



Zika Virus and Infants: A Primer

Grand Rounds



First time in history...

“Never before in history has there been a situation where a bite from a mosquito could result in a devastating malformation.”

– Dr. Tom Frieden, CDC Director
Fortune, April 13, 2016

“...the last time an infectious pathogen (rubella virus) caused an epidemic of congenital defects was more than 50 years ago...”

– *New England Journal of Medicine*, April 13, 2016



Today's Presentation

- Zika: The Basics
- Zika, Pregnancy, and Congenital Zika Syndrome
- CDC Guidance: Infants with Possible Zika Virus Infection
- Zika Virus and Children
- What is CDC Doing?
- What Can You Do?

Zika: The Basics

What is Zika virus?

- Single-stranded RNA virus
- Closely related to dengue, yellow fever, Japanese encephalitis, and West Nile viruses
- Primarily transmitted by the bite of two *Aedes* species mosquitoes
 - *Aedes aegypti* and *Aedes albopictus* mosquitoes
- Additional modes of transmission
 - Intrauterine and perinatal transmission (mother to fetus)
 - Sexual transmission
 - Laboratory exposure
 - Probable: Blood transfusion



Aedes aegypti mosquito



Aedes albopictus mosquito

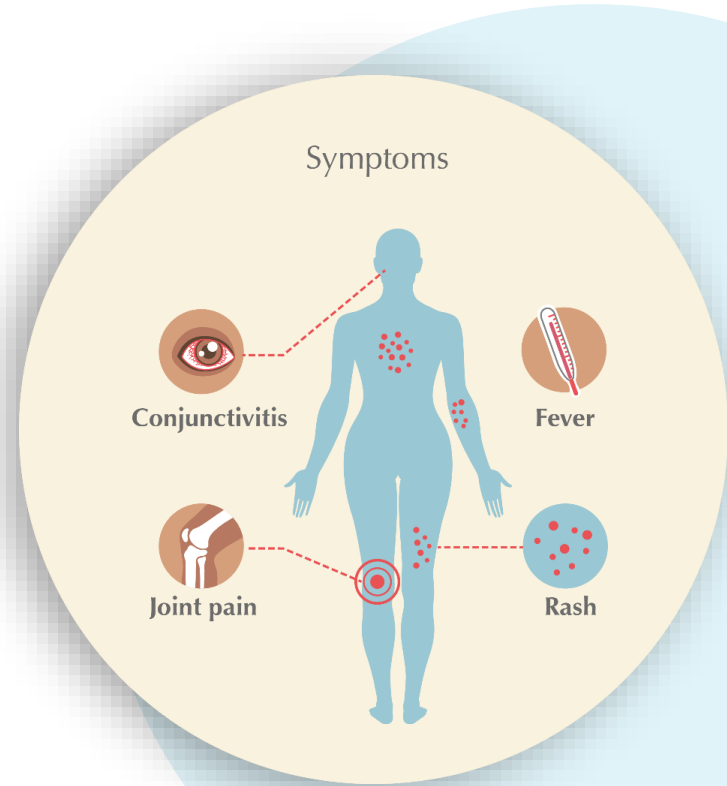
Where is Zika Now?

As of December 14, 2016



Signs and Symptoms

- Clinical illness is usually mild
- Most common symptoms are:
 - Fever
 - Rash
 - Joint pain
 - Conjunctivitis
- Symptoms last several days to a week
- Severe disease is uncommon
- Fatalities are rare
- Once infected, a person is likely to be protected from future infections



Clinical Management

- No vaccine or specific antiviral treatment
- Treat the symptoms
 - Rest
 - Drink fluids to prevent dehydration
 - Take medicine such as acetaminophen to reduce fever and pain
 - Avoid aspirin and other non-steroidal anti-inflammatory drugs (NSAIDs) until dengue can be ruled out to reduce the risk of bleeding



Zika, Pregnancy, and Congenital Zika Infection

Zika Virus Infection in Pregnant Women

- Pregnant women can be infected
 - Through the bite of an infected mosquito
 - Through sex without a condom with an infected partner
- If a woman is 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



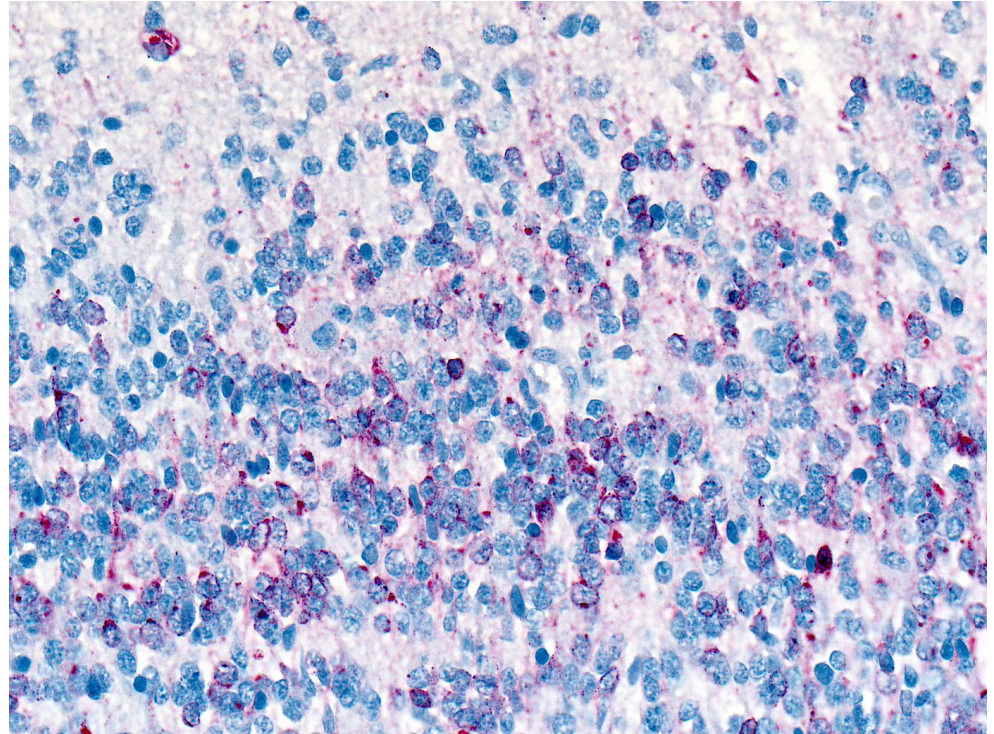
Zika Virus in Pregnancy



- Infection can occur in any trimester
- No evidence of increased susceptibility to Zika virus
- The clinical course is similar in pregnant women and in non-pregnant people

CDC Lab Confirms Zika In Fetal Tissues

- Zika virus has been shown to be present in fetal tissue
- Evidence of Zika virus has been detected in
 - Amniotic fluid
 - Placenta
 - Fetal brain tissue
 - Products of conception
- Zika virus has been found to continue to replicate in infants' brains after birth (Bhatnagar et.al., 2017)



Immunohistochemical staining of Zika virus antigen (red stain) in fetal brain tissue. This staining is present in the same areas where neuronal cell death/necrosis was identified by microscopic review of tissue morphology.

Bhatnagar J, Rabeneck DB, Martines RB, Reagan-Steiner S, Ermias Y, Estetter LBC, et al. Zika virus RNA replication and persistence in brain and placental tissue. *Emerg Infect Dis.* 2017 Mar [Epub ahead of print].

Reference/attribution for image: Ritter JM, Martines RB, Zaki SR. Zika Virus: Pathology From the Pandemic. *Arch Pathol Lab Med.* 2016 Oct 5. [Epub ahead of print]

Zika is a Cause of Microcephaly

The NEW ENGLAND JOURNAL of MEDICINE

SPECIAL REPORT

Zika Virus and Birth Defects — Reviewing the Evidence for Causality

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SUMMARY

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

POTENTIAL RELATIONSHIP BETWEEN ZIKA VIRUS INFECTION AND BIRTH DEFECTS

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

Potential Risk of Birth Defects Related to Zika

- Among pregnant women in the United States with laboratory evidence of possible Zika virus infection:
 - Overall about **6%** of fetuses or infants had birth defects potentially related to Zika virus
 - The proportion of pregnancies with birth defects was similar (around **6%**) among symptomatic and asymptomatic pregnant women
 - Among women with infection in the 1st trimester of pregnancy, birth defects were reported in **11%** of fetuses or infants



Congenital Zika Syndrome

- Pattern of congenital anomalies associated with Zika virus infection during pregnancy that includes
 - Severe microcephaly (small head size) resulting in a partially collapsed skull
 - Thin cerebral cortices with subcortical calcifications
 - Eye anomalies, including macular scarring and focal pigmentary retinal mottling
 - Congenital contractures or limited range of joint motion
 - Marked early hypertonia, or too much muscle tone, and symptoms of extrapyramidal involvement
- Infants with normal head circumference at birth may:
 - Have brain abnormalities consistent with congenital Zika syndrome
 - Develop microcephaly after birth



Baby with Severe Microcephaly



Potential Risk of Microcephaly

- **1 - 13%** estimated risk of microcephaly due to Zika virus infection in first trimester
 - Modeling based on current outbreak in Bahia, Brazil
 - Not enough data to estimate 2nd or 3rd trimester risk
- *Important to remember*
 - Data are limited (infection rates unknown; microcephaly cases still being reported)
 - Microcephaly is difficult to detect prenatally
 - Microcephaly is only one of a range of possible adverse outcomes



Congenital Zika Syndrome without Microcephaly at Birth

- Microcephaly from congenital infection can occur after birth
- The full spectrum of poor outcomes caused by Zika virus infection during pregnancy remains unknown

Centers for Disease Control and Prevention

MMWR

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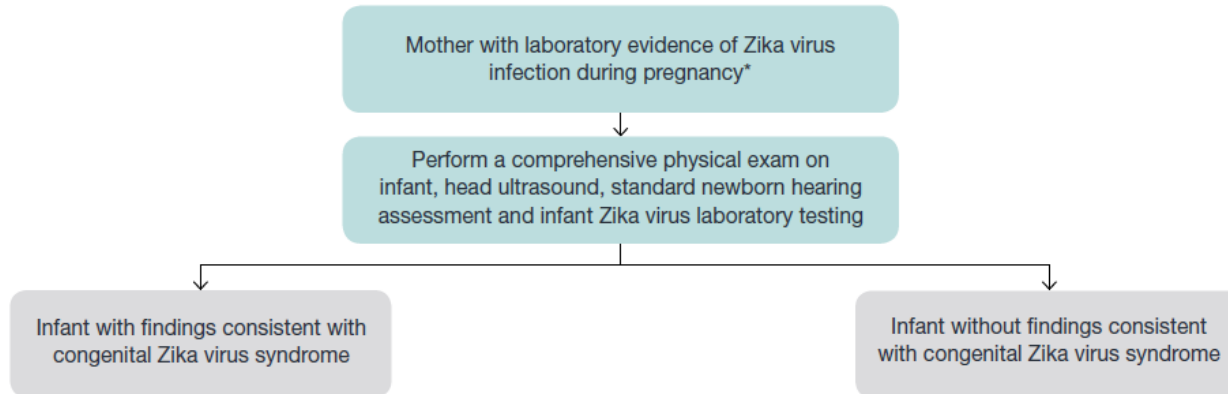
November 22, 2016

**Description of 13 Infants Born During October 2015–January 2016 With
Congenital Zika Virus Infection Without Microcephaly at Birth — Brazil**

CDC Guidance: Infants with Possible Congenital Zika Virus Infection

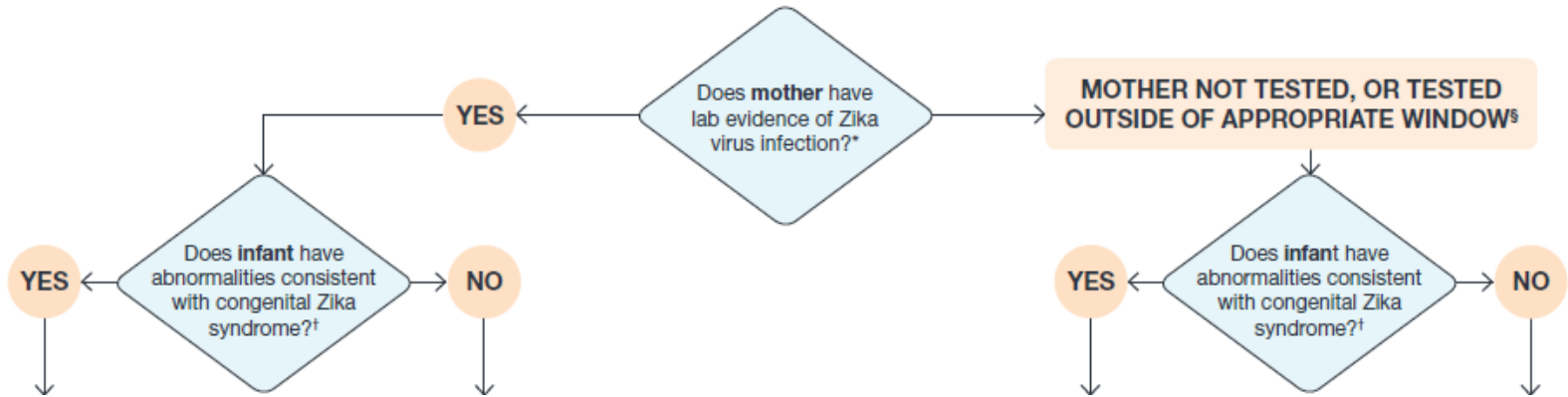
Infants with Possible Congenital Zika Virus Infection

- Testing for Zika virus infection is recommended for infants born to:
 - 1) mothers with laboratory evidence of possible Zika virus infection;
 - 2) infants with findings suggestive of congenital Zika syndrome and a maternal epidemiologic link suggesting possible transmission, regardless of maternal testing results
- Congenital Zika virus infection can be diagnosed by RNA nucleic acid testing (NAT)
- All infants with possible congenital Zika virus infection should have a comprehensive physical exam and head ultrasound before hospital discharge regardless of the presence of abnormalities and prenatal ultrasound results



Infants with Possible Congenital Zika Virus Infection

Recommendations for follow-up depend on whether the infant has abnormalities consistent with congenital Zika syndrome



Initial Evaluation

Infants with abnormalities consistent with congenital Zika syndrome born to a mother with lab evidence of Zika

- Before hospital discharge:
 - ✓ Routine newborn care: physical exam, including occipitofrontal (head) circumference, weight, length, a neurologic exam, and universal hearing screen
 - ✓ Head ultrasound
 - ✓ Testing for congenital Zika virus infection
 - ✓ Complete blood count, metabolic panel and liver enzyme testing
 - ✓ Consult with multiple subspecialists
 - ✓ Referral for comprehensive eye exam by an ophthalmologist
 - ✓ Referral for auditory brainstem response (ABR) hearing evaluation
 - ✓ Consider advanced cranial imaging (e.g., MRI)
 - ✓ Consider transfer to hospital with specialty care
- Refer for a comprehensive ophthalmologic exam and evaluation of hearing by ABR testing before 1 month of age

Consult with Specialists

Infants with abnormalities consistent with congenital Zika syndrome and lab evidence of Zika

- **Neurologist** to determine appropriate neuroimaging and additional evaluation
- **Infectious disease specialist** to evaluate other congenital infections
- **Ophthalmologist** to examine the eye and evaluate for possible cortical visual impairment prior to discharge from hospital or within 1 month of birth
- **Endocrinologist** to evaluate for hypothalamic or pituitary dysfunction
- **Clinical geneticist** to evaluate for other causes of microcephaly or other anomalies if present

Consult with Specialists

Infants with abnormalities consistent with congenital Zika syndrome and lab evidence of Zika

Consultation with the following should also be considered:

- **Orthopedist, physiatrist, and physical therapist** to manage hypertonia, club foot, or arthrogryptic-like conditions
- **Pulmonologist or otolaryngologist** to consult about aspiration
- **Lactation specialist, nutritionist, gastroenterologist, or speech or occupational therapist** to manage feeding issues

Outpatient Management

Infants with abnormalities consistent with congenital Zika syndrome and lab evidence of Zika

- Establish a medical home to facilitate coordination of care
- Provide routine preventive pediatric health care, including immunizations and monthly primary care visits for at least the first 6 months
- Conduct developmental monitoring at each routine visit
- Complete neurologic exam at age 1 and 2 months, then as needed
- Refer patients to developmental specialist and early intervention services
- Repeat ophthalmology exam with retinal assessment at 3 months
- Repeat ABR hearing assessment at age 4–6 months
- Conduct thyroid screening at age 2 weeks and age 3 months
- Provide family support services
- Provide appropriate referrals

Initial Evaluation & Outpatient Management

Infants with lab evidence of Zika and without abnormalities consistent with congenital Zika syndrome

- Before hospital discharge infants should receive
 - Routine care including monitoring of occipitofrontal circumference, length, and weight
- Outpatient management includes routine follow up and
 - Establish medical home
 - Perform vision screening at every well child visit
 - Evaluate hearing: consider repeat ABR testing at 4–6 months or perform behavioral diagnostic testing at age 9 months if ABR is not done at 4-6 months
 - Provide referrals: Any children with identified or suspected delays should be referred to a developmental specialist or early intervention programs
 - Provide family support services, such as counseling, as needed

Family and Psychosocial Support

- Families and caregivers of infants with congenital Zika virus infection may require ongoing psychosocial support.
- Families should be empowered to be active participants in their child's monitoring and care.
- Healthcare providers should work closely with parents to ensure that the care plan is consistent with the infant's needs and the family's wishes.
- Families with already limited access to medical care might be affected with a disproportionate burden of Zika virus infection.
- Barriers to care for all affected infants and their families should be addressed by linking them with national, state, and local health programs as well as social services.
- Additional resources for families can be found at:
<http://www.cdc.gov/zika/parents/families-of-newborns-affected-zika.html>

Pediatric Evaluation and Follow-up Tools

Initial Evaluation and Outpatient Management During the First 12 Months of Life for Infants with Possible Congenital Zika Virus Infection

CDC's Response to Zika

TABLE 1
Interpretation of results of laboratory tests*

RT-PCR

Positive

Negative

Negative

Abbreviations: RT-PCR = real-time reverse transcriptase PCR

* Interpretation: sites on serological test

+ Laboratory results should be interpreted in the context of the clinical picture consistent with congenital Zika syndrome, and

CHECKLIST 1

Initial clinical evaluation & management of infants with laboratory evidence of Zika virus infection and abnormalities consistent with congenital Zika syndrome†

Consultation with:

- Neurologist for determination of appropriate neuroimaging and additional evaluation
- Infectious disease specialist for diagnostic evaluation of congenital infections (e.g., syphilis, toxoplasmosis, cytomegalovirus infection, lymphocytic choriomeningitis, and herpes simplex virus infections)
- Ophthalmologist for comprehensive eye examination for possible cortical visual impairment prior to hospital or within 1 month of birth
- Endocrinologist for evaluation for hypothyroidism
- Clinical geneticist to evaluate for other causes of neurodevelopmental or other anomalies if present

Consider consultation with:

- Orthopedic, physical and physical therapist for management of hypotonia, diaphragm or other motor conditions
- Neurologist or ophthalmologist for concerns about function, quality of vision, or other neurodevelopmental occupational therapist for the management of fine motor skills
- Perform ABU to assess hearing
- Perform complete blood count and metabolic panel
- Provide family and supportive services

CDC's Response to Zika

Outpatient Management Checklist

2 weeks

ROW 1

Infant with abnormalities consistent with congenital Zika syndrome* and laboratory evidence of Zika virus infection*

Thyroid (TSH) test

ROW 2

Infant with abnormalities consistent with congenital Zika syndrome* and negative for Zika virus infection

Ophthalmic exam

ABR

ROW 3

Infant with no abnormalities consistent with congenital Zika syndrome* and laboratory evidence of Zika virus infection*

ROW 4

Infant with no abnormalities consistent with congenital Zika syndrome* and negative for Zika virus infection

Abbreviations: rRT-PCR = real-time reverse transcriptase PCR; ABR = auditory brainstem response; CI = congenital infection; * Laboratory evidence of Zika virus infection (maternal or infant) and/or laboratory evidence of congenital Zika virus infection

+ Outpatient management checklist for infants born to mothers consistent with congenital Zika virus infection

† Mothers who traveled to or reside in an area of at least 2 weeks of exposure or suspicion onset, or other exposure or suspicion onset does not rule out Zika virus infection

‡ Infant testing is recommended within the first 12 months of life

CDC's Response to Zika

INITIAL EVALUATION AND OUTPATIENT MANAGEMENT
DURING THE FIRST 12 MONTHS OF LIFE FOR INFANTS WITH POSSIBLE CONGENITAL ZIKA VIRUS INFECTION

Initial Evaluation

Flowchart logic:

- Start: Does mother have lab evidence of Zika virus infection?
 - YES: Does infant have abnormalities consistent with congenital Zika syndrome?
 - YES: Before hospital discharge:
 - Consider transfer to hospital with subspecialty care
 - CBC, metabolic panel, LFTs
 - Ophthalmology exam
 - ABU
 - Consider further neuroimaging
 - Consult with multiple specialists
 - NO: Before hospital discharge:
 - Routine newborn care: physical exam, including head circumference, weight, length and neuro exam
 - Standard newborn hearing screen
 - Head ultrasound
 - Infant testing for congenital Zika virus infection (See Table 1)
 - MOTHER NOT TESTED, OR TESTED OUTSIDE OF APPROPRIATE WINDOW*: Does infant have abnormalities consistent with congenital Zika syndrome?
 - YES: Before hospital discharge:
 - Maternal Zika virus testing†
 - Consider transfer to hospital with subspecialty care
 - Routine newborn care: physical exam, including head circumference, weight, length and neuro exam
 - Ophthalmology exam
 - ABU
 - Consider further neuroimaging
 - Consult with multiple specialists
 - NO: Before hospital discharge:
 - Maternal Zika virus testing†
 - Consider Zika virus testing of the placenta
 - Routine newborn care: physical exam, including head circumference, weight, length and neuro exam
 - Standard newborn hearing screen
 - Head ultrasound
 - Perform infant Zika virus testing if evidence of Zika virus infection or maternal testing††

Follow-up recommendations:

- ROW 1: Follow-up management and follow-up recommendations indicated in Outpatient Management Checklist
- ROW 2: Follow-up management and follow-up recommendations indicated in Outpatient Management Checklist
- ROW 3: Follow-up management and follow-up recommendations indicated in Outpatient Management Checklist
- ROW 4: Follow-up management and follow-up recommendations indicated in Outpatient Management Checklist

Abbreviations: rRT-PCR = real-time reverse transcriptase PCR; ABR = auditory brainstem response; CI = congenital infection; * Laboratory evidence of Zika virus infection (maternal or infant) and/or laboratory evidence of congenital Zika virus infection

† Outpatient management checklist for infants born to mothers consistent with congenital Zika virus infection

‡ Mothers who traveled to or reside in an area of at least 2 weeks of exposure or suspicion onset, or other exposure or suspicion onset does not rule out Zika virus infection

‡ Infant testing is recommended within the first 12 months of life

Download at:
<http://www.cdc.gov/zika/pdfs/pediatric-evaluation-follow-up-tool.pdf>

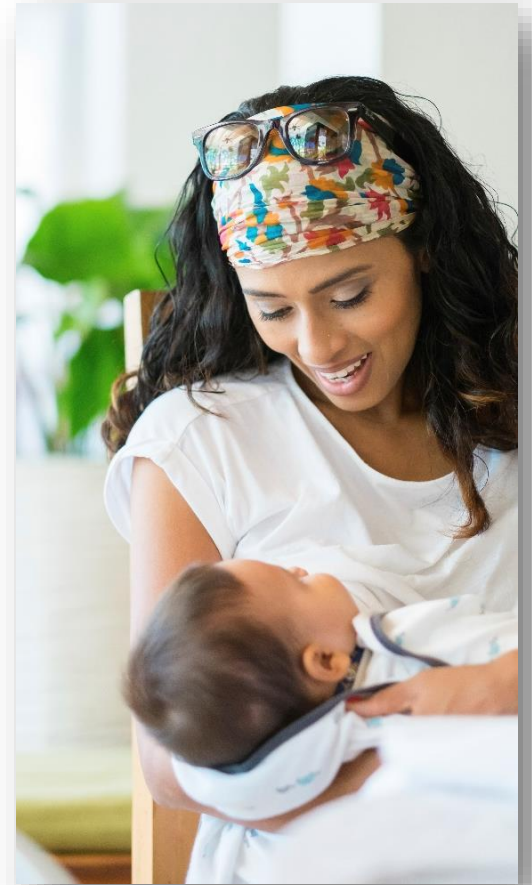
Zika Virus and Caring for Infants and Children

Infants with Possible Postnatal Zika Virus Infection

- [Guidance for testing and clinical management](#) of infants and children with postnatal Zika virus infection is in line with testing and clinical management recommendations for adults.
- [Symptomatic treatment and supportive care](#) are appropriate and usually sufficient to treat Zika. Special considerations to treat children with Zika include
 - Aspirin should never be used to treat children with symptoms of acute viral illness because of the risk of Reye's syndrome.
 - All non-steroidal anti-inflammatory drugs (NSAIDs) should be avoided in children <6 months.
- Patients with suspected Zika virus infections should be evaluated and managed for possible dengue or chikungunya virus infection.
 - Aspirin and other non-steroidal anti-inflammatory drugs (NSAIDs) should be avoided until dengue can be ruled out

Zika and Breastfeeding

- Transmission of Zika virus through breast milk has not been documented.
- Benefits of breastfeeding outweigh theoretical risk of Zika virus transmission through breast milk
- CDC and the World Health Organization recommend that 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 usual infant feeding guidelines.



Tips for Parents and Caregivers

- Dress your child in clothing that covers arms and legs.
- For children older than 2 months, use insect repellent on exposed skin.
 - » Do not use insect repellent on babies younger than 2 months old.
- Cover crib, stroller, and baby carrier with mosquito netting.



Tips for Parents and Caregivers

Adults applying insect repellent for babies and children

- Do not apply repellent onto hands, eyes, mouth, and cut or irritated skin.
- Spray onto your hands and then apply to a child's face.
- Do not use products containing oil of lemon eucalyptus or para-menthane-diol on children younger than 3 years old.



Resources for Healthcare Providers

- Caregivers of children with Zika-related complications are often overwhelmed and may need support, guidance, and help establishing a medical home.
- Healthcare providers should work closely with and empower parents and families to monitor their infant's development and determine what choices are available and how to best care for their infant's condition and needs.
- [Resources and guidance for healthcare providers caring for infants affected by Zika virus](http://www.cdc.gov/zika/hc-providers/infants-children/resources-hc-providers-caring-for-infants.html) are available on the CDC website.

Resources for Families

CDC's Response to Zika
PREGNANT AND IN AN AREA WITH ZIKA?*
 WARNING: ZIKA IS LINKED TO BIRTH DEFECTS

Protect Yourself From Mosquito Bites

CDC's Response to Zika
DOCTOR'S VISIT CHECKLIST:
 For Pregnant Women Who Traveled to an Area with Zika*

If you are pregnant and have traveled to pregnancy or up to 8 weeks before see talk to your healthcare provider, even if bring this checklist to your visit to make discuss anything important.

Here are some topics and questions to discuss with your healthcare provider:

INFORMATION TO SHARE WITH YOUR HEALTHCARE PROVIDER:

- When did you travel to an area with Zika?
 - Where did you travel?
 - How long did you stay?
- In what trimester was your pregnancy at an area with Zika?
- Did you have any symptoms of Zika during within 2 weeks of returning?
 - The most common symptoms of Zika (joint pain, and red eyes).
- Did your partner travel to an area with Zika?
 - When and where did your partner travel?
 - Did your partner have any signs or symptoms including fever, rash, joint pain, or red eyes on the trip, or after returning?

*Check www.cdc.gov/zika

CDC's Response to Zika
Ideas for Talking to your Children about Zika

For children of all ages, start the conversation by asking: **What have you heard about Zika?**

- Listen to see if your children have any fears about Zika.
- Learn what your children have heard and correct any misinformation.
- Let your children know that you are open to answering questions and talking about Zika.
- Limit your children's exposure to news reports and media on Zika. When they see a lot of information, it may seem like the risk is bigger than it really is.

Explain what you know about Zika, simply and directly. Here are some facts you can talk about with children.

- Zika is mostly spread by getting bitten by a certain type of mosquito.
- Any person that lives in an area where the type of mosquito that spreads Zika lives could catch Zika through a mosquito bite.
- A mosquito that bites a person who has Zika can get infected and spread it to another person through bites.
- They can only catch Zika if they live in or travel to an area where mosquitoes are spreading Zika and are bit by a mosquito carrying Zika.
- Everyone can take steps to prevent mosquito bites to protect themselves and others. Children can help remind adults about taking steps to protect the family from mosquito bites.
- Most people infected with Zika will not get sick. The people who do get sick will probably only feel a little sick for a few days. They might not even know they have Zika.
- People who do get sick with Zika might get a fever, rash, joint pain (like in elbows or knees), or red eyes.
- There is no medicine or vaccine for Zika. If people get sick they will go to the doctor for some tests. People who get Zika can feel better by getting a lot of rest and drinking fluids and taking medicine for pain.

The government, doctors, health departments, and their community are taking steps to keep everyone healthy.

www.cdc.gov/zika

CDC's Response to Zika
FOR WOMEN: A POSITIVE ZIKA VIRUS TEST

CDC's Response to Zika
HOW TO PROTECT AGAINST MOSQUITO BITES

CDC's Response to Zika
THINKING ABOUT HAVING A BABY?*
 WARNING: ZIKA IS LINKED TO BIRTH DEFECTS

Plan Your Pregnancy

With the Zika outbreak, planning your pregnancy is more important than ever. There is no vaccine to prevent Zika virus infection.

If you are thinking about having a baby, your doctor or other healthcare provider can help you plan for a healthy and safe pregnancy. Talk with your doctor about:

- Your plans for having children
- The potential risk of getting Zika during pregnancy
- Your partner's potential exposures to Zika

If you decide that now is not the right time for you to have a baby, work with your doctor or other healthcare provider to find a birth control method that is safe, effective, and works for you and your lifestyle.

Protect yourselves from getting Zika from mosquito bites

Use insect repellent

- Protect yourself and your family from mosquito bites all day and night, whether you are inside or outside.
- Insect repellent is safe and it works! Read the label and follow the directions.

Cover your skin

- Wear long-sleeved shirts and long pants. For extra protection, treat clothing with permethrin.*

Mosquito-proof your home

- Use screens on windows and doors.
- Use air conditioning when available.
- Empty containers with standing water.

Once you're pregnant, protect yourself from getting Zika from sex

Use a condom

- Use a condom every time you have sex during your pregnancy. To be effective, condoms must be used correctly from start to finish, every time you have sex. This includes vaginal, anal, and oral sex.

OR

Don't have sex

- Don't have sex during your pregnancy.

Talk to your healthcare provider

- If you think your partner may have or had Zika, let your healthcare provider if you had sex without a condom.

Find the insect repellent that's right for you by using EPA's search tool!

For more information: www.cdc.gov/zika

HOW TO PROTECT THEMSELVES TO DO.

...well probably be mild and only including fluids to prevent a fever and pain. ...until dengue can be ruled out to return, talk to your doctor or other

Protecting a baby or child of pregnant on babies younger than 2 years old:

- Use clothing that covers arms and legs.
- Use baby carrier with mosquito netting.
- Wash insect repellent onto a child's hands, eyes, or cut or irritated skin.
- Wash insect repellent onto your hands and a child's face.

Shoes and gear

- Use shoes and gear with permethrin from treated clothes and gear.
- Information to find out the number of length of time the protection will last on yourself, follow the product instructions. Permethrin products directly on skin.

Protecting Zika to others?

...mosquito bites. During the first 6 weeks, the virus can be passed from sick to others. An infected mosquito can spread Zika to others. ...avoiding insect repellent with DEET, picaridin, IR3535, oil of lemon eucalyptus with air conditioning.

U.S. Department of Health and Human Services Center for Disease Control and Prevention

For more resources to share with families visit <http://www.cdc.gov/zika/hc-providers/infants-children/resources-hc-providers-caring-for-infants.html>. Available in English, Spanish and other languages

What is CDC Doing?

Many Questions Remain

- What is the level of risk from a Zika virus infection during pregnancy?
- When during pregnancy does Zika virus infection pose the highest risk to the fetus?
- What is the full range of potential health problems that Zika virus infection may cause?
- What other factors (e.g., co-occurring infection, nutrition, symptomatic vs. asymptomatic) might affect the risk for birth defects?
- What is the risk for later health problems in an infant who is infected or who has had exposure to Zika virus but is born without abnormalities?



Collecting Data for Action

Surveillance of Zika and its Effects on Pregnant Women, Infants, & Children

US Zika Pregnancy Registry



Zika Active Pregnancy Surveillance System (Puerto Rico)



Proyecto Vigilancia de Embarazadas con Zika (Colombia)



US Zika-Related Birth Defects Surveillance



ArboNET Surveillance of Children with Postnatal Zika



Sharing Up-to-Date Information

- Providing updated clinical guidance
- Responding to your inquiries:
 - Email: ZikaMCH@cdc.gov
 - Zika Pregnancy Hotline: 770-488-7100
 - CDC-INFO: (800-232-4636)



<http://www.cdc.gov/zika>

Centers for Disease Control and Prevention

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Update: Interim Guidance for Health Care Providers Caring for Pregnant Women with Possible Zika Virus Exposure — United States, July 2016

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Developing Tools for Healthcare Providers


CDC's Response to **Zika**
MEASURING HEAD CIRCUMFERENCE



Baby with Typical Head Size **Baby with Microcephaly** **Baby with Severe Microcephaly**

- 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
- Head circumference measurements should be taken on the first day of life because commonly-used birth head circumference reference charts by age and sex are based on measurements taken before 24 hours of age

For more information: www.cdc.gov/zika



U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

CDC's Response to **Zika**

ZIKA VIRUS: COLLECTION AND SUBMISSION OF SPECIMENS FOR ZIKA VIRUS TESTING AT TIME OF BIRTH

General Information

Laboratory testing for congenital Zika virus infection is recommended for infants born to mothers with laboratory evidence of Zika virus infection during pregnancy, and for infants who have abnormal clinical findings suggestive of congenital Zika virus syndrome and a maternal epidemiologic link suggesting possible transmission, regardless of maternal Zika virus test results.

For infants born to mothers with risk factors for maternal Zika virus infection (travel to or residence in an area of Zika virus transmission or sex with a partner with travel to or residence in such an area) for whom maternal testing was not performed before delivery, assessment of the infant, including comprehensive physical exam and careful measurement of head circumference should be performed. Maternal diagnostic testing should be performed and testing of the placenta for Zika virus PCR should be considered. If an infant appears clinically well, further evaluation and infant testing can be deferred until maternal test results are available. However, if there is concern about infant follow-up, infant testing should be performed before hospital discharge.

IMPORTANT: Pre-approval is required prior to submission of any placental or other tissue specimens. For pre-approval please contact pathology@cdc.gov and exocvent189@cdc.gov.

Healthcare Providers:

- Please contact your state, tribal, local, or territorial health department to facilitate laboratory testing and pathology specimen submission.
 - If available in your hospital/institution, please consult surgical pathology to ensure appropriate collection and processing of tissue specimens for Zika virus testing.
 - Please see table below for information on collection of specimens for Zika virus testing.
- Specimens should **ONLY** be sent to CDC directly from health departments. CDC's Zika Pregnancy Hotline (770-488-7100) is available 24/7 to healthcare providers and health departments for consultation regarding management of pregnant women and infants with possible Zika virus. This hotline can also assist with questions regarding specimen submission. Healthcare providers and state and local health officials can call our CDC Watch desk at 770-488-7100 (ask for CDC Zika Pregnancy Hotline) or email zikapregnancy@cdc.gov.

Health Departments:

- When submitting specimens, please submit [CDC Form 50.34](#) with all specimens. For test order name, write "Zika virus".
- Pre-approval is required prior to submission of all tissue specimens (i.e., placenta, umbilical cord). Please contact pathology@cdc.gov and exocvent189@cdc.gov to discuss the case and obtain pre-approval. If you have additional questions for the Infectious Diseases Pathology Branch, please call 404-639-3133.
- If you have additional questions for the Arboviral Diseases Branch, please call 970-221-6400.

Reporting of Results:

- Test results will be reported to the state health department and the submitting healthcare provider. Results will not be directly released to patients.
- Turnaround time will depend on testing volume and established reporting systems.



U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

www.cdc.gov/zika

*Free materials available in English, Spanish and other languages

What Can You Do?

Report Confirmed or Probable Cases of Zika

- Zika virus infection and disease are nationally notifiable conditions.
- Healthcare providers should report laboratory-confirmed and symptomatic cases of Zika to the local, state or territorial health department which in turn should report the case ArboNET.



Report Cases to US Zika Pregnancy Registry

- Healthcare providers are encouraged to report and actively monitor pregnancies and congenital outcomes among symptomatic and asymptomatic women with laboratory evidence of possible Zika virus infection
- **More information**
 - Available on the [US Zika Pregnancy Registry website](http://www.cdc.gov/zika/hc-providers/registry.html) (<http://www.cdc.gov/zika/hc-providers/registry.html>)
 - To contact CDC Registry staff, call the CDC Emergency Operations Center watch desk at 770-488-7100 and ask for the Zika Pregnancy Hotline or email ZIKApregnancy@cdc.gov
 - For non-urgent requests, call 800-CDC-INFO (800-232-4636)



In Summary

- Know the basics about Zika transmission in your community
- Diagnose and test for Zika for those with symptoms in your community
- Understand the assessment and management of Zika among pregnant women and infants
- Recommend Zika prevention behaviors
- Provide support for families of infants affected by Zika
- Inform your local or state health department to help keep ArboNET and the US Zika Pregnancy Registry up-to-date

More Information about Zika

More information on caring for pregnant women, infants, or children with Zika virus infection is available at [CDC's Zika website](http://www.cdc.gov/zika).

The screenshot shows the CDC website interface. At the top left is the CDC logo with the text "Centers for Disease Control and Prevention" and "CDC 24/7: Saving Lives. Protecting People™". To the right is a search bar with the word "SEARCH" and a magnifying glass icon. Below the search bar is a "CDC A-Z INDEX" dropdown menu. A dark blue navigation bar contains the text "Zika Virus". Below this are social media icons for Facebook, Twitter, and a plus sign. To the right of the icons is a "Language: English" dropdown menu. The main content area features a large banner for "ZIKA VIRUS UPDATE" with a sub-headline "Zika Cases in Florida". The banner includes a map of the Americas and a mosquito. Below the banner are five small circular navigation dots. To the right of the banner is a section titled "At-A-Glance" containing two articles. The first article is "Pregnant Women with Any Lab Evidence of Zika Virus Infection*" with bullet points: "US States and DC: 808" and "US Territories: 1,490". It includes a source note: "*Source: Pregnancy Registries as of September 22, 2016" and a link "More on Outcomes". The second article is "Zika Virus Disease Cases Reported to ArboNET*" with bullet points: "US States and DC: 3,625" and "US Territories: 22,069". It includes a source note: "*Source: ArboNET as of September 28, 2016".

www.cdc.gov/zika

Thank you!

More information on Zika: www.cdc.gov/zika

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.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.

