Zika virus infection in Thailand: Detect Prevent Respond and Future Research

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Global Zika Virus in the past 1947 - 2007

Figure 1. Approximate known distribution of Zika virus, 1947–2007. Red circle represents Yap Island. Yellow indicates human serologic evidence; red indicates virus isolated from humans; green represents mosquito isolates.

Source: Hayes EB. Zika virus outside Africa. Emerg Infect Dis. 2009 Sep
Members in the family *Flaviviridae*

**Flavivirus in Thailand**
1. JEV
2. Denv-1
3. Denv-2
4. Denv-3
5. Denv-4
6. Zikv

False positive of serology among flavivirus in this area is crucial.
Vector-borne transmissions in Thailand

Main vector
• *Aedes aegypti*

Other vector involvement
• *Ae. albopictus*

Possible vector (research)
• *Culex quin.* (we found the ZIKV in saliva grand)
Vector-borne transmissions

Aedes also has “Tran ovarian transmission”

Positive rate of Zika virus in Aedes spp. during outbreak from April – September 2016 approximately 7-10%
Non-vector-borne transmissions

• Infected monkey bite (infected human bite ?)
• Blood transfusion
• Organs transplantation (Kidney/Liver)
• Sexual intercourse (both hetero and homo)
• Tranplacental infection to fetus
• Perinatal infection
• Breast milk? (virus detected in breast milk)
• Eyes secretion ?
Zika virus detected in different samples

**Blood**: 5 – 7 days (depend on blood type and except pregnancy)

**Saliva**: 5 – 7 days

**Eyes secretion**: 5-7 days

**Urine**: up to 14 days

**Semen**: up to 2 months

**Cervical mucus**: up to 8 days

**CSF**: acute phase of meningoencephalitis

**Amniotic fluid/Placenta**: until delivery

**Death fetus in utero**: autopsy

**Breast milk**: infected during perinatal period
<table>
<thead>
<tr>
<th>No.</th>
<th>Colour</th>
<th>Name</th>
<th>Type</th>
<th>Ct</th>
<th>Ct Comment</th>
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<th>Calc Conc (copies/ul)</th>
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</thead>
<tbody>
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<td>PC zikavirus</td>
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<tr>
<td>8</td>
<td></td>
<td>water</td>
<td>Unknown</td>
<td></td>
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</tr>
</tbody>
</table>

Saliva, Plasma, Urine in acute case (LOI 5 days) : Positive
First recognize of Zika virus circulation in the country

- 2013, Thailand MOPH was notified from Canada health authority about confirmed Zika virus infection in a traveler ex Thailand
- Retrospective investigation in unexplained outbreak of rash in 2012 and revealed confirmed Zika virus infection (US CDC-Arboviral Branch)
- Prospective investigation in outbreak of rash nationwide (2013 – 2015)
Zika virus – in a Returning Canadian Traveller from Thailand

Patricia Webster RN BScN
Alberta Health Services, Communicable Disease Control
Calgary Zone, Team Lead Communicable Disease and Epidemiology
Molecular Detection

[Diagram of molecular structure with labels and annotations]

- 3'UTR to 5'UTR
- Structural and Non-Structural regions
- C, prM, E, NS1, 2B, 2A, NS3, 4A, 4B, NS5
- Protein regions: prM, NS2B-NS3 protease, Furin, Host signalase
- Protease, Helicase, Methyltransferase, Guanylyltransferase, Polymerase

[Table of Zika virus polyprotein sequences]

- Uganda_YP_002790881.1: 3065-3309 polyprotein [Zika virus]
- Uganda_AEN75263.1: 3069-3313 polyprotein, partial [Zika virus]
- Uganda_AAC58803.1: 88-332 NS5 protein, partial [Zika virus]
- Uganda_ABI54475.1: 3063-3307 polyprotein [Zika virus]
- Senegal_AEN75266.1: 3069-3313 polyprotein, partial [Zika virus]
- Nigeria_AEN75265.1: 3063-3307 polyprotein, partial [Zika virus]
- Malaysia_AEN75264.1: 3069-3313 polyprotein, partial [Zika virus]
- Cambodia_AFD30972.1: 3069-3313 polyprotein, partial [Zika virus]
- Micronesia_ACD75819.1: 3069-3313 polyprotein [Zika virus]
- C13VS012396 Serum

[Image of gel electrophoresis with markers and samples: 1 Kb Ladder, Patient Serum 19-Mar-2013, Patient Serum 16-Feb-2013, Positive Control #1, Positive Control #2, Negative Control]
Exported case# 2

Rapid communications
FIRST CASE OF LABORATORY-CONFIRMED ZIKA VIRUS INFECTION IMPORTED INTO EUROPE, NOVEMBER 2013

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4. Internal Medicine I, Saarland University Medical Center, Homburg/Saar, Germany
5. German Centre for Infection Research (DZIF), partner site Hamburg-Luebeck-Borstel, Hamburg, Germany
### Table

Serological results of a case of Zika virus infection from Thailand imported into Germany, November 2013

<table>
<thead>
<tr>
<th>Antibody or antigen tested</th>
<th>Serum samples taken after symptom onset (days)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Anti-ZIKV-IgG&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1:5,120</td>
</tr>
<tr>
<td>Anti-ZIKV-IgM&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1:10,240</td>
</tr>
<tr>
<td>Anti-DENV-IgG&lt;sup&gt;a&lt;/sup&gt;</td>
<td>&lt;1:20</td>
</tr>
<tr>
<td>Anti-DENV-IgM&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1:40</td>
</tr>
<tr>
<td>DENV NS&lt;sub&gt;1&lt;/sub&gt;&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Negative (0.1 arbitrary units)</td>
</tr>
<tr>
<td>Anti-JEV-IgG&lt;sup&gt;a&lt;/sup&gt;</td>
<td>&lt;1:20</td>
</tr>
<tr>
<td>Anti-JEV-IgM&lt;sup&gt;a&lt;/sup&gt;</td>
<td>&lt;1:20</td>
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<tr>
<td>Anti-WNV-IgG&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>Anti-CHIKV-IgG&lt;sup&gt;a&lt;/sup&gt;</td>
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<tr>
<td>Anti-CHIKV-IgM&lt;sup&gt;a&lt;/sup&gt;</td>
<td>&lt;1:20</td>
</tr>
</tbody>
</table>

CHIKV: chikungunya virus; DENV: dengue virus; JEV: Japanese encephalitis virus; NS<sub>1</sub>: nonstructural protein-1; WNV: West Nile virus; YFV: yellow fever virus; ZIKV: Zika virus.

<sup>a</sup> Indirect immunofluorescence assay (IIFA) titres <1:20 for serum were considered negative [1-3].

<sup>b</sup> SD BIOLINE Dengue Duo NS<sub>1</sub> Ag + Ab Combo and Bio-Rad Platelia Dengue NS<sub>1</sub> Ag.
Exported case# 2

In November 2013, an acute Zika virus (ZIKV) infection was diagnosed in a German traveller returning from Thailand. The patient reported a clinical picture resembling dengue fever. Serological investigations revealed anti-ZIKV-IgM and -IgG, as well as ZIKV-specific neutralising antibodies in the patient’s blood. In Europe, viraemic travellers may become a source of local transmission of ZIKV, because *Aedes albopictus* (Skuse) and *Ae. aegypti* (Linnaeus) are invasive mosquitoes and competent vectors for ZIKV.

Conclusions

This report constitutes, to the best of our knowledge, the first laboratory-confirmed case of a ZIKV infection imported into Europe. The case highlights that unusual DENV serology results might be caused by a flavivirus different than DENV despite a similar clinical picture. A serological study after the Yap outbreak indicated that ZIKV-infected patients can be positive in anti-DENV-IgM assays [20], as also experienced in our case. This cross-reaction in the Yap outbreak was seen especially if ZIKV was a secondary flavivirus infection. These findings underscore the importance of a careful diagnostic investigation in travellers suspected with dengue, and the well-known serological cross-reactions in the flavivirus group. Thus, the rate at which seemingly imported dengue cases among travellers from endemic areas in the recent years were actually ZIKV infections remains a question.
Brief communication

Zika fever imported from Thailand to Japan, and diagnosed by PCR in the urine

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Accepted 24 September 2015

Travel period 25 – 31 July 2014/ visited Koh Samui

Taiwan reports 1st imported Zika case via Thailand

Posted by Robert Herriman on January 19, 2016 // Leave Your Comment

Taiwanese health officials are reporting today the first imported Zika virus infection in the country since testing began in 2003. The patient is a 24-year-old male from northern Thailand.

Health officials say the individual was stopped by the quarantine officer at the fever screening station upon his arrival in Taiwan Taoyuan International Airport. Infection with Zika virus was confirmed in the case through testing his blood samples by the Taiwan CDC laboratory. This is the first case of Zika virus infection detected among the 50,000 samples collected by the Taiwan CDC laboratory since 2003.

According to the patient, prior to his trip to Taiwan, he was in Thailand for the past three months and it was his first visit to Taiwan. When he was in Thailand on January 9, he already experienced symptoms such as fever and headache. After specimens were collected from him, he was tested negative for dengue virus by the dengue NS1 rapid test and his specimens were submitted to the Taiwan CDC laboratory for further testing. He was then confirmed to have Zika virus infection.

The other two travelers traveling with him are his coworkers who both reside in northern Thailand as well. Although one of them experienced sore throat and headache, the symptoms subsided after seeking medical attention. The other one of them experienced a mild sore throat and mucus. Both of them were tested negative for Zika virus and dengue virus. As of now, the case is currently stable and recovering.

Taiwan CDC is raising the travel notice level for six countries in Central and South America and Southeast Asia.

Source: http://outbreaknewstoday.com/
<table>
<thead>
<tr>
<th>Case</th>
<th>Dengue captured ELISA-IgM</th>
<th>Dengue captured ELISA-IgG</th>
<th>CHIKV (IgM) ELISA</th>
<th>JEV (IgM) ELISA</th>
<th>CDC Dengue PRNT</th>
<th>CDC Zika</th>
<th>CDC Zika IgM ELISA</th>
<th>CDC Zika PRNT</th>
<th>CDC interpretation</th>
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<tbody>
<tr>
<td>1</td>
<td>Negative</td>
<td>Negative</td>
<td>Negative</td>
<td>Negative</td>
<td>Not done</td>
<td>Positive</td>
<td>10240</td>
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<td>&gt;20480</td>
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<td>11</td>
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<tr>
<td>12</td>
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<td>Negative</td>
<td>Negative</td>
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<td>Positive</td>
<td>10</td>
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<tr>
<td>13</td>
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<td>Negative</td>
<td>Negative</td>
<td>160</td>
<td>Negative</td>
<td>Negative</td>
<td>40</td>
<td>convalescent sample</td>
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</table>

10/13 = Zika IgM positive
3/10 = PRNT of ZIKV higher than DNV 4 times
Epi & Clinical Characteristics of inconclusive fever and rash outbreak in 2012

T. Tantitaweewat & R. Buathong, Thailand MOPH
7 Confirmed Zika Fever Cases, 2012-2014 (blood ONLY)

<table>
<thead>
<tr>
<th>Date</th>
<th>Province</th>
<th>Age</th>
<th>Gender</th>
<th>DOI (days)</th>
<th>DENV RT-PCR</th>
<th>ZIKV RT-PCR</th>
<th>DENV IgM</th>
<th>DENV IgG</th>
<th>ZIKV IgM</th>
<th>DENV PRNT</th>
<th>ZIKV PRNT</th>
<th>Interpretation*</th>
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<tr>
<td>March 2012</td>
<td>Ratchaburi</td>
<td>18</td>
<td>M</td>
<td>7</td>
<td>ND</td>
<td>Negative</td>
<td>Positive</td>
<td>Negative</td>
<td>Positive</td>
<td>160</td>
<td>1,280</td>
<td>ZIKV</td>
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<tr>
<td>March 2012</td>
<td>Ratchaburi</td>
<td>12</td>
<td>F</td>
<td>9</td>
<td>ND</td>
<td>ND</td>
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<td>Negative</td>
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<td>Ratchaburi</td>
<td>32</td>
<td>F</td>
<td>16</td>
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<td>Lamphun</td>
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<td>F</td>
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<td>Positive</td>
<td>Negative</td>
<td>Negative</td>
<td>Negative</td>
<td>ND</td>
<td>ND</td>
<td>ZIKV</td>
</tr>
<tr>
<td>September 2013</td>
<td>Sisaket</td>
<td>53</td>
<td>F</td>
<td>3</td>
<td>Negative</td>
<td>Positive</td>
<td>Negative</td>
<td>Negative</td>
<td>Negative</td>
<td>ND</td>
<td>ND</td>
<td>ZIKV</td>
</tr>
<tr>
<td>July 2014</td>
<td>Petchabun</td>
<td>39</td>
<td>F</td>
<td>1</td>
<td>Negative</td>
<td>Positive</td>
<td>ND†</td>
<td>ND†</td>
<td>ND†</td>
<td>ND</td>
<td>ND</td>
<td>ZIKV†</td>
</tr>
<tr>
<td>July 2014</td>
<td>Petchabun</td>
<td>24</td>
<td>F</td>
<td>3</td>
<td>Negative</td>
<td>Positive</td>
<td>ND†</td>
<td>ND†</td>
<td>ND†</td>
<td>ND</td>
<td>ND</td>
<td>ZIKV</td>
</tr>
</tbody>
</table>

DENV = dengue virus; DOI = date of illness; ND = not determined; PRNT = plaque reduction neutralization test; RT-PCR = reverse transcription polymerase chain reaction; ZIKV = Zika virus.

Geographic of confirmed Zika fever case from 2012-2015 (Blood testing period)

2012: 3 cases
2013: 2 cases
2014: 2 cases
2015: 5 cases

Exported case
2013: 2 cases

Molecular sequencing of Zika virus in Thailand linked closely with French Polynesia

WGS of Zika virus in Thailand (N=10)

EID-TRC, CU
National Surveillance for Zika virus 2016 - present

• Zika Fever
  – **PUI** was divided into 3 categories: Pregnant women / Pediatric / Adults
  – all PUI cases were required lab testing: urine +/- blood for PCR
  – **Confirmed case** was a PUI case with confirmed either ZIKV PCR/sequencing or PRNT

• Congenital Zika Syndrome in newborn

• GBS
Laboratory Capacity Building Before Implement National Wide Passive Surveillance

- August 2014, US CDC (Arbovirus section) and TUC came to Thailand for staff training for Zika virus PCR
- 5 major national lab centers were trained
- In 2015, the lab testing centers were located all Thailand (14 regional lab centers)
- Lab testing is free of charge (sponsored by Bureau of Epidemiology 2 million US dollars/years)
Zika fever in Yap Islands for set case definition

Table 1. Clinical Characteristics of 31 Patients with Confirmed Zika Virus Disease on Yap Island during the Period from April through July 2007.

<table>
<thead>
<tr>
<th>Sign or Symptom</th>
<th>No. of Patients (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macular or papular rash</td>
<td>28 (90)</td>
</tr>
<tr>
<td>Fever*</td>
<td>20 (65)</td>
</tr>
<tr>
<td>Arthritis or arthralgia</td>
<td>20 (65)</td>
</tr>
<tr>
<td>Nonpurulent conjunctivitis</td>
<td>17 (55)</td>
</tr>
<tr>
<td>Myalgia</td>
<td>15 (48)</td>
</tr>
<tr>
<td>Headache</td>
<td>14 (45)</td>
</tr>
<tr>
<td>Retro-orbital pain</td>
<td>12 (39)</td>
</tr>
<tr>
<td>Edema</td>
<td>6 (19)</td>
</tr>
<tr>
<td>Vomiting</td>
<td>3 (10)</td>
</tr>
</tbody>
</table>

* Cases of measured and subjective fever are included.
Patients under investigation: PUI

Preg

General

Age > 15 yr

1. Use blood for PUI in 3 accessories

Age < 15 yr

2. Use blood for PUI

3. Use blood for PUI

4. Use blood for PUI

Congenital Zika Synd.

5. Use blood for PUI

GBS

6. Use blood for PUI

PUI

E.g. no evidence

GBS

Consortium

E.g. no evidence

GBS

E.g. no evidence
Attention!

• Zika virus is notifiable by law since 2015
• All public and private hospitals/labs must do report within 7 days after detection
• Penalty is 500 euro/case will be apply

→ All lab cost (PCR) is free of charge (MOPH is responsible for PUI)

→ Total budget for PCR cost in 2016 is 2 millions US dollar
Pregnant women

With the following symptoms: Any single case of

1 → Maculopopular (MP) rash + 1 of the following:
fever, joint pain or conjunctivitis

2 → Fever + 2 of the following:
headache, joint pain or conjunctivitis

3 → MP rash + living or have been travelling
in area where confirmed cases of Zika infection where
found during control mission (28 days after detection)
General patients
Adult

15 years old and over with the following symptoms:

Any single case of

1→ MP rash + 1 of the following:
fever, joint pain or conjunctivitis

2→ Fever + 2 of the following:
headache, joint pain or conjunctivitis

3→ MP rash + living or have been travelling in area
where confirmed cases of Zika were found
during control mission
General patients
Paediatric case

Under 15 years old with the following symptoms:

4→ **1 child** has fever + MP rash + conjunctivitis

1/2→ **A cluster** (2 children or more from the same village, school or workplace) within 2 weeks that presents:
- MP rash + 1 of the following: fever, joint pain or conjunctivitis
- Fever + 2 of the following: headache, joint pain or conjunctivitis

3→ MP rash + living or have been travelling in area where confirmed cases of Zika where found during control mission
Babies with congenital abnormalities

Congenital Zika Syndrome

**Neonatal** (infants < 1 month) **presenting microcephaly** (whose head curve is under 3 percentile of ref curve) and/or brain calcification
Patients with **Guillain-Barré syndrome** or other **inflammatory neurological disease** acquired after an infection leading to **acute muscle weakness, paralysis** (that may require mechanical ventilation) or **severe limbs weakness** on both sides.
Case classification

- **PUI** : notify for lab investigation
- **Suspected case** : for outbreak use only, not count as Zika virus infection in the registry
- **Confirmed case** : for implement control, count as Zika virus infection in the registry
  - **Only** confirmed by molecular diagnosis either PCR or sequencing
  - **Except** CZS either molecular or IgM
Number of Zika virus infection by week of onset
1 Jan 2016 – 31 Dec 2017 (N = 1,689)

<table>
<thead>
<tr>
<th>Week of Onset</th>
<th>Number 2016</th>
<th>Number 2017</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>1,121</td>
<td>577</td>
</tr>
</tbody>
</table>

Peak of DENV in 2016 (wk 33rd)
2016 = 1,121
Peak of DENV in 2017 (wk 23rd)
2017 = 577
Number of Zika virus infection by month of onset
1 Jan 2016 – Jan 2018

<table>
<thead>
<tr>
<th>Time</th>
<th>Number</th>
<th># Affected Province</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Symptomatic</td>
<td>Asymptomatic</td>
</tr>
<tr>
<td>Last week (13 - 19 Jan 18)</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>2018</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>2017</td>
<td>564</td>
<td>13</td>
</tr>
<tr>
<td>2016</td>
<td>882</td>
<td>239</td>
</tr>
<tr>
<td>Total</td>
<td>1,481</td>
<td>250</td>
</tr>
</tbody>
</table>

(87.68%) (12.32%)
Clinical presentations of confirmed Zika infection, 1st Jan – 23rd September 2016 (N = 840)

- Rash: 82.3%
- Fever: 59.6%
- Red eyes: 44.9%
- Joint pain: 41.9%
- Myalgia: 32.0%
- อ่อนแรง: 29.0%
- ปวดศีรษะ: 28.1%
- ข้อบวม: 9.9%
- อาการ URI: 9.6%
- ต่อมน้ำเหลืองโต: 5.1%
- ผื่น: 4.9%
- ตาแดง: 4.7%
- ปวดกล้ามเนื้อ: 4.6%
- ปวดข้อ: 4.3%
- อาการ GBS: 0.3%
Zika infection distribution (proportion) by age group, 1 Jan – 23 September 2016 (N = 884)

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10</td>
<td>14.3%</td>
</tr>
<tr>
<td>11-20</td>
<td>18.0%</td>
</tr>
<tr>
<td>21-30</td>
<td>17.8%</td>
</tr>
<tr>
<td>31-40</td>
<td>17.3%</td>
</tr>
<tr>
<td>41-50</td>
<td>15.2%</td>
</tr>
<tr>
<td>51-60</td>
<td>9.6%</td>
</tr>
<tr>
<td>61-70</td>
<td>4.9%</td>
</tr>
<tr>
<td>71-80</td>
<td>2.6%</td>
</tr>
<tr>
<td>81-90</td>
<td>0.5%</td>
</tr>
</tbody>
</table>
Morbidity rate of Zika infection by age group, 1 Jan – 23 September 2016 (N = 884)
Zika infection distribution (proportion) by age group, 2017 (N = 557)
Morbidity rate of Zika infection by age group, 2017 (N = 577)

Morbidity rate per 100,000 population:
- 0-10: 0.62
- 11-20: 0.88
- 21-30: 1.16
- 31-40: 1.11
- 41-50: 0.89
- 51-60: 0.83
- 61-70: 0.42
- 71-80: 0.17
- 81-90: 0.01
Zika infection distribution (proportion) by age group, 2016 (N=884) vs 2017 (N=577)
Zika morbidity by age group, 2016 (N=884) vs 2017 (N=577)
Geographic area of confirmed Zika virus infection in Thailand 2016/2017/2018
Pregnancy with confirmed Zika virus

• During 1 Jan 2016 – 19 Jan 2018, total ZKV infected pregnancy was **121 case (6.98%)**

  ➢ Symptomatic infection = **67 cases (55.3%)**
  ➢ Asymptomatic infection = **54 cases (44.7%)**

• **108 pregnant women were delivered (89 %)**
  - Miscarriage = **4 cases (3.7%)** (2 confirmed)
  - Birth abnormalities = **4 cases (3.7%)**
Microcephaly with confirmed Zika virus

- During 1 Jan 2016 – 16 Jan 2018, total ZKV infected pregnancy was 3 case
- All 3 cases were confirmed either molecular or IgM
  - Born from un-registered infected pregnancy
  - 2 newborns diagnosed with microcephaly and one was congenital Zika syndrome (CZS)
GBS confirmed Zika virus

• During 1 Jan 2016 – 24 Nov 2017, total GBS with confirmed Zika virus infection was 3 cases and died 1 case
Zika related abortion in Pregnancy

Bureau of Epidemiology
EOC
17 OCT 2016
Misccariage Case 1 Summary

- **Maternal age**: 16 years old, G1P0A1
- **Place**: Phonpisai, Nongkhai
- **Rash and illness during pregnancy**: None
- **Asymptomatic infection**: first confirmed on 21\textsuperscript{st} July 2016 (Active search) at GA 12 wks
- **Abortion**: 14\textsuperscript{th} October 2016 at GA 25 wks
- **Death fetus weight**: 1,002 grams
- **Lab confirmations**: Mother Urine PCR – positive on 21\textsuperscript{st} July (US CDC protocol: NIH)
Miscarriage Case 1 Summary

• Lab confirmations:

Death fetus
1. Cord Blood - Positive Zika PCR on 14th Oct 16
2. Placenta – Positive Zika PCR on 14th Oct 16 (2 sites from 5 sites)
3. Brain necropsy – Positive Zika PCR on Rt. And Lt. brain on 15th Oct 16
### Zika Virus PCR Results

<table>
<thead>
<tr>
<th>№</th>
<th>CU-ID</th>
<th>Sample Type</th>
<th>Name</th>
<th>Date of Collection</th>
<th>Date of Test</th>
<th>Zika Virus PCR Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SI164517-BTL</td>
<td>Left-Brain Tissue</td>
<td>บุตร</td>
<td>14/10/2016</td>
<td>15/10/2016</td>
<td>Detected</td>
</tr>
<tr>
<td>2</td>
<td>SI164517-BTR</td>
<td>Right-Brain Tissue</td>
<td>บุตร</td>
<td>14/10/2016</td>
<td>15/10/2016</td>
<td>Detected</td>
</tr>
<tr>
<td>3</td>
<td>SI164517-SR</td>
<td>Serum</td>
<td>บุตร</td>
<td>14/10/2016</td>
<td>15/10/2016</td>
<td>Not Detected</td>
</tr>
<tr>
<td>4</td>
<td>SI164517-SRPC</td>
<td>Serum from umbilical cord</td>
<td>บุตร</td>
<td>14/10/2016</td>
<td>15/10/2016</td>
<td>Detected</td>
</tr>
<tr>
<td>5</td>
<td>SI164518-PC1</td>
<td>Placenta</td>
<td>น.ส.</td>
<td>14/10/2016</td>
<td>15/10/2016</td>
<td>Not Detected</td>
</tr>
<tr>
<td>6</td>
<td>SI164518-PC2</td>
<td>Placenta</td>
<td>น.ส.</td>
<td>14/10/2016</td>
<td>15/10/2016</td>
<td>Detected</td>
</tr>
<tr>
<td>7</td>
<td>SI164518-PC3</td>
<td>Placenta</td>
<td>น.ส.</td>
<td>14/10/2016</td>
<td>15/10/2016</td>
<td>Not Detected</td>
</tr>
<tr>
<td>8</td>
<td>SI164518-PC4</td>
<td>Placenta</td>
<td>น.ส.</td>
<td>14/10/2016</td>
<td>15/10/2016</td>
<td>Not Detected</td>
</tr>
<tr>
<td>9</td>
<td>SI164518-PC5</td>
<td>Placenta</td>
<td>น.ส.</td>
<td>14/10/2016</td>
<td>15/10/2016</td>
<td>Detected</td>
</tr>
</tbody>
</table>
Microcephaly Case 1 Summary

- **Maternal age**: 16 years old, G1P1
- **Place**: Samut Sakorn and Suphan Buri
- **Gestation**: 39+3 wks **Birth weight**: 2,165 grams
- **Rash and illness during pregnancy**: None
- **Mode of Delivery**: normal, 1\(^{st}\) March 2016
- **Detected date**: 3\(^{rd}\) March 2016
- **CT Brain**: calcification in frontal lobe and loss of cerebral sulci
- **Lab confirmations**: Anti-Zika IgM positive (Both US CDC protocol and Euroimmune Kit)
  - **TORCHS Ab**: Negative
CT Brain Findings
3 days of age
Investigation of Zika virus infection Incidence among Measles- and Rubella-negative patients in Measles Elimination Program in Thailand 2016

Nipapan SARITAPIRAK, Nirandorn YIMCHOHO, Rome BUATHONG

MZ Project,

Bureau of Epidemiology, MOPH Thailand
Research Question

Measles 46.04 %

Rube
lla 1.10 %

Zika ......... %
Methodology & Result

Measles cases from Measles elimination program Data based in 2016 (N=750) at NIH

Measles cases were negative for Measles IgM and Rubella IgM (N=322) at NIH

1. Real time PCR of US CDC Kits (N=154) at EID-TRC
- All Negative
- Negative
- Negative 148 sample

2. Real Star Altona Commercial Kits
- All Positive
- Positive
- Positive for Zikv by PCR 1 sample

(1) Or (2) Positive
Nested PCR then Molecular sequencing
Positive for Zikv by Molecular sequencing 5 sample

Positive for Zikv 6 sample AR=3.9%
Discussions & Conclusion

Still under estimation of Zika infection among Measles program because of
1. Sample recruit for testing is acute sample (< 7 days after onset) is not preferred sample for Measles / Rubella IgM
2. Diagnosis of Zika virus based on ONLY molecular technique. The incidence will be higher if the Zika serology is reliable and cheaper.
Asymptomatic rate of Zika virus infection in adults during Zika virus outbreak in a community of Thailand 2017

Rome BUATHONG, Supaporn WACHARAPHUSADEE, Yongjua LOASIRITHAWORN, Jurai WONGSAWAT
PZ Project, Bureau of Epidemiology, MOPH, Nonthaburi, Thailand
The EID Health Science Center, The Thai Red Cross Society, Bangkok, Thailand
Research Question

Is asymptomatic rate of ZKV in emerging area different from endemic area?

Previous report in Yap Island 80%

Thailand? (ZKV endemic)
Index case was confirmed by ZIKV PCR (2 protocols)

went to the field
Collect blood + urine for all villager who age >15 years

Revisited the village and collect blood + urine in the same person

- Molecular testing by real time PCR (Commercial Kit) in both urine and blood
- 489 were enrolled in 7 provinces of all regions in Thailand
- 74 people were positive PCR either first time or second time AND 415 were negative twice
  - 44 symptomatic and 30 asymptomatic
  - Asymptomatic rate in adults is 40.5 %
Conclusion

Asymptomatic rate of emerging ZKV area is different from endemic ZKV area

Previous report in Yap Island (Ab) 80%

Thailand (PCR) 40%
(Waiting for seroconversion)
Discussions

• Under diagnosis will be common in flavivirus endemic to country due to

1) High cross reactivity between Dengue and Zika viruses
   Zika fever tend to be diagnosed with Dengue fever if the clinicians use either rapid test or ELISA

2) High cost
   + needs other diseases exclusion by laboratory testing with need more invest cost
   + many diseases mimic the presentation in the country
Discussions

• Under diagnosis will be common in flavivirus endemic country due to

3) High technique

+ needs confirmation by molecular detection such as PCR and sequencing
+ methods itself is also complicated
+ blood is not good sample due to rapidly disappeared within 5 days
+ the best sample is urine due to long lasting detection by PCR (>14 days)

• In endemic countries, it needs Zika vaccine for adult female similar to Rubella

Zika fever in Thailand will be obliterated by Dengue fever
And there is persisting such for a
Control Strategy
Activities of Zika Control and Prevention

- Logistics
- Prepared meeting at day 0
- Investigation and active case finding
- Community and social mobilization
- EOC

Village check
Sub district check
District check

HI, CI near 0 < 5%
Epidemic curve of Zika fever outbreak in a province
May – July 2017
HI, CI in affected village

Day after detection
What emerging look like in Thailand?
Number of suspected CHIK by date of onset

No death report
Geographic distribution of CHIK report between 2008 and 2009, Thailand

2008 (n=2,494)  
Thai-Malay border 99.7%  
Upper southern 0.3%

2009 (n=41,546)  
Thai-Malay border 60.0%  
Upper southern 38.3%
CHIK reporting case movement from southernmost to upper southern provinces
Thank you for your kind attention

SAWASDEE
KRUB