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Copper and Silver Water Treatment

Case Study

Eastbourne Hospital

Controlling Legionella and Pseudomonas risk in a UK hospital using copper and silver ionisation

Background

Eastbourne District General Hospital is part of the East Sussex Healthcare NHS Trust. The hospital puts effort to restrain the spread of infection by following strict infection control procedures. These include using the copper and silver ionisation Orca system to prevent bacteria growth in the hospital water system.

L. pneumophila and *P. aeruginosa* are two waterborne bacteria that can cause patients minor to severe infection. *L. pneumophila* has been identified to cause Legionnaires' disease especially in the immunosuppressed. *P. aeruginosa* can cause more complicated infections that can be life threatening. It can involve many parts of the body from respiratory tract, bloodstream, heart, CNS, ear, eye, bones and joints, GI tract, urinary tract, and skin (Marston et al., 1994). *L. pneumophila* and *P. aeruginosa* infections are frequent causes of nosocomial infections. In 1980, Kingston Hospital had an outbreak of Legionnaire's disease over 3 years (Colbourne et al. 1984). Therefore, Eastbourne Hospital apply copper and silver ionisation system to control the infection.

This case study reports the long term performance of the copper and silver ionisation system installed to control *L. pneumophila* and *P. aeruginosa* in Eastbourne Hospital.

The system had been installed since 2012, and a total of 1274 samples for *L. pneumophila* and 74 samples for *P. aeruginosa* were collected from selected hospital outlets from 2012 to 2017.

Installation of Orca copper and silver system

Before installation, 50 pre-commissioning samples were measured in 2008. A total of 49% of samples were legionella positives.

After installation in 2012, around 20 samples were collected every month in outlets and analysed for *L. pneumophila*, and around 5-10 samples were collect every six month and analysed for *P. aeruginosa* if previous test had no infection found.

Results

L. pneumophila measurement results are shown in Figure 1. Monthly measurement is summarised as annual data from 2012 to 2017 and pre-commissioning data in 2008. The percentage of positives declined from 49% to 5.5% on the first year of using copper and silver ionisation system. After 2015, the growth of *L. pneumophila* was effectively controlled to below 1%.

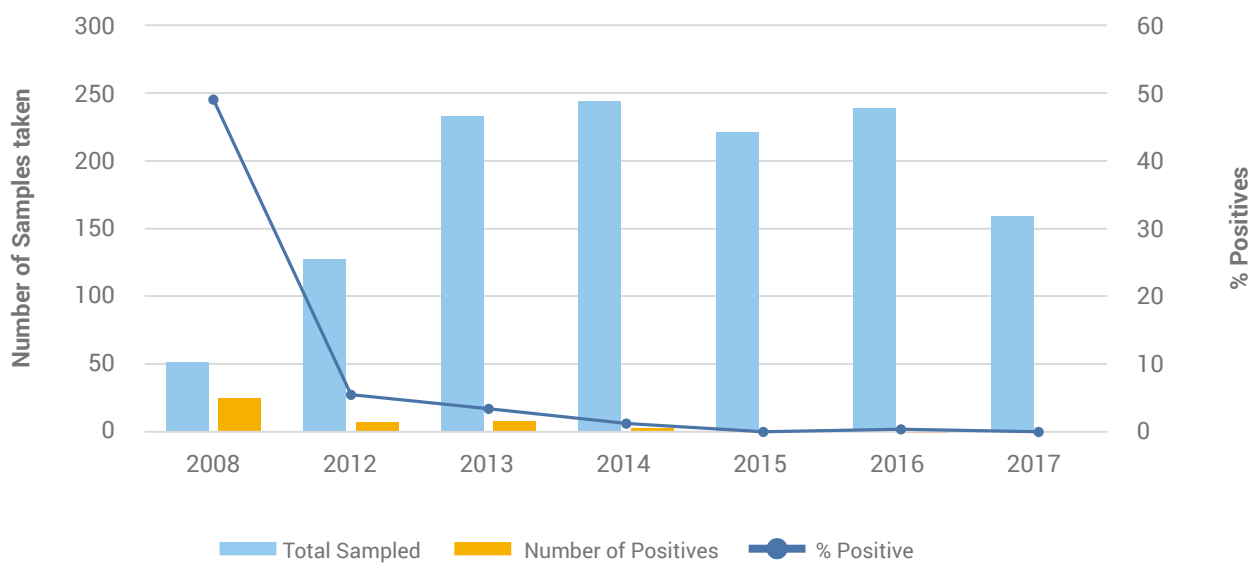


Figure 1. Total samples, number of *L. pneumophila* positives and percentage positives in Eastbourne Hospital.

The copper and silver ionisation system seemed to work more effectively at temperature below 20 °C and above 50 °C. The temperature data for *L. pneumophila* is shown in Figure 2. It can be observed that 90% of *L. pneumophila* regrew in temperature between 20°C and 50°C. Only 9% of *L. pneumophila* grew below 20 °C. When temperature was above 50 °C, no *L. pneumophila* was detected.

P. aeruginosa measurement result is shown in Figure 3. The highest percentage of positives was detected in 2012. The following years *P. aeruginosa* was effectively controlled to below 10%. After September 2013, no *P. aeruginosa* was detected ever again in Eastbourne Hospital.

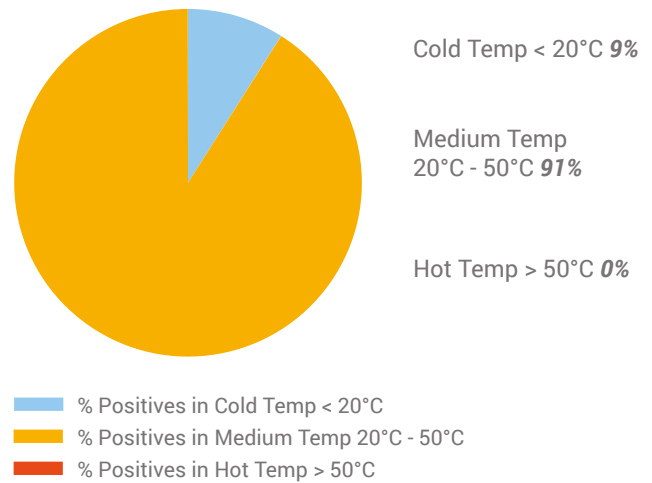


Figure 2. Percentage of *L. pneumophila* positives at different temperature in Eastbourne Hospital.

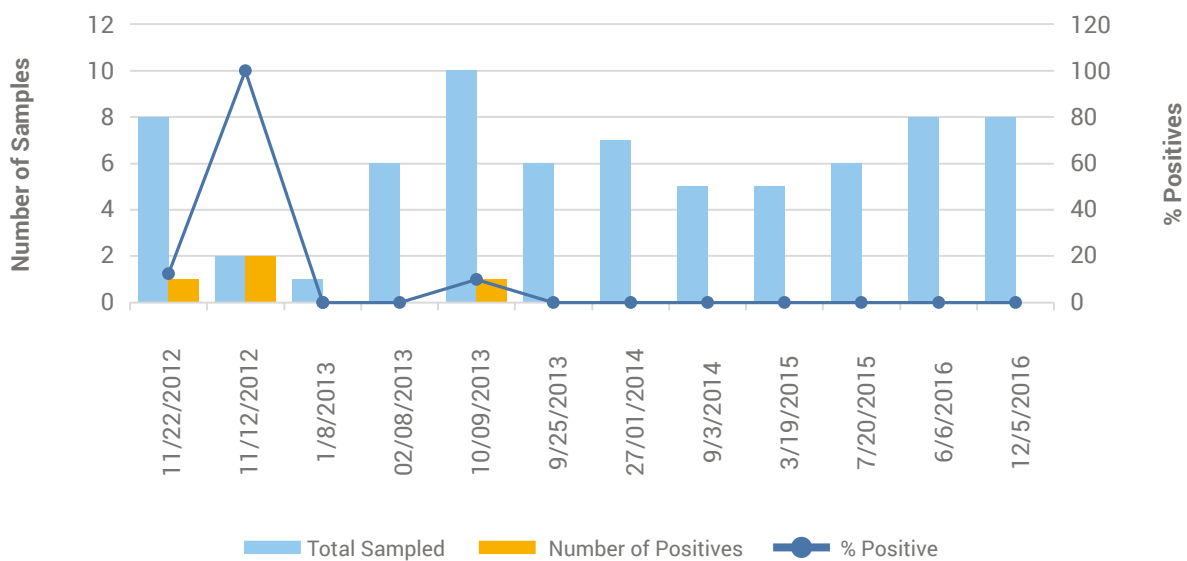


Figure 3. Total samples, number of *P. aeruginosa* positives and percentage positives in Eastbourne Hospital.

Conclusion

L. pneumophila and *P. aeruginosa* have been very well controlled after the system was applied. The overall percentage of positive detection has largely declined.

The copper and silver ionisation system has had a very obvious effect on *L. pneumophila* and *P. aeruginosa* control in Eastbourne Hospital water system. The combination with temperature control seemed to reinforce the effectiveness. The regular monitoring and water circulation is important for long term *L. pneumophila* and *P. aeruginosa* control.

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References

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