Infectious Disease Challenges
following Natural Disasters among
APEC Economies

Infectious Disease Surveillance and Control after WenChuan Earthquake, China, 2008

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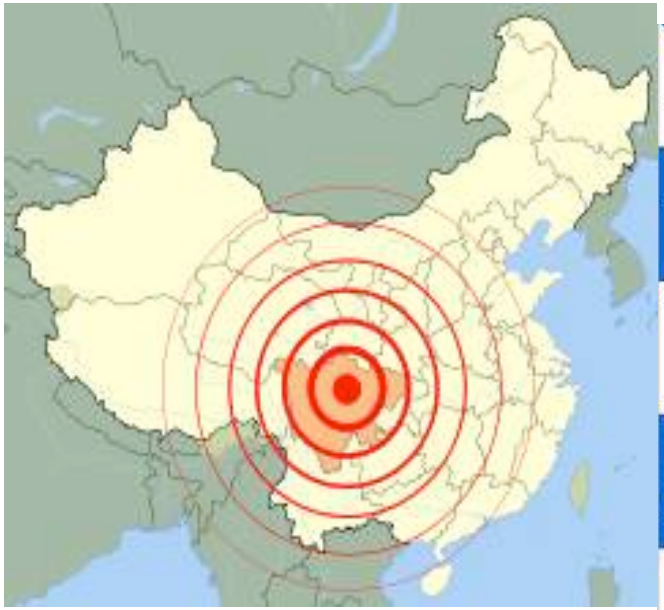
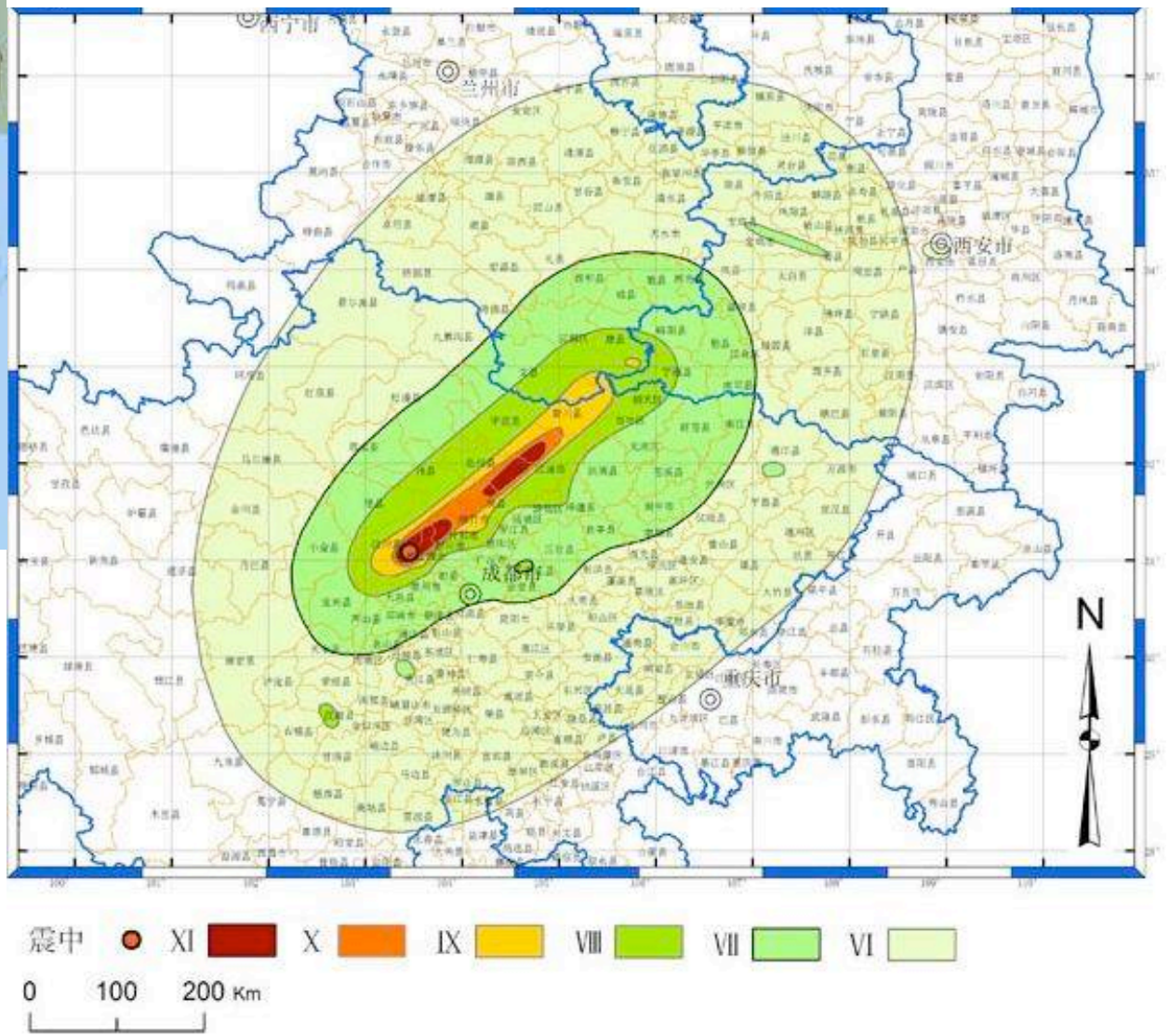
Outline

- Background
- Rapid response after the earthquake
- Actions related to disease surveillance and control
- Evaluation of infectious diseases in severely affected area

Wenchuan Earthquake Situation Map





- **Date:** May 12, 2008
- **Time:** 14:28
- **Magnitude:** 8.0
- **Max. Intensity**
  - XI – Very Disastrous

Casualties and Damages

- As of September 25, 2008:
  - 69,227 people dead
  - 17,923 people missing
  - 374,643 people injured
  - more than 84,000 hospitalized
- About 5 million buildings collapsed, and more than 21 million buildings were damaged
- About 15 million people displaced, and total affected population 45.61 million

Casualties and Damages

- Many health clinics have been damaged
- Access to public health system severely affected
- Among 580 hospitals in severely affected area, more than 450 were not able report to national web-based disease reporting system

Beichuan People's Hospital, Sichuan, China

Rapid Response

- Rapid response teams
- Past disease information analysis
- Rapid assessment of situation and needs
- Restoring of surveillance system
- Risk assessment
- Prevention and control work

Risk Factors for Infectious Diseases after the Strong Earthquake

- Interruption of access to safe water and sanitation facilities
- Population displacement with overcrowding
- Increased exposure to disease vectors
- Increased population movements
- Increased susceptibility to disease
- Poor access to health services

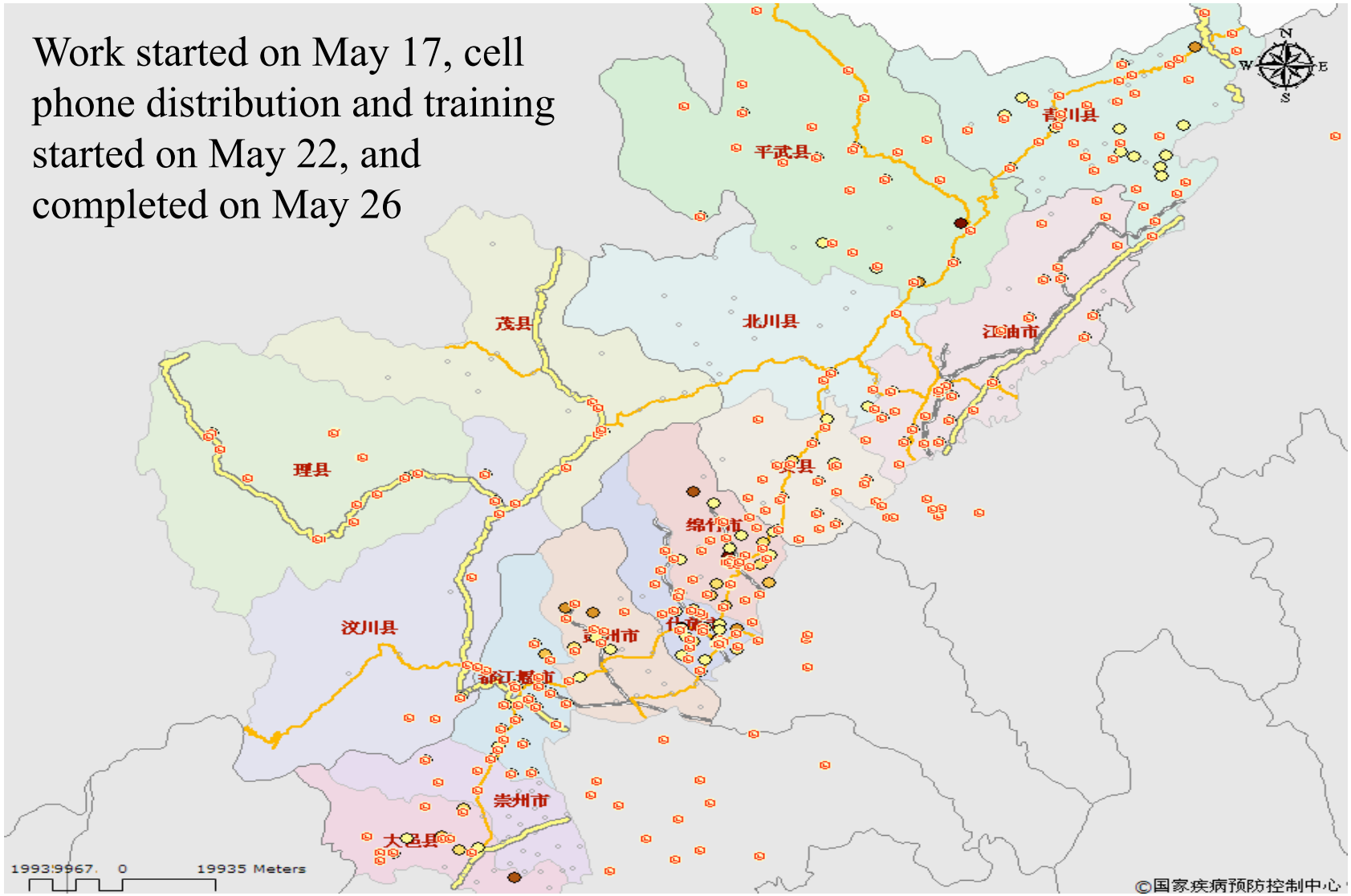
Risk Assessment of Main Infectious Diseases

Type of disease	Level of risk	Type of disease	Level of risk
Bacillary dysentery	++++	Malaria	+〜++
Infectious diarrhea	++++	Plague	+
Cholera	+++	Hepatitis B	+
Hepatitis A	+++	Japanese Encephalitis	+
Typhoid and paratyphoid	+++	Leptospirosis	+
Tuberculosis	+++	Dengue	+
Acute upper respiratory tract infection	+++	Rabies	+
Rubella	+++	Schistosomiasis	+
Mumps	+++	Streptococcus suis	+
Acute hemorrhagic conjunctivitis	+++	Avian influenza/H5N1	+
Chicken pox	+++	Syphilis /gonorrhea	+
Measles	++	SARS	-〜+
Meningococcal meningitis	++		
HFMD	++		
Anthrax	++		
Kala-azar	++		
Hemorrhagic fever with renal syndrome	++		
Tetanus	++		

Cell-phone-based Reporting System

- 400 donated cell-phones
- Solar-energy supported
- Pre-installed surveillance system
  - Notifiable disease reporting
  - Syndromic surveillance system
    - 1. Fever with respiratory illness 2. Fever with rash 3. Watery diarrhea 4. Diarrhea with blood 5. Acute jaundice 6. Encephalitis or meningitis 7. Other febrile disease 8. Food poisoning
  - Text message report for other outbreaks or emergency events
- Training conducted

Cell-phone-based Reporting System



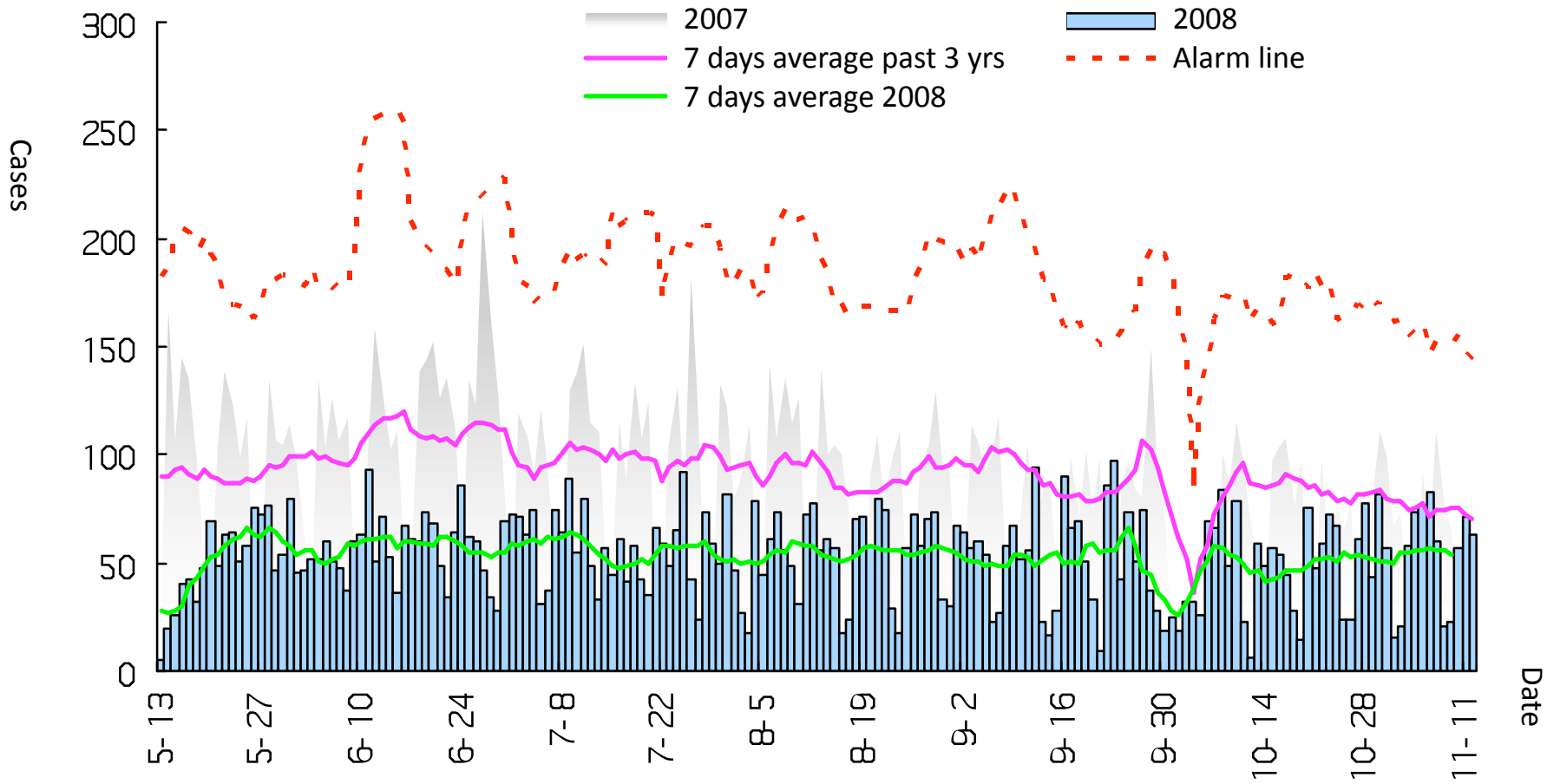
Post-earthquake Disease Control Practices

- Strengthen the protection of water sources and ensure water safety
- Maintain adequate food supply and ensure food safety
- Shelter planning and assessment
- Strengthen the monitoring and control of vectors
- Strengthen health education
- Enhance the disease surveillance and investigation
- Revitalize the basic public health service
- Strengthen case management

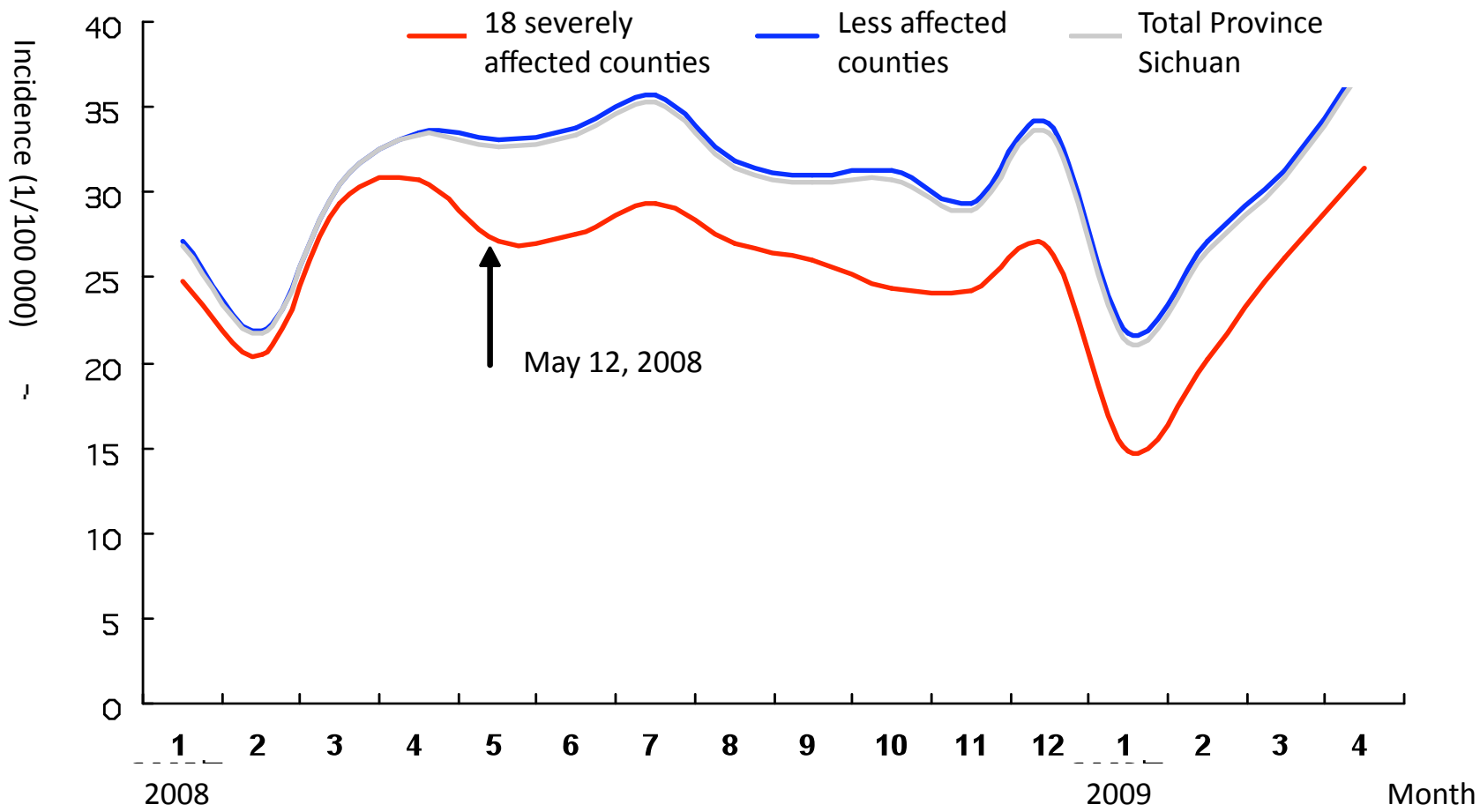
Top 15 Infectious Disease in 18 Counties, Sichuan Province, May 13 - Nov. 12, 2008

	Disease	Cases of 2008 (0513-1112)	Total cases of last 3 years	Compared with average cases of last 3 years(%)
	Total cases	9797	50551	-42
1	**Tuberculosis**	2668	10921	-27
2	**Infectious Diarrhea**	2114	9276	-32
3	**Hepatitis B**	1930	16280	-64
4	**Bacillary Dysentery**	1103	4989	-34
5	**Mumps**	646	2462	-21
6	**Syphilis**	456	977	40
7	**Rubella**	162	1346	-64
8	**Hepatitis A**	154	993	-53
9	**Gonorrhea**	131	424	-7
10	**Unspecified Hepatitis**	109	449	-27
11	**Hepatitis C**	98	367	-20
12	**Acute hemorrhagic conjunctivitis**	67	298	-33
13	**Measles**	41	984	-88
14	**Hepatitis E**	18	27	100
15	**AIDS**	17	20	155

Notifiable Infectious Diseases Reported in 18 Counties, Sichuan Province, May 13 - Nov. 12, 2008



Notifiable Infectious Diseases Reported in 18 Counties, Sichuan Province, January 2008 - April 2009



Summary

- Infectious disease situations remain stable in the seriously affected counties of Sichuan Province
- No major disease outbreak or public health emergency happened
- After-earthquake surveillance and control work are effective

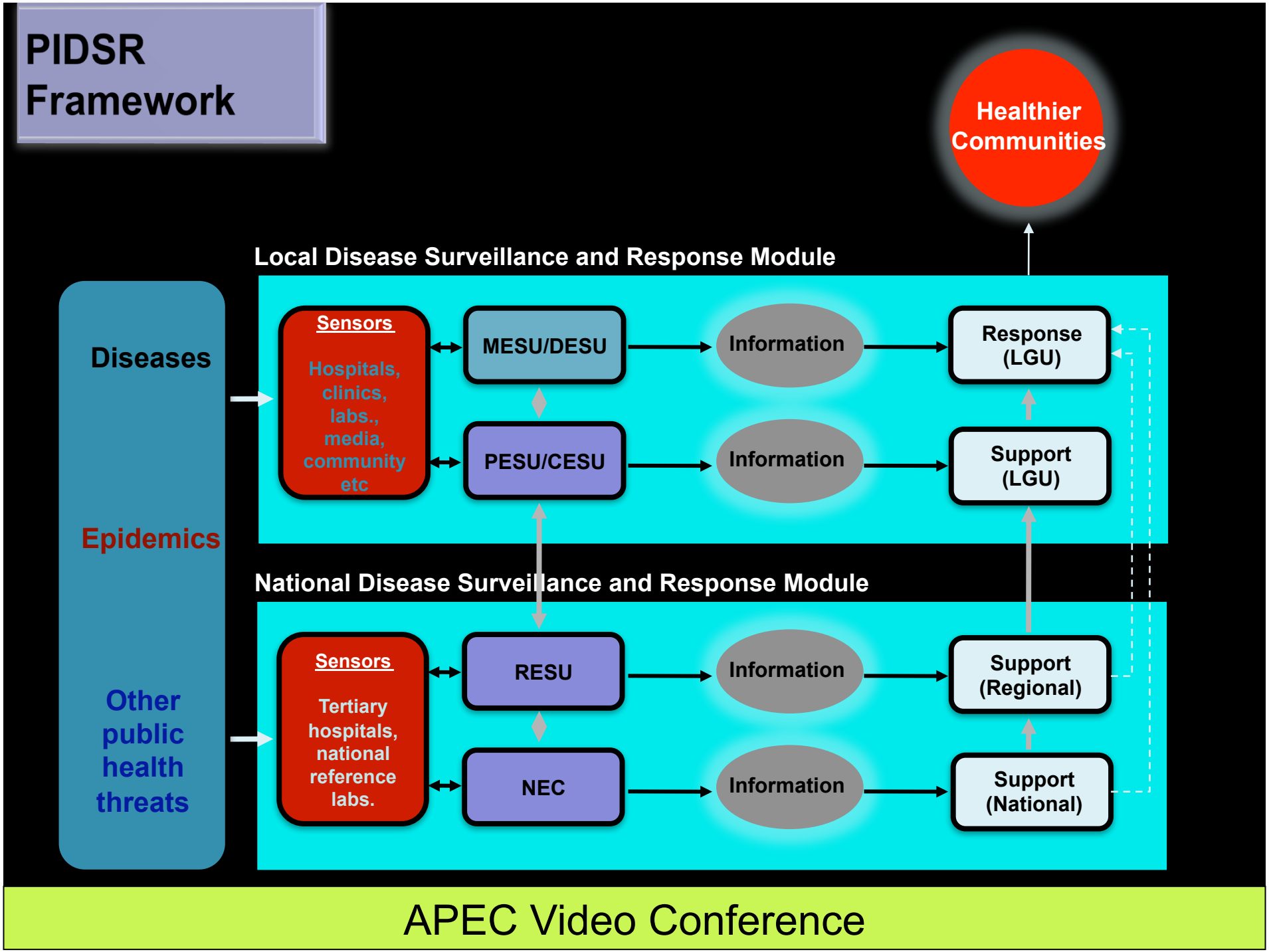
Thank you !

Lessons Learned in Leptospirosis Surveillance and Response After a Natural Disaster

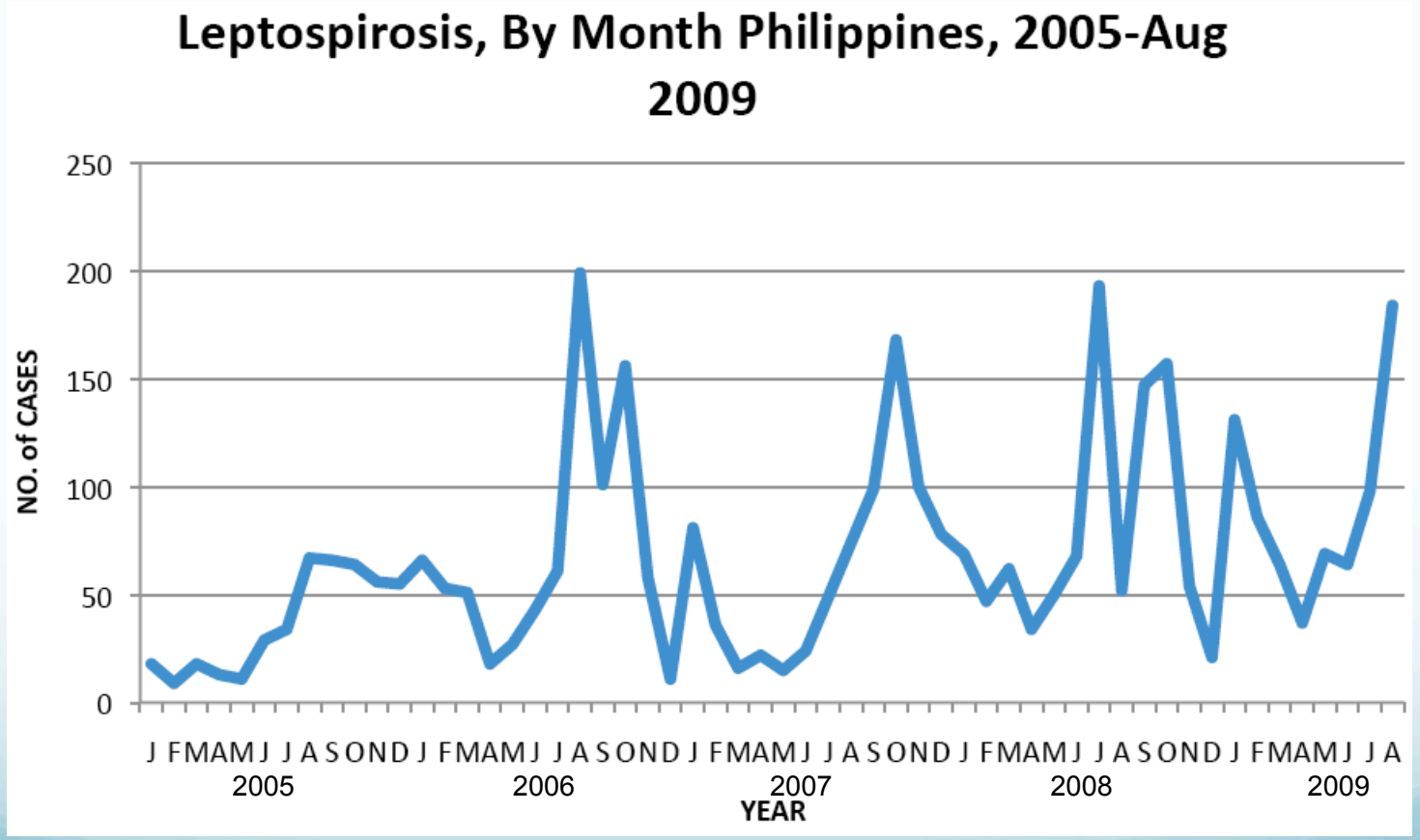
Dr. Enrique Tayag
Director IV
National Epidemiology Center
Department of Health
Philippines

Outline

- Background: Philippine Integrated Disease Surveillance and Response (PIDSR)
- Aftermath of Flooding and Destruction after Twin Typhoons
- Post-disaster Disease Surveillance
- National outbreak response
- GOARN mission
- Lessons learned
- Way Forward


PIDSR Framework
Healthier Communities
Local Disease Surveillance and Response Module
Diseases
Epidemics
Other public health threats
Sensors
Hospitals, clinics, labs., media, community etc
MESU/DESU
PESU/CESU
Information
Information
Response (LGU)
Support (LGU)
National Disease Surveillance and Response Module
Sensors
Tertiary hospitals, national reference labs.
RESU
NEC
Information
Information
Support (Regional)
Support (National)
APEC Video Conference

Endemic Leptospirosis



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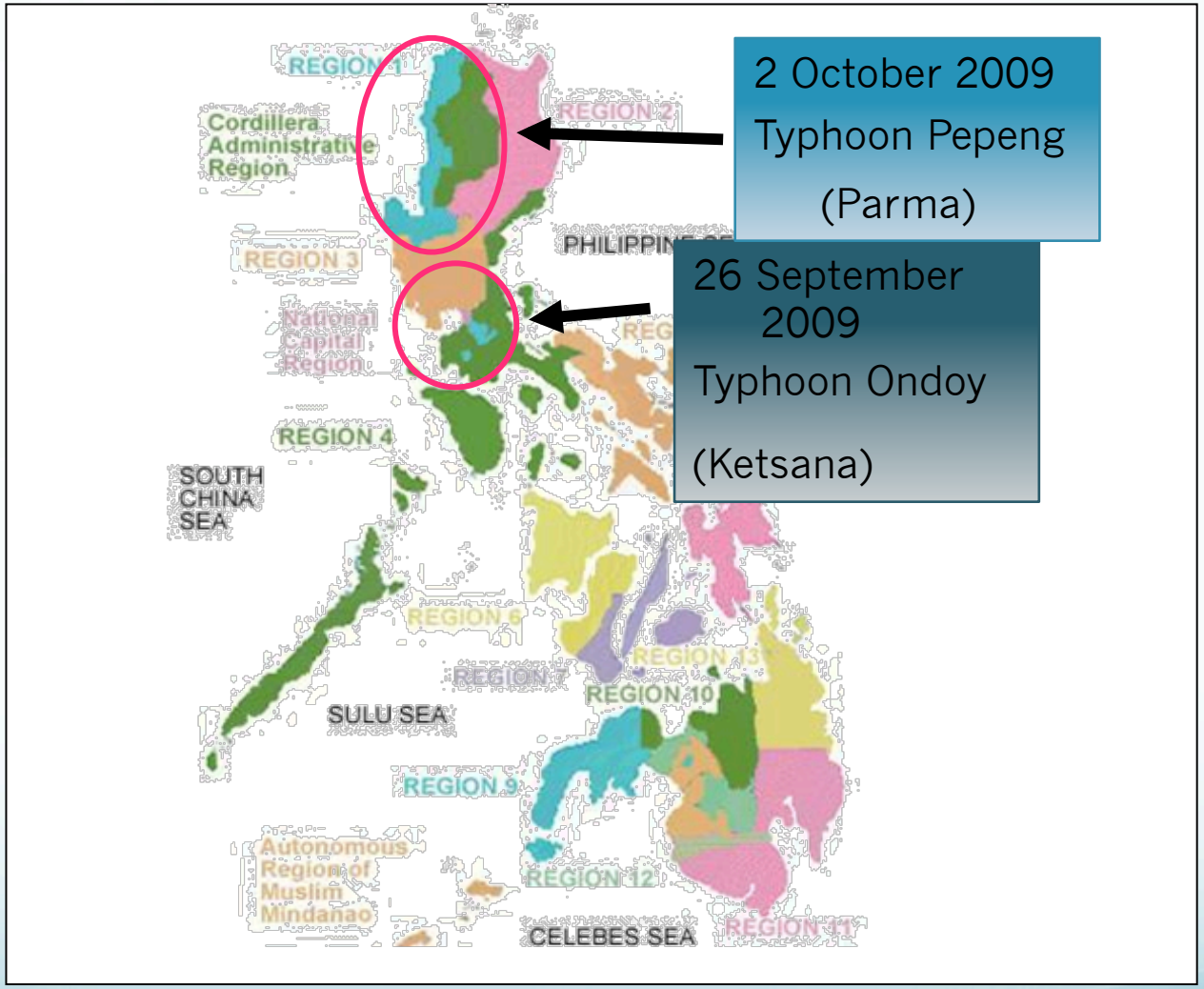
2009 Twin Torrents



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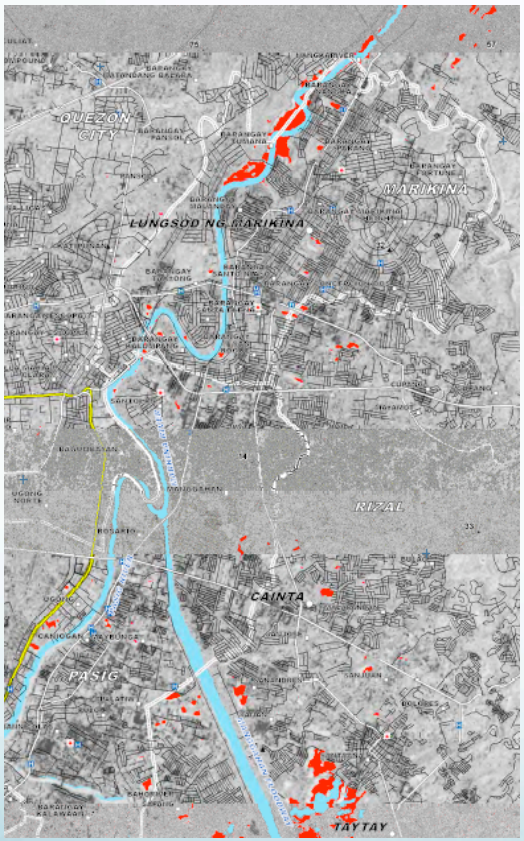
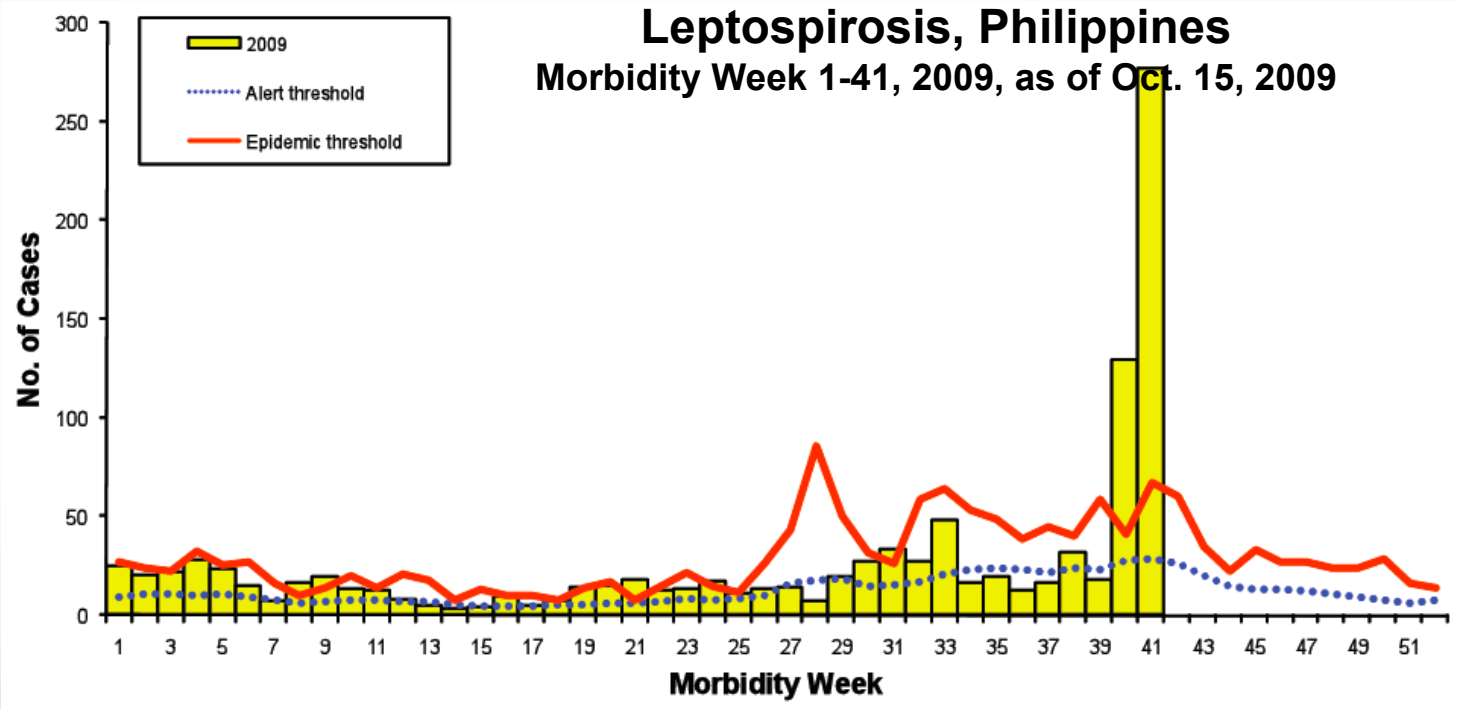
Aftermath: widespread flooding
over 9 million people affected
disruption of local health services



Aftermath: Leptospirosis outbreak with high case fatality rate



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International Health Regulations (2005): Annex 2

Criteria	Risk	Remarks
Serious	YES	Increasing number of deaths; surge capacity threatened
Unusual or unexpected	NO	Leptospirosis expected after flooding; CFR within universal range
International spread	NO	
Interference with travel or trade	NO	

Request for GOARN Support

Scope of Work

1. Provide guidance on clinical aspects of Leptospirosis including investigations of suspect deaths
2. Improve laboratory capacity for early detection and diagnosis
3. Develop strategies for risk communication
4. Strengthen post-disaster surveillance
5. Recommend public health control measures

Important Lessons Learned

- Implement post-disaster surveillance for early detection of outbreaks
- Anticipate that international assistance is an option to maximize response efforts
- Understand that surge capacity is a significant determinant of health outcomes
- Consider that desperate measures to prevent spread may fail because of operational ineffciency

Carrying the Lessons Forward

Disaster Surveillance

- Assess surveillance implementation
- Harmonize post-disaster surveillance systems
- Build laboratory capacity

Carrying the Lessons Forward

Outbreak Response

- Train rapid response teams
- Foster zoonoses collaboration
- Develop Guidelines on Surge capacity

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Infectious Disease Issues Associated with Hurricane Katrina (HK)

Joe Posid
Centers for Disease Control and Prevention

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New Orleans

- Largest city in LA
- Almost 500,000 residents (greater NO area 1.3 million)
- 67% African American
- Median income for a family $32 K
- Almost ¼ below poverty line
- Significant portion of NO is 1-10 feet below sea level

Impact of Katrina Greater than 'Just' a Hurricane

- 80% of New Orleans was flooded
- 60-80% of the population was evacuated
- No power or water
- Media coverage questioned Federal response
- Public health infrastructure gone
- Think of post-tsunami Banda Ache or post-earthquake Haiti

Public Health Issues Associated With Natural Disasters

- Water Quality
- Wounds
- Solid Waste Disposal
- General Sanitation (debris removal)
- Vector Control
- Immunizations (workers and population)
- Close-quarter, densely populated living conditions
- Disruption of access to medical services

Priorities

- Surveillance
- Support re-building PH infrastructure
- Support planning for enhanced PH

Support, not supplant!

CDC Commitment

- Agency-wide response from August 25, 2005 through January 1, 2006.
- Residual , focused assistance continued past these 129 days.
- 1,324 staff deployed; mainly to the Emergency Operations Center, but also to impacted states/cities

Planning Challenges

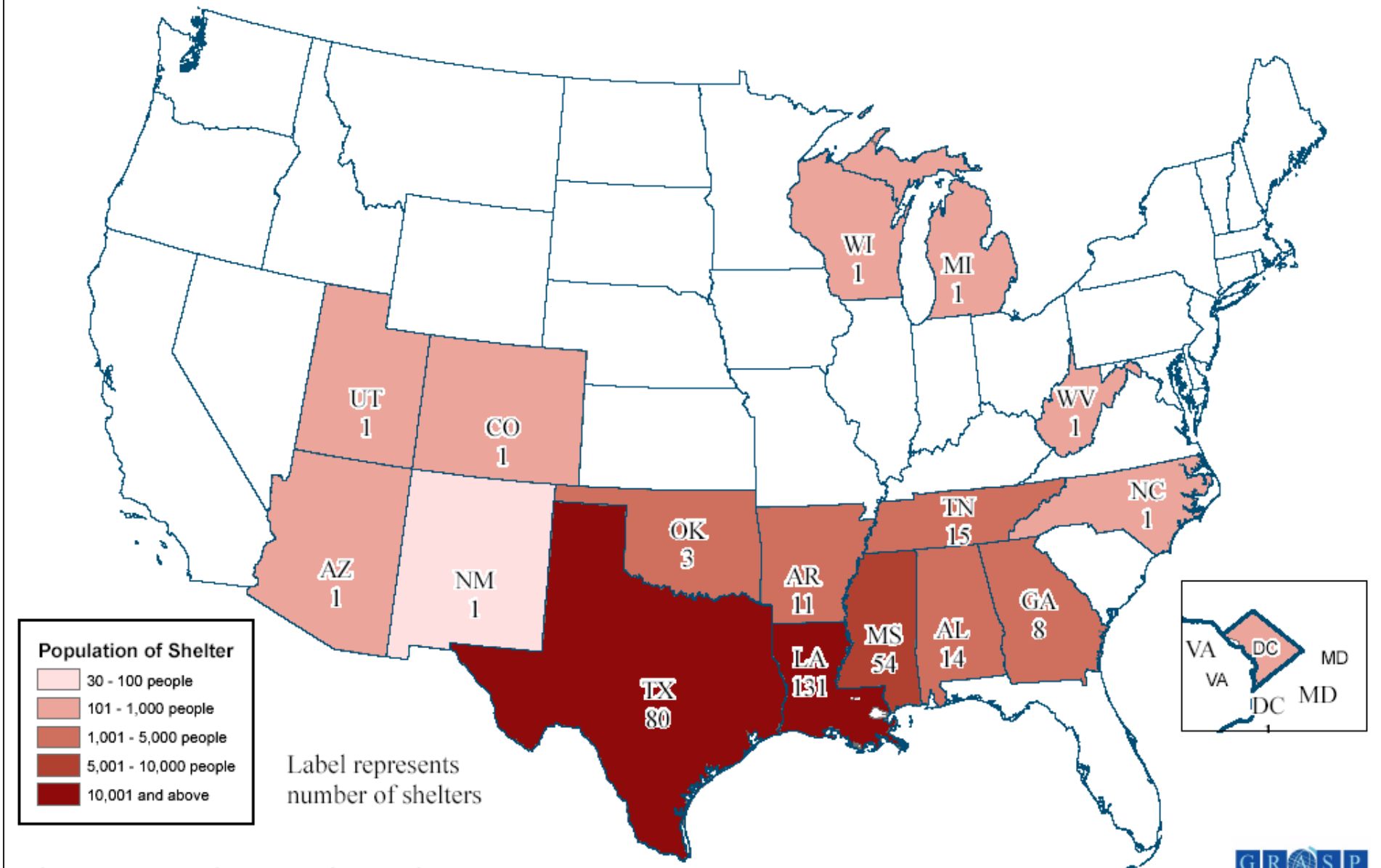
- Lack of clear predictability of future (e.g., population of New Orleans = 150K? 450K?)
- Evolving mission and competing priorities
- Multiple overlapping planning processes, commissions, organizations, Agencies, etc.
- Sustainability after our departure

New Orleans population estimates

- pre-Katrina – 484,674 (2000 US Census)

- October 2005 – 127,800
- December 2005 – 134,400
- January 2006 – 181,4000

Distribution of Evacuation Centers and Census by State
September 14, 2005

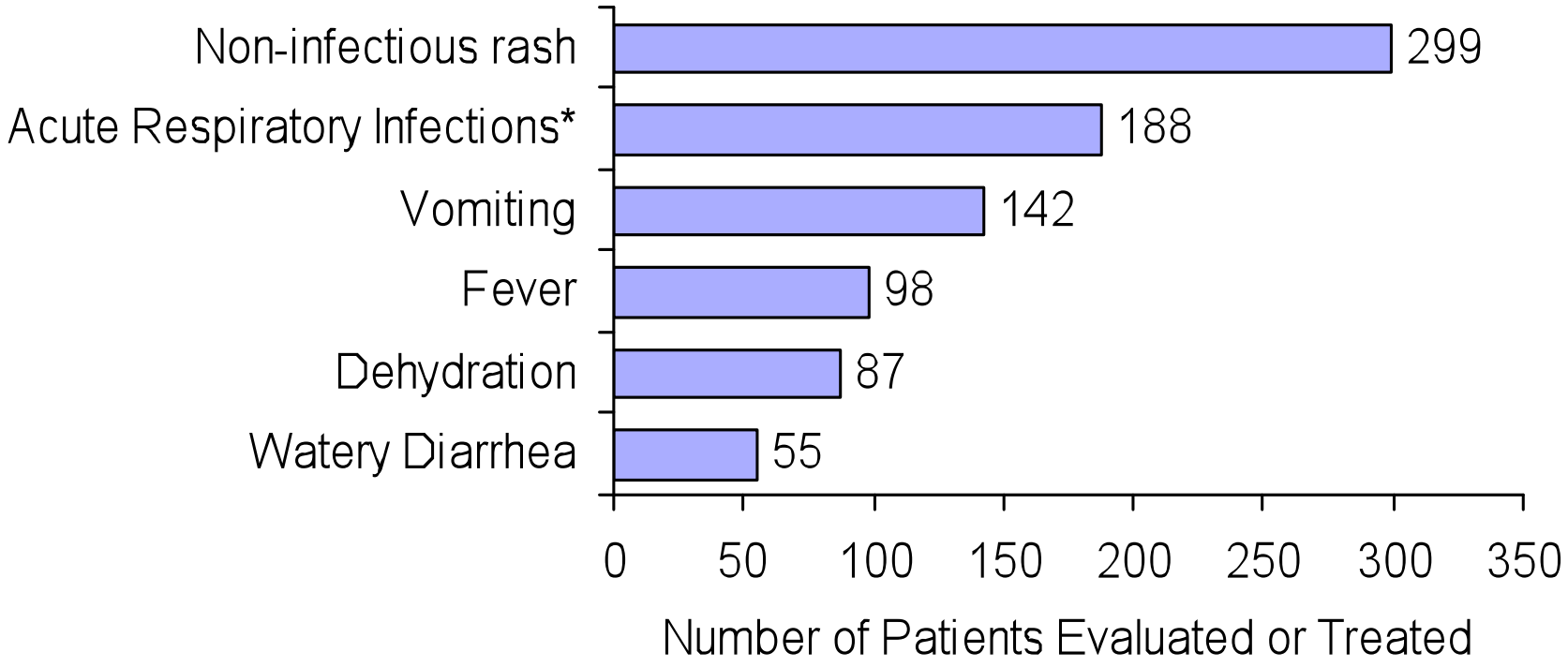


* Source: American Red Cross Disaster Operations Summary Report

Surveillance Challenges

- Disruption of Public Health and Medical Infrastructure
  - Displaced personnel
  - Damaged laboratory and other facilities
  - Affected power and telephone service
- Large numbers of Evacuation Centers (EC) with need for longer operation
- Multi-state HK effects and evacuee displacement
- Lack of single registration source for evacuees

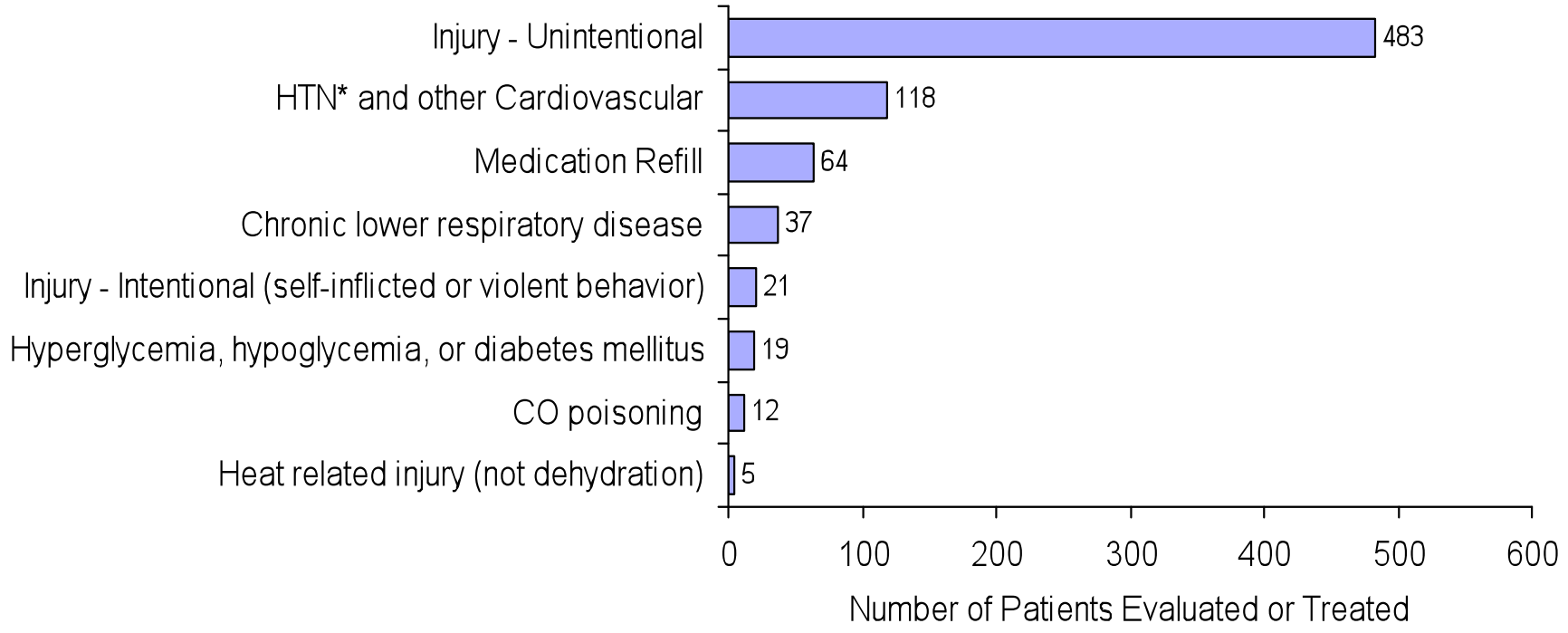
Surveillance at New Orleans Area Hospitals* for Conditions with Infectious Disease/Epidemic Potential, September 9-20, 2005



*represents 5 hospitals (West Jefferson, East Jefferson, Ochsner, Northshore, and St. Charles Parish); Total of 3,750 patients seen during reporting period

Source: LA DOH and Greater New Orleans Public Health Response Team

Surveillance at New Orleans Area Hospitals* for Injury/Chronic Disease/ Other Conditions, September 9-20, 2005



*5 hospitals (West Jefferson, East Jefferson, Ochsner, Northshore, and St. Charles Parish); Total of 3,750 patients seen during reporting period

Source: LA DOH and Greater New Orleans Public Health Response Team

Top Conditions Identified in LA Shelter Needs Assessment (USPHS and ARC)

Condition	Incidence per 1,000 residents
Hypertension/ Cardiovascular	108.2
Diabetes	65.3
New Psychiatric Conditions	59.0
Pre-existing Psychiatric Conditions	50.0
Rash	27.6
Asthma/ COPD	27.5
Flu-like/severe respiratory symptoms or Pneumonia	26.3
Toxic exposure	16.0
Other infections*	15.6
Diarrhea	12.8

*TB, hepatitis, pertussis, varicella, rubeola, encephalitis, meningitis, other serious communicable illness of outbreak concern

Main Categories of Infectious Diseases Seen Post HK

- Gastrointestinal
- Wound infections
- Respiratory
- Skin infections

Diarrhea/Gastroenteritis

- Norovirus
- *Vibrio cholera*, non O1, non-O139
  - 3 cases, no deaths
- *Vibrio cholera* O1, nontoxigenic
  - 3 cases, no deaths
- nontyphoidal Salmonella

Wound Infections

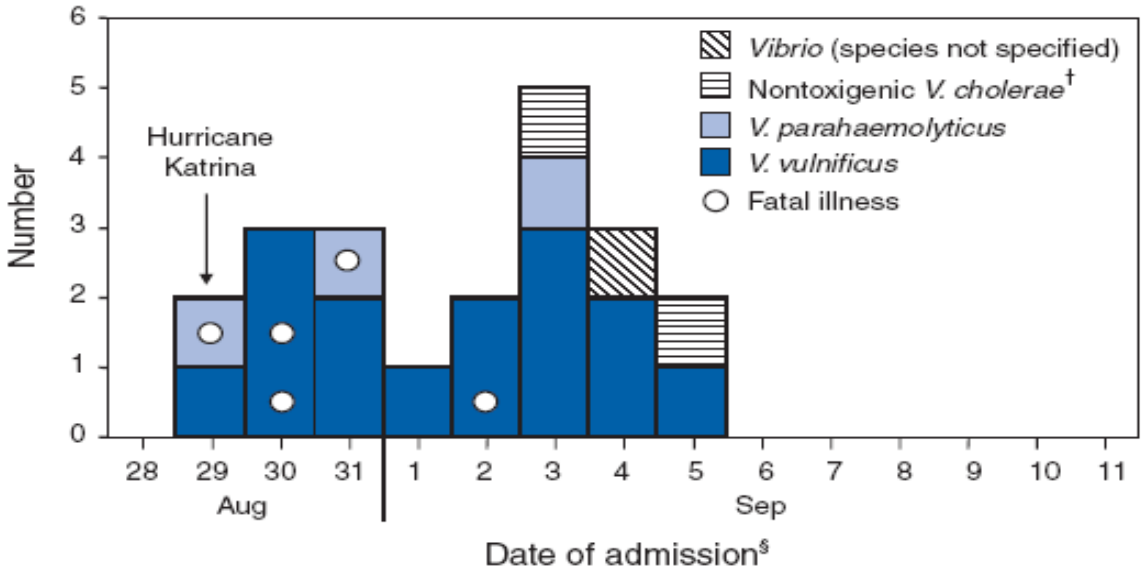
- *Vibrio vulnificus*
  - 14 cases* (3 deaths)
- *Vibrio parahemolyticus*
  - 3 cases* (2 deaths)

*Number of cases reported as of September 14, 2005

FIGURE 3. Primary septicemic skin lesions caused by *Vibrio vulnificus*

From: CDC. *Vibrio* Illnesses After Hurricane Katrina --- Multiple States, August--September 2005. MMWR September 14, 2005 / 54(Dispatch): 1-4

FIGURE 1. Cases of post-Hurricane Katrina *Vibrio* illness among residents of Louisiana and Mississippi,* by date of hospital admission — United States, August 29–September 11, 2005



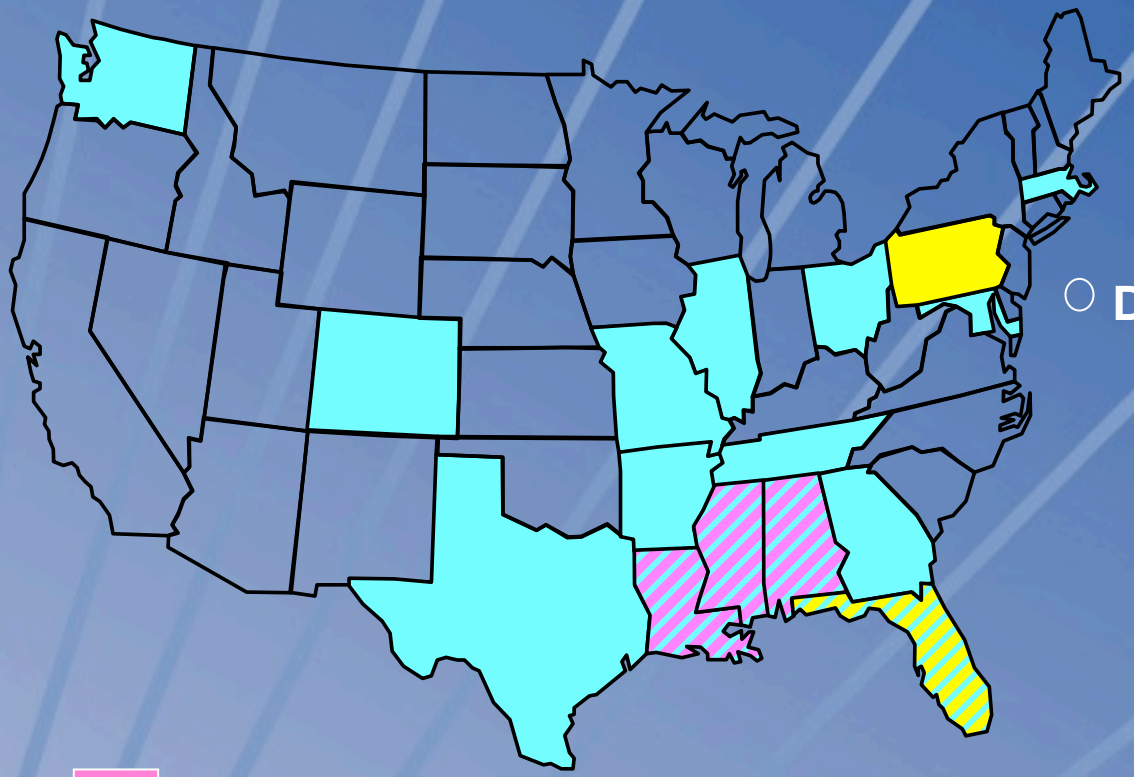
*N = 22; Alabama, a third state under surveillance, reported no cases.
†Nontoxigenic *V. cholerae* illnesses represent infections entirely distinct from the disease cholera, which is caused by toxigenic *V. cholerae* serogroup O1 or O139.
§Date of admission was not available for one Louisiana resident. In cases that did not require hospitalization, the date represents the first contact with a health-care provider for the illness.

From: CDC. *Vibrio* Illnesses After Hurricane Katrina --- Multiple States, August--September 2005. MMWR, September 14, 2005 / 54(Dispatch);1-4

Respiratory Diseases

- Upper and lower respiratory infections
  - Pertussis
  - Respiratory synctial virus
  - Streptococcal pharyngitis
- Tuberculosis (TB)
  - ~ 9 evacuees evaluated as suspected TB cases
  - Only 2 confirmed to have TB (1 pulm, 1 extrapulm)

Location, by State, of TB Patients Displaced by Hurricane Katrina
(as of Sept 30, 2005)



Where began treatment

Where now continuing treatment

Where new case confirmed

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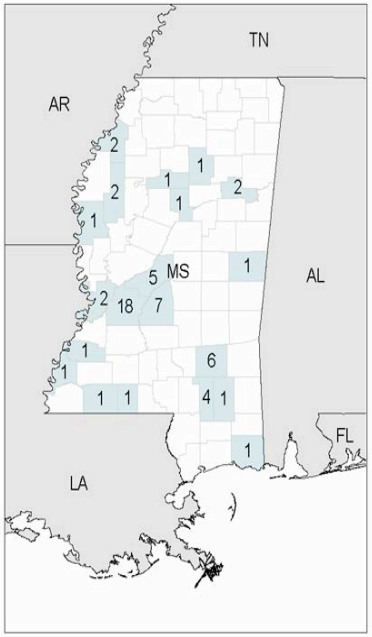
Skin Infections/Other

- Methicillin Resistant *Staphylococcal aureus* (MRSA)
  - 30 cases reported, 3 confirmed
- Tinea corporis
- Folliculitis
- Varicella
- Presumed viral conjunctivitis
- Others: scabies, head lice, arthropod bites, immersion foot, animal bites

Vector-borne Infections

Human West Nile virus cases by county, Mississippi, 2005*

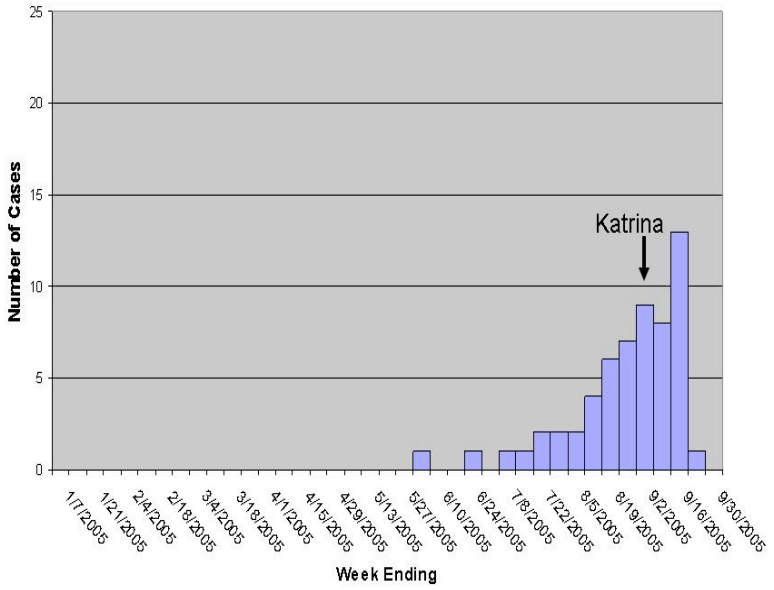
Adams	1
Amite	1
Calhoun	1
Clay	2
Coahoma	2
Forrest	4
Grenada	1
Hinds	18
Jackson	1
Jefferson	1
Jones	6
Kemper	1
Madison	5
Montgomery	1
Perry	1
Pike	1
Rankin	7
Sunflower	2
Warren	2
Washington	1
Mississippi	59



*Reported as of 10/3/2005

ArboNET CDC

Human West Nile virus cases by week of onset, Mississippi, 2005*



*Reported as of 10/3/2005

ArboNET CDC

Other Infectious Disease Challenges

- Continuity of HIV/AIDS Patient Care
- Recommended Responder Vaccinations
  - To address vaccine-preventable disease risks to responders
    - Tetanus if not up to date
    - Hepatitis B if patient care or exposure to bodily fluids
    - If working in large ECs, other vaccines as recommended for evacuees

Other Infectious Disease Challenges (Prevention)

- Recommended Evacuee Vaccinations
  - To ensure children, adolescents, and adults were protected by maintaining current, standard vaccine recommendations
  - To reduce likelihood of outbreaks of vaccine-preventable diseases in the large, crowded group settings

Other Infectious Disease Challenges (Prevention)

- Recommended Evacuee Vaccinations
  - For routine vaccinations, assume up-to-date and follow schedule for age
  - For crowded group settings:
    - Influenza (≥ 6m)
    - Varicella (≥ 12m unless history of chickenpox or record)
    - MMR (≥12m and borne 1957 or after, if no record of 2 shots)
    - Hepatitis A (≥ 2y, one dose, unless history or record)

Summary

- Infections consistent with those endemic to the affected regions and are predictable
- Only 1 outbreak of illness (diarrhea) resulted in a request for additional response assistance
- Longer-term displacement and medical system disruption presented treatment challenges for those on pre-hurricane treatment for infectious diseases and chronic illnesses
- Unified registration source for evacuees would assist with medical treatment/vaccine registry matching to assure continuity of care

Questions?

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