

Control of legionellosis in hot & cold water systems



Karen Parkinson HSE
Specialist Inspector
Occupational Hygiene



Content

- The legionella group of bacteria
- Legionellosis
- How the risk arises in hot & cold water systems
- Legislation – a brief guide
- Managing the system to reduce the risk
- Checks & tests

Legionnaires' disease

- Bacterial pneumonia contracted by inhaling infected droplets
- Incubation period 2-10 days
- Fatal in approx 12% of cases
- Causative organism *Legionella pneumophila*



Where do Legionella bacteria come from?



- Ubiquitous bacterium widespread in natural water sources, mud & soil.
- Rarely causes disease

Man-made re-circulating water systems

- Cooling towers
- Evaporative condensers
- Display fountains
- Jacuzzis/hot tubs
- Hot and cold water systems

Legionella: risk factors

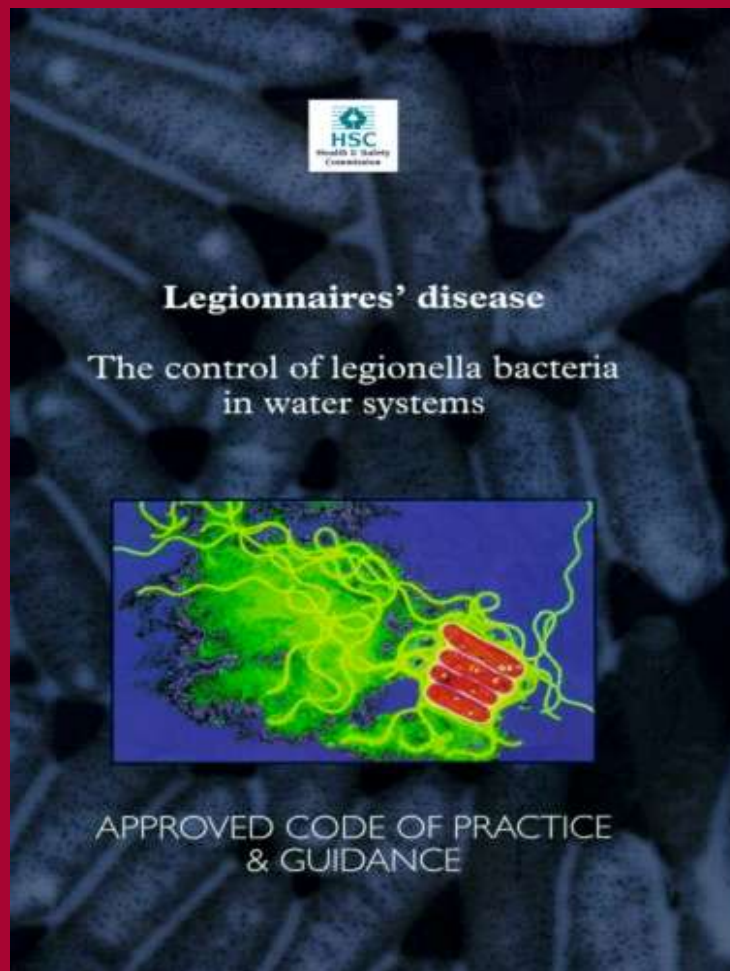
- Temperature
 - 20-45°C favours growth; killed >60°C
- Source of nutrients
 - Scale, rust, organic matter, slime, biofilm
- Stagnation
 - Deadlegs, storage, circulation
- Aerosolisation
 - Facilitates inhalation; wide dispersion

Susceptibility of occupants and others

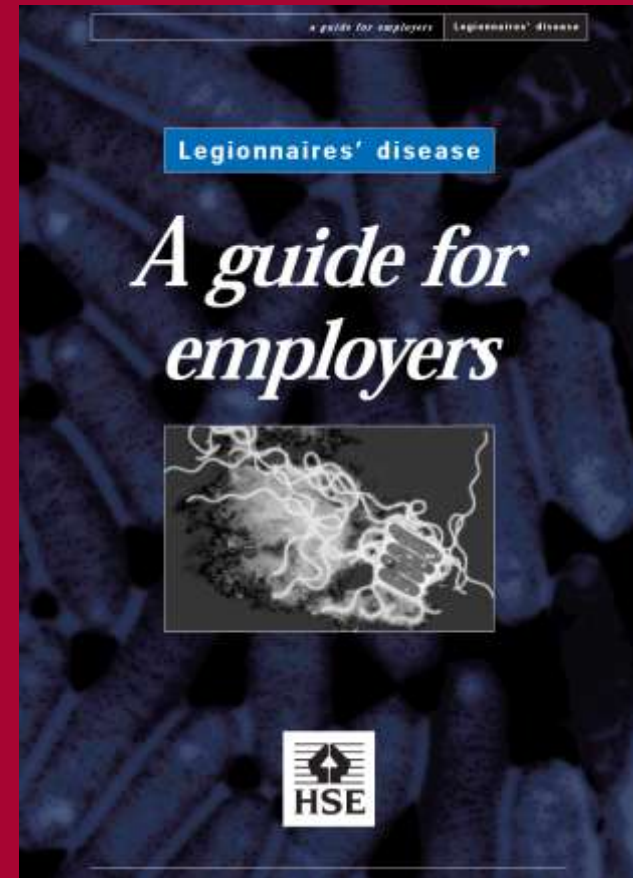
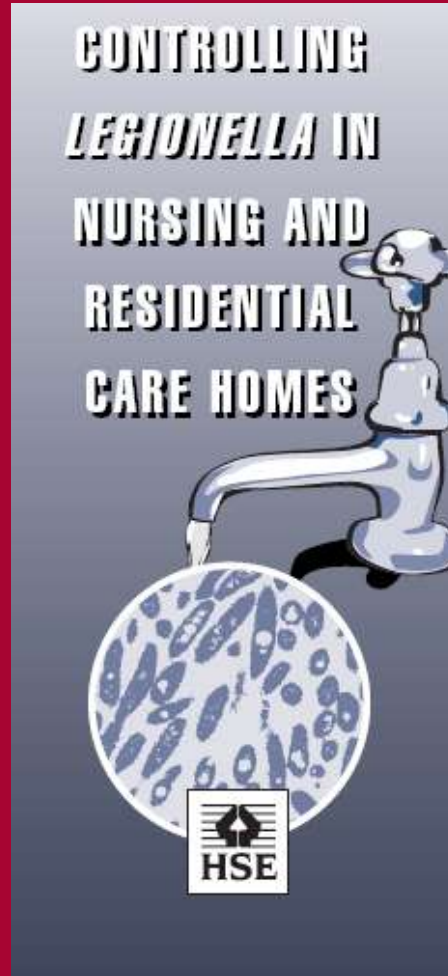
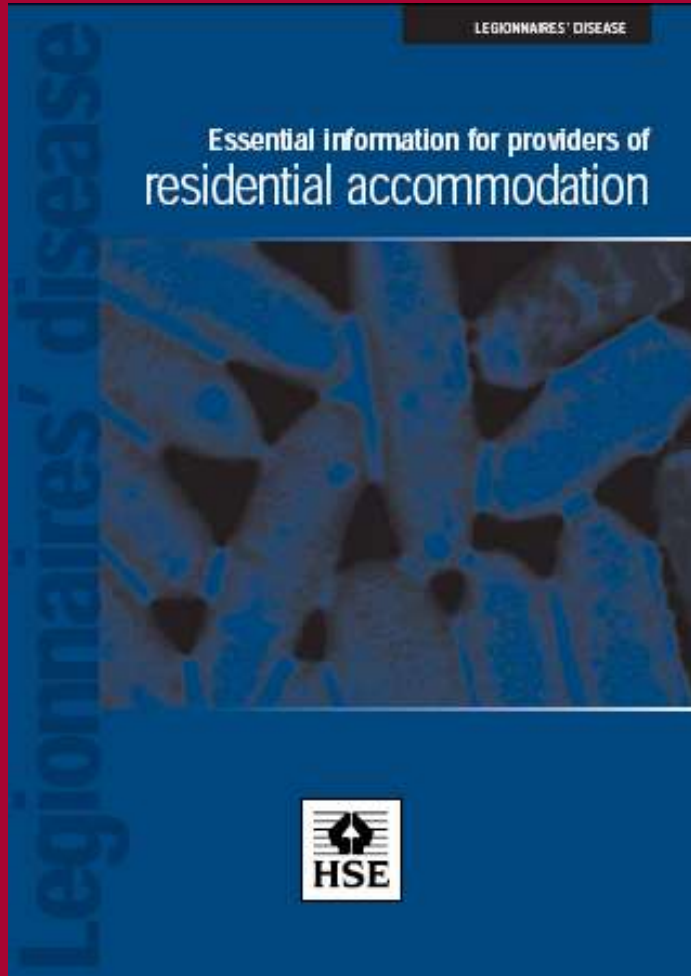
- Hot and cold water services where occupants are particularly susceptible
 - Hospitals
 - Residential care and nursing homes
 - Alcohol/drug dependency units

Legislation

- Health & Safety at Work Act
- Control of Substances Hazardous to Health Regulations (COSHH) 2002 as amended
- Approved Code of Practice (L8)



Publications



COSHH in a nutshell

- Identify and assess risk to health
- Prevent or adequately control exposure by implementing the controls identified in the assessment
- Maintain the defined controls

COSHH in a nutshell

- Identify the factors that could encourage microbial growth within the water system; degree of risk to occupants
- Prevent or control the risk by minimising the potential for growth within the system
- Prepare a written scheme for implementing the controls
- Carry out a regime of checks and tests
- Keep suitable records of checks and tests

Duties of Responsible Person

- Managerial responsibility for water system
 - Provide supervision
 - Working knowledge of risks
 - Working knowledge of water system and controls

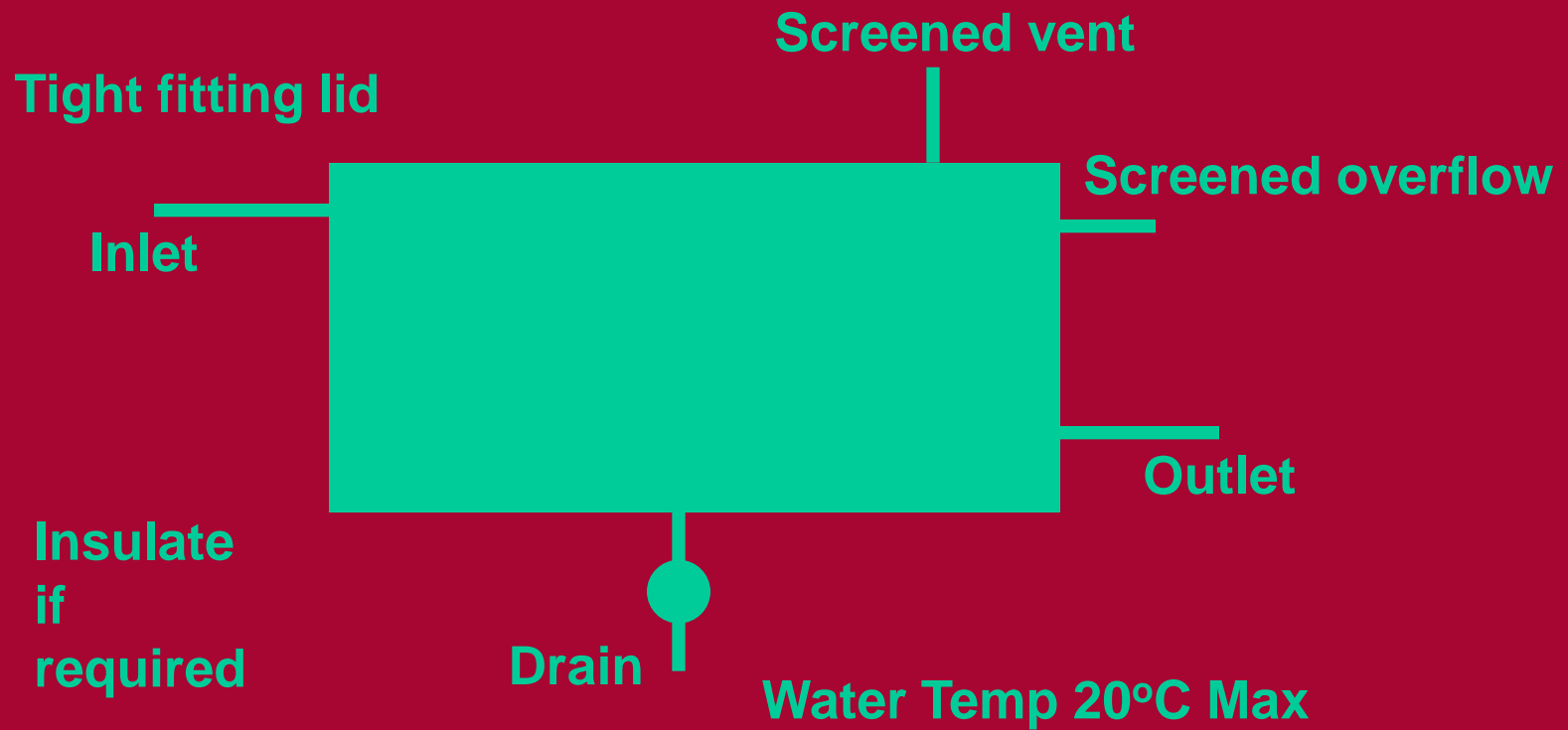
Controlling the risk

- **System design**
 - Insulate pipes and storage tanks
 - Fit lids to storage tanks
 - Use materials that do not support microbial growth or corrode easily
 - Remove deadlegs and little-used outlets where possible
 - Up to date schematic plan

System design : cold water storage tanks



DESIGN PRECAUTIONS - To keep water clean



Note - maximum of one day storage volume

Controlling the risk

- **Operation and maintenance**
- Do not store more water than you need
- Ensure calorifier/hot water cylinder can meet daily demand without drop in temperature
- Consider trace heating on non-re-circulating systems
- Flush little-used outlets weekly
- Clean & disinfect shower heads quarterly

Controlling the risk

- **Operation and maintenance**
- Use scale control in hard water areas e.g. water softeners
- Water softeners should be backwashed and maintained
- Check and clean filters and strainers regularly
- Annually drain sediment from base of water heater

Controlling the risk

- **Treatment and control programmes**
 - Hot water storage $>60^{\circ}\text{C}$
 - Hot water distribution $>50^{\circ}\text{C}$ within 1 minute
 - Cold water storage $<20^{\circ}\text{C}$

Scalding

- Scalding risk high where water is $>43^{\circ}\text{C}$ and there is whole body immersion as in showers and baths
- Elderly and disabled people may not be able to recognise high temperatures and respond quickly.
- Thermostatic mixing valves (TMVs) should be fitted where vulnerable people can access showers and baths.

Controlling the risk

- **Treatments and control programmes**
 - Biocide – chlorine dioxide
 - Ionisation
 - Ozone and ultraviolet light

Maintaining and demonstrating adequate control



Weekly checks & controls

Flush through little-used outlets to remove stagnant water (baths, basins, showers, toilets)

Monthly checks

- Water temp at sentinel hot water outlets
 - at least 50°C within 1 minute
- Water temp at sentinel cold water outlets
 - below 20°C after running for 2 minutes
- Outgoing temp from hot water cylinder
 - at least 60°C
- Returning temp to hot water cylinder
 - at least 50°C

Quarterly controls

- Dismantle, clean, de-scale and disinfect shower heads/hoses

Six monthly checks

- Water temp in cold water storage tanks ($< 20^{\circ}\text{C}$)
- Incoming mains temp ($< 20^{\circ}\text{C}$)

Annual checks & controls

- Hot & cold water temp at representative number of outlets on rotational basis in addition to sentinel outlets
- Check cold water storage tank for damage/corrosion/deposits
- Drain hot water cylinder and check for sludge/scale
- Check schematic is up to date
- Check water connections to outside services

Microbiological monitoring

- Routine microbiological analysis not normally necessary
- Analysis for legionella may be required where:
 - difficulties in achieving required temperatures
 - suspected contamination
 - outbreak situation

Cleaning & disinfection

- Major refurbishment/maintenance work
- Routine inspection indicates fouling
- Outbreak

Cleaning & disinfection

- Chemical (Chlorination)
- Thermal – temperature at outlets should not fall below 60°C

References

- <http://www.hse.gov.uk/legionnaires/index.htm>



Legionnaires' home

- What is Legionnaires'?
- Symptoms and treatment

Barrow incident

Further information

Legionnaires' Disease



What is Legionnaires'?



Symptoms and treatment



Further information



Barrow incident

Legionnaires Disease is a potentially fatal form of pneumonia which can affect anybody, but which principally affects those who are susceptible because of age, illness, immunosuppression, smoking etc.

It is caused by the bacterium Legionella pneumophila and related bacteria that can be found naturally in environmental water sources such as rivers, lakes and reservoirs, usually in low

Your industry

Agriculture

Health & safety topics

Asbestos



Local search

Order a Publication
01787 881165

Call HSE Infoline
0845 345 0055

www.legionellacontrol.com



LEGIONELLA
CONTROL ASSOCIATION