

**Emerging Diseases in the U.S.**



Sue Moore, MSN, RN, APRN, NP-C

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**Topics**

- Diseases spreading in the U.S.
  - Zika
  - Chikungunya
  - Dengue
  - West Nile
- Assessing fever in a returned traveller

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**Emerging Diseases**

- Why diseases are spreading into the U.S.
- Where the disease is now and where it's expected to spread
- Transmission
- Incubation
- Testing
- Signs and symptoms
- Treatment

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### Why Spreading?

- The speed of international travel
  - The lady who caught malaria in suburban L.A.
- Climate change – temperature is increasing
  - Mosquitos that can carry the diseases are able to survive at more northern latitudes
  - Increases in precipitation in some areas allow for increased mosquito reproduction

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### ZIKA



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### Zika Cases

- First noted in Africa in 1947
- First diagnosis in the U.S. – Houston, January, 2016
- U.S. areas with local transmission
  - Florida – 59 cases
  - American Samoa – 47 cases
  - Puerto Rico – 21, 535
  - U.S. Virgin Islands – 406
- 3,566 Travel – associated cases

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### Zika Transmission

- Mosquito
  - *Aedes aegypti*
  - *Aedes albopictus*
  - Prefer biting humans
  - Lives indoors and outdoors
  - Mostly daytime biter
  - Does not travel more than 1/2 mile from home

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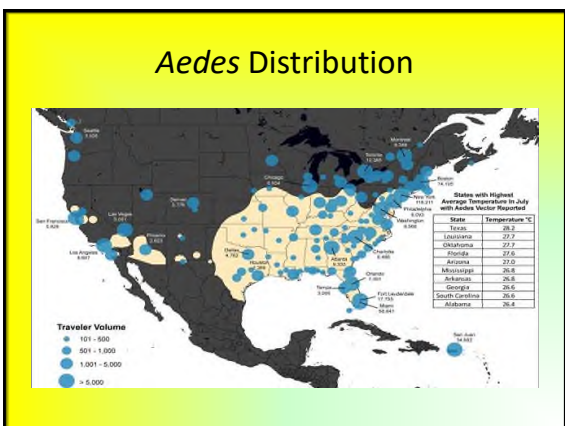
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### Zika Transmission

- Maternal
  - In utero
  - During delivery
  - No transmission in breast milk yet
- Sex
  - Vaginal and anal penetration
- Blood transfusion
- Lab exposure

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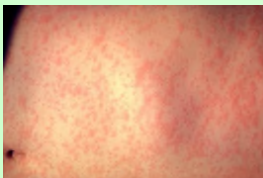
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### Zika

- Incubation period
  - 3 – 12 days after a bite or sexual exposure
- Signs and symptoms
  - Most victims have no signs or symptoms
  - Fever
  - Rash (viral exanthem)
  - Joint pain
  - Conjunctivitis



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### Complications

- Microcephaly
- Guillain-Barre Syndrome
- Brain changes in adults



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### Testing

- Many state health departments can now test for Zika
- Nevada's samples go to California

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### Testing Guidelines

- Symptomatic person less than 14 days after travelling in Zika area – Urine sample, DNA testing. If negative, do serum antibody testing
- Asymptomatic pregnant person less than 14 days after travel to Zika area – DNA testing; if negative, antibody testing
- In Zika areas, antibody testing for ALL pregnant people

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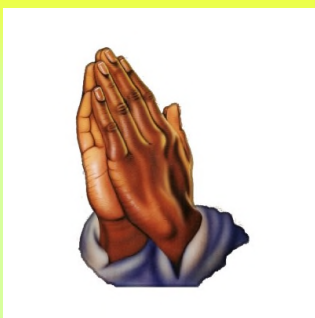
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### Treatment

- Supportive



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### Prevention

- Zika areas - Avoid mosquitos, get rid of standing water, DEET
  - Not helpful - mosquito nets, bug zappers, staying indoors
- Non-Zika areas
  - Avoid mosquito bites for 3 weeks after returning from an area where Zika is present
- Use condoms for 3 weeks after travel to Zika area
- Females – wait 8 weeks before stopping birth control

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### Chikungunya

- Originated in Africa
- Few outbreaks in Asia
- Italy 2007
- U.S. – First local transmission was in Florida in July, 2014.
- 1.8 million suspected and confirmed infections world wide by 2016.

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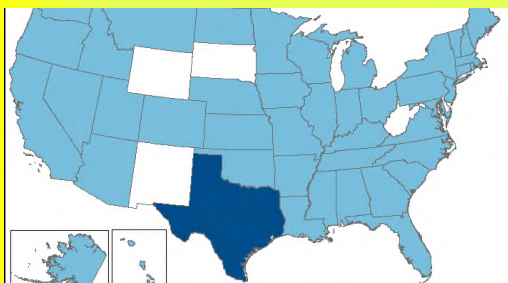
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### Chikungunya 2015



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### Transmission

- Same mosquitos as Zika
- Blood products/organ transplants
- Mother to child during birth
- No evidence of sexual or fetal transmission

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### Chikungunya

- Incubation Period 2 – 4 days, max 12 days
- Signs and symptoms - only 2% not symptomatic
  - High fever
  - Joint pain (The name of the disease means “bent”)
    - Symmetrical, hands, wrists, ankles
  - Viral exanthem
  - Headache, GI symptoms
  - Conjunctivitis
- Lasts 7 – 10 days
- Joint pains intermittent up to 3 years or more

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### Chikungunya

- Complications
  - Older than 65
  - Meningoencephalitis
  - Guillain-Barre
  - Ocular inflammations
  - Deafness
  - Hepatitis
  - Kidney failure

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### Testing

- Serology is first tool – antibody testing
- No set CDC guidelines

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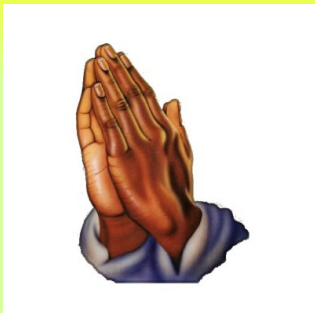
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### Treatment

- Supportive



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### Dengue

- Originated in Africa
- The most prevalent mosquito-borne viral disease
- 390,000,000 infections per year
- Four different viruses
- If get one virus, not immune to another virus, in fact, will be sicker if catch a second strain

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### Dengue Distribution



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## Dengue

- Transmission
  - Local transmission in Louisiana, Texas, Hawaii, Florida, Caribbean, American Samoa
  - Same mosquito as Chikungunya and Zika
- Incubation period
  - 3 – 14 days

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## Signs and Symptoms

- “Break bone fever” – terrible muscle aches
- High fever
- Headache
- N&V, cough, sore throat, nasal congestion
- Hepatomegaly, conjunctivitis, swollen glands
- “Saddleback fever” – fever 4 – 5 days, then feel better, then may get sick again (5%)
  - If get sick again, more likely to become hemorrhagic
    - Petechiae, anemia, epistaxis, distributive shock, thrombocytopenia
- Fatigue lasting for weeks

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## Testing

- Serum antibody testing if more than 3 days after onset of symptoms

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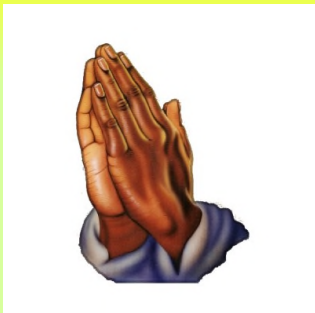
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### Treatment

- Supportive



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### West Nile Virus

- Is a member of the Japanese encephalitis virus antigenic complex
- Originated in Africa
- First diagnosed in U.S. in 1999
- Most abundant in cities and farms

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### West Nile Distribution



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### Transmission

- Can live in MOST mosquitos – found in over 50 serotypes already
- Robins are important host
- Rare transmission to fetus

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### West Nile Virus

- Incubation period – 2 - 14 days
- Signs and symptoms
  - 75% get no symptoms at all
  - Fever
  - Muscle and joint aches
  - Anorexia
  - Viral exanthem, conjunctivitis, etc.

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### Complications

- Encephalitis, meningitis, paralysis
- Extrapramidal reactions
- More likely in over 65, alcoholics, diabetics
- 10% mortality

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### Treatment

- Supportive



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### Fever in Returned Traveler

- Most common cause of death while travelling? Car crash
- Most common cause of vaccine-preventable death in travellers? Hepatitis A
- Most common mosquito-borne disease world-wide? Malaria
- 25,000,000 U.S. citizens travel internationally every year
- 5 – 10% get a fever on return
- Half of those have a fever related to travel
  - Half of those know what they have

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### Fever in a Returned Traveller

- Why did they go?
  - Safest travel: the military
  - Tourism and business
  - Visiting and volunteering
  - Returning to family home
  - Religious travel
- Where did they go?
  - Get as precise as possible
- When did they go? Over 2 weeks?

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### Preparing for Travel

- <http://wwwnc.cdc.gov/travel/destinations/list>



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