

Water Hygiene

An Overview for Departmental Safety Officers

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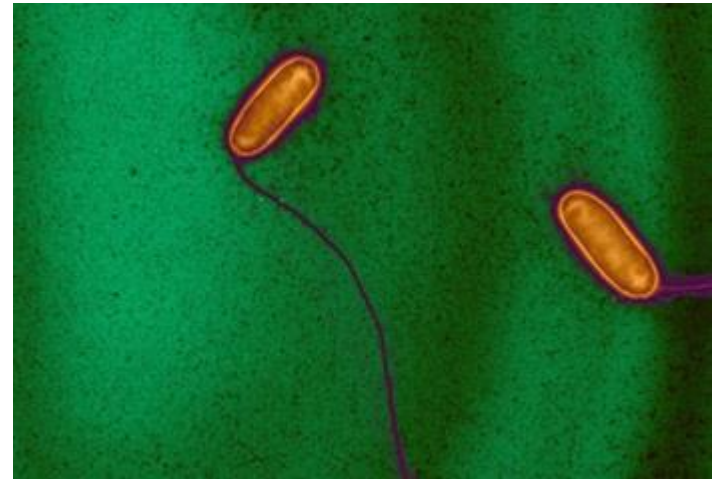
Estate Management

Presentation Overview

- Legionella Background - History and Sources
- Statutory Obligations
- Where are we now?
- Role of Departments in managing Water Hygiene
- Methods of Control
- Pseudomonas Aeruginosa

What are Legionella?

- Legionella are a naturally occurring bacteria
- Found in natural and artificial water systems
- They are aerobic bacteria which means they require oxygen.
- Require specific nutrients
- Can survive under a wide variety of temperatures, between 6° C to 60° C



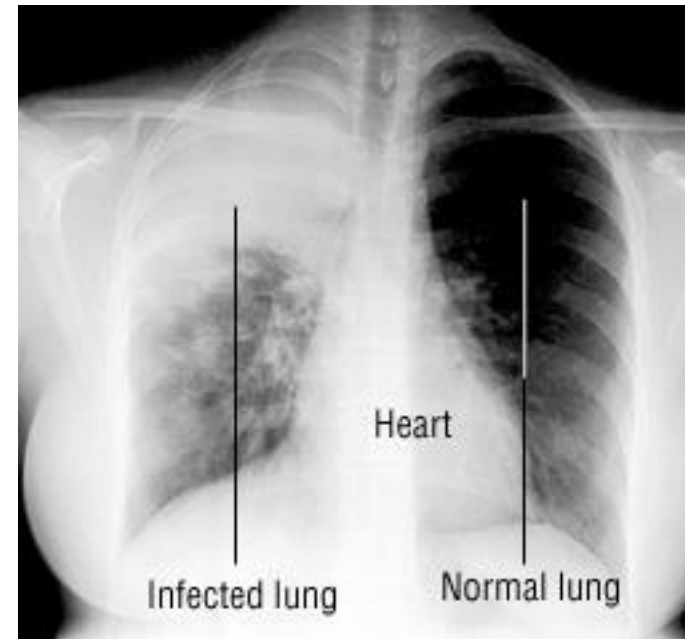
History of Legionnaires' Disease

- First recognised outbreak was in Philadelphia, USA in July 1976 at a convention of the American Legion
- Oldest known clinical isolate was 1947
- Earliest UK case to have occurred in 1972 in Nottingham

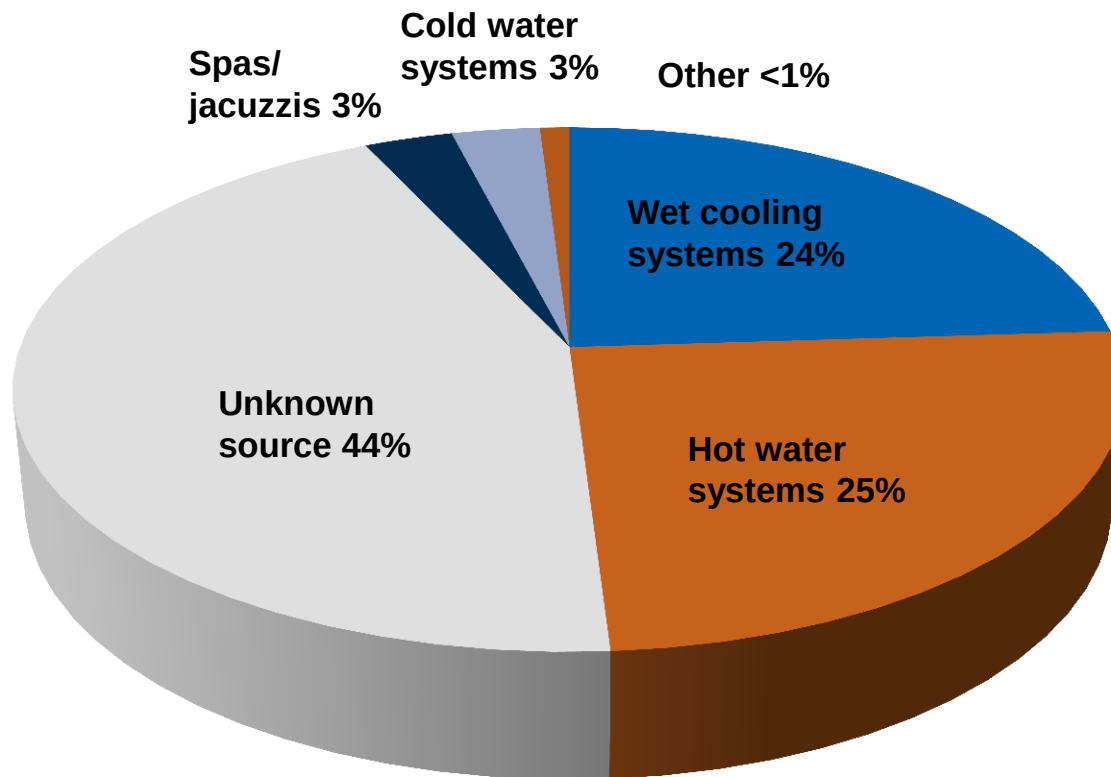


Legionnaires' Disease

- Causes acute bacterial pneumonia
- 200-300 cases of infection in England & Wales annually
- most commonly caused by *L. pneumophila* sero groups 1, 3, 5 and 6
- incubation period 2 to 19 days
- initial symptoms are flu-like; headache, muscle pain, fever, chills, being delirious with diarrhoea & vomiting are common
- *Legionella* can also cause non-fatal Pontiac / Lochgoilhead Fever

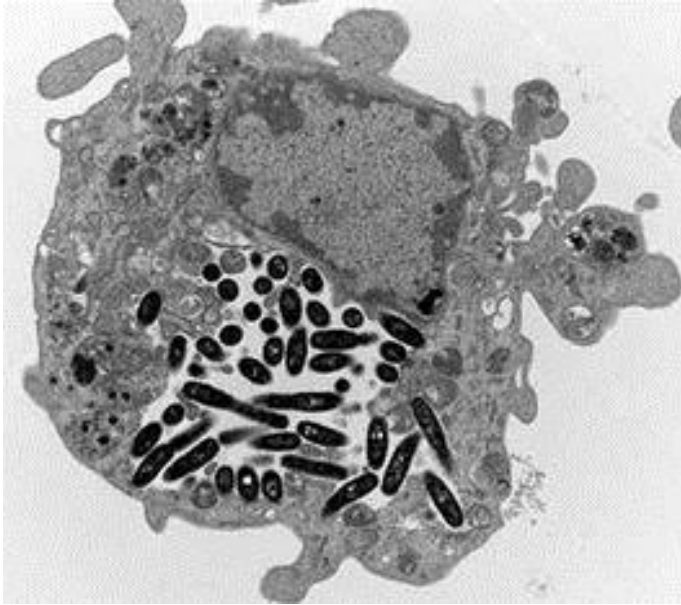


Sources of Legionnaires' Disease



Source: HPA

Legionella Growth



Legionella requires some of the following before it becomes a problem:

- stagnation
- nutrients
- protective environments
- temperature between 20 – 45°C
- aerosolisation

Legislation: Statutory Documents



Legionnaires' disease

The control of legionella bacteria in water systems

Approved Code of Practice and guidance on regulations



This book is aimed at dutyholders, including employers, those in control of premises and those with health and safety responsibilities for others, to help them comply with their legal duties in relation to legionella. These include identifying and assessing sources of risk, preparing a scheme to prevent or control risk, implementing, managing and monitoring precautions, keeping records of precautions and appointing a manager to be responsible for others.

This fourth edition of the ACOP and guidance on regulations contains revisions to simplify and clarify the text. The main changes are removing Part 2, the technical guidance, which is published separately as HSG274 at www.hse.gov.uk/pubns/books/hsg274.htm, and giving the following issues ACOP status:

- risk assessment;
- the specific role of an appointed competent person, known as the 'responsible person';
- the control scheme;
- review of control measures;
- duties and responsibilities of those involved in the supply of water systems.

L8 (Fourth edition)
Published 2013

- Health and Safety at Work etc. Act 1974
- HSE - Approved Code of Practice and Guidance (ACOP – shown left) L8 - Legionnaires Disease- The Control of Legionella Bacteria in Water Systems.
- Management of Health & Safety at Work Regulations 1999
- Control of Substances Hazardous to Health (COSHH)
- RIDDOR 1995.
- Statutory Instruments 1992 No 2225 Health and Safety The Notification of Cooling Towers and Evaporative Condensers
- Water Supply (Water Fittings) Regulations 1999

L8 Guide to Successful Control

Requires:

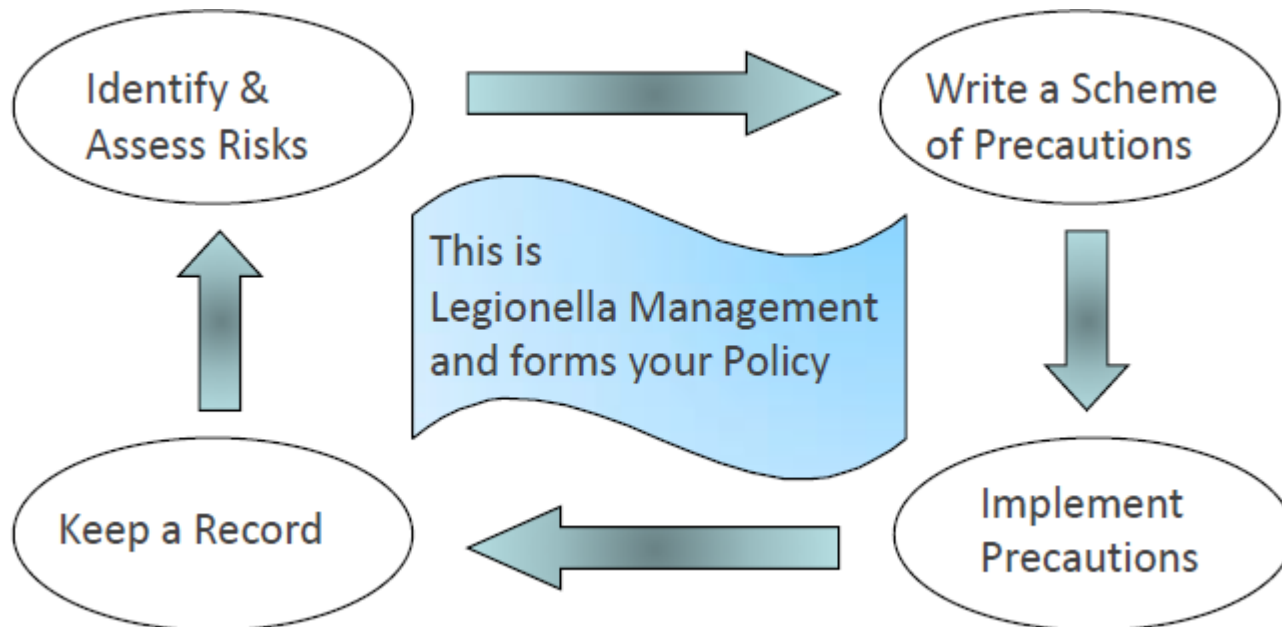
- Management Regime in place
- Risk Assessments
- Control Regime
- Maintenance and Upgrade
- Review



Nutrients in a CWS Tank

Managing Risk

The regulations ask us to perform four key tasks, if completed correctly the risk from Legionella should be minimised.



Risk Assessments

Risk Assessments should:

- identify & quantify relevant wet systems plus equipment holding / circulating water
- assess potential for Legionella growth
- identify who is at risk
- assess the potential for bacterial transfer
- quantify and prioritise the risks
- determine suitable means of control



Biofilm from tank clean

Estate Management's Current Position

- Updating of Management Procedures
- Water Hygiene Policy in process of being updated
- Water Hygiene Log Book being revised and to be re-issued.
- Programme in place to Risk Assess all buildings by end Q4 2017
- Programme of identified remedial works in place to reduce risk
- Training Programme for Nominated Persons and Tradespersons
- Water Hygiene Consultant engaged to assist EM

Demarcation of Responsibilities

- Estate Management responsible for services to taps, showers
- Departments responsible for temperature checks, little used and sentinel outlets, shower heads.
- Departments responsible for items of plant and systems dedicated to research i.e. ice machines, process water for use in experiments

What Departments Need to Do

- Identify a Nominated Person to help you manage Legionella risks in your Department
- Identify & record all : -
- water-containing equipment which operates in the temperature range 20-45°C
- all rarely-used taps & showers
- all equipment supplied from stored water sources producing sprays, mists or aerosols
- Assess the risk of Legionella growth in each

What Departments Need to Do

- Check Legionella Procedures Manual for information of the management of specific items of laboratory equipment
- if your equipment is not listed, determine the best means of reducing Legionella risks – if needed, contact Estate Management for help
- Make sure risk assessments and records are always up to date and easy to find - they are your first line of defence should you be inspected!

Responsibilities of Staff

- All those involved with the water systems should have their responsibilities in writing.
- They should be competent and trained to carry out the tasks they are responsible for.
- All staff have a legal obligation under HASWA. Failure to undertake their roles in a competent and effective manner means they will be liable.
- If staff are not competent or trained for the tasks for which they have a responsibility for, management will be found at fault.

“It doesn’t depend on whether she realised whether she had failed to take reasonable care but whether or not she did fail to take it.”

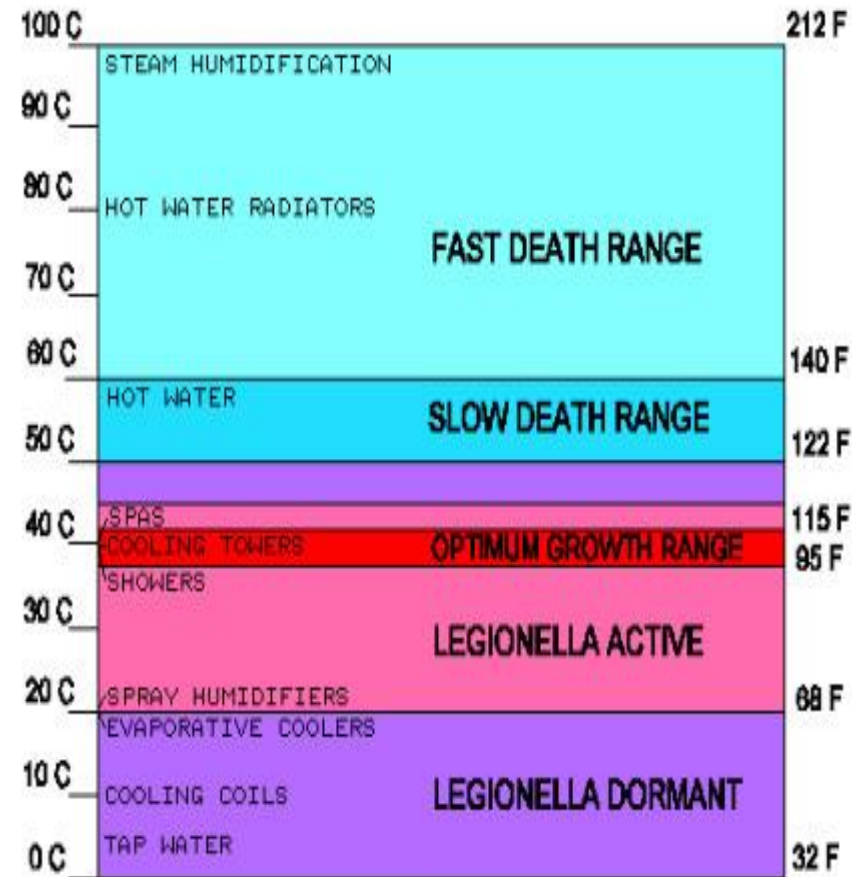
Quote from Mr. Justice David Pool during the Barrow trial

Controlling Legionella

- Temperature monitoring - avoid temperature conditions 20 - 45⁰ C
- Avoid water stagnation
- Flushing regime for rarely-used outlets
- Avoid materials which harbour bacteria
- Maintain cleanliness of outlets
- Water treatment where necessary
- Controlled release of water spray
- Ensure correct and safe operation of system
- Good maintenance regimes

Legionella and Temperature

- the bacteria will not multiply below 20°C
- 20 to 45°C is ideal for growth and reproduction
- at 40 to 50°C cell multiplication is reduced but cells are still viable
- above 60°C 99.9% of cells die within 2 minutes
- at 70°C for a minimum of 1 hour, all of the bacteria are dead
- temperature also affects virulence



Stagnation

The definition of stagnation is the condition where water ceases to flow.

Examples include;

- Oversized water storage vessels
- Recirculating duty/stand-by pumps which are not rotated
- Dead ends and dead legs
- Booster pump failure
- Valved off return legs on hot water recirculating systems
- Over-sized pipe work
- Water systems lying idle

To prevent stagnation occurring, it is a requirement of the ACoP (L8) to check water circuits on an annual basis against current schematics where appropriate and to flush little used outlets **at least weekly**.

Nutrients / Protective Environments

- Biofilm: bacteria encased in a polysaccharide matrix (usually can't be seen but can be felt - slimy)
- Amoebae: legionella can live within organisms and reproduce
- Scale: can protect biofilms beneath the scale preventing control schemes from working
- Sediment



Biofilm



Scale

Aerosolisation

High aerosol producing outlets such as

- Cooling Towers, Adiabatic Cooling
- Showers
- Aerators on taps



Examples of lab and workshop Equipment

- Water tanks & baths
- Water recirculation systems for cooling
- Rarely used taps & showers
- Misting equipment
- Dentistry tools
- Oil / water emulsions for lubricating lathes
- Mobile AC equipment with water
- Ice Machines



Record Keeping

It does not matter what monitoring activities are carried out or how successful they are, if they are not logged in a specific logbook or computerised system, they are not deemed to have been done at all !

Record Keeping

A description and schematic of the entire system, including all items of plant . System design parameters and total system volume should be recorded.

- Procedures on the safe operation of the system / plant
 - including safe start up and shut down procedures
 - responsibilities of site and contractors
 - routine alternation of standby equipment
- A log showing checks carried out
 - water treatment results
 - control parameters & corrective actions
 - cleaning and disinfection certificates
 - appropriate maintenance schedules and inspection records
 - personnel training records - including this course !

An operations manual should be available for each individual system

Temperature Checks – Hot and Cold

Hot water sentinel outlets and agreed number of representative outlets:

- run hot water from the outlet for 1 minute
- run cold water from the outlet for 2 minutes
- take temperature reading of the running water using an approved temperature probe
- record the temperature on the monthly log sheet against the outlet designation

IF HOT IS <THAN 50°C AFTER 1 MINUTE REPORT IT TO THE EM HELPDESK

IF COLD IS >THAN 20°C AFTER 2 MINUTES REPORT IT TO THE HELPDESK



Temperature Checks – Sentinel Outlets

SITE WATER SERVICES LOG BOOK

MONTHLY CHECKS - OUTLETS					
MONTH:					
OUTLET	TEMPERATURE		DATE	SIGNATURE	COMMENTS
	Control	Actual			
COLD OUTLETS - Check that temperature is below 20°C after running the water for up to two minutes in the sentinel taps.					
	<20°C				
	<20°C				
	<20°C				
	<20°C				
	<20°C				
	<20°C				
HOT OUTLETS - Check water temperature up to one minute to see if it has reached 50°C in the sentinel taps.					
	>50°C				
	>50°C				
	>50°C				
	>50°C				

Flushing Infrequently-used Outlets

Infrequently used outlets should be flushed on a weekly basis:

- run water from the outlet for at least 2 minutes
- record the flushing on the log sheet against the outlet designation
- for remote sites that are only visited weekly or less often flush ALL outlets on arrival and fill in the flushing log

SITE WATER SERVICES LOG BOOK

7.0 WEEKLY CHECKS		
The following tasks are to be carried out on a WEEKLY basis:-		
Service	Task	Frequency
Little-Used Outlets	Flush through and purge to drain, or purge to drain immediately before use, without release of aerosols.	Weekly

Flushing Infrequently-used Outlets - Showers

Showers should be flushed on a weekly basis:

- ensure outlet is guarded to avoid a release of spray when flushed
- run water from the outlet for at least 2 minutes
- record the flushing on the log sheet against the outlet designation

SITE WATER SERVICES LOG BOOK

SITE WATER SERVICES LOG BOOK				
<u>WEEKLY CHECKS</u>				
OUTLET	FLUSHED	DATE	SIGNATURE	COMMENTS
Flush and purge to drain all little used outlets				

What Else is Required by Departments?

- Daily emptying of Ice Machines to encourage turnover
- Quarterly Clean and De-scale of the shower heads and hoses
- Maintain any Research equipment using water
- Update the site log book when any works are carried out to the hot and cold water systems
- Assist Estate Management with the Risk Assessment Programme and associated remedial works

Pseudomonas Aeruginosa

- Commonly found in soil, water and plants
- Opportunistic pathogen – more likely to infect those who are already sick or vulnerable
- Growth favourable over 20°C and tolerant to temperature as high as 45°C to 50°C
- Pseudomonas species will grow in temperatures as low as 4°C
- Causes folliculitis (skin infection), soft tissue infections, sepsis, pneumonia et al
- Can produce a biofilm which creates a protective layer when it grows in the water system
- Relatively resistant to many antibiotics
- Can be isolated from moist, inanimate environments including water in sinks and drains, toilets and showers

Any Questions?