Zika Virus in Pregnancy
What Midwives Need To Know

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Zika Virus Emergency Response
U.S. Centers for Disease Control and Prevention
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Overview

- Current state of the outbreak
- Managing Zika virus in pregnancy
- Standard precautions during labor and delivery
- Infant evaluation and management
- What CDC is doing
- Resources
- Questions and answers
What is Zika Virus?

- Single stranded RNA virus
- Closely related to dengue, yellow fever, Japanese encephalitis, and West Nile viruses
- Primarily transmitted by two *Aedes* species mosquitoes
  - *Aedes aegypti* and *Aedes albopictus*
- Additional modes of transmission
  - Intrauterine and perinatal transmission (mother-to-fetus)
  - Sexual transmission
  - Laboratory exposure
  - Probably blood transfusion
Where is Zika now?

As of September 8, 2016

58 countries and territories worldwide, including 48 countries and territories in the Americas, reporting active Zika virus transmission

Zika Virus Infection in Pregnant Women

- Pregnant women can be infected:
  - Through the bite of an infected mosquito
  - Through sex with an infected partner
- If infected around conception
  - Zika might present risk to fetus
- If infected during pregnancy
  - Zika can be passed to the fetus during pregnancy or around the time of birth
Zika and Breastfeeding

- Transmission of Zika virus through breast milk not documented
- Benefits of breastfeeding outweigh theoretical risk of Zika virus transmission through breast milk
- Infants born to women with suspected, probable, or confirmed Zika virus infection, or who live in or have traveled to areas of Zika, should be fed according to infant feeding guidelines.
Zika is a Cause of Microcephaly

The Zika virus has spread rapidly in the Americas since its first identification in Brazil in early 2015. Prenatal Zika virus infection has been linked to adverse pregnancy and birth outcomes, most notably microcephaly and other serious brain anomalies. To determine whether Zika virus infection during pregnancy causes these adverse outcomes, an increasing number of infants with microcephaly in Brazil have been identified. Since the identification of the Zika virus in Brazil in early 2015, the virus has spread rapidly throughout the Americas (www.cdc.gov/zika/geo/active-countries.html). An increase in the number of infants with microcephaly in Brazil, associated with Zika virus infection, has been reported.
US Zika Pregnancy Registry

- Developed to monitor pregnancy and infant outcomes following Zika virus infection during pregnancy and inform clinical guidance and public health response

- Coordinated by CDC and dependent on the voluntary collaboration of the state, tribal, local, and territorial health departments
Number of Pregnant Women Who May Be Affected

- Currently there are over 2,000* pregnant women with laboratory evidence of possible Zika virus infection in the United States and U.S. territories

*As of September 15, 2016
Assessment and Testing
Assessing for Zika During Pregnancy

- All pregnant women should be assessed for Zika exposure, signs and symptoms at each prenatal care visit. They should be asked if they
  - traveled to or live in an area with active Zika transmission
  - had sex without a condom to prevent infection from a partner with potential exposure to Zika
CDC Recommendations for Zika Testing

- Pregnant women with possible exposure to Zika virus and signs or symptoms should be tested for Zika virus infection.

- Pregnant women with ongoing risk of possible Zika virus exposure and who do not report symptoms should be tested in the first and second trimesters of pregnancy.

- Pregnant women with limited risk of possible Zika virus exposure and who do not report symptoms should consult with their healthcare providers to obtain testing for Zika virus.

Additional detailed guidance for testing of pregnant women for Zika virus infection can be found at: [http://www.cdc.gov/mmwr/volumes/65/wr/mm6529e1.htm?s_cid=mm6529e1_e](http://www.cdc.gov/mmwr/volumes/65/wr/mm6529e1.htm?s_cid=mm6529e1_e).
Testing and interpretation recommendations for pregnant women with possible exposure to Zika virus — United States (including U.S. territories)

Assess for possible Zika virus exposure
Evaluate for signs and symptoms of Zika virus disease

A
- Symptomatic: <2 weeks after symptom onset, or
- Asymptomatic and NOT living in an area with active Zika virus transmission: <2 weeks after possible exposure

Zika virus rRT-PCR on serum and urine

Positive Zika virus rRT-PCR on serum or urine: Recent Zika virus infection

Negative Zika virus rRT-PCR on serum and urine

B
- Symptomatic: 2–12 weeks after symptom onset or
- Asymptomatic and NOT living in an area with active Zika virus transmission: 2–12 weeks after possible exposure, or
- Asymptomatic and living in an area with active Zika virus transmission: 1st and 2nd trimester

Zika virus IgM and dengue virus IgM on serum

Dengue virus IgM positive or equivocal and Zika virus IgM negative: Presumptive dengue virus infection

Zika virus IgM positive or equivocal and any result on dengue virus IgM:
- Presumptive recent Zika virus or flavivirus infection
- No recent Zika virus infection

Zika virus IgM and dengue virus IgM negative: No recent Zika virus infection

Zika virus IgM or dengue virus IgM positive or equivocal:
- Presumptive recent Zika virus or dengue virus or flavivirus infection

Plaque reduction neutralization test (PRNT)

Zika virus PRNT \geq 10 and dengue virus PRNT < 10:
- Recent Zika virus infection
- Recent flavivirus infection, specific virus cannot be identified

Zika virus PRNT \geq 10 and dengue virus PRNT \geq 10:
- No recent evidence of Zika virus infection

Zika virus PRNT < 10:
- No recent evidence of Zika virus infection

Diagnostic Testing for Zika Virus

- Molecular method
  - Real-time reverse transcriptase-polymerase chain reaction (rRT-PCR) for viral RNA in body fluids or tissues

- Serologic method
  - Zika virus immunoglobulin M (IgM) enzyme-linked immunosorbent assay
  - Plaque reduction neutralization test (PRNT) to detect neutralizing antibodies in serum
Symptomatic Pregnant Women

- Evaluated <2 weeks after symptom onset
  - Should receive Zika virus rRT-PCR testing of serum and urine

- Evaluated 2–12 weeks after symptom onset
  - Should first have a Zika virus immunoglobulin (IgM) test
  - If positive or equivocal, serum and urine rRT-PCR should be performed

[Link to CDC MMWR report](http://www.cdc.gov/mmwr/volumes/65/wr/mm6529e1.htm?s_cid=mm6529e1_w)
Asymptomatic Pregnant Women

- Who live in areas without active Zika virus transmission, evaluated <2 weeks after their last possible exposure
  - rRT-PCR testing should be performed
    - If the rRT-PCR test is negative, a Zika IgM test should be performed 2–12 weeks after the exposure

- Who live in an area without active Zika virus transmission, evaluated 2–12 weeks after their last possible exposure
  - Should receive a Zika virus IgM antibody test
    - If positive or equivocal, serum and urine rRT-PCR should be performed

- Who live in areas with active Zika virus transmission
  - Should receive Zika virus IgM antibody testing as part of routine obstetric care during the 1st and 2nd trimesters, with immediate rRT-PCR testing of women who are IgM-positive or equivocal
Standard Precautions During Labor and Delivery
Zika Virus Disease in Healthcare Settings

- No reports to date of transmission of Zika virus from infected patients to healthcare personnel (HCP) or other patients in healthcare settings
- Zika virus has been detected in blood, amniotic fluid, urine, saliva, and semen
- HCP working in these settings must adhere to Standard Precautions
Standard Precautions

- Basic measures to prevent infections that apply to all patient care
- Based on principle that all blood, body fluids, secretions, excretions (except sweat), non-intact skin, and mucous membranes may contain transmissible infectious agents
- Goals
  - Prevent direct contact between a patient’s body fluids and HCP mucous membranes or broken skin
  - Protect HCP and prevent them from transmitting potentially infectious material from one patient to another
  - Avoid percutaneous exposure to contaminated sharp implements
Standard Precautions

- Hand hygiene
- Appropriate personal protective equipment (PPE)
- Safe injection practices
- Environmental hygiene
- Respiratory hygiene/cough etiquette
Standard Precautions: Personal Protective Equipment (PPE)

- Gloves, gowns, face masks, face shields, goggles
- Facilities should assure availability and accessibility of PPE to HCP
- Educate all HCP on proper selection and correct use of PPE
  - HCPs must assess their risk for exposure and select appropriate PPE
Risk Assessment and Choosing Appropriate PPE

- Examples of obstetric procedures that require increasing amount of PPE
  - Vaginal exam particularly during amniotomy
  - Vaginal delivery including manual removal of placenta
  - Operative procedures
Reporting and Ongoing Education and Training

- Report all occupational exposures to facility’s occupational health clinic
- Provide ongoing education/training about standard precautions and PPE
- Identify and address barriers to use of standard precautions when identified
- No transmission of Zika to a healthcare worker has been documented
Zika Virus Testing of the Placenta

- Detection of Zika virus RNA in the placenta can confirm maternal infection
  - Cannot distinguish between maternal and congenital infection

- Placental testing can be helpful to confirm maternal infection when maternal testing:
  - Not previously performed
  - Performed beyond 12 weeks after exposure
  - Not definitive (e.g., Flavivirus Not Otherwise Specified)

- Clinical implications for infant with Zika virus RNA detected in the placenta are unknown, especially if infant testing is negative
Laboratory Testing of Infants with Possible Congenital Zika Virus Infection

- Testing is recommended for
  - Infants born to mothers with laboratory evidence of Zika virus infection*
  - Infants with signs of congenital Zika syndrome at birth if the mother has an epidemiologic link†

* Lab evidence of maternal Zika virus infection includes: Zika virus RNA detected by rRT-PCR or positive Zika virus IgM with confirmatory neutralizing antibody titer

† Epidemiologic link includes: Travel to/residence in an area of Zika virus transmission or sex with a partner who traveled to/resided in such area

http://www.cdc.gov/mmwr/volumes/65/wr/mm6533e2.htm?s_cid=mm6533e2_w
**Collecting & Submitting Fetal Tissues Samples**

<table>
<thead>
<tr>
<th>Specimen Type</th>
<th>Fixed Specimens</th>
<th>When to Consider</th>
<th>General Notes</th>
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<tbody>
<tr>
<td>Products of conception (POC)</td>
<td>• 4 or more specimens</td>
<td>Generally less than 12wks gestational age</td>
<td>For early pregnancy loss/miscarriage, please send POCs fixed in formalin.</td>
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| Placenta and fetal membranes  | • Several full thickness pieces including at least 3 full thickness pieces (0.5-1 cm x 3-4 cm in depth) from middle third of placental disk and at least 1 from the placental disk margin  
• One 5 x 12 cm strip of fetal membranes | Any gestation for which placenta is available | Please include sections of the placental disk, fetal membranes, and pathologic lesions when possible.  
Please include information about placenta weight and sample both maternal and fetal side of the placenta.  
Label all specimens to identify location of sample. |
| Umbilical cord                | • 2.5 cm segments of cord  
• 4 or more specimens                                                            | Any gestation for which placenta is available | Umbilical cord segments should be obtained proximal, middle, and distal to umbilical cord insertion site on the placenta.  
Label all specimens to identify location of sample. |


*Pre-approval is required prior to submission of any tissue specimens. For pre-approval please contact pathology@cdc.gov and eocevent189@cdc.gov"
Postpartum Care and Guidance
CDC and AAP Collaboration

- On July 21–22, CDC sponsored a meeting in collaboration with American Academy of Pediatrics (AAP), entitled “Clinical Evaluation and Management of Infants with Congenital Zika Virus Infection” involving:
  - Specialties
    - Audiology, clinical genetics, critical care, developmental and behavioral pediatrics, endocrinology, hospitalist medicine, infectious disease, lactation and infant feeding, maternal-fetal medicine, neonatology, neurology, nutrition, ophthalmology, orthopedics, pediatrics, physical medicine and rehabilitation
  - Principal partners
    - AAP, AAP Puerto Rico chapter, American Academy of Family Physicians, American Congress of Obstetricians and Gynecologists, Association of Maternal and Child Health Programs, Family Voices, March of Dimes, Parent to Parent, and the National Association of Pediatric Nurse Practitioners
  - Other federal agencies
    - Administration for Children and Families, Office of the Assistant Secretary for Preparedness and Response, Maternal & Child Health Bureau of the Health Resources and Services Administration, and National Institute of Child Health and Human Development, National Institutes of Health

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http://www.cdc.gov/mmwr/volumes/65/wr/mm6533e2.htm?s_cid=mm6533e2_w
Interim Guidance for Evaluation and Testing: Infants with Possible Congenital Zika Virus Infection

Mother with laboratory evidence of Zika virus infection during pregnancy

Perform a comprehensive physical exam on infant, head ultrasound, standard newborn hearing assessment and infant Zika virus laboratory testing

Infant with findings consistent with congenital Zika syndrome

Infant without findings consistent with congenital Zika syndrome
What CDC is Doing
Many Questions Remain

- What is the full range of potential health problems that Zika virus infection may cause?
- What is the level of risk from a Zika virus infection during pregnancy?
- When during pregnancy Zika virus infection poses the highest risk to the fetus?
- What are other factors (e.g., co-occurring infection, nutrition, symptomatic vs. asymptomatic) that might affect the risk for birth defects?
Rapidly Collecting Data for Action

Surveillance of Pregnant Women, Fetuses, & Infants

- US Zika Pregnancy Registry
- Zika Active Pregnancy Surveillance System (Puerto Rico)
- Proyecto Vigilancia de Embarazadas con Zika (Colombia)
- U.S. Zika-Related Birth Defects Surveillance
# Weekly Reporting of Adverse Pregnancy Outcomes

## Pregnancy Outcomes in the United States and the District of Columbia

<table>
<thead>
<tr>
<th>Liveborn infants with birth defects*</th>
<th>Pregnancy losses with birth defects**</th>
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<td>20</td>
<td>5</td>
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## Pregnancy Outcomes in the United States Territories

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<tr>
<th>Liveborn infants with birth defects*</th>
<th>Pregnancy losses with birth defects**</th>
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<tbody>
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Sharing Information

- Providing updated clinical guidelines
- Sharing up-to-date information
  - Sign up to receive the CDC Emergency Partners Newsletter: http://emergency.cdc.gov
  - Sign up for the CDC Clinician Outreach and Communication Activity (COCA) mailing list: http://emergency.cdc.gov/coca/subscribe.asp
Clinical Consultation

- Clinical questions:
  - Please email ZikaMCH@cdc.gov

- For U.S. Zika Pregnancy Registry questions:
  - E-mail ZIKApregnancy@cdc.gov or
  - Call 770-488-7100 and ask for the Zika Pregnancy Hotline

- For general, non-urgent questions:
  - Visit www.cdc.gov/info or
  - Call 800-CDC-INFO (800-232-4636)
Additional Resources

- Pocket guide

- Resources
  For healthcare providers:
  For families:

- Webcast of CDC meeting in collaboration with AAP
Thanks to our many collaborators and partners!

For clinical questions, please contact

ZikaMCH@cdc.gov

For U.S. Zika Pregnancy Registry questions, please contact

ZikaPregnancy@cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.