Zika: Recommendations to Travelers to Endemic Countries

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Outline

- Describe guidelines and illustrate how they evolved over time
- Discuss pre-conception recommendations for couples planning pregnancy after travel
- Summarize recommendation on travel and screening for pregnant travelers
- Review guidelines to address travelers to low-burden areas such as Thailand
Zika epidemiology

- Human infections sporadic before 2007:
  - Nigeria 1954, 1968, 1971-75
  - Indonesia 1977
  - 1951-99:
    - Uganda, Tanzania, Egypt, Central African Republic, Sierra Leone, Gabon, Senegal...
    - India, Malaysia, Philippines, Thailand, Vietnam, Indonesia...

- Mosquitoes Zika+:
  - Malaysia, Cote d’Ivoire
Zika: clinical presentation

- Incubation: 2-7d (≈1-12d)
- Symptoms: 80% asymptomatic
  - Fever – usually 2 days
  - Rash, conjunctivitis
  - Arthralgia, myalgia - up to 1 week
- Severe: link to GBS, myelitis, encephalitis, sensory polyneuropathy, autoimmune disorder
- Congenital Zika syndrome

Initial travel recommendations

Prior to departure

Health authorities should advise travelers heading to any country with documented circulation of dengue, chikungunya, and/or Zika virus to take the necessary measures to protect themselves from mosquito bites, such as using repellents, appropriate clothing that minimize skin exposure, and using insecticides or nets. It is also important to inform travelers of the symptoms of dengue, chikungunya, or Zika virus, in order to assist them in identifying it promptly during their trip. This advice could be relayed through travel medicine services, clinics, travel health web pages of the Ministry of Health, or other relevant government web pages.

While visiting places with dengue, chikungunya and/or Zika virus transmission

Advise travelers to:

- Take appropriate measures to protect themselves from mosquito bites through use of repellents or use of appropriate clothes that minimize skin exposure.
- Avoid mosquito-infested areas.
- Use nets and/or insecticide.
- Recognize symptoms of dengue, chikungunya, and Zika virus and seek professional health care if any of these symptoms occur.

Upon returning

Advise travelers returning home, that if they suspect they have dengue, chikungunya, or Zika virus they should contact their health care provider.
Recommendations evolved with new information

- October 2015: Brazil MOH reported unusual increase of microcephaly in Pernambuco, Paraiba and Rio Granded do Norte.
- November 11, 2015: Brazil declared national public health emergency due to increasing numbers of microcephaly.

Epidemiological Alert
Increase of microcephaly in the northeast of Brazil

17 November 2015
Recommendations evolved: congenital Zika

December 2015: ECDC Rapid Risk Assessment

January 2016: CDC Alert Level 2 Enhanced Precautions: preventing mosquito bites
Microcephaly: causality

- Consensus: Zika virus infection can cause fetal congenital anomalies
- Other malformations: ocular abnormalities, hearing loss, hydrops fetalis, impaired growth, fetal loss, arthrogryposis
- CDC estimated risk for 1\textsuperscript{st} trimester infection = 0.88\% - 13.2\%
- Pregnancy Registry with births: 6\% fetuses/infants had birth defects
  - Infection in 1\textsuperscript{st} trimester: 11\% had defects
Sexual transmission: earlier reports

- November 2015: sexual transmission reported in German ex. Haiti

Morbidity and Mortality Weekly Report

Male-to-Male Sexual Transmission of Zika Virus — Texas, January 2016

D. Trew Deckard, PA-C; Wendy M. Chung, MD; John T. Brooks, MD; Jessica C. Smith, MPH; Senait Woldai, MPH; Morgan Hennessey, DVM; Natalie Kwit, DVM; Paul Mead, MD

Recommendations evolved again: sexual transmission

- February 2016: health authorities published guidance to prevent sexual transmission –
- WHO, CDC, ECDC, Health Canada/CATMAT, Health Protection England/NaTHNaC

Interim Guidelines for Prevention of Sexual Transmission of Zika Virus — United States, 2016

Zika virus is a mosquito-borne flavivirus primarily transmitted by Aedes aegypti mosquitoes (1,2). Infection with Zika virus is asymptomatic in an estimated 80% of cases (2,3), and when Zika virus does cause illness, symptoms are generally mild and self-limited. Recent evidence suggests a possible association between maternal Zika virus infection and adverse fetal outcomes, such as congenital microcephaly (4,5), as well as a possible association with Guillain-Barré syndrome. Currently, no vaccine or medication exists to prevent or treat Zika virus infection. Persons residing in or traveling to areas of active Zika virus transmission should take steps to prevent Zika virus infection through prevention of mosquito bites (http://www.cdc.gov/zika/prevention/).

Sexual transmission of Zika virus is possible, and is of particular concern during pregnancy. Current information about possible sexual transmission of Zika is based on reports of three cases. The first was probable sexual transmission of Zika virus from a non-pregnant (6) to her non-pregnant sexual partner, followed by the apparent sexual transmission of Zika virus from the non-pregnant partner to his pregnant sexual partner (7). The following recommendations, which apply to men who reside in or have traveled to areas with active Zika virus transmission (http://www.cdc.gov/zika/travel/notices/) and their sex partners, will be revised as more information becomes available.

Recommendations for men and their pregnant partners

Men who reside in or have traveled to an area of active Zika virus transmission who have a pregnant partner should abstain from sexual activity or consistently and correctly use condoms during sex (i.e., vaginal intercourse, anal intercourse, or fellatio) for the duration of the pregnancy. Pregnant women should discuss their male partner’s potential exposures to mosquitoes and history of Zika-like illness (http://www.cdc.gov/zika/symptoms) with their health care providers; providers can consult CDC’s guidelines for evaluation and testing of pregnant women (8).
26 February 2016

The United States reports two sexually transmitted cases of Zika virus.
Sexual transmission and other transmission

- Urine, saliva – live virus 6 days, RNA up to 91 days
  - RNA longer in urine (2-3 weeks), longest in whole blood (58 days)
- Semen – 24 days live virus; 46-69 days outliers; 188 days RT-PCR (RNA non-infective)
- Vaginal secretions – 3 days, cervical mucus 11 days, both by RT-PCR
- Breast milk + (infectious virus)
- Blood transfusion – platelet

Pre-conception travel advice for travelers going to areas with active Zika virus transmission

<table>
<thead>
<tr>
<th>Preconception planning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Women</strong></td>
</tr>
<tr>
<td>• Wait at least 8 weeks before attempting conception.</td>
</tr>
<tr>
<td><em>WHO: wait 6 months</em></td>
</tr>
<tr>
<td><strong>Men</strong></td>
</tr>
<tr>
<td>• Practice safe sex for 6 months.</td>
</tr>
</tbody>
</table>

Oduyebo T et al. MMWR 65(29); Petersen EE et al. MMWR 65(39); WHO/ZIKV/MOC/16.1 Rev.3.
Travel advice for pregnant women going to areas with risk for Zika virus transmission

<table>
<thead>
<tr>
<th>Persons with risk for pregnancy and fetal complications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pregnant women</strong></td>
</tr>
<tr>
<td>• Avoid travel.</td>
</tr>
<tr>
<td>• If travel cannot be avoided, talk to a healthcare provider before travel, and optimize use of anti-vector measures.</td>
</tr>
<tr>
<td><strong>Partners of pregnant women</strong></td>
</tr>
<tr>
<td>• Practice safe sex or abstain from sexual activity for the duration of the pregnancy.</td>
</tr>
</tbody>
</table>

Oduyebo T et al. MMWR 65(29); Petersen EE et al. MMWR 65(39); WHO/ZIKV/MOC/16.1 Rev.3.
Advice for pregnant women residing in areas with ongoing risk for exposure to Zika: CDC

- Zika virus IgM antibody testing should be done as part of routine obstetric care during the 1\textsuperscript{st} and 2\textsuperscript{nd} trimesters
- Immediate rRT-PCR testing if IgM results are positive or equivocal

Oduyebo et al. MMWR 2016: 65(29)
Travel recommendations: additional messages

- Even if they do not feel sick, travelers returning from an area with Zika should take steps to prevent mosquito bites for 3 weeks so they do not spread Zika to uninfected mosquitoes.

- The mosquito vectors do not live at elevations >6,500 feet (2,000 meters). Travelers who plan to be only in areas above this elevation are at a very low risk of getting Zika from a mosquito.

CDC. Key Messages – Zika Virus Disease. October 4, 2016
Current worldwide situation: WHO

- 76 countries/territories reported mosquito-borne Zika since 2007 (70 from 2015 on):
  - 59 reported outbreak from 2015
  - 7 possible endemic transmission or local mosquito-borne Zika
  - 10 with local mosquito-borne Zika pre-2015, no case 2016/2017, or outbreak over

- 13 countries: person-to-person
- 21 countries: increased GBS

Figure 2. New detection of mosquito-borne Zika virus infections, January 2013—February 2017
Zika virus in low burden areas

http://apps.who.int/iris/bitstream/10665/254507/1/zikasitrep2Feb17-eng.pdf?ua=1

<table>
<thead>
<tr>
<th>Classification</th>
<th>WHO Regional Office</th>
<th>Country / territory</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1: Countries with a reported outbreak from 2015 onwards*</td>
<td>AFRO</td>
<td>Angola; Cabo Verde; Guinea-Bissau; Anguilla; Antigua and Barbuda; Argentina; Aruba; Bahamas; Barbados; Belize; Bolivia (Plurinational State of); Bonaire, Sint Eustatius and Saba – Netherlands; Brazil; British Virgin Islands; Cayman Islands; Colombia; Costa Rica; Cuba; Curacao; Dominica; Dominican Republic; Ecuador; El Salvador; French Guiana; Grenada; Guadeloupe; Guatemala; Guyana; Haiti; Honduras; Jamaica; Martinique; Mexico; Montserrat; Nicaragua; Panama; Paraguay; Peru; Puerto Rico; Saint Barthélemy; Saint Kitts and Nevis; Saint Lucia; Saint Martin; Saint Vincent and the Grenadines; Saint Maarten; Suriname; Trinidad and Tobago; Turks and Caicos; United States of America; United States Virgin Islands; Venezuela (Bolivarian Republic of)</td>
<td>48</td>
</tr>
<tr>
<td>Subtotal</td>
<td></td>
<td></td>
<td>59</td>
</tr>
<tr>
<td>Category 2: Countries with possible endemic transmission or evidence of local mosquito-borne Zika infections in 2016 or 2017</td>
<td>AMRO/PAHO</td>
<td>Indonesia; Maldives; Thailand</td>
<td>3</td>
</tr>
<tr>
<td>Subtotal</td>
<td>SEARO</td>
<td>Malaysia; New Caledonia; Philippines; Viet Nam</td>
<td>4</td>
</tr>
<tr>
<td>Subtotal</td>
<td></td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Category 3: Countries with evidence of local mosquito-borne Zika infections in or before 2015, but without documentation of cases in 2016 or 2017, or outbreak terminated</td>
<td>AFRO</td>
<td>Gabon**</td>
<td>1</td>
</tr>
<tr>
<td>Subtotal</td>
<td>PAHO/AMRO</td>
<td>ISLA DE PASCUA – Chile**</td>
<td>1</td>
</tr>
<tr>
<td>Subtotal</td>
<td>SEARO</td>
<td>Bangladesh**</td>
<td>1</td>
</tr>
<tr>
<td>Subtotal</td>
<td>WPRO</td>
<td>Cambodia**; Cook Islands**; French Polynesia**; Lao People’s Democratic Republic; Papua New Guinea; Solomon Islands; Vanuatu</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>76</td>
</tr>
</tbody>
</table>

*The wording has been revised in recognition of the fact that a country that has had a first outbreak since 2015 and in which that outbreak has since terminated, may again report a new outbreak or cases which would qualify the country to be re-included in category 1.

**These countries and territories have not reported Zika virus cases in 2015, 2016 or 2017.
Zika Travel Notices

- Zika Virus in Cape Verde
- Zika Virus in Mexico
- Asia
  - Currently Includes: Singapore
- The Caribbean
  - Currently Includes: Antigua and Barbuda, Aruba, Barbados, British Virgin Islands, Cayman Islands, Curacao, Dominica, Grenada, Guadeloupe, Haiti, Jamaica, Martinique, the Commonwealth of Puerto Rico, and the U.S. Virgin Islands
- Central America
  - Currently Includes: Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama
- The Pacific Islands
  - Currently Includes: American Samoa, Fiji, Marshall Islands, Micronesia, New Caledonia, Palau, Papua New Guinea, Samoa, Tonga
- South America
  - Currently Includes: Argentina, Bolivia, Brazil, Colombia, Ecuador, French Guiana, Guyana, Paraguay, Peru, Suriname, Venezuela

- Zika Virus Health Advisory/Infographics
- Questions and Answers: Zika risk at high elevations

Special Populations

- Going to Visit Friends or Family in an Area with Zika?
- Guidelines for Travelers Visiting Friends and Family in Areas with Chikungunya, Dengue, or Zika
- Guidelines for US Citizens and Residents Living in Areas with Chikungunya Virus Transmission

Special Travel Considerations for Endemic Countries in Southeast Asia

Zika Virus in Southeast Asia

Travelers have returned from certain areas of Southeast Asia with Zika virus infection. These countries have either reported local Zika virus transmission or are next to countries with known Zika virus transmission. Because of this, CDC recommends pregnant women should consult with their health care provider and consider postponing nonessential travel to countries listed below. Travel notices have not been issued for these destinations but would be considered if the number of cases rises to the level of an outbreak. Check this page for the most up-to-date information before you make travel plans.

- Currently Includes: Brunei, Burma (Myanmar), Cambodia, Indonesia, Laos, Malaysia, Maldives, Philippines, Thailand, Timor-Leste, (East Timor), Vietnam

Other Countries with Endemic Zika

Some countries in Africa, the Pacific Islands, and Asia have reported Zika in the past and may report occasional new cases. The risk to travelers in these endemic countries is likely much lower than it is in countries with Zika outbreaks (see Q&A: Zika Risk in Countries with Endemic Zika). Because Zika infection in a pregnant woman can cause severe birth defects, pregnant women should consult with their health care provider and, if they decide to travel, should strictly follow steps to prevent mosquito bites during their trip. Travel notices have not been issued for these destinations but would be considered if the number of cases rises to the level of an outbreak. Check this page for the most up-to-date information before you make travel plans.

- Asia: Bangladesh, India, Pakistan
- The Pacific Islands: Easter Island, Vanuatu

## Low burden areas?

<table>
<thead>
<tr>
<th>Country report of Zika</th>
<th>WHO</th>
<th>CDC</th>
<th>ECDC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Thailand</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>October 2016: 2 cases of babies with microcephaly</td>
<td>5 Feb to 14 April 2016: viral circulation, past transmission, with or without ongoing transmission</td>
<td>Endemic, risk to travelers is low</td>
<td>21 Jan to 3 June 2016: autochthonous or sporadic or past transmission</td>
</tr>
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<tr>
<td></td>
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<tr>
<td></td>
<td>7 July 2016 to present: Category 2</td>
<td>30 Sep 2016: Included in CDC’s Southeast Asia Regional special considerations notice</td>
<td>8 July 2016 to present: changed to widespread transmission</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Data compilation: Karin Leder
# Recommendations for low-burden areas

<table>
<thead>
<tr>
<th>Risk categories</th>
<th>“Low risk” areas</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WHO</strong></td>
<td><strong>Low risk</strong> areas</td>
</tr>
<tr>
<td>• Outbreaks from 2015 onwards</td>
<td>• Possible endemic transmission or evidence of local mosquito-borne Zika infections in 2016 or 2017 with the reporting period beginning in 2007</td>
</tr>
<tr>
<td>• Possible endemic transmission 2007 to 2016-2017</td>
<td></td>
</tr>
<tr>
<td>• Evidence of transmission 2007-2015</td>
<td></td>
</tr>
<tr>
<td><strong>CDC</strong></td>
<td><strong>Low risk</strong> areas</td>
</tr>
<tr>
<td>• Epidemic</td>
<td>• Pregnant women should consult with their health care provider and consider postponing nonessential travel</td>
</tr>
<tr>
<td>• Endemic</td>
<td></td>
</tr>
<tr>
<td>• “Special considerations” notice for Southeast Asia on September 30th 2016</td>
<td></td>
</tr>
<tr>
<td><strong>ECDC</strong></td>
<td><strong>Low risk</strong> areas</td>
</tr>
<tr>
<td>• Increasing or widespread transmission &gt;3 months</td>
<td>• Consider postponing nonessential travel</td>
</tr>
<tr>
<td>• Sporadic transmission (&lt;10 in 1 area within 3 months)</td>
<td></td>
</tr>
<tr>
<td>• Past transmission (2007 up to 3 months ago)</td>
<td></td>
</tr>
<tr>
<td><strong>Public Health England</strong></td>
<td><strong>Low risk</strong> areas</td>
</tr>
<tr>
<td>• High (active transmission in last 3 months)</td>
<td>• No Zika specific advisory... should seek advice from healthcare provider before travel for an individual risk assessment and to</td>
</tr>
</tbody>
</table>
After travel: tests and criteria

- **Molecular:** PCR (CDC Triplex rRT-PCR)
  - Serum, CSF, urine, amniotic fluid
  - Whole blood – more sensitive

- **Serologic:**
  - Zika IgM MAC-ELISA: serum, CSF
  - Plaque reduction neutralization test (PRNT)
Testing and interpretation recommendations for a pregnant woman with possible exposure to Zika virus

**PREGNANT WOMAN**

A

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

- 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 RNA NAT on serum and urine

Positive Zika virus RNA NAT on serum or urine:
**Recent Zika virus infection**

Negative Zika virus RNA NAT on serum and urine

Zika virus IgM and dengue virus IgM on serum

- Symptomatic: Zika virus IgM and dengue virus IgM
- Asymptomatic and NOT living in an area with active Zika virus transmission: Zika virus IgM 2-12 weeks after exposure

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**

Zika virus IgM and dengue virus IgM negative:
**No evidence of 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 ≥10 and dengue virus PRNT <10:
**Recent Zika virus infection**

Zika virus PRNT ≥10 and dengue virus PRNT ≥10:
**Recent flavivirus infection, specific virus cannot be identified**

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

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

No evidence of recent Zika virus infection

Reflex Zika virus RNA NAT on serum and urine

Negative Zika virus RNA NAT on serum

Positive Zika virus RNA NAT on serum or urine:
**Recent Zika virus infection**

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<table>
<thead>
<tr>
<th>Interpretation of Laboratory Results</th>
<th>Prenatal Management</th>
<th>Postnatal Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recent Zika virus infection</td>
<td>Consider serial ultrasounds every 3–4 weeks to assess fetal anatomy and growth. Decisions regarding amniocentesis should be individualized for each clinical circumstance.</td>
<td>LIVE BIRTHS: Infant serum and infant urine should be tested for Zika virus Zika RNA NAT. Infant serum should be tested for Zika IgM. If CSF is obtained for other reasons, it can also be tested. FETAL LOSSES: Zika virus Zika RNA NAT and IHC staining of umbilical cord and placenta is recommended.</td>
</tr>
<tr>
<td>Recent flavivirus infection; specific virus cannot be identified</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presumptive recent Zika virus infection***</td>
<td>Consider serial ultrasounds every 3–4 weeks to assess fetal anatomy and growth. Amniocentesis might be considered; decision should be individualized for each clinical circumstance.</td>
<td>LIVE BIRTHS: Infant serum and infant urine should be tested for Zika virus Zika RNA NAT. Infant serum should be tested for Zika IgM. If CSF is obtained for other reasons, it can also be tested. FETAL LOSSES: Zika virus Zika RNA NAT and IHC staining of umbilical cord and placenta should be considered.</td>
</tr>
<tr>
<td>Presumptive recent flavivirus infection***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recent dengue virus infection</td>
<td></td>
<td>Clinical management in accordance with existing guidelines (<a href="http://apps.who.int/iris/bitstream/10665/44183/1/9789241547871_eng.pdf">http://apps.who.int/iris/bitstream/10665/44183/1/9789241547871_eng.pdf</a>).</td>
</tr>
<tr>
<td>No evidence of Zika virus or dengue virus infection</td>
<td>Prenatal ultrasound to evaluate for fetal abnormalities consistent with congenital Zika virus syndrome. Fatal abnormalities present: repeat Zika virus Zika RNA NAT and IgM test; base clinical management on corresponding laboratory results. Fatal abnormalities absent: base obstetric care on the ongoing risk of Zika virus exposure to the pregnant woman.</td>
<td></td>
</tr>
</tbody>
</table>
### Persistence of Zika virus in body fluids (NEJM)

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Median (d)</th>
<th>95% CI (d)</th>
<th>95th percentile(d)</th>
<th>95% CI (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum</td>
<td>14</td>
<td>11-17</td>
<td>54</td>
<td>43-64</td>
</tr>
<tr>
<td>Urine</td>
<td>8</td>
<td>6-10</td>
<td>39</td>
<td>31-47</td>
</tr>
<tr>
<td>Semen</td>
<td>34</td>
<td>31-47</td>
<td>81</td>
<td>64-98</td>
</tr>
</tbody>
</table>

Intermittently positive samples with intervals of:
- Serum – 14-62 days
- Urine – 14-35 days
- Semen – 21-36 days

Summary I: approach to travel and Zika virus

- Current recommendations:
  - Pregnant women from non-endemic areas: avoid travel
  - Pre-conception planning: wait 8 weeks (women) and 6 months (men) after possible exposure
  - Expatriate pregnant women living in areas with ongoing risk: routine testing with Zika IgM during 1st & 2nd trimesters; rRT-PCR if positive/equivocal
Summary II: approach to travel and Zika virus

- Health authorities differ in defining risk and designating risk areas
- Desirable to harmonize risk designations
- Low burden areas: “special considerations” risk category
- Recommendations continue to evolve
- Latest data may lead to modification
  - More than half of the participants had detectable viral RNA in urine for ≥1 week after symptom onset, in serum for 2 weeks, and in semen for >1 month.
  - Up to 5% had detectable viral RNA in urine for 6 weeks, in serum for 8 weeks, in semen for 3 months.
  - ZIKV RNA was infrequently detected in saliva and vaginal secretions.
- Sensitive, specific, and accessible diagnostic tests are needed
Resources

- www.cdc.gov/Zika
- www.who.int/emergencies/zika-virus/en/
- www.paho.org
- www.ecdc.europa.eu
TOP 5 THINGS EVERYONE NEEDS TO KNOW ABOUT ZIKA

1. Zika primarily spreads through infected mosquitoes. You can also get Zika through sex.
   - Many areas in the United States have the type of mosquitoes that can spread Zika virus.
   - These mosquitoes are aggressive daytime biters and are also biters at night. Mosquitoes can be passed through sex from a person who has Zika to his or her sex partner.

2. The best way to prevent Zika is to prevent mosquito bites.
   - Use insect repellent. It works!
   - Wear long-sleeved shirts and long pants.
   - Stay in places with air conditioning or window and door screens.
   - Remove standing water around your home.

3. Zika is linked to birth defects.
   - Zika infection during pregnancy can cause a serious birth defect called microcephaly that is a sign of incomplete brain development. If you have a partner who lives in or has traveled to an area with Zika, do not have sex, or use condoms every time you have sex during your pregnancy.

4. Pregnant women should not travel to areas with Zika.
   - If you must travel to one of these areas, talk to your healthcare provider first and strictly follow steps to prevent mosquito bites during your trip.

5. Returning travelers infected with Zika can spread the virus through mosquito bites.
   - If you get infected with Zika and a mosquito bites you, you can pass the virus to the mosquito.
   - The infected mosquito bites other people, who get infected. Returning travelers should also use condoms or not have sex if they are concerned about passing it to their partners through sex.