



# **Leptospirosis situation in the WHO South-East Asia Region**

Leptospirosis is an emerging zoonotic disease of public health importance in countries of the World Health Organization's South-East Asia (SEA) Region. It is caused by a bacteria called spirochete, and is transmitted by the urine of an infected animal. It is contagious in a moist environment. Although rats, mice and other rodents are important primary hosts, a wide range of other mammals including dogs, deer, rabbits, cattle, buffaloes, sheep, and pigs also carry and transmit the disease as secondary hosts. Humans get infected through skin contact with water or soil containing urine from infected animals or consuming contaminated food or water. The disease is not known to be spread from human to human.

Leptospirosis is still widely overlooked and underreported. One of the possible reasons for this is that the clinical features are non-specific, with signs and symptoms similar to those seen in many other infectious diseases, such as influenza-like illness, headache, muscle and abdominal pain. Furthermore, confirmation of leptospirosis requires laboratory tests that are not always available and rapid diagnostic tests are not reliable.

## Burden of disease

The annual incidence of leptospirosis is estimated from 0.1–1 per 100,000 in temperate climates to 10–100 per 100 000 in the humid tropics. A disease incidence of more than 100 per 100 000 is encountered during outbreaks and in high-exposure risk groups (1).

Most countries in the SEA region are endemic for leptospirosis. The incidence of leptospirosis is often influenced by various socio-cultural, occupational, behavioural and environmental factors. The risk is higher in rural areas where the animals are present in large numbers and the population is mainly involved in agriculture or animal husbandry. The eleven countries in the SEA region together have a population of over 1.7 billion and a work force of about 774 million with more than 447 million people engaged in agriculture.

Seasonal outbreaks have been reported in northern Thailand and Gujarat state of India following heavy rainfall and flooding. Major outbreaks in South-East Asia were reported in the past due to cyclone in Orrisa (1999), flooding in Jakarta (2002), Mumbai (2005) and in Sri Lanka (2008). Leptospirosis is known to be a possible cause of acute pyrexia of unknown origin (PUO) after flooding and most PUO cases are not further investigated.

## Disease situation

The epidemiological characteristics of leptospirosis in major endemic countries of the South-East Asia Region are presented in Table 1. A summary of leptospirosis situation is as follows;

### India

Leptospirosis has been a significant problem in low lying areas of India that are densely populated and prone to flooding and water stagnation during monsoon. The outbreaks of leptospirosis are increasingly been reported from Kerala, Gujarat, Tamil Nadu and Karnataka. Cases have been reported from Goa, Andhra Pradesh and Assam (2). Interestingly it is prevalent predominantly in coastal region. Possibly the 'restrictions' to coastal regions is correlated with the presence of semi domestic rats causing severe leptospirosis.

The Government of India has launched a pilot project on control of leptospirosis in Gujarat and Kerala. The main objective of the project is to reduce morbidity and mortality due to leptospirosis. WHO has been working closely with the national health authority and Regional Medical Research Centre Port Blair to develop guidelines, assess the quality of commercially available test kits and organize workshops to disseminate scientific information among medical and public health professionals.

### Indonesia

Leptospirosis probably poses a severe and strongly underestimated continuous health problem in Indonesia. In 2001, 139 human serum samples were tested out of which 18.7% were positive, predominantly presumptive serovar bataviae infections (3). In the wake of massive floodings in Indonesia in January 2002, a leptospirosis outbreak occurred, notably in Jakarta. Serosurvey carried out in animals during the flooding in 2002 showed that high seropositivity rates among potential domestic infection reservoirs such as cat, dog and cattle, and thus high infection risks. There is an increase in number of reported human cases since 2006. There were 667 reported human cases in 2007, 93% of which were laboratory confirmed. The case fatality rate was eight per cent.

### Sri Lanka

Leptospirosis is one of the notifiable diseases in Sri Lanka. It is endemic in many parts of Sri Lanka and occurs throughout the year. The disease is prevalent in rural areas. Paddy cultivation takes place in most of the endemic areas and the peak incidence is associated with the paddy

harvesting seasons. Majority of the patients (59%) were exposed in the paddy fields, indicating occupational exposures among the farmers (4). Most of the cases were in the age group of 20-44 years (60.8%). Male to female ratio is 9:1 which reveals high vulnerability among males due to activities in outdoor settings. The case fatality rate is less than 4%.

Sentinel site surveillance has been started in 2004 in order to strengthen prevention and control strategies in affected areas. These sentinel sites report more than 50% of total reported cases.

There has been a gradual increase of the number of cases with 167 in 1991 up to about 2198 cases in 2007 followed by the marked increase of 7000 cases in 2008. Based on the notification of suspected cases, the incidence of leptospirosis in Sri Lanka in 2008 is 35.7 per 100,000 population.

Large number of cases has been reported in 2007-2008. Heavy rain was observed and large area was flooded. Potential factors that may have contributed to the epidemic are the re-use of abandoned land mainly for paddy cultivation and the new recommendation of the Ministry of Agriculture to use paddy straw as fertilizer. It is important to note that paddy straws were burnt before 2007. The paddy straw is an excellent hiding and breeding place for rodents. When spreading the fertilized straw on the paddy field, also the leptospires are spread.

WHO has been providing technical support to Government of Sri Lanka in outbreak investigation and strengthening of laboratory based surveillance system including human resource development.

## Thailand

Leptospirosis is an emerging health problem in Thailand, with dramatic increases in reported incidence since 1996.

Data from disease notification reports indicated a drastically increase in leptospirosis cases between 1995 and 2003, with a peak in 2000. There was an increase in the incidence rate from less than 0.3 per 100,000 in 1995 to 23.7 in 2000, with a drop in subsequent years (5). High morbidity of leptospirosis has been reported from provinces situated in the lower part of the Northeast region. Most infections occur in agricultural workers, primarily rice producers. The main risk factor of this disease is the bare-footed human activity during daily work in rice fields. Outbreaks of leptospirosis correspond with the rainy season, with an increase in cases beginning in August and decreasing in November.

As of December 1, 2008, a total 3350 cases have been reported with 59 deaths from 71 provinces out of 76 during 48 weeks in 2008. The overall incidence rate is 5.3 per 100,000 population and male to female ratio is 1:0.25.

## Other countries

Sero survey in a rural flood prone district of **Bangladesh** in 1994 has showed 38% seropositivity in 89 samples of human sera tested (6). The study concluded that rural people in Bangladesh are at high risk to leptospiral infection.

There are no published human leptospirosis data for **Bhutan**. However, suspected leptospirosis human cases have been reported from Chukha district during summer season after flooding in 2008. The National Center for Animal Health has detected leptospirosis cases among pigs based on positive serology.

**The Maldives** reported their first confirmed case of human leptospirosis in November 2000. Since then, the disease is under national surveillance.

A number of serological studies carried out in **Nepal** during the last decade showed the presence of antibodies against major *Leptospira* spp. prevalent in Asia (7,8,9). Nepal has reported leptospirosis cases based clinical observation and results of rapid diagnostic tests in 2009 and 2010.

In **Myanmar**, veterinary investigations have reported the presence of leptospirosis in the animal population while data for human leptospiral cases are not available.

Suspected clinical case of leptospirosis was reported during flooding season in **Timor-Leste** in 2006 but it could not be confirmed.

There are no published human leptospirosis data for **Democratic Peoples Republic of Korea**.

## Regional initiative for leptospirosis risk reduction

The current trend of leptospirosis outbreaks in endemic countries indicate that geographical spread as well as epidemics will increase in coming years. Control of leptospirosis is complicated due to existence of large number of serovars, the large number of infection sources and the wide difference in transmission conditions. Despite identification of risk factors for leptospirosis in many countries, control strategies are lacking. It is time to prepare ourselves for leptospirosis risk reduction and control rather than waiting for disaster during epidemics.

WHO SEARO organized an informal regional expert consultation on leptospirosis surveillance, diagnosis and risk reduction in Chennai from 17-18 October 2009. The conclusions and recommendations have been presented separately.

## References

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Table 1: Epidemiology of Leptospirosis in high endemic countries of the South-East Asia Region

Countries	Number (2008) of		Incidence per 100,000 population	Age group affected	Male to female ratio	Major affected areas	Main outbreak season	Principal reservoirs	Major serovars	Risk groups
	Cases	Deaths								
India	7438	589	5.6 - 50 (Estimation based on International Leptospirosis Society, 2000)	15-24 (18%) 25-34 (24%) 35-44 (30%) 45-64 (23%) (2007 sample data)	4:01 (2007)	Andamans, Kerala, Gujarat, Tamil Nadu, Maharastra and Karnataka	October to November	Rodents, pigs, cattle, bandicoots, dogs	icterohaemorrhagiae, Co-penhageni autumnalis, canicola, pyrogenes, grippityphosa, australis, sejroe, javanica, louisiana, pomona, valbuzzi	Agriculture workers (83%), farm workers (7%), cattle handler, sewage workers, laborers
Indonesia	269	7	1.2 Semarang (Estimation based on ILS, 2000)	N/A	N/A	Jakarta, East Java, Central Java, West Java, Yogyakarta, South Sulawesi	Rainy season	Rodents, cat, dog, cattle	bataviae, hardjo	Paddy farmers
Thailand	4155	75	20-42.6 (2008)	N/A	3:01	Buriram, Kalasin, Loei, Sri Sa ket, Surin, Na Thammarat Khon Sri, Udonthani	July to October	Rodents, bandicoots, cattle, buffalo, pigs	icterohaemorrhagiae, grippityphosa, autumnalis, hebdomatilis, ranarum, pyrogenes, australis, javanica, sejroe, bratslava, pomona	Paddy farmer, rat hunter and canal dredger
Sri Lanka	7099	207	35.7-150 (2008)	20-44 years (60.8%)	9:01	Colombo, Matale, Gampaha, Ratnapura, Kandy, Kalutara, Kegalle	January-March, June-October	Rodents, cattle, buffalo, dogs	icterohaemorrhagiae, grippityphosa, autumnalis, canicola, australis, javanica, sejroe, louisiana, pyrogenes, hardjo, hebdomatilis	Paddy farmers (59%), laborers, others