

Preparedness for Emerging Infections and Bioterrorism: Are We There Yet?

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One bright sunny day...

- A child is brought in for evaluation
- Fever and URI for 2 days
- By the way...
- She has a skin rash

This is her hand...



Courtesy: Michael Anderson,
The New York Times

And this is her pet...



courtesy APHIS USDA

This is a true story

- The New York Times, April 18, 2004
 - By Gretchen Reynolds (NYT) 5347 words
Late Edition - Final , Section 6 , Page 32 ,
Column 1
- “Why Were Doctors Afraid to Treat Rebecca McLester?”

Unknown Skin Lesion

- The worry: smallpox-like lesions
- The problem: who would see her?
- To find smallpox vaccinated health care workers

Unknown Skin Lesion

- The child had monkeypox!
 - Transmitted from prairie dogs that came in contact with a sick African rat
- *In a small town in Illinois*

Are We Prepared?

- Why are we concerned?
- What are some of those diseases?
- What can we do?

Is There a Problem?

<http://www.ahrq.gov/clinic/epcindex.htm#healthcare>

- Training of Clinicians for Public Health Events Relevant to Bioterrorism Preparedness 2001
- “Modest” evidence: detect and manage infectious disease outbreaks
- Very little evidence: bioterrorism preparedness

Is there a problem?

- Provider Perspective
- “On the Front Lines: Family Physicians’ Preparedness for Bioterrorism”
 - FM Chen *et al*, J Fam Pract, 2002:745-750

Provider Perspective

- Oct 2001: 976 Family Physicians
- 63% response!
- 26% felt prepared
- Training would be welcomed

Is there a problem?

- “Ready and Willing? Physicians’ Sense of Preparedness for Bioterrorism”
 - Alexander and Wynia, Health Affairs (Millwood), 2003;22(5):189-97

Physician Perspective

- 526 of 1000 Physicians responded
- 21% felt prepared
- 80% were willing to do what it takes
 - even at the risk of becoming ill

Is There a Problem?

- National Assoc. of Comm. Health Centers, Inc.
- Nov 2001: HC Preparedness Survey
 - 137 Health Centers

Community Health Centers

- 91%
 - Inadequately prepared for a public health emergency involving bioterrorism
- 84%
 - Identified training as a key component

Patient Perspective

- Are our patients at risk?
- Why not?

Our patients

- No different from other patients
- Higher risk sub-categories
 - Foreign Born (migrant/refugees)
 - TB: esp. multi-resistant
 - “Exotic” imported diseases
 - Homeless

Higher Risk?

- Delay in seeking care
 - Care Without Coverage: Too Little Too Late
 - IOM Report 2002, National Academy Press
- With regard to infections
 - More severe illness before seeking care
 - May be transmitted to others
 - Outbreak before you know it!

Higher Risk?

- NACHC Issue Brief #75, July 2003
- PL 107-188: Public Health Security and BioT Preparedness and Response Act of 2002
- Awaiting a report by HHS Secretary
 - Factors that may make underserved areas more vulnerable to biological attacks

Most Recent Survey

- NACHC 2003: Preparedness
- Results not published yet
- Not fully prepared?
- Better prepared than 2001?

So...

- We are not fully prepared
- Our patients are at risk

What are we facing?

- Emerging infections
- Natural disease outbreaks
 - Avian Influenza
 - Monkey pox
 - SARS
 - West Nile Virus
 - Multi-drug resistant TB
 - Community Associated MRSA

What are we facing?

- Agents of Bio-Terrorism
- Category A: easiest to transmit
 - Anthrax
 - Botulism
 - Plague
 - Smallpox
 - Tularemia
 - Viral Hemorrhagic fevers

Recognition of agents

- Easier said than done
- Emerging infections & Bio-T agents
 - Similar presentation
 - Clusters of illness?

Recognition

- Nothing specific
- General symptom complex
 - Most have respiratory component
 - Many have fever and rash

Non-outbreak Situation

- We will all miss the first few cases
- Be aware of clusters of illness
- Are you seeing more than one patient with similar illnesses?
- Are others noting the same?

Non-Outbreak Situation

- Anything common among patients?
- Exposure?
 - Same household
 - Same animal
 - Same substance
 - Sick contact
 - Same travel

Outbreak Situation

- Heightened awareness
- Know what is circulating in your community
- Global Village
 - Your local health district
 - Your state
 - Your country
 - World

Epidemiologic Clues

- Travel History
 - SARS
 - TB
 - Measles (airplane)
- Any sick contacts
 - SARS
 - TB

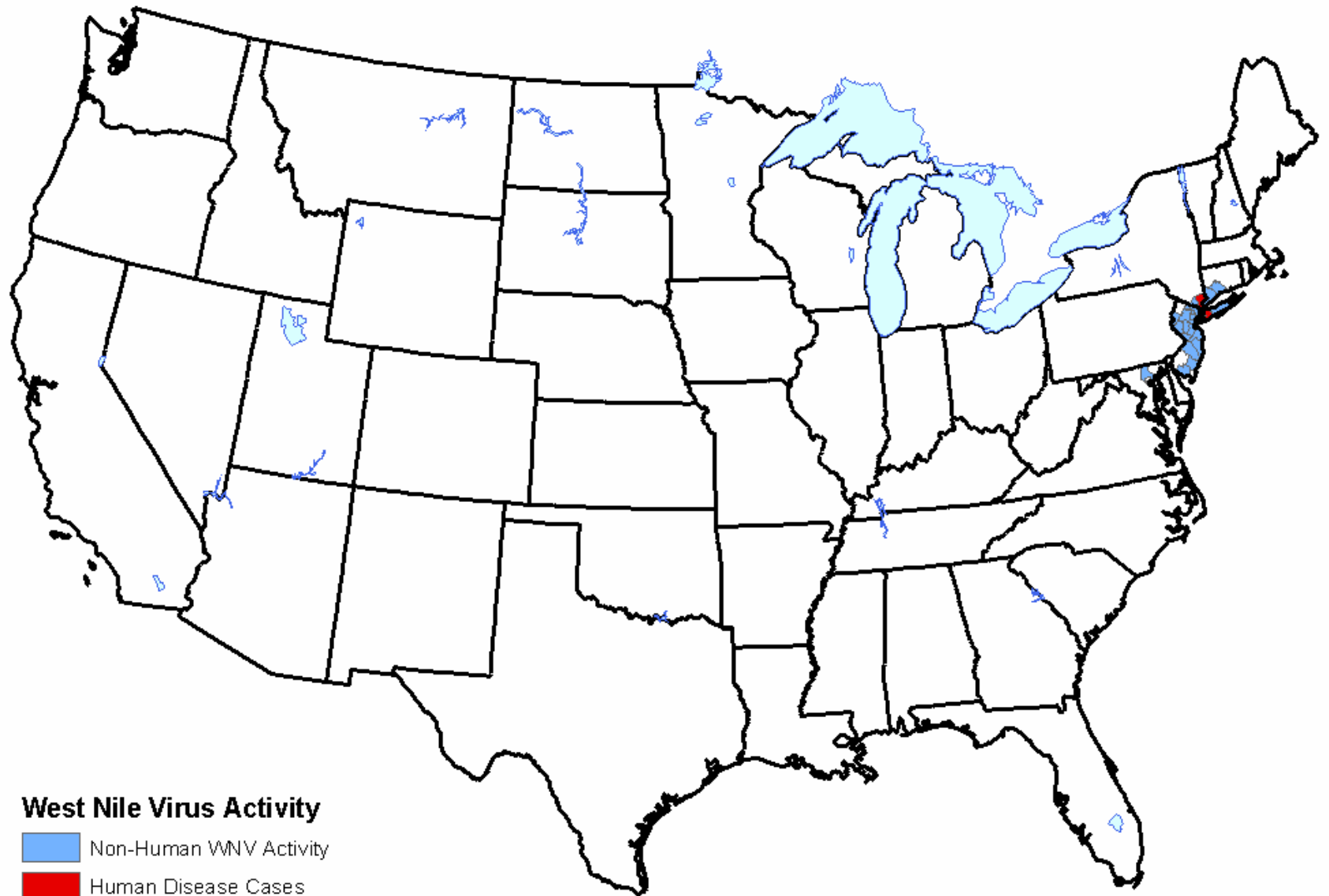
Epidemiologic Clues

- Any contact with animals
 - Tularemia
 - Plague
 - Monkeypox
 - Avian Influenza
- Mosquito exposure
 - West Nile Virus

Some emerging infections

West Nile Virus

- 1937: Uganda
- 1950s: Egypt and Israel
- 1999: First seen in the US
- How did it get here?



National Center for Infectious Diseases
West Nile Virus Activity
Cumulative results for 1999 calendar year

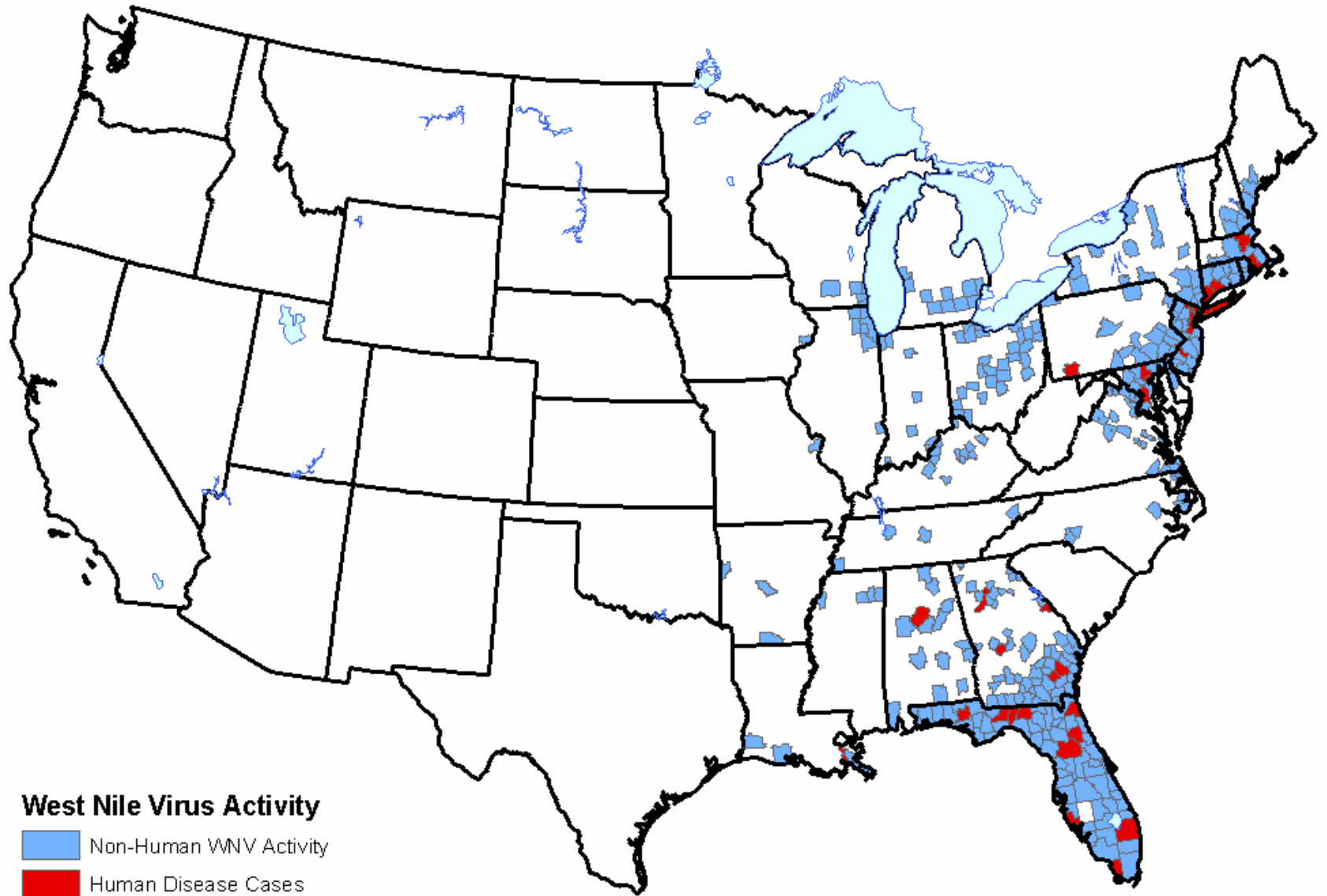
CDC





Community
Health
Association of
Mountain/
Plains
States

National Center for Infectious Diseases
West Nile Virus Activity
Cumulative results for 2000 calendar year

CDC

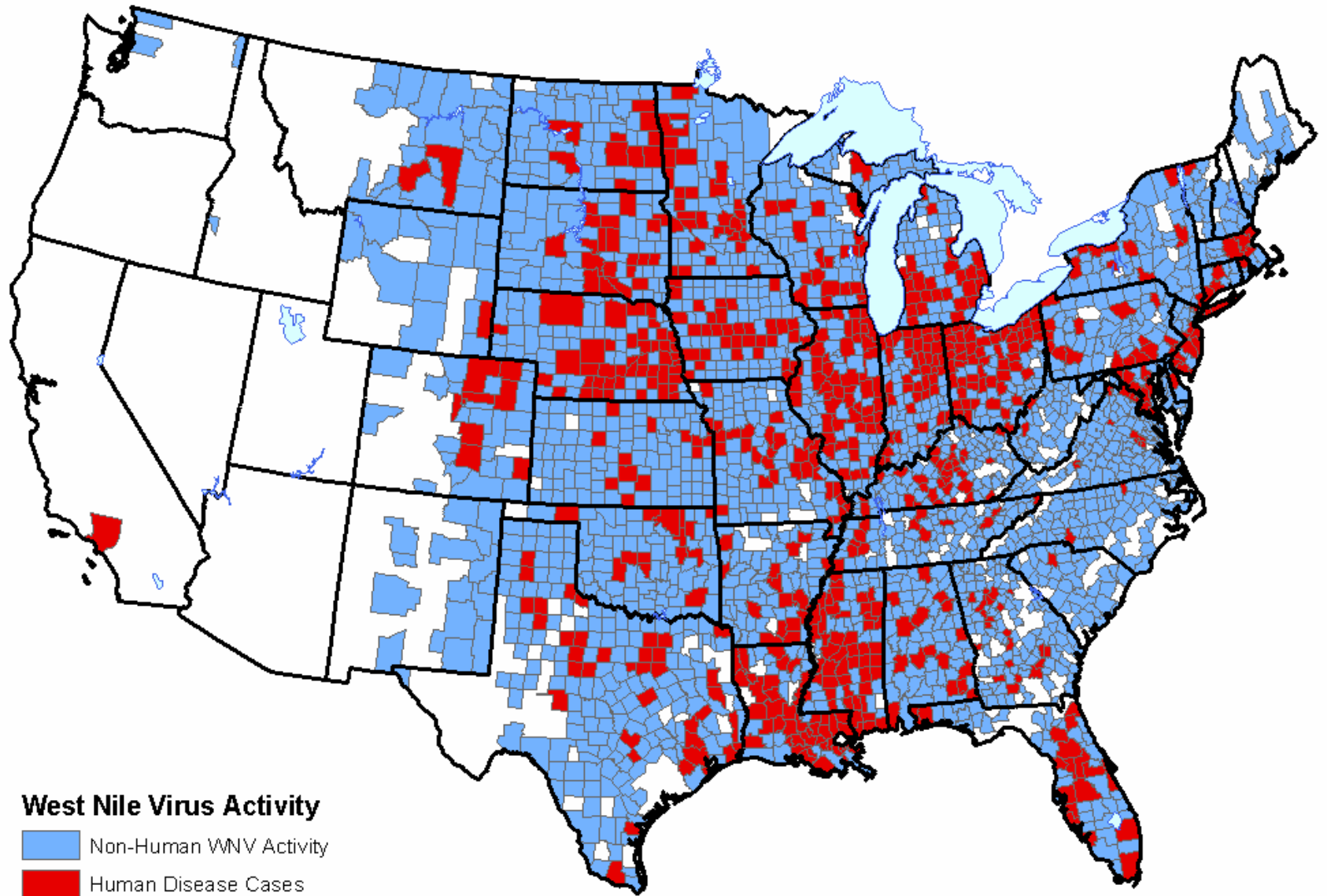


West Nile Virus Activity

-  Non-Human WNV Activity
-  Human Disease Cases



National Center for Infectious Diseases
West Nile Virus Activity
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West Nile Virus Activity

- Non-Human WNV Activity
- Human Disease Cases

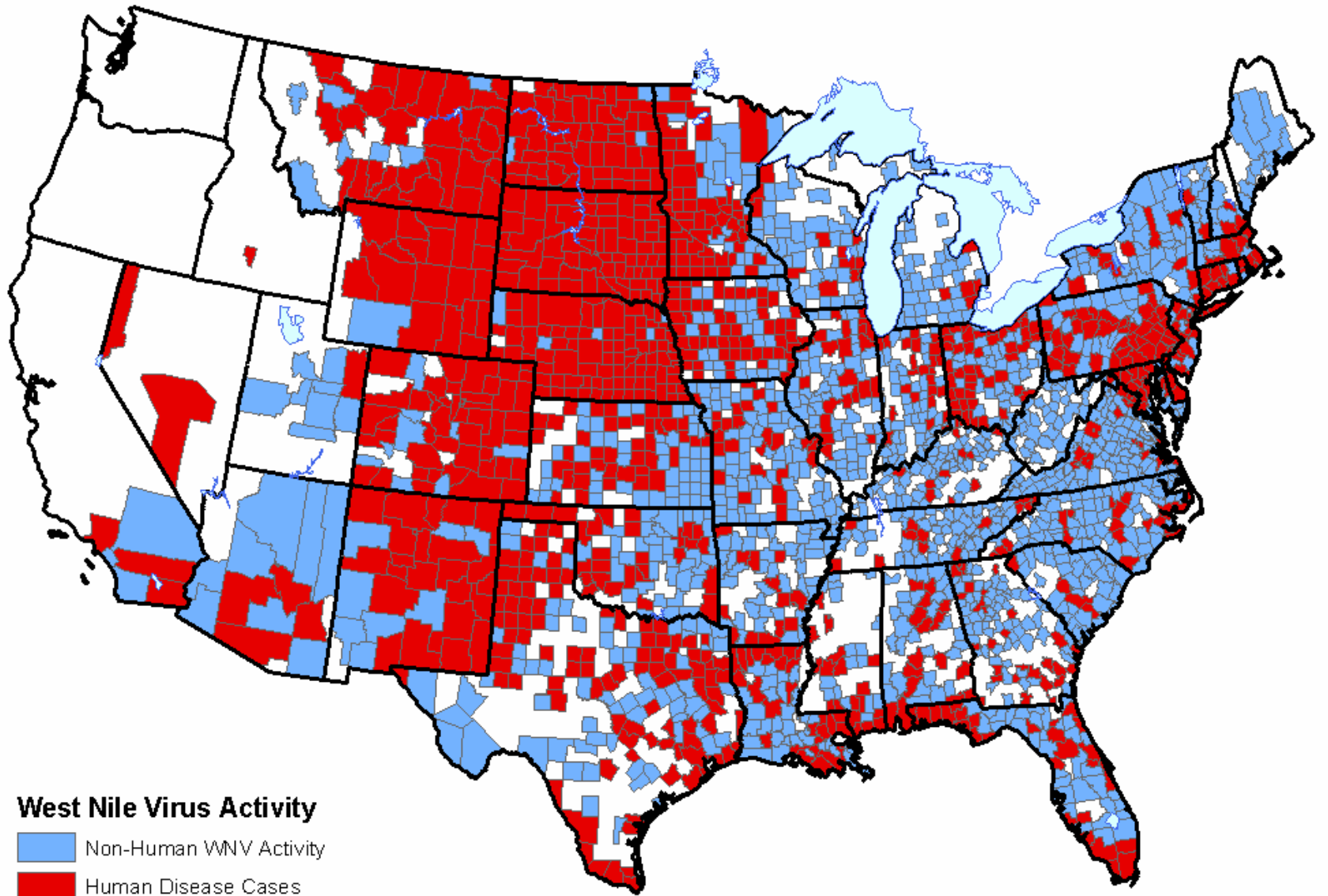


National Center for Infectious Diseases



West Nile Virus Activity

Cumulative results for 2002 calendar year reported as of April 15, 2003

CDC



West Nile Virus Activity

-  Non-Human WNV Activity
-  Human Disease Cases



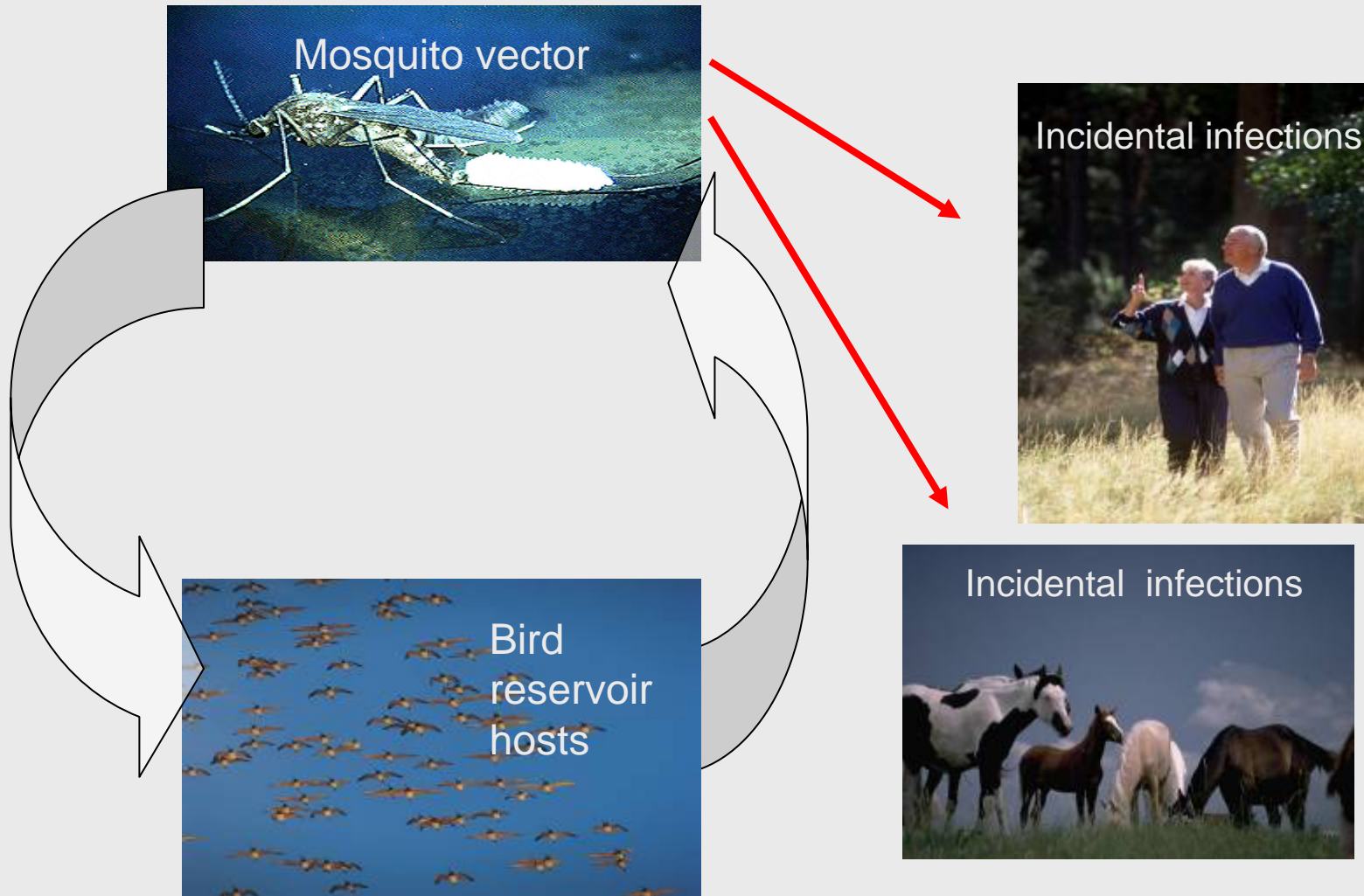
National Center for Infectious Diseases
West Nile Virus Activity
Cumulative results for 2003 calendar year reported as of January 20, 2004



West Nile

- How do you get it?

West Nile Virus Transmission Cycle



West Nile Virus

- Fortunately, most are mild illnesses
- West Nile Fever
 - Acute Febrile Illness
 - Sudden onset
 - Malaise, headache, anorexia
 - Myalgia, nausea and vomiting
 - Rash, lymphadenopathy, eye pain

West Nile

■ Neurological

- Most dreaded manifestation, 1 in 150
- Encephalitis
- Meningitis less common
- Other neurological signs
 - Flaccid paralysis (looks like polio)

West Nile

■ Diagnosis

- High index of suspicion in the summer
- Know what is in your backyard
- Appropriate testing (serum, CSF)

West Nile

- Management
 - Supportive
 - No specific treatment

Anthrax

- Described in history worldwide
- Forms
 - Skin
 - Gastro-intestinal
 - Respiratory system
- Inhalation Anthrax (US): 20th cent.

Anthrax

- Cutaneous (skin)
 - Blister, then painless ulcer
 - Skin necrosis (dying of the skin cells)



Courtesy CDC

Inhalational anthrax

- Patients are sicker
- Mortality is high
- Presents like the flu
- Then pneumonia
- NO PERSON to PERSON SPREAD

Diagnosis of anthrax

- Microbiology specimens
- Alert the lab!
- Seek expert consultation

Management

- Actually it can be treated
- Ciprofloxacin, doxycycline, pen G
- Treatment
- Prophylaxis for exposed persons
- There is a vaccine
 - Used mostly in the military

Monkeypox

- 1958 : lab monkeys
- 1970: first reported human case
- Sporadic cases in Africa
- Surge after smallpox vaccination was stopped?
 - Did the vaccine protect?

US Monkeypox Outbreak

- June 2003
- In the news: mid-west
- Sick African rats were imported
- Contact with local prairie dogs
- Transmitted illness to pets
- Then to humans

Monkeypox features

- A rather long incubation period
 - Upto 12 days
- Fever, muscle aches, headache
- Just like the flu!
- Lymph node swelling
- Rash a few days later

Diagnosis and Management

- Diagnosis by suspicion only
- May look like smallpox
- Needs special diagnostic tests
- No specific treatment
- Smallpox vaccine for the exposed
 - The CDC does recommend this

Monkeypox cases, July 03

State	Cases Under Investigation	Lab-Confirmed Cases
Illinois	13	9
Indiana	16	7
Kansas	1	1
Missouri	2	2
Ohio	1	0
Wisconsin	39	18
Total	72	37

Monkeypox

- Animal to human
- Person to person possible
 - Large respiratory droplets
 - Close contact required
 - Secretions from skin lesion
 - Contaminated bedding/objects

SARS

- Severe Acute Respiratory Syndrome
- This is truly an emerging infection
- Not known to exist before 2003
- Knowledge is still “emerging”
- Current thinking
 - Animal reservoir
 - Civet cats in China?

SARS

- Caused by a coronavirus
 - A mutant cousin of the cold virus!
- Highly communicable
 - Person to person
 - Large droplet: close contact needed
 - From inanimate objects?

SARS

- 2003: 8098 cases with 774 deaths
- The US was largely spared
- Unlucky: Southeast Asia & Canada
- 2004: Handful of cases
 - China
 - Lab accidents

SARS

- Presents like the flu
- No specific treatment
- Highly contagious
- Will it become seasonal?

What does SARS look like?

- Influenza
- Avian influenza
- Other viral respiratory illnesses
- Severe pneumonia

Now that we have
discussed some diseases...

What Constitutes Preparedness?

- No right answer
- Some common denominators
- Start with the Disaster Plan
 - Everyone has one
- Review the communicable disease section

Please hold on...



Courtesy AVG Family

Now – Here is THE plan
you need...



Not so fast...



I can't write YOUR plan!

- We are all the same
- ...Yet different
- We are
 - Urban Community Health Centers
 - Rural Health Centers
 - Homeless Health
 - Migrant Health

We are different

- Different training
- Different expertise
- Resources are variable
- Our disasters are different!
 - Natural disasters: Earthquakes
 - Chemical
 - Near Port-of-Entry

Basic Principles

- Awareness
- Triage area
- Waiting room
 - Can you isolate ill from the well?
- Prompt identification of ill patients
 - Can you take them into a private room?

Respiratory Etiquette (CDC)

- Basic infection control
- Surgical mask for coughing patients
- Masks for front office/intake team

Other Basics

- Personal Protective Equipment (PPE)
 - N95 Mask with fit-testing
 - Gowns, gloves, face shields

Other Basics

- Room cleaning
 - Good disinfectant- hospital grade
- Medical Waste Disposal
- Laundry Facilities



Now...

We have equipped our clinic
and ourselves

Increase our awareness

- Some suggestions
- Disclaimer
 - These are only suggestions
 - Not validated yet

Syndromic Surveillance

- Look for groups of symptoms
- “Syndrome”
- Not specific for anything
- *MAY* suggest an illness

Syndromic Surveillance

- Best Example – Validated
- Influenza-like illness (ILI) surveillance
- Looking for either
 - Fever AND Cough OR
 - Fever AND Sore throat
- During flu season
 - Patient with ILI most likely has the flu!

A Suggestion

- Syndromic surveillance
- In the season: Influenza-like illness
- Other times:
 - Fever with Cough and SOB
 - Modify for West Nile: fever + HA
- Rash with Fever

Sample Work Sheet

	Fever With Cough and SOB or Influenza-like Illness		Rash with Fever		Concerned ?
	Children	Adults	Children	Adults	
Monday					
Tuesday					
Wednesday					
Thursday					
Friday					
Saturday					
Sunday					

Sample work sheet

- What will this alert you to?
- Most of the time
 - The usual suspects!
- Influenza in the winter
- Childhood illnesses
 - Chickenpox
 - Measles

When would I use this?

- Not all the time!
- Large outbreak in the world (SARS)
- Unusual activity in my community
- When threat level is raised to Orange?
 - Otherwise we do not do anything differently

Seen anything unusual?

- Notification
- Local health department
- Technical assistance from them

Partnerships

- Build bridges before the flood!
- Do you know how to contact
 - Your local health department
 - Your State health department
- Do they know you?

Partnerships

- Do you have consult services?
- Can you call someone?
- Where can you refer your patients?

Communication is the key

- Bi-directional
- Current information
 - Accurate and timely
 - Where will you get it?
 - Health departments
- You will hear a lot from the media
- Rumors/Panic

Communication is the key

- Information TO public health
- You are their eyes and ears!
- They depend on you!

Challenges

- No one size fits all!
- Basic plan: You all have one
- Tailor to your specific needs

Challenges

- RESOURCES
- Training
- Quick access to
 - Information
 - Specialists
 - Public health
- Build bridges now

Scenario 1: Rebecca

- What happened to Rebecca?
- Emergency smallpox vaccination
- Admitted to isolation room
- Supportive care
- Good outcome

Scenario 2

- 36 year old woman
- Presents with fever and cough
- Slowly progressing
- Walks in to the waiting room
- She is actively coughing

Scenario 2

- No travel history
- No risk factors for TB
- By the way...

Scenario 2

- Live-in Nanny
- The employer is also sick
- The employer just returned from a business trip to China

Scenario 2: Respiratory

- What would you do?

Scenario 2

- You are concerned
- Differential includes
 - SARS
 - Influenza: avian and human
 - Other viral disease
 - Other bacterial disease
 - A new disease?

Scenario 2: Respiratory

- Mask for patient and providers
- Isolate in private room
- Basics: Is she stable?
- What does her employer have?
- Call local HD and local ER
- Who are her contacts?

Acknowledgements

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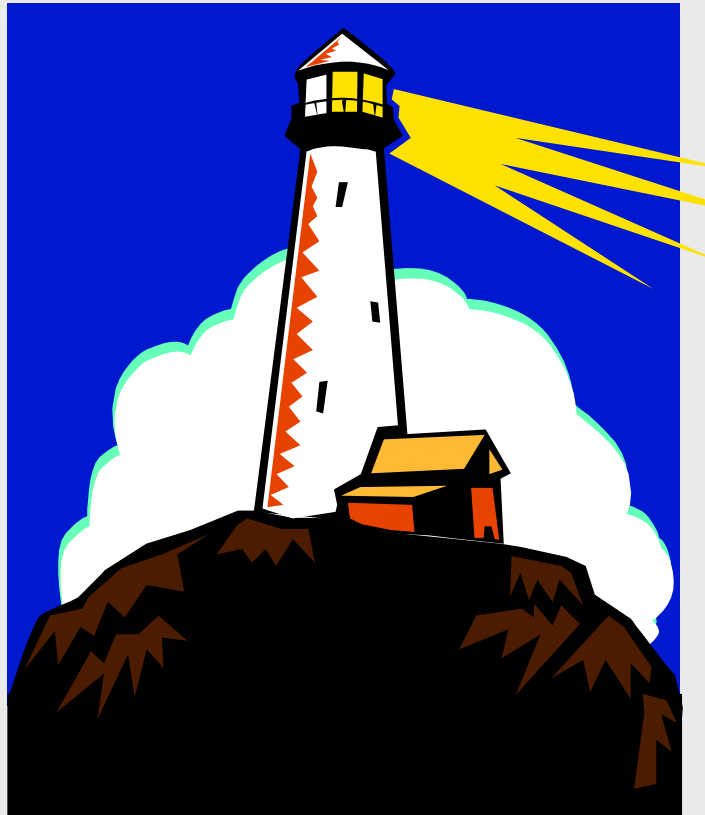
This is where we work...



And this is where we play...



Questions and Comments



Resources

- Local HD and State HD websites
- www.cdc.gov
- <http://www.bt.cdc.gov/>
- Other government sites
- Major university sites
- National associations (NACHC)

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Dr. Gundlapalli is board certified in internal medicine and infectious diseases and has received training in both basic and clinical research. His research interests include issues in infection control, epidemiology of upper respiratory infections, public health surveillance for emerging infections and agents of bioterrorism, and health care for the homeless. He is actively involved in research and teaching at the University of Utah School Of Medicine and has presented his work at national and international meetings. Dr. Gundlapalli has also been invited by several local and national organizations to lecture on topics relating to infectious diseases and public health.

Adi Gundlapalli received his basic medical training in India and graduate training in immunology at the University of Connecticut Health Center in Farmington, CT. He then completed an internal medicine residency at the University of Connecticut and moved to the University of Utah School Of Medicine where he completed a fellowship in infectious diseases and hospital epidemiology. He is currently the medical director of Wasatch Homeless Health Care, Inc. in Salt Lake City, Utah and adjunct assistant professor of medicine at the University of Utah School Of Medicine .