

Zika virus outbreak and considerations for blood transfusion safety in Puerto Rico: 2016

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Objectives

- ❑ Description of current Zika virus epidemic in the U.S. and territories
- ❑ Discuss implications for blood safety
- ❑ Present options for strengthening blood safety in Puerto Rico and other affected areas in the U.S.
- ❑ Question/Answer and further discussion

What role does CDC play in blood safety?

- **Part of Federal government as a Public Health Service (PHS) agency (e.g., FDA, NIH, HRSA)**
- **PHS agency with primary responsibility for surveillance and detection of public health risks**
 - **not a regulator**
 - **not authorized to investigate events on own, but only by assisting local and state authorities**
 - **Creates recommendations in concert with other PHS agencies (we cannot enforce them)**

Sources of public health investigations

- **CDC will support and assist in investigations upon invitation based on reports from any source**
- **These have included:**
 - **Government agencies (e.g., FDA,)**
 - **State/local health departments**
 - **Blood centers**
 - **Pathologists**
 - **Laboratory staff**
 - **Clinicians**

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 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 the Americas

- In May 2015, the first locally-acquired cases in the Americas were reported in Brazil
- Currently, outbreaks are occurring in many countries or territories in the Americas, including the Commonwealth of Puerto Rico and the U.S. Virgin Islands
- Spread to other countries likely



Zika Virus Incidence and Attack Rates

- 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

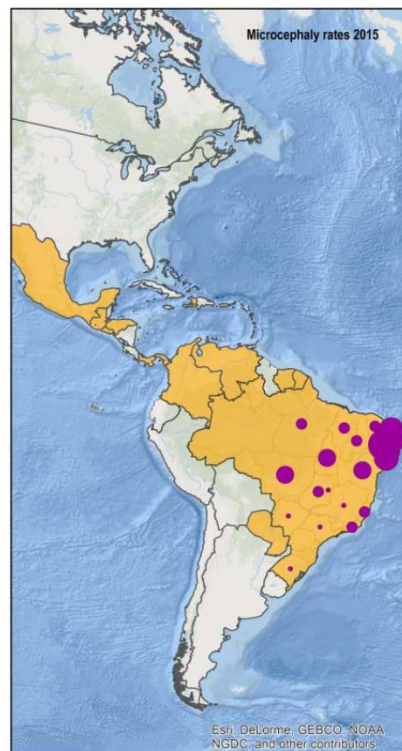
Note: Rates based on serosurvey on Yap Island, 2007 (population 7,391)

Duffy M. N Engl J Med 2009



Rates of Microcephaly Over Time: the Americas and the Caribbean

Comparison of the rates of microcephaly in the Americas and Caribbean from 2010-2014 and 2015



Updated as of Epidemiological Week 52
(December 27, 2015 – January 2, 2016)

Microcephaly rates by state in Brazil
(cases per 1.000 live births)

- 0.1-1.0
- 1.1-15.0
- 15.1-30.0
- 30.1-45.0
- 45.1-88.6

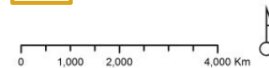
Countries

Countries with Zika confirmed cases

Epi Week 52 2015

Country limits

Brazil State Boundaries



Data Source:
Reported from the
IHR National Focal
Points and through
the Ministry of
Health websites.

Map Production:
PAHO-WHO AD
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Source: Pan American Health Organization, Epidemiological update, 17 January 2016

Laboratory-confirmed Zika virus disease cases reported to ArboNET by state or territory — United States, 2015–2016 (as of February 3, 2016)

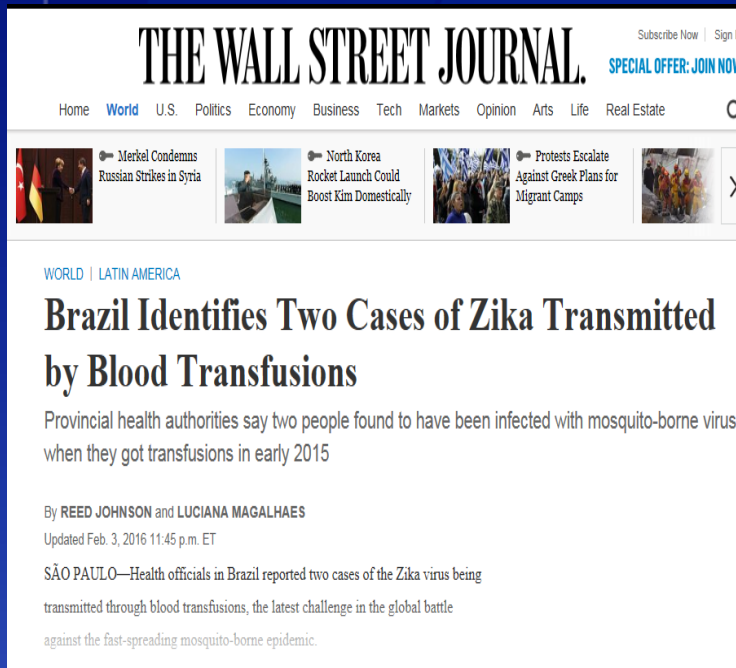
States	Travel-associated cases (N=35)	Locally acquired cases (N=0)
Arkansas	1	0
California	2	0
District of Columbia	3	0
Florida	9	0
Georgia	1	0
Hawaii	3	0
Illinois	3	0
Massachusetts	2	0
Minnesota	1	0
New Jersey	1	0
Texas	8	0
Virginia	1	0
 Territories	 (N=1)	 (N=9)
Puerto Rico	1	8
US Virgin Islands	0	1

Special considerations and clinical complications of Zika virus

- ❑ **80% of Zika-infected patients are asymptomatic**
- ❑ **If symptoms develop, typically self-limited illness:**
 - Fever, rash, arthralgia, conjunctivitis
- ❑ **Neurologic complications:**
 - Possible association with microcephaly
 - >3,000 microcephaly reports in Brazil (June-Dec 2015)
 - 20 per 10,000 live births vs expected 1-2 per 10,000 live births
 - Reports of Zika and Guillain-Barre syndrome
 - French Polynesia, Central and South America

Can Zika virus be transmitted through blood transfusion?

- ❑ Probably...
- ❑ Zika is a flavivirus – same as West Nile virus and engue (both are transfusion-transmissible)
- ❑ 2.8% of blood donors in French Polynesia found Zika PCR+ (*Euro Surveill* 2014)
- ❑ 2 recent reports from Brazil
 - Not published in peer reviewed literature



What is the threat of Zika transmission via blood collections in Puerto Rico?

- ❑ **21 autochthonous cases of Zika identified in Puerto Rico (Dec 2015- Feb 2016)**
- ❑ **80% of Zika infected persons are asymptomatic- so likely more than 21 cases**
- ❑ **Viremic blood donor can remain asymptomatic and not be identified through active follow up or self report**
- ❑ **Actual transfusion-transmission risk has not been quantified**
 - **Risk may also change based on epidemic course**

How can transfusion-transmitted Zika be prevented?

- ❑ **Self-deferral of blood donors**
 - 80% of viremic donors may be asymptomatic
- ❑ **Active follow-up of donors with quarantine of blood products**
 - Currently implemented in response to Chikungunya
 - 80% of viremic donors may be asymptomatic
- ❑ **Screening of blood donors**
 - Nucleic acid tests are in development but not currently FDA approved
 - Implementation may be possible through investigational new drug protocol

How can transfusion-transmitted Zika be prevented? cont'd

- ❑ **Expansion of pathogen reduction technology**
 - Intercept (Cerus) approved for platelets/plasma only
 - Terumo (Mirasol) not FDA approved (for any blood component type)
 - No method approved for RBCs, but could be implemented by investigational device exemption (IDE)
- ❑ **Need to understand extent of and barriers for pathogen reduction technology implementation in Puerto Rico**



Transfusion-transmitted Zika prevention in Puerto Rico: Importation of blood products for select populations

- ❑ Challenge is identifying who is at risk...
- ❑ Identifying pregnancy in all women:
 - Pregnancy test may not be performed prior to transfusion (e.g. trauma)
 - Early pregnancy or becoming pregnant immediately after transfusion
- ❑ Sexual transmission
 - Transfusion-transmission in males with subsequent sexual transmission to partners
- ❑ No identified risk factors yet for Guillain-Barre syndrome
 - Measures to prevent microcephaly may not mitigate risk for GBS



Transfusion-transmitted Zika prevention in Puerto Rico: Additional considerations

- ❑ Implementation of Pathogen Reduction Technology for all platelet and plasma collections (with FDA approved technology)
 - What are the barriers to implementation?
- ❑ Importation of all red blood cell units from mainland until screening can be implemented
 - What are the concerns among Puerto Rico blood collection centers and hospitals?
 - Solutions to overcome these concerns

Next steps

- ❑ **Collect additional information which can guide blood safety decisions**
 - Collection and utilization survey of blood collection centers and hospitals in Puerto Rico
 - Survey to be disseminated electronically from 2/12/2016-2/24/2016
 - CDC will have a team in Puerto Rico to administer the survey
 - Survey results will be presented to stakeholders
- ❑ **Enhance awareness for transfusion-transmitted Zika**
 - Recognize if transfusion-transmission occurs
 - Notify public health authorities to investigate



Thank you

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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.

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