Epidemiology and Current Situation of Leptospirosis in Malaysia

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Ministry of Health Malaysia
Outline

- Introduction
- Etiological Agent
- Transmission
- Risk factor
- Clinical Presentation
- Laboratory Diagnosis
- Treatment of Leptospirosis
- Leptospirosis in Malaysia
- Prevention & Control (involving local authority)
- Conclusion
Introduction

- Zoonotic Disease
- Major cause of morbidity and mortality worldwide
- In Malaysia
  - It causes ‘preventable’ mortality to the young & personnel in high risk occupations
- Endemic in tropics and subtropics (less common in temperate countries)
- Sporadic and major outbreaks.

Leptospirosis is an acute arthropod-zoonotic infection
Scientific Beginning

- It was first described by Adolf Weil in 1886 when he reported an "acute infectious disease with enlargement of spleen, jaundice and nephritis". *Leptospira* was first observed in 1907 from a post mortem renal tissue slice.
Leptospirosis: Causative agent

• Genus: *Leptospira*,
• Family: Leptospiraceae
• Order: Spirochetales
• Previous classification system [serological classification]: 2 species (before 1989)
  • Pathogenic: *L. interrogans* }
  • Non pathogenic: *L. biflexa* }
• *L interrogans* is divided further into 24 serogroups, serovars (> 200) and strains (LPS).
• Genotypic classification: based on DNA hybridization studies;
Morphology

- The Leptospira appear tightly coiled thin flexible Spiracles 5 – 15 microns long.
- Fine spiral of 0.1 – 0.2 microns
- One end appears bent forms a hook.
- Actively motile
- Seen best with dark field Microscopy.
Leptospirosis: Transmission

Asymptomatic rodent carriers

Wild animals

Livestock and domestic animals

Soil and water

Uveitis

Meningitis

Myocarditis

Pulmonary haemorrhage syndrome

Hepatic dysfunction

Renal dysfunction

Maintenance Host (Kidneys)

Urine

Forest

Pastures

Rice fields

Houses

Water

Rivers

Susceptible Hosts
Modes of Transmission

1. Direct contact with urine or tissue of infected animal
   Through skin abrasions, intact mucus membrane

2. Indirect contact
   Broken skin with infected soil, water or vegetation
   Ingestion of contaminated food & water

3. Droplet infection
   Inhalation of droplets of infected urine
Animals spread Leptospirosis

Rats, Mice, Wild Rodents, Dogs, Swine, Cattle are principle source of infection

The above animals excrete Leptospira both in active infection and Asymptomatic stage

The Leptospira survive and remain viable for several weeks in stagnant water.
Serological Prevalence of Leptosporal Infection in Wildlife in Sarawak, Malaysia

SIVA THAYAPARAN*1, IAN ROBERTSON1, FAIRUZ AMRAAN2, LELA SU’UT3 & MOHD TAJUDDIN ABDULLAH4

Leptospirosis is a zoonotic disease caused by pathogenic leptosporal bacteria, which are transmitted directly or indirectly from animals to humans or animal to animal. The first phase of this proposed study was carried out to determine the extent of exposure to leptospirosis in wild mammals surrounded by human settlements around wildlife or tourism area (Wind Cave, Fairy Cave, Bako National Park and Matang Wildlife Center). This study reports an incident of leptosporal among primates (three captive and two free ranging), rats, bats, squirrels and mongoose around Kuching, Sarawak area, which has been screened for Leptospirosis. Blood samples were obtained to determine the presence of antibodies through the microscopic agglutination test (MAT) using eighteen serovars of Leptospira commonly found in Malaysia as antigens. It was observed that four out of the five monkeys (80%), rats (9/4) (44%), bats (20/5) (20.8%), squirrels 4/4 (100%) and mongoose (1) (100%) reacted against one or more serovars of Leptospira. In this study antibody of five serovars of Leptospira interrogans Copenheni, Leptospira interrogans Lai, Leptospira interrogans Pomona, Leptospira interrogans Pyrogenes, Lepto 175* were detected. Serovars Copenhegeni, Lai, Pomona and Pyrogenes were considered pathogenic for different mammals including human beings. No information about serovars lepto 175 and further studies going on. This is providing information on the possible zoonotic importance of mammalian species in maintaining this disease in Sarawak. The transmission of leptospires in rats reported several incidents and between primates, bats, squirrels, mongoose and human is not reported elsewhere but this could create new reservoir and transmission routes and may affect the tourism, conservation effort and public health.
Risk Groups

- Factors Responsible for the Emergence of Leptospirosis
  - Reservoir and carrier hosts
  - Flooding, drainage congestion
  - Animal-Human Interface
  - Human host risk factors

- High Risk Groups
  - Workers in the agricultural sectors
  - Search and rescue workers in high risk environment
  - Disaster relief workers
  - People involved with outdoor/recreational activities
  - Sewerage workers
  - Livestock handlers
  - Pet shops workers
  - Military personnel
  - Travelers who are not previously exposed to the bacteria in their environment
A hospital-based study on seroprevalence of leptospirosis among febrile cases in northeastern Malaysia

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bDepartment of Anaesthesiology, School of Medical Sciences, Universiti Sains Malaysia, Malaysia
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**Objective:** To determine the seroprevalence of leptospirosis among febrile inpatient cases in northeastern Malaysia.

**Methods:** A hospital-based cross-sectional study was conducted among 999 febrile cases admitted to 10 hospitals in northeastern Malaysia. A survey using a proforma sheet was used to obtain epidemiological and occupational information. Serum samples were screened for leptospirosis by indirect enzyme-linked immunosorbent assay (IgM ELISA) and confirmed by microscopic agglutination test (MAT).

**Results:** There was an equivalent distribution of males and females in the 999 respondents enrolled in the study. The majority were Malay (847.78%) and their mean age was 39.4 (standard deviation 17.6) years. The overall seroprevalence of leptospirosis was 8.4% (95% confidence interval 7.8–9.0%) (n=84). The high-risk occupational group was found to have a higher seroprevalence, which was 56.6% (95% CI 49.8–63.4) (n=62). The predominant serogroup was Sejroe (53.93, 95% CI 47.6–60.3) (n=69).

**Conclusions:** This study revealed a possible high seroprevalence of leptospirosis among febrile cases, indicating the need to review the importance of adding leptospirosis to the case investigation of febrile illness, especially among high-risk occupational groups in Malaysia, as well as in other endemic countries.

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Seroprevalence of Leptospiral Antibodies among Healthy Municipal Service Workers in Selangor

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Introduction. Municipal service workers have been found to have an occupational risk of leptospirosis. Study among municipality workers show high seropositivity of leptospiral antibodies detected among town cleaners and garbage collectors. Objective: Aim of this study were to determine seroprevalence of leptospiral antibodies and distribution of serovars detected in samples among municipal service workers. Methodology: Cross-sectional study involved 88 municipal service workers in Selangor. Blood samples were taken and serological tests were done using MAT following standard procedures. Results: Seropositivity of leptospiral antibodies among municipal service workers was 54.8%. Serovars identified were strains of Serovar, Copenhagen, Hardjo, Lai, Batavia, Tokyo, Colheiros, Hardjo Togana, Tampico, and Pomona. There were 31 workers with positive leptospiral antibodies. All of them were frequently exposed to leptospira. Significant associations have been reported between seropositivity of leptospiral antibodies with job category (P = 0.021) and worker’s nationality (P = 0.014) among municipal service workers. Conclusion: High seropositivity of leptospiral antibodies detected among municipal service workers who were associated with job category and nationality of workers. The significant findings from this study suggest that health education programs and safe work practice should be considered to prevent leptospirosis among municipal service workers in future.

Table 3: Prevalence of leptospiral antibodies according to job category.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Leptospiral antibodies</th>
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<tbody>
<tr>
<td></td>
<td>Positive (%)</td>
</tr>
<tr>
<td>Job category</td>
<td></td>
</tr>
<tr>
<td>Garbage collector</td>
<td>22 (41.5)</td>
</tr>
<tr>
<td>Town cleaner</td>
<td>9 (33.3)</td>
</tr>
<tr>
<td>Public worker</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Public health worker</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Total</td>
<td>31 (34.8)</td>
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</tbody>
</table>

Figure 1: Serovar (local) among seropositive municipal service workers.
Clinical Presentation

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<th>Anicteric</th>
<th>Icteric</th>
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<tbody>
<tr>
<td>Common, mild</td>
<td>Rare, Severe</td>
</tr>
<tr>
<td>&lt; 2% Mortality</td>
<td>15% Mortality</td>
</tr>
</tbody>
</table>

90% of Cases

10% of Cases
Sequence of Leptospira Infection

1. Entry (broken skin or mucosa)

2. Spread

3. Disease
   - Meningitis
   - Hepatitis
   - Nephritis
   - Rash

4. Exit
Differential Diagnosis

Fever
- Viral fever, Malaria, Typhus

Jaundice
- Malaria, Viral hepatitis, Sepsis

Renal Failure
- Malaria, Hanta virus, Sepsis

Meningitis
- Bacterial / Viral causes

Hemorrhagic Fever
- Dengue, Hanta virus, Typhus
Laboratory diagnosis of infectious diseases

1. Isolation of infectious agent
2. Observation of infectious agent (direct microscopy)
3. Measure an immune response to the infectious agent (Antibody) : Rapid test, ELISA & MAT
4. Detect the infectious agent or its products
   - Ag / DNA / Biproducts : PCR
5. Biomarkers
When to do & What to do

Leptospiraemic phase: Detect DNA or Antigen

Immune phase: Detect Antibody
Case Classification

• **Clinical case**
  Acute febrile illness with history of exposure to water and/or environment possibly contaminated with infected animal urine with symptoms

• **Probable Case**
  A clinical case AND positive ELISA/other Rapid tests

• **Confirmed case**
  - Microscopic Agglutination Test (MAT),
  - Positive PCR
  - Positive culture for pathogenic leptospires
  - Demonstration of leptospires in tissues using immunohistochemical staining
Treatment

- Mild flu like symptoms – symptomatic treatment
- Mild cases – Doxycycline
- Moderate to severe cases – Penicillin
- Other drugs found to be effective
  - Ceftriaxone
  - Cefotaxime
GLOBAL SITUATION OF LEPTOSPIROSI S
<table>
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<td>Mendhekar [22]</td>
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<tr>
<td>China</td>
<td>7.1</td>
<td>Victoriano et al. [23]</td>
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<tr>
<td>Thailand</td>
<td>4.1-40</td>
<td>Myint et al. [24]</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>11</td>
<td>Agampodi et al. [25]</td>
</tr>
<tr>
<td>French Polynesia</td>
<td>11</td>
<td>Pappas et al. [20]</td>
</tr>
<tr>
<td>Portugal, Azores Islands</td>
<td>11</td>
<td>Vieira et al. [26]</td>
</tr>
<tr>
<td>Cambodia</td>
<td>7.7</td>
<td>Seng et al. [27]</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>6.7</td>
<td>Pappas et al. [20]</td>
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<tr>
<td>Hawaii</td>
<td>3.3</td>
<td>Ellis et al. [28]</td>
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<tr>
<td>Cuba</td>
<td>2.5</td>
<td>Pappas et al. [20]</td>
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<td>Argentina</td>
<td>1.0</td>
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<tr>
<td>Italy</td>
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<td>Ciceroni et al. [29]</td>
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<tr>
<td>Germany</td>
<td>0.06</td>
<td>Jansen et al. [30]</td>
</tr>
<tr>
<td>Israel</td>
<td>0.05</td>
<td>Kariv et al. [31]</td>
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LEPTOSPIROSIS IN MALAYSIA
Leptospirosis in “Eco-Challenge” Athletes, Malaysian Borneo, 2000

James Sejvar,* Elizabeth Bancroft,*† Kevin Winthrop,*† Julie Bettinger,* Mary Bajani,*
Sarah Bragg,* Kathleen Shutt,* Robyn Kaiser,* Nina Marano,* Tanja Popovic,* Jordan Tappero,*
David Ashford,* Laurene Mascola,† Duc Vugia,† Bradley Perkins,* Nancy Rosenstein,*
and the Eco-Challenge Investigation Team†

88 cases from 189 (42%) contacted from 26 countries. 29 hospitalized but no death
Harian Metro 16 Mei 2009

Malay Mail, 18 Mac 1995

The Star 9 Ogos 2010

The Star 28 Julai 2010

Liow: Report cases of bacterial infection to ministry
At the 18 Mac 1995, a volunteer in a search and rescue operation at Lubuk Yu in Maran, Pahang, Mohd Fadzil Hassan, 40, died in Selangor Hospital of complications related to the bacterial infection. He was the eighth person to die of the infection in Pahang. Another man, a state Health department officer, died when he was infected with leptospirosis. He had been in contact with dead rats, which has remained tempo-
cases had been recorded this year, with 93 deaths, the latest victim being from Selangor.

"Dengue cases have reached an alarming level I hope the public will cooperate with us to help prevent the spread of the disease. There are no harm in getting the notification to the ministry would work with schools to create more awareness among students. This will allow health officers to give talks on dengue to students and the community to prevent its spread," he said.

Harian Metro 15 Mei 2009

Satu lagi mati akibat leptospirosis


"Kematian itu adalah daripada 23 kes yang dirawat di dua hospi-
tial, katanya dalam kaitan kematian ini, semalam.

Sementara itu, seramai 12 lagi pendatang tanpa zn yang di-
tahapkan di Hospital Tahanan Juru dekat sini, dimasukkan ke Hos-
tial Bukit Mertajam (HBM) se-
lepas dikesan mengalami sim-
ptom penyakit leptospirosis.

Infeksi pembasut menyebabkan seorang manokan dan seorang wanita di Hospital Tahanan Juru, Jalan Kedah, Kepala Hulu, di Hospital Rubiah, Penang, dan di Hospital Raja Permaisuri Agong, Lembah Pantai, sebelah selatan, dimasukkan ke hospital.

FIREMAN IN LUBUK YU OPERATION DIES

By ROSLINA MOHAMAD
roslinam@thestar.com.my

KUARAN: A 45-year-old fireman personnel involved in the search and rescue operation in Lubuk Yu in Maran last month has been admitted to the seventh person in Pahang to die from leptospirosis.

Mohd Nor Abdullah Ismail, 51, who had the leprosy and recurrent infection was infected with two different bacteria, namely leptospirosis, which causes a tetanus-fever syndrome and meningitis, he died at Sultan Haji Ahmad Shah Hospital in Temerloh at 8.30am today. He was born in 1959 and had been married for 15 years.

He was married with seven children.

The Star 28 Julai 2010

Malaysia is now a patient of a new drug being developed to treat the Leptospirosis epidemic, the state's health minister said today.

Mr Danyal expressed concern at the risk of spreading the disease, which has caused 13 deaths in Pahang and 92 cases in Selangor, and warned the public not to take any risks.

"The disease is not spread through direct contact with infected animals, but through contaminated water or soil, which can carry the bacteria," he said.

The Star 28 Julai 2010

Health Minister Datin Sri Law Liew Tiong Lee said the state government is working with the state health department to curb the outbreak.

"Health officers are being deployed to affected areas to provide first aid and medical treatment for sick people," he said.

"We are also working with local councils to provide disinfectant to clean up affected areas," he added.
Lubuk Yu incident emphasises need for hygiene and cleanliness

BY ROSLINA MOHAMAD
rosina@thestar.com.my

The Star online 29 Dec 2010

Metro YEARENDER 2010

THE Lubuk Yu recreational forest in Maran was just one of the natural attractions tucked in the middle of Pahang.

This place is not as popular as its big sister in Taman Negara, Jerantut.

As a matter of fact, little is known about the existence of this waterfall and its rapids.

Pelajar kritikal disyaki dijangkuti kencing tikus

KANGAR 2 Jan. - Seorang pelajar kritikal dihospitalisasi kerana dijangkuti kencing tikus atau leptospirosis selepas dilekatkan di Taman Perdana di Padang Peranakan.

Kepala Khabar di Kangar, En. Riza, menjakartakan kepergian pelajar itu selepas dia dilekatkan di bawah penjagaan rapidasan dan kemudian memasuki hospital.

Riza, 19 tahun, tidak berkata semula kebimbangannya pada tatkah berkenaan, pelajar berkenan sudah kritikal berkenan mengalami demam panas dan mabuk.

Bagaimanapun, katanya, pengetahuan mereka tentang gejala dan tanda penyakit tersebut dalam tempoh dua minggu lagi.

"Ini kemana kami baru menerima laporan daripada pelajar itu untuk jujuran maut di institut penyakit pada 29 Disember," katanya.

Resort tercemar virus kencing tikus ditutup

KAMPONG SKC Jaya, 25 Julai - Seorang pemandu, Mohd Salleh Mamat berkata, resort yang bersempadan dengan komuniti penduduk di Kampung SKC Jaya itu ditutup selepas empat berasal dari sana dikesan positive virus kencing tikus.

"Kita memastikan berasal dari Kampung SKC Jaya akan diketuk doktor dan dijangkuti virus kencing tikus," katanya.

Utusan Malaysia 3 Jan 2013

Harian Metro 7 Jan 2013

Harian Metro 25 July 2011
Outbreak of Melioidosis and Leptospirosis Co-infection Following a Rescue Operation

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¹Pahang State Health Department, ²Jengka Health Clinic, ³International Islamic University Malaysia, ⁴Hospital Sultan Haji Ahmad Shah, Temerloh, ⁵Pahang State Health Department, ⁶Institute of Medical Research, Kuala Lumpur, ⁷Disease Control Division, Ministry of Health Malaysia, ⁸International Islamic University Malaysia

SUMMARY
We analyzed the epidemiological data of all people who were involved in the search and rescue operation in Lubuk Yu, a natural recreational forest with waterfall and stream. The hospital admission records of the cases who fulfilled the case definition and the environmental samples collected at Lubuk Yu recreation area were studied. 153 people were exposed to this outbreak, 85 (55.5%) were professional rescuers from various government agencies and 68 (44.5%) were villagers. 21 fulfilled the case definition. Ten cases were confirmed with melioidosis, six melioidosis alone and four co-infected with leptospirosis. There were eight deaths in this outbreak, seven were villagers and one professional rescuer. Overall case fatality was 70%. All confirmed melioidosis cases and seven who died had diabetes mellitus. The morbidity rate were higher among the villagers, 23.5% compared to professional rescuers, 5.9%. The case fatality rate were also higher in this group which was 100% compared to 33.3% in professional rescuers. The soil and water samples in Lubuk Yu recreational area were positive for leptospira and Burkholderia pseudomallei. The presence of co-infection and co-morbidities especially diabetes mellitus among the exposed led to the high mortality in this outbreak hence a high index of suspicion is important among the healthcare professionals in the management of melioidosis cases. To avoid similar incident in future, search and rescue operation should be only conducted by professional rescuers with appropriate personal protective equipment. A register of rescuers should be maintained for surveillance and follow up if necessary.

entry of the organism into the blood stream via very minor wounds or skin abrasions. Person with underlying diabetes mellitus are more likely to develop melioidosis (20-75% of cases) ⁴⁻⁶. Leptospirosis is an infectious disease that affects humans and animals. It is considered the most common zoonotic disease in the world.⁷⁻⁹. Leptospirosis is caused by pathogenic spiral bacteria that belong to the genus Leptospira ¹⁰⁻¹². The organism enters the body when mucous membranes or abraded skin come in contact with contaminated environmental sources ¹³. The infection may cause systemic illness that sometimes leads to renal and hepatic dysfunction. Occupational exposure probably accounts for 30-50% of human cases. The main occupational groups at risk include farm workers, veterinarians, pet shop owners, field agricultural workers, abattoir workers, plumbers, meat handlers, coal miners, workers in the fishing industry, military troops, milkers, and sewer workers. Leptospirosis has also increasingly been recognized as a disease of recreation. Recreational activities that present some risk include canoeing, hiking, kayaking, fishing, windsurfing, swimming, waterskiing, wading, riding trail-bikes through puddles, white-water rafting, and other outdoor sports played in contaminated waters. Supramanium in 1979 reviewed the status of leptospirosis among the Malaysian army personnel and found that serological studies revealed a 12-22% prevalence of antibodies indicating past infection. Study of febrile cases showed that only 4.6% of fever in Malaysian soldiers were due to leptospirosis.⁴ Brown et al in 1984 studied 1629 patients with febrile illness from...
Infested with nibbling pests

Rats terrorise patients and staff in poorly-maintained hospital

The Tengku Ampuan Rahimah Hospital in Klang is rat-infested as a patient was unfortunate to have been bitten by a rodent.

The existence of rats in the hospital wards for the past few months has become a nuisance not only to patients but also to the hospital staff.

If nibbling leftover food at the wards was not enough, the hungry rats have moved on to bigger bites such as a patient’s finger.

G. Megaranathan, 34, said he was bitten by a rat while being treated at Ward 8B for stomach ailment and had lodged a report about the rat-bite incident at the Pandan Jaya police station on April 5.

Although the hospital declined to confirm that Megaranathan was bitten by a rat, an official from the hospital said he was given a tetanus toxoid jab to prevent infection.

Megaranathan said that he had sleepless nights when he was placed at Ward 8B from March 28 until April 4, because of the rats.

“The rats were running all over the place and I could hear them moving inside a wooden panel behind the railing of my bed. I only realised that I was bitten after feeling the pain on my finger and noticed the bite marks on March 30,” he said, adding that he was given an injection to relieve the pain on his finger.

Following the incident, Megaranathan said several rat traps were placed in the ward.

“How can one get bitten by a rat while being warded at a hospital? I expect high standards of cleanliness and hygiene,” said Megaranathan, adding that he was also worried that other patients may suffer the same fate at the hospital.

Another patient who only wished to be known as Mohamad, 38, said rats could be seen in the hospital wards.

He said the rodents would look for food from the rubbish bins that were placed near the beds.

“I feel very uncomfortable and the rest of the patients also feel the same,” said Mohamad, who noted that the hospital was sometimes left open.

She informed the hospital staff about the rodents and was told that they were aware of it but there was nothing they could do.

“I was also informed that the hospital staff, who are mostly females, are also uncomfortable about the situation,” said Christina. A staff had also seen rats at the cooking area in the canteen.

“It is not surprising that the rats are here because the drains and the area around the canteen is dirty,” she said.

Checks also revealed that facilities within the hospital’s overcrowded wards were not well maintained.

Some of the toilet doors had no latches and the bathroom drainage outlets are often clogged.

There were also complaints of a leaking roof on the eighth floor which resulted in wet floors at the wards on rainy days. A hospital source said the contractor who had been awarded the contract to maintain the premises had failed to carry out the work responsibly.

He said a new contractor had been appointed with effect from April 1 and the situation is expected to improve.

“The rat problem is one of the issues that the new contractor has to deal with,” he said, adding that the company was also expected to improve the overall upkeep of the wards at the hospital.
Number of Leptospirosis Cases and Deaths from 2004 until July 2015 in Malaysia

Year | Cases | Deaths
--- | --- | ---
2004 | 263 | 20
2005 | 378 | 20
2006 | 527 | 22
2007 | 949 | 22
2008 | 1,263 | 47
2009 | 1,418 | 62
2010 | 1,976 | 69
2011 | 2,268 | 55
2012 | 3,665 | 48
2013 | 4,457 | 71
2014 | 7,806 | 92
2015 | 5,370 | 30
Incidence & Mortality Rate of Leptospirosis
2004 until July 2015 (Annualised) in Malaysia
Table 1: Selected regions with reports on leptospirosis incidence in humans

<table>
<thead>
<tr>
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<td>French Polynesia</td>
<td>11</td>
<td>Pappas et al. [20]</td>
</tr>
<tr>
<td>Portugal, Azores Islands</td>
<td>11</td>
<td>Vieira et al. [26]</td>
</tr>
<tr>
<td>Cambodia</td>
<td>7.7</td>
<td>Seng et al. [27]</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>6.7</td>
<td>Pappas et al. [20]</td>
</tr>
<tr>
<td>Hawaii</td>
<td>3.3</td>
<td>Ellis et al. [28]</td>
</tr>
<tr>
<td>Cuba</td>
<td>2.5</td>
<td>Pappas et al. [20]</td>
</tr>
<tr>
<td>Argentina</td>
<td>1.0</td>
<td>Pappas et al. [20]</td>
</tr>
<tr>
<td>Italy</td>
<td>0.13</td>
<td>Ciceroni et al. [29]</td>
</tr>
<tr>
<td>Germany</td>
<td>0.06</td>
<td>Jansen et al. [30]</td>
</tr>
<tr>
<td>Israel</td>
<td>0.05</td>
<td>Kariv et al. [31]</td>
</tr>
</tbody>
</table>
Leptospirosis Cases in 5 major State 2004 until July 2015 in Malaysia

- Kelantan
- Perak
- Sabah
- Sarawak
- Selangor

Incidence Rate (IR) of Leptospirosis in 5 major State 2004 until July 2015 (Annualised IR) in Malaysia

- Kelantan
- Perak
- Sabah
- Sarawak
- Selangor
Number of Leptospirosis Cases by State until July 2015 in Malaysia

Number of Leptospirosis Deaths by State until July 2015 in Malaysia
Leptospirosis Deaths in 5 major State 2004 until July 2015 in Malaysia

- Kelantan
- Perak
- Sabah
- Sarawak
- Selangor

Mortality Rate (MR) of Leptospirosisin in 5 Major State 2004 until July 2015 (Annualised MR) in Malaysia

- Kelantan
- Perak
- Sabah
- Sarawak
- Selangor
Number of Leptospirosis Cases by State in Malaysia 2013-2014

Number of Cases

Epid Week

Perlis 20 25
WP Labuan 141 191
Melaka 288 302
P.Pinang 350 374
Pahang 387
N.Sembilan 616
WPKL 621
Terengganu 699
Johor 930
Sarawak 1030
Perak
Kedah
Sabah
Kelantan
Selangor 1832

2013 2014
Number of Leptospirosis Cases by State in Malaysia 2014-2015 (Corresponding Week : EW1 – EW30)
Incidence Rate (IR) of Leptospirosis Cases by State in Malaysia 2014 & 2015 (Annualised IR) until EW30

State | 2014 | 2015
--- | --- | ---
Perlis | 7.7 | 7.0
P. Pinang | 8.1 | 7.0
Johor | 10.7 | 9.7
Sabah | 16.4 | 19.0
WPKL | 19.9 | 22.4
Pahang | 19.0 | 25.7
Perak | 22.4 | 33.4
Selangor | 58.4 | 58.4
WP Labuan | 31.4 | 31.4
Sarawak | 33.4 | 33.4
N. Sembilan | 33.4 | 39.4
Melaka | 33.4 | 39.4
Kedah | 68.5 | 68.5
Terengganu | 33.4 | 39.4
Kelantan | 126.7 | 126.7
Distribution of Leptospirosis Cases by Gender in Malaysia 2013-2014

2013
- Male, 3205, 72%
- Female, 1252, 28%

2014
- Male, 5056, 65%
- Female, 2750, 35%
Distribution of Leptospirosis Cases by Age Group in Malaysia 2013-2014

2013
- < 1 yrs: 218 (5%)
- 1 - 6 yrs: 764 (17%)
- 7 - 18 yrs: 576 (13%)
- 19 - 24 yrs: 356 (8%)
- 25 - 60 yrs: 2532 (57%)
- > 60 yrs: 11 (0%)

2014
- < 1 yrs: 0 (0%)
- 1 - 6 yrs: 1466 (19%)
- 7 - 18 yrs: 454 (6%)
- 19 - 24 yrs: 763 (10%)
- 25 - 60 yrs: 4098 (52%)
- > 60 yrs: 1025 (13%)

Legend:
- Blue: < 1 yrs
- Dark Blue: 1 - 6 yrs
- Orange: 7 - 18 yrs
- Green: 19 - 24 yrs
- Yellow: 25 - 60 yrs
- Red: > 60 yrs
Distribution of Leptospirosis Cases by Occupation in Malaysia 2013-2014

- **2013**
  - Self employed: 32%
  - Firemen: 7%
  - Laborer: 10%
  - Health Care Worker: 12%
  - Technician/Engineer: 11%
  - Others: 6%
  - Government Servant: 0%
  - Private Sector: 2%
  - Student: 0%
  - Transportation: 1%
  - Food Handler: 1%
  - Industrial: 1%
  - Management: 1%
  - Farming: 0%
  - Agriculture: 0%
  - Unknown: 2%
  - Jobless: 1%

- **2014**
  - Self employed: 46%
  - Firemen: 9%
  - Laborer: 8%
  - Health Care Worker: 0%
  - Technician/Engineer: 2%
  - Others: 10%
  - Government Servant: 1%
  - Private Sector: 2%
  - Student: 1%
  - Transportation: 1%
  - Food Handler: 1%
  - Industrial: 2%
  - Management: 1%
  - Farming: 2%
  - Agriculture: 0%
  - Unknown: 1%
  - Jobless: 0%
# SITUATION OF LEPTOSPIROSIS IN MALAYSIA 2015

( until July, Epid Week (EW) 30/2015 )

<table>
<thead>
<tr>
<th>Particular</th>
<th>Number of Cases</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Total Cases (Cumulative)</td>
<td>5,370</td>
<td>Malaysia [ 3,829 (2014) ] – increasing 40%</td>
</tr>
<tr>
<td>3. Total Deaths (Cumulative)</td>
<td>30</td>
<td>All States not included Perlis, Terengganu and WP Labuan</td>
</tr>
<tr>
<td>5. Total Outbreaks (Cumulative)</td>
<td>14 (9 States)</td>
<td>Selangor (2) /Sarawak (2) /N. Sembilan (2) /WPKL (2) /Perak (1) /Kedah (2) /Terengganu (1) /Kelantan (1) /Sabah (1)</td>
</tr>
<tr>
<td>6. Number of Outbreak Cases</td>
<td>86</td>
<td>Selangor (14)/Sarawak (15) /N. Sembilan (17) /WPKL (20) /Perak (3) /Kedah (5) /Terengganu (3) /Kelantan (2) /Sabah (7)</td>
</tr>
</tbody>
</table>
Trend of Leptospirosis in Malaysia
2011 - July, EW30/2015

Number of Cases

Epid Week

2011 2012 2013 2014 2015
Trend of Leptospirosis in Malaysia

2014 - July, EW30/2015

Number of Cases

Epid Week

Median (2011-2014)
Trend of Leptospirosis in Malaysia
2014 - July, EW30/2015

Number of cases

Epid Week

2014 2015 Mean Alert Threshold Epidemic Threshold
Trend of Leptospirosis in Malaysia
2014 - July, EW30/2015
### Number of Leptospirosis Outbreak and Cases 2014 in Malaysia

<table>
<thead>
<tr>
<th>State</th>
<th>2014</th>
<th>Num.of Outbreak</th>
<th>Cases</th>
<th>2015</th>
<th>NNum.of Outbreak</th>
</tr>
</thead>
<tbody>
<tr>
<td>Johor</td>
<td>29</td>
<td>3</td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Kedah</td>
<td>9</td>
<td>4</td>
<td>5</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Kelantan</td>
<td>14</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>N.Sembilan</td>
<td>6</td>
<td>2</td>
<td>17</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Perak</td>
<td>31</td>
<td>8</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Sabah</td>
<td>10</td>
<td>4</td>
<td>7</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Sarawak</td>
<td>7</td>
<td>3</td>
<td>15</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Selangor</td>
<td>96</td>
<td>5</td>
<td>14</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>WP. Labuan</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>WPKL</td>
<td>64</td>
<td>6</td>
<td>20</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Terengganu</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>269</td>
<td>41</td>
<td>86</td>
<td>14</td>
<td></td>
</tr>
</tbody>
</table>

### Number of Leptospirosis Outbreak and Cases until July, 2015 in Malaysia

![Graph showing the number of leptospirosis cases and outbreaks in Malaysia from 2014 to 2015.](image)
Distribution of Areas of Leptospirosis Outbreak in Malaysia 2014 & 2015 (until July, EW 30/2015)

2014
- Residential areas, 15, 37%
- Recreation areas, 13, 32%
- Forest Reserve, 7, 17%
- Farm, 2, 5%
- Chalet, 1, 2%
- Hostel, 3, 7%

2015
- Residential areas, 6, 43%
- Recreation areas, 3, 22%
- Depo Prisoners, 3, 21%
- Forest Reserve, 1, 7%
- Port, 1, 7%
Prevention & Control (involving local authority)

Prevention and control should be targeted at:

(a) The infection source;
(b) The route of transmission between the infection source and the human host;
(c) Prompt and proper treatment of infection

AND:

(d) Surveillance
(d) Prophylaxis, ? Vaccination
(e) Risk communication, awareness & collaboration
Prevention & Control (involving local authority)

(a) Reduce the infection source:
- Reduce rodent population using rodenticide or mechanical trapping and Biological mean
- Use rodent-proof material to cover food storage
- Scheduled & proper garbage disposal to eliminate food for rodent in surrounding human habitation
- Unclogged drain to deny rodent of shelter, food & water
- Maintain environmental sanitation i.e. housing areas and recreational parks by regular cleaning
- Food premises inspection & rating. Closure of unhygienic eating places (cover ready-to-eat-food, proper disposal of left over food.
Prevention & Control (involving local authority)

(b) The route of transmission between the infection source and the human host:

• Avoid contact with potential contaminated water such as stagnated water / drain: ablution, washing
• Apply water proof plasters for wound before coming into contact with water
• Avoid unnecessary contact with flood water
• Wear rubber boots, glove for high risk occupation (abattoir, sewerage workers)
• Prohibit use or closure of contaminated water bodies until risk assessment has been conducted and control measures have been instituted and found to be effective. Reopening of affected area can only be carried out after reassessment has shown that the risk has been controlled effectively.
(c) Prompt and proper treatment of infection.
Advise people who have been exposed to possible contaminated water source either through occupation or recreational activities to wash themselves with clean water and seek immediate medical treatment if developed symptoms within the incubation period.
Prevention & Control (involving local authority)

(d) Surveillance

- Preventive measures must be based on knowledge of the groups at particular risk of infection and the local epidemiological factors.
- Data verified & registered in e-Notifikasi
- Investigation to identify the probable source of infection – to take environmental sample where ever is appropriate for evidence (i.e. water, rodent, soil etc)
- Identified risk factor must be recorded in ‘comment’ column in e-Notifikasi
- Analyze the data from e-Notifikasi
- Strategized control & preventive measures.
Prevention & Control (involving local authority)

(d) Prophylaxis, ? Vaccination
   – Get prophylaxis for people with short term of exposure i.e. soldier conducting jungle operation

(e) Risk communication, awareness & collaboration
   – Create awareness about the disease and its prevention: health staff & public and recreational park operators using various media
   – Promote interagency collaboration such as with local authorities, Wildlife Department, Department of Veterinary Services, JLKN, etc. to maintain cleanliness in the respective environmental settings, especially rodent control
LEPTOSPIROSIS
(Penyakit Kencing Tikus)

- Jaga kebersihan kawasan tempat rekreasi atau berkelah
- Buang sampah sarap dan sisa makanan secara sempurna
- Basuh tangan dan kaki dengan air dan sabun selepas aktiviti rekreasi air
LEPTOSPIROSIS

PENGENALAN

- Leptospirosis ialah sejenis penyakit yang berjangkit daripada haiwan kepada manusia (penyakit zoonosis)

- Penyakit ini disebabkan oleh bakteria Leptospira

CARA DAN PUNCA JANGKITAN

- Bakteria ini terdapat di dalam air kencing haiwan yang terjangkit seperti tikus, kucing, anjing, lembu, kambing, babi, kuda dan haiwan liar yang lain

- Manusia boleh dijangkit apabila terdedah kepada air, makanan atau tanah lembab yang dicemari dengan air kencing haiwan yang mengandungi bakteria Leptospira

- Bakteria Leptospira juga boleh memasuki tubuh manusia melalui luka atau kudis di kulit dan lapisan Mukosa seperti selaput mata dan lapisan dalam mulut

TANDA DAN GEJALA

Tanda dan gejala muncul dalam tempoh 2-10 hari (adakahnya sehingga 30 hari) dari masa terdedah kepada jangkitan.

Antara tanda dan gejala tersebut adalah:

- Demam yang tinggi
- Sakit kepala
- Menggigit (chills)
- Sakit otot
- Muntah
- Jaundik (penyakit kuning)
- Radang mata
- Sakit perut
- Ciri-ciri: biri-biri
- Batuk
- Ruam di kulit

RAWATAN

Penyakit ini boleh dirawat dengan menggunakan antibiotik. Rawatan awal dengan antibiotik dapat mengelakkan komplikasi dan kematian.

SEGERA DAPATKAN RAWATAN jika mengalami tanda dan gejala penyakit ini dalam tempoh 2 minggu selepas mengunjungi tempat-tempat rekreasi atau berkelah.

GOLONGAN BERISIKO

- Pengunjung tempat rekreasi atau berkelah
- Pemburu
- Peserta aktiviti lasak / rekreasi luar (di sungai, tasik dan hutan)
- Petani / pesawat / peladang
- Penternak
- Pekerja veterinar
- Pekerja penyelenggaraan perbaratan dan pembetungan
- Pekerja dan pelanggan premis makanan yang kotor

Bahagian Kawalan Penyakit
Kementerian Kesihatan Malaysia
Cegah Leptospirosis

AMARAN!
RISIKO KESIHATAN

RISIKO PENYAKIT BERJANGKIT
SUNGAI, KOLAM, AIR TERJUN DAN LUMPUR MUNGKIN DICEMARI BAKTERIA ATAU VIRUS ATAU PARASIT JANGAN MINUM AIR YANG TIDAK DIMASAK ATAU DIRAWAT
ELAKKAN BERENANG ATAU BERMAIN AIR SEKIRANYA ANDA LUKA ATAU ADA PENYAKIT KULIT BERENANG ATAU BERMAIN AIR ATAS RISIKO SENDIRI DAPATKAN RAWATAN SEKIRANYA TIDAK SIHAT DALAM TEMPOH 2 MINGGU DARI SEKARANG JAGA KEBERSIHAN PERSEKITARAN. PERSEKITARAN YANG KOTOR MENGUNDANG KEHADIRAN PERUMAH HAIWAN YANG MENINGKATKAN RISIKO PENCEMARAN KUMAN UNTUK MAKLUMAT LANJUT, HUBUNGI: PEJABAT KESIHATAN DAERAH BERHAMPIRAN

SEGERA DAPATKAN RAWATAN

Jika mengalami demam yang tinggi dengan SALAH SATU daripada yang berikut: sakit kepala, menggigil (chills), sakit otot-otot, tenatramanya bahagian belakang (calf pain), loya dan muntah, sakit di bahagian abdomen, cint-birit, radang mata (conjuntival suffusion), jaundice (kuningan pada selep atau kulit), batuk dan/atau ruam di kulit dalam dua minggu selepas mengunjungi tempat-tempat rekreasi atau berkelaah.
SEPERTI SENARAI EDARAN

Y.Bhg. Datuk/Dato’/Datín/Tuan/Puan,

SURAT PEKELILING KETUA PENGARAH KESIHATAN MALAYSIA BIL. 16/2012:

LANGKAH-LANGKAH PENAMBHAIBAUN BAGI MENURUNKAN RISIKO KEJADIAN PENYAKIT LEPTOSPIROSIS DI KALANGAN PELATIHAN KELANTAN KDNM (PLKN)

1. TUJUAN

Memaklumkan langkah-langkah penambahaibaan yang perlu dilaksanakan bagi mengurangkan risiko kejadian penyakit leptospirosis di kalangan pelatih Program Latihan Khidmat Negara (PLKN) yang terlibat dalam aktiviti-air dalam PLKN.

2. LATAR BELAKANG

Kementerian Kesihatan Malaysia telah menerbitkan Garis Panduan Pemeriksaan Kesihatan Persekitaran Kem PLKN Jabatan Latihan Khidmat Negara (ULKN) pada tahun 2008 untuk menilai risiko penyakit di kom PLKN termasuk penyakit leptospirosis. Berikut laporan beberapa kejadian kes leptospirosis yang berlaku di kom PLKN, langkah-langkah penambahaibaan seperti arahan penutupan kolam aktiviti air dan pemeriksaan kesihatan pelatih sebelum dan selepas aktiviti air perlu dilaksanakan untuk meminimkan risiko jangkitan penyakit leptospirosis kepada pelatih PLKN.

UNTUK TINDAKAN SEGERA

Ruj. tuan : KOM 87/P1/19/3 J.d. 4 (5)
Ruj. kami : KOM 87/P1/19/3 J.d. 4 (5)
Tarikh : 15 Ogos 2012

Dengan segala hormatnya, saya merujuk kepada perkara tersebut di atas.

2. Untuk makluman pihak Y.Bhg. Datuk/Dato’/Datín/Tuan/Puan, pihak KKM telah menerima beberapa aduan berkenaan dengan kecualan pengurusan pesakit dari kalangan pelatih Pusat Latihan Khidmat Negara (PLKN) yang telah datang mendapatkan rawatan di fasiliti-fasiliti KKM. Kecualan sebegini sewajarnya dapat diselidik dari berlaku pada masa akan datang.

3. Seperti yang kita sedes maklum, pelatih-pelatih PLKN adalah terdedah kepada jangkitan peibga penyakit berjangkit semasa tempoh latihan dan ada di antaranya yang membaik kepada kematian. Salah satu langkah yang perlu diambil oleh pihak KKM adalah memastikan kesemua pegawai-pegawai perubatan yang bertugas di hospital KKM diberi latihan penekanan tentang pengurusan dan rawatan penyakit-terkait berjangkit kelebihan Leptospirosis dan demam dengan. Latihan berterusan untuk update terkini ini amat kritikal terutamanya kepada pegawai-pegawai perubatan yang bertugas di hospital minor dengan pakar dan hospital lapa pakar yang terletak berdekatan dengan mana-mana Pusat Latihan Khidmat Negara.

GUIDELINES FOR
THE DIAGNOSIS, MANAGEMENT, PREVENTION
AND CONTROL OF LEPTOSPIROSIS
IN MALAYSIA

Published By:
DISEASE CONTROL DIVISION
DEPARTMENT OF PUBLIC HEALTH
MINISTRY OF HEALTH, MALAYSIA
2012
Prevention

Prevention is difficult due to wild animal infection

Good sanitation, Immunization of live stock

Personal hygiene, PPE, Water treatment

No useful human vaccines – multiple serovars

Doxycycline 200 mg weekly for at risk groups
Guidelines and References

- MOH. Guidelines For The Diagnosis, Management, Prevention And Control Of Leptospirosis In Malaysia. 2011
- Surat Pekeliling Ketua Pengarah Kesihatan Malaysia Bil. 16/2012 : Langkah-langkah Penambahbaikan Bagi Mengurangakan Risiko kejadian Penyakit leptospirosis Di Kalangan Pelatih Program PLKN
Challenges of Leptospirosis Re-emerging Infection

• Awareness
• Early & accurate diagnosis
• Prompt treatment
• Prevention and control measures
• Laboratory capacity building
• Multiagency cooperation & collaboration
The Way Forward

- Providing continue awareness for healthcare personnel and public: In service training, guidelines, seminar, media, articles etc
- Strengthening lab capacity
- Sharing of surveillance information
- Coordinated response
- ‘One Health’ approach – bridging of the medical, veterinary professionals and related agencies in the control and prevention of leptospirosis (early & prompt treatment, livestock's farms, garbage disposal, institutional hygiene, recreational areas sanitation and research)
Conclusion

• Leptospirosis is an important re-emerging zoonosis as a result of interface between human and animal (environment).
• Awareness, control & protective measures, early detection and prompt treatment are the keys to reducing the morbidity & mortality risks from Leptospirosis.
• Way forward through the scope of the One Health approach of collaboration and continued core capacity building.
Thank You