

LEGIONELLA RISK MANAGEMENT

A REVIEW OF THE STATE AND COMMONWEALTH REQUIREMENTS

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Recent outbreaks of legionellosis in Australia have been associated with the water distribution systems inside hospitals, as well as the better publicised source of the air conditioning cooling tower. As such, new guidelines have been released in late 2015 that apply to all health facilities in Australia, rather than the state or territory approach of existing *Legionella* control guidelines, and which specifically relate to the control of *Legionella* within the water distribution system. In addition to these guidelines, State and Territory guidelines and legislation still apply.

Individual state or territory guidelines still apply separately to the cooling tower systems, and a comparison of the state/territory guidelines for *Legionella* control show different controls, risk management and requirements are prescribed by each state and territory. This article will concentrate on bringing together some of the state and national guidelines to give an overview of the requirements of these guidelines, and the guidelines for overall risk management strategy for *Legionella spp.* for Australian healthcare premises.

It is quite difficult to find all of the relevant information on the applicable *Legionella* guidelines and legislation for Australia all in one place – this article attempts to do so, but does not guarantee to be a complete resource of all applicable legislation. The resources ‘Prensa update: National Summary of Cooling Tower Legislation, March 2011’ and the ‘ABCB Plumbing Code Development Research report – Warm Water Systems 2015’ have been invaluable in compiling this article. Both are freely available on line.

The most prescriptive legislation and guidelines for control of *Legionella spp.* in cooling towers is that from Victoria (see information under the state listing below), and for warm water systems, from Queensland (Guidelines for Managing Microbial Water Quality in Health Facilities 2013). For water systems, a Commonwealth wide set of Guidelines, the En Health ‘Guidelines for Legionella control in the operation and maintenance of water distribution systems in health and aged care facilities (2015)’ exists, which apply Australia wide, and should be followed in addition to individual state legislation and guidelines.

Legionella are a group of naturally occurring bacteria, associated with water sources. Of the numerous species, *Legionella pneumophila* and *Legionella longbeachae* are the species that primarily cause disease in humans. 18 other species of *Legionella* have been documented to cause disease in humans, but control measures for *Legionella pneumophila* and for *Legionella longbeachae* will also control other potentially pathogenic species¹. These bacteria are important as they colonise cooling towers and warm water systems of large buildings, and can cause significant outbreaks of disease. Along with their ability to cause outbreaks, the disease is often difficult to diagnose, hard to trace to the source; and also have a high mortality and morbidity rate in those persons who become ill. There is also a very high rate of admission to intensive care associated with the disease.

Infection with *Legionella pneumophila* causes two types of disease –Legionnaires disease, which often presents with a headache and flu like symptoms, cough, difficulty breathing, nausea, vomiting and diarrhoea and often confusion is present. Alternatively, Pontiac fever may occur which is a much less serious form of the disease and also presents with flu like symptoms. Pontiac fever generally does not require treatment. *Legionella longbeachae* has symptoms similar to legionnaire’s disease.

Legionella longbeachae is the most common cause of Legionnaires disease in WA and SA, with *Legionella pneumophila* being slightly more common in the Eastern states. In WA, cases of *Legionella pneumophila* are often associated with foreign travel and are not generally acquired within the state.

Certain risk factors increase susceptibility to all types of disease – these include middle to advanced age, male, smoker, chronic heart or lung disease, diabetes, alcohol abuse, renal disease and other conditions that lead to an impaired immune system.

Transmission of legionella is never from person to person – it is always associated with a natural source. *Legionella pneumophila* is water borne, and transmitted via extremely small droplets deep into the lungs, and *Legionella longbeachae* is possibly transmitted by inhaled dust from potting mixes or mulches with travels into the lungs.

Documented sources of *Legionella species* include cooling tower systems, warm water supply systems, showers, misting systems, spas, decorative water features, fountains, humidifiers (especially if cleaned in tap water rather than sterile water), respiratory therapy equipment, ice machines, potting mix, mulch and compost, roadside puddles and commercial car wash systems. Dental equipment, water pumps and dental drills have also been implicated in some cases.

COMPOST PRECAUTIONS

Although often overlooked in the efforts to control *Legionella* in a hospital, the correct use of PPE by grounds staff is vital to avoid infection with *Legionella longbeachae*. A P2 mask and gloves should be worn when handling mulch and compost, and hands washed thoroughly after handling. Bags of compost should be wetted to avoid dust production, and used in a ventilated area.

WATER PRECAUTIONS

There is a risk of *Legionella* proliferation between the temperatures of 20C and 42C. This, along with stagnation, is the main risk in warm water systems within hospitals. In cooling towers, additional risks include nutrient growth, poor water quality, scale, sediment, location of the cooling tower, deficiencies of the system and the presence of free living amoeba that can engulf and protect the legionella bacteria from disinfectants. Temperatures of between 20C and 42C are easily reached and maintained in cooling towers in the Australian summers, and in uninsulated cold water supplies and warm water supplies.

Biofilm can be a particular issue in pipework and in cooling towers. This is a sticky 'slime' produced by bacterial cells, which sticks to surfaces and surrounds the bacteria. This protects them from the effects of disinfectants and can increase the amount of disinfectant that needs to be added to a system to ensure that it stays free of legionella. Biodispersants, as recommended for use in cooling towers in most states, can help disperse the biofilm layer and ensure that disinfectants can target the legionella bacteria. These can be added as a separate chemical with its' own dosing pump, or, some water treatment companies produce a combined disinfectant and biodispersant.

COOLING TOWERS

Cooling tower legislation and guidelines vary from state to state. The Victorian guidelines are the most prescriptive and the strictest. The Victorian government also produce a variety of assessment tools and very useful information on their website, which can be used by those in other states to asses and audit their cooling towers, and identify any potential problems that may arise in the future.

AS/ANZ 3666 is an Australia wide standard. It requires monthly inspection of the cooling towers for cleanliness, mechanical inspection and of the biocide and dosing systems. There should be no stagnation in the tower. The tower should be cleaned every six months, and measurements of the pH, total dissolved solids and temperature should be taken. Microbial testing is required monthly for HCC (Heterotrophic Colony Count, also referred to as HPC (Heterotrophic Plate Count) or TPC (Total Plate Count) in some documents), and six monthly testing for *Legionella spp.*

Victorian guidelines require a risk assessment to be prepared for all cooling towers, and for this to be audited annually. The Critical Risks' for cooling towers are assessed, and the operators of cooling towers in any state of territory would be advised to be aware of these factors in relation to their own cooling towers. The critical risks are shown in the following table and comprise:

- Stagnant Water
- Nutrient Growth
- Poor Water Quality
- Deficiencies in the Cooling Tower System
- Location and Access

FIGURE 1: RISK EVALUATION TABLE.

Critical risk	Question
Stagnant water	<p>Is the cooling tower system (or part of the system) idle for more than a month?</p> <p>Where the system (or part of the system) is idle for more than a month, is a recirculating pump with a timer fitted to automatically circulate the water at regular intervals, to prevent it becoming stagnant?</p> <p>Are dead legs present?</p>
Nutrient growth	<p>Are there factors in and around the site that may lead to environmental contamination and an increase in the level of nutrients in the cooling tower system?</p> <p>Is there a corrosion control program?</p> <p>Are any of the wetted surfaces exposed to sunlight?</p> <p>Is a biocides dispersant used?</p>
Poor water quality	<p>Has an automated biocide dosing device been fitted?</p> <p>Is a comprehensive water treatment program in place?</p>
Deficiencies in the cooling tower system	<p>Is a modern, high-efficiency drift eliminator fitted to all cooling towers in the system?</p> <p>Has the system design been reviewed?</p> <p>Has the operation and performance of the system been reviewed?</p>
Location and access	<p>Is the tower system located in, or near, an acute health or aged residential care facility?</p> <p>How many people are in close proximity to the tower during a day?</p>

A comprehensive risk analysis leading to a risk classification from A-D (with A being the highest risk) is required, and a maintenance and testing schedule followed according to the risk classification of the tower.

FIGURE 2: RISK CLASSIFICATION

Critical risk	Higher risk			Lower risk
Stagnant water	System is idle more than one month and Recirculating pump with timer not fitted	System is idle more than one month and Recirculating pump with timer fitted and 'Dead legs' exist	Any ONE of the following: System is idle more than one month or 'Dead legs' exist	System operates continuously and No 'dead legs'
Nutrient growth	Any THREE of the following: Environmental contamination and No corrosion control program and Wetted surfaces not protected from sunlight and No biodispersant used	Any TWO of the following: Environmental contamination or No corrosion control program or Wetted surfaces not protected from sunlight or No biodispersant used	Any ONE of the following: Environmental contamination or No corrosion control program or Wetted surfaces not protected from sunlight or No biodispersant used	No significant environmental contamination and Corrosion control program exists and Wetted surfaces protected from sunlight and Biodispersant used
Poor water quality	No automated biocide dosing device installed and No comprehensive water treatment program in place	No automated biocide dosing device installed and Comprehensive water treatment program in place	Automated biocide dosing device installed and No comprehensive water treatment program in place	Automated biocide dosing device installed and Comprehensive water treatment program in place
Deficiencies in the cooling tower system	Modern, high efficiency drift eliminator not fitted and No review of system design and No review of system operation and performance	Modern, high efficiency drift eliminator not fitted	Modern, high efficiency drift eliminator not fitted and at least ONE of the following: No review of system design or No review of system operation and performance	Modern, high efficiency drift eliminator not fitted and System design reviewed and System operation and performance reviewed
Location and access	System is located in an acute health or aged residential care facility or Very high numbers of people are potentially exposed	System is located near an acute health or aged residential care facility or High numbers of people are potentially exposed	System is not located near an acute health or aged residential care facility and Moderate numbers of people are potentially exposed	System is not located near an acute health or aged residential care facility and Low numbers of people are potentially exposed
Risk classification	If your system matches any of the above responses, the Risk Classification for the system is A	If your system matches any of the above responses and does not match any of the responses in Risk Classification A, the Risk Classification for the system is B	If your system matches any of the above responses and does not match any of the responses in Risk Classification A or B, the Risk Classification for the system is C	If your system matches any of the above responses and does not match any of the responses in Risk Classification A, B or C, the Risk Classification for the system is D
	Higher risk			Lower risk

FIGURE 3: MAINTENANCE PROGRAMMES.

Risk classification	Recommended operational program
A	A
B	B
C	C
D	D

Table 6: Recommended operational programs

Program A	Program B	Program C	Program D
Weekly inspection	Monthly inspection (2 weeks after service)	Monthly inspection (2 weeks after service)	Monthly service
Fortnightly service	Monthly service	Monthly service	
HCC and <i>Legionella</i> tested at a minimum of once each month	HCC and <i>Legionella</i> tested monthly	HCC tested monthly <i>Legionella</i> tested every 2 months	HCC tested monthly <i>Legionella</i> tested every 3 months
Six-monthly cleaning, or more frequently where environmental contamination (e.g. dust, soil, building works) is a problem			

HCC = heterotrophic colony count

Both Victoria and Queensland require the HCC to be tested monthly, and action taken at levels over 200, 000cfu/ml – this differs from other states and territories, where action is required at over 100, 000 cfu/ml. *Legionella* should be tested every three months and action taken at or over 10cfu/ml, as in other states. The system should be inspected monthly, and an annual review of the risk management plan should be undertaken. Towers must also be registered.

The Western Australian guidelines require automated dosing systems to be installed, monthly inspection, 6 monthly cleaning and that the towers should have a risk assessment and management plan. HCC should be tested monthly and *Legionella* every three months. Action should be taken when HCC is at or above 100, 000 cfu/ml or *Legionella* levels are detected. The guidelines on the action to be taken are taken from AS/ANZ 3666.

FIGURE 4: ACTION TO BE TAKEN FROM HCC LEVELS.

Test result (cfu*/mL) (heterotrophic)	Required control strategy
<100,000	System under control. Maintain monitoring and treatment program.
≥100,000 to <5,000,000	Immediate online disinfection (alternative or higher dose biocide than usual). Review control strategy. Re-test water within three to seven days of plant operation, and assess if further remedial action** is necessary.
≥5,000,000	Immediate online disinfection (alternative or higher dose biocide than usual). Review control strategy. Re-test water within three to seven days of plant operation, and assess if further remedial action** is necessary.

* cfu = colony forming units

** Adapted from Australian / New Zealand Standard, AS/NZS 3666.3; refer to this standard for further information.

FIGURE 5: ACTION TO BE TAKEN FROM LEGIONELLA LEVELS

Test result (cfu*/mL) (<i>Legionella</i>)	Required control strategy
Not detected (<10)	System under control. Maintain monitoring and treatment program.
Detected as <1,000	Immediate online disinfection (alternative or higher dose biocide than usual). Review control strategy. Re-test water within three to seven days of plant operation, and assess if further remedial action** is necessary.
Detected as ≥1,000	Immediate online decontamination (halogen based biocide). Review control strategy. Re-test water within three to seven days of plant operation, and assess if further remedial action** is necessary.

* cfu = colony forming units

** Adapted from Australian/New Zealand Standard, AS/NZS 3666.3. Refer to this standard for further information

Tasmania, New South Wales, South Australia and Australian Capital Territory all have very similar requirements. Towers must be registered, with annual inspection or certification. HCC should be carried out monthly and *Legionella* testing 3 monthly (or 6 monthly in Tasmania). Monthly inspection is required, and action taken if HCC levels are at or over 100, 000cfu/ml and *Legionella* at or above 10 cfu/ml. In ACT, levels of HCC over 5, 000, 000cfu/ml are notifiable to the Health Department, as are levels of *Legionella* over 1000cfu/ml. In Tasmania, towers with HCC levels over 100, 000cfu/ml or *Legionella* over 10cfu/ml are notifiable.

The Northern Territory has no specific *Legionella* legislation, but NT Worksafe refer to AS/ANZ 3666, as described above.

WARM WATER SYSTEMS

As stated in the ABCB Plumbing Code Development Research report on Warm Water, there are no specific requirements in The National Construction Code or The Plumbing Code of Australia for the installation or planning of Warm Water Systems, however, the Part B2 Heated Water Services requirements are relevant, among which the system should 'Safeguard people from illness, injury or loss'.

Individual project design for each installation should therefore be in accordance with the state/territory health authority jurisdiction.

The En Health Guidelines, released in 2015 are designed for use Australia wide, and sit over the top of each State/territories' own regulatory framework. The guidelines apply to all water systems *except* cooling towers in healthcare and aged care premises, regardless of if they are public or privately owned.

Examples of the water systems covered by the En Health Guidelines include, but are not limited to:

- Warm Water Systems
- Cold Water Systems
- Hot Water Systems
- Showers
- Eye Wash systems
- Emergency Showers
- Toilets
- Ice machines
- Filtered water
- Water Fountains

The En Health guidelines concentrate on proactively managing the risks associated with water systems, rather than responding to positive testing results.

The systems should be analysed for the layout of pipework (notoriously difficult in older, renovated and repurposed buildings); components (TMVs, Heaters etc.); connected systems such as fire systems and fountains; outlets (showers, toilets, taps); Construction materials (plastic, copper); Temperatures achieved and maintained throughout the system, especially temperature stability; and the results of previous testing – for example has the system tested positive for *Legionella* previously. When testing, the quality of the water entering the building at the point closest to the scheme (or other) supply should always be tested for comparison.

The level of water quality that you are aiming for should also be known – are you looking to adhere to the ADWG 2011 (Australian Drinking Water Guidelines, 2011), or something stricter? What microbiological testing is required? Some examples of testing that may be required along with *Legionella* testing might be testing for HCC, *Pseudomonas aeruginosa*, which can cause serious infections in burns and other immunosuppressed patients, *Escherichia coli*/ coliforms, thermotolerant coliforms (indicators of faecal contamination) and amoebae. Stricter standards may be required for water supplied to areas such as Oncology, intensive care, neonatal care, elderly care, respiratory care, renal wards and dialysis and areas with immunosuppressed patients to give some examples.

Extra measures may be required in areas with at risk patients, which may include removal of aerators from taps, the removal of any mist generating devices and the installation of low aerosol producing showers or increased exhausts fitted to showers. Microfiltration or Ultra Violet sterilisation may be required to remove all bacteria from the water supply in especially sensitive areas. Water chillers and ice machines have been implicated in some outbreaks, and can have a build-up of biofilm in the internal parts. This can provide an ideal environment for HCC, *Legionella* and sometimes amoebae to grow.

Monitoring of water supplies takes two forms, operational monitoring and verification monitoring. The frequency of each type of testing should be determined with regard to the risk assessment of the system, the complexity of the system and the implications of an outbreak.

Operational monitoring ensures that controls are effective, and allows results to be obtained immediately or very quickly. Examples include residual chlorine levels, temperature, pH and turbidity. These can be valuable indicators that a system may have problems.

Verification monitoring detects general colonisation of the systems, and determines if the control strategies employed are effective. Results are not available immediately, and can be delayed up to ten days in the case of *Legionella* testing.

Any monitoring programme must comply with the State and Territory guidelines in place, as well as with En-Health guidelines. For example, more testing may be required under the strictest Australian guidelines - those in place in Queensland, than may be required by En Health guidelines.

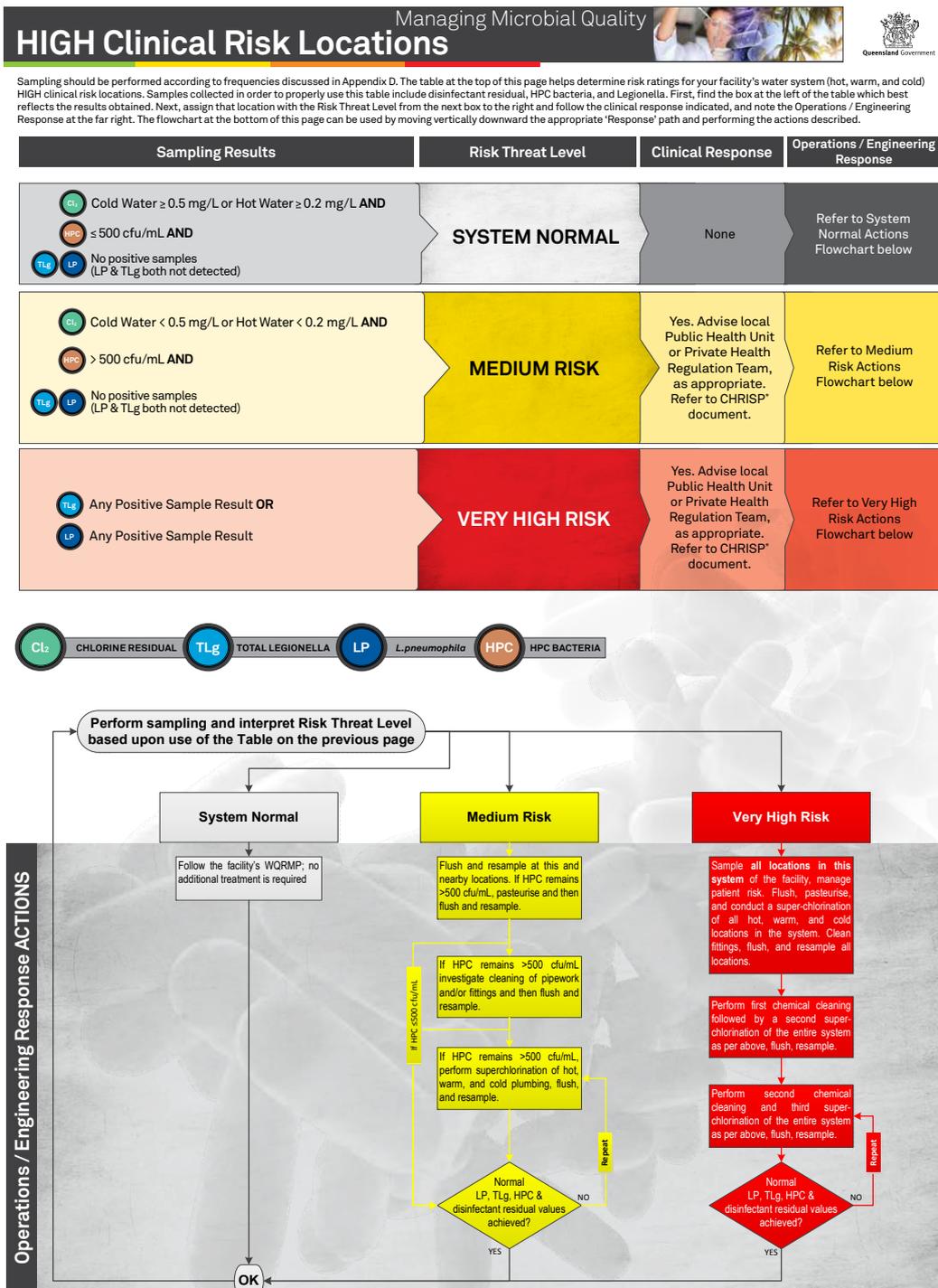
Sampling methods must also be carefully chosen, as first flush samples detect colonisation of the taps and plumbing fittings, while samples taken after flushing the taps for a set amount of time may detect colonisation in the more distant pipework. AS/NZ 5661 contains advice on sampling techniques, as does the Queensland Health Department Guidelines for Managing Microbial Water Quality in Health Facilities 2013. The testing laboratory should also be consulted to ensure that the HCC testing for drinking water is carried out, as the testing usually done for HCC levels in cooling tower waters is not sensitive enough for drinking water supplies.

The ADWG have no guidelines for HCC levels in drinking water, apart from stating that they should be 'Low'. The Queensland guidelines state that drinking water providers should inform a health facility if HCC levels are above 500cfu/ml. While HCC levels are not a reliable indicator that *Legionella* could be present, they are an indicator that a system may not be under control, and that there could be the potential for *Legionella* or other problematic bacteria to flourish.

While implementation of the En Health guidelines should go a long way to avoiding the presence of *Legionella* within the water systems of a hospital, there are actions to take if *Legionella* is discovered with a system. Examples of strategies to attempt to eradicate the colonisation include heat disinfection, where the temperature of the whole heated water system is raised to $\geq 70^{\circ}\text{C}$ for at least 5 minutes or $\geq 60^{\circ}\text{C}$ for at least 10 minutes, and all outlets flushed. Other strategies include chlorination or hyper-chlorination of the system, and different states/territories have different preferences for each strategy. Cleaning and replacement of fittings may also be required to help remove colonisation, and other exposure controls may be required.

The Queensland Guidelines for Managing Microbial Water Quality in Health Facilities 2013 have excellent flowcharts that are helpful in investigating and actioning any deviances from the required test results. The guidelines have two separate flowcharts of actions for high risk clinical locations and for lower risk clinical locations.

FIGURE 6: ACTIONS TO BE TAKEN WITH ADVERSE RESULTS IN A HIGH RISK CLINICAL SETTING.



Individual State/Territory legislation varies in the requirements, but is overlain with the En-Health Guidelines.

While only South Australia, New South Wales, Australian Capital Territory and Tasmania state that a NATA (National Association of Testing Authorities) accredited laboratory should be used for testing water samples, it would be extremely unwise to use a non NATA accredited laboratory for any water testing from a health or aged care facility.

The following is a list of the legislation and guidelines relevant in each state for the control of *Legionella*. While every effort has been made to ensure this is a complete list, other guidelines and legislation may be relevant that has not been listed here.

AUSTRALIAN GUIDELINES, CODES OF PRACTICE AND LEGISLATION

Warm water

- En Health 'Guidelines for Legionella control in the operation and maintenance of water distribution systems in health and aged care facilities (2015)
- Plumbing Code of Australia
- The National Construction Code

Cooling Towers

- AS/NZS 3666 (2011) *Air Handling and water systems of buildings – microbial control*

Water Sampling

- AS/NZS 5667.1:1998 (2016) Water quality—Sampling Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples

Australian Drinking Water Guidelines

- NHMRC Australian Drinking Water Guidelines (2011) updated November 2016
<https://www.nhmrc.gov.au/guidelines-publications/eh52>

USEFUL RESOURCES FOR ALL STATES AND TERRITORIES

Warm water

- En Health 'Guidelines for Legionella control in the operation and maintenance of water distribution systems in health and aged care facilities (2015)
- Guidelines for Managing Microbial Water Quality in Health Facilities 2013 Queensland Health Department.
- CDC (Center for Disease Control, USA) Guide to Developing a Water Management Program to Reduce Legionella Growth and Spread in Buildings: A practical guide to implementing industry standards (2016) www.cdc.gov/legionella/maintenance/wmp-toolkit.html
- HSE Legionnaires' disease. The control of legionella bacteria in water systems L8 (Fourth Edition) 2014
- HSE Legionnaires' disease: Technical Guidance Part 1: The control of legionella bacteria in evaporative cooling systems 2014
- HSE Legionnaires' disease: Technical Guidance Part 2: The control of legionella bacteria in hot and cold water systems 2014
- HSE Legionnaires' disease: Technical Guidance Part 3: The control of legionella bacteria in other risk systems 2014
- Department of Health (UK) Health Technical Memorandum 04-01: Safe water in healthcare premises. Part A: Design, installation and commissioning 2016.
- Department of Health (UK) Health Technical Memorandum 04-01: Safe water in healthcare premises. Part B: Operational Management 2016.
- Department of Health (UK) Health Technical Memorandum 04-01: Safe water in healthcare premises. Part C: Pseudomonas aeruginosa – advice for augmented care units 2016.

Cooling Towers

- *A guide to developing risk management plans for cooling tower systems (Victoria) 2001* www2.health.vic.gov.au/about/publications/policiesandguidelines/Guide%20to%20Developing%20Risk%20Management%20Plans%20for%20Cooling%20Tower%20Systems%20November%202001
- Guidelines for auditing risk management plans for cooling tower systems (Victoria)

AUSTRALIAN CAPITAL TERRITORY

Planning and Development Act 2007

Public Health Act 1997

The Cooling Towers, Evaporative Condensers and Warm Water Storage Systems (Specialised Systems) Code of Practice 2005. (Public Health Act 1997).

Websites:

Legislation - www.legislation.act.gov.au

Plumbing - www.planning.act.gov.au

Health - www.health.act.gov.au

NEW SOUTH WALES

Microbial Sampling - Warm Water Systems Including Thermostatic Mixing Valves

Notification of installed water cooling system or warm water system.

NSW Code of Practice for the Control of Legionnaires' Disease 2004

NSW Health-

Part A - Approval specification for operational testing of thermostatic mixing valves for use in non-domestic buildings in New South Wales. And

Part B - Approval specification for operational testing of warm water generating systems not incorporating thermostatic mixing valves for use in non-domestic buildings in New South Wales.

Plumbing and Drainage Act 2011

Plumbing and Drainage Regulation 2012

Public Health (Microbial Control) Regulation 2000

Public Health Act 2010

Public Health Regulation 2012

Public Health Regulation 2012 – Part 2 Legionella Control

Warm Water System – Installation inspection Checklist

Warm Water System – Maintenance inspection Checklist

Policy Directive Water - Requirements for the Provision of cold and Heated Water Jan 2015

Policy Directive Water - Requirements for the Provision of cold and Heated Water Feb 2015

Websites:

Legislation - www.legislation.nsw.gov.au

Plumbing - www.fairtrading.nsw.gov.au

Health - www.health.nsw.gov.au

NORTHERN TERRITORY

Building Act 2015

Building Regulations 2014

Health Services Act 2014

Health Services Regulations 2014

Public and Environment Health Regulations 2014

Public and Environmental Health Act 2014

Public Health Fact Sheet No. 407 Legionaries' Disease

AS/ANZ 3666

Websites:

Legislation - www.nt.gov.au

Plumbing - www.plumberslicensing.nt.gov.au

Health - www.health.nt.gov.au

QUEENSLAND

Design Guidelines for Queensland Residential Aged Care Facilities

Guidelines for Managing Microbial Water Quality in Health Facilities 2013

Health infrastructure requirements, Volume 1 • Legionnaires disease – reducing the risk in the home (Queensland Government – Department of Health)

Public Health Act 2005

Public Health (Water Risk Management) Amendment Bill 2016

Queensland Workplace Health and Safety Act 2011

Guide to Legionella Control in Cooling Water Systems, including Cooling Towers, 2008

Websites:

Legislation - www.legislation.qld.gov.au

Plumbing - www.hpw.qld.gov.au

Health - www.health.qld.gov.au

SOUTH AUSTRALIA

Guidelines for the Control of Legionella in Manufactured Water Systems in South Australia 2013

Public Health (Legionella) Regulations 2013

Public Health Fact Sheet #303 Is my heated water system captured under the legionella regulations?

Public Health Fact Sheet #304 Decontamination of high risk manufactured water systems

South Australian Public Health Act 2011

Websites:

Legislation - www.legislation.sa.gov.au

Plumbing - www.sa.gov.au

Health - www.health.sa.gov.au

TASMANIA

Guidelines for Notification of Notifiable Diseases, Human Pathogenic Organisms and Contaminants 2010

Guidelines for the Control of Legionella in Regulated Systems 2012. (Public Health Act 1997)

Public Health Act 1997

Building Regulations 2014

AS/ANZ 3666

Websites:

Legislation - www.thelaw.tas.gov.au

Plumbing - www.justice.tas.gov.au

Health - www.dhhs.tas.gov.au

VICTORIA

Building Act 1993

Building Regulations 2006.

Health (legionella) Regulations 2001

Plumbing Regulations 2008

Public Health and Wellbeing Act 2008

Public Health and Wellbeing Act 2008 – News Bulletin – Information for aged care, health services, health service establishments, registered funded agencies, correctional services and commercial vehicle washes

Public Health and Wellbeing Regulations 2009

Technical Solution Sheet 6.01 6: Hot Water Plumbing – Achieving Hot Water Delivery Temperatures/Dead Ends

Technical Solution Sheet 6.03 6: Hot Water Plumbing – Heat Trace Cables in Warm Water and Hot Water Systems (Victorian Building Authority, 2014)

Technical Solution Sheet 6.11 6: Hot Water Plumbing – Warm Water Systems

Guidelines for Legionella control in health and aged care facilities (to be read in conjunction with Water delivery system – fact sheet June 2015)

Risk management plan for Legionella control in health and aged care facilities.

A guide to developing risk management plans for cooling tower systems

Guidelines for auditing risk management plans for cooling tower systems

Websites:

Legislation - www.legislation.vic.gov.au

Plumbing - www.vba.vic.gov.au

Health - www.health.vic.gov.au

WESTERN AUSTRALIA

Code of Practice Prevention and control of Legionnaires' disease 2010. (Occupational Safety and Health Act 1984 & Mines Safety Act 1994)

Health (Air-handling and Water Systems) Regulations 1994

Health Act 1911

Occupational Safety and Health Act 1984

Plumbers Technical Note - Water Temperature www.commerce.wa.gov.au/sites/default/files/atoms/files/technical_note_water_temperature_january_2017.pdf

Websites:

Legislation - www.slp.wa.gov.au

Plumbing - www.commerce.wa.gov.au

Health - www.health.wa.gov.au

REFERENCES

1. Robert R. Muder and L. Yu Victor *Infection Due to Legionella Species Other Than L. pneumophila*. Clin Infect Dis. (2002) 35 (8): 990-998.