

# Study of Leptospirosis outbreak in Sri Lanka In Kurunagala District -2008



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## **Introduction**

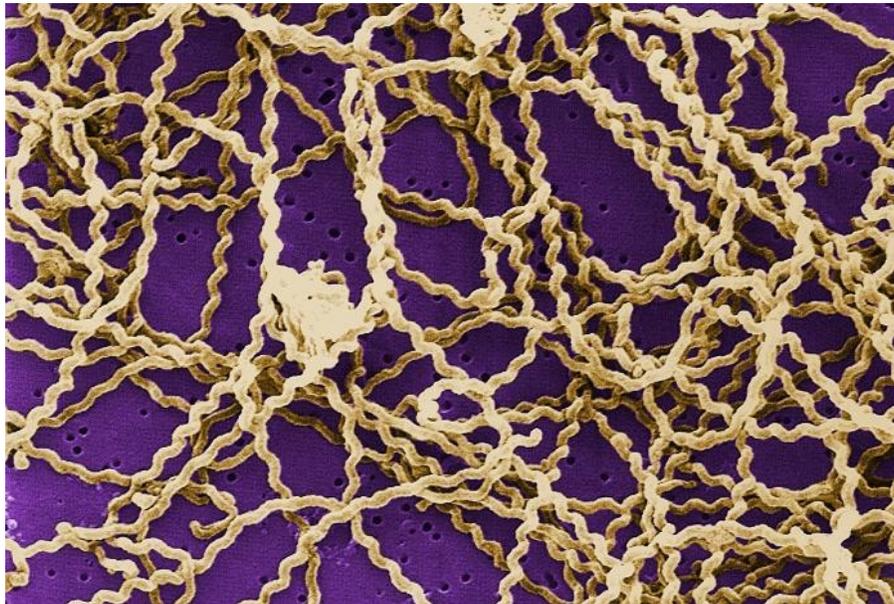
In the year 2008 bringing forth a large number of casualties in Sri Lanka Leptospirosis spread ranging a public fear.

This spread in large numbers of in the districts of Colombo, Gampaha, Matale, and Kurunegala. Epidemiology unit, Ministry of Health care and Nutrition in Sri Lanka has done research work and took urgent preventive action to control the incidence.

This report is about the incidence of Leptospirosis in the Kurunegala District in the year 2008, reporting 22 unfortunate casualties, causing misery to rural villages.

### Definition of Leptospirosis:

Leptospirosis (Also known as Weil's disease, Weil's Syndrome, 7 Day Fever, and Rat Fever) is an infectious disease caused by a particular type of Bacteria called a Spirochete of the genus *Leptospira* that affects humans and a wide range of animals, including mammals, birds, amphibians and reptiles.



Scanning electron microscope of a number of *Leptospira* sp. bacteria atop a 0.1  $\mu\text{m}$  polycarbonate filter

### History:

Leptospirosis 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.

### Occurrence in Sri Lanka:

Human Leptospirosis was first described in Sri Lanka in the year 1953 though Leptospirosis has been known to occur in the Indian Subcontinent for the last one hundred years.

The majority of cases were reported from Ratnapura (Sabaragamuwa Province), then Ragama, Colombo, and Kalutara (Western Province), Matara (Southern Province) to a

lesser degree from Kandy and Matale (Central Province) and Anuradhapura (North central Province). It is recorded that reporting varied from time to time and place to place depending on the clinician working in that place.

In 1959 the first *Leptospira* *L. icterohaemorrhagiae* was isolated from the blood of a patient in Colombo and soon after from the kidney of a sewer rat trapped in the vicinity of that patient's home.

### **Occurrence in nature:**

Leptospirosis occurs worldwide but is most common in tropical and subtropical areas. These Leptospirosis species are maintained in nature in the kidneys of certain animals such as rodents, live stock, canines, and wild mammals. (Rats, mice, dogs, deer, rabbits, hedgehogs, cows, sheep, raccoons, opossums, skunks, foxes, and even certain marine mammals)

### **Transmission:**

These organisms are transmitted directly or indirectly from animals to humans i.e. zoonosis. The disease is not known to be spread from person to person and cases of bacterial dissemination in convalescence are extremely rare in humans.

Humans become infected through contact with water, food, or soil containing urine from these infected animals. This may happen by swallowing contaminated food or water or through skin contact. *Leptospira* – contaminated environment caused by, for example, local agricultural practices and poor housing and waste disposal give rise to many sources of infection. *Leptospire*s enter to body through abraded or traumatized skin, or nasal, oral or eye mucous membranes. Ingestion of contaminated water can also lead to infection. After infection, they enter the blood and invade practically all tissues and organs.

### **Incubation Period:**

Symptoms normally appear within 5 – 14 days following exposure to the germ. The range is between 2 – 30 days.

## Symptoms:

Leptospirosis may present with a wide variety of clinical manifestations. These may range from a mild flu – like illness to a serious and some time fatal disease.

The illness typically progress through two phases.

- **The first phase** of non specific flulike symptoms includes intense **headache**, muscle aches, eye pain with bright lights, followed by **chills** and **fever**. Watering and redness of the eyes occurs and symptoms seem to improve by the 5 Th to 9 Th day.
- **The second phase** begins after a few days of feeling well. The initial symptoms recur with fever and aching with stiffness of the neck. Some patients develop serious inflammation of the nerves to the eyes, brain, spinal column (**meningitis**) or other nerves. Right upper area **abdominal pain** may occur. Less common symptoms relate to disease of the liver, lungs, kidneys, and heart.

Leptospirosis associate with liver and **kidney disease** is called Weil's Syndrome and is characterized by yellowing of the eyes (**jaundice**). Patients with Weil's Syndrome can also develop **kidney disease** and have more serious involvement of the organs affected.



**Diseased kidney affected by Leptospirosis**

## **Diagnosis:**

Knowledge of local epidemiology and varied clinical presentation, and high index of suspicion are essential to make a diagnosis. Suspicion should be further increased if there is a history of occupational or recreational exposure.

Diagnosis of Leptospirosis is confirmed with tests such as Enzyme – Linked Immunosorbent Assay (ELISA) and PRC. Serological testing, the MAT (Microscopic Agglutination Test) is considered the gold strand in diagnosis Leptospirosis.

However, simple investigation like urine full report (albumin+) and white blood cells/ differential count (polymorpholeucocystosis) would help the clinicians to make a probable diagnosis and also to decide on the need for hospital admission. For epidemiological and public health reasons also laboratory support is important. Identifying serovars (serotype) is costly, time consuming and the results are not likely to affect treatment of an individual patient. However, the resulting information is useful in investigation its source/ potential reservoir, and planning and evaluating interventions.

## **Treatments:**

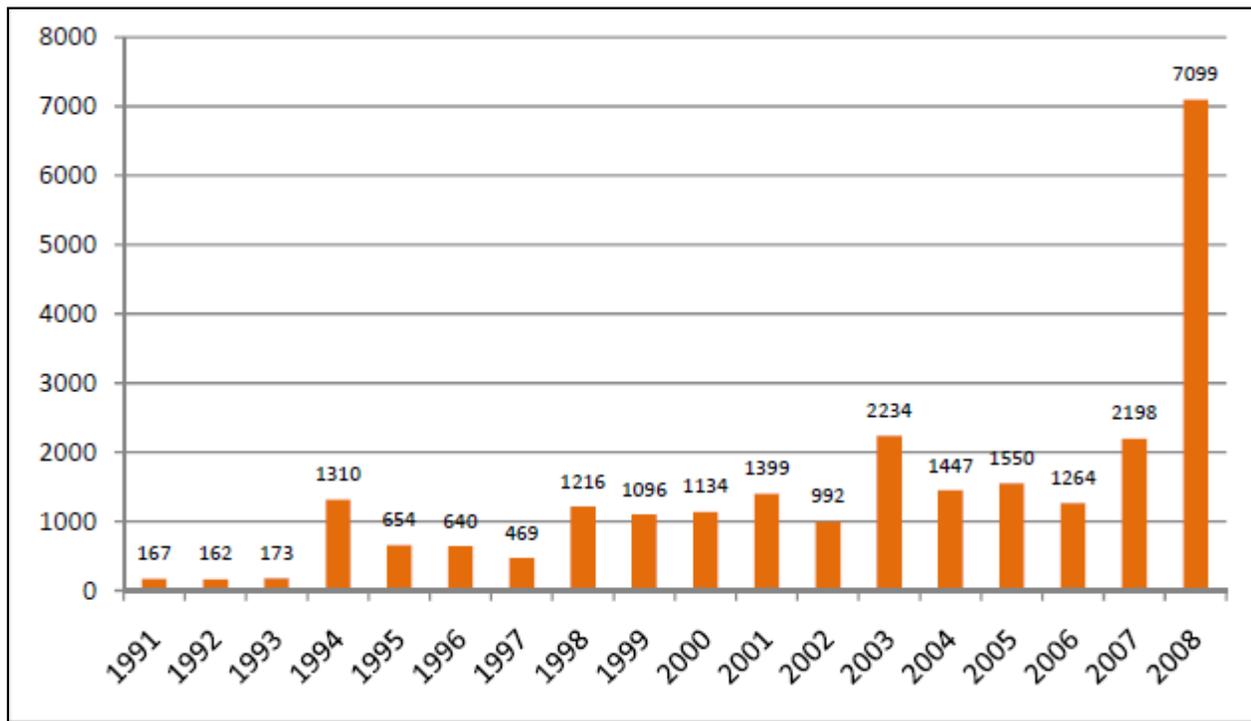
Leptospirosis is a potentially serious but treatable disease. Treatment with effective antibiotics (Droxycline, Penicillin...) should be initiated as soon as the disease is suspected. Clinicians should never wait for the results of laboratory tests before starting treatment with antibiotics because serological tests do not become positive until about a week after the onset of illness, and culture may not become positive for weeks. Supportive care with strict attention to fluid and electrolyte balance is essential. Dialysis is indicated in renal failure.

## **Spreading Time of the year:**

In Sri Lanka, Leptospirosis is reported throughout the year. High humidity and heavy rain fall intensify outbreaks because of widespread contamination by rodent urine in flood water (Rodents are displaced from their burrows and drains by the flood water). Annually there are two peaks in the disease incidence, at the time of the monsoons, a smaller one during March - May and a larger one during October – December. This seasonal variability should be taken in to consideration while planning prevention and control activities.

### Current Situation:

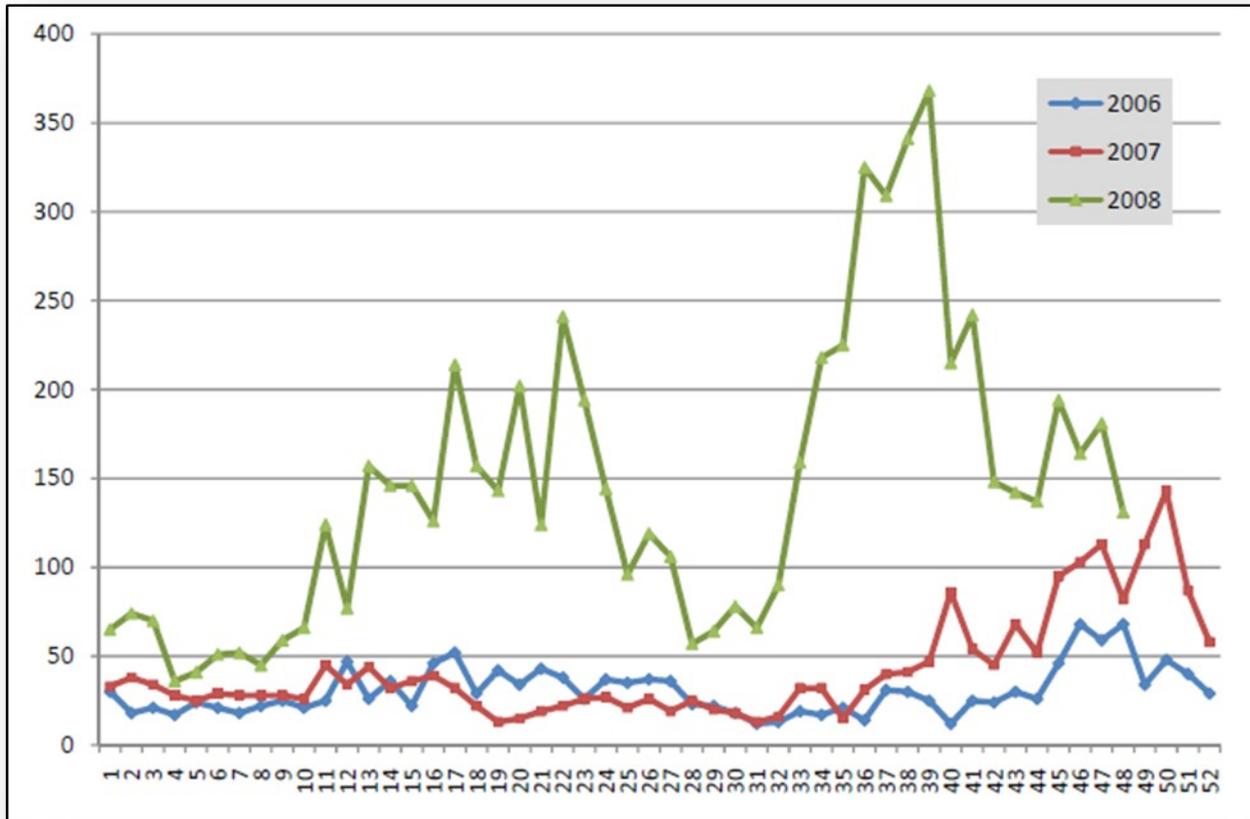
Over the past decade or more Leptospirosis remains endemic in Sri Lanka with an outbreak situation once in every four to five years (Figure 1). Beginning from the latter part of the year 2007, Sri Lanka is experiencing the largest ever recorded outbreak of Leptospirosis. When compared with the year 2006, the increased in the number of cases reported in 2008 has surpassed 400% already. Based on the notification of suspected cases, the incidence of Leptospirosis in Sri Lanka in 2008 is 35.7 per population.



Number of cases in 2008 is up to 17<sup>th</sup> December 2008

**Figure 1: Number of suspected cases of Leptospirosis notified 1991 – 2008**

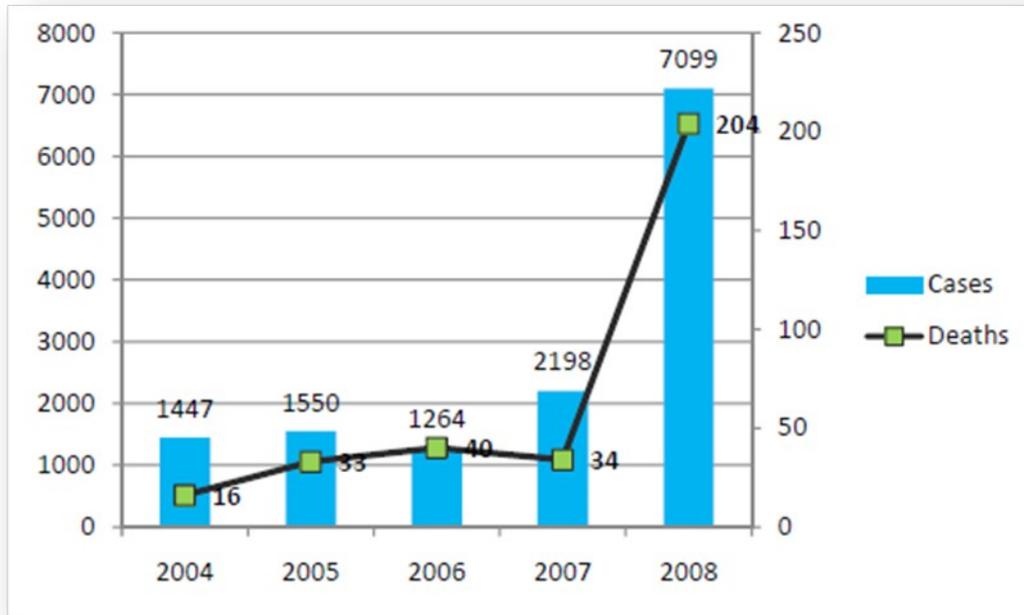
The peak of the current outbreak with notification of 368 cases was in the week 39 (Week ending 26<sup>th</sup> September 2008) (Figure 2).



Data for year 2008 is up to week 49 (Week ending 5 th December 2008)

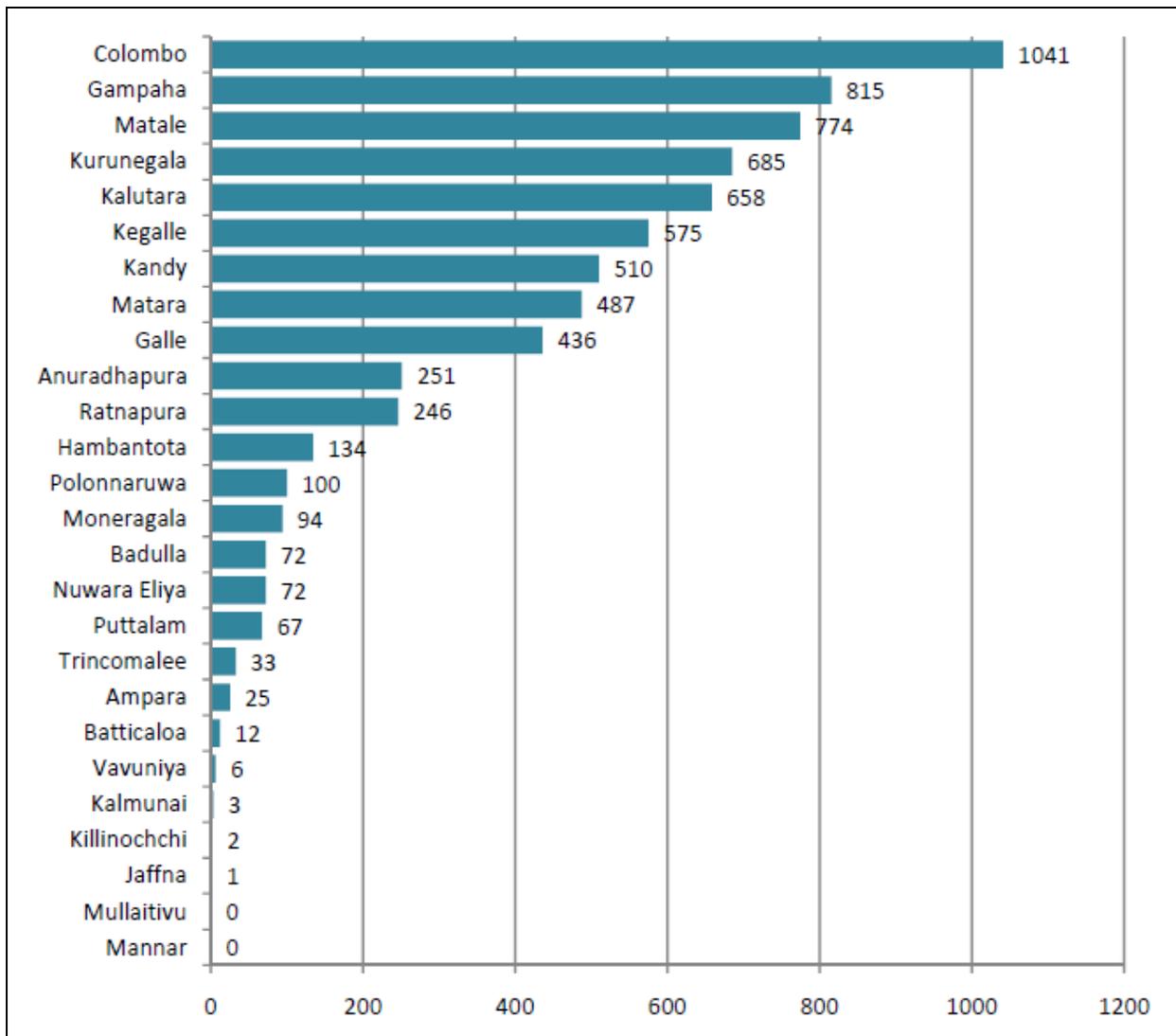
**Figure 2: Leptospirosis case notification by week 2006 – 2008**

At present, the outbreak is in the declining phase and the total number of notified up to 17<sup>th</sup> December 2008 was 7099 patients (Figure 3). There were 204 deaths with a case fatality rate of 2.9%. In 2007, the case fatality rate was 1.5 %.



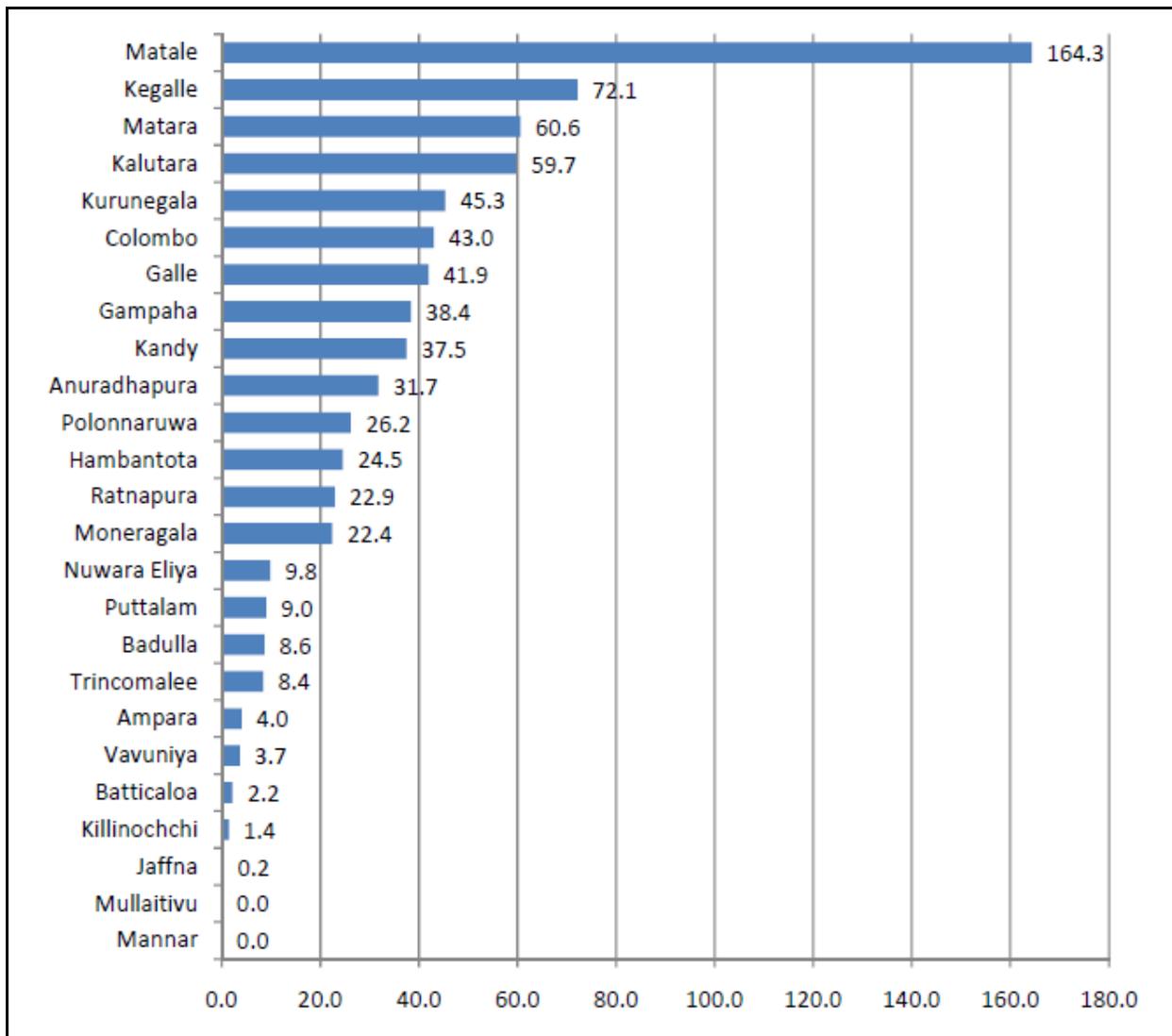
**Figure: 3 Cases and deaths due to Leptospirosis in Sri Lanka 2004 – 2008**

Worst affected districts with the largest case load are Colombo, Gampaha, and Kalutara in the Western Province, Matale and Kandy in the Central Province, Kurunegala in the North Western Province, Kegalle in the Sabaragamuwa Province, and Matara and Galle in the Southern Province (Figure 4). The highest incidence is in the Matale District with 150.5 per 100,000 population (Figure 5). The next incidence of 66.5 per 100,000 population has been reported from the Kegalle District.



Based on notified suspected cases up to 17<sup>th</sup> December 2008

**Figure 4: Distribution of suspected cases of Leptospirosis in Sri Lanka 2008**

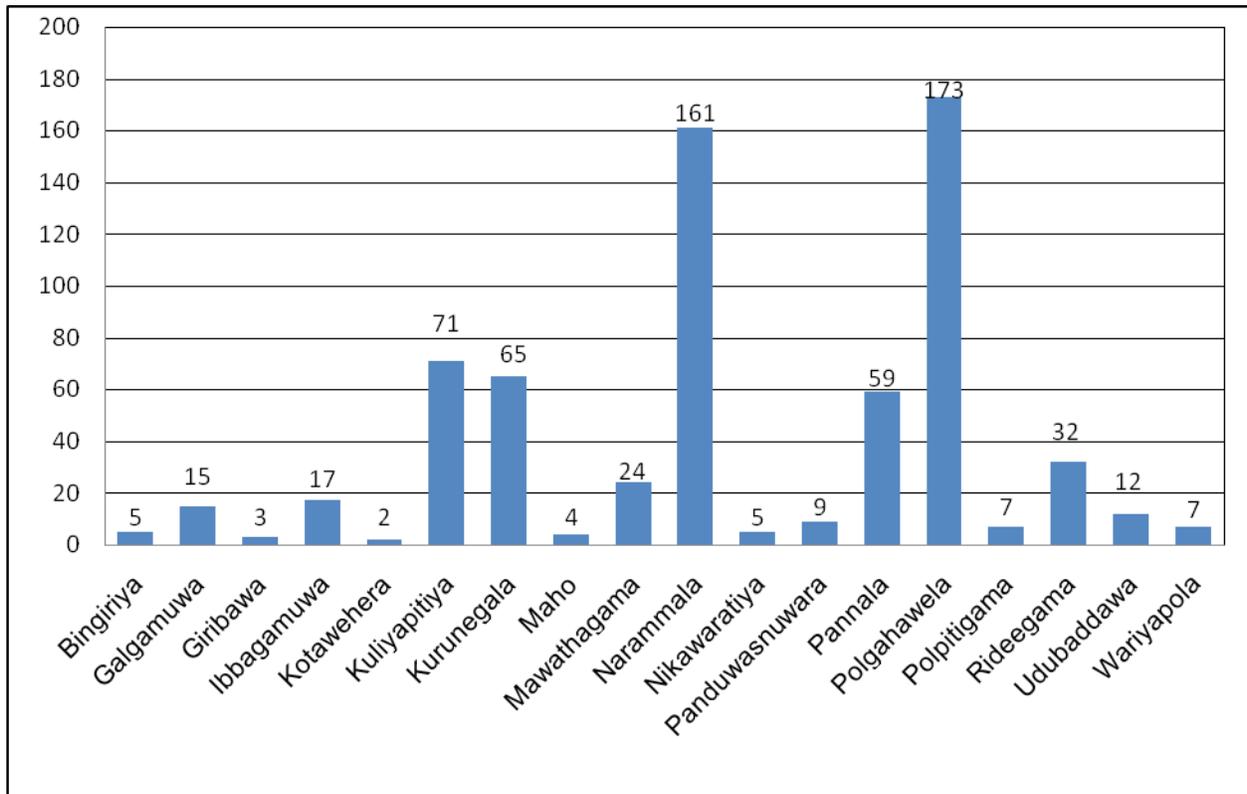


Based on notified suspected cases up to 17<sup>th</sup> December 2008

**Figure 5: Incidence rates of Leptospirosis in Sri Lanka 2008**

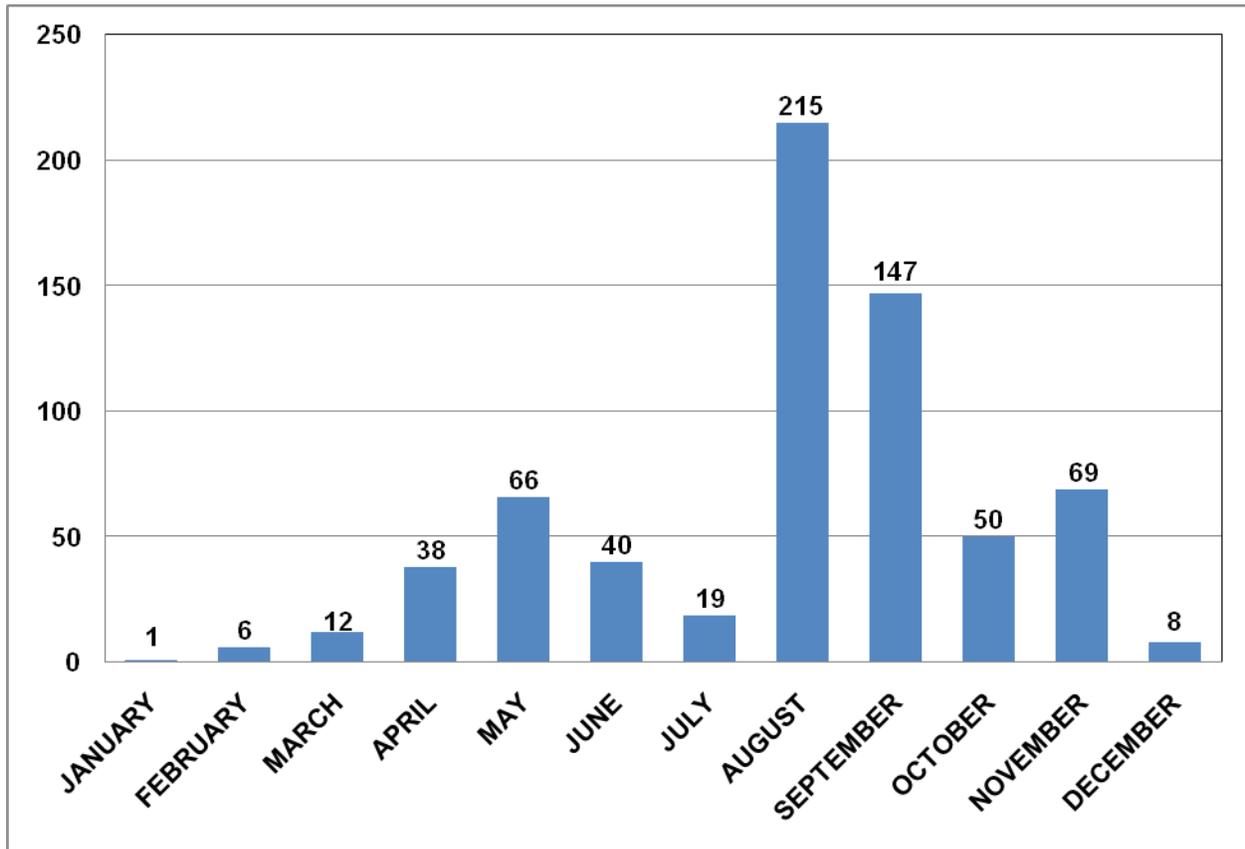
**Situation in Kurunegala District:**

In the Kurunegala District worst affected MOOH areas were Polgahawela, tolling 173 cases and Narammala tolling 161 cases. (Figure 6)



**Figure: 6 Distribution of Leptospirosis cases by MOOH area in Kurunegala District 2008**

In the Kurunegala District majority of cases occurred in the months of April - May, August – November. (Figure 7)



**Figure 7: Distribution of Leptospirosis by months in Kurunegala District year 2008**

By 31<sup>st</sup> of December, 2008 in the Kurunegala District the reported death toll was 22. Deaths reported in the MOH areas as follows.

**Table 1: Reported death toll in the Kurunegala District in the year 2008**

MOH Area	Leptospirosis
Kuliyapitiya	4
Kurunegala	2
Mawathagama	3
Narammala	8.
Polgahawela	5
Total	22

### **Action taken by Health Authorities**

Health Authorities of Kurunegala District took immediate action to give prophylactic treatment, educate the public through loudspeakers, distribution of leaflets and house to house visits to educate general public.

### **Participation of Suwadana Centers**

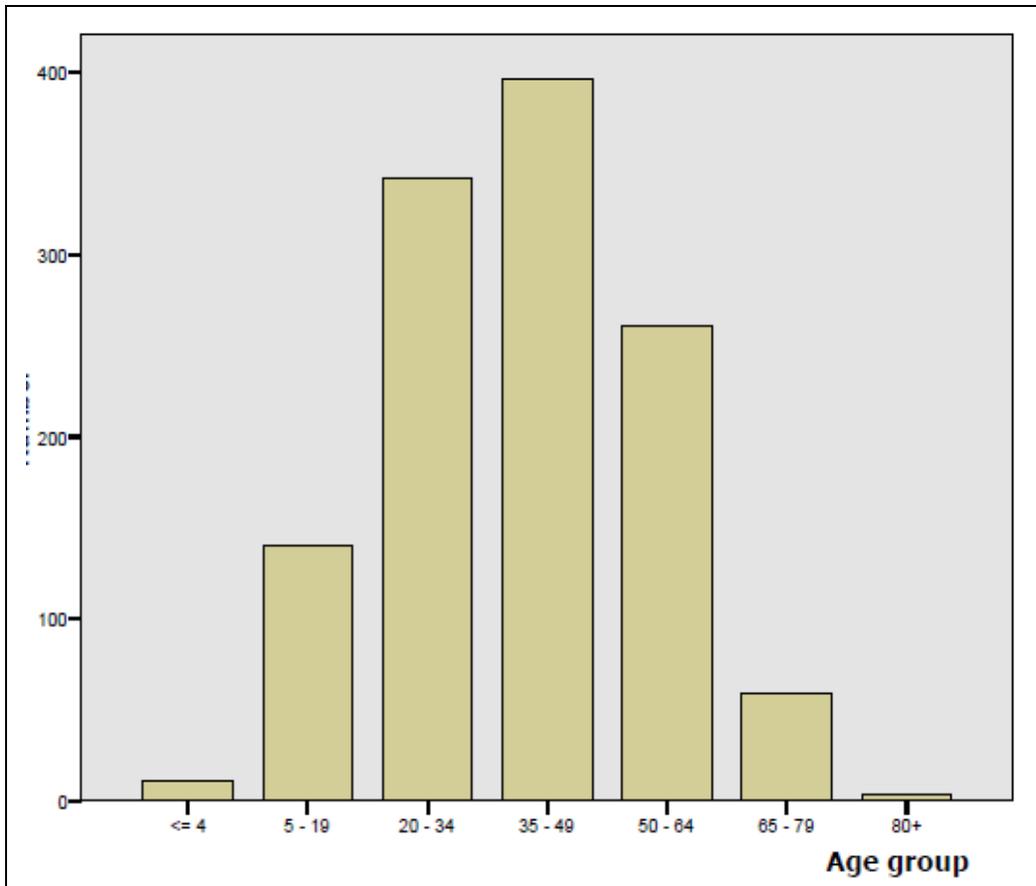
Most of the Suwadana Centers knew about the occurrence of Leptospirosis through various media. Few suwadana center volunteers witnessed the occurrence of Leptospirosis as it happened in their own village. After they witnessed the occurrence of Leptospirosis in Kurunegala District any of them could not take any preventive action.

Some have taken action to inform the immediate neighbors. Health Authorities were not informed through any of the Suwadana Centers.

### **Special Investigations:**

By 11<sup>th</sup> December 2008, a total of 1957 completed special investigation forms have been received by the Epidemiology Unit. This include 261 patients treated at Base Hospital Horana, 230 at District General Hospital Matale, 227 at Teaching Hospital Colombo South, 192 at General Hospital Kegalle, 138 at Base Hospital Homagama, 160 at Teaching Hospital Kurunegala and 115 at Teaching Hospital Kaluthara.

The commonest symptoms were acute fever, myalgia, headache, conjunctival suffusion and prostration. Table 2 shows frequency distribution of symptoms and signs associated with Leptospirosis.



**Figure: 8** Age distribution of confirmed Leptospirosis patients in Sri Lanka 2008

**Table 2: Frequency distribution of symptoms and signs associated with Leptospirosis in Sri Lanka 2008**

Symptom/ Sign	Number	Percentage
Acute fever	1930	98.6
Myalgia	1781	91.0
Headache	1770	90.4
Conjunctival suffusion	1406	71.8
Prostration	722	36.9
Anuria/Oliguria	654	33.4
Jaundice	474	24.2
Proteinuria	198	10.1
Cardiac failure/ arrhythmias	99	5.1
Haemorrhagic manifestations	98	5.0
Meningeal irritation	61	3.1
Skin rash	61	3.1

The majority (61%) has been exposed to paddy fields (Table 3).

**Table 3: Exposure history to risk environment by confirmed Leptospirosis patients in Sri Lanka 2008**

Risk environment	Number	Percentage
Paddy fields	1192	60.9
Marshy/ muddy lands	464	23.7
Other water related sources	227	11.6
Other agricultural lands	40	2.0
Animal husbandry	8	0.4

## References:

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4. News paper article, The Nation EYE, Health, SUNDAY, September, 21, 2008.
5. [http://www.cdc.gov/ncidod/dbmd/diseaseinfo/leptospirosis\\_g.htm](http://www.cdc.gov/ncidod/dbmd/diseaseinfo/leptospirosis_g.htm)

## Special thanks to:

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