

## Preliminary report of Zika virus outbreak in Yap

We report preliminary findings from the ongoing Zika outbreak in Yap, Federated States of Micronesia, based on information collected up to 8 May 2007.

In April 2007, health-care providers on the main island of Yap began to notice several unusual cases of rash, red eyes and/or joint pain. Often, the symptoms were mild and mimicked an allergic reaction. As more cases were found, the Yap State EpiNet Team began statewide surveillance and samples were sent to the CDC (Centers for Disease Control and Prevention) arboviral lab in Fort Collins, Colorado for testing. On 22 June, Yap was notified by the CDC that the etiology of the illness was Zika virus.

### Zika virus

Zika is a flavivirus that is similar to the dengue virus. It was first identified in 1947 in rhesus monkey serum in Uganda. Antibodies to Zika virus have been found in the blood of people from Africa to Asia and into the Philippines. In some African populations, up to 50% of people show antibodies to Zika virus. Outbreaks are rare or infrequently recognised. The last recognised outbreak involved a small number of febrile patients in Indonesia in 1978. Prior to the Yap outbreak, approximately 40 clinical cases had been described in the literature. The current outbreak in Yap is the largest recognised Zika outbreak.

### Vectors

According to the literature, Zika is vectored by *Aedes* mosquitoes. The predominant mosquito on Yap is *Aedes hensili*. However, 15 other types of mosquito have been identified on Yap in previous studies. Data from the outbreak entomologic survey are not yet available.

### Outbreak epidemiology

The epidemic appears to have started in early April and peaked in late May. It was first noticed on the main island of Yap and spread to neighbouring islands. The last probable Zika case to present for medical care on the main island of Yap was seen on 17 July 2007. The outbreak is still occurring on the neighbouring islands, including Ulithi, Fais, Eauripik, Woleai and Ifaluk.

As of 8 May 2007, 99 cases of Zika had been confirmed by PCR and IgM ELISA and there were 54 probable cases. Because of the relatively mild symptoms, there are reports that many cases did not seek medical attention and were therefore not included in the prospective surveillance. Blood samples for confirmation of cases on neighbouring islands are being collected.

### Clinical syndrome

Traditionally, the syndrome caused by Zika virus was called 'Zika fever' and was often associated with severe fevers. However, during the Yap outbreak, fevers were generally subjective or low grade. Preliminary assessment of the Yap outbreak symptomology shows that approximately 80% of patients presented with rash, 70% with subjective fever, 65% with conjunctivitis and 60% with joint pain. There were no hospitalisations or deaths due to Zika.

### Diagnostics

All serum testing for Zika was done at the CDC arboviral lab in Fort Collins, Colorado, confirming that 99 cases were Zika. Official results will follow. Of note, PanBio and PENTAX Anti-Dengue Virus IgM test kits showed a false-positive result on Zika-confirmed serum.

### Public health response

Measures taken to control the epidemic included:

- Bi-weekly meetings of the Yap EpiNet team
- daily radio conferences with neighbouring islands
- presentations to the community on Zika (both over the radio and in villages)
- handing out flyers on Zika and mosquito control in villages
- giving a travel advisory to all incoming and departing passengers (plane and ship)

- radio messages on control and preventative measures
- distributing mosquito repellent donated by WHO to neighbouring island communities
- sanitation department visits to affected homes to facilitate clean-up
- continued prospective surveillance through a standardised Zika case report form for all Zika encounters and case interviews
- Zika brochure produced for health providers to improve regional surveillance
- community investigation, including a voluntary serosurvey, an environmental survey with clean-up guidelines and, an entomologic survey

## Lessons learnt

Experience from dengue outbreaks helped us respond better to the Zika outbreak.

Nevertheless, we were still able to identify areas for further improvement. We need to:

- continue our efforts to achieve the capability to immediately access LabNet level 2 laboratories to avoid delays in confirming outbreak diseases;
- develop a regular campaign to improve community cleanliness to prevent vector-borne outbreaks;
- improve the existing surveillance system to ensure detection of early cases; and
- develop a travel advisory template to facilitate faster implementation in future epidemics.

## Regional cooperation

Regional support for our response to the epidemic was essential. The support received from the national government of the Federated States of Micronesia, CDC, WHO, New Caledonia Pasteur Institute (IPNC), Pacific Island Health Officers Association (PIHOA) and SPC were all key to enabling Yap to identify and respond to this unusual outbreak.

### **Dr Martin Bel**

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## TREATMENT

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### General Measures:

Patients should avoid mosquito bites while ill in order to prevent the spread of Zika

### Medications

- Acetaminophen for fever and pain
- Diphenhydramine can be helpful for pruritic rash
- Avoid ibuprofen and aspirin to avoid a hemorrhagic syndrome common in similar flaviviruses

### Follow-up:

Patients asked to follow-up in 10-14 days to obtain convalescent serum to test for presence of Zika IgM.

### Prevention:

Community-wide mosquito control by removing standing water from environment

### Surveillance:

- Physicians are asked to report all suspected cases to their local health department.
- Also report cases to the Yap State Department of Health Services by e-mailing [yapepinet@fsmhealth.fm](mailto:yapepinet@fsmhealth.fm). Questions, including on where to obtain Zika laboratory testing, can be sent to [yapepinet@fsmhealth.fm](mailto:yapepinet@fsmhealth.fm).



*Disclaimer: This pamphlet has been produced by the Yap Department of Health Services to provide additional information on the Zika virus. It is based on preliminary findings and should not be used to diagnose or treat disease. Some recommendations may change as more is understood about the Zika virus.*



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# ZIKA VIRUS

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INFORMATION FOR CLINICIANS AND  
OTHER HEALTH PROFESSIONALS.

PREPARED BY THE YAP STATE DEPARTMENT OF  
HEALTH SERVICES

## OVERVIEW

**Family:** Flaviviridae

**Genus:** Flavivirus

**Discovery:** First isolated in 1947 from serum of a febrile rhesus monkey from Zika forest, Uganda.

**Distribution:** Antibodies to Zika found in humans from Africa to Philippines

**Known Vectors:** Aedes mosquitoes

### Outbreaks:

**1978-** Zika caused a small outbreak of acute fever in Indonesia. Common clinical symptoms were high fever, malaise, stomach ache, dizziness, anorexia and rash.

**2007-** Zika identified as cause of ongoing outbreak in Yap, Federated States of Micronesia.



## CLINICAL SYNDROME

*\*Based on preliminary findings from the Yap Outbreak 2007.*

### Predominant Sex:

Females presented with illness more often than males; approximately 2:1

### Predominant Age:

Illness appears less severe in children

### Signs and Symptoms:

Yap Outbreak Clinical Characteristics:

Sign/Symptom	%
Rash (maculo-papular)	80
Subjective Fever or Chills	70
Conjunctivitis	65
Arthralgia or Arthritis	60
Arthralgia	35
Arthritis	25
Headache	40
Retro-orbital pain	30
Myalgias	25
Edema	20
Dizziness	10
Abdominal pain	8

*\*High fever has not been common in Yap. Often the fever is subjective or low-grade.*

### Expected Course/Prognosis:

- Symptoms usually resolve spontaneously in 4-7 days.
- There have been no hospitalizations or deaths attributed to Zika during the Yap 2007 Outbreak.

## DIAGNOSIS

### Differential Diagnosis:

- Dengue and other flaviviruses
- Chikungunya and other alphaviruses
- Rubella
- Measles
- Reiters Syndrome
- Allergic Reaction
- Conjunctivitis
- Arthritis
- Gout

### Laboratory:

- **WBCs:** Normal to low normal WBC count
- **WBC Diff:** Normal Differential, but can be lymphocytic or neutrophilic
- **Platelets:** Normal to low normal platelet counts

