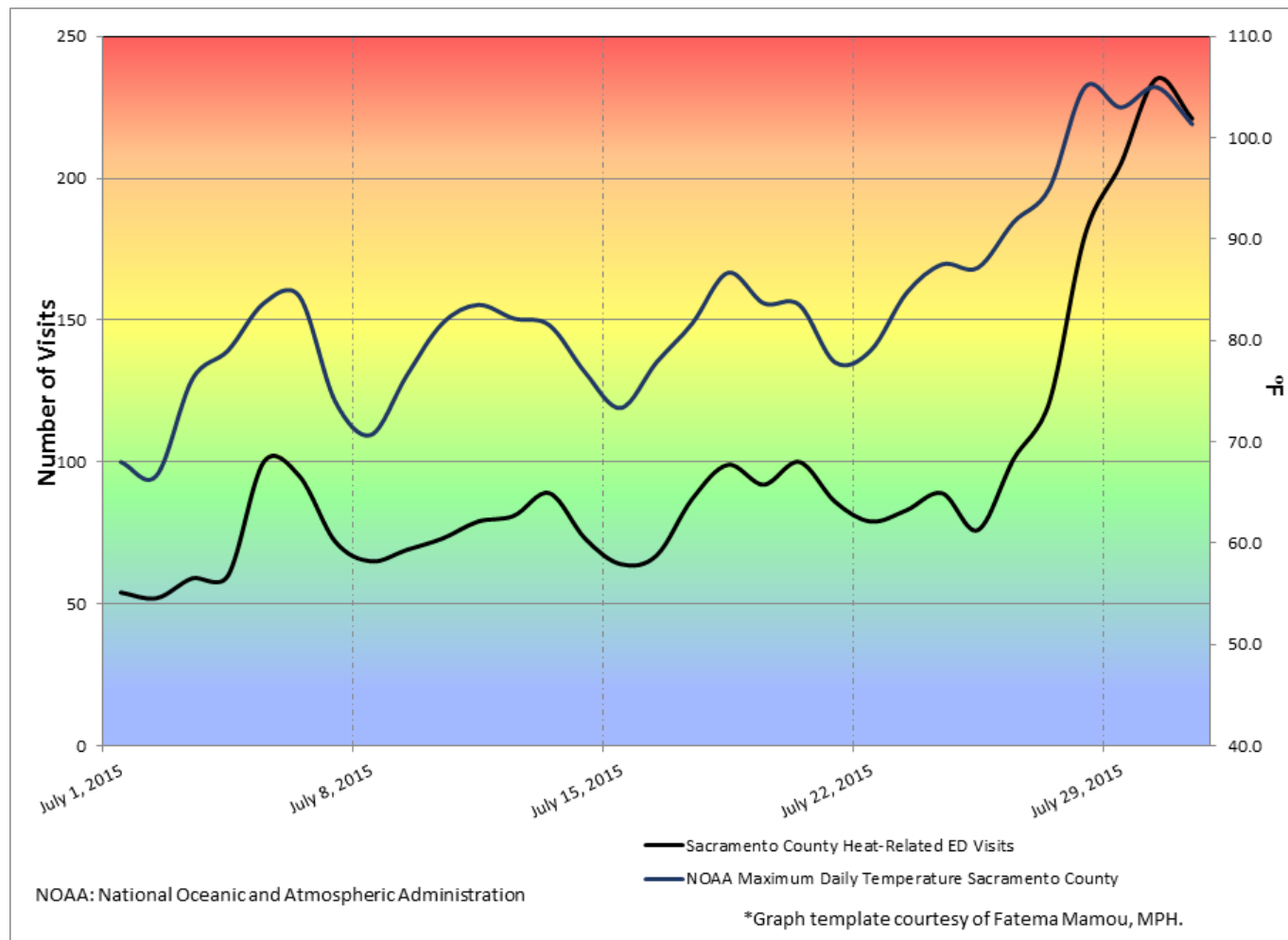
Vectors Hurricanes

Snow/Ice Storms

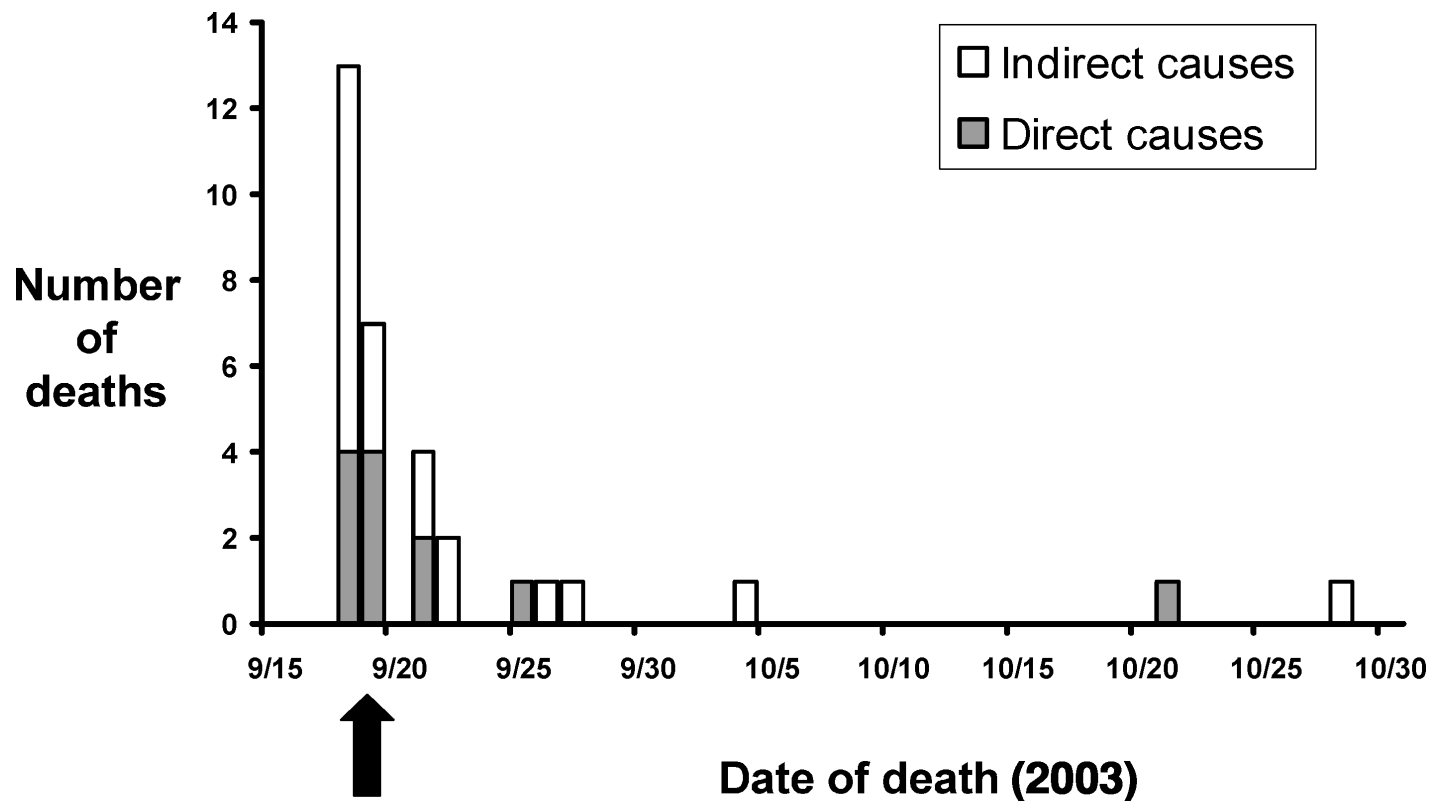
CO Poisoning



# Heat-Related Emergency Room Visits, Sacramento, CA, July 1- 31, 2015



# Mortality Surveillance

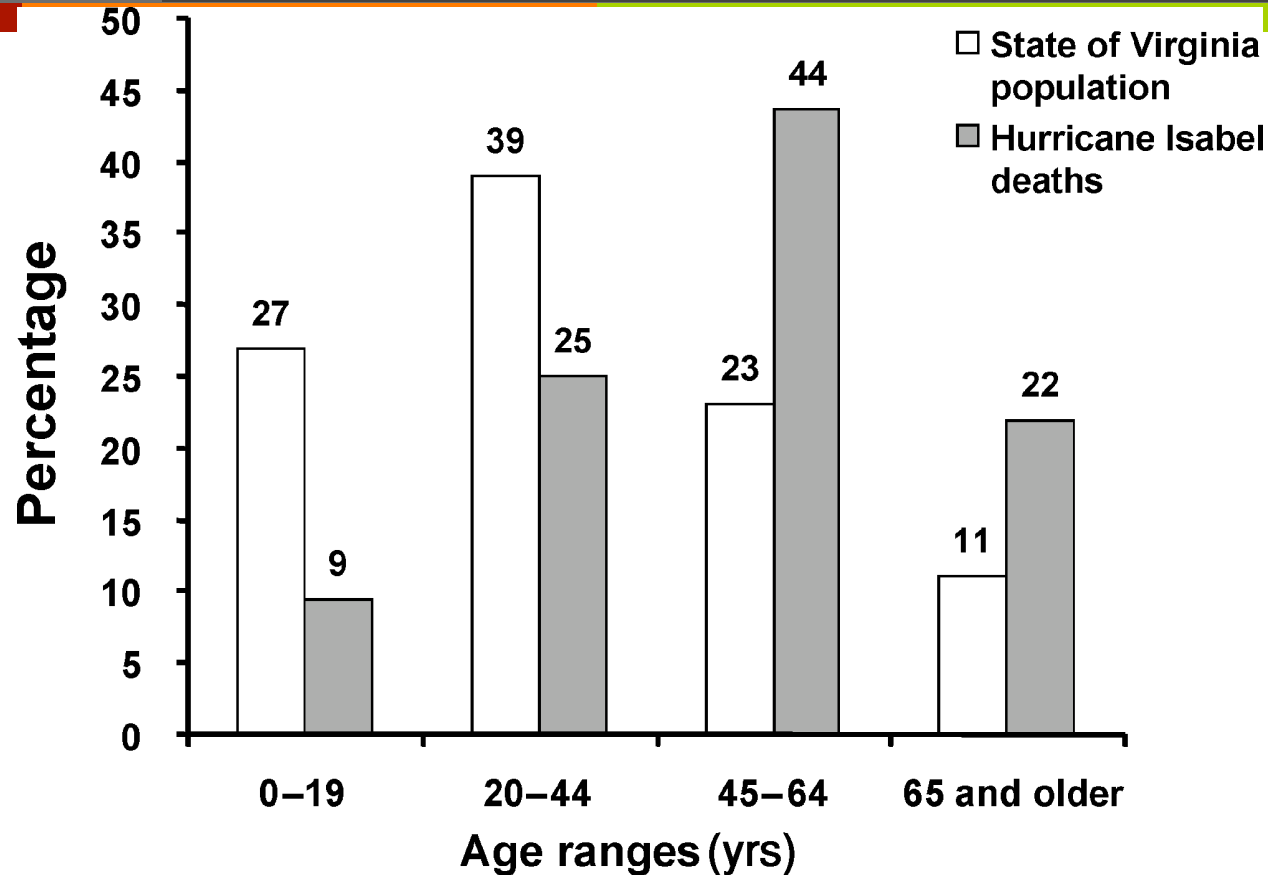


Hurricane Isabel

## Hurricane Isabel-Related Mortality—Virginia, 2003

From: J Public Health Management Practice, 2006, 12(1), 97–102

# Mortality Surveillance



Comparison of the percentages of age distribution for Hurricane Isabel deaths in Virginia with the Virginia population (2000 Census estimates).

From: J Public Health Management Practice, 2006, 12(1), 97-102

# Shelter Surveillance

- Track populations in shelter settings
- Identify outbreaks or clusters of conditions
- Characterize environmental and sanitation conditions



# Emergency Responder Health Monitoring Surveillance (ERHMS)

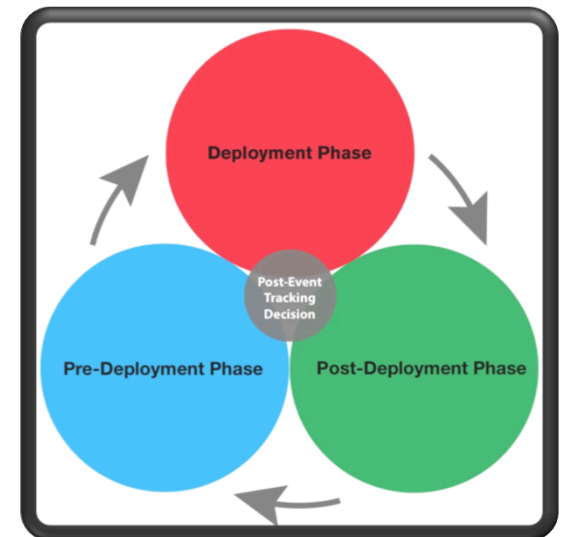
A health monitoring and surveillance framework for protecting responders through all phases of a response

➤ <http://www.cdc.gov/niosh/topics/erhms/>

➤ Which responders are “ready,” credentialed, and available to respond ?

➤ Who are the responders on-site, what are the exposures? How is their health?

➤ What did the responders do, how is their health now, & what they were exposed to ?



# Epi Investigation: Assessment of Chemical Exposures (ACE) Program

- Chemical Release Response ATSDR/CDC training & response
  - Epidemiologic assessment after a chemical release
  - Toolkit materials
    - Surveys, consent forms, medical chart abstraction form, Interviewer training manual, databases
    - All modifiable

<http://www.atsdr.cdc.gov/ntsip/ace.html>



# Evaluation Studies

## Hurricane Harvey Hazardous Exposures

- 13 Hazardous waste sites flooded
- People in nearby Houston communities potentially exposed
- Passive Wristband Samplers deployed to measure exposures
  - Residents wear for 7 days
  - Return by mail
  - Bands can detect >1,500 chemicals
- Research partnership with
  - Oregon State University SRP
  - Texas A&M
  - UTHealth School of PH
  - Baylor College of Medicine

