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Paper Poster Session

Prevention of hospital and healthcare-associated infection

Seasonal changes in Legionella spp. concentrations in hospital in-building water systems

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Background. In Europe, Legionella spp. are an important cause for pneumonia with numbers of notified cases increasing in late summer and early autumn. Potable water systems are one of the main reservoirs, and for some countries, a corresponding increase of Legionella spp. concentrations in the water supply has been shown. As Legionella spp. are also relevant in nosocomial pneumonia, this study was conducted to determine seasonal changes in the concentrations in hospital water systems.

Methods. Between January 2010 and September 2015, regular routine water samples from ten hospitals in the Cologne metropolitan area and around were collected. Each hospital took samples at least twice a year from predetermined sampling sites. All samples were tested for Legionella spp. using cultural microbiological methods and the water temperature was recorded.

Results. In total, 1170 samples were taken from ten hospitals in 111 sampling sessions. Medium level concentrations or higher (>100 cfu/100ml) requiring disinfection were detected at 27 sampling sessions (24.3%) in seven hospitals, while lower concentrations or no Legionella spp. were detected in three hospitals. Of all sampling sessions, 22 (19.8%) were completely free of Legionella spp. Ninety-seven percent of positive samples (390 out of 402) contained L. pneumophila, one sample contained L. anisa and 11 samples (all from the same hospital) contained L. bozemanii.

Medium Legionella spp. concentrations in the first, second, third and fourth quarter of the year were 59.8 cfu/100ml, 76.8 cfu/100ml, 134.8 cfu/100ml and 54.3 cfu/100ml, respectively. The difference between the third and other quarters was statistically significant (p=0.03). Medium hot water temperatures for the four quarters were 55.9°C, 54.0°C, 56.1°C and 56.1°C, respectively; there was no discernible trend in temperature variation.

During the study period, the numbers of samples taken (2010: 129, 2011: 123, 2012: 150, 2013: 150, 2014: 328, 2015 (first three quarters): 290) increased as well as the regularity in sampling, suggesting an increased awareness for water-related infection risks in the hospital setting.

Conclusion. The results of this survey indicate that the prevalence of Legionella spp. in the water systems of hospitals shows some seasonal variation with a peak in late summer. Although a higher hot water temperature is generally associated with a lower risk of contamination, the water temperature did not vary in the same degree as the Legionella contamination in our study. Hospitals should consider including the late summer months in their water sampling routine to avoid missing an increased risk of exposure in this season.