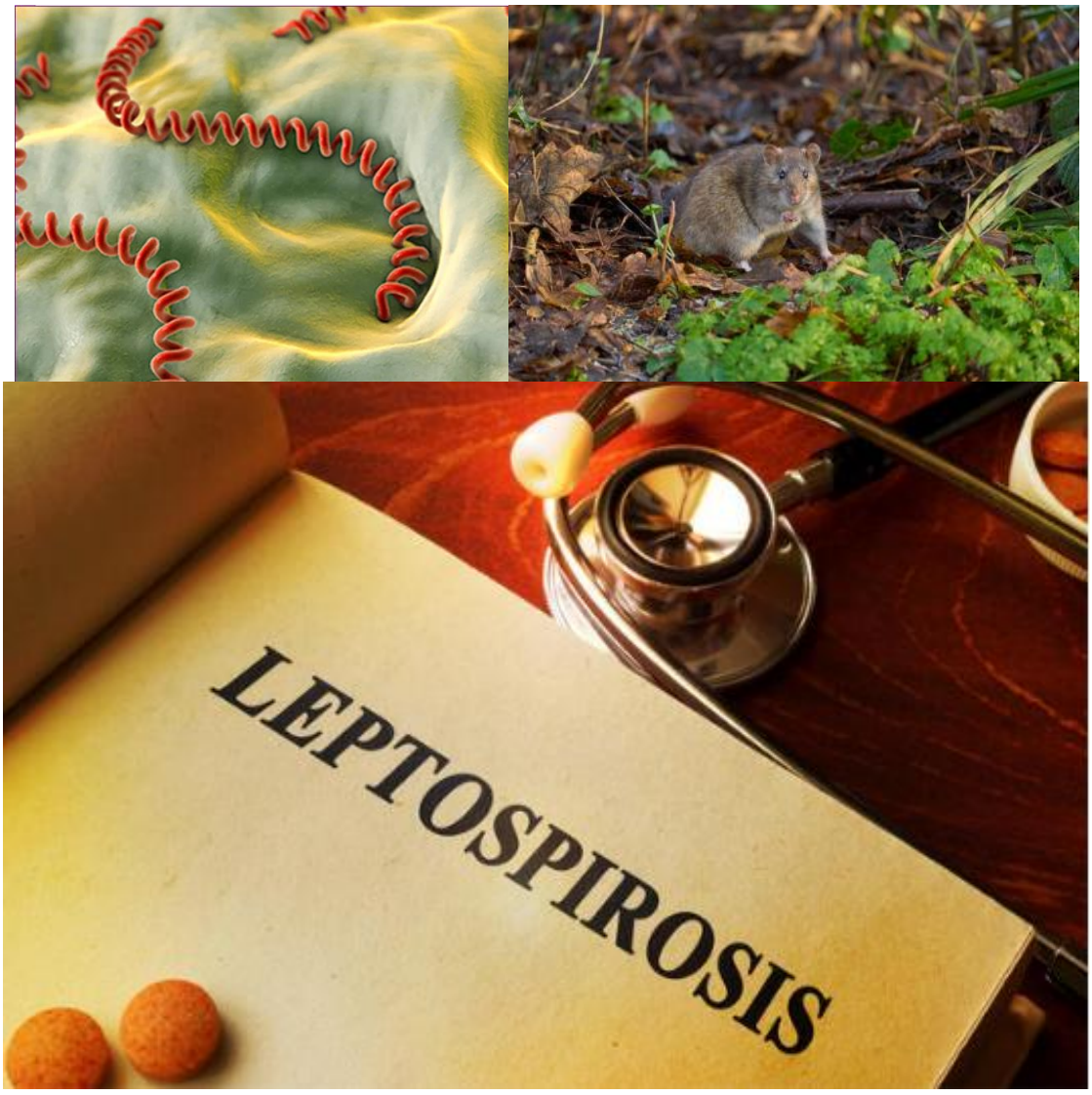
OPERATIONAL PLAN

LEPTOSPIROSIS



Ministry of Health & Wellness **JUNE 2024**

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1.0 Introduction

Leptospirosis is a zoonosis caused by pathogenic spirochetes of the genus *Leptospira* which are spiral-shaped and highly motile. Approximately 90% of cases are asymptomatic or mild with a favorable outcome. 5% to 15% of cases present a severe form with multiple organ dysfunction and a high mortality rate without prompt treatment.

1.1 Disease occurrence and public health implications

Leptospirosis is endemic in temperate and tropical regions and is considered an important re-emerging disease due to changing risks groups, increasing magnitude and frequency of outbreaks and the emergence of new predominant serovars. Sporadic cases typically have recreational or occupational exposures, frequently farming, abattoir or veterinary work.

Globally, leptospirosis has increased in incidence over recent years, with increasing frequency and severity of outbreaks attributable to climatic, sociodemographic and environmental factors – these include climate change, flooding, population growth and rapid urbanisation (often associated with insanitary conditions, such as inadequate waste disposal), and agro-farming activities.

1.2 Modes of transmission

Rodents are the most important reservoirs for maintaining transmission in most settings. In addition to rodents, the organism infects a variety of both wild and domestic mammals, especially cattle, swine, dogs, horses, sheep, and goats. It rarely occurs in cats. Organisms can survive for days to months in urine-contaminated soil and fresh water.

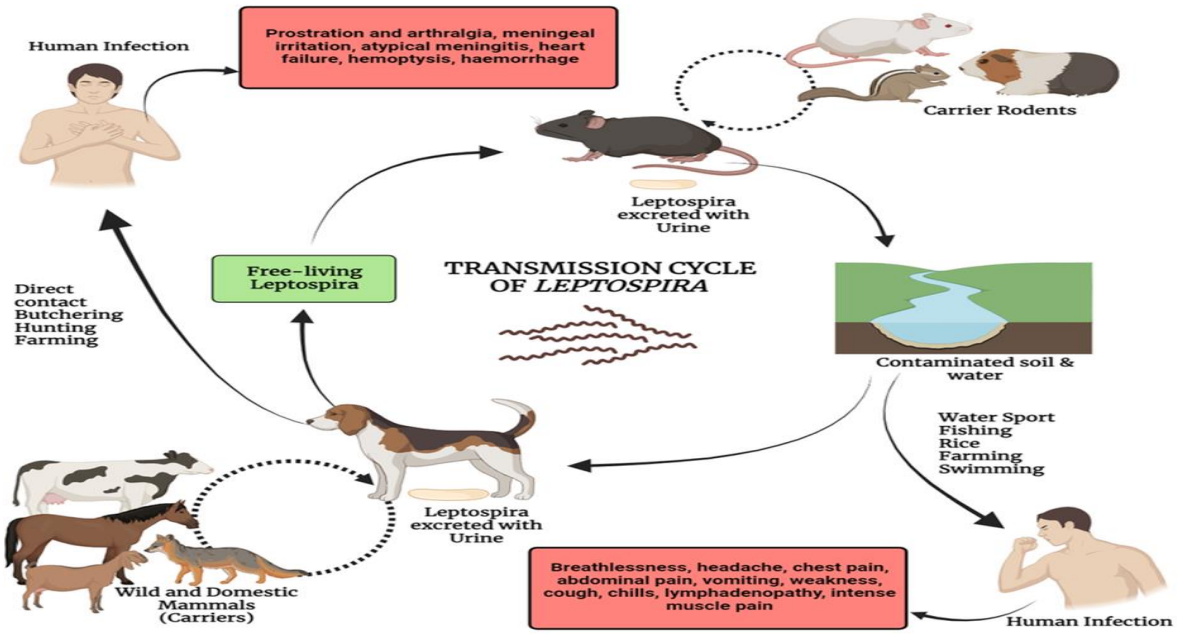

Fig. 1. Transmission cycle of Leptospires also showing signs and symptoms of Leptospirosis in humans. (Akhtar et al., 2024)

Human exposures that lead to infection include contact with urine-contaminated soil or water (e.g. floodwater, ponds, rivers, streams or sewage), ingestion of food or water contaminated by urine or urine-contaminated water, or direct contact with the urine or reproductive fluids from infected animals.

1.3 Persons at risk

Persons at increased risk of catching leptospirosis include farmers, abattoir workers, butchers or sewer workers, and those who enjoy freshwater swimming, gardening, walking barefoot or who are often exposed to water recreationally. Below is a table illustrating all those people at risk to be infected with leptospirosis.



Environmental	**Occupational**	**Recreational**
Rainfall, flooding, monsoon season	Farmers	Swimming in fresh water
Contaminated environment	Sewage work	Sailing, rafting
Poor sanitation	Abattoir and butcher workers	Marathon/trail runners
Inefficient solid waste disposal	Veterinarians, medical and laboratory staff	Gardening
Inadequate drainage	Inland fishermen	Adventure travel
Presence of reservoir animals (such as rats)	Soldiers	Water sports
Walking bare foot	Refuse collectors	Ecotourism
Wading through contaminated water	Sugar cane workers	
Urban slums	Pest control workers	
Outdoor manual work	General workers, Handy workers (sanitation/disease control)	

Table 1. List of 'at risk occupations/situations' in Mauritius (Occupational Health Unit and CDCU, MOHW, 2024)

1.4 Incubation period

The typical incubation period is 5 to 14 days (range 2 to 30 days).

1.5 Infectious period

Person-to-person spread very rarely occurs.

1.6 Signs and Symptoms

Most cases are mild and self-limited or asymptomatic. The majority of symptomatic patients with leptospirosis have the anicteric form of disease. Anicteric leptospirosis has been described as a biphasic illness, with an acute phase and an "immune" phase which occurs about a week later.

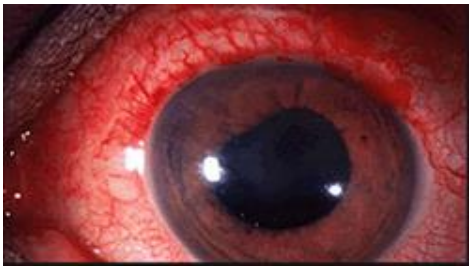

Fig. 2. Conjunctival Suffusion: dilated conjunctival vessels without purulent discharge (Kumar, 2013)

Symptoms during the acute phase include fever, rigors, myalgias, headache, nausea, vomiting, diarrhea, nonproductive cough, arthralgia, bone pain, sore throat, abdominal pain, and rash. Noteworthy signs are hepatosplenomegaly, conjunctival hyperemia ('suffusion') and petechiae.

In the immune phase, patients present with aseptic meningitis and/or uveitis.

Icteric leptospirosis occurs in approximately 5 to 10 percent of symptomatic leptospirosis cases and is a rapidly progressive multisystem illness associated with mortality rates of 5 to 15 percent. Usually, icteric leptospirosis is accompanied by fever, jaundice, and renal failure, a syndrome known as "Weil's disease."

1.7 Differential diagnosis

The differential diagnosis of leptospirosis should include the following diseases:

- Influenza
- Dengue and dengue hemorrhagic fever
- Hantavirus infection
- Yellow fever and other viral hemorrhagic fevers
- Rickettsiosis
- Borreliosis
- Brucellosis
- Malaria
- Pyelonephritis
- Pharyngitis
- Aseptic meningitis
- Chemical poisoning
- Food poisoning
- Typhoid fever and other enteric fevers
- Viral hepatitis
- Pyrexia of unknown origin
- Primary HIV seroconversion
- Legionnaire's disease
- Toxoplasmosis
- Infectious mononucleosis

2.0 Surveillance objectives

Reliable data on the incidence and prevalence of leptospirosis in many parts of the world including Mauritius are scarce and often underreported. Available data is restricted to moderate/severe cases requiring hospitalisation which undeniably underlines the selection bias of the data collected. Nevertheless, compilation and analysis of these data has the following objectives:

i. To monitor trends in leptospirosis with respect to time, population groups, geography, and risk factors.

ii. To identify a likely source of infection so that the likelihood of further cases from the same source can be minimised, such as in workplace settings.

iii. To detect and guide immediate action and control measures for outbreaks to prevent further transmission.

iv. To guide the planning and implementation of policy, service provision, prevention strategies, and other public and animal health interventions.

3.0 Case definition for leptospirosis during outbreaks (adapted from WHO)

3.1 Suspected case

• evocative epidemiological context; and

• clinical signs and symptoms consistent with leptospirosis: abrupt onset of fever, chills, conjunctival suffusion, headache, myalgia, jaundice, cardiac or renal failure, and pulmonary haemorrhage.

3.2 Probable case

• suspected case and the presence of Leptospira immunoglobulins type M (IgM) in one serum sample detected by serology (e.g. enzyme-linked immunosorbent assay (ELISA)).

3.3 Confirmed case

• a suspected case confirmed by laboratory test as follows:

- seroconversion (first sample – negative, second sample – positive, i.e. above the cut-off point), or a four-fold or higher rise in titre detected by serological techniques (e.g. microscopic agglutination technique (MAT). Complement Fixation Test in consecutive serum samples; or detection of Leptospira DNA from a clinical specimen by polymerase chain reaction (PCR).

4.0 Case Reporting

Mandatory notification of laboratory confirmed leptospirosis cases as per the Public Health Act 1925 is done via the notification filled by the treating doctor and sent to the RPHS Office and the Health Office. The standardised reporting form also includes data on demographics, clinical symptoms, occupation, and potential exposure sources (Annex A: notification form).

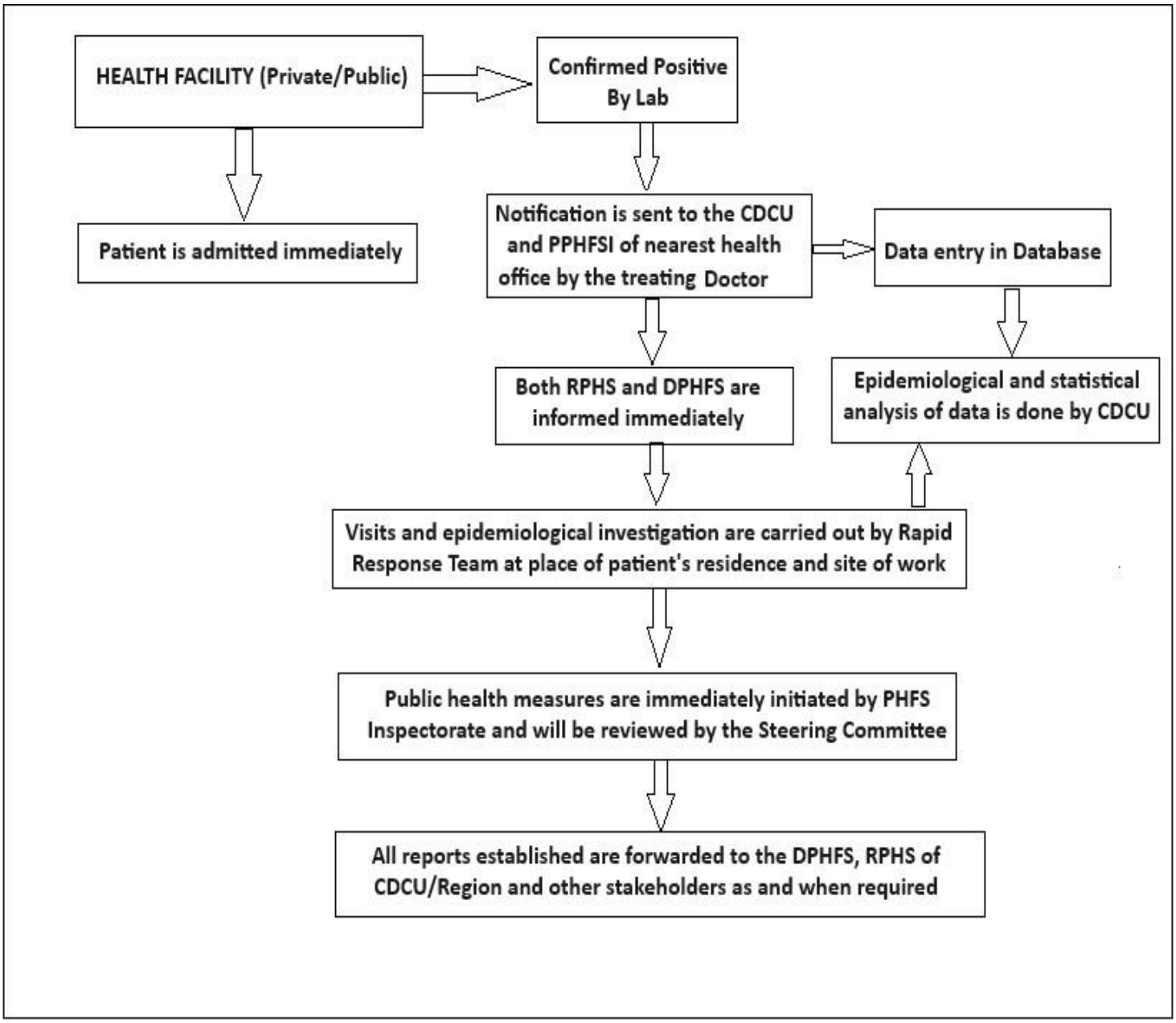

Fig. 3. Chart describing the flow of information for leptospirosis investigation and response.

5.0 Response measures

Sporadic cases: Routine response - Initial case investigation should commence within one day of notification.

Outbreak: High priority response - Outbreak investigation team should be set up and case investigation initiated as soon as possible.

Outbreak investigation

An outbreak of leptospirosis is declared when the number of cases detected exceeds the expected average in that particular time. It is incumbent of the CDCU in collaboration with the DHS (Public Health) to declare an outbreak by:

1. Informing the SCE and DGHS.
2. The press attaché
3. Members of the regional outbreak rapid response team

Rapid Response Teams comprising of a Community Physician trained in Field Epidemiology (FETP), Epidemiologist, Public Health and Food Safety Inspector (PHFSI) and a Rodent Control officer will be sent to the affected regions and outbreak investigation procedures will be followed and these will include, inter alia, the following:

- Determination of the sites and facilities (including residential premises and place of work) frequented and family and social groups exposed by outbreak-related patients during their infectious periods, including undertaking of public health risk assessment of the residential and work premises with a view to detect factors favoring rat harborage(or burrows)/ proliferation, traces, urine, droppings, and shortcomings associated with solid waste, wastewater disposal and water distribution systems.
- Such information can be obtained from: case-patient interviews and contact investigation; onsite environmental health survey, medical and public health records; and Information from the facility logs or records. The completed epidemiological investigation form (Annex B) is sent to the CDCU.

6.0 Diagnosis

Diagnosis should be suspected based on a clinical assessment – once suspected, empirical treatment must be started promptly without waiting for the results of tests.

4ml of clotted blood should be sent to the Central Health Laboratory for Leptospira IgM and/or complement fixation test; in addition, 4ml in an EDTA tube should also be sampled for a *Leptospira* polymerase chain reaction (PCR) test.

The diagnosis is confirmed by a positive PCR of blood or by positive serologic testing. The diagnosis is not ruled out by negative test results, because the sensitivity of leptospirosis testing is suboptimal.

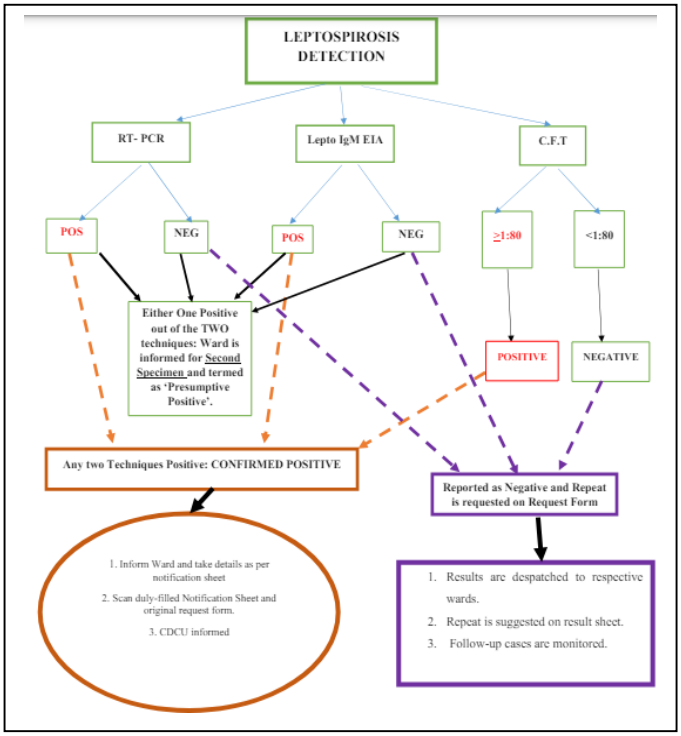

Figure 2. Flowchart for laboratory confirmation of Leptospirosis (Virology Dept, CHL, 2024)

PCR is most sensitive during the bacteremic phase (i.e., the first week) of infection, with antibodies becoming detectable by serology after the first week.

To diagnose leptospirosis by serologic testing, one blood sample should be obtained upon presentation (i.e., an acute sample) and a second sample should be obtained 7 to 14 days after the first antibody test is sent (i.e., a convalescent sample). Seroconversion or a four-fold or higher rise in titre confirms infection.

A single positive IgM antibody titer is suggestive of the disease but is not definitive.

Serological data are important in the diagnostic process but must always be considered in conjunction with the clinical presentation and epidemiological data (a history of possible exposure, presence of risk factors).

7.0 Complications of Leptospirosis

- Acalculous cholecystitis
- Pancreatitis
- Rapidly progressive pulmonary hemorrhage
- Acute respiratory distress syndrome
- Myocarditis
- Rhabdomyolysis
- Renal failure (which may be oliguric or polyuric)
- Heart failure or cardiogenic shock
- Encephalitis
- Guillain-Barré syndrome
- Transverse myelitis

8.0 Triage

All patients suspected of having leptospirosis should be admitted to a regional hospital for a work-up.

Initial investigations can include full blood count, urea, electrolytes, creatinine, urinalysis, liver function tests, INR / PTT, chest x-ray (CXR) and electrocardiogram.

Transfer the patient to the High Dependency Unit or an Intensive Care Unit (if available) if:

- CXR is abnormal, or the patient is hypoxic (O_2 sat < 90% on 6L of O_2 by mask) or respiratory rate > 30/min
- Moderate to severe bleeding or coagulopathy or platelets < 50,000/mm^3
- Acute renal failure requiring hemodialysis
- Hypotension with systolic blood pressure < 90mmHg or mean arterial pressure < 60mmHg
- Seizures
- Malignant cardiac arrhythmias, or
- Glasgow Coma Scale ≤ 12.

9.0 Treatment

Doses shown in this section are for adults and for a normal renal function. Adjustments may be required for pediatric populations or for patients in renal failure.

9.1 Mild to moderate disease

- Doxycycline 100mg PO BD x7d (avoid in pregnant women and in children)
- Azithromycin 500mg PO OD x3d – if not available, substitute with clarithromycin 500mg PO BD x7d; however, note that few studies are available on the efficacy of clarithromycin in the treatment of leptospirosis.
- Amoxicillin 500mg PO TDS x7d

9.2 Severe disease

- Penicillin 1.5 million units IV Q6h x7d
- Doxycycline 100mg IV BD x7d (avoid in pregnant women and in children)
- Ceftriaxone 2g IV OD x7d
- Cefotaxime 1g IV Q6h x7d

If complications occur, supportive treatment should be provided after appropriate referrals to the concerned departments e.g., patients in respiratory failure can be intubated and patients in shock should be placed on inotropes.

Supportive renal replacement therapy (e.g. hemodialysis) may be required for survival in up to half of patients with Weil's disease, but complete renal recovery is typical after discontinuation of renal replacement therapy. Electrolyte imbalances are common, including hypokalemia and hyperkalemia, which should be treated accordingly.

While admitted, the following tests should be ordered every 24 to 48 hours based on the patient's clinical condition: platelets, INR/PTT, urea, electrolytes, creatinine and bilirubin.

Adverse reaction in relation to antimicrobial therapy for leptospirosis

A Jarisch-Herxheimer (JHR) reaction may occur following antimicrobial therapy for leptospirosis; this is an acute inflammatory response to clearance of spirochetes from the circulation and is characterized clinically by fever, rigors, and hypotension.

It is noteworthy to mention that the JHR occurs within 24 hours of antibiotic therapy for spirochetal infections, including syphilis, leptospirosis, Lyme disease, and relapsing fever. It usually manifests as fever, chills, rigors, nausea and vomiting, headache, tachycardia, hypotension, hyperventilation, flushing, myalgia, and exacerbation of skin lesions. It is an acute, self-limiting condition and it is important to identify JHR and to distinguish it from allergic reactions and sepsis, which can be life-threatening.

Mild reactions are self-limiting and often resolve spontaneously within 24 hours. Treatment of severe leptospirosis-related JHR may require crystalloid infusion, corticosteroids, vasopressors and inotropic support.

10.0 Discharge

Patients can be discharged when all complications and danger signs have resolved. Of note, mild cases may not require more than 24 - 48 hours of admission – such patients can be discharged on outpatient oral therapy with instructions to return to the hospital if their condition deteriorates.

Jaundice can persist for many weeks – it is not necessary to wait until jaundice is resolved before discharging a patient if all else is satisfactory.

11.0 Measures for control of leptospirosis

11.1 Collaboration and Coordination

In the management of leptospirosis, a coordinated effort from various departments/ministries is essential. Each department/ministry brings unique expertise and resources, contributing to a comprehensive strategy for controlling and mitigating the disease. A One Health approach is adopted. Below are the roles of key departments/ministries involved:

11.2 Ministry of Health and Wellness

The Ministry of Health and Wellness (MOHW) is actively involved in the following:

11.2.1 Surveillance and Reporting

Effective surveillance of leptospirosis involves comprehensive data collection from health facilities to monitor trends over time, identify high-risk population groups, and map geographical hotspots. Detailed case investigations and environmental sampling help identify sources of infection, particularly in workplace settings, while early warning systems and rapid response teams are essential for outbreak detection and control. Successful implementation requires capacity building, community engagement, technological integration, and intersectoral collaboration to achieve accurate and effective leptospirosis prevention and control.

11.2.2 Diagnosis and Treatment

- Provide guidelines for diagnosing leptospirosis.
- Ensure availability of necessary diagnostic tools and facilities.
- Offer treatment protocols and manage patient care.

11.2.3 Risk Communication and Community Engagement

(Refer to Chapter 13.2.1 for more details)

- Educate the public about prevention, symptoms, and treatment.
- Promote hygiene and safe practices to reduce risk.

11.2.4 Interventions to break routes of transmission

(Refer to Chapter 13.3 for more details)

- Conduct of environmental health surveys with a view to detect rat harbourage, traces, burrows and environmental conditions favoring proliferation of rats such as management of solid and liquid waste and conditions of surrounding environment.
- Carrying out rodent control activities in buildings of Ministry of Health and Wellness, port/airport and that of notified cases.

11.3 Ministry of Agro Industry & Food Security

11.3.1 Livestock and Veterinary Division (LVD)

Clinical cases of leptospirosis in animals are very sporadic and any clinical case of leptospirosis observed in animals are to be communicated to the Ministry of Health and Wellness under the One Health collaboration, as soon as possible.

The main point of intervention is pest control, especially rat control on farms, ranches, slaughterhouses and other establishments where animal feed is stored, prepared and manufactured.

To combat the spread and transmission of leptospirosis, the following is carried out by the LVD:

1) Sensitization Program for Leptospirosis and Rodent Control

LVD carries out a sensitization program targeting livestock farmers, deer ranches, feed manufacturing establishments, slaughterhouses, and other relevant entities. The program aims to educate these groups about leptospirosis and effective rodent control measures.

2) Information Sharing Between Ministries

There shall be an ongoing exchange of information between the Ministry of Health and Wellness and the Ministry of Agro-Industry and Food Security.

Whenever an infected farmer or any other person in contact with animals having leptospirosis, the LVD will be promptly informed to facilitate an investigation.

3) Collaboration for Leptospira Serotyping

Both ministries will collaborate on the serotyping of isolated Leptospira strains to enhance our understanding and response to the disease.

4) Pest Control Measures

Pest control measures should be rigorously implemented on farms, in slaughterhouses, and at feed stores. It is crucial to protect animals, their litter, bedding, feed, and fodder, as well as feed troughs, drinking water facilities, milking machines, and other equipment from direct or indirect contact with rodents and their urine or fecal matter.

5) Regular Cleaning and Disinfection

Regular cleaning and disinfection of equipment and feeding troughs are mandatory to maintain a hygienic environment and prevent disease transmission.

6) Personal Hygiene Practices

All stakeholders must adopt stringent personal hygiene practices to minimize the risk of infection and to ensure use of relevant PPEs.

7) Waste Treatment

Solid wastes will be treated through methods such as biogas production and composting before disposal to ensure environmental safety and reduce contamination risks.

8) Reporting Suspicion of Leptospirosis

Any suspicion of leptospirosis in animals must be reported immediately to the LVD at 4541017.

11.3.2 Agricultural Department (Crop Sector)

Through the below-mentioned initiatives, the crop sector will significantly contribute to reducing the incidence and spread of leptospirosis:

1. *Sensitization and Awareness Campaign*

    - Conduct a comprehensive sensitization and awareness campaign on leptospirosis for farmers to educate them about the disease and its prevention.

2. *Treatment of Animal Waste*

    - Prohibit the use of untreated animal waste as manure. All animal solid wastes should be properly treated through composting or biogas processes before being used on plantations.

3. *Protection from Rodents*

    - Ensure the protection of harvested produce, manure, fertilizers, and farm equipment from rodents to prevent contamination and damage.

4. *Cleaning and Disinfection*

    - Implement regular cleaning and disinfection protocols for all equipment used on farms to maintain hygiene and prevent disease transmission.

5. *Pest Control Measures*

    - Enforce effective pest control measures on farms to safeguard crops and maintain a healthy agricultural environment.

11.4 Ministry of Local Government and Disaster Risk Management

The efforts of the Ministry of Local Government and Disaster Risk Management through its various Local Authorities (comprising one Municipal City Council, four Municipal Councils, seven District Councils), will significantly contribute to controlling leptospirosis by addressing key environmental factors that facilitate the spread of the disease. Cleaning and maintaining drains, road surfacing and cleaning of riverbanks will help prevent water stagnation, which can harbor rodents and their urine, a primary source of leptospirosis. Cleaning of public places, particularly bare lands and wastelands, and ensuring these areas are free from waste and debris reduces rodent habitats. Regular scavenging services and the application of rodenticides in public places and buildings, especially in high-risk areas like markets and fairs, directly target and reduce rodent populations.

Additionally, bulky waste collection campaigns will prevent the accumulation of waste that could attract rodents and promote their proliferation.
Collectively, these actions create a cleaner, safer environment, thereby reducing the risk of leptospirosis transmission.

11.5 Ministry of Environment, Solid Waste Management & Climate Change

The *Information and Education Division* of this *Ministry* has the responsibility to conduct awareness raising campaigns on environmental issues and contributes to sensitization on the consequences of poor environmental conditions, resulting from littering and dumping and improper disposal of wastes which can lead to proliferation of rodents and pests. This will contribute to educating communities on environmental factors contributing to spread of leptospirosis and promote preventive practices to keep environmental conditions clean and safe.

11.6 Ministry of Energy and Public Utilities

Central Water Authority (CWA)

It is to be noted that the water supplied by the CWA for domestic use is treated and disinfected before distribution. The CWA ensures that the chlorine concentration at the end of the pipeline is maintained between 0.3 to 0.5 mg/l. Under these conditions, the water is free from any bacterial contamination.

12.0 Outbreak Response

In the event of an outbreak of leptospirosis, a steering committee chaired by the **Director Health Services (Public Health)** will be set up. Members of the steering committee will include:

- DPS Public Health
- Regional Public Health Superintendent, Communicable Disease Control Unit
- Director Public Health and Food Safety
- Director Health Promotion and Research
- Epidemiologist
- Director Laboratory Services
- Medical microbiologist or Clinical scientist
- Rapid Response Team (RPHS, CP, PHFSI, Epidemiologist)
- Ministry of Agro-Industry and Food Security
- The Ministry of Environment, Solid Waste Management and Climate Change
- The Ministry of Local Government and Disaster Risk Management
- Ministry of Education, Tertiary Education, Science and Technology
- Ministry of Tourism
- Private Medical Practitioners and private health institution representative
- Representatives from farmers, animal breeders and others
- Health Information, Education and Communication Officer

Objective of the committee

This committee will be responsible for planning and ensuring implementation of effective control and preventive measures in the community, identifying resources that may increase the scope of community education, ensure critical analysis of epidemiological/environmental health reports, medical management of cases outcomes and monitor on trends and relevant data collected to guide decision making.

13.0 Prompt Interventions

13.1 Interventions at the transmission route

Transmission can be prevented by:

· Wearing protective clothing (boots, gloves, spectacles, aprons, masks).

· Covering skin lesions with waterproof dressings.

· Washing or showering after exposure to urine splashes or contaminated soil or water.

· Washing and cleaning wounds.

· Developing an awareness of potential risks and methods of preventing or minimizing exposure, e.g. by avoiding or preventing urine splashes and aerosols, avoiding touching ill or dead animals, fetuses, placentas, organs (kidneys, bladders) with bare hands, and, unless wearing gloves, avoiding assisting animals giving birth.

· Wearing gloves when handling the urine of dogs and other animals, washing hands afterwards, and being aware that it is possible to be infected while nursing sick dogs or other animals.

· Strictly maintaining hygienic measures during care or handling all animals and avoiding contact with urine or other body fluids.

· Where feasible, disinfecting contaminated areas (scrubbing floors in stables, butcheries, abattoirs, etc.).

· Provision of clean drinking-water.

· Preventing access to, or giving adequate warning of water bodies known or suspected to be contaminated (ponds, rivers, lakes)

· Proper disposal of solid and liquid wastes and ensuring safe and clean agricultural, institutional, industrial, recreational and residential environments

Specific precautions for high-risk occupations are at Annex C.

13.2 Interventions at the level of the human host

These will include the following:

13.2.1 Communication and Community Engagement for Leptospirosis Control

Effective communication of leptospirosis risks is essential not only for disseminating information on prevention and mitigation but also for fostering informed decision-making, encouraging positive behaviour change, and maintaining public trust in the Ministry of Health and Wellness's response efforts. This includes identifying and managing rumours and misinformation that frequently arise during health emergencies by employing a range of communication techniques, from social media to face-to-face interactions. Distribution of pamphlets on Leptospirosis should be done during engagement activities.

13.2.2 Community Education and Engagement Activities

The objective is to target different strata of the population such as through meetings with community leaders and health talks in community, worksites and secondary schools to encourage the adoption of protecting behaviours.

13.2.3 Preventive Measures:

- Avoid contact with rodents, their excrement or urine
- Maintain hygiene at home and workplaces, such as storing food leftovers and other debris in rodent-proof containers and ensuring safe disposal methods for liquid and solid waste
- Seal holes in homes to prevent rodent access and fill/seal rat burrows
- Avoid wading, swimming, bathing, or swallowing floodwater or any freshwater that may contain animal urine

13.2.4 During Outbreaks:

- Encourage the use of waterproof protective clothing, shoes, or boots near floodwater or any freshwater source that may be contaminated with animal urine to interrupt transmission.
- Organize community-based environmental management and clean-up campaigns.

13.2.5 Capacity Building:

- Train healthcare professionals and trainers on leptospirosis, focusing on diagnosis, case management, surveillance, and response measures.

- These comprehensive strategies aim to educate and engage the community while enhancing the capacity of healthcare professionals to effectively manage and respond to leptospirosis.

13.3 Interventions at the level of the rodent/reservoir

The following activities as carried out by the PHFS Inspectorate and Rodent Control Unit collectively ensure effective rodent control and prevention across various environments and include:

- **Deratting Operations:** Conducting deratting of premises associated with cases and their immediate neighbors.

- **Inspection of Food Trade Premises:** Inspecting food trade premises and warehouses for rodent infestations and ensuring that remedial actions are taken.

- **Monitoring Overgrown Plots:** Detecting overgrown plots of land littered with waste and ensuring they are addressed.

- **Control Measures in Public Health Institutions:** Implementing regular control measures in all public health institutions.

- **Responding to Complaints:** Addressing complaints related to rodent infestations in residential, industrial, institutional, recreational, and agricultural zones, and conducting regular inspections.

- **Coordination with Stakeholders:** Coordinating with relevant stakeholders to address rodent harborage and proliferation.

- **Market and Infrastructure Inspections:** Reinforcing inspections of markets, malls, food trade premises, sewage networks, storm drains, farms, slaughterhouses, wastewater and water treatment plants.

- **Points of Entry Inspections:** Ensuring inspections of ships and aircrafts at points of entry, issuing deratting certificates or exemptions as necessary, maintaining permanent rodent control at port and airport areas and ensuring conduct of deratting process of ships.

- **Collection of solid waste:** Overviewing the scavenging processes ensured by local authorities or other stakeholders:

13.3.1 Activities in the Port Area

The Port Health Office and Food Import Unit conducts a range of critical activities to ensure the safety and sanitation of imported goods and the overall port sanitation status. These activities include fumigating all containers of rice and pulses arriving from Africa, Asia, and South America, as well as fumigating the cargo holds of vessels transporting corn, wheat, and soya from these regions, inspection of ships/containers and port areas. The deratting of vessels is performed to issue Ship Sanitation Control Certificates (Deratting Certificates). Rodent control measures, such as the use of rat glue and poison, are implemented throughout the port area. Additionally, rat traps are employed to capture live rats, which are subsequently dissected by the Rodent Control Unit. Fleas collected from these rats and spleens are sent to the Vector Biology Control Division, and to the Central Health Laboratory (Candos) respectively to detect the presence of *Yersinia Pestis*, the causative agent of Plague.

13.3.2 Activities in the Airport Area

The airport conducts extensive rodent control activities to maintain a safe and sanitary environment across various key locations. These activities include the application of rat glue and rodenticides at the National Coast Guard, Mauritius Police Force, and Fire Brigade Stations. Additional sites include the AML Building in the Parking Area, tuck shops, general parking areas, airfield yards and buildings, landfill, warehouse, Civil Aviation facilities, AMB cold room, incinerator, Alpha Cleaning facilities, and the pass office.

These measures are crucial for controlling rodent populations and ensuring the operational integrity and safety of the port and airport environment.

These procedures ensure that rodent control activities are conducted effectively and that all related issues are properly addressed and reported.

13.3.3 Safe use of Rodenticides

Safety is of utmost priority when applying rodenticide treatments, necessitating strict adherence to several precautions:

Wear Protective Gear: Always wear gloves and a face mask before handling rodenticides.

Strategic Placement: Place rat poison in locations inaccessible to humans and other animals, preferably outside the house and within rat burrows.

Avoid Direct Contact: Use gloves to prevent direct contact with poisons and food bases.

Use Labelled Poisons: Purchase well-labelled poisons and meticulously follow the provided instructions.

Targeted Bait Placement: Place baits along rats' travel routes, such as along walls, boxes, or sacks, preferably inside bait stations.

Regular Monitoring: Check bait availability each morning and replenish every few days as needed.

Dispose of Unused Bait: Discard all unconsumed baits, as rats avoid putrid or moldy food.

Safe Disposal of Rats: Properly collect and dispose of all dead rats.

Hygiene Practices: Wash hands thoroughly after handling rodenticides or disposing of dead rats.

13.3.4 Methods of placing rat glue

When handling rat glue, it is important to take precautions to avoid contact with the adhesive by wearing gloves and mask.

Usually, boards are used by rubbing rat glue on and adding some kind of attractant (cheese, salted fish, etc.) to the centre of the board.

Rat glue traps must be placed near entrances on both sides, adjacent to the wall.

Rat glue trap should be checked daily; if rats have been caught it should be disposed and replaced by a fresh rat glue trap.

Failure to observe a good housekeeping, to maintain a good standard of Environmental sanitation and to prevent rats having access to food and food wastes, will not help to eradicate rats and the placing of rodenticides in these ill conditions will amount to a loss of time, manpower and money.

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Annex A1: Notification Form

MINISTRY OF HEALTH AND QUALITY OF LIFE

CERTITICATE OF NOTIFICATION
(to be forwarded to the nearest Health Office)

I hereby certify and declare that in my opinion

Mr/Mrs/Miss ..... aged .....

residing at .....

Is suffering from .....

Duly Qualified Medical Practitioner

Name: .....

Address: .....

Signature: ..... Date: .....

B. Blank copies of this form are obtainable free from Health Offices and from the Ministry of Health and Quality of Life, 5th Floor, E. Anquetil Building, Port Louis or downloadable from the Ministry's website

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INFECTIOUS OR COMMUNICABLE DISEASES

By virtue of the Public Health (Infectious or Communicable Diseases) Regulations 1987, the following diseases are declared to be infectious or communicable:

1. Acquired Immuno Deficiency (AIDS) related complex ARC with positive serology
2. Acquired Immuno Deficiency Syndrome (AIDS)
3. Amoebiasis
4. Anthrax (Human)
5. Brucellosis
6. Chikungunya
7. Cholera
8. Dengue Fever
9. Diphtheria
10. Food Poisoning (bacterial, other)
11. Gonorrhoea
12. Haemorrhagic fever
13. Human Immuno Deficiency (HIV) Infection
14. Infective Hepatitis
15. Influenza like diseases
16. Leprosy
17. Leptospirosis
18. Malaria
19. Measles
20. Meningitis (cerebrospinal)
21. Plague
22. Poliomyelitis, acute
23. Puerperal Pyrexia
24. Rabies (Human)
25. Relapsing fever
26. Schistosomiasis (Bilharsiasis)
27. Soft Chancre
28. Syphilis
29. Tetanus (neonatorum & adult)
30. Tuberculosis (respiratory, skeletal, central nervous system)
31. Typhoid fever (with paratyphoid)
32. Typhus
33. Whooping cough (Pertussis)

Annex A2: Leptospirosis Case Report

RPHS OFFICE

TEL: **FAX:** **Email:**

Date:…….

REPORT: CASE OF LEPTOSPIROSIS

NAME	
AGE	
GENDER	
NATIONALITY	
CONTACT NUMBER	
ADDRESS (AT TIME OF NOTIFICATION)	
DATE OF NOTIFICATION	
RESIDENTIAL ADDRESS	
OCCUPATION	
TRAVEL HISTORY	
DATE OF ARRIVAL	

SIGNS AND SYMPTOMS	
DATE OF ONSET OF SYMPTOMS	
VITALS	
PAST MEDICAL HISTORY	
ADMISSION	
TREATING PHYSICIAN	
INVESTIGATION	
TREATMENT	

PRINCIPAL PUBLIC HEALTH AND FOOD SAFETY INSPECTOR HAVE BEEN INFORMED TO CARRY OUT EPIDEMIOLOGICAL SURVEY AND SUBMIT REPORT (WILL FOLLOW)

RPHS OFFICE

Annex B: Outbreak Investigation Form

Leptospirosis case investigation form

Demographic information	
Name of Patient	
Sex	
Age	
Nationality	
Residential Address	
Occupation	
Resident/Non-Resident	
Address of work	
Telephone number	
No. of cases reported in same region	
Date of notification	
Place of notification	**Hospital ☐ Private Medical Practitioner ☐** **Private Clinic ☐ Health Centre ☐**
Name of Medical Practitioner	
Place where patient was at time of notification?	
Treatment as out patient	
Date	
Place of treatment	
Treatment as inpatient	
Name of hospital	
Date of admission	
Date of discharge	

Travel history past two months					
Did the patient travel to in the month before the onset of symptoms?					
If so, specify where					
Date of departure					
Date of arrival					
Clinical information – case history					
Date of onset symptoms					
Clinical signs and symptoms					
Fever	**Yes☐**	**No ☐**	**Jaundice**	**Yes☐**	**No ☐**
Chills	**Yes☐**	**No ☐**	**Cough**	**Yes☐**	**No ☐**
Severe headache	**Yes☐**	**No ☐**	**Abdominal pain**	**Yes☐**	**No ☐**
Skin rash	**Yes☐**	**No ☐**	**Vomiting**	**Yes☐**	**No ☐**
Red Eyes *(photophobia)*	**Yes☐**	**No ☐**	**Muscle aches**	**Yes☐**	**No ☐**
Diarrhoea	**Yes☐**	**No ☐**	**Nausea**	**Yes☐**	**No ☐**
Other, Specify					
Exposure to risk factors					
Presence of a skin lesion/wound on the body during the past month					
Walking barefooted during the past month					
Drinking-Water Supply			**Tap water ☐ Well water ☐ Stream water ☐ Other: _____**		
Exposure to animals					
Do you have any domestic animal or pet at home?			**Yes☐ No ☐ Dog ☐ Cat ☐ Other: _____**		
Did you handle any animals during the last month (apart from your domestic animal)?			**Yes ☐ No ☐ Cows ☐ Pigs ☐ Horses ☐ Rodents ☐ Other: _____**		
Types of handling (feeding, cleaning, etc.)					

Date of the handling	
Were you exposed to any animals in the environment without handling them in the last month? (e.g. farm visit, animals in the neighbourhood or the backyard, pest in the house, etc.)	
If so, which animals were you exposed to?	**Rats ☐ Mice ☐ Pigs ☐ Cows ☐ Horses ☐ Dogs ☐ Other ☐**
Date and place of exposure	
To the best of your knowledge, was there any animal in your surrounding that was ill or died in the last month?	
Outdoor or sport activities	
Did you practice one or several of these activities in the last month?	**Canoe ☐ Swimming ☐ Rafting ☐ Triathlon ☐ Fishing ☐ Canyoning ☐ Gardening ☐ Hunting ☐ Hiking ☐ Kayak ☐ Running in muddy conditions ☐**
Did you swallow some water during this activity?	
In case of flood exposure	
Swimming in flood water	
Exposure of a wound/cut to flood	
Involvement in flood recovery/cleaning	
Consumption of wet food or food contaminated by flood water	
Family history	
Number of inmates in family:	**Adults: children:**
Has any member been affected by said disease recently or in the past?	
Was patient residing at same address? If no? Where?	
Is any member of the family suffering from similar symptoms? If yes? Advice given	

Any other action taken to prevent contamination	
Sanitation at place of residence	
Whether premises is infested with rats?	
Whether rats are seen regularly?	
At what time are rats seen?	
Any other indication of rat infestation?	
Type of water closet used	
Waste water disposal system	
Refuse disposal system	
Do you have any pest control system?	
Any pets on premises?	
Any animal breeding on premises?	
Sanitary condition of premises	
Sanitation at workplace (if applicable)	
Whether premises is infested with rats?	
Whether rats are seen regularly?	
At what time are rats seen?	
Any other indication of rat infestation?	
Type of water closet used	
Waste water disposal system	
Refuse disposal system	
Do you have any pest control system?	
Any pets on premises?	
Any animal breeding on premises?	
Sanitary condition of premises	
Nuisances detected and description	
1.	
2.	

3.	
4.	
5.	
Action taken	
1.	
2.	
3.	
4.	
5.	
Name of investigating Officer	
Grade	
Signature	
Date	

Annex C: Specific measures to target occupational exposure

Protecting Workers from Leptospirosis

Hazard removal

- Where possible, eliminate the bacteria from the workplace. Pest control and good housekeeping are essential steps. Regularly clean and tidy workplaces (including kitchen dining, toilets and hand-washing facilities).
- However, this is often difficult where the workplace cannot be controlled (e.g. on construction sites) but measures should be put in place to at least protect eating areas and water supplies.
- Even in environments where contamination persists, isolate workers from the hazard using remote-reach equipment or designing activities to prevent accidental exposure.

Personal Protective Equipment

In high-risk workplaces:

- Animal handlers should treat all animals as if they are infected and always wear full protection.
- Farm, agricultural and horticultural workers should treat all wet soil and vegetation as if it is contaminated and wear full protection, particularly after heavy rain, flooding or where significant earthworks were recently done in areas nearby your workplace.
- PPE does not eliminate or minimize the risk – it acts only as a barrier between the infection source and the worker. For leptospirosis, the aim of PPE is to prevent contaminated urine, water and fluids from getting through broken skin or the mucous membranes of the eyes, nose or mouth.
- Employers must provide suitable PPE for workers at risk of exposure to leptospirosis and provide information, training and instruction on how to use, wear, storage, maintain and dispose of it. PPE may include:
- Gloves must be changed immediately if they are damaged.
- Full-cover, waterproof boots or shoes that do not allow water to enter from the top. Boots or shoes must be changed immediately if they are damaged.
- Goggles and/or face shields that protect the eyes, nose and mouth may be necessary for activities that pose a risk of splashes / airborne bacteria being ingested, inhaled or entering eyes.
- Long sleeve shirts when having contact with soil, vegetation or animal feed that is possibly contaminate.
- For animal handlers (e.g. milking, trimming, tagging, birthing, etc.): disposable hats, milking

sleeves and plastic aprons

- Extra PPE may be needed when working in wet conditions or assisting with birthing e.g. overalls
- Protect broken skin with waterproof dressings or clothing

High risk workers should be taught on how to recognise symptoms of leptospirosis in themselves and/or co-workers and to seek medical attention in case of symptoms or accidental exposure.

Other workplace systems:

- Conduct regular workplace inspections to identify sources of infection and exposure risks.
- Encourage hazard and incident reporting.
- Investigate and monitor known sources of infection to reduce the risk of exposure.
- Display signage / information when workplace exposure to leptospirosis is considered high-risk.
- Ensure an appropriate number of first aiders are trained in leptospirosis exposure and are available on all shifts.
- Ensure all possible infections are diagnosed and treated early.
- Reallocate at-risk workers (e.g. who have eczema, are pregnant or trying to become pregnant) to work away from high-risk areas and activities.

Annex D: Contributors

The Ministry of Health and Wellness appreciates the valued cooperation and contribution of other stakeholders as mentioned below:

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The CDCU would like to place on record its grateful appreciation to Mr R.Hurree, Management Support Officer for his dedication and commitment in editing this document.