Springdale Health Department
Zika Virus Prevention
June 2016
Zika Virus

- Single stranded RNA Virus
- Genus *Flavivirus*, Family *Flaviviridae*
- Closely related to dengue, yellow fever, Japanese encephalitis and West Nile viruses
- Transmitted to humans primarily by *Aedes (Stegomyia)* species mosquitoes
Zika Virus Vectors: 
**Aedes Mosquitoes**

- *Aedes* species mosquitoes
  - *Ae aegypti* more efficient vectors for humans
  - *Ae albopictus* commonly found in Southwest Ohio

- Also transmit dengue and chikungunya viruses
- Lay eggs in domestic water-holding containers
- Live indoors and outdoors
- Aggressive daytime biters; can also bite at night
- Prefer to bite people
Aedes Albopictus

Aedes albopictus is a small, dark mosquito with a white dorsal stripe and banded legs.

- They are strongly attracted to bite humans, but will feed on cats, dogs, squirrels, deer and other mammals, as well as birds.

- They will bite any exposed skin surface. They bite outdoors and indoors, but are usually found outside.
Aedes Albopictus

• These mosquitoes can use natural locations or habitats (for example treeholes and plants) and artificial containers with water to lay their eggs.

• About four or five days after feeding on blood, the female mosquito lays her eggs just above the surface of the water. When rain covers the eggs with water, the larvae hatch.
Aedes Albopictus

• Generally larvae feed upon small aquatic organisms, algae and particles of plant and animal material in water-filled containers.

• The entire immature or aquatic cycle (i.e., from egg to adult) can occur in as little as 7-9 days. The life span for adult mosquitoes is around three weeks.
Aedes Albopictus

• They have a short flight range (less than 200 m (656 ft)), so egg production sites are likely to be close to where this mosquito is found.

• Aedes albopictus mosquitoes remain alive through the winter in the egg stage in temperate climates (areas with four seasons) but are active throughout the year in tropical and subtropical locations.
Aedes Albopictus Habitat

• The Aedes albopitus mosquito lays its eggs on the inner sides of water-holding receptacles in urban, suburban, and rural areas as well as in nearby edges of forested areas.

• Aedes albopictus is closely associated with vegetated areas in and around homes. The immature forms (larvae and pupae) are found in artificial containers with water such as tires, flower pots, plates under potted plants, cemetery urns/vases, buckets, tin cans, clogged rain gutters, ornamental ponds, drums, water bowls for pets, birdbaths, etc.

• In some instances this species has been found in catch basins. Larvae can also be found in natural habitats such as tree holes, rock holes, hollow bamboo stumps, and leaf axils.
Estimated range of *Aedes aegypti* and *Aedes albopictus* in the United States, 2016*

* *Aedes aegypti* mosquitoes are more likely to spread viruses like Zika, dengue, chikungunya than other types of mosquitoes such as *Aedes albopictus* mosquitoes.

- These maps show CDC’s best estimate of the potential range of *Aedes aegypti* and *Aedes albopictus* in the United States.
- These maps include areas where mosquitoes are or have been previously found.
- Shaded areas on the maps do not necessarily mean that there are infected mosquitoes in that area.

*Maps have been updated from a variety of sources. These maps represent CDC’s best estimate of the potential range of *Aedes aegypti* and *Aedes albopictus* in the United States. Maps are not meant to represent risk for spread of disease.*

Other Modes of Transmission

- Maternal-fetal
  - Intrauterine
  - Perinatal
- Sexual
- Laboratory exposure
- Theoretical
  - Blood transfusion
  - Organ or tissue transplantation

Zika Virus and Sexual Transmission

- Zika virus can be spread by a man to his sex partners

- Pregnant women with male partners who have or are at risk of Zika virus infection should abstain or use condoms for the duration of pregnancy
Zika Virus Disease Symptoms

- Most common symptoms include:
  - Rash
  - Fever
  - Joint pain
  - Conjunctivitis (red eyes)

- Other symptoms include:
  - Muscle pain
  - Headache
Zika Virus Clinical Disease Course and Outcomes

- Clinical illness usually mild
- Symptoms last several days to a week
- Severe disease requiring hospitalization uncommon
- Fatalities are rare
- Guillain-Barré syndrome reported in patients following suspected Zika virus infection
  - Relationship to Zika virus infection under investigation
Complications of Zika Virus

- Guillain-Barré syndrome (GBS) has been reported after Zika virus infection, but causal link has not been established
  - Unclear how many people have had GBS after Zika virus infection
  - Brazil: 6 patients aged 2-57 years with neurologic syndromes (GBS and Acute Disseminated Encephalomyelitis) after Zika infection
  - French Polynesia: 38 cases of GBS, none among children
  - Overall, GBS incidence appears to increase with increasing age
Distinguishing Zika from Dengue and Chikungunya

- Dengue and chikungunya viruses transmitted by same mosquitoes with similar ecology
- Dengue and chikungunya can circulate in same area and rarely cause co-infections
- Diseases have similar clinical features
- Important to rule out dengue, as proper clinical management can improve outcome*

Zika Virus Epidemiology

- First isolated from a monkey in Uganda in 1947
- Prior to 2007, only sporadic human disease cases reported from Africa and southeast Asia
- In 2007, first outbreak reported on Yap Island, Federated States of Micronesia
- In 2013–2014, >28,000 suspected cases reported from French Polynesia*

Zika Virus in Yap Island Outbreak

- Infection rate: 73% (95%CI 68–77%)
- Symptomatic attack rate among infected: 18% (95%CI 10–27%)
- All age groups affected
- Adults more likely to present for medical care
- No severe disease, hospitalizations, or deaths

Note: Rates based on serosurvey on Yap Island, 2007 (population 7,391)

Duffy M. NEJM 2009
Zika Virus in the Americas

- In May 2015, the first locally-acquired cases in the Americas were reported in Brazil.
- Currently, outbreaks are occurring in many countries or territories in the Americas, including the Commonwealth of Puerto Rico, the U.S. Virgin Islands, and American Samoa.
- Spread to other countries likely.

*Last updated March 22nd*
Zika Virus in the United States

- Local vector-borne transmission of Zika virus has not been reported in the continental United States
- With current outbreak in the Americas, cases among U.S. travelers will likely increase
- Imported cases may result in virus introduction and local transmission in some areas of U.S.
Zika Virus in the United States, May 2016

- **US States**
  - 591 travel-associated cases
    - 168 pregnant women
    - 11 sexually transmitted
    - 0 locally-acquired vector-borne cases

- **US Territories**
  - 4 travel-associated cases
  - 935 locally acquired cases
    - 142 pregnant women
Laboratories for Diagnostic Testing

- No commercially-available diagnostic tests
- Testing performed at CDC and a few state health departments
- CDC is working to expand laboratory diagnostic testing in states through the Laboratory Response Network (LRN)
- Healthcare providers should contact their state or territorial health department to facilitate diagnostic testing
Initial Assessment and Treatment

- No specific antiviral therapy
- Treatment is supportive (i.e., rest, fluids, analgesics, antipyretics)
- Suspected Zika virus infections should be evaluated and managed for possible dengue or chikungunya virus infections
- Aspirin and other NSAIDs should be avoided until dengue can be ruled out to reduce the risk of hemorrhage
Reporting Zika Virus Disease Cases

- Zika virus disease is a nationally notifiable disease
  - Healthcare providers are encouraged to report cases with laboratory evidence of Zika infection to their state, tribal, local, or territorial health department
- Health departments are requested to report cases with laboratory evidence of Zika infection to CDC
- Timely reporting allows health departments to assess and reduce the risk of local transmission or mitigate further spread
Zika Virus Preventive Measures in Puerto Rico

- No vaccine or medication to prevent infection or disease
- Primary prevention measure is to reduce mosquito exposure
- Protect infected people from mosquito exposure during first week of illness to prevent further transmission
Zika Virus in Pregnant Women
Protecting Pregnant Women: Zika Prevention Kits (ZPKs)

- What’s in a ZPK- Wave 1 for Puerto Rico?
  - Educational materials in English and Spanish
  - EPA-registered insect repellent
  - Condoms to reduce possible sexual transmission of Zika
  - Thermometer
  - Treatment tabs for preventing mosquitoes from breeding in standing water
  - Bed net
Zika Virus in Pregnancy

- Limited information is available
- Existing data show:
  - No evidence of increased susceptibility
  - No evidence of more severe disease compared with non-pregnant people

Centers for Disease Control and Prevention, *CDC Health Advisory: Recognizing, Managing, and Reporting Zika Virus Infections in Travelers Returning from Central America, South America, the Caribbean and Mexico*, 2016.


Guidelines for Breastfeeding for Mothers with Zika Virus Infection and Living in Areas with Zika virus

- Zika virus RNA has been identified in breast milk
- Zika virus has not been cultured from breast milk
- No cases of Zika transmission associated with breastfeeding have been reported
- Mothers are encouraged to breastfeed their infants
- Current evidence: benefits of breastfeeding outweigh theoretical risks
What is Microcephaly?

- Clinical finding of a small head when compared to infants of same sex and age
- Reliable assessment of intracranial brain volume
- Often leads to cognitive and/or neurologic issues
- Mechanisms
  - Primary due to abnormal development (often with a genetic etiology)
  - Secondary due to destruction of normally-forming brain tissue (by infection, vascular disruption)
Microcephaly Surveillance and Monitoring

- Difficult birth defect to monitor because of inconsistent definition and use of terminology
- Typically, in the US, below the third percentile on a standard growth chart identifies infants with microcephaly. However, standards can vary
  - CDC guidelines for evaluation and testing of infants with possible congenital Zika virus infection provide a standard case definition for microcephaly
Pregnancy Outcomes and Zika Virus

• A range of other problems have been detected among fetuses and infants infected with Zika virus before birth including:
  • Absent or poorly developed brain structure
  • Defects of the eye
  • Impaired growth

• Although Zika has been linked with birth defects and other problems in infants, there is more to learn

• Researchers are collecting data to better understand the impact of Zika on mothers and their children
CDC Recommendations: Pregnant Women Considering Travel

- Pregnant women in any trimester should consider postponing travel to areas where Zika is present

- Pregnant women who do travel to one of these areas should talk to their healthcare provider and strictly follow steps to avoid mosquito bites during the trip
Zika Virus Disease Prevention: Pregnant Women

- CDC recommends taking the following steps to prevent mosquito bites:
  - Use EPA-registered insect repellents, including DEET and permethrin
  - Wear long-sleeved shirts and pants to cover exposed skin
  - Stay and sleep in screened-in or air-conditioned rooms
  - Wear permethrin-treated clothes
  - Practice mosquito prevention strategies indoors and outdoors throughout the entire day

- Pregnant women with male partners who have Zika virus infection should take the following measures to prevent sexual transmission:
  - Use condoms the right way every time or
  - Abstain from sexual activity for the duration of pregnancy
Acute Zika Virus Disease in Infants and Children
Clinical Manifestations of Zika Virus in Children

- Most children asymptomatic or have mild illness
- Zika virus outbreak in Yap Island, Micronesia, 2007
  - Illness reported in persons 1-76 years of age
  - Most common signs and symptoms: rash (macular or papular), fever, joint pain (arthritic like symptoms), conjunctivitis
  - Children 0-19 years had lower attack rates than adults 20-59 years
- Among 8 travel-related cases of Zika virus disease in children in US
  - All had rash and at least one additional manifestation (fever, arthralgia, and nonpurulent conjunctivitis)


CDC unpublished data, 2016
Prevention of Zika Virus in Infants and Children

- Mosquito prevention
  - Air conditioning or window and door screens when indoors
  - Long-sleeves and long pants
  - Use permethrin-treated clothing and gear
  - When use as directed on the product label, most EPA*-registered insect repellants can be used in children ≥ 2 months
  - Oil of lemon eucalyptus should not be used in children < 3 years old
  - Mosquito netting for carriers, strollers, or cribs for infants

*N= Environmental Protection Agency

Nasci, RS et al. Protection against Mosquitoes, Ticks, & Other Arthropods in Chapter 2: The Pre-Travel Consultation: Counseling & Advice for Travelers
Prevention of Zika Virus Infection in Infants and Children

- Healthcare providers should educate parents and caregivers about mosquito bite prevention in infants and children if they are traveling to or residing in areas affected by Zika virus.

- Parents should protect infants and children with Zika virus from mosquito bites for at least one week to decrease risk of transmission to others.
CDC Activities and Plans
CDC Response to Zika
CDC Activities and Plans

- Very little is known about the risks of Zika virus infection during pregnancy.
- Increased understanding of the impact of Zika virus infection on pregnant women and their infants is needed.
- To learn more about the impact of Zika virus infection during pregnancy, CDC is collaborating with state, tribal, local, and territorial health departments to collect information about women infected with Zika virus during pregnancy and their infants.
- The information collected will:
  - Direct public health efforts intended to mitigate the impact of Zika virus infection.
  - Guide recommendations for the monitoring and treatment of women affected by Zika during pregnancy.
Zika Pregnancy Surveillance

- In collaboration with state and territorial health departments, CDC has established two surveillance systems for pregnant women with Zika virus infection
  - US Zika Pregnancy Registry
    - 50 U.S. States & Washington, DC
  - Zika Active Pregnancy Surveillance System (ZAPSS)
    - Puerto Rico
    - Data collected via medical record abstraction
- Surveillance systems will facilitate public health response for pregnant women with Zika virus infection
Summary

- Zika virus continues to circulate and cause locally-transmitted disease in the Americas
- Consider the possibility of Zika virus infection in travelers with acute fever, rash, arthralgia, or conjunctivitis within 2 weeks after return
- A substantial increase in rates of congenital microcephaly have been reported in Brazil
  - Research is underway to characterize the relationship between Zika and congenital microcephaly
- Pregnant women in any trimester should consider postponing travel to areas of Zika virus transmission