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The Society for Healthcare Epidemiology of America

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Zika Virus Disease – What You Need to Know

April 8, 2016

Joanne Cono, MD, ScM
Centers for Disease Control and Prevention (CDC)

Jeanne S. Sheffield, MD
Johns Hopkins Medicine

Moderator: Gina Pugliese, RN, MS
Vice President, Premier Safety Institute

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Premier Safety Institute- *www.premierinc.com/zika*

CDC Health Advisories
Blood supply
Clinicians- healthcare providers
Clinicians-reporting, lab testing
Hospital- clinic care settings
Key Resources
Location of Zika infections
Mosquito control
Outbreaks, cases transmission
Pregnant Women
Prevention
State and local public health labs
Symptoms, diagnosis, treatment
Transmission
Travelers
Travelers health precautions

APIC Zika Resources

Zika virus consumer alert in English and Spanish— at http://www.apic.org/For-Consumers/Monthly-alerts-for-consumers

APIC Position Paper: Safe Injection, Infusion, and Medication Vial Practices in Healthcare (2016)—at: http://apic.org/Resource_/TinyMceFileManager/Position_Statements/2016APICSIPPositionPaper.pdf

SHEA
The Society for Healthcare Epidemiology of America

www.shea-online.org

- Vision: Safe Healthcare for All
- Mission: To promote the prevention of healthcare-associated infections and antibiotic resistance and to advance the fields of healthcare epidemiology and antibiotic stewardship.
- Professional society representing healthcare workers committed to SHEA's mission in all healthcare settings globally
- Zika Resources:
  www.shea-online.org/PriorityTopics/EmergingPathogens/ZikaVirusResources.aspx

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Audio

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Notes

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Questions

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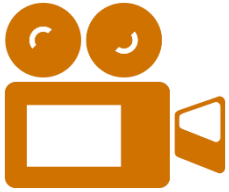


Recording

This webinar is being recorded. View it later today on the event post at premierinc.com/events

Faculty

Moderator: Gina Pugliese RN MS

Vice President, Premier Safety Institute

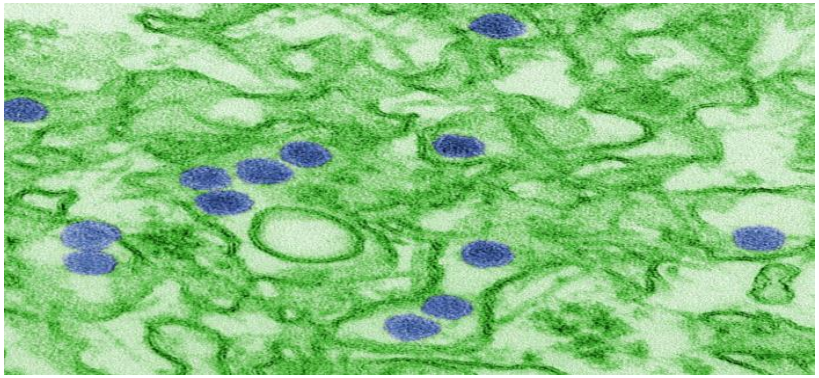
Joanne Cono, MD, ScM

Director, Office of Science Quality, Office of the Director, Centers for Disease Control and Prevention (CDC)

Jeanne S. Sheffield, MD

Director of Maternal-Fetal Medicine Division and Professor in the Johns Hopkins Medicine Department of Gynecology and Obstetrics

Preventing Zika



Joanne Cono, MD, ScM
Director
Office of Science Quality
Office of the Director
Centers for Disease Control and Prevention
April 6, 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

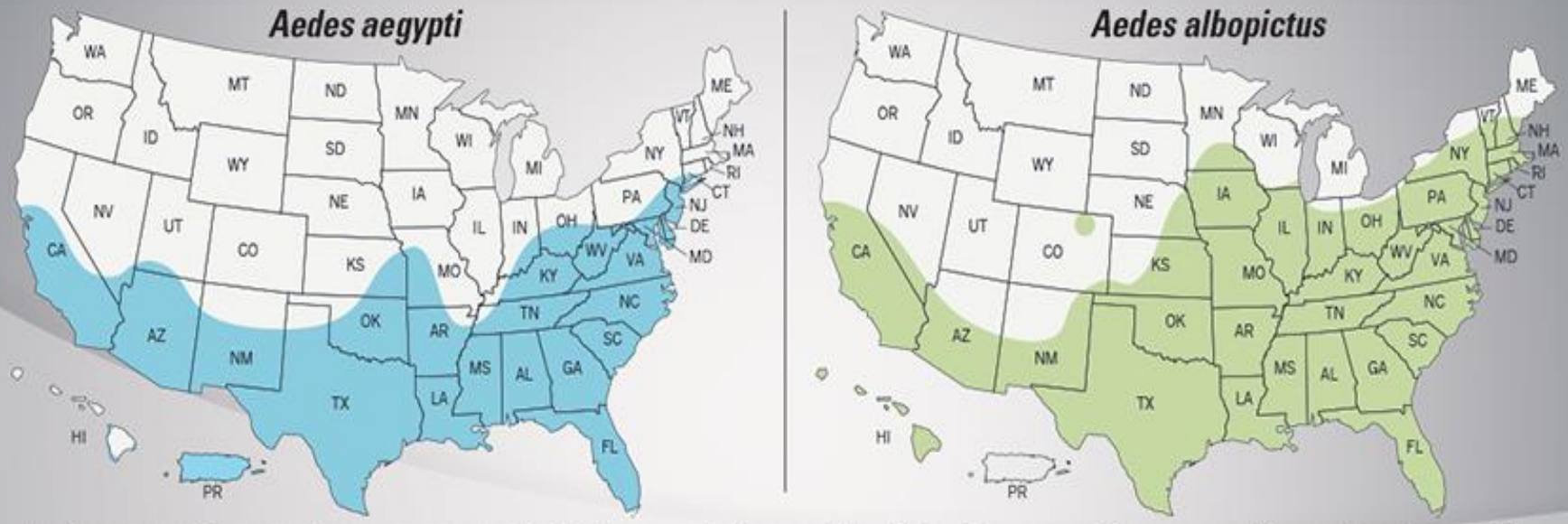
Zika Virus Vectors:
Aedes Mosquitoes

- *Aedes* species mosquitoes
  - Ae *aegypti* more efficient vectors for humans
  - Ae *albopictus*
- 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 aegypti **mosquito**

Aedes albopictus **mosquito**

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.*

SOURCE: Zika: Vector Surveillance and Control. www.cdc.gov/zika/vector/index.html

Other Modes of Transmission

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

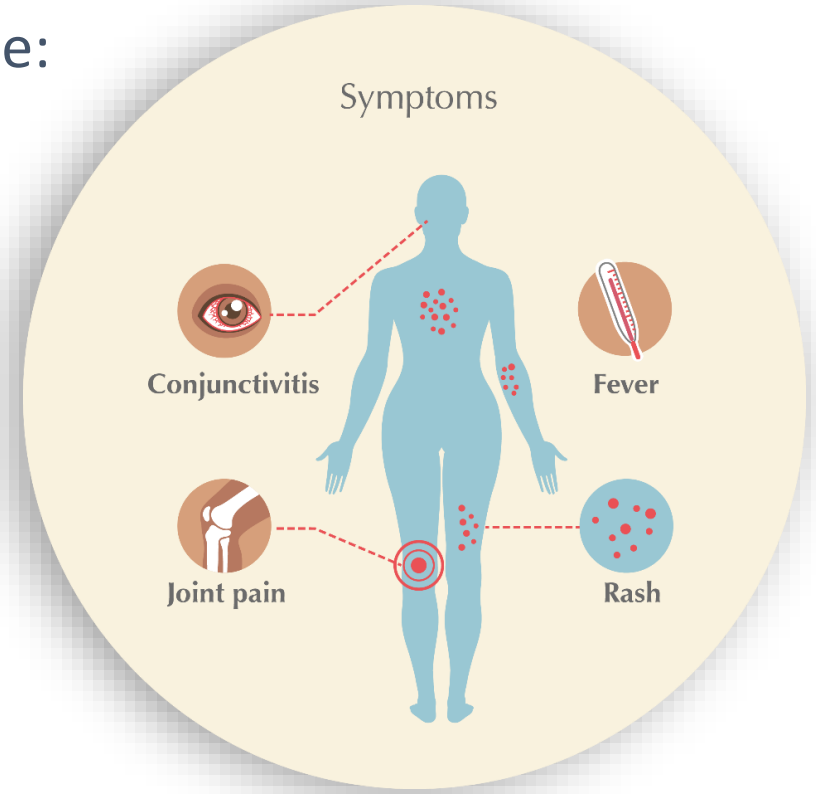
The Subcommittee on Arbovirus Laboratory Safety of the American Committee on Arthropod-Borne Viruses. Laboratory safety for arboviruses and certain other viruses of vertebrates. Am J Trop Med Hyg 1980;29:1359–81.
European Centre for Disease Prevention and Control. Rapid risk assessment: Zika virus epidemic in the Americas: potential association with microcephaly and Guillain-Barre syndrome. Stockholm, Sweden: European Centre for Disease Prevention and Control; 2015.

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

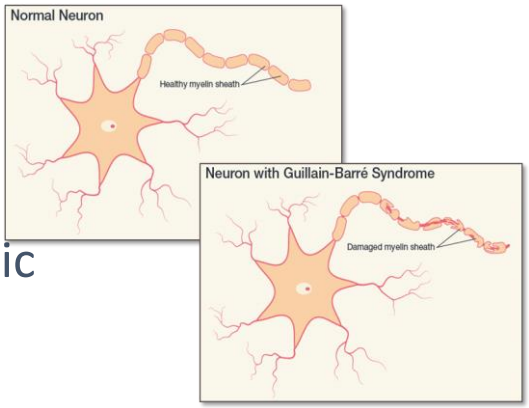
- Most common symptoms include:
  - Rash
  - Fever
  - Joint pain
  - Conjunctivitis (red eyes)
- Other symptoms include:
  - Muscle pain
  - Headache



Zika Virus Clinical Disease Course and Outcomes

- Incubation period: 3 – 14 days
- 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

Zika Virus and Guillain-Barré syndrome (GBS)



- Unclear how many people have had GBS after Zika virus infection
  - Brazil, 2015: 6 patients aged 2-57 years with neurologic syndromes (GBS and Acute Disseminated Encephalomyelitis) after Zika infection
  - French Polynesia, 2014: 38 cases of GBS, none among children
  - US: 1 case in the States and 1 in the territories
- Overall, GBS incidence appears to increase with increasing age

European Centre for Disease Prevention and Control. Rapid risk assessment: Zika virus infection outbreak, French Polynesia. 14 February 2014. Stockholm: ECDC; 2014.
Minstério de Saúde. Protocolo de vigilância e resposta à ocorrência de microcefalia relacionada à infecção pelo vírus Zika 2015. http://portalsaude.saude.gov.br/images/pdf/2015/dezembro/09/Microcefalia---Protocolo-de-vigil--ncia-e-resposta---vers--o-1----09dez2015-8h.pdf
Sejvar J, Baughman A, Wise M, Morgan O. Population incidence of Guillain-Barré syndrome: a systematic review and meta-analysis. Neuroepidemiology. 2011;36(2):123-33

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*

*http://ecdc.europa.eu/en/publications/Publications/Zika-virus-French-Polynesia-rapid-risk-assessment.pdf

Zika Virus in Yap Island Outbreak

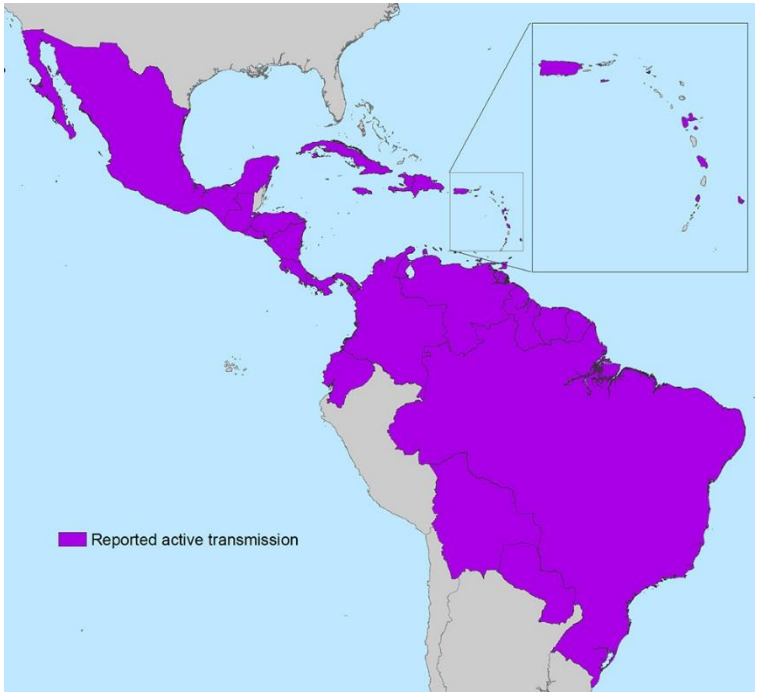
- Infection rate: 73% (95%CI 68–77%)
- Symptomatic attack rate among infected: 18% (95%CI 10–27%)
- All age groups affected
- Adults more likely to present for medical care
- No severe disease, hospitalizations, or deaths

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
- As of March 23, 2016, there are outbreaks in 39 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



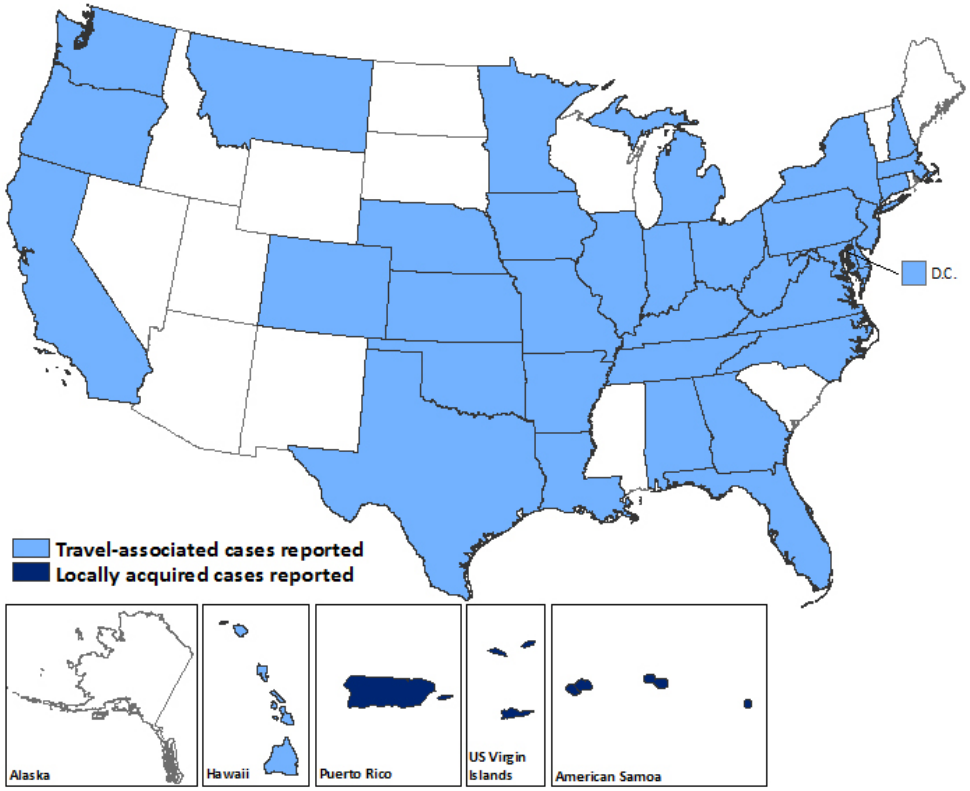
**Last updated March 22nd*

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, 30 March 2016

- US States
  - 312 travel-associated cases
    - 27 pregnant women
    - 6 sexually transmitted
  - 0 locally-acquired vector-borne cases
- US Territories
  - 3 travel-associated cases
  - 349 locally acquired cases
    - 37 pregnant women



Diagnostic Testing for Zika Virus

- Reverse transcriptase-polymerase chain reaction (RT-PCR) for viral RNA in serum collected ≤7 days after illness onset
- Serology for IgM and neutralizing antibodies in serum collected ≥4 days after illness onset (duration 12 weeks)
- Immunohistochemical (IHC) staining for viral antigens or RT-PCR on fixed tissues
- More information about laboratory testing can be found at: http://www.cdc.gov/zika/state-labs/index.html

Serology Cross-Reactions with Other Flaviviruses

- Zika virus serology (IgM) can be positive due to antibodies against related flaviviruses (e.g., dengue and yellow fever viruses)
- Neutralizing antibody testing may discriminate between cross-reacting antibodies in primary flavivirus infections
- Difficult to distinguish infecting virus in people previously infected with or vaccinated against a related flavivirus
- Healthcare providers should work with state, territorial, and local health departments to ensure test results are interpreted correctly

Laboratories for Diagnostic Testing for Zika Infection

- 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

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*

*WHO dengue clinical management guidelines:
http://whqlibdoc.who.int/publications/2009/9789241547871_eng.pdf

Initial Assessment and Treatment of Patients

- No specific antiviral therapy
- Treatment is supportive (i.e., rest, fluids, analgesics, antipyretics)
- Patients with 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 Disease Surveillance (1)

- Consider in travelers with acute onset of fever, maculopapular rash, arthralgia, or conjunctivitis within 2 weeks after return
- Inform and evaluate women who traveled to areas with Zika virus transmission while they were pregnant
- Evaluate fetuses/infants of women infected during pregnancy for possible congenital infection and microcephaly
- Be aware of possible local transmission in areas where *Aedes* species mosquitoes are active

Zika Virus Disease Surveillance (2)

- Jurisdictions most likely to have *Aedes aegypti* and *Aedes albopictus* mosquitoes should plan and implement surveillance activities to identify local transmission early

- Approaches to surveillance may include:

  - Enhance surveillance activities to identify potential additional cases near a travel-associated case
  - Testing people with symptoms of Zika virus in areas with *Aedes aegypti* and *Aedes albopictus* and known travel-associated cases
  - Identifying unusual clusters of rash illness and testing for Zika

Preventing Mosquito Bites

- Use EPA- registered insect repellent
- EPA- registered repellents including DEET are considered safe to use in pregnant and lactating women, and children
- Wear long-sleeved shirts and long pants to cover exposed skin
- Wear Permethrin-treated clothes
- Stay and sleep in screened-in or air-conditioned rooms
- Aedes mosquitoes that transmit Zika virus bite mostly during the daytime
- Practice mosquito prevention strategies throughout the entire day

Zika Virus Preventive Measures in Puerto Rico

- No vaccine or medication to prevent infection or disease
- Primary prevention measure is to reduce mosquito exposure
- Pregnant women should consider postponing travel to areas with ongoing Zika virus outbreaks
- Protect infected people from mosquito exposure during first week of illness to prevent further transmission

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

Mosquito Control in the United States

- Coordinated and funded locally in most areas
  - Divided into mosquito control or abatement districts
- Many mosquito control programs are stand-alone divisions of local governments
  - Need to link mosquito control districts with both state and local health departments
- State and local jurisdictions may have different laws and ordinances concerning mosquito control
  - Stand-alone program or connected to health departments
  - Especially relevant concerning property access

Zika Virus and Blood Safety

- As of March 31, 2016, there have not been any confirmed blood transfusion transmission cases in the United States.
- There have been suspected cases of Zika transmission through blood transfusion in Brazil. These reports are currently being investigated.
- During the previous French Polynesian outbreak, 2.8% of blood donors tested positive for Zika and in previous outbreaks, the virus has been found in blood donors.
- Zika virus currently poses a low risk to the US blood supply, but this could change depending on how many people in the United States become infected with the virus.
- Zika virus may be transmitted through blood transfusions. Because 80% of people infected with the Zika virus don't show any symptoms, they may not know they have been infected.

Zika Virus and Blood Safety

- February 16th – FDA released “Recommendations for Donor Screening Deferral and Product Management to Reduce the risk of Transfusion – Transmission of Zika Virus”
- March 30, 2016 – FDA Announced the availability of an investigational test to screen blood donations for Zika virus

Infection Control and Zika Virus: Considerations for Labor and Delivery Units

- **MMWR-** "Infection Control and Zika Virus: Considerations for Labor and Delivery Units" – report emphasizing the infection control practices to prevent spread of infectious diseases such as Zika virus
- Standard Precautions - CDC recommends basic measures to prevent infections
- No difference between recommendations for labor and delivery setting versus other healthcare settings
- Standard precautions can help prevent the spread of infectious diseases
  - Zika virus
  - HIV
  - Hepatitis C

CDC Response to Zika

CDC Activities and Plans

- Coordinate response with PAHO and other regional partners
- Assist with investigations of microcephaly and Guillain-Barré syndrome
- Technical assistance with vector control planning
- Continue to evaluate and revise guidance as new data emerge
- Distribute guidance through health advisories, MMWR publications and the CDC website
- Communicate regularly with clinicians, professional organizations and state and local partners

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

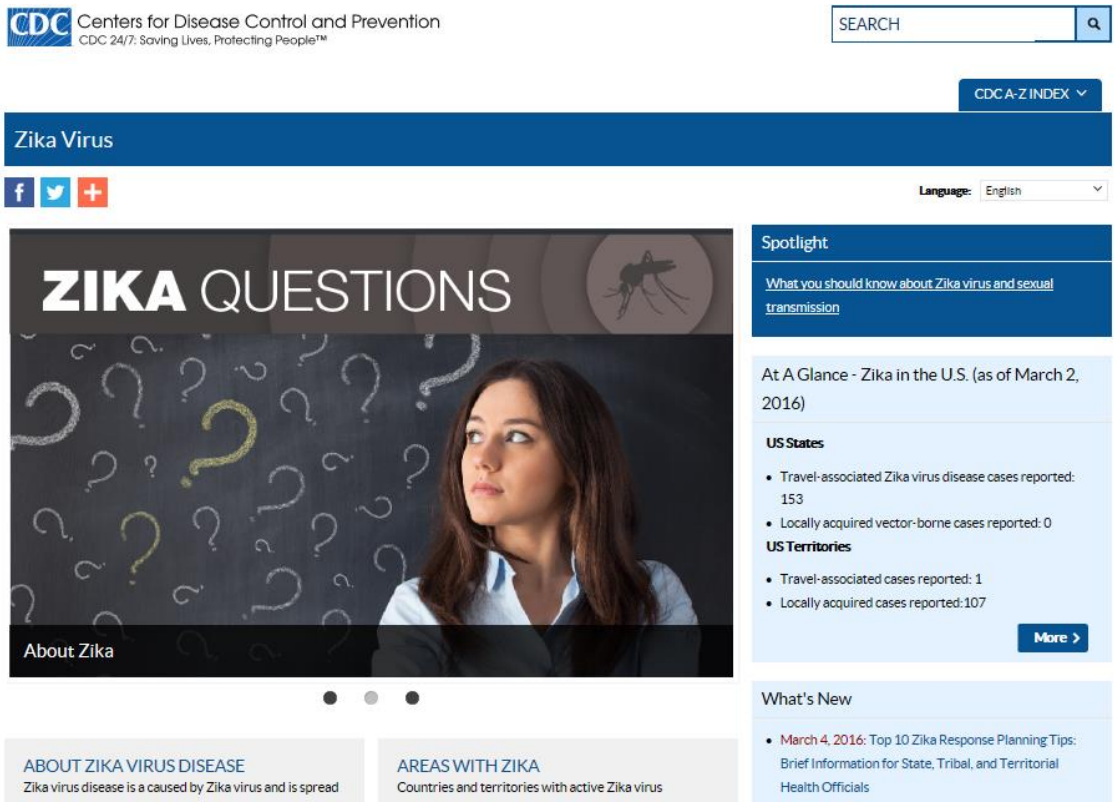
Clinical Inquiries Hotline

- Call the CDC Emergency Operations Center Watch Desk at 770-488-7100 and ask for the Zika Pregnancy Hotline
- Email ZikaMCH@cdc.gov.

Possible Future Course of Zika Virus in the Americas

- Virus will continue to spread in areas with competent vectors
  - Transmission increasing in Central America, Mexico, and Caribbean
  - Anticipate further spread in Puerto Rico and U.S. Virgin Islands
- Travel-associated cases will introduce virus to U.S. states
  - Imported cases will result in some local transmission and outbreaks
  - Air conditioning may limit the size and scope of outbreaks
  - Colder temperatures will interrupt and possibly stop further spread
- Experience from dengue might be predictive
  - From 2010–2014, 1.5 million dengue cases reported per year to PAHO
  - 558 travel-related and 25 locally transmitted cases in U.S. states

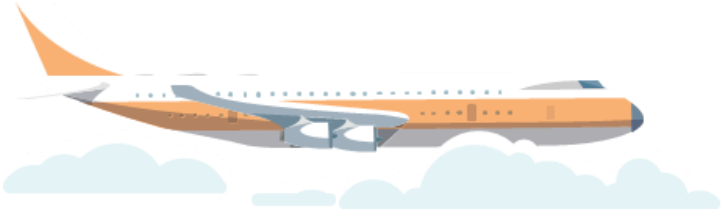
www.cdc.gov/zika



Additional resources

- CDC Zika virus information: http://www.cdc.gov/zika/
- PAHO Zika virus pages: http://www.paho.org/hq/index.php?option=com_topics&view=article&id=427&Itemid=41484&lang=en
- Zika virus information for clinicians: http://www.cdc.gov/zika/hc-providers/index.html
- Zika virus information for travelers and travel health providers: http://wwwnc.cdc.gov/travel/yellowbook/2016/infectious-diseases-related-to-travel/zika
- Travel notices: http://wwwnc.cdc.gov/travel/notices

Zika Travel Information



For the most current information about Zika virus, please visit www.cdc.gov/zika.

Zika Travel Notices

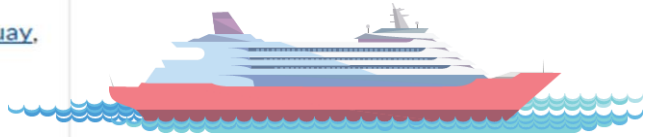
- Zika Virus in Cape Verde
- Zika Virus in Mexico
- **The Caribbean**

  Currently includes: Aruba; Barbados; Bonaire; Cuba; Curaçao; Dominica; Dominican Republic; Guadeloupe; Haiti; Jamaica; Martinique; the Commonwealth of Puerto Rico, a US territory; Saint Martin; Saint Vincent and the Grenadines; Sint Maarten; Trinidad and Tobago; US Virgin Islands
- **Central America**

  Currently includes: Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama
- **The Pacific Islands**

  Currently includes: American Samoa, Marshall Islands, New Caledonia, Samoa, Tonga
- **South America**

  Currently includes: Bolivia, Brazil, Colombia, Ecuador, French Guiana, Guyana, Paraguay, Suriname, Venezuela
- 2016 Summer Olympics (Rio 2016)



Thanks to our many collaborators and partners!

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

Centers for Disease Control and Prevention

CDC Webinar

Clinical Outreach and Communication Activity (COCA)

Updated Interim Zika Clinical Guidance for Reproductive Age Women and Men, Sexual Transmission of Zika, and the U.S. Zika Pregnancy Registry

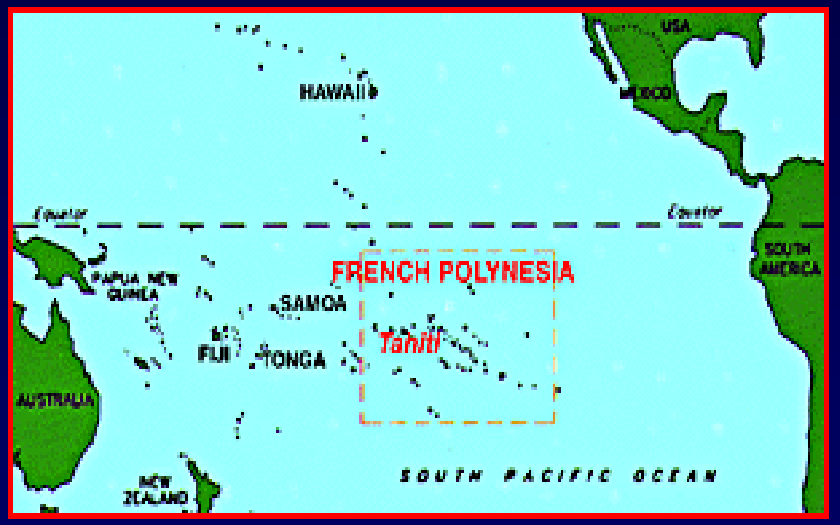
Date: Tuesday, April 12, 2016
Time: 2:00 - 3:00 pm (Eastern Time)
More Information at:
http://emergency.cdc.gov/coca/calls/index.asp

Zika Virus and the Pregnant Woman

Jeanne S. Sheffield, MD
Maternal-Fetal Medicine
Johns Hopkins Medical Center

Initial reports of possible congenital infection associated with ZIKV infection

- 2013-2014 French Polynesia
  - ZIKV seropositivity before outbreak 0-1.7%
  - Estimated 10% of the population were infected (~28,000 persons)
  - GBS 40 cases, 8 cases fetal and neonatal microcephaly
    - 1% women infected in the first trimester



Brazil 2015

- Northeastern Brazil May 2015 first reported at the same time Dengue was circulating
- September, 2015 an increase in microcephaly cases reported in the same areas as the Zika epidemic (20 cases per 10,000 live births – 20 fold increase)

Zika Virus Infection

- Incubation ~3-12 days
- Viremia ~7 days but now reports out >60 days in a GBS patient
- Only 20% of infected individuals develop symptoms
  - Acute onset fever, maculapapular rash, arthralgias and conjunctivitis are the big 4
  - Myalgias, headache, retroorbital pain, pruritis and vomiting
  - Usually last up to 7 days

Meaney-Delman et al Obstet Gynec 2016;0:1-7

Zika Virus Infection

- Adult disease sequelae
  - Rare to have severe disease or death
  - Guillain-Barre syndrome
  - Fetal complications

Meaney-Delman et al Obstet Gynec 2016;0:1-7

ZIKV Transmission

- *Aedes* genus of mosquito is the common vector (*Aedes aegypti* and *Aedes albopictus)*
- Vertical transmission
  - Antepartum
  - ?Intrapartum
  - ?Breastfeeding – no cases but ZIKV RNA is found in breast milk. Official recommendation is to allow breastfeeding
- Sexual transmission
- Blood bank
- Laboratory exposure

Brazil 2015

- Northeastern Brazil May 2015 first reported at the same time Dengue was circulating
- September, 2015 an increase in microcephaly cases reported in the same areas as the Zika epidemic (20 cases per 10,000 live births – 20 fold increase)

What is Microcephaly….

- Head significantly smaller than would be expected at a specific gestational age and sex
- Associated with
  - Genetic disorders (Chromosomal and single gene disorders)
  - Environmental
    - Perinatal infections
    - Prenatal exposure to drugs or chemicals
    - Perinatal hypoxia or trauma

Society for Maternal•Fetal Medicine

- Ultrasound Screening for Fetal Microcephaly Following Zika Virus Exposure February, 2016
  - Isolated fetal microcephaly ≥ 3 SD below mean for GA
  - Pathologic microcephaly if ≥ 5 SD below mean for GA
  - If > 2 SD, careful intracranial anatomy evaluation

Zika virus intrauterine infection causes fetal brain abnormality and microcephaly: tip of the iceberg?

1.A. S. Oliveira Melo[1],
2.G. Malinger[2,*],
3.R. Ximenes[3],
4.P. O. Szejnfeld[4],
5.S. Alves Sampaio[5] and
6.A. M. Bispo de Filippis[5]

ULTRASOUND in Obstetrics & Gynecology

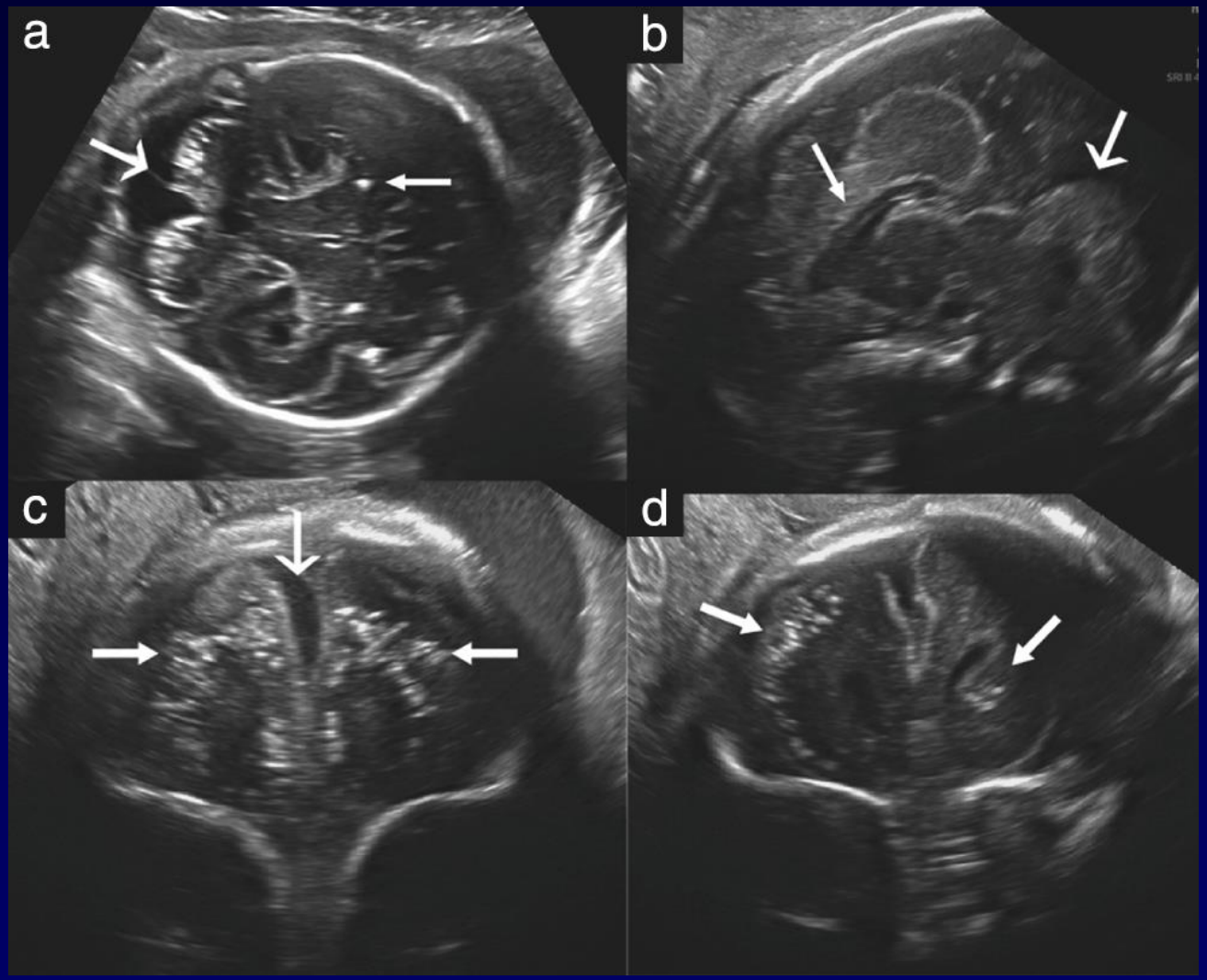
January, 2016

2 Pregnant women diagnosed with fetal microcephaly
- Blood test for Zika negative
- RT-PCR of the amniotic fluid positive

Case 1 at 30 weeks gestation

Case 2 at 29 weeks gestation

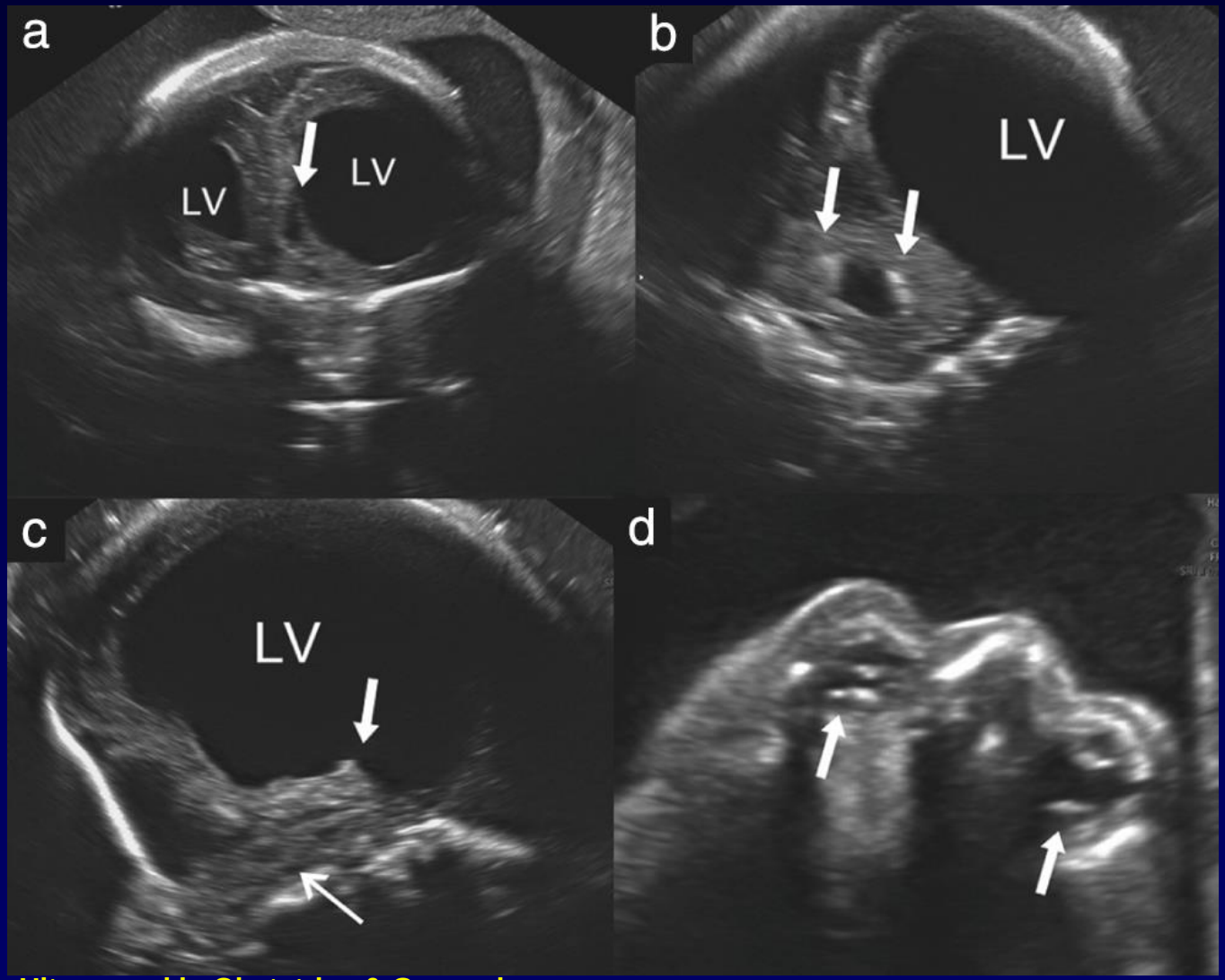
Zika virus intrauterine infection causes fetal brain abnormality and microcephaly: tip of the iceberg?



Intracranial calcifications
Absent normal vermis
Dysgenesis of the corpus callosum
Brain atrophy

Ultrasound in Obstetrics & Gynecology
Volume 47, Issue 1, pages 6-7, 5 JAN 2016 DOI: 10.1002/uog.15831
http://onlinelibrary.wiley.com/doi/10.1002/uog.15831/full#uog15831-fig-0001

Zika virus intrauterine infection causes fetal brain abnormality and microcephaly: tip of the iceberg?



Severe asymmetric Ventriculomegaly
Absent thalamus,
Eye calcifications

Ultrasound in Obstetrics & Gynecology
Volume 47, Issue 1, pages 6-7, 5 JAN 2016 DOI: 10.1002/uog.15831
http://onlinelibrary.wiley.com/doi/10.1002/uog.15831/full#uog15831-fig-0002

The NEW ENGLAND JOURNAL of MEDICINE

BRIEF REPORT

Zika Virus Associated with Microcephaly

Jernej Mlakar, M.D., Misa Korva, Ph.D., Nataša Tul, M.D., Ph.D., Mara Popović, M.D., Ph.D., Mateja Poljšak-Prijatelj, Ph.D., Jerica Mraz, M.Sc., Marko Kolenc, M.Sc., Katarina Resman Rus, M.Sc., Tina Vesnaver Vipotnik, M.D., Vesna Fabjan Vodušek, M.D., Alenka Vizjak, Ph.D., Jože Pižem, M.D., Ph.D., Miroslav Petrovec, M.D., Ph.D., and Tatjana Avšič Županc, Ph.D.

CDC MMWR 1/22/2016

Brazilian Ministry of Health Task Force Findings

- The initial 35 infant cohort (≤ 2 SD)
  - All mothers lived in or traveled to endemic areas
    - 74% had a rash in first or second trimester
  - 71% severe microcephaly ≥ 3 SD
  - 49% had at least one neurologic abnormality
  - 27/35 infants had neuroimaging and 100% were abnormal
    - Brain calcifications, cell migration abnormalities, cortical/subcortical atrophy

CDC MMWR 1/22/2016

Brazil Updated Data

- 42 women with laboratory – confirmed Zika virus infection anytime in pregnancy
  - 29% had abnormal findings
    - Microcephaly, intracranial calcifications, other brain abnormalities, abnormal cerebral artery flow, intrauterine growth restriction, and fetal death

Brasil P, Pereira JP , Raja Gabaglia C, et al. Zika virus infection in pregnant women in Rio de Janeiro—preliminary report. N Engl J Med. Published online March 4, 2016.

Fetal effects

- Microcephaly and intracranial calcifications
  - Vertical transmission – symptoms at 13 weeks gestation
  - Ultrasound at 14 and 20 weeks normal anatomy and growth
  - 29 weeks gestation “abnormal”
  - 32 weeks: IUGR <3%, normal AFI, placental calcifications, HC <2%, moderate ventriculomegaly, numerous intracranial calcifications and “blurred anatomy” Dopplers all normal

NEJM Brief Report 2/12/2016

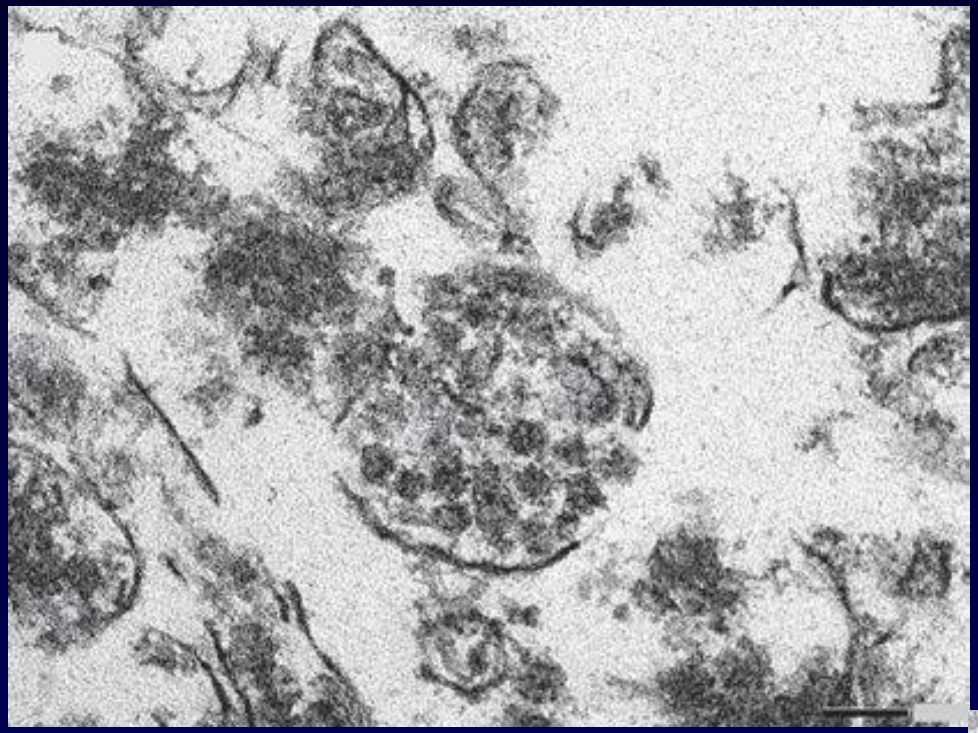
Mlakar et al NEJM 2/10/2016

Fetal effects

- Pregnancy termination : 5%, prominent microcephaly at the 1%, whole brain weight 4SD below average. Small cerebellum and brain stem, complete agyria and internal hydrocephalus, numerous calcifications. Virus particles identified with EM, RT-PCR positive in brain only, negative for other flaviviruses

NEJM Brief Report 2/12/2016

Mlakar et al NEJM
2/10/2016



Mlakar et al NEJM 2/10/2016

Fetal/Neonatal effects

- Eye abnormalities
  - 29 infants with microcephaly in Brazil
    - 35% had ocular abnormalities (chorioretinal atrophy and focal pigment mottling)

Freitas and Colleagues JAMA Ophthal February 9, 2016 Online

Congenital ZIKV Infection

- Microcephaly
- Brain atrophy
- Ventricular enlargement
- Intracranial calcifications
- Ocular defects
- Joint contractures
- Hydrops fetalis
- Absence of the corpus callosum
- Vermian agenesis
- Agenesis of the thalami
- Cataracts
- ……..

CDC MMWR 2/26/2016 Pregnancy Update

- Preliminary testing for ZIKV testing
  - 257 pregnant women tested – 97% test negative
  - 9 U.S. pregnant travelers with Zika virus infection
    - No hospitalizations or deaths of the infected mother
    - 2 early pregnancy losses
    - 2 elective terminations
    - 3 live births
      - 2 healthy infants to date
      - 1 severe microcephaly
    - 2 continuing pregnancies with no issues to date

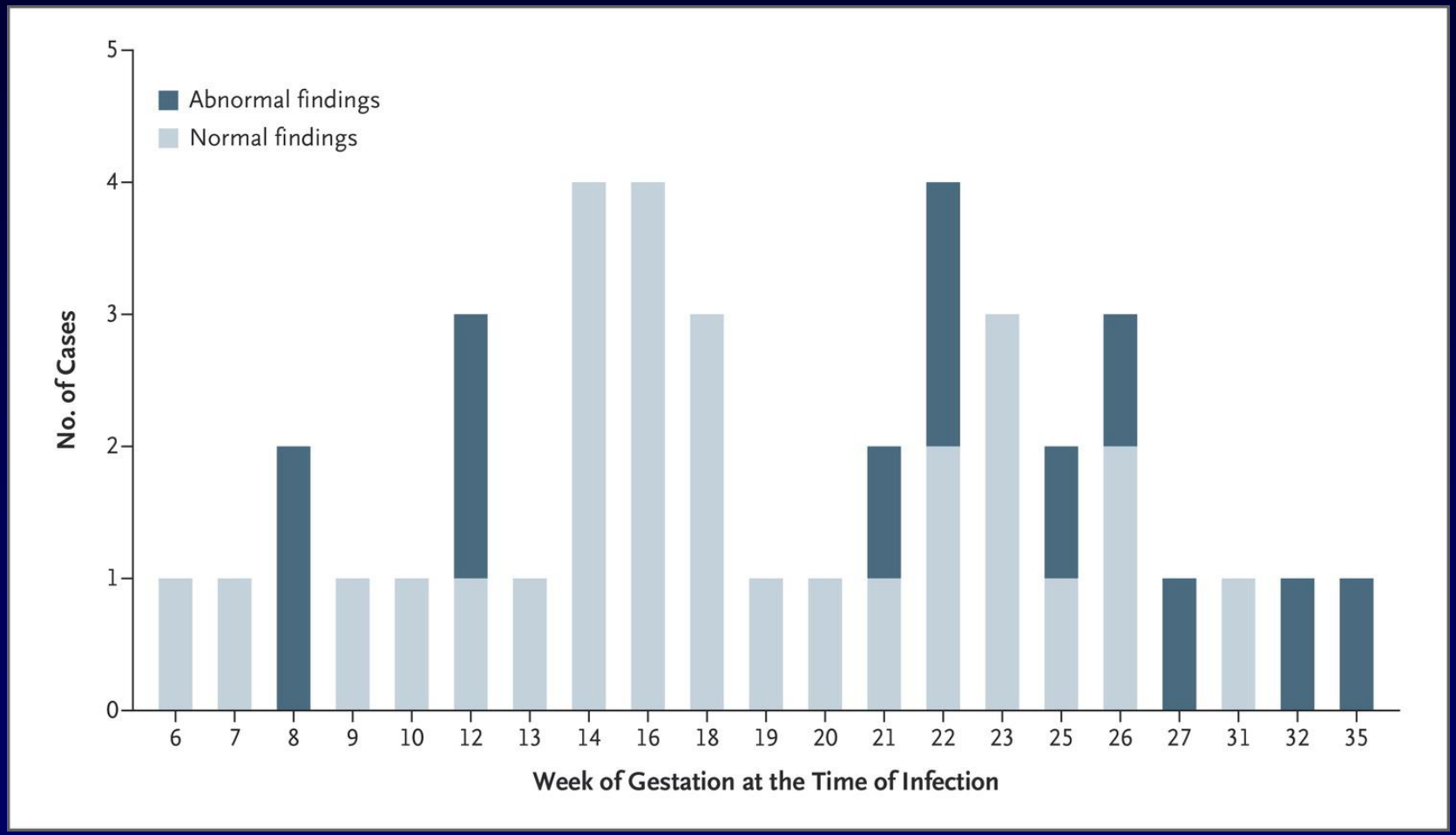
NEJM 3/4/2016
Brasil et al Rio de Janeiro Report

- 88 pregnant women with a concerning rash
  - 72% positive for Zika in blood and or urine
    - Rash was mainly pruritic and maculopapular
    - 65% arthralgias
    - 58% conjunctival injection
    - LAD 41%
    - Fever <1/3 acute infection – mainly low grade and short lived

NEJM 3/4/2016
Brasil et al Rio de Janeiro Report

- Of the 72 Zika positive pregnant women
  - 2 miscarriages in first trimester
  - 42 women (60%) had an ultrasound
    - 12 (29%) abnormal
      - 5 IUGR
      - 4 cerebral calcifications
      - 2 other CNS abnormalities
      - 2 Oligohydramnios/anhydramnios
      - 4 Abnormal dopplers
  - 2 fetal deaths

Week of Gestation at the Time of ZIKV Infection and Abnormal Ultrasonographic and Doppler Findings.

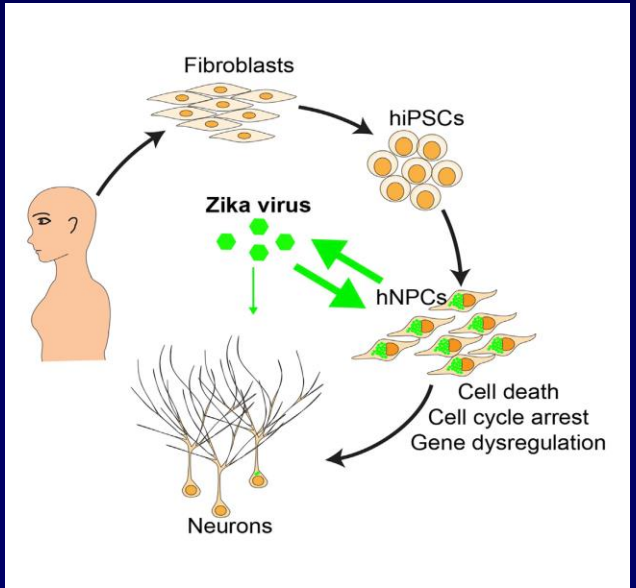


Brasil P et al. N Engl J Med 2016. DOI: 10.1056/NEJMoa1602412

The NEW ENGLAND JOURNAL of MEDICINE

Biologic Link between Zika and Microcephaly

- Ming, G et al Johns Hopkins March 2016 *Cell Stem Cell*
  - The Zika virus selectively infects cells from the brain cortex resulting in cell destruction or at least disrupted growth by cell cycle dysregulation
    - Cortical neural progenitor cells



Pregnancy Effects

- Unknown if pregnant women are more susceptible
- Disease does not appear to be any worse in pregnancy
- Transmission to the fetus has been documented in all trimesters
  - Zika RNA in abortus tissues, AF, placenta and term neonates

The unknowns for counseling

- Incidence among pregnant women
- Rate of vertical transmission
- Rate of clinical manifestations of the fetus is infected

There is no evidence that Zika virus will cause congenital infection in pregnancies conceived after the resolution of maternal Zika viremia

Preconceptional counseling

- Women with Zika virus disease should wait at least 8 weeks after symptom onset to conceive
- Men with Zika virus disease should wait 6 months after symptom onset to conceive
- Men and women with possible exposure but no documented disease or symptoms should wait at 8 weeks after exposure to conceive

Update: Interim Guidance for Health Care Providers Caring for Women of Reproductive Age with Possible Zika Virus Exposure — United States, 2016 MMWR Weekly / April 1, 2016 / 65(12);315–322

Preconception Exposure and Testing

- Pregnant women who do not reside in areas with active Zika virus transmission who have had possible Zika virus exposure during the 8 weeks before conception (6 weeks before the last menstrual period) can be offered serologic testing within 2–12 weeks of this exposure.

MMWR 3/25/2016

Recommendations for Pregnant Women

- CDC Recommends all pregnant women consider postponing travel to areas of ongoing Zika virus transmission if possible
  - http://wwwnc.cdc.gov/travel/notices
- If pregnant women have to travel, avoid mosquito bites
  - Protective clothing
  - U.S. EPA-registered insect repellent
  - Screened-in or air-conditioned areas

CDC's Response to **Zika**

PREGNANT? Read this before you travel

What we know about Zika

- Zika can be passed from a mother to her fetus during pregnancy.
- Infection with Zika during pregnancy is linked to birth defects in babies.
- Zika is spread mostly by the bite of an infected *Aedes* species mosquito.
  - » These mosquitoes are aggressive daytime biters. They can also bite at night.
- There has been no local transmission of Zika in the continental US.
- There is no vaccine to prevent or medicine to treat Zika.
- Zika can be spread by a man to his sex partners.

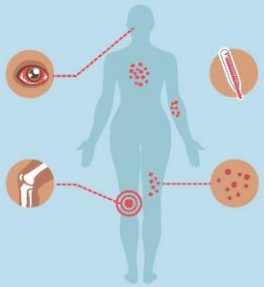
What we don't know about Zika

- If there's a safe time during your pregnancy to travel to an area with Zika.
- If you do travel and are infected, how likely it is that the virus will infect your fetus and if your baby will have birth defects from the infection.

Travel Notice

CDC has issued a travel notice (Level 2-Practice Enhanced Precautions) for people traveling to areas where Zika virus is spreading.

- For a current list of places with Zika outbreaks, see CDC's Travel Health Notices: http://wwwnc.cdc.gov/travel/page/zika-travel-information
- This notice follows reports in Brazil of microcephaly and other poor pregnancy outcomes in babies of mothers who were infected with Zika virus while pregnant.



Symptoms of Zika

About 4 out of 5 people with Zika won't even know they have it. The illness is usually mild with symptoms lasting for several days to a week.

The most common symptoms of Zika are:

- Fever
- Rash
- Joint Pain
- Conjunctivitis (red eyes)

CDC recommends special precautions for pregnant women and women trying to become pregnant

Pregnant?

Pregnant women and their male partners should strictly follow steps to prevent mosquito bites.

If you have a male sex partner who lives in or travels to an area with Zika, you should use condoms the right way every time you have sex, or do not have sex during the pregnancy.

If you develop the symptoms of Zika, see a healthcare provider right away for testing.

Trying to become pregnant?

Women trying to become pregnant and their male partners should strictly follow steps to prevent mosquito bites.

Talk to your healthcare provider about plans to become pregnant.

Your Best Protection: Prevent Mosquito Bites

Clothing

- Wear long-sleeved shirts and long pants.
- Treat clothing and gear with permethrin or purchase permethrin-treated items.
  - » Treated clothing remains protective after multiple washings. See product information to learn how long the protection will last.
  - » If treating items yourself, follow the product instructions carefully.
- Do NOT use permethrin products directly on skin. They are intended to treat clothing.

Indoor Protection

- Stay in places with air conditioning or that use window and door screens to keep mosquitoes outside.
- Sleep under a mosquito bed net if air conditioned or screened rooms are not available or if sleeping outdoors.

Repellent

Use Environmental Protection Agency (EPA)-registered insect repellents. When used as directed, these insect repellents are safe and effective for pregnant and breastfeeding women.

- Always follow the product label instructions.
- Reapply as directed.
- Do not spray repellent on the skin under clothing.
- If you are also using sunscreen, apply sunscreen before applying insect repellent.

www.cdc.gov/zika

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

CS263062-B February 23, 2016

Evaluation- Maternal

- Test all pregnant woman with travel to an affected area (Algorithms)
  - Symptoms within 2 weeks of travel
    - RT-PCR and IgM
  - No symptoms
    - IgM 2-12 weeks after exposure
- Pregnant women living in an endemic area algorithm
- Infants and Children Guidelines

Evaluation- Fetal

- Women who have traveled to an endemic area
  - Ultrasound initially 3-4 weeks after symptoms or exposure
    - Intracranial calcifications, microcephaly, brain and eye abnormalities
  - If mother's PCR or IgM positive or inconclusive, ultrasound every 3-4 weeks
  - Consider repeating at least once even if no symptoms and negative testing

Evaluation- Fetal

- If the ultrasound is abnormal or the maternal testing is positive for Zika infection, consider an amniocentesis after 15 weeks gestation
  - Limited knowledge of how good the AF PCR is, how long AF stays positive and if + AF PCR correlates with disease severity
- Send all pathology specimens and placentas for testing

If an infant is Zika infected…

The prognosis for infants with congenital Zika virus infection is not known. In infants with severe microcephaly from other causes, a range of neurologic sequelae have been reported (e.g., intellectual disability, hearing loss, vision loss, and seizures). These problems can range from mild to severe, are often life-long, and in some cases can be life-threatening.

CDC MMWR 2016

Current Commentary

Zika Virus and Pregnancy

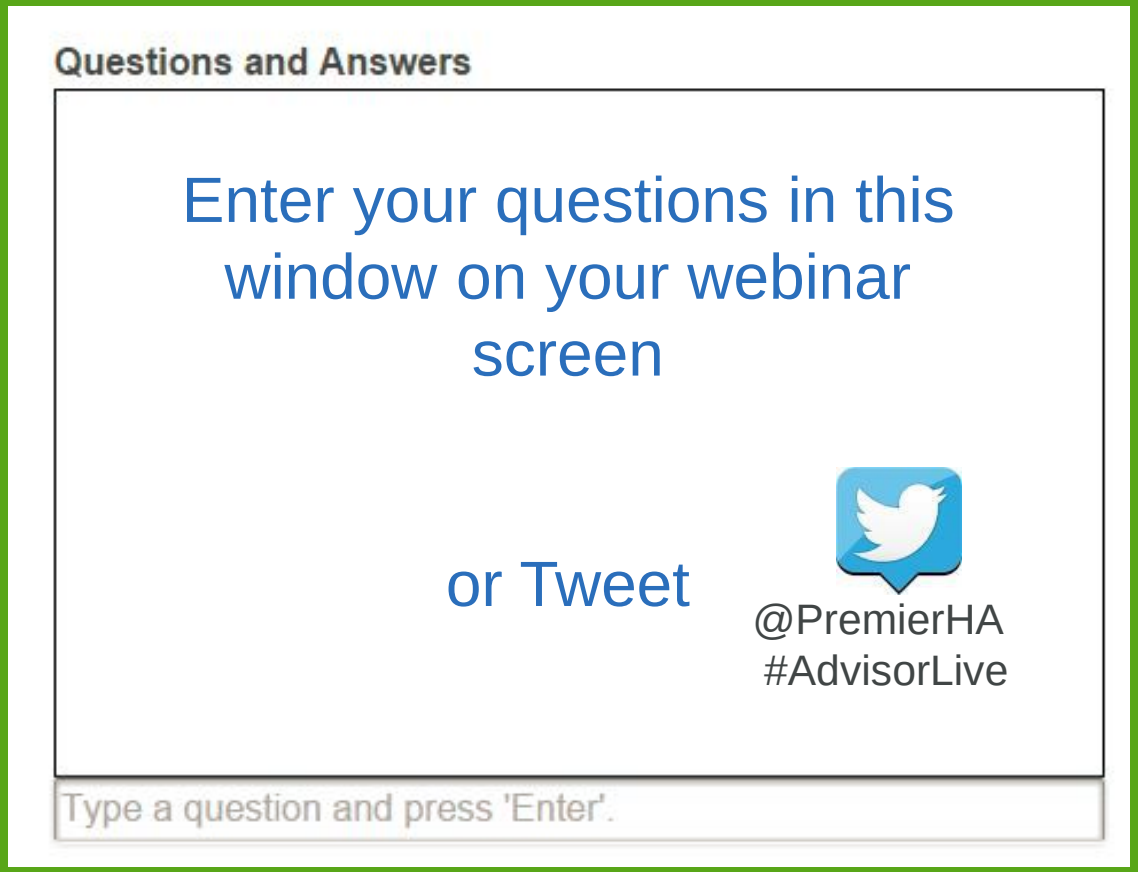
What Obstetric Health Care Providers Need to Know

Dana Meaney-Delman, MD, MPH, Sonja A. Rasmussen, MD, MS, J. Erin Staples, MD, PhD,Titilope Oduyebo, MD, Sascha R. Ellington, MSPH, Emily E. Petersen, MD, Marc Fischer, MD,and Denise J. Jamieson, MD, MPH

ACOG and SMFM Practice Advisory: Updated Interim Guidance for Care of Women of Reproductive Age During a Zika Virus Outbreak

3/31/2106

Your questions



Faculty

Moderator: Gina Pugliese RN MS

Vice President, Premier Safety Institute

Joanne Cono, MD, ScM

Director, Office of Science Quality, Office of the Director, Centers for Disease Control and Prevention (CDC)

Jeanne S. Sheffield, MD

Director of Maternal-Fetal Medicine Division and Professor in the Johns Hopkins Medicine Department of Gynecology and Obstetrics

Thank you for joining us

For more information, contact:

Anna Vordermark – Premier Advisor Live®
anna_vordermark@premierinc.com 704-816-5599

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Centers for Disease Control and Prevention

CDC Webinar

Clinical Outreach and Communication Activity (COCA)

Updated Interim Zika Clinical Guidance for Reproductive Age Women and Men, Sexual Transmission of Zika, and the U.S. Zika Pregnancy Registry

Date: Tuesday, April 12, 2016
Time: 2:00 - 3:00 pm (Eastern Time)
More Information at:
http://emergency.cdc.gov/coca/calls/index.asp