Pro*Economy* |**or**ca

Copper and Silver Water Treatment

Case Study

Bristol Dental Hospital

Background

Bristol Dental Hospital is part of the University Hospitals Bristol NHS Trust, built in the 1930's. A major refurbishment of the hospital, including most of the pipework was completed in 2007. Following an invitation by Mr Ian Bannister of The Royal Bristol NHS Trust, a proposal was prepared for the installation of the Orca water ionisation system by ProEconomy. The hospital previously used to operate a temperature regime to control Legionella. However with the installation of the Orca system it is possible to circulate the water at a temperature of 43°C, without installing thermostatic mixing valves.

Installation of the Orca system

One copper and silver ionization system, with six copper and two silver electrode chambers were installed as part of the Orca system to treat both the hot and cold water distribution systems. Monthly samples are taken to determine if Legionella is present, with sample analysis being carried out by an independent laboratory.

Sampling and Results

Prior to the installation of the Orca system, 13 outlets were sampled including hot, cold and mixed outlets. Eight samples returned positive for Legionella.

Table 1 shows the results of each outlet for Legionella (cfu/L) and water temperature (°C). It can be observed that 7 from the 8 samples that tested positive for Legionella, were detected in water temperatures of above 30 °C, ranging from 100 cfu/L to 13,400 cfu/L.

Table 1. Result of each outlet for *Legionella* and water temperature prior to the installation of *Orca* system.

Outlet	Legionella (cfu/L)	Temperature (°C)
Outlet 1 - mixed	200	39
Outlet 2 - cold	0	31
Outlet 3 - hot	1400	38
Outlet 4 - hot	0	40
Outlet 5 - cold	0	28
Outlet 6 - hot	700	40
Outlet 7 - cold	200	33
Outlet 8 - hot	13400	39
Outlet 9 - mixed	1300	39
Outlet 10 - hot	100	40
Outlet 11 - cold	0	18
Outlet 12 - hot	0	40
Outlet 13 - cold	100	25

After the installation of the Orca, monthly samples were taken from outlets that were recognised as being at risk of Legionella contamination. Within a month the number of outlets which returned positive for Legionella had decreased to 3, with a range of 100 cfu/L to 2400 cfu/L. Within six months, four outlets returned positive, with Legionella counts having a range of 200 cfu/L to 400 cfu/L.

Results from October 2011 to March 2016 are shown in Figure 1. It can be seen that there was no noticeable change in the number of outlets containing Legionella after the installation of the Orca system (Figure 1). It can be observed that from an average of 180 samples analysed between January 2012 and December 2015, around 90 samples (50%) were positive for legionella. This could be due to local engineering problems, as samples returning positive were mainly collected from the same outlets.

There was a decrease in the number of positives towards the end of the study, between January and March 2016, with only 6 (18%) of the 33 samples analysed returning positive. However, there was also a decrease in the number of samples analysed in that period when compared to previous period.
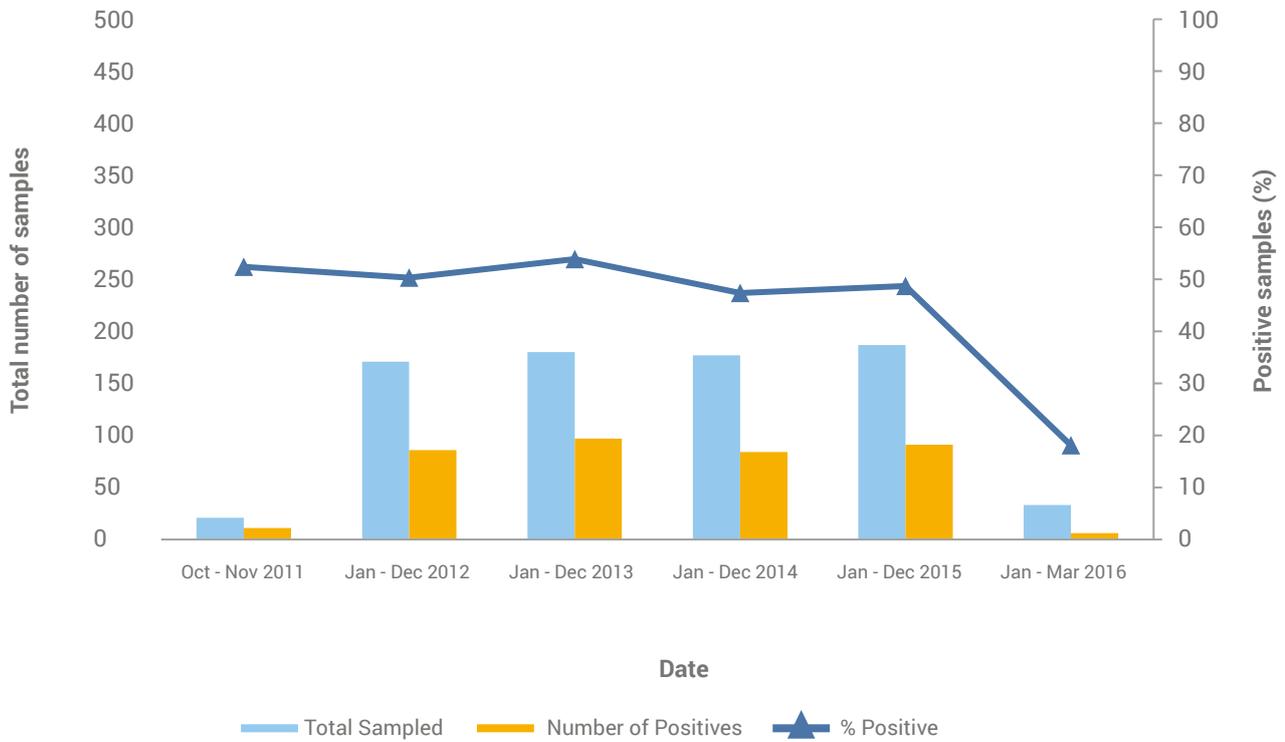
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Figure 1. Total number of samples and number and percentage of positive samples - Bristol Dental Hospital.

Conclusion

There was no noticeable change observed in the number of positive Legionella samples after the first month of sampling following the installation of the Orca system, possibly caused by local engineering problems. It can be concluded that there was a constant 50% reduction in the number of Legionella positive samples since the installation of the Orca copper and silver ionisation system. An investigation of the pipework is recommended to evaluate the cause of positive samples. Regular monitoring including sample collection and independent sample analysis will allow early detection.

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