Fulfilling a healthcare provider’s duty of care to eradicate a major outbreak of *Legionella*, and to take all possible steps to prevent any repetition, will usually entail both major disruption, and significant expenditure. Shutting down operational areas of a hospital or other healthcare building is a major logistical exercise, and expensive in itself, before one even factors into the equation the cost of disinfection and remedial work.

Even though a ‘*Legionella* positive’ result does not always mean that immediate shutdown is essential, there is never going to be much time for delay; and institutional ‘checks and balances’ can make it difficult to authorise significant expenditure quickly enough. There may simply be no time for competitive tendering or normal due process; it is the finance director’s nightmare – one that having good risk assessment procedures in place can help to avoid.

Facing a ‘dreaded combination’

As a business with significant experience of working with healthcare organisations, air and water treatment specialist, Airmec, has first-hand knowledge of working with Trusts that have been faced with the dreaded combination of *Legionella*-positive laboratory results, no budget for the remedial works necessary, and no time for the due process that ought to be followed before commissioning works of such necessity. However, at times advising health estates managers and finance chiefs of the consequences of infection can be a thankless task. We are, after all, not bringing good news, but please do not ‘shoot the messenger’. Independent laboratory tests speak for themselves, and the seriousness of the predicament usually sinks in fairly quickly. After all, the law will hold responsible persons to account for any failure to deal effectively with the situation.

While newer buildings may have the advantage of zoned water systems and built-in flushing valves, systems in older buildings are often a mystery, even to the people who manage them. A history of refurbishments and minor works may mean that no-one really knows the system, or could easily locate every pipe, outlet, and area of potential risk. Again, having a good, current, and legally compliant risk assessment in place will render all this investigative trace-and-access work far simpler.

**Legionella pneumophila** – dealing with an outbreak requires a rigorous and well-planned and considered approach.

Six-figure sums

If there is a ‘*Legionella* positive’ result, then getting rid of infection, and avoiding a major incident in a sizeable health estate, will typically involve several stages, and potentially six-figure sums. These may include:

- Risk assessment to identify where the danger lies (deadlegs, redundant piping etc).
- An initial disinfection to get the current outbreak under control (but this will often not remove the root cause).
- Remedial work to remove major risks and likely causes of the current positive test results.
- Further disinfection and ongoing sampling, because remedial work such
as the removal of system deadlegs is very likely to disturb bacterial colonies, and cause them to be distributed around the piping circuits.

Figure 1 shows how the costs were broken down in a recent £200,000 project.

The full risk assessment is highly significant here, because, in this recent example, it should not have been necessary, since it should already have been in place, enabling the water treatment professionals to confirm the cause of the infection, and where it might have spread to, more quickly and cost-effectively. Even where risk assessments are thought to be in place, their inadequacy can be quite staggering in Airmec’s experience. By law, risk assessments should include schematic diagrams, and be undertaken every two years; more often if there have been changes to the system, or indications that controls are failing. All too frequently such risk assessments and accurate schematic diagrams are completely absent.

The legal framework
The requirement for detailed schematics, and other criteria for risk assessment, are laid out quite clearly in the UK Health and Safety Executive’s Approved Code of Practice and Guidance (ACOP), ‘Legionnaires’ disease: Control of Legionella bacteria in water systems’ (L8). L8 has special legal status, and is legally binding: if designated responsible people within an organisation do not comply with its requirements, the courts may hold them personally responsible for the consequences.

For healthcare estates personnel, there is an additional requirement to adhere to the relevant Health Technical Memorandum (HTM), HTM 04-01, or, to give it its full title, Health Technical Memorandum 04-01: The control of Legionella, hygiene, ‘safe’ hot water, cold water and drinking water systems. The current guidance was published by the Department of Health in 2006. HTM 04-01 builds on L8, but provides additional guidance to those involved with the control of Legionella in healthcare environments.

Risk assessment best practice
British Standard BS 8580:2010, ‘Water quality – Risk assessments for Legionella control – Code of practice’, clearly lays out the best practice for risk assessments, but takes the form of guidance and recommendations, rather than being a definitive specification. Since this document was first published in 2010, it is not referred to in the current edition of HTM 04-01, but prudent health estates managers would certainly wish to consider the recommendations contained within it. Experienced water hygiene specialists will certainly be familiar with these recommendations, and will undertake risk assessments that conform to the best practices laid out in the document.

A key requirement of HTM 04-01 is that risk assessments should be carried out by Competent Persons, so it is all the more surprising that good risk assessments are nowhere near ubiquitous. A risk assessment identifies any reasonably foreseeable risks to health, and advises on the necessary precautionary measures that need to be taken to prevent, or adequately control, the risk. Of course, prevention is always going to be better – and more cost-effective – than cure.

Importance of timing
The risk assessment also enables the person on whom the statutory duty falls to show that all the steps needed to prevent or control foreseeable risk have been considered.

Risk assessments should be undertaken before the maintenance regime is put in place – or as soon as possible afterwards. This is especially important with so many

Airmec says that, in older hospital buildings, a history of refurbishment may mean few healthcare estates, or indeed other personnel, have a really detailed knowledge of the water system.

Having to shut down operational areas of a hospital is a major logistical exercise, and expensive in itself, before one even factors in the cost of disinfection and remedial work.

Trusts now preferring to manage routine work internally. It is a logical approach that offers significant cost savings. Airmec, believes, but these will quickly be wiped out if the regime fails to address the risks and there is an outbreak. Professional help in aligning monitoring, inspection, and flushing schedules with the asset register and schematic in the risk assessment is undoubtedly a good investment, and one that will add further value to the risk assessment as a valuable tool for preventing outbreaks in the first place.

It is also worth remembering that a risk assessment is a ‘live’ document, not a one-off exercise. It is important that it is reviewed regularly, and, ideally, in anticipation of, rather than in response to, changes.

Wise estates managers reading this article will be double checking their risk assessments as soon as possible – and be happy that they are not the ones juggling the need for urgent action with the budgetary constraints of the NHS... yet.

How HTM 04-01 and HSE ACOP L8 work together
L8, or to give it its full title – ‘Legionnaires’ disease – The control of Legionella bacteria in water systems. Approved Code of Practice and Guidance’, was first published in 2000, and issued by the Health and Safety Commission (HSC) and Executive (HSE).

As previously mentioned, it is very important to note that this Code has been approved by the Health and Safety Commission, with the consent of the Secretary of State, and has special legal status; namely, if you are prosecuted for breach of health and safety law, and it is proven that you did not follow the relevant provisions of the Code, you will need to show that you have complied with the law in some other way, or a Court will find you at fault. In other words, in these circumstances you are assumed to be guilty unless you can prove otherwise.

Shower heads, if not in regular use, can see growth of Legionella bacteria, and thus require particular consideration.
The Department of Health published HTM 04 – 01: The control of Legionella, hygiene, “safe” hot water, cold water and drinking water systems’, in 2006. Health estates managers who comply with the operational processes outlined in this document will also meet the requirements of ACOP L8. In fact HTM 04-01 is actually more stringent in a number of areas.

**Exceeding L8 requirements**

One example of HTM 04-01 exceeding the requirements of ACOP L8 is in relation to the treatment of water outlets not in regular use. While ACOP L8 states that such outlets should be flushed weekly, HTM 04-01 suggests more frequent flushing, and that this procedure should form part of the daily cleaning process. In practice it can be very difficult for managers to determine those outlets that are regularly used, and those that are not (unless an area has been closed down). The only reliable way of doing this is to:

- Produce an asset register identifying location of all outlets.
- Develop a clear maintenance plan with agreed responsibilities for staff undertaking the flushing regime.
- Compile a log book to record flushing activities.
- Make sure that training, spot checks, and supervision, are then implemented, to ensure that staff realise the significance of their work, and ensure that the tests are carried out.

**Auditable regimes**

Instigating and maintaining robust and auditable regimes such as these can be a major headache for health estates managers. It will often be expedient to utilise experienced contractors who can advise on implementation of such systems, training of staff, and ongoing compliance with the processes. ACOP L8 and HTM 04-01 refer to the use of service providers who are able to provide trained personnel under a Code of Conduct developed by the Water Management Society and the British Association for Chemical Specialities. Details of companies who have agreed to work within this code can be found on the Legionella Control Association website (www.conduct.org.uk).

The other key area in terms of regular monitoring defined by both HTM 04-01 and ACOP L8 is the temperature control regimen. HTM 04-01 details the tests to be carried out on hot and cold water outlets, and the standard frequency is monthly for all ‘sentinel taps’ – typically the first and last taps on a hot water recirculating system, or the nearest and furthest from the tank on a cold water system. All results should be logged using a standard template, an example of which is also contained within the document.

**Biological monitoring**

Biological monitoring is not generally considered necessary unless there are taste or odour issues, but HTM 04-01 does make it clear that the infection control team will need to consider the level of risk, and decide if such monitoring should take place. Section 10.2 details the situations where biological monitoring may be required, one example being where water storage and distribution temperatures do not achieve the levels required by the temperature control regimen. If biological monitoring is required, British Standard BS 7592:2008, ‘Sampling for Legionella bacteria in water systems – Code of practice’, lays out recommendations and best practice for such monitoring. As this standard was published after the current edition of HTM 04-01 (published in October 2006), health estates managers would be well advised to consider these recommendations if biological monitoring is necessary.

**The ‘Responsible Person’**

HTM 04-01 is very clear that there must be a nominated Responsible Person in the organisation, appointed in writing by the management, who possesses adequate professional knowledge and training to devise and manage the necessary procedures to ensure that the quality of the water in healthcare premises is maintained. This person should be a manager or director with sufficient authority to ensure that all procedures in place are carried out in a timely, effective manner. Although the definition of a Responsible Person in HTM 04-01 is similar to that defined in ACOP L8, the HTM again goes further; Paragraph 6.5 suggests that a Responsible Person should ideally be a Chartered Engineer, microbiologist, or other professionally qualified person.

So, in summary, a health estates manager who puts in place and operates systems as defined in HTM 04-01 can also be confident that they are meeting the requirements of ACOP L8. In addition, they will be managing a regime which provides best practice in terms of Legionella control and water system management for the specific needs of the healthcare estate and the organisation’s stakeholders.