WEEKLY EPIDEMIOLOGICAL REPORT

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LEGIONELLOSIS Part I

This is the first in a series of three articles on Legionellosis.Legionellosis is a collection of infections that emerged in the second half of the 20th century, and that are caused by Legionella pneumophila and related bacteria. The bacterium *L. pneumophila* was first identified in 1977, as the cause of an outbreak of severe pneumonia in a convention centre in the USA in 1976. The generic term "legionellosis" is now used to describe these bacterial infections, which can range in severity from a mild, febrile illness (Pontiac fever) to a rapid and potentially fatal pneumonia (Legionnaires' disease). Cases can be usefully grouped by the way in which they were acquired, as community acquired, domestically acquired, nosocomial (acquired in a health-care setting, or "health-care acquired") or travel associated.

Worldwide, waterborne *Legionella pneumophila* is the most common cause of cases including outbreaks. *Legionella pneumophila* and related species are commonly found in lakes, rivers, creeks, hot springs and other bodies of water. Other species including *L. longbeachae* can be found in potting mixes.

It has since been associated with outbreaks linked to poorly maintained artificial water systems, particularly cooling towers or evaporative condensers associated with air conditioning and industrial cooling, hot and cold water systems in public and private buildings, and whirlpool spas.

The infective dose is unknown but can be assumed to be low for susceptible people, as illnesses have occurred after short exposures and 3 or more km from the source of outbreaks. The likelihood of illness depends on the concentrations of *Legionella* in the water source, the production and dissemination of aerosols, host factors such as age and pre-existing health conditions and the virulence of the particular strain of *Legionella*. Most infections do not cause illness.

The Causative Agent

The causative agents are *Legionella* from water or potting mix. The most common cause of the illness is the freshwater species *L. pneumophila* which is found in natural aquatic environments worldwide. However, artificial water systems which provide environments conducive to the growth and dissemination of *Legionella* represent the most likely sources of disease.

The bacteria live and grow in water systems at temperatures of 20 to 50 degrees Celsius (optimal 35 degrees Celsius). *Legionella* can survive and grow as parasites within free-living protozoa and within biofilms which develop in water systems. They can cause infections by infecting human cells using a similar mechanism to that used to infect protozoa.

Disease Transmission

The most common form of transmission of *Legionella* is inhalation of contaminated aerosols. Sources of aerosols that have been linked with transmission of *Legionella* include air conditioning cooling towers, hot and cold water sys-

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tems, humidifiers and whirlpool spas. Infection can also occur by aspiration of contaminated water or ice, particularly in susceptible hospital patients, and by exposure of babies during water births. There is no direct human-to-human transmission.

Disease Burden and Risk Factors

Legionnaires' disease is believed to occur worldwide. The identified incidence of Legionnaires' disease varies widely according to the level of surveillance and reporting. Since many countries lack appropriate methods of diagnosing the infection or sufficient surveillance systems, the rate of occurrence is unknown. In Europe, Australia and the USA there are about 10 –15 cases detected per million population per year.

Of the reported cases 75–80% are over 50 years and 60–70% are male. Other risk factors for community-acquired and travel-associated legionellosis include: smoking, a history of heavy drinking, pulmonary-related illness, immuno-suppression, and chronic respiratory or renal illnesses.

Risk factors for hospital-acquired pneumonia are: recent surgery, intubation, mechanical ventilation, aspiration, presence of nasogastric tubes, and the use of respiratory therapy equipment. The most susceptible hosts are immuno-compromised patients, including organ transplant recipients and cancer patients and those receiving corticosteroid treatment.

Symptoms

Legionellosis is a generic term describing the pneumonic and non-pneumonic forms of infection with *Legionella*.

The non-pneumonic form (Pontiac disease) is an acute, self-limiting influenza-like illness usually lasting 2–5 days. The incubation period is 24 to 48 hours. The main symptoms are fever, chills, headache, malaise and muscle pain (myalgia). No deaths are associated with this type of infection.

Legionnaires' disease, the pneumonic form, has an incubation period of 2 to 10 days (but up to 16 days has been recorded in some outbreaks). Initially, symptoms are fever, loss of appetite, headache, malaise and lethargy. Some patients may also have muscle pain, diarrhoea and confusion. There is also usually an initial mild cough, but as many as 50% of patients can present phlegm. Blood-streaked phlegm or hemoptysis occurs in about one-third of the patients. The severity of the disease ranges from a mild cough to a rapidly fatal pneumonia. Death occurs through progressive pneumonia with respiratory failure and/or shock and multi-organ failure.

Untreated Legionnaires' disease usually worsens during the first week. In common with other risk factors causing severe pneumonia, the most frequent complications of legionellosis are respiratory failure, shock and acute kidney and multi-organ failure. Recovery always requires antibiotic treatment, and is usually complete, after several weeks or months. In rare occasions, severe progressive pneumonia or ineffective treatment for pneumonia can result in brain sequelae.

The case–fatality rate depends on the severity of the disease, how it was acquired, timely diagnosis, the appropriateness and timing of initial antimicrobial treatment, and other risk factors present. The death rate may be as high as 40–80% in untreated immuno-suppressed patients and can be reduced to 5–30% through appropriate case management and depending on the severity of the clinical signs and symptoms. Overall the death rate is usually within the range of 5–10%.

Diagnostic methods

The clinical symptoms of infection with Legionella are indistinguishable from the symptoms of other causes of pneumonia. Accurate diagnostic methods are therefore needed to identify Legionella, and to provide timely and appropriate therapy. To improve diagnosis, specialized laboratory tests must be carried out, by the clinical microbiology laboratory, on patients in a high-risk category. Tests for Legionnaires' disease should ideally be performed on all patients with pneumonia at risk, including those who are seriously ill (with or without clinical features of legionellosis), and those for whom no alternative diagnosis prevails. In particular, tests for Legionnaires' disease should be carried out on ill patients who are older than 40 years, immunosuppressed or unresponsive to beta-lactam antibiotics, or who might have been exposed to Legionella during an outbreak. Despite the availability of immunological and molecular genetic methods, diagnosis of Legionnaires' disease is generally effective only for L. pneumophila serogroup 1. Since 1995, diagnostic tests for legionellosis have changed significantly. The following laboratory methods are currently used for diagnosing Legionella infections

• Isolation of the bacterium on culture media
• Identification of the bacterium using paired serology
• Detection of antigens in urine
• Detection of the bacterium in tissue or body fluids by immunofluorescent microscopy (e.g. direct immunofluorescence assay (DFA) testing)
- Detection of bacterial DNA using polymerase chain reaction (PCR).

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to be continued ...

Table 1: Selected notifiable diseases reported by Medical Officers of Health 30th – 05th April 2019 (14th Week)

RDHS Division	Dengue Fever		Dysentery		Encephalitis		Enteric Fever		Food Poisoning		Leptospirosis		Typhus Fever		Viral Hepatitis		Human Rabies		Chickenpox		Meningitis		Leishmaniasis		WRCD	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	T*	C**
Colombo	166	2998	1	13	0	2	0	5	0	22	3	54	0	7	0	4	0	0	11	165	0	18	0	2	**46**	**100**
Gampaha	91	1780	0	5	0	1	0	0	0	12	1	29	0	2	0	1	0	0	3	106	0	8	1	28	**54**	**97**
Kalutara	38	826	1	23	0	3	0	5	0	28	8	156	0	3	0	2	0	0	4	254	0	33	0	3	**62**	**85**
Kandy	35	783	3	20	1	5	0	1	1	6	0	23	2	28	1	2	0	1	6	66	3	17	2	11	**63**	**100**
Matale	3	177	0	11	0	2	0	0	0	1	0	21	1	4	0	3	0	1	2	28	0	3	6	88	**53**	**100**
NuwaraEliya	1	56	5	13	0	1	0	1	0	0	0	12	0	24	0	4	0	0	1	17	1	17	0	0	**24**	**100**
Galle	35	446	2	19	0	4	0	1	0	1	11	93	1	17	0	2	0	0	11	153	1	25	0	1	**62**	**99**
Hambantota	20	330	0	3	0	0	0	0	0	5	2	25	6	54	0	1	0	0	4	122	0	14	2	191	**73**	**100**
Matara	24	477	0	4	0	4	0	1	0	2	7	81	0	15	0	8	0	0	15	114	0	3	10	169	**61**	**100**
Jaffna	54	1676	2	43	0	5	1	7	1	3	0	20	5	242	1	1	0	0	4	99	1	6	0	0	**21**	**93**
Kilinochchi	3	76	0	6	0	1	0	9	0	0	0	14	0	18	0	1	0	0	0	3	0	2	0	4	**41**	**100**
Mannar	1	58	0	0	0	1	0	7	0	1	0	0	0	6	0	0	0	0	0	0	0	0	0	0	**46**	**96**
Vavuniya	1	143	1	6	0	3	0	15	0	3	2	32	0	4	0	0	0	0	7	35	0	6	0	1	**46**	**100**
Mullaitivu	1	87	0	6	0	0	0	4	0	1	0	11	0	5	0	0	0	0	0	0	0	2	0	1	**35**	**81**
Batticaloa	43	647	3	36	0	0	1	9	1	2	0	14	1	1	0	0	0	1	12	68	0	3	0	0	**51**	**100**
Ampara	3	83	0	9	0	0	0	0	0	4	0	14	0	0	1	6	0	0	2	56	0	3	0	3	**51**	**100**
Trincomalee	35	433	0	5	0	0	0	0	0	4	0	3	1	3	1	1	0	0	8	77	1	4	0	0	**32**	**86**
Kurunegala	28	538	2	21	0	5	0	3	0	4	3	73	0	8	1	13	0	0	15	221	4	20	11	275	**57**	**100**
Puttalam	9	200	1	10	0	1	0	1	0	0	1	12	1	8	0	0	0	0	6	67	3	14	1	4	**60**	**100**
Anuradhapura	9	177	0	8	0	5	0	3	0	0	3	65	0	22	1	12	0	1	18	198	1	34	15	163	**39**	**97**
Polonnaruwa	2	85	0	7	0	1	1	1	0	0	0	30	0	2	2	7	0	0	11	115	0	10	2	79	**59**	**100**
Badulla	9	229	1	15	0	1	0	4	0	55	1	63	1	37	0	9	0	0	7	88	2	55	0	9	**65**	**100**
Monaragala	8	155	3	21	0	2	0	0	0	73	8	113	1	40	3	31	0	0	7	85	4	52	0	9	**62**	**100**
Ratnapura	30	580	0	30	2	15	0	6	0	7	15	200	2	12	1	9	0	1	8	151	3	52	1	50	**44**	**99**
Kegalle	16	373	1	14	2	10	0	0	0	20	1	49	1	17	11	53	0	0	13	173	1	12	0	10	**63**	**100**
Kalmune	22	338	0	19	0	0	0	1	0	0	1	17	0	1	0	1	0	0	8	71	0	7	0	0	**59**	**100**
SRILANKA	**687**	**13751**	**26**	**367**	**5**	**72**	**3**	**84**	**3**	**254**	**67**	**1224**	**23**	**580**	**23**	**171**	**0**	**5**	**183**	**2532**	**25**	**420**	**51**	**1101**	**53**	**98**

Source: Weekly Returns of Communicable Diseases (WRCD).

*T=Timeliness refers to returns received on or before 05th April , 2019 Total number of reporting units 353 Number of reporting units data provided for the current week: 334 **C****-Completeness

A = Cases reported during the current week. **B** = Cumulative cases for the year.

Table 2: Vaccine-Preventable Diseases & AFP

30th – 05th April 2019 (14th Week)

Disease	No. of Cases by Province									Number of cases during current week in 2019	Number of cases during same week in 2018	Total number of cases to date in 2019	Total number of cases to date in 2018	Difference between the number of cases to date in 2019 & 2018
	W	C	S	N	E	NW	NC	U	Sab					
AFP*	00	00	00	00	00	01	00	00	00	01	02	27	13	92.3%
Diphtheria	00	00	00	00	00	00	00	00	00	00	00	00	00	0 %
Mumps	00	00	01	03	02	00	00	01	00	07	11	102	115	-11.3 %
Measles	02	01	00	01	00	01	00	01	01	07	03	56	37	51.3 %
Rubella	00	00	00	00	00	00	00	00	00	00	00	00	04	0 %
CRS**	00	00	00	00	00	00	00	00	00	00	00	00	00	0 %
Tetanus	00	00	00	00	00	00	00	00	00	00	01	06	07	- 14.2 %
Neonatal Tetanus	00	00	00	00	00	00	00	00	00	00	00	00	00	0 %
Japanese Encephalitis	00	00	00	00	00	00	00	00	00	00	01	07	12	- 41.6 %
Whooping Cough	00	00	01	00	00	00	00	00	00	01	01	23	10	130 %
Tuberculosis	61	33	17	18	05	06	14	06	20	180	219	2409	2035	18.3 %

Key to Table 1 & 2

Provinces: **W**: Western, **C**: Central, **S**: Southern, **N**: North, **E**: East, **NC**: North Central, **NW**: North Western, **U**: Uva, **Sab**: Sabaragamuwa.

RDHS Divisions: **CB**: Colombo, **GM**: Gampaha, **KL**: Kalutara, **KD**: Kandy, **ML**: Matale, **NE**: Nuwara Eliya, **GL**: Galle, **HB**: Hambantota, **MT**: Matara, **JF**: Jaffna, **KN**: Killinochchi, **MN**: Mannar, **VA**: Vavuniya, **MU**: Mullaitivu, **BT**: Batticaloa, **AM**: Ampara, **TR**: Trincomalee, **KM**: Kalmunai, **KR**: Kurunegala, **PU**: Puttalam, **AP**: Anuradhapura, **PO**: Polonnaruwa, **BD**: Badulla, **MO**: Moneragala, **RP**: Ratnapura, **KG**: Kegalle.

Data Sources:

Weekly Return of Communicable Diseases: Diphtheria, Measles, Tetanus, Neonatal Tetanus, Whooping Cough, Chickenpox, Meningitis, Mumps., Rubella, CRS,

Special Surveillance: AFP* (Acute Flaccid Paralysis), Japanese Encephalitis

CRS =**Congenital Rubella Syndrome

NA = Not Available

Dengue Prevention and Control Health Messages

Look for plants such as bamboo, bohemia, rampe and banana in your surroundings and maintain them free of water collection.

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Comments and contributions for publication in the WER Sri Lanka are welcome. However, the editor reserves the right to accept or reject items for publication. All correspondence should be mailed to The Editor, WER Sri Lanka, Epidemiological Unit, P.O. Box 1567, Colombo or sent by E-mail to **chepid@sltnet.lk. Prior approval should be obtained from the Epidemiology Unit before publishing data in this publication**

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