



Pro*Economy* | orca

Copper and Silver Water Treatment

# Case Study

## Spire Healthcare Hospitals

Controlling Legionella risk in five Spire Healthcare hospitals in the UK, using copper and silver ionisation

## Little Aston Hospital

### Background

Spire Healthcare is the second largest private hospital operator in the United Kingdom, with 42 hospitals in England, Wales and Scotland. Following an invitation by Mr. Nigel Sharpe of BUPA, a proposal was prepared for the installation of the Orca copper and silver ionisation water system by ProEconomy at Little Aston Hospital, Birmingham. The hospital previously used to operate a temperature regime to control Legionella (*Legionella pneumophila*), however with the installation of the Orca system it is possible to circulate the water at a temperature of 43°C.

### Installation of the Orca system

One copper and silver ionization system Model 1 Mark 4, with two copper and two silver electrode chambers were installed as part of the Orca system to treat both the hot and cold water distribution systems, treating a maximum of 60 litres per minute. Monthly samples are taken to determine if *L. pneumophila* and *Pseudomonas (P. aeruginosa)* are present, with samples analyses being carried out by an independent laboratory (ALS, Coventry, UK). The Orca system was installed in 2007.

### Sampling and Results

Five outlets were sampled, including cold and hot water outlets. Figure 1 shows the total number of samples, and the number and percentage of positive samples. A decrease in the number of Legionella positive samples was observed from 2012 to 2017. In 2013, two out of 62 samples were positive for Legionella, while since 2015 Legionella has been completely eradicated.

Figure 2 shows the total number of samples, the number of positive samples and percentage of positive samples of *P. aeruginosa*. A decrease in the number of *P. aeruginosa* positive samples can also be observed from 2012 to 2017. In 2013, two out of 63 samples were positive for *P. aeruginosa* while since 2014 *P. aeruginosa* has been completely eradicated.

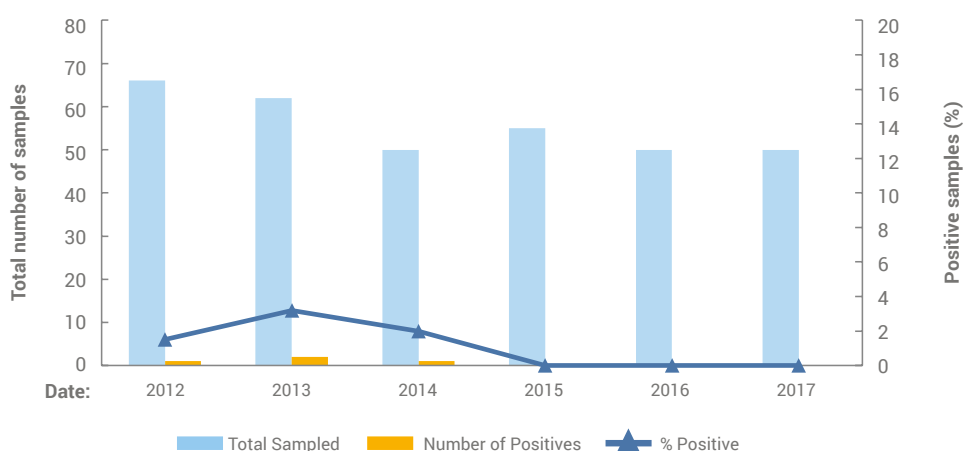


Figure 1. *Legionella pneumophila* – Spire Little Aston Hospital – 2012-2017.

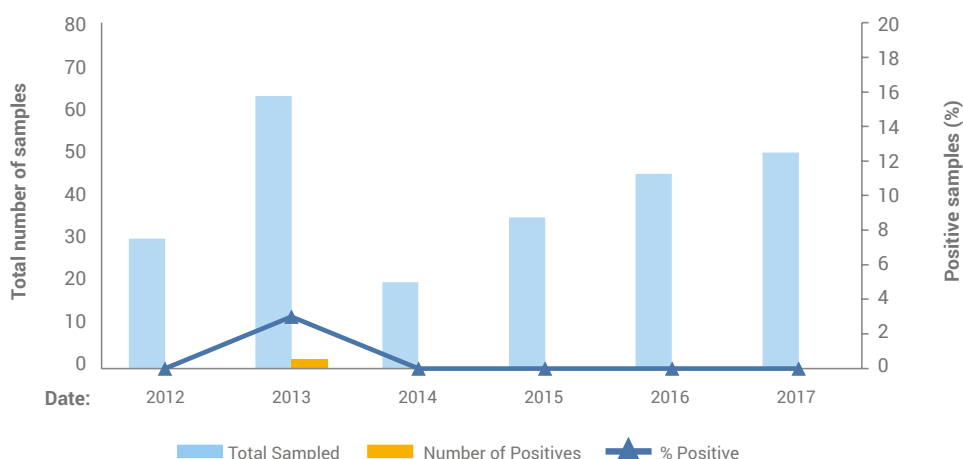


Figure 2. *Pseudomonas aeruginosa* – Spire Little Aston Hospital – 2012-2017.

## Gatwick Park Hospital

### Background

Following the success of the Orca system at Little Aston Hospital, Mr. Nigel Sharpe and John Blue of BUPA invited ProEconomy to prepare a proposal for the installation of the Orca water ionisation system at Gatwick Park Hospital, Horley. 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 45°C.

### Installation of the Orca system

One copper and silver ionization system Model 2 Mark 4, with two electrode pods, consisting of two-copper and two-silver electrodes were installed, treating a maximum of 60 litres per minute. The Orca system was installed in 2010. Monthly samples are taken to determine whether Legionella and Pseudomonas are present.

### Sampling and Results

A total of 13 outlets were sampled including cold and hot outlets. Figure 3 shows the total number of samples, and the number and percentage of positive Legionella samples. In 2012 two out of five samples were positive for Legionella while since 2014, Legionella has been eradicated from the hospital.

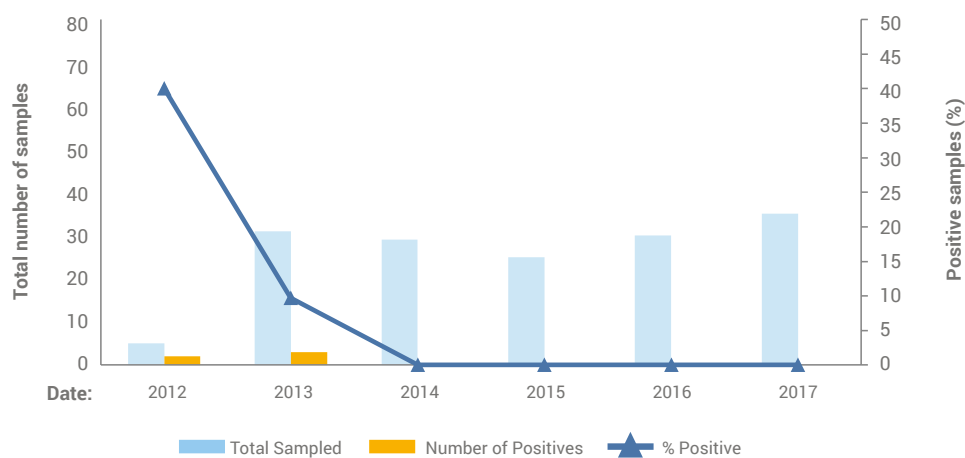


Figure 3. *Legionella pneumophila* – Spire Gatwick Park Hospital – 2012-2017.

## Greenbank Road Liverpool Hospital, Methley Park Hospital and Dunedin Hospital

### Background

Following the success of the Orca system at Little Aston Hospital and Gatwick Park Hospital, a proposal was prepared for the installation of the Orca copper and silver ionisation water treatment system at Greenbank Road Liverpool Hospital in Liverpool, Methley Park Hospital in Leeds, and Dunedin Hospital in Reading.

### Installation of the Orca system

One copper and silver ionization system Mark 1, with two pods, consisting of one copper and one silver electrodes were installed, treating a maximum of 75 litres per minute. The Orca system was installed in 2016 at Greenbank Road Liverpool Hospital and in 2017 at Methley Park and Dunedin Hospitals. Monthly samples are taken to determine whether Legionella or Pseudomonas are present, with sample analysis being carried out by an independent laboratory (ALS).

### Sampling and Results

At Methley Park Hospital, 20 pre-commissioning outlets and four post-commissioning were sampled for *P. aeruginosa*, including hot and cold outlets. Table 1 shows the number of samples, number of positives and percentage positives for *P. aeruginosa* from 2017 to 2018. There were 2 positive *P. aeruginosa* samples detected in 2017. Since February 2018 *P. aeruginosa* has been eradicated at the hospital.

**Table 1.** *Pseudomonas aeruginosa* – Spire Methley Park Hospital – 2017-2018.

<i>Pseudomonas aeruginosa</i>			
Year	Number of samples	Number of Positives	% positive
2017	20	2	10
2018	4	0	0

Table 2 gives the summary Legionella data (number of samples taken, and the number and percentage of positive samples) for all Spire hospitals. As can be observed in Table 2, the Orca system successfully reduced the number of positive Legionella at the hospitals.

**Table 2.** *Legionella pneumophila* – Spire Little Aston, Gatwick Park, Greenbank Road Liverpool, Methley Park and Dunedin Hospitals – 2012-2018.

Location	Year	Samples taken	Number of Positives	% positive
Little Aston	2012	66	1	1.5
	2013	62	2	3.2
	2014	50	1	2
	2015	55	0	0
	2016	50	0	0
	2017	50	0	0
Gatwick Park	2012	5	2	40
	2013	31	3	9.7
	2014	29	0	0
	2015	25	0	0
	2016	30	0	0
	2017	35	0	0
Greenbank Rd	2016	30	2	6.6
	2017	101	1	0.9
	2018	20	0	0
Methley Park	2017	20	0	0
	2018	20	0	0
Dunedin	2017	100	45	45
	2018	40	13	32.5

At Gatwick Park, five outlets were sampled for Legionella, including cold and hot outlets. Table 2 shows the number of samples taken, the number of positive samples and the percentage of positive Legionella samples from 2012 to 2018. After two positives found in 2012 and three in 2013, no more positives were detected since 2014.

At Methley Hospital, 20 pre-commissioning samples were collected and analysed for Legionella and another 20 were collected since, 10 in January and 10 in February 2018. As shown in Table 2 no Legionella was detected at Methley Park.



At Dunedin Hospital it took longer for Legionella to be eradicated and it has not been completely eradicated. Out of the 100 outlets sampled in 2017, 45 were positive for Legionella, with counts ranging from 100-15000 cfu/L, but 39 of these were *L. non-pneumophila*. There was a noticeable decrease from 45% to 32% Legionella positives from June 2017 to February 2018 (Table 2). This was due to remedial work that took place at the hospital. Table 3 shows the outlets that were positive for Legionella from the start of sampling. It can be observed that only one outlet had Legionella positive at Dunedin in February 2018, with all other outlets being now legionella-free.

**Table 3.** *Legionella pneumophila* counts (cfu/L) at positive outlets – June 2017-February 2018.

Outlet	13/06/2017	18/07/2017	11/08/2017	11/09/2017	24/10/2017	15/11/2017	12/12/2017	08/01/2018	05/02/2018
Lvl 1 CT Suite WHB MT Hot	Pre-commission	700 np	3000 np	200 np	0	900 np	1600 np	1200 np	0
415 Shower	600 np	2400 np	8300 np	200 np	300 np	500 np	1400 np	5400 np	0
411 Shower	1200 np	20000 np	10500 s2-15	400 s2-15/600 np	7800 np		1900 np	2200 np	0
Oncology Waiting Rm WHB Sensor	600 np	200 np		200 np	0	0	200 np	0	0
Lvl 3 Consulting Rm 2 WHB MT	9200 np	20000 np	15000 np	500 np	3400 np	900 np	3200 np	9600 np	0
304 Shower	200 np	0	0	0	0				
Lvl 2 Male WC WHB MT Hot	100 np	100 np	0	0	0	0	0	0	0
X Ray WC WHB MT Hot	200 s2-15	200 np	0	200 s1	200 s2-15	0	0	0	200 np
Cardio WC Lvl 2	200 np	0	0	0	0	0	0	0	0

Np = *L. non-pneumophila*; s2-15 = serum group 2-15; MT = mixer tap; WHB = wash-handbasin

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