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Agenda

1. Zika in the News
2. Zika Science
   ◦ What is it?
   ◦ How is it transmitted?
   ◦ History
3. Prevention – Practical Applications
4. DEET
5. Legal Implications
Zika “In the News”

Florida Zika Cases Linked to Mosquito-Borne Virus Transmission

Protecting Workers and the Public from Exposure to the Zika Virus

Zika Virus Infects 41 in Singapore

Test your knowledge

*Sex, salvia, tears, etc.

How is Zika Transmitted?

1. Mosquito to Mosquito
2. Person to Mosquito
3. Mosquito to Person
4. Person to Person
5. Mother to Unborn
6. Blood Transfusions

1. False!
2. True
3. True
4. True*
5. True
6. True
Zika virus background

- Zika identified in Uganda in 1947 in monkeys.\(^1\)
- First human outbreak in Africa in 1952.\(^1\)
- Human case in researcher confirmed through virus isolation and re-isolation in 1964.\(^2\)
- Other cases have been associated with outbreaks in Africa, Asia, and Pacific Islands.
- Some other occupational cases
  - 1972: Lab worker\(^3\) – 2008: Scientists\(^4\) (mosquito bites)


Current outbreak

- Began in countries throughout Central and South America (Brazil) and Pacific Islands
- Active transmission in defined areas of U.S. mainland: (1 sq. mi. area of Miami, FL)
  - 6–23 cases* (plus 1,955 travel-acquired cases; 22 sexually transmitted)
- Active transmission in U.S. territories
  - 6,475 cases in Puerto Rico (plus 30 travel-acquired)
  - 68 cases in USVI (plus 1 travel-acquired)
  - 44 cases in American Samoa

* Depending on information source (CDC.gov or floridahealth.gov) and case definition
What is Zika?

A virus that:
- Causes microcephaly (improper brain development in fetuses).
- Flavivirus
  - Zika
  - Dengue
  - West Nile
  - Encephalitis

Viral disease mainly transmitted by mosquitoes
- Mainly *Aedes* species, which can be aggressive biters

**A. aegypti**
Better vector; will rest indoors.

**A. albopictus**
Better suited to temperate climates.

What Other Diseases?

The mosquitoes may carry:
- Dengue (fever, headache, vomiting etc.). May become hemorrhagic (bleeding).
- Chikungunya (fever, joint pain).
Zika Virus 2015

Where is Zika?
Zika Cases Reported in the United States

Laboratory-confirmed Zika virus disease cases reported to ArboNET by state or territory (as of August 31, 2016)
Where is Zika?

From the CDC as of 8/31/16

**US States**

- Locally acquired mosquito-borne cases reported: 35
- Travel-associated cases reported: 2,686
- Laboratory acquired cases reported: 1
- Total: 2,722
  - Sexually transmitted: 23
  - Guillain-Barré syndrome: 7

<table>
<thead>
<tr>
<th>States</th>
<th>Travel-associated cases* No. (% of cases in states) (N=2,687)</th>
<th>Locally acquired cases† No. (% of cases in states) (N=35)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maryland</td>
<td>85 (3)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>District of Columbia</td>
<td>11 (&lt;1)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Virginia</td>
<td>75 (3)</td>
<td>0 (0)</td>
</tr>
</tbody>
</table>

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Symptoms of Zika?

Asymptomatic (none at all)

Pregnant Women

- Rash, itching; fever, headache, arthritis, myalgia (muscle pain), conjunctivitis, lower back pain.

Others

- Similar symptoms.

On average symptoms show in 6 days after exposure.

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Symptoms of Zika infection

**Common symptoms:**
- Fever
- Rash
- Joint pain
- Conjunctivitis (pink eye)

**Rarer symptoms:**
- Muscle pain
- Headache

**ONLY 20% SHOW SYMPTOMS**

The incubation period likely a few days to a week.
How is Zika Transmitted?

Transmission occurs from:

- Aedes Aegypti mosquitoes
- Maybe Aedes Albopictus mosquitoes
- Sexual contact, blood transfusions, possibly other fluids such as tears or aerosols.
- Mother to unborn child

It is **not** known at this time to be transmitted by:

- Contact with animals (other than primates)

**Highest concentration of Zika virus in testes than any other part of body**
If I’m thinking of getting pregnant next year, can I still travel to a Zika positive country? Can my husband?

Recommendations from the CDC

If there are no Zika symptoms for man or woman:
Women should wait 8 weeks after traveling to Zika infected area before getting pregnant
Women should wait 8 weeks to have sex with man after he returns from Zika infected area

If there are Zika symptoms for man or woman:
Women should wait 8 weeks after symptoms start before getting pregnant
Women should wait 6 months to have sex with man if he has symptoms
How to Test for Zika

Can’t be done until it seroconverts (body responds to it).
On average it is 9 days in salvia.
Tests results may indicate a different disease.

<table>
<thead>
<tr>
<th>Sample origin</th>
<th>Time of detection (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before the onset of symptoms</td>
</tr>
<tr>
<td>Blood</td>
<td>2–3</td>
</tr>
<tr>
<td>Urine</td>
<td>-</td>
</tr>
<tr>
<td>Saliva</td>
<td>-</td>
</tr>
<tr>
<td>Seminal fluid</td>
<td>-</td>
</tr>
<tr>
<td>Breast milk</td>
<td>-</td>
</tr>
</tbody>
</table>

How do I Prevent it?

Interim Guidance for Protecting Workers from Occupational Exposure to Zika Virus

The Occupational Safety and Health Administration (OSHA), and the National institute for Occupational Safety and Health (NIOSH) are monitoring the Zika virus outbreak spreading through Central and South America, Mexico, and parts of the Caribbean, including U.S. territories. For the most up-to-date information, check the Centers for Disease Control and Prevention (CDC) Zika website frequently. Some U.S. states have mosquitoes that can become infected with and spread Zika virus, and travel-associated Zika virus infections in U.S. states may result in local spread of the virus. Visit the CDC Areas with Zika website to learn where there is current transmission.

Workers who are exposed on the job to mosquitoes or the blood or other body fluids of infected individuals may be at risk for occupationally acquired Zika virus infection. This interim guidance provides employers and workers with information and guidance on preventing occupational exposure to the Zika virus. The guidance may be updated as additional information becomes available.

Introduction
Zika virus is primarily spread through the bite of infected mosquitoes. Mosquitoes can become infected when they bite infected persons and can then spread the Zika virus to other persons they subsequently bite.

Zika virus has been found in Africa, Southeast Asia, and the Pacific Islands. The first case was identified in the Zika Forest in Uganda in 1947. In 2007, cases of Zika virus infection emerged in the American and the Caribbean.

Zika virus has the potential to spread elsewhere that mosquitoes capable of spreading this virus...
How do I Prevent it?

*Outdoor workers*

Recommended employer actions:

- Inform workers about their risks of exposure to Zika virus through mosquito bites and train them how to protect themselves. Check the [CDC Zika website](https://www.cdc.gov/zika/) to find Zika-affected areas.
- Provide insect repellents and encourage their use according to the guidance below.
- Provide workers with, and encourage them to wear, clothing that covers their hands, arms, legs, and other exposed skin. Consider providing workers with hats with mosquito netting to protect the face and neck.

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How do I Prevent it?

- In warm weather, encourage workers to wear lightweight, loose-fitting clothing. This type of clothing protects workers against the sun’s harmful rays and provides a barrier to mosquitoes. Always provide workers with adequate water, rest and shade, and monitor workers for signs and symptoms of [heat illness](https://www.cdc.gov/heat Illness/).
- Get rid of sources of standing water (e.g., tires, buckets, cans, bottles, barrels) whenever possible to reduce or eliminate mosquito breeding areas. Train workers about the importance of eliminating areas where mosquitos can breed at the worksite.
How do I Prevent it?

• If requested by a worker, consider reassigning anyone who indicates she is or may become pregnant, or who is male and has a sexual partner who is or may become pregnant, to indoor tasks to reduce their risk of mosquito bites.

How do I Prevent it?

Mosquito Control and Bite Prevention*
Remember the three D’s:
  Drain: Regularly inspect your property. Drain any water-filled containers or other areas of standing water around your home.
  Dress: Wear light-colored, loose fitting clothing. When practical, wear long sleeves and pants.
  Defend: Properly apply a mosquito repellent that is registered by the Environmental Protection Agency, such as:
    DEET
    Picaridin
    Oil of lemon eucalyptus

*From MD DLLR
How do I Prevent it?

Zika Virus and Mosquito Control

What does the Maryland Department of Agriculture have to do with Zika? In Maryland, the Department of Agriculture works with the Maryland Department of Health and Mental Hygiene to prevent the spread of Zika virus. This is done through education, surveillance, and insect control. 

Do all mosquitoes carry the Zika virus? No. Zika virus is transmitted to people primarily through the bite of an infected Aedes aegypti mosquito. Other mosquito species, such as Culex tarsalis and Culex pipiens, do not transmit Zika virus.

With proper protection, you can prevent Zika! Yes, in most cases. A few infected mosquito species can produce large outbreaks and put people at risk of becoming infected. According to the U.S. Centers for Disease Control and Prevention (CDC), mosquitoes are the most important vectors for the transmission of Zika virus.

Are there preventive measures? Yes. The U.S. Department of Health and Human Services has determined that the expulsion products that the bug repellant department supplies are effective at preventing mosquito bites. The products are available at local pharmacies and can be purchased over the counter. The department also supplies mosquito spray for those who prefer to spray indoor areas for mosquitoes.

What can help protect you? The EPA approved the use of adult mosquito control treatments on mosquito populations in areas where they are not normally found. These products are available at local pharmacies and can be purchased over the counter. The department also supplies mosquito spray for those who prefer to spray indoor areas for mosquitoes.

How do I Prevent it?

Mosquito Bite Prevention (United States)

Not all mosquitoes are the same. Different mosquitoes spread different viruses and bite at different times of day.

Active ingredient

<table>
<thead>
<tr>
<th>Type of Mosquito</th>
<th>Widespread</th>
<th>Biting habits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aedes aegypti</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Culex pipiens</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Culex tarsalis</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Protect yourself and your family from mosquito bites

Use insect repellent

Use insect repellent with one of the following active ingredients:

- DEET
- Picaridin
- Oil of lemon eucalyptus
- Remoletin

Some brand name examples:

- OFF!
- Cutter, Sawyer, Ultrathon

Protect yourself and your family from mosquito bites (continued)

- Always follow the product label instructions.
- Repellent should be applied to exposed skin and clothing.
- Repellent should be applied to the skin, not clothing.

If you have a baby or child

- Always follow the manufacturer’s instructions for use.
- Repellent should be applied to the skin, not clothing.
- Repellent should be applied to the skin, not clothing.
- Repellent should be applied to the skin, not clothing.

Treat clothing and gear

- Treat clothing and gear with permethrin or another insect repellent.
- Repellent should be applied to the skin, not clothing.
- Repellent should be applied to the skin, not clothing.

Mosquito-proof your home

- Use insecticides on windows and doors.
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www.cdc.gov/features/StopMosquitoes

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How do I Prevent it?

Long Sleeves
Screens/Netting
Local Government Potential Responses
  - Investigation and quarantine?
  - Reassignment
  - Spraying
  - Standing water
Home Response
  - Standing water
Blood supplies etc.
How do I Prevent it?

Keep them out!
- Screens in good shape
- Do not open doors at night with the inside (or outside) lights on.

Create a barrier!
- Clothing
- Netting
- Condoms

Insect repellent.
- 50% DEET (can be used by pregnant women)
  - May need additional sunscreen 30 – 50 SPF.
  - Do NOT spray on skin under clothing.
  - Do NOT put on irritated skin.
  - Do NOT spray in an enclosed space (outside is best).
  - Wash hands AND skin treated before eating/drinking.
- Permethrin
  - Apply to clothing.
- Impact on co–workers
  - Annoyng
  - Sensitization
Legal Implications

- Work-related?
  - Occupational Exposure
- Liability Issues

Occupational exposures & cases

- Occupational cases may not be well surveilled, particularly outside of the U.S.
  - Domestically, state reporting to CDC may vary
- One laboratory-acquired case at University of Pittsburgh
  - Sharps injury to individual working with Zika virus
  - Student (volunteer, not working in employee capacity)
  - OSHA did make contact with university, but OSHA does not have jurisdiction (PA is Fed OSHA state; University is public sector)
Liability Issues

- General Duty Clause
- Employee Suits
  - Negligence
  - Proof of work related
  - Reassignments
  - Travel

What Does All This Mean?

Personal Opinion
- It is not if, but when?
- We will probably have “herd immunity” before an effective vaccine.
- Zika is the next of many to come (e.g. West Nile Virus was before Zika).
- Good pest management practice is needed.
- Insect repellants have consequences for using and NOT using.
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