



Pro *Economy* | **orca**

Copper and Silver Water Treatment

Case Study

Croydon University Hospital

Controlling *Legionella* risk in Croydon University Hospital building using copper and silver ionisation

Background

Croydon University Hospital is situated in Thornton Heath, South London, and is run by Croydon Health Services NHS Trust. This hospital is a District General Hospital which has 24-hour Accident & Emergency Department and provides 670 beds.

Four cases of potentially deadly Legionnaires’ disease were confirmed in Croydon in 2013 and they were treated at Croydon University Hospital (Dunne, 2013).

Legionnaires’ disease is caused by the *Legionella* bacteria in water, especially *L. pneumophila*, which is aspirated as droplets during splashing or showers, and immune-compromised vulnerable people (babies, elderly, smokers) are more likely to be infected. Therefore, it is necessary to control *Legionella* in hospital drinking water.

As Croydon University Hospital has the experience of treating victims of Legionnaires’ disease, they realized the importance of controlling *Legionella* within their hospital. They chose the Orca system from ProEconomy Ltd to help them control *Legionella* in the drinking water.

The Orca system is the trade name of ProEconomy’s copper and silver ionisation system. The Orca system releases positively-charged copper and silver ions in water to find negative sites in *Legionella* bacteria and cause the death of cells. According to the research results (Liu et al.1994, Stout et al. 1998, Huang et al. 2008) *Legionella* contamination is avoided when copper and silver ion concentrations are maintained above 0.2 and 0.02 mg/L, respectively.

ProEconomy has already successfully helped several hospitals in the UK (see other case studies) with *Legionella* control and they are confident in the performance of their system. The Orca system was installed in Croydon University Hospital in April 2013.

Pre-commissioning and sampling

Before the activation of the Orca system, pre-commissioning samples were taken from 60 outlets. The results of the analysis of these samples showed that Croydon University Hospital was at risk of *Legionella* contamination (Fig 1).

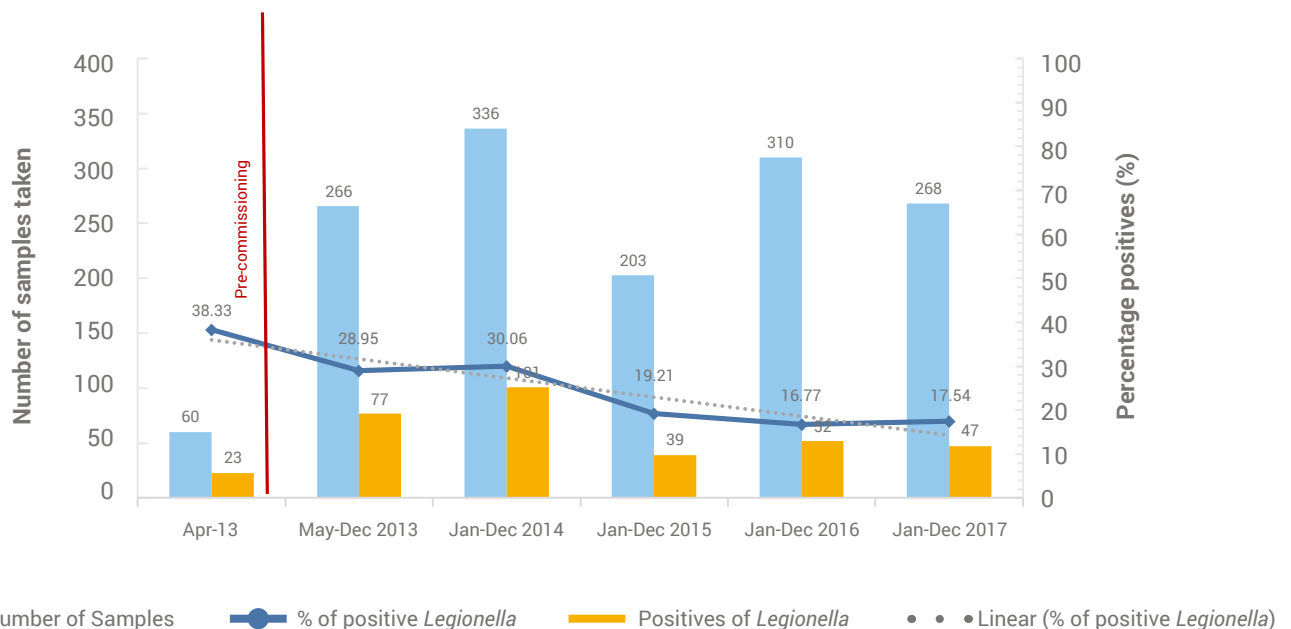


Figure 1. Total samples, number of *Legionella* positives and percentage positives, Croydon University Hospital. Note: Positive *Legionella* means *Legionella* >100 CFU/L.

After the activation of the Orca system, ProEconomy took samples monthly and sends them for analysis to check for the presence of *Legionella* and determine the concentration of copper and silver.

Results

Table 1 presents the results of sampling. From 2013 to 2017, 1443 samples were analysed by ProEconomy, and 339 *Legionella* positive samples were found at Croydon Hospital, ranging from 100 to 70000 cfu/L. There were 255 samples whose *Legionella* were above 200 cfu/L.

Table 1. Sample analysed and *Legionella* positive counts - Croydon Hospital- 2013-2017.

| | |
|--|-----------|
| Total number of samples analysed | 1443 |
| Total numbers of positives | 339 |
| Percent positives | 23.5 |
| Colony forming units range cfu/L | 100-70000 |
| Number of samples with 100-200 cfu/L | 84 |
| Number of samples with more than 200 cfu/L | 255 |

As Figure 1 shows, the percentage of *Legionella* positives accounted for 38.3% during pre-commissioning, indicating that *Legionella* was a problem. After the activation of the Orca system, the percentage of *Legionella* positives dropped by nearly 10% in the first year to 29.0% in 2013. A slight increase of 1 % occurred in 2014, but what can be noted is that 70 more samples were taken in that year (compared with 2013). Therefore, a slight increase is acceptable. After 2014, there was a decreasing trend in *Legionella* positives, despite a less than 1% increase to 17.5% in 2017. To be more specific, the figure for *Legionella* positives decreased significantly from 30.1% to 19.2% in 2015 and at a slower pace in 2016, decreasing by nearly 3%.

Copper and silver ions in water help to control *Legionella*. Figure 2 illustrates the average concentration of copper and silver. Both copper and silver concentrations were below the target (copper 0.2 mg/L and silver 0.02 mg/L) before the activation of the Orca system. The average concentration of silver seldom 'touched' the baseline (0.02 mg/L) and it never dropped too much below the target level. Mostly, silver ions were within the effective levels (>0.02 mg/L). The copper concentration dropped twice, in 2014 and 2017, which can probably explain the increase of the percentage of *Legionella* positives in those two years. The copper concentration increased to over 0.2 mg/L in a short time. The decrease of copper and corresponding increase of percentage of *Legionella* positives indicate the importance of ensuring copper and silver remain above the recommended levels. The follow-up service provided by ProEconomy helps to guarantee a better control of *Legionella*.

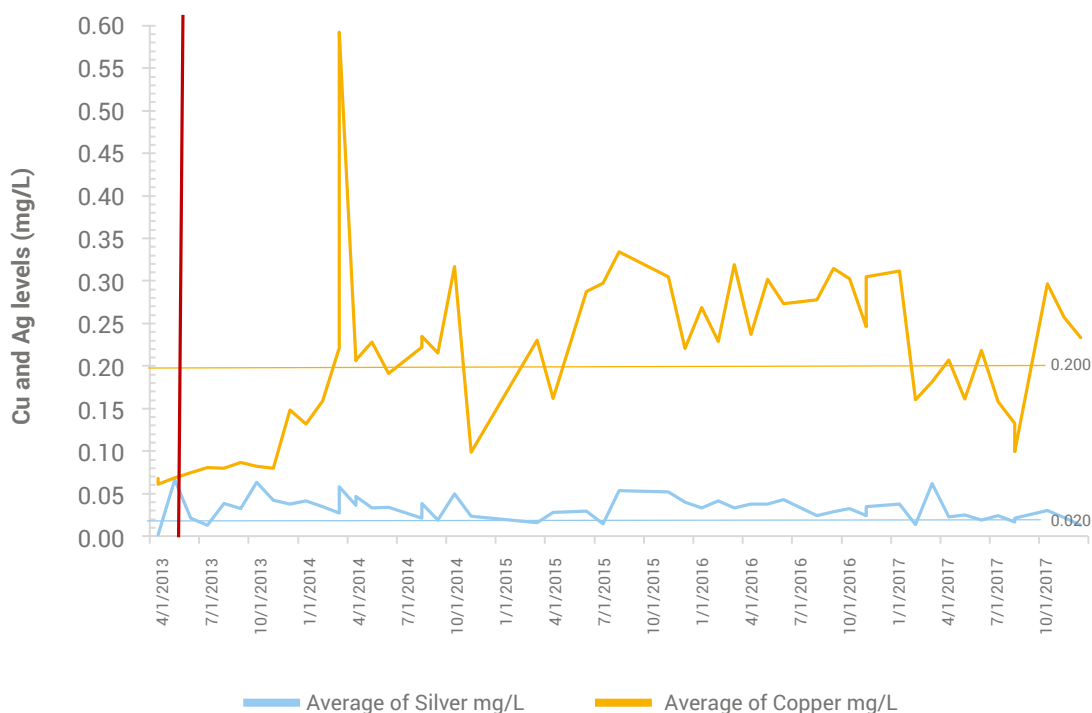


Figure 2. Average copper and silver concentration, Croydon University Hospital, 2013-2017

Conclusion

To sum up, the Orca CSI system is successfully controlling *Legionella* in the water system of Croydon University Hospital with an overall 20.8% decrease in *Legionella* positives between 2013 and 2017. After the Orca system installation, ProEconomy always monitors the concentration of copper and silver to ensure the effectiveness of the Orca system.

The ProEconomy Orca CSI system has proven to be a successful system to control *Legionella* at Croydon University Hospital and ProEconomy will keep offering the service to control *Legionella* in the long term.

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References

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