HealthManagement
Promoting Management and Leadership

Volume 8, Issue 3 /2006 - Architecture

Combatting Legionella in Hospitals

Author:

Matt Freije

President of HC Information Resources, Inc.

E-mail: mf@hcinfo.com

Legionella is a bacterium which can cause Legionnaires' disease, a deadly pneumonia. Domestic (potable) water systems and cooling towers provide good habitats for Legionella growth, as well as a means of transmitting the bacteria from water to people. Patients who are elderly or have weakened immune systems are more likely to become infected, but young and healthy individuals have also contracted the disease. While the precise number of people affected by Legionella s unclear due to the similarity of symptoms with pneumonia, it is estimated that thousands of cases occur annually in the United States. In Europe, as in the US, cases of Legionella have led to the introduction of prevention and control measures to ensure protection against Legionella in hospitals.

Preventive Measures

Minimising dead legs in domestic water plumbing is perhaps the most widely recommended *Legionella* preventive measure, yet the advice is usually given without even defining "dead legs", let alone substantiating the cost versus benefits of removing them. Moreover, dead legs - commonly thought of as piping with low or infrequent flow - are only one of many causes of stagnation in domestic water systems.

Health facilities should have an expert evaluate the facility and provide specific recommendations for minimising stagnation. For now, though, implementing the following measures will provide a good start:

1. Remove Dead Legs.

Although *Legionella* bacteria in dead legs can contaminate an entire domestic water system, the presence of dead legs does not guarantee a *Legionella* problem, nor will removing them necessarily solve one. Before removing a dead leg, consider the benefits versus the cost. Some dead legs present a greater risk than others do. Some are expensive to correct; others are not. The following rules are good practice:

a. Remove accessible dead legs. In equipment rooms and other areas where dead legs are accessible, the cost of removal will be low in most cases, so remove them. For example, if water heaters are abandoned, remove all the piping associated with them back to the point of flow, instead of simply capping the lines (see Figure 1).

b. Establish a policy of removing dead legs during plumbing renovations. For outside contractors, make it part of the project specifications.

c. If a dead leg cannot be removed without tearing out a wall, then leave it in the wall but cut and cap it where it tees into the main. For example, if a sink is removed, cut and cap the line serving it where it tees into the main, instead of at the wall.

d. If neither b nor c are feasible options for inaccessible dead legs, then try other methods of controlling Legionella bacteria before going to the expense of tearing out walls to remove dead legs. If water tests indicate that *Legionella* bacteria are under control in your facility, then the expense of removing inaccessible dead legs is not warranted. If *Legionella* bacteria are not under control, then continuous disinfection (e.g. copper-silver ionization or chlorine dioxide) will likely be more practical and effective than tearing out walls and removing dead legs.

e. If a continuous disinfection system is installed and operating properly, yet test results indicate that Legionella bacteria are still not under control, then dead legs and other stagnant water conditions may have to be corrected unless another method (e.g., point-of-use submicron filters) can be implemented to protect patients.

f. Choose flushing over removal only as a last resort. In some situations, facility managers choose to periodically flush dead legs instead of removing them. For example, one hospital, instead of removing piping serving abandoned showers, cut the lines at the shower wall, attached hose connections, and set a maintenance policy of flushing the piping every two weeks. Relying on the maintenance staff to flush the lines is a risk, especially since most hospital staffs are so stretched. Also, *Legionella* bacteria will, theoretically, build up in the lines between flushes, posing a health risk.

2. Do not use showers for storage unless the unused piping is removed.

3. Keep backup lines open, or flush them before use.

For water lines that split into two branches and then come back into one (e.g. to have a backup), both branches should ideally be kept open at all times. If one branch is valved off, it should be flushed thoroughly before each use, flushing to a drain so that none of the potentially contaminated water is distributed downstream to the building. This may require adding a valve and drain at the downstream end of each branch.

4. Design bypass lines to minimise the domestic water system's exposure to stagnant water, and flush before each use (see Figure 3).

5. Use all pumps regularly, preferably everyday. For example, if two pumps are installed on the domestic hot water return line, but only one is operating at a given time, they should ideally be rotated so that neither is offline for more than 24 hours. The same principle applies to cold water booster pumps, alternating the lead pump accordingly. Stagnant water in idle pumps and the piping associated with them can provide a habitat for *Legionella* and other bacteria that can enter the system when the pumps are turned on.

6. Flush vacant buildings, floors and rooms regularly.

If a building or wing is completely out of use, requiring no water, the water system serving it should ideally be valved off and drained. On vacant floors with undrained systems, an employee in generally good health should periodically - at least twice a week, preferably daily – run water at all outlets at full flow for 30 seconds and flush all toilets. This applies also to infrequently used sinks, showers, or toilets in rooms that have been converted from patient to office or storage use (occupants of these rooms should be encouraged to operate the fixtures daily). Prior to assigning a patient to a room that has been vacant for three or more days, an employee in generally good health should run the cold and hot water at each tap and shower at full flow for at least two minutes, and flush the toilet.

7. Use backup water supplies regularly, or flush them before each use.

Most hospitals have a backup water supply from the city main to the building that may go several months or years without use, building up foul water that will be distributed throughout the facility when the line is used. If backup supply lines are not kept open, they should be flushed before each use, which may require adding a valve and drain at the downstream end, just before the building.

8. Store water for no longer than 24 hours.

If hot water storage tanks are used or if tank-type water heaters are used in lieu of instantaneous heaters, then design and operate the system so that water remains in the tanks for no longer than 24 hours. The same applies to cold water storage tanks.

9. Use water heaters daily.

Even semi-instantaneous water heaters hold enough water (about 12 gallons) to pose a problem. If removing backup water heaters is not a reasonable option, then they should be used regularly, preferably daily. If they are not used, they should be drained and isolated from the rest of the system, and disinfected before use.

10. Eliminate or isolate crossover piping.

Pipes connecting buildings or systems, often used as a backup supply of hot or cold water, may harbor stagnant water that makes control of *Legionella* bacteria difficult. If the crossover piping cannot be eliminated, it should be isolated from the rest of the system, and flushed before use.

Bear in mind that the goal is to minimise *Legionella* and other waterborne pathogens, and eliminating stagnant water conditions is just one of many means of getting there. Prioritise remedial measures based on a risk assessment. Deserving higher priority are measures that either reduce a significant risk, or are relatively inexpensive and should thus be implemented out of good sense. Classify measures as lower priority if the risk reduction benefit is questionable and the cost of implementation is relatively high.

Published on : Mon, 24 Jul 2006