Hull and Goole Port Health Authority
257 Hessle Road
Kingston upon Hull HU3 4BE
Tel: (44) 1482 324776
E mail: admin@hullandgoolepha.gov.uk

LEGIONELLA INFORMATION AND ADVICE

What is Legionnaires' disease?

Legionnaires' disease is a severe type of pneumonia (lung infection) caused by Legionella bacteria. Not everybody who is exposed to Legionella will get ill. People with underlying illness, smokers and older people are at a higher risk of getting ill from Legionella. Legionnaires' disease is fatal for between 5–10 % of people who contract it. Symptoms generally start between two and ten days after infection, but in rare cases it may take up to three weeks to develop symptoms.

The illness usually begins with a fever, chills, headache and muscle pain. This is followed by a dry cough and breathing difficulties that may progress to severe pneumonia. About a third of patients also have diarrhoea or vomiting and about half become confused or delirious. Most patients need to be hospitalised and treated with appropriate antibiotics. Diagnosis requires specific laboratory tests.

How is Legionnaires' disease caught?

The bacterium Legionella pneumophila and related bacteria are common in natural water sources such as rivers, lakes and reservoirs, but usually in low numbers. They may also be found in stagnant water in man-made water systems between 20°C to 50°C, such as cooling towers, evaporative condensers, hot and cold-water systems and spa pools. If conditions are favourable, the bacteria may multiply, increasing the risks of legionnaires' disease, and it is therefore important to control the risks by introducing appropriate measures.

Legionnaires' disease is caught by inhaling microscopic water droplets (aerosols) containing the Legionella bacteria. Aerosols with Legionella may be produced by, for example, running a tap or shower, by bubbles rising through water in a spa pool or by some air-conditioning systems.

Water systems on board vessels are considered a risk for legionella for several reasons; the source water may be contaminated, and water stored within the vessel may be subject to conditions that allow the growth of biofilms (a thin slimy bacterial layer) and legionella growth within the water system.

Practical control measures

Under the International Health Regulations and subsequent technical advice produced by the World Health Organisation there is a requirement that ships have sufficient procedures in place to ensure the safety of potable/fresh water on board.

Improperly managed water is an established route for disease transmission on ships. It is good practice to ensure that you are routinely observing the following basic measures in terms of controlling legionella:

- Initial sources of legionella bacteria may be associated with bunkering water of poor quality. Stagnation of residual water in supply hoses may also increase the risk when bunkering. It is a good idea to flush the hose through prior to connecting to the vessel. It is recommended that a suitable disinfection preparation is added to the supply during bunkering.

- Chlorine is the most commonly used disinfectant for this purpose, where chlorine is used it is important that the 'free chlorine' availability within the supply is maintained to at least 0.2 mg/l (max 5.0 mg/l) when tested at the farthest points of the distribution system. There is some evidence to suggest that maintaining levels of free chlorine at a minimum of 0.5 mg/l is more effective in the control of legionella. Residual chlorine within bunkered mains supplied water is often at very low levels and cannot be relied upon to provide protection within your ships water system.

- Planned maintenance routines should include regular cleaning, disinfection and descaling of fixtures and fittings including filters, pumps, aerators, shower heads and mixer taps etc at the distribution points. Shower heads and hoses should be removed, descaled and soaked in chlorine solution every 3 months (or more frequently if necessary).

- Super-chlorination (or shock treatment) of freshwater tanks and the ships distribution system should be planned into the vessels maintenance routines; ideally this should be completed annually.

- Regular flushing (weekly) of all freshwater outlets should be undertaken, particularly of 'dead legs' (a length of pipe leading to an outlet which has been removed or is rarely used or unused entirely), infrequently used outlets e.g. showers in medical rooms, and any areas of long runs within the water distribution system.

- The system should be assessed to ensure the removal of 'blind ends' (blanked off pipes where water cannot circulate) to reduce stagnation which can increase the risk of legionella bacteria growth.

- Water temperatures should be regularly checked. Cold water supplies should ideally be at 20°C or below (always <25°C) and hot water a minimum of 50°C when checked at the farthest points within the system.

- The hot water return temperature on circulatory systems should be >50°C.

- Sampling of the water can be undertaken to assess the efficacy of the control measures. However, it should be noted that a water sample taken at a single point is not an accurate reflection of the water system as a whole and a sampling regime should be properly planned according to the requirements of a water safety plan following a complete assessment of the vessels fresh water distribution system.

- This advice is not exhaustive. Recurrent unsatisfactory results may need further investigation and/or specialist treatment of the system. This Authority advocates the use of a 'water safety plan' (WSP) on board vessels. A WSP can be applied to assessing and managing the specific risks associated with your ships water system.

Interpretation of sampling results

The Health and Safety Executive (HSE) use the following parameters for interpretation of sample results and the associated recommended action **-**

Legionella content (cfu/l)	Result	Recommended actions
<100 cfu/l	Satisfactory	Ensure control measures are maintained
>100 cfu/l and up to 1000	Borderline	Either: If the **minority of samples are positive**, the system should be re-sampled. If similar results are found again, a review of the control measures and risk assessment should be carried out to identify any remedial actions necessary; or If **most samples are positive**, the system may be colonised, albeit at a low level. An immediate review of the control measures and risk assessment should be carried out to identify any other remedial action required. Disinfection of the system should be considered.
>1000 cfu/l	Unsatisfactory	The system should be resampled, and an immediate review of the control measures and risk assessment carried out to identify any remedial actions, including possible disinfection of the system. Retesting should take place a few days after disinfection and at frequent intervals afterwards until a satisfactory level of control is achieved.

Legionella is measured in colony forming units (cfu/l) per litre of water sampled.

Further information can be obtained from the following websites and publications:

- HSE guidance (l8 advice) http://www.hse.gov.uk/pubns/priced/l8.pdf
- HSE HSG274 Part 2: The control of legionella bacteria in hot and cold water systems http://www.hse.gov.uk/pubns/priced/hsg274part2.pdf
- WHO Legionella and the prevention of legionellosis http://www.who.int/water_sanitation_health/emerging/legionella_rel/en/
- ECDC Health information https://www.ecdc.europa.eu/en/publications-data/leaflet-managers-tourist-accommodation-how-reduce-risk-legionnaires-disease
- MGN 38 (M&F) Contamination of ships air conditioning systems by legionella bacteria.