

Japanese Encephalitis in a rural district in Sarawak; Human-Animal Interface

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Introduction

- Japanese encephalitis (JE) is the most important vaccine-preventable diseases (VPD) that cause encephalitis in the Asia-Pacific region (WHO, 2015)
- Majority (75%) of JE cases occur in children aged <15 years (Campbell *et al.*, 2011)
- The case fatality rate among patients with encephalitis approaches 30%, and
- approximately 30%–50% of survivors have long-term neurologic sequelae . (Fischer *et al.*, 2008)

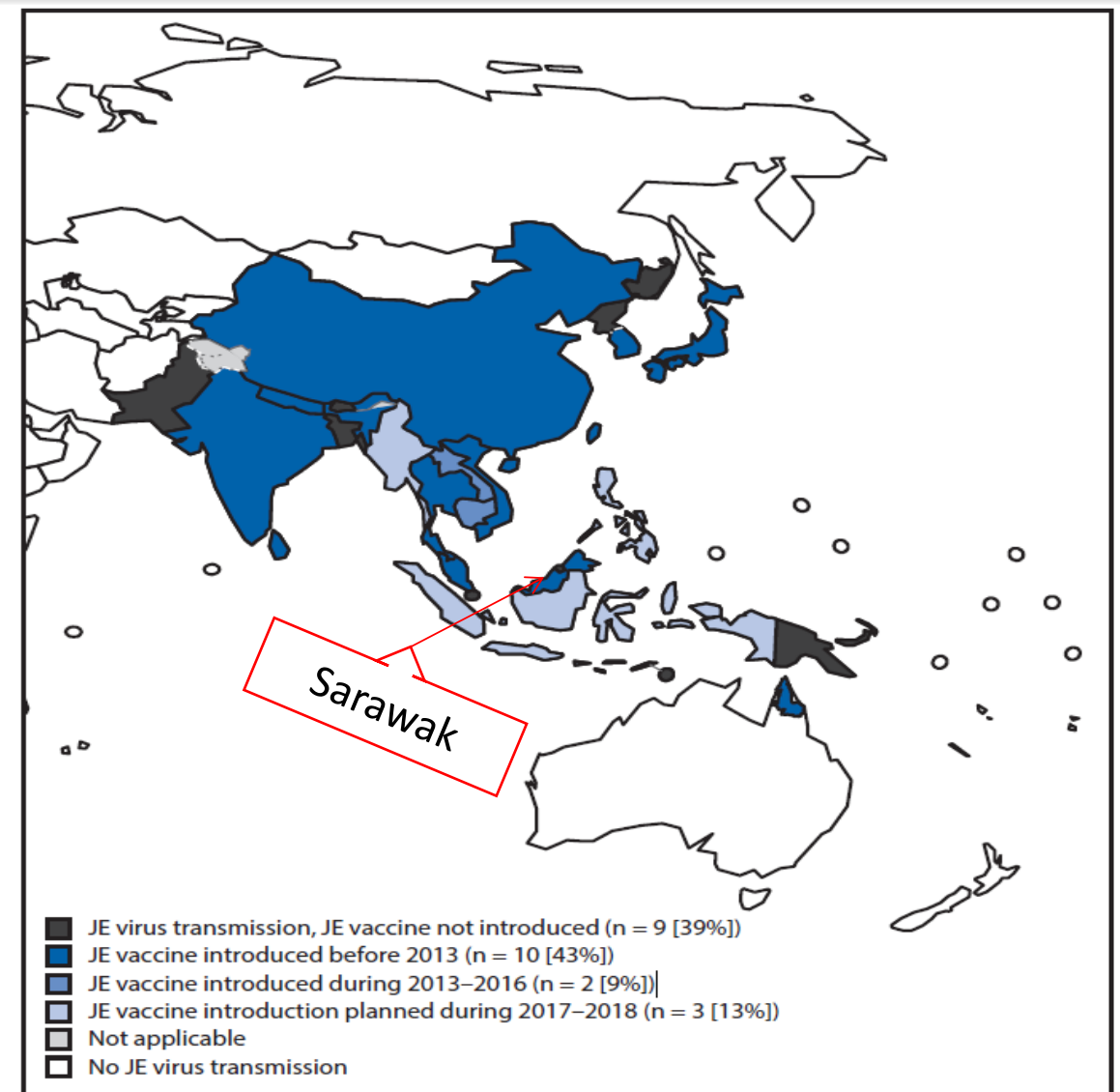
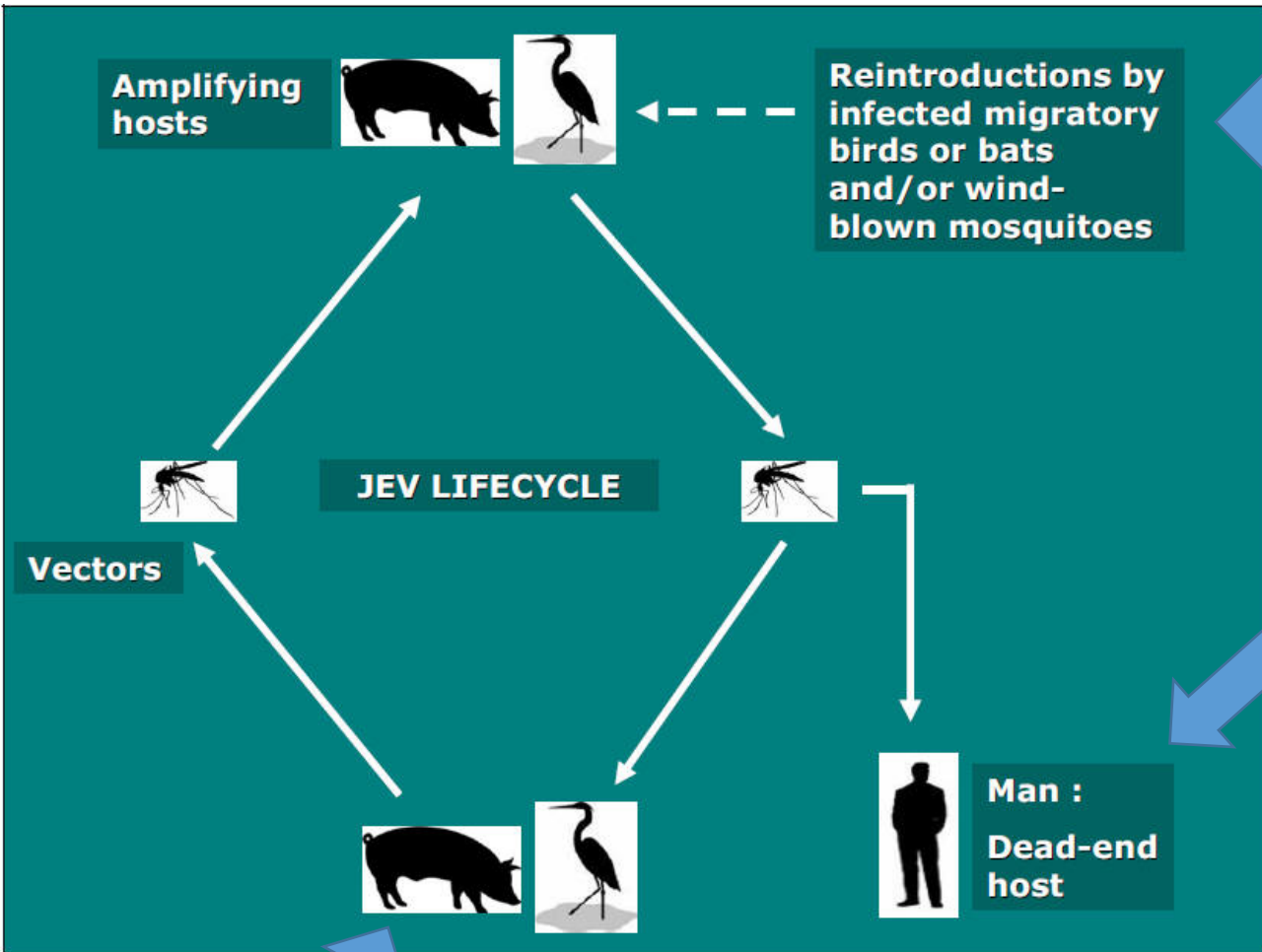


Figure 1. Areas with risk for Japanese encephalitis (JE) virus transmission and JE vaccine introduction*-24 countries in Asia and the Western Pacific Region, 2016

Japanese Encephalitis Virus Life-Cycle



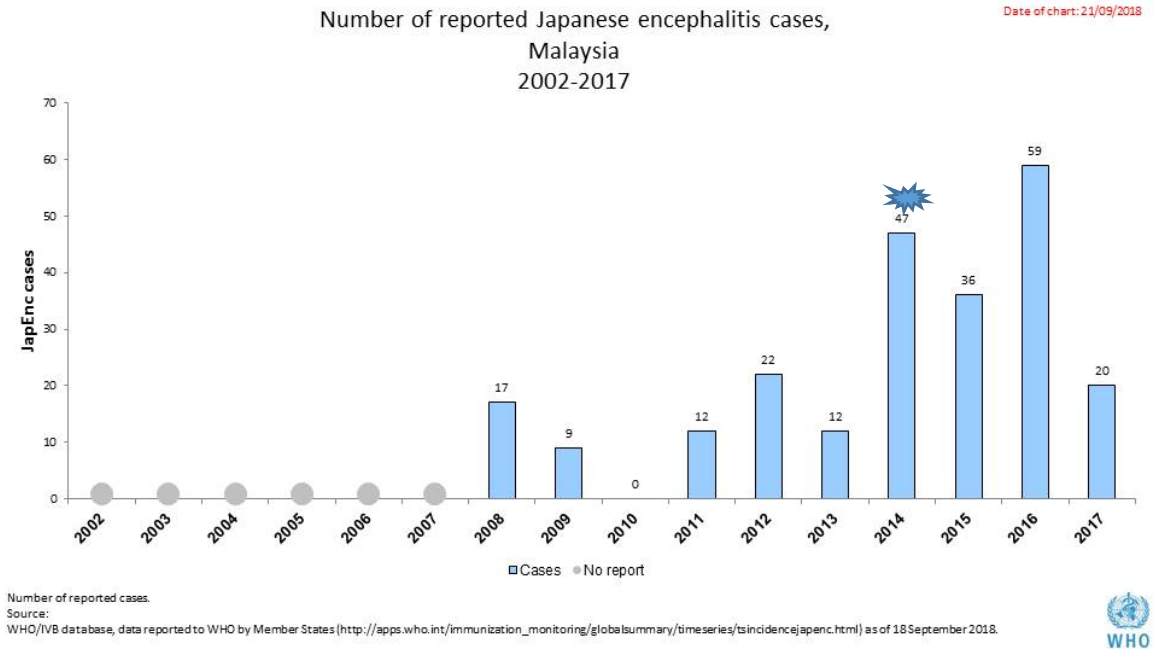
- The virus is transmitted naturally in an enzootic cycle among birds, pigs, and other vertebrate hosts by the *Culex* mosquito .

- Humans are incidental/dead end hosts that become infected by the bite of an infected mosquito. They have short duration and low viremia in man.

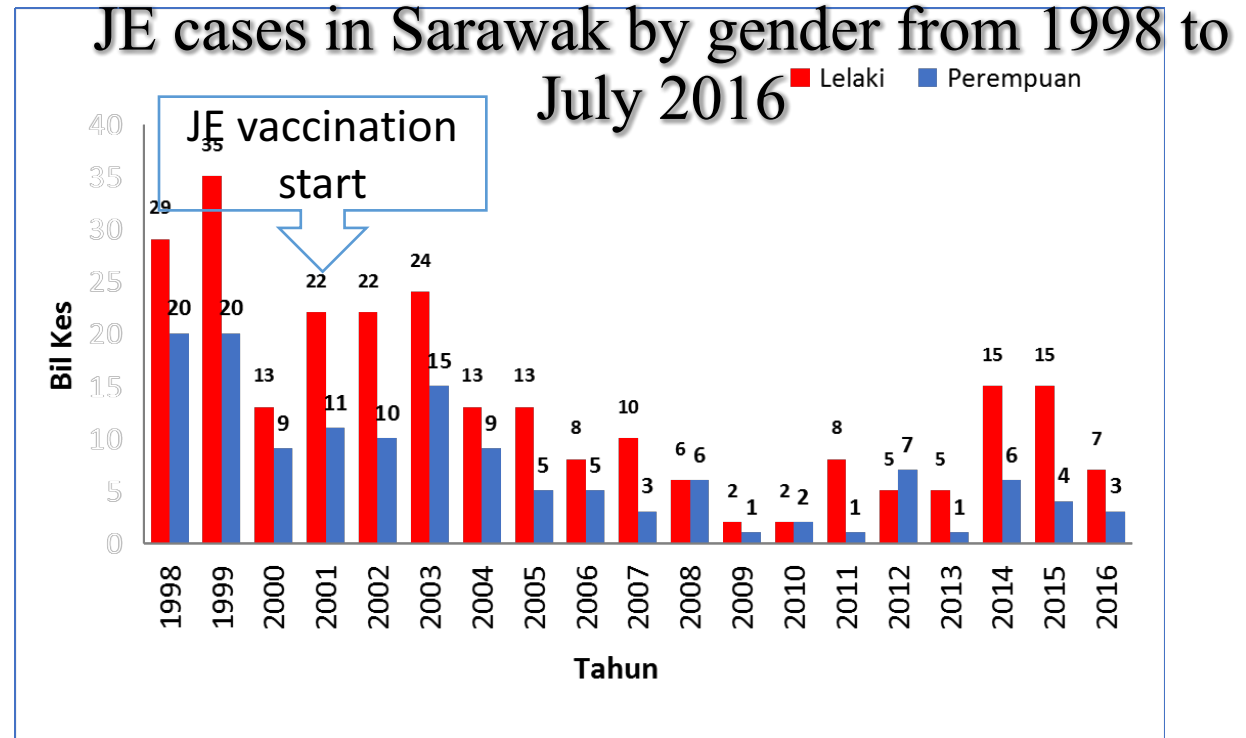
One Health agenda in some Asian countries to attain optimal health for people, animals, and the environment.

- Pigs are an important maintenance host for this virus

JE cases in Malaysia and Sarawak



★ As of June 2014, a total of 16 cases were confirmed in Malaysia for that year and of this, eight cases were from Sarawak (50%).



From year 2010-2015, 71 cases diagnosed in Sarawak showed an increasing trend, particularly among unvaccinated young adults.

News on JE in Sarawak

Japanese Encephalitis (JE) case confirmed in Sarawak



By **AINA NASA** and **WAN NORLELA WAN SAZALI** - July 7, 2017 @ 2:29pm

KUALA LUMPUR: The Health Ministry today confirmed a case of Japanese Encephalitis (JE) in Kota Samarahan, Sarawak, but stressed that it is an isolated case and that health measures have been taken.

Speaking to reporters at the International Symposium on Paediatric Pain here today, Health Minister Datuk Seri Dr S. Subramaniam said his ministry received the case report yesterday.

He said the disease is common in Sarawak and that the ministry has taken note of the current case, which is reported to have been detected last month.

"(JE) is something that occurs from time to time in Sarawak because of the lifestyle there.

"The Sarawak Health Department will take health measures to contain it," he assured.

He added that no other case of JE has been reported.

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Study objectives

- **General aim:**
 - To estimate risk of association between JE human cases, JE hosts and vector density.
- **Specific Aims:**
 - To determine the epidemiology of human cases
 - To determine hot spot areas for JE cases
 - To determine the seroprevalence of anti-JE antibody in animal hosts
 - To study vector density for JE virus in identified areas
 - Risk estimation on the relationship between unvaccinated JE cases, host and vectors
- This research was funded by MyOHUN seed funding award 2016

•Hypothesis:

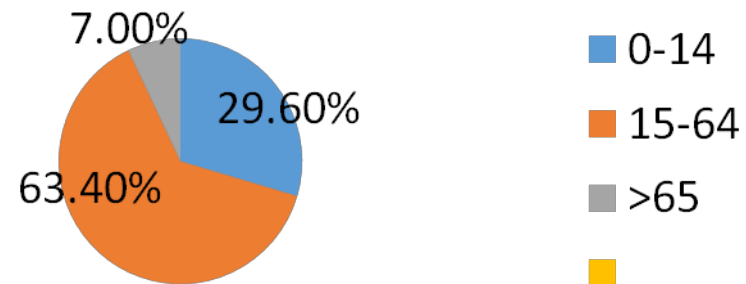
- Increase in JE cases among unvaccinated young adults is postulated to be due to absence of immunity; and
- Increased JEV reservoir in animals and availability of vector

Study location

The district population (year 2010 census); 80,874.
About 65% of the population are Bidayuh. The other main ethnic groups are Iban, Chinese and Malay.



population by age group



Methodology

- i. MyOHUN seed funding award received ; 23/8/2016
- ii. Ethical approval ;NMRR -16-2397-32373(IIR) on 7 Feb 2017
- iii. Case note review of cases from 2010-2015 in Sarawak General Hospital
- iv. Mapping of affected area in Serian District



Sensitization visit started in February 2017



Methodology

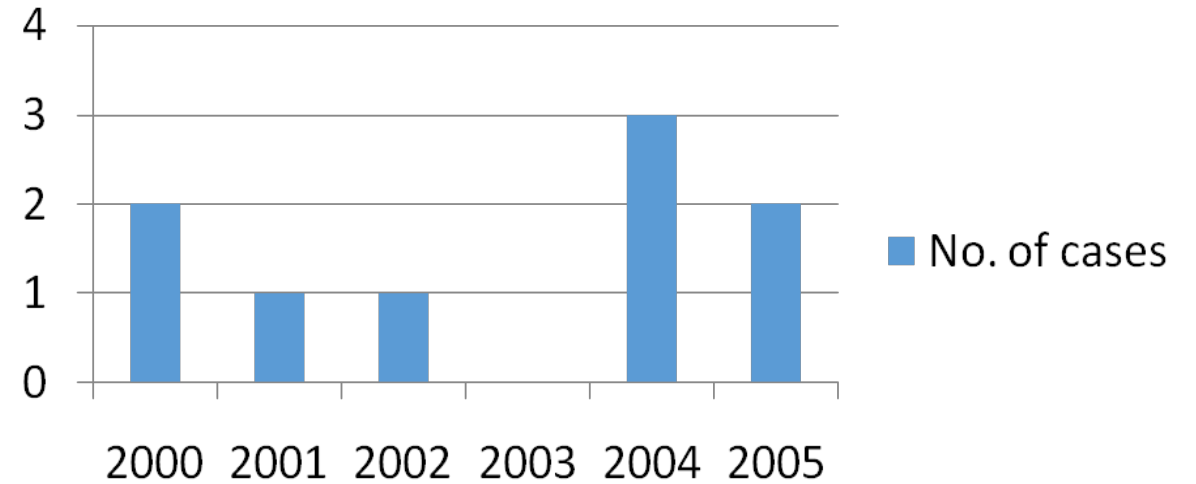
- vi. Mosquito trapping using BG-sentinel traps for vector density (JEV using RT-PCR)
 - Trapping of mosquitoes started on 15th Mac 2017.
- vii. Serological study among 50 animal reservoirs (pigs and water birds)
 - not able to do due to rabies outbreak
- viii. Data analysis



Results

1. Total cases 2010-2015 in Serian District : 9 cases

- Five villages affected
- Age group: 10 mth- 23 yrs (median age 12 yrs old) ; 7 students



Outcomes:

4 discharge well (44.4%)

2 deaths – case fatality rate 22.2% ,

3 severe neurological deficit – long term sequelae 33.3%, (including death 55.6%)

Environmental assessment – backyard pig farming



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Environmental assessment



Paddy field

Swampy area



Mapping of the cases showed close relationship with traditional pig husbandry

positive cases

- 📍 Sungai Baru
- 📍 Kampung Bunan Gega
- 📍 Kampung Merian Bedup
- 📍 SK Daha
- 📍 Kampung Jenan

with pig husbandry

- 📍 Kampung Bintawa Sungai Barie
- 📍 Kampung Lintang Baru
- 📍 Kampung Bunan Punok
- 📍 Kampung Bunan Gega
- 📍 Jalan Kampong Mujat
- 📍 SK Daha



Vector trapping – Adult Culex density

Village/Kampung	No. of trap	Duration	Trapping period	Samples collected
Kpg Lintang Baru	2	6 pm -7am	15-23 Mac	29 female Culex (average density 10/14 hrs)
Kpg. Bintawa Sg. Barie	2	6 pm -7 am	27 -30 Mac	Aedes and Mansonia
Kpg Riih Mawang	2	6 pm -7 am	6 - 9 Jun	50 Female Culex (average 17/14 hrs)

- Vector trapping showed the presence of adult Culex mosquitoes with the density of 10-17 mosquitoes per 14 hours.



Discussion

- The morbidity and mortality of JE cases in this study still similar with previous findings. (Fischer *et al.*, 2008)
- Backyard pig farming is a common practice in Sarawak
- They were repeated cases in the same location/near previous location
- identification of hot spot areas

Conclusions:

- Identification of JE hot spot areas in Serian
- There are shift in the age to older age group of patient with JE in Sarawak.
- The complications among the admission cases were still profound.
- Positive interface demonstrated between human cases, pig husbandry and Culex mosquitoes.
- However, seroprevalence among pig was not able to do in view of rabies outbreak in the same areas.

Recommendations

- This initial findings are important implications for future research in seroprevalence among the pig in Sarawak.
- **Expected outcomes:**
 - Review of JE vaccination policy especially in adults
 - Frequent supplementary immunization activity (SIA), up to 15 years old
 - Increased awareness of JE risk among at risk community
- **Explicit future follow-up:**
 - Statewide study on similar problem elsewhere
 - Community awareness program regarding JE vaccine
 - Community behavioral change towards domestic pig husbandries

Limitations in this study

- Late approval from NMRR (National medical research registry)
- New financial system in university ;
 - Late approval for purchasing
 - Late payment
- JE locations are similar to rabies location
 - No Sampling pig still pending
- Team member (vet) – retired



Project detail

- Project Duration : 12 months
- Commencement date : 1st October 2016
- End date : 30th September 2017

Thank you

Researchers:

- AP Dr Razitasham Safii (PHS,UNIMAS)
- Prof Dr Lela Suut (UNIMAS)
- Prof Dr Chua Hock Hin (ID Physician, SGH)
- Ass. Prof Dr Nor Aliza Abdul Rahim
- Dr Chia Pek Chin (State veterinary)

