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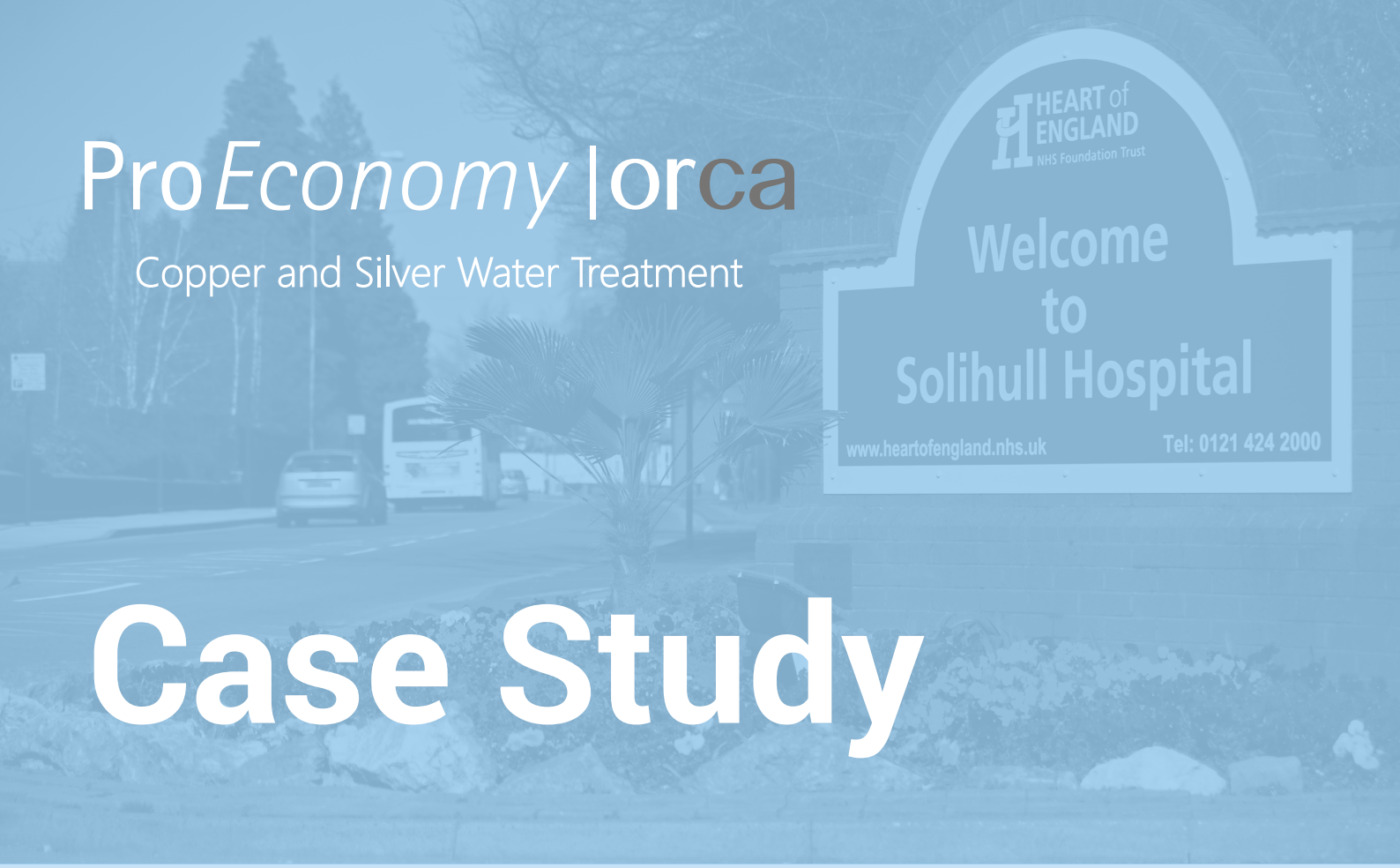
Copper and Silver Water Treatment



Case Study

Solihull Hospital

Controlling pathogens in a UK hospital using copper and silver ionisation

This 350-bed hospital is a smaller site with newer buildings than Birmingham Heartlands. As was the case with Heartlands, a temperature regime was applied as the sole *Legionella* control measure. This proved difficult to maintain. Mixing valves had to be fitted and rubber lined flexible hoses and rubber fittings were attached to several outlets. Water stagnation was also possible due to poor use of outlets and ward closures – ideal conditions for *Legionella* proliferation.

Following the success of the Orca at Heartlands, one copper and silver ionization system, with eight copper and four silver electrode chambers, was installed in January 2008. Prior to installation 30 outlets were sampled, including hot, cold and blended outlets. Table 1 shows the results for *Legionella* and water temperature of the outlets tested. It can be observed that counts ranged from 100 cfu/L to 5,900 cfu/L and that seven out of 30 outlets (23%) tested positive for *Legionella*, including four outlets where water temperature was below 20 °C. One month later, these seven outlets were resampled, together with a further eight outlets identified as being at risk. Only one, an original positive, showed the presence of *Legionella*, and even here the level had fallen from 2,200 cfu/L to 200 cfu/L.

Results for the last six years demonstrate the level of control exerted by the Orca system (Figure 1). There were occasional low counts (100-300 cfu/L *non-pneumophila*) between 2011 and 2013, with one 900 cfu/L np count in April 2012 and one 600 cfu s2-14 in April 2014. No *Legionella* has been detected for the past 3 years (April 2014 - April 2017).

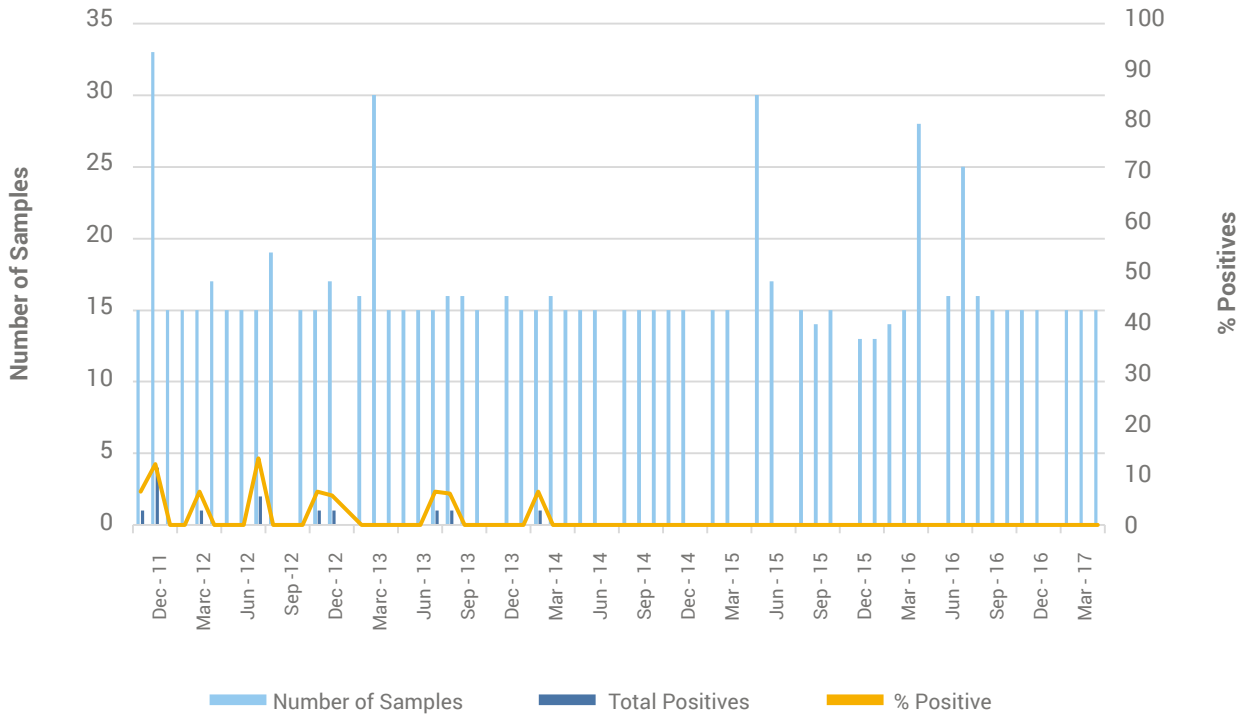


Figure 1. *Legionella pneumophila* monthly results for Solihull Hospital, 2011-2017

Table 1. Initial Pre-Orca Analyses Results – Solihull Hospital – 10/01/2008

Outlets	Legionella counts (cfu/L)	Water Temperature (°C)
Outlet 1-mixed	0	28
Outlet 2-hot	0	57
Outlet 3-cold	100	13
Outlet 4-mixed	2200	14
Outlet 5-mixed	100	45
Outlet 6-hot	0	55
Outlet 7-hot	0	15
Outlet 8-mixed	100	18
Outlet 9-hot	0	41
Outlet 10-cold	0	13
Outlet 11-hot	0	57
Outlet 12-cold	0	12
Outlet 13-hot	0	53
Outlet 14-cold	0	11
Outlet 15-hot	0	54
Outlet 16-cold	0	12
Outlet 17-mixed	0	39
Outlet 18-mixed	0	36
Outlet 19-mixed	0	44
Outlet 20-hot	0	56
Outlet 21-cold	0	14
Outlet 22-mixed	0	38
Outlet 23-hot	0	55
Outlet 24-cold	0	12
Outlet 25-mixed	5900	32
Outlet 26-mixed	100	41
Outlet 27-hot	0	59
Outlet 28-cold	200	12
Outlet 29-hot	0	57
Outlet 30-cold	0	11

Pseudomonas aeruginosa

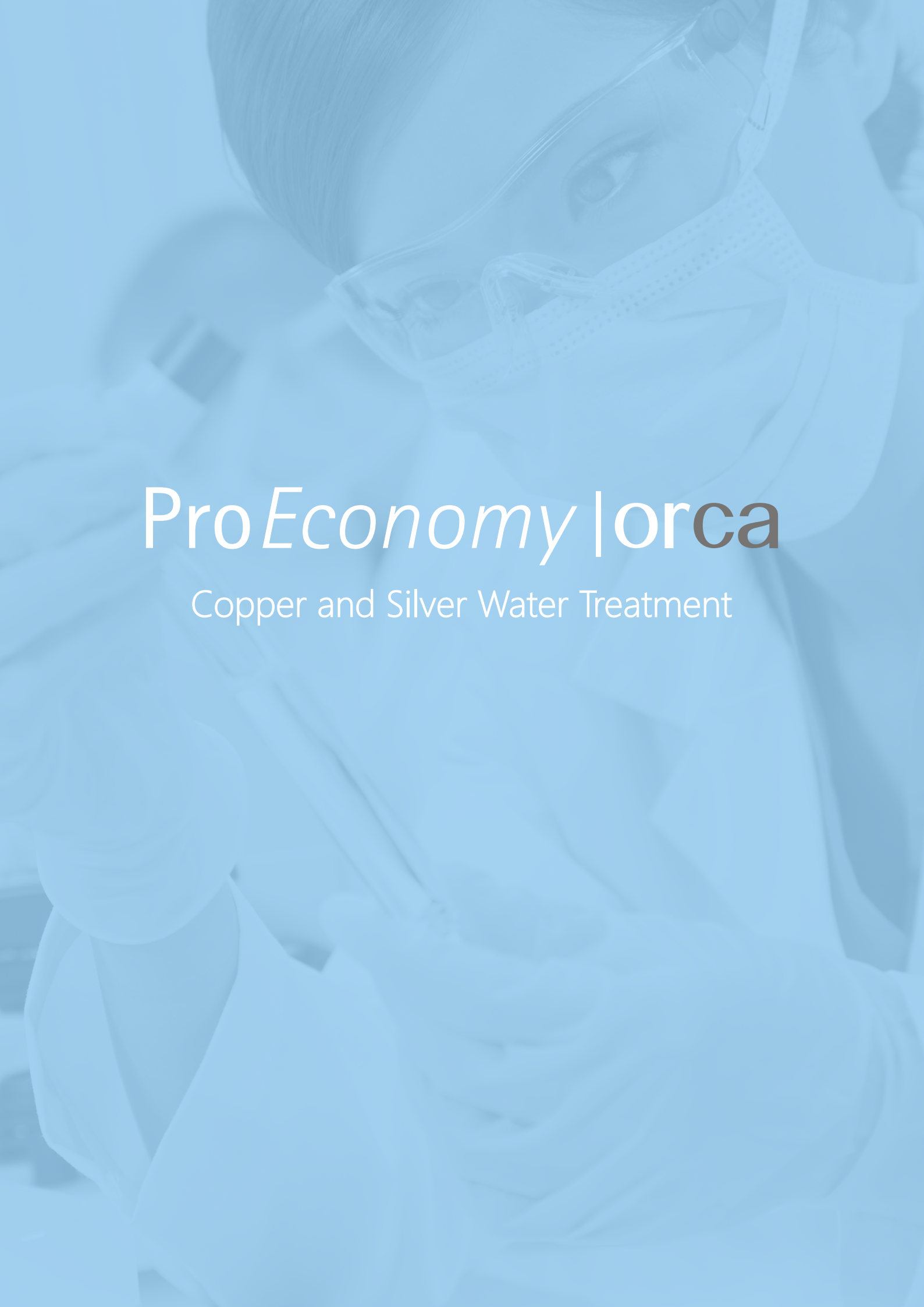
In 2013 Solihull asked ProEconomy to test for the presence of *Pseudomonas aeruginosa*. Of the 357 samples taken in the past four years, only six were positive for *P. aeruginosa* (1.7%).

The results for *P. aeruginosa* have shown that between July 2013 and June 2017 there were only 6 positives for *P. aeruginosa*, out of 357 samples tested (1.7%), with counts of 2 to 9 cfu/100 ml and one count of 100 cfu/ml (Table 2).

Table 2. Solihull Hospital *P. aeruginosa* results – 1st January 2012 – 31st December 2013.

Sample Date	Total Samples taken	*Pseudomonas aeruginosa* cfu/100ml	Percent Positives (%)
05/07/2013	30	0	0.0
20/10/2013	27	0	0.0
03/11/2013	35	2	5.7
31/01/2016	32	0	0.0
07/02/2016	23	0	0.0
21/02/2016	34	0	0.0
05/09/2016	5	0	0.0
25/09/1916	81	2	2.5
16/10/2016	4	1	25.0
06/11/2016	2	0	0.0
08/05/2017	5	0	0.0
14/05/2017	75	1	1.3
08/06/2017	4	0	0.0
Total	**357**	**6**	**1.7**

ProEconomy undertakes monthly sampling at 21 outlets at Solihull, with analysis being carried out at an independent laboratory to determine the presence of *Legionella*, copper and silver concentrations, temperature and TVC. *Pseudomonas aeruginosa* tests are carried out every six months.



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