

## LEGIONELLOSIS PROTOCOL

Based on of the MoH Communicable Diseases Manual 2012, July 2016 update

### Associated Documents

- Case Report Form LegionellosisCRF2013.pdf  
<K:\CFS\ProtectionTeam\FinalDocs\NotifiableConditions\Legionellosis\FormsStdLettersQuest\LegionellosisCRF2013.pdf>
- Fact sheet:  
<Y:\CHC03DataLink\Division\CPH\CFS\Quality\ApprovedDocuments\ProtectionTeam\FactSheets\LegionnairesDiseaseFactSheet.pdf>
- CoolingTowerQuestionnaire160727  
<K:\CFS\ProtectionTeam\FinalDocs\NotifiableConditions\Legionellosis\FormsStdLettersQuest\CoolingTowerQuestionnaire160727.pdf>
- Legionella Questionnairev4.docx  
<K:\CFS\ProtectionTeam\FinalDocs\NotifiableConditions\Legionellosis\FormsStdLettersQuest\LegionellaQuestionnairev4160729.docx>
- ESR0182 Legionella sample request form  
<Y:\CFS\ProtectionTeam\FinalDocs\NotifiableConditions\Legionellosis\FormsStdLettersQuest\ESR0182-Legionella-request-form-fillable.pdf>
- ESR0039 Single human source specimen request form  
<http://www.esr.cri.nz/assets/Test-Forms/ESR-0039-Single-human-request-form-FEB-VERS6.0-16-fillable.pdf>
- Environmental assessment form 01: Potting mix/Soil/Compost  
<Y:\CFS\ProtectionTeam\FinalDocs\NotifiableConditions\Legionellosis\FormsStdLettersQuest\EAF01PottingMixSoilCompost160727.docx>
- Environmental assessment form 02: Spa pool/Water fountain/Water feature  
<Y:\CFS\ProtectionTeam\FinalDocs\NotifiableConditions\Legionellosis\FormsStdLettersQuest\EAF02SpaPoolWaterFountain160727.docx>
- Environmental assessment form 03: Warm water systems  
<Y:\CFS\ProtectionTeam\FinalDocs\NotifiableConditions\Legionellosis\FormsStdLettersQuest\EAF03WarmWaterSystems160727.docx>
- Environmental assessment form 04: Wet cooling systems  
<Y:\CFS\ProtectionTeam\FinalDocs\NotifiableConditions\Legionellosis\FormsStdLettersQuest\EAF04WetCoolingSystem160727.docx>

### The Illness

Legionnaires' disease (the pneumonic form of legionellosis) was first identified in the United States in the mid 1970s after a large outbreak of pneumonia (due to *L. pneumophila*) among war veterans in Philadelphia. Since then outbreaks have been identified worldwide often associated with cooling towers.

#### Epidemiology in New Zealand

*Legionella* bacteria are ubiquitous in the New Zealand environment, particularly in soil and aquatic environments, making it difficult to prevent pathogens from entering engineered water reticulation systems. The disease is more common in older people, smokers, chronic disease sufferers and the immunocompromised.

In New Zealand and particularly Canterbury, the commonest cause of legionellosis is from potting mix/compost and is usually due to *L. longbeachae*.

Most cases in New Zealand are caused by *L. longbeachae* and *L. pneumophila*. The primary sources of these bacteria are constructed warm-water systems (*L. pneumophila*) and composted vegetative material (*L. longbeachae*). Further information on *Legionella* species in New Zealand can be found in the Ministry of Health publication *The Prevention of Legionellosis in New Zealand: Guidelines for the control of legionella bacteria* (Ministry of Health 2011).

The annual number of cases notified remained relatively stable between 1997 and 2009 but increased dramatically in 2010. This increase was in part at least due to increased sensitivity of laboratory identification using PCR testing.

**Case Definition**

**Clinical description**

Infection with *Legionella* is an important cause of community-acquired pneumonia and occasionally multi-systemic disease, occurring both sporadically and in outbreaks. *Legionella* infections can cause a spectrum of symptoms, including subclinical infection (infection with **no** disease).

For notification purposes, the following three categories meet the clinical criteria for a clinically compatible illness:

1. pneumonia (Legionnaires' disease)
2. non-pneumonic disease (eg Pontiac fever) – a self-limiting acute febrile illness which may be accompanied by cough
3. extrapulmonary disease – involving skin, joints, pericardium or other organs.

Although the most common clinical manifestation of legionellosis reported worldwide is Legionnaires' disease, non-pneumonic disease is often clinically unrecognised and therefore likely to be under-reported.

**Incubation period**

The time between exposure and the first sign of symptoms for:

- ◇ Legionnaires' disease is usually 2–10 days but can be up to 14 days (*up to 16 days has been recorded in some outbreaks* (<http://www.who.int/mediacentre/factsheets/fs285/en/>)).
- ◇ Pontiac fever is usually 24–48 hours, but can be between 5 hours and 3 days.

**Mode of transmission**

Transmission is through inhalation of aerosols of either water or dust particles carrying *Legionella* bacteria, or via aspiration of contaminated water.

Common sources of water or soil colonised with *Legionella* bacteria include cooling towers, spa pools, potting mix and other compost-related products, and warm-water systems (including fittings).

**Period of communicability**

Person-to-person transmission has not been demonstrated.

**Prevention**

- ◇ The prevention of *L. pneumophila* infection focuses on minimising the risk of the growth of *Legionella* in cooling towers through maintenance, water quality, education of building operators, legislation and enforcement.
- ◇ Most bags of potting mix /compost have warning labels about safe handling. More research is required to understand the mechanisms of risks involved with handling potting mix/compost.

**Differentiating Legionnaires' Disease and Pontiac Fever**

CDC website: <https://www.cdc.gov/legionella/clinicians/clinical-features.html>

	Legionnaires' disease	Pontiac fever
Clinical features	Pneumonia, cough, fever	Flu-like illness (fever, chills, malaise) without pneumonia
Pathogenesis	Replication of organism	Inflammatory response to endotoxin
Radiographic pneumonia	Yes	No
Incubation period	2-14 days after exposure	24-72 hours after exposure
Etiologic agent	<i>Legionella</i> species	<i>Legionella</i> species
Attack rate	< 5%	> 90%
Isolation of organism (from the patient)	Possible	Never
Outcome	Hospitalization common. Case-fatality rate: 10%, 30% in healthcare associated cases	Hospitalization uncommon. Case-fatality rate: 0%

<b>Notification Procedure</b>	
	<p>Attending medical practitioners or laboratories must <b>immediately</b> notify the local medical officer of health of suspected cases. Notification should not await confirmation.</p> <p><b>Case classification</b></p> <ul style="list-style-type: none"> <li>• <b>Under investigation:</b> A case that has been notified, but information is not yet available to classify it as probable or confirmed.</li> <li>• <b>Probable:</b> A clinically compatible illness that has laboratory suggestive evidence.</li> <li>• <b>Confirmed:</b> A clinically compatible illness that has laboratory definitive evidence.</li> <li>• <b>Not a case:</b> A case that has been investigated and subsequently found not to meet the case definition.</li> </ul> <p>Note:</p> <ul style="list-style-type: none"> <li>○ A single elevated titre is a useful screen, but can be a false positive, hence the need for confirmatory testing. Public health investigations should take account of all the information available.</li> <li>○ A positive nucleic acid amplification test (NAAT) (PCR or other nucleic acid detection method) is very useful for rapid diagnosis and case management but may not identify the causative agent. In this situation, further testing to identify the causative agent is required (<i>Legionella</i> culture or convalescent serology).</li> <li>○ Urine antigen testing is not completely specific for Lp1 and there can be cross-reactivity with other serogroups. Therefore convalescent serology may be useful to clarify the causative species/serogroup.</li> <li>○ Isolation of <i>Legionella</i> bacteria remains the gold standard for diagnosis of legionellosis.</li> </ul>
<b>Laboratory Testing</b>	
	<p>Laboratory definitive evidence for a confirmed case requires at least one of the following:</p> <ul style="list-style-type: none"> <li>• isolation (culture) of <i>Legionella</i> species from respiratory secretions or other clinical samples</li> <li>• detection of <i>Legionella</i> species nucleic acid (by PCR or other detection method)</li> <li>• a fourfold or greater rise in IFA titre against <i>Legionella</i> species to <math>\geq 256</math> between paired sera tested in parallel using pooled antigen at the same reference laboratory</li> <li>• detection of <i>Legionella pneumophila</i> serogroup 1 (Lp1) antigen in urine.</li> </ul> <p><b>Laboratory suggestive evidence for a probable case requires:</b></p> <ul style="list-style-type: none"> <li>• one or more elevated <i>Legionella</i> species serology titres of <math>\geq 512</math> tested using pooled antigen at a reference laboratory.</li> </ul>
<b>Management of Case / Outbreak</b>	
	<p><b>Investigation</b></p> <ul style="list-style-type: none"> <li>• Action on day of notification if <i>L. pneumophila</i>.</li> <li>• Action within 24 hours if sporadic case (not <i>L. pneumophila</i>) eg. <i>longbeachae</i>.</li> <li>• Complete questionnaire by phone, either by interviewing the case or the next of kin if the case is unavailable. If contact by phone is not possible, visit the hospital.</li> <li>• Obtain a two-week history of:             <ul style="list-style-type: none"> <li>– places visited before the onset of symptoms (including social, work, educational, shopping malls, hospital and recreational settings)</li> <li>– exposure to:                 <ul style="list-style-type: none"> <li>○ exposure to compost and potting mix</li> <li>○ large-building water systems</li> <li>○ aerosolised or sprayed water, such as from cooling towers, commercial or hand car-washing apparatuses, air conditioners, nebulisers, heated swimming pools, spa pools, decorative fountains, water blasters and showers.</li> </ul> </li> <li>– travel in NZ and overseas.</li> </ul> </li> </ul>

- Establish if the case has been an inpatient or outpatient of a medical facility or had dental procedures in the two weeks before the onset of symptoms.
  - Ensure the attending medical practitioner has obtained laboratory confirmation, including identification to species and serotype level. Samples should also be referred to the Legionella Reference Laboratory at ESR for confirmatory testing or typing (for serology, this includes both acute and convalescent paired sera).
  - Review recent cases to see if there have been any common exposures or linkages.
  - Sample the domestic hot water cylinder and check the temperature (refer Disinfection below).  
(<K:\CFS\ProtectionTeam\FinalDocs\notifiableconditions\Legionellosis\Procedures\LegionellaEnviroSamplingProcedureVersion2July2011.pdf>).
  - Other environmental samples (*but not usually domestic potting mix/compost - see following\**) should be taken from possible sources (refer to ESR instructions above),  
Use the ESR requisition form for water and other environmental samples:  
(<Y:\CFS\ProtectionTeam\FinalDocs\notifiableconditions\Legionellosis\FormsStdLettersQuest\ESR0182-Legionella-request-form-fillable.pdf>).
- \* The average home gardener does not need to have samples taken. However potting mix/compost/soil samples may be taken depending on the risk exposure and the significance of the result to the management of the case, e.g. a person working at a compost manufacturer etc. Discuss with MOH if necessary.
- Fax the Case Report Form to notifying doctor for completion. Do not wait for this to be returned before completing the questionnaire with the case.
  - Potting mix/compost/soil samples may be taken depending on the risk exposure and the significance of the result to the management of the case. Discuss with MOH if necessary.

**Refer References And Further Information** for other relevant documents.

**Treatment**

To be coordinated by the notifying medical practitioner.  
See <http://www.healthpathways.org.nz/> <Legionnaires' Disease>

**Restriction**

Nil.

**Counselling**

- Advise the case and their caregivers of the nature of the infection and its mode of transmission.
- A fact sheet is available:  
[\CHC03DataLink\Division\CPH\CFS\Quality\ApprovedDocuments\ProtectionTeam\FactSheets\LegionnairesDiseaseFactSheet.pdf](CHC03DataLink\Division\CPH\CFS\Quality\ApprovedDocuments\ProtectionTeam\FactSheets\LegionnairesDiseaseFactSheet.pdf)
- Pamphlets are available (see Health Education section)

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**Outbreak**

In the event of a suspected outbreak, initiate an outbreak response with an Incident Controller and CIMS structure. Refer to the following documents and forms:

- Outbreak Response Plan  
([http://cdhbintranet/communitypublichealth/cphpoliciesandprocedures/Documents/ComDis\\_Outbreak\\_Response\\_Plan.aspx](http://cdhbintranet/communitypublichealth/cphpoliciesandprocedures/Documents/ComDis_Outbreak_Response_Plan.aspx))
- Outbreak Response Plan associated documents including:
- the Environmental Checklist  
([CFS\ProtectionTeam\FinalDocs\notifiableconditions\OUTBREAK\\_GENERAL\FormsStdLettersQuest\OutbreakChecklists\Checklist03Environmental\\_Outbreak.docx](CFS\ProtectionTeam\FinalDocs\notifiableconditions\OUTBREAK_GENERAL\FormsStdLettersQuest\OutbreakChecklists\Checklist03Environmental_Outbreak.docx))

	<ul style="list-style-type: none"> <li>• Outbreak Task Cards (<a href="#">CFS\ProtectionTeam\FinalDocs\NotifiableConditions\OUTBREAKGENERAL\FormsStd LettersQuest\OutbreakChecklists\CPHOutbreakTaskCards150514.docx</a>)</li> <li>• Incident Action Plan (<a href="#">CFS\ProtectionTeam\Final Docs\NotifiableConditions\OUTBREAK4GENERAL\FormsStdLetters Quest\Incident ActionPlan. Docx</a>).</li> <li>• If a cooling tower/evaporative condenser is involved consider forming a technical advisory group including industry representatives (eg: from IRHACE (Institute of refrigeration heating and cooling engineers), CCCA (Climate Control Companies Association), Christchurch City Council Environmental team, WorkSafe and possibly a CHL clinical microbiologist).</li> <li>• Consider taking our own samples (under the aegis of WorkSafe) from suspected cooling towers/evaporative condensers.</li> <li>• Inform those in the health sector who need to know including GPs, the Emergency Dept, the Microbiology laboratory, Southern Community Laboratory, the Ministry of Health and ESR.</li> </ul>
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**Management of Contacts**

	<p><b>Definition</b> A contact is any person who has experienced exposures similar to the case within the preceding three months.</p> <p><b>Investigation</b> Because there is no person-to-person spread with legionellosis, advise contacts about the mode of infection and encourage them to go promptly to their general practitioner if symptoms develop.</p> <p><b>Prophylaxis</b> Nil.</p> <p><b>Restriction</b> Nil</p> <p><b>Counselling</b></p> <ul style="list-style-type: none"> <li>• Advise contacts of the nature of the infection and its mode of transmission.</li> <li>• A fact sheet is available: <a href="#">\CHC03DataLink\Division\CPH\CFS\Quality\ApprovedDocuments\Protection Team\FactSheets\LegionnairesDiseaseFactSheet.pdf</a></li> <li>• Pamphlets are available (see Health Education section)</li> </ul>
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**Other Control Measures**

	<p><b>Identification of source</b></p> <ul style="list-style-type: none"> <li>• Refer to <a href="#">The Prevention of Legionellosis in New Zealand: Guidelines for the control of legionella bacteria</a> (Ministry of Health, Revised Oct 2012) for detailed information on investigation of cases.</li> <li>• The medical officer of health is responsible for coordinating an investigation into the source of infection.</li> <li>• The Ministry of Health liaises with the medical officer of health regarding the public health response and ESR regarding the laboratory testing and results.</li> <li>• The public health unit will take environmental samples to test for <i>Legionella</i> bacteria from potential sources. (If a cooling tower is implicated as a possible source consider shutting it down. If an unknown cooling tower is a possible source ask the Local Authority (Building Warrant of Fitness section) for a list of buildings in the area that have a cooling tower.[C&amp;PH])</li> <li>• Following any hospital-acquired case, infection prevention and control and building services for the hospital should be notified.</li> <li>• Suspected occupational sources and clusters of cases should be thoroughly investigated. In the case of a suspected occupational source, WorkSafe New Zealand is responsible for investigating specific risks in a workplace. Sporadic</li> </ul>
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cases, however, may not warrant extensive investigation because of the difficulty in identifying the specific source and the likelihood of detecting a variety of natural or constructed water-distribution systems naturally colonised with other *Legionella* strains.

- Even when cases appear to be sporadic, an assessment of space–time clustering with other cases should be considered.
- For further information on environmental testing, please refer to:
  - <http://www.esr.cri.nz/health-science/specialist-testing/show/761>
  - [http://www.who.int/water\\_sanitation\\_health/emerging/legionella.pdf](http://www.who.int/water_sanitation_health/emerging/legionella.pdf)
  - Also see **References And Further Information**

### Disinfection

Disinfection of contaminated water sources is an important control measure (but take samples first if possible). Disinfection is obligatory when *Legionella* bacteria are identified in any of the following systems in levels of concern and considered to have caused or may cause disease:

- in a domestic water system
- in a cooling tower when the level is at or above 10 colony-forming units/mL (refer to AS/NZS 3666).
- in a spa pool
- in a decorative fountain etc.

⇒ **For advice on disinfection of any contaminated site, contact the Legionella Reference Laboratory at ESR.**

⇒ For further information on disinfection, refer to [The Prevention of Legionellosis in New Zealand: Guidelines for the control of legionella bacteria](#) (Ministry of Health Revised Oct 2012).

### Notes:

- ◇ Legionella are less likely to survive in water held at greater than 60°C, (although ACC recommends 55°C for domestic hot water cylinders unless there is a tempering valve on the outlet to prevent scalding).
- ◇ Cooling tower disinfection:
  - should be performed by a commercial ventilation/air-conditioning or water treatment company.
- ◇ Spa pool disinfection:
  - contact either **the Legionella Reference Laboratory at ESR**

Or

refer to the following the ESR publications:

  - ◇ Controlling The Risks Of Infection In Spa Pools (Management Of Spa Pools) 2006. Reviewed March 2011, [CFS\Protection Team\FinalDocs\NOTIFIABLEConditions\Legionellosis\Procedures\ControllingTheRisksOfInfectionInSpaPoolsReviewed March 2011.pdf](#)).
  - ◇ Guidelines for the remediation of spa pools implicated in cases of legionellosis 2005. Reviewed March 2011 ([CFS\ProtectionTeam\FinalDocs\NOTIFIABLEConditions\Legionellosis\Procedures\Guidelines for the remediation of spa pools implicated in cases of legionellosis, Reviewed March 2011.pdf](#))

Or

contact a water treatment company.
- ◇ Ensure cleaning protocols are in place subsequently for any air conditioning, spa or hot water system causing illness, especially in an outbreak.
- ◇ For disinfection of a spa pool refer either to the Legionella Reference Laboratory at ESR.

### Health Education

- Medical officers of health are responsible for health education in the event of a non-occupational cluster of cases.

- A fact sheet resource suitable for soil and compost product suppliers is available from WorkSafe New Zealand at <http://www.business.govt.nz/worksafe/information-guidance/all-guidance-items/legionnaires-disease>
- Another educational resource is the Ministry of Health pamphlet on safe gardening, which is available at [www.health.govt.nz/system/files/resource-files/HE4605.pdf](http://www.health.govt.nz/system/files/resource-files/HE4605.pdf)
- The Ministry of Health pamphlet on safe gardening is available at: <https://www.health.govt.nz/system/files/resource-files/HE4605-Gardening-WEB.pdf>
- CHIC resource: Legionnaires' Disease (MED0063)
- CHIC resource Advice For Gardeners (SAF0036)

**Reporting**

- ⇒ Ensure complete case information is entered into EpiSurv.
- ⇒ In the event of a cluster of cases or outbreak, contact:
  - ◇ the Ministry of Health Communicable Diseases Team and outbreak liaison staff at ESR, and complete the Outbreak Report Form.
- ⇒ If an outbreak, write a report for the File, ([.\CFS\ProtectionTeam\FinalDocs\NotifiableConditions\Legionellosis\Outbreaks](file:///C:/CFS/ProtectionTeam/FinalDocs/NotifiableConditions/Legionellosis/Outbreaks)) and also attach to the EpiSurv outbreak report.

**References And Further Information**

**Ministry of Health/ESR**

- Legionellosis, Communicable Disease Control Manual, 2012 Updated July 2016 Ministry of Health, <http://www.health.govt.nz/system/files/documents/publications/cd-manual-legionellosis-jul16.pdf>
- ESR Notifiable And Other Diseases Annual Report 2014 ([https://surv.esr.cri.nz/PDF\\_surveillance/AnnualRpt/AnnualSurv/2014/2014AnnualReportFinal.pdf](https://surv.esr.cri.nz/PDF_surveillance/AnnualRpt/AnnualSurv/2014/2014AnnualReportFinal.pdf)).
- Environmental Sampling For Legionella Bacteria Version 2.0, 6 July 2011 ([CFS\ProtectionTeam\FinalDocs\NOTIFIABLEConditions\Legionellosis\Procedures\LegionellaenvirosamplingprocedureJuly2011.pdf](file:///C:/CFS/ProtectionTeam/FinalDocs/NOTIFIABLEConditions/Legionellosis/Procedures/LegionellaenvirosamplingprocedureJuly2011.pdf)).
- Controlling The Risks Of Infection In Spa Pools (Management Of Spa Pools) 2006. Reviewed March 2011 ([CFS./ProtectionTeam/FinalDocs/NotifiableConditions/Legionellosis/Procedures/Controlling the risks of infection in spa pools.pdf](file:///C:/CFS/ProtectionTeam/FinalDocs/NotifiableConditions/Legionellosis/Procedures/Controlling%20the%20risks%20of%20infection%20in%20spa%20pools.pdf))
- Guidelines for the remediation of spa pools contaminated with legionella ([CFS\ProtectionTeam\FinalDocs\NOTIFIABLEConditions\Legionellosis\Procedures\Guidelines for the remediation of spa pools contaminated with legionella.pdf](file:///C:/CFS/ProtectionTeam/FinalDocs/NOTIFIABLEConditions/Legionellosis/Procedures/Guidelines%20for%20the%20remediation%20of%20spa%20pools%20contaminated%20with%20legionella.pdf)).
- Guidelines for remediation of (potable water reticulation) systems infected with (culture positive for) legionella (bacteria) v5 1 July 2009 ([CFS\ProtectionTeam\FinalDocs\NOTIFIABLEConditions\Legionellosis\Procedures\Guidelines for remediation of systems infected with legionella v5 1 July 2009.pdf](file:///C:/CFS/ProtectionTeam/FinalDocs/NOTIFIABLEConditions/Legionellosis/Procedures/Guidelines%20for%20remediation%20of%20systems%20infected%20with%20legionella%20v5%201%20July%202009.pdf)).
- Guidelines for the remediation of domestic water reticulation systems fed from bulk storage tanks found culture positive for legionella 2008. Reviewed March 2011 ([CFS\ProtectionTeam\FinalDocs\NOTIFIABLEConditions\Legionellosis\Procedures\Guidelines for the remediation of domestic water reticulation systems fed from bulk storage tanks found culture positive for legionella Reviewed March 2011.pdf](file:///C:/CFS/ProtectionTeam/FinalDocs/NOTIFIABLEConditions/Legionellosis/Procedures/Guidelines%20for%20the%20remediation%20of%20domestic%20water%20reticulation%20systems%20fed%20from%20bulk%20storage%20tanks%20found%20culture%20positive%20for%20legionella%20Reviewed%20March%202011.pdf)).
- The Prevention of Legionellosis in New Zealand: Guidelines for the Control of Legionella Bacteria (Ministry of Health Revised Oct 2012)

<http://www.health.govt.nz/system/files/documents/publications/prevention-of-legionellosis-in-new-zealand-v2.pdf>

**Other**

- Department of Building and Housing 2007. Compliance Schedule handbook, Wellington: Department of Building and Housing. Available at: <http://www.barrierfreenz.org.nz/i/1ebee8c9521da797.pdf>
- AS/NZS 3666.3:2011. Australian/New Zealand Standard. Air-handling and water systems of buildings— Microbial control, Part 3. Available at: <https://www.standards.govt.nz/>
- Legionella and the prevention of legionellosis. Available at: [http://www.who.int/water\\_sanitation\\_health/emerging/legionella.pdf](http://www.who.int/water_sanitation_health/emerging/legionella.pdf)