Zika Virus Update

Clinical Considerations for Vulnerable Populations

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Epidemic Intelligence Service Officer
Regional Zoonotic Disease Training
April 29, 2016
1947: Zika virus (ZIKV) was isolated from a febrile monkey in Uganda

1951–1981: ZIKV reported sporadically in humans in central Africa, India, Indonesia, Malaysia, Philippines, Thailand, and Vietnam

2007: ZIKV outbreak reported on Yap Island, Federated States of Micronesia; attack rate 73%

No increased incidence of fetal abnormalities reported in Yap
Where Is Yap?
ZIKV Comes to America

2007–2015: Several pacific islands reported ZIKV outbreaks and sporadic disease activity

May 2015: Pan American Health Organization (PAHO) issued an alert that cases of ZIKV were confirmed in Brazil

February 8, 2016: Centers for Disease Control and Prevention (CDC) elevated ZIKV response efforts to a Level 1 activation due to active transmission reported in 36 countries

April 20, 2016: There were 388 travel-associated cases in the US
Areas of Active ZIKV Transmission

as of April 18, 2016

Reported active transmission

March 10, 2016: West Virginia reported first lab-confirmed travel-associated ZIKV case

Another emerging infectious disease

- 2013: Chikungunya
- 2014: Ebola
- 2015: Zika

Travel-associated ZIKV cases pose an infection risk for residents of West Virginia
Epidemiology of ZIKV

Arbovirus in the flavivirus family
- Flavivirus family includes Dengue, West Nile, Yellow Fever

Transmitted primarily by the bite of *Aedes* mosquitoes
- *Aedes aegypti* and *Aedes albopictus* are present in the US

Does not require development or amplification in the vector
- Rapid autochthonous transmission in densely populated areas
Possible ZIKV Vector in West Virginia

*Aedes albopictus*

- Aggressive daytime feeder
- Multiple bites before resting
- Container breeder
- Competent vector for:
  - Chikungunya
  - Dengue
  - La Crosse Encephalitis
  - Zika
Alternate Modes of Transmission

Vertical transmission (maternal-child) across the placenta or during delivery
- No documented cases from breastfeeding

Sexual transmission (through semen)

Blood transfusion

Tissue donation
Vertical Transmission

ZIKV transmission across placenta
- ZIKV detected in fetal brain tissue
- Findings on prenatal ultrasound
- Linked to congenital brain defects
- Mothers may be asymptomatic

ZIKV transmission through exposure during delivery
- Viremia during delivery confers risk of transmission through perinatal exposure to blood or body fluids

Breast feeding is still recommended

Eight cases of transmission through semen
- Includes male to male sexual transmission
- Males were symptomatic at the time of transmission
- Unknown how long ZIKV remains alive in semen
- Semen testing not recommended by CDC


### Healthcare-associated Transmission

**No transfusion-related cases have occurred in the US**
- Brazil suspects several cases associated with transfusion
- French Polynesia reports 2.8% blood donors positive
- 80% infected persons asymptomatic
- No FDA-approved screening test detects ZIKV
- Difficult to assure clean blood supplies in endemic areas
Clinical disease

What this means for patients

Public health implications
# ZIKV Infection

## Symptoms
- Fever
- Rash (macules & papules)
- Arthralgia
- Conjunctivitis
- Myalgia
- Headache

## Illness lasts 2–7 days

## Treatment
- Rest
- Oral hydration
- Acetaminophen for fever, pain
- Avoid NSAIDs

80% are asymptomatic
ZIKV Symptoms

Zika can cause:

- Mild fever
- Conjunctivitis
- Headache and joint pain
- Skin rash
ZIKV Lab Confirmation

Virus detection: within 7 days of illness onset
- RT-PCR (real time polymerase chain reaction) at CDC

Serology: 2-12 weeks after exposure
- IgM ELISA (enzyme-linked immunosorbent assay)
- Cross-reacts with Dengue, Yellow Fever, JEV (false positives)

Immunohistochemical staining: after delivery or evacuation
- Tissues from placenta and umbilical cord

Complications of ZIKV

Severe microcephaly and cerebral microcalcifications associated with the 2015 Brazilian outbreak

- More than 4,000 microcephaly cases reported in 2015
- Study released March 2016 revised case number to 574
- Prior case rate of 157 cases per year

Guillain-Barré syndrome

- French Polynesia
- Central and South America
- Caribbean

www.cdc.gov/mmwr/volumes/65/wr/mm6509e2.htm?s_cid=mm6509e2_w
Cerebral microcalcifications

- Historically correlated with intracranial infection in utero
- Non-specific clinical prognosis

Severe microcephaly

- Brain dysgenesis causes the cranium to fail to expand normally
- Ultrasound imaging in confirmed maternal cases
- Post-mortem evaluation of fetal brain structures
- Devastating developmental defect

Pregnancy loss has been reported
Severe Microcephaly

Guillain-Barré Syndrome

Disease affecting peripheral nerves

Autoimmune process post-infection

Symptoms include

- Symmetric ascending weakness
- Sensory component common
- Affects adults > children
- Recovery may be protracted
- Mortality up to 20%
ZIKV Immunity

No antiviral treatment or vaccine

No documented cases of ZIKV re-infection

Unknown duration of natural immunity

There is still a great deal to learn
What We Have Learned About ZIKV

Rapid spread in tropical and subtropical regions

Microcephaly rate increased when introduced into an immune naïve area

Potential for spread in West Virginia

First arbovirus with confirmed sexual transmission

Often asymptomatic, silent threat to fetal development
Advice to Travelers

CDC has issued an Alert Level 2 for 43 countries


Mosquito avoidance and repellant recommendations

- Stay above 2,000 meters elevation
- Full-coverage clothing treated with permethrin
- Applied to skin: DEET (30% recommended; safe >2 months old)
- Area control: Metofluthrin (personal space repellant fans) [www.mosquito.org/repellents](http://www.mosquito.org/repellents)

Condoms or abstinence for male partners of pregnant women

Returning Travelers

West Virginia Department of Health and Human Resources, Bureau for Public Health, Division of Infectious Disease Epidemiology (DIDE) resources:


- DIDE on-call epidemiologist: (304) 558-5358 x1; after hours call (304) 423-1271
Preconception Planning

Women symptomatic from ZIKV should wait 8 weeks before attempting pregnancy

Men symptomatic from ZIKV should wait 6 months before attempting conception

Men and women with possible ZIKV exposure should wait 8 weeks before attempting conception

Residents of areas where ongoing transmission occurs should consult a physician before attempting conception

www.cdc.gov/mmwr/volumes/65/wr/mm6512e2.htm?s_cid=mm6512e2_w
PRECONCEPTION COUNSELING
For Women and Men Living in Areas with Ongoing Spread of Zika Virus Who Are Interested in Conceiving

This guide describes recommendations for counseling women and men living in areas with Zika who want to become pregnant and have not experienced clinical illness consistent with Zika virus disease. This material includes recommendations from CDC's updated guidance, key questions to ask patients, and sample scripts for discussing recommendations and preconception issues. Because a lot of content is outlined for discussion, questions are included throughout the sample script to make sure patients understand what they are being told.

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Key Issue</th>
<th>Questions to Ask</th>
<th>Sample Script</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assess pregnancy intentions</td>
<td>Introduce importance of pregnancy planning</td>
<td>Have you been thinking about having a baby? Would you like to become pregnant in the next year? Are you currently using any form of birth control?</td>
<td>If you are thinking of having a baby, I would like to help you have a healthy and safe pregnancy. With the Zika virus outbreak, planning pregnancy is more important than ever. Preparing and planning for a healthy pregnancy means getting as healthy as you can before becoming pregnant, and also taking the time now to learn about how best to care for yourself during pregnancy.</td>
</tr>
<tr>
<td>Assess risk of Zika virus exposure</td>
<td>Environment</td>
<td>Do you have air conditioning in your home? At work? Do you have window and door screens in your home? At work? Do you have a bed net? Would you consider using one? Do you live in an area with a lot of mosquitoes?</td>
<td>The best way to prevent Zika is to prevent mosquito bites. To protect yourself at home and work, use air conditioning if possible. Install window and door screens and repair any holes to help keep mosquitoes outside. Sleep under a bed net, if air conditioning or screened rooms are not available. Since you live in an area where Zika is spreading, you are at risk of getting Zika. It is important that we discuss the timing of your pregnancy, and ways to prevent infection when you are pregnant. Knowledge check: What are some ways to protect yourself at home and work?</td>
</tr>
<tr>
<td>Assess risk of Zika virus exposure</td>
<td>Personal measures to prevent mosquito bites</td>
<td>Are you willing to wear clothes that cover your skin, like long pants and long-sleeved shirts? Do you dip or spray your clothes with permethrin or wear permethrin-treated clothing (specially treated clothing to keep mosquitoes away)? Do you use insect repellents throughout the day and night? How often do you reapply? Are you following the directions on the label? Do you have standing water near or around your home or workplace?</td>
<td>Now and throughout your pregnancy, you and your partner should take important steps to protect yourselves from getting Zika. Wearing long-sleeved shirts and long pants protects your arms and legs. Treating clothing with permethrin adds another layer of protection, just don’t put it directly on your skin. Use EPA-registered insect repellents with one of the following active ingredients: DEET, picardin, IR3535, or oil of lemon eucalyptus. These insect repellents are safe to use during pregnancy. Always follow the product label instructions and use as directed. This includes reapplying throughout the day as directed on the product label instructions. Help reduce the number of mosquitoes around your home by emptying standing water from flowerpots, gutters, buckets, pool covers, pet water dishes, discarded tires, and bird baths on a regular basis. Knowledge check: How would you describe the steps to protect yourself from mosquito bites?</td>
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# Effectiveness of Family Planning Methods

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<tr>
<th>Most Effective</th>
<th>Reversible</th>
<th>Permanent</th>
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<tr>
<td>Implant</td>
<td>LNG - 0.2% CopperT - 0.8%</td>
<td>Female Sterilization (Abdominal, Laparoscopic, Hysteroscopic)</td>
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<tr>
<td>Male Sterilization (Vasectomy)</td>
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<thead>
<tr>
<th>Injectable</th>
<th>Pill</th>
<th>Patch</th>
<th>Ring</th>
<th>Diaphragm</th>
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<tbody>
<tr>
<td>6%</td>
<td>9%</td>
<td>9%</td>
<td>9%</td>
<td>12%</td>
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<table>
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<tr>
<th>Least Effective</th>
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<tr>
<td>Male Condom</td>
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<tr>
<td>Female Condom</td>
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<tr>
<td>Withdrawal</td>
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<tr>
<td>Sponge</td>
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**Fertility-Awareness Based Methods**: JANUARY

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<td>1 2 3 4 5 6 7</td>
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**Spermicide**

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<td>24%</td>
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*The percentages indicate the number out of every 100 women who experienced an unintended pregnancy within the first year of typical use of each contraceptive method.*

**How to make your method most effective**
- After procedure, little or nothing to do or remember.
- **Vasectomy and hysteroscopic sterilization**: Use another method for first 3 months.

**Injectable**: Get repeat injections on time.
- **Pills**: Take a pill each day.
- **Patch, Ring**: Keep in place, change on time.
- **Diaphragm**: Use correctly every time you have sex.

**Condoms, sponge, withdrawal, spermicides**: Use correctly every time you have sex.
- **Fertility awareness-based methods**: Abstain or use condoms on fertile days. Newest methods (Standard Days Method and TwoDay Method) may be the easiest to use and consequently more effective.

**Condoms should always be used to reduce the risk of sexually transmitted infections.**
What to Tell Pregnant Patients

Postpone travel

Avoid mosquito bites

Avoid contact with infected semen or blood

Seek testing if exposed

Prenatal Care for ZIKV Exposed Patients

Negative serology
- Routine care; consider additional fetal anatomy survey early 3rd trimester

Positive PCR or serology
- False positives are less likely in travelers
- Serial fetal ultrasound every 3-4 weeks for intracranial abnormalities
- Referral to Maternal Fetal Medicine
- Arrange for ZIKV testing at delivery of cord serum and placenta
- If fetal loss: RT-PCR and immunohistochemical staining of fetal tissues, cord, placenta

www.cdc.gov/mmwr/volumes/65/wr/mm6505e2.htm?s_cid=mm6505e2_w
Preventing Transmission to Healthcare Staff

Use standard precautions

Use personal protective equipment during exposure to body fluids and mucous membranes

Use disposable absorbent material on floor for cleaning around birthing procedures to reduce risk of splash

Use standard cleaning and disinfection procedures

www.cdc.gov/mmwr/volumes/65/wr/mm6511e3.htm?s_cid=mm6511e3_w
Acute infection should be suspected in a neonate if
- In the first 2 weeks of life, AND
- Mother traveled or resided in affected area within 2 weeks of delivery, AND
- Has ≥2 of the following: fever, rash, arthralgia, conjunctivitis

Acute infection should be suspected in person <18 years old who
- Traveled to or resided in affected are in last two weeks, AND
- Has ≥2 of the following: fever, rash, arthralgia, conjunctivitis

Disease is mild; treatment is supportive
Evaluating Children for ZIKV

Postnatal ultrasound
- Recommended for neonates of confirmed ZIKV cases

Lumbar puncture is not required
- Cerebrospinal fluid sample is acceptable for testing, if clinically indicated as part of a work-up for infection

www.cdc.gov/mmwr/volumes/65/wr/mm6507e1.htm
Clinical Evaluation for Microcephaly

MEASURING HEAD CIRCUMFERENCE

- Use a measuring tape that cannot be stretched
- Securely wrap the tape around the widest possible circumference of the head
  - Broadest part of the forehead above eyebrow
  - Above the ears
  - Most prominent part of the back of the head
- Take the measurement three times and select the largest measurement to the nearest 0.1 cm
- Optimal measurement at 24-36 hours after birth when molding of the head has subsided

Preventing Transfusion-Related Transmission

Food and Drug Administration (FDA) recommendation for blood collection centers

- Screen with donor travel history questionnaire
- Update educational materials with risks, symptoms of ZIKV; do not donate if exposed or symptomatic in the last 4 weeks
- Donors should inform collection center promptly if diagnosed in the 2 weeks following donation
- Deferral of donors in affected areas until nucleic acid testing of donations is available
- Processes for pathogen reduction being examined

Consider Special Group Education

Student travelers

Humanitarian relief workers

Missionaries

Others?
ZIKV may be a silent, devastating threat to the fetus

Educate persons who plan to travel

Some vulnerable populations may need customized information

Transmission is possible here in West Virginia
Resources

CDC:
- www.cdc.gov/zika

PAHO:

DIDE:
- www.dhhr.wv.gov/oeps/disease/Zoonosis/Mosquito/Pages/zika.aspx
- Main: (304) 558-5358 ext. 1
- Answering service: (304) 423-1271
Contact Information

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