

## Microbial Sampling - Warm water systems including thermostatic mixing valves

**Document Number** PD2006\_078

**Publication date** 10-Oct-2006

**Functional Sub group** Corporate Administration - Asset Management  
Population Health - Environmental  
Population Health - Infection Control  
Personnel/Workforce - Occupational Health & Safety

**Summary** This policy directive requires all health facilities to have appropriate monitoring programs for their warm water systems including thermostatic mixing valves to manage the potential health risk from the growth of Legionella bacteria

**Author Branch** Environmental Health

**Branch contact** Tony Burns 6923 5755

**Applies to** Area Health Services/Chief Executive Governed Statutory Health Corporation, Board Governed Statutory Health Corporations, Affiliated Health Organisations, Affiliated Health Organisations - Declared, Public Health System Support Division, Environmental Health Officers of Local Councils, NSW Dept of Health, Private Hospitals and Day Procedure Centres, Private Nursing Homes, Public Health Units, Public Hospitals

**Audience** Asset management personnel who operate and maintain warm water systems

**Distributed to** Public Health System, Divisions of General Practice, Environmental Health Officers of Local Councils, NSW Ambulance Service, NSW Department of Health, Public Health Units, Public Hospitals, Private Hospitals and Day Procedure Centres, Private Nursing Homes

**Review date** 30-Sep-2012

**Policy Manual** Not applicable

**File No.** 99/10488-3

**Status** Active

### Director-General

This Policy Directive may be varied, withdrawn or replaced at any time. Compliance with this directive is **mandatory** for NSW Health and is a condition of subsidy for public health organisations.

---

## MICROBIAL SAMPLING – WARM WATER SYSTEMS INCLUDING THERMOSTATIC MIXING VALVES

As part of the overall strategy to manage the potential health risk from the growth of *Legionella* bacteria, it is a requirement for health care facilities to comply with Section 19 – *Legionella Monitoring - NSW Code of Practice for the Control of Legionnaires' Disease (2<sup>nd</sup> edition) June 2004*.

Note: The Code of Practice has been adopted as policy by the Department for implementation in all health care facilities in NSW (See Foreword). A hardcopy of the Code of Practice can be obtained from your Public Health Unit or downloaded from:

[http://www.health.nsw.gov.au/pubs/2004/legionnaire\\_disease.html](http://www.health.nsw.gov.au/pubs/2004/legionnaire_disease.html)

The Code of Practice states on page 55 “*The frequency of monitoring should be determined by the record of performance of individual systems*”. It will be necessary to develop monitoring programs based on the performance of the system, priority should be given to the performance of systems where performance is unknown and lack water treatment.

Where no data on the performance of a system is available it would be appropriate to initially determine the necessity to monitor the system based on health risk. Refer to the attachment: Legionnaires' Disease Guidance on Assessing Risk of Warm Water System

As a guide, where monitoring is decided to be necessary the system should be sampled twice per year as a minimum until the *Legionella* profile has been determined and then to reduce sampling to perhaps every year or second year once the profile has been found to be satisfactory. The advice of the PHU could be sought regarding the necessity to monitor a particular system and its sampling frequency.

This Policy Directive requires all health facilities to have appropriate monitoring programs in place, which satisfy Section 19 of the *NSW Code of Practice for the Control of Legionnaires' Disease*. Area Health Services should liaise with all appropriate staff to ensure that the most appropriate monitoring programs are established for its health care facilities.

Information regarding environmental health aspects of warm water supply systems can be obtained from the *Environmental Health Sections* of the local *Public Health Units* listed below.

*Title: MICROBIAL SAMPLING – WARM WATER SYSTEMS INCLUDING THERMOSTATIC MIXING VALVES*

<b>Public Health Unit</b>	<b>Telephone No:</b>
Greater Southern	Albury: 6021 4799 Goulburn: 4824 1842 Wagga: 6923 5755
Greater Western	Bathurst: 6339 5601 Broken Hill: (08) 8080 1499 Dubbo: 68415569
Hunter / New England	Newcastle: 4924 6477 Tamworth: 6767 8630
North Coast	Lismore: 6620 7500 Port Macquarie: 6588 2750
Northern Sydney / Central Coast	Gosford: 4349 4845 Hornsby: 9477 9400
South Eastern Sydney / Illawarra	Randwick: 9382 8333 Wollongong: 4221 6700
Sydney Southwest	Camperdown: 9515 9420 Liverpool: 9828 5944
Sydney West	Parramatta: 9840 3603 Penrith: 4734 2022
Justice Health	6021 4799

This policy and its attachments are available on the *NSW Health Department's Intranet and Internet.*

Robyn Kruk  
**Director-General**

## **Legionnaire's Disease Guidance on Assessing Risk of Warm Water System**

### Assessing Risk of Warm Water System

The risk a warm water system poses in terms of hospital acquired Legionnaire's disease (LD) depends on multiple factors. These include both patient factors and design features of the system.

#### 1. *Patient factors*

1.1 Recognised patient risk factors include chronic lung disease and immunosuppression<sup>1,2</sup>. Patients are also at risk after surgery with the single most important factor thought to be receipt of an organ transplant, particularly heart transplants<sup>1</sup>. Other factors implicated include receiving respiratory therapy, receiving corticosteroids, diabetes mellitus, cigarette smoking and cancer<sup>3</sup>. The most frequently described routes of transmission include inhalation of contaminated aerosols<sup>1</sup> and micro aspiration<sup>2</sup>.

1.2 Although transplant patients are potentially at highest risk surveillance programs monitoring locations of hospital acquired Legionella by ward type have found that most cases occur outside these wards. For example, in a Swedish hospital 31 cases were identified over a 14 month period with 8 in patients from surgical wards, 16 from internal medicine or geriatric wards and 3 each from psychiatric and physiotherapy units<sup>4</sup>.

1.3 Consequently any hospital screening program should focus preferentially on systems that supply water to areas that care for:

- immunocompromised patients
- patients with chronic respiratory disease
- high risk surgical patients undergoing general anaesthesia.

1.4 The absolute number of patients served by a particular system should also be considered.

#### 2 *System Design Features*

2.1 The main predictor of whether hospital acquired LD occurs or not is the proportion of systems colonised with Legionella rather than the level of micro-organism count found in the particular system<sup>5, 6</sup>. Factors that most enhance colonisation of water environments include the water temperature, obstruction and stagnation of the flow of water, biofilm formation in plumbing systems and the presence of other micro-organisms that support the growth of Legionella spp<sup>2</sup>. The risk of colonisation is also reduced by appropriate disinfection<sup>6</sup>.

---

*Title: MICROBIAL SAMPLING – WARM WATER SYSTEMS INCLUDING THERMOSTATIC MIXING VALVES*

2.2 In practice any environmental monitoring program should preferentially target systems with the following features<sup>7</sup>.

2.2.1 those likely to have stagnant water present eg not used regularly each 1 week, presence of significant “dead legs”

2.2.2 older and more complex systems with lengthy network of pipes and heaters eg systems where outlets are a long way from heating or disinfection points

2.2.3 absence of a disinfection system

2.2.4 prior known poor performance eg inadequate temperature, previous growth detected

### 3 *Sampling Program Protocol*

3.1 Each facility should have a monitoring program that bases its sampling protocol on risk. The results of the sampling program should be fed back into the program:

- to assess overall risk in the facility;
- to inform management options to reduce risk; and
- to refine the monitoring program.

To effectively achieve this involvement of infection control, engineering and clinical expertise is necessary<sup>2</sup>.

#### 3.2 Number of tests for a facility

It is not possible to prescribe exact numbers of tests that a particular facility should perform due to the broad spectrum of patient mix and system design features across hospital facilities in NSW. However, it has been proposed that environmental sampling that could constitute a satisfactory minimum primary prevention programme would consist of<sup>3,7</sup>:

- For up to a 500 bed hospital a minimum of 10 distal sites;
- For hospitals greater than 500 beds an additional 2 distal sites per extra 100 beds;
- Testing should be at least twice per year as a minimum until the Legionella profile has been determined;
- In a transplant centre quarterly sampling is required as a minimum.

#### 3.3 Sampling Sites

Sites should be preferentially chosen based upon level of risk. It is important that a comprehensive profile of a facility is built up over time and that sampling protocols allow a rotation of sites sampled.

---

**Title:** MICROBIAL SAMPLING – WARM WATER SYSTEMS INCLUDING THERMOSTATIC MIXING VALVES

## 3.4 Response to Colonisation

It is important that each facility has a documented response protocol to the detection of Legionella from warm water systems.

3.4.1 Appropriate decontamination procedures should be clearly documented in the protocol and instituted when contamination of a warm water system is detected.

3.4.2 The response to detecting contamination of warm water systems may include the commencement of an active surveillance program for clinical illness and /or changes to clinical treatment protocols should significant colonisation of the hospitals warm water systems be demonstrated<sup>1, 3</sup>. The decision to adopt this strategy should be made at a facility level on a case-by-case basis.

### References:

1. Sabria M & Yu, VL. Hospital-acquired legionellosis: solutions for a preventable infection. *The Lancet Infectious Diseases*. 2002; vol2 p368-71.
2. O'Neill, E & Humphreys H. Surveillance of hospital water and primary prevention of nosocomial legionellosis: what is the evidence? *Journal Hospital Infection*. 2005; 59: 273-279.
3. Goetz a, Stout J Jacobs S et al. Nosocomial legionnaire's disease discovered in community hospitals following cultures of water system: seek and ye shall find. *American Journal of Infectious Control*. 1998; 2(1) p 8-11.
4. Darelid J, Bengtsson, Gastrin B et al. An outbreak of Legionnaires' disease in a Swedish Hospital. *Scandinavian Journal Infectious Disease*. 1994; 26:417-425.
5. Stout J & Yu VL. Hospital acquired Legionnaires' disease: new developments. *Current Opinion in Infectious Disease*. 2003; 16:337341.
6. Kool J, Bergmire-Sweat Butler J et al. Hospital Characteristics associated with colonisation of water systems by Legionella and risk of nosocomial legionnaires' disease: a cohort of 15 hospitals. *Infectious Control & Hospital Epidemiology*. 1999; 20, 12 798-805.
7. Managing Risk of Legionnaires' disease: supplementary notes for hospital. Victoria Department of Human Services. Nov 2001.