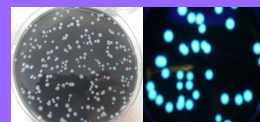


Microbiological monitoring of water for control of *Legionella*

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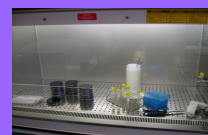


INTRODUCTION

The genus *Legionella*, a member of the family Legionellaceae, has at least 50 species comprising 70 distinct serogroups. *Legionella* are Gram-negative, rod-shaped, nonspore-forming bacteria that require L-cysteine for growth and primary isolation (3). *Legionella* spp. are members of the natural flora of many freshwater environments, such as rivers, streams and impoundments, where they occur in relatively low numbers. The microorganism passes from its natural reservoirs into the water distribution networks, including cooling towers, whirlpools and spas, fountains, sprinklers and shower heads (1). They are able to reproduce at temperatures between 25 °C and 45 °C and survive in temperatures of up to 55-60 °C (4). *Legionella* can be ingested by trophozoites of certain amoebae which play an important role in their persistence in water environments. Infection by *Legionella pneumophila* is usually acquired by the inhalation of aerosols contaminated with the *L. pneumophila* bacteria. The disease is not known to be transmissible via person-to-person contact (3). Although all *Legionella* species are potentially pathogenic for humans, *L. pneumophila* is the major species responsible for legionellosis which occurs in two clinical forms: legionnaire's disease, a pneumonia, and Pontiac fever, a milder respiratory infection. Outbreaks of Legionnaires' disease have been traced to a wide variety of environmental water sources (2).

METHODS

The detection and enumeration of *Legionella* in water samples was performed according to HPA NSM W12:2006 – Filtration and Centrifugation. HPA NSM W13:2006 – Centrifugation was used for very dirty or oily samples. Regarding the identification and serotyping of *Legionella pneumophila* was used a commercially available latex agglutination test kit (Microgen *Legionella* - Legionela latex test) that distinguishes *Legionella* spp not *pneumophila* and *L. pneumophila* serogroup 1 and serogroups 2-15.



The samplings were performed according to ISO 194586:2006.



This study included a statistic analysis of 518 water samples received in UAS-Porto of Departamento de Saúde Ambiental of Instituto Nacional de Saúde Doutor Ricardo Jorge for the detection and quantification of *Legionella pneumophila* and *Legionella* spp. not *pneumophila* during the years 2010, 2011 and 2012 until May. The results were analyzed according to the sampling areas and points.

RESULTS

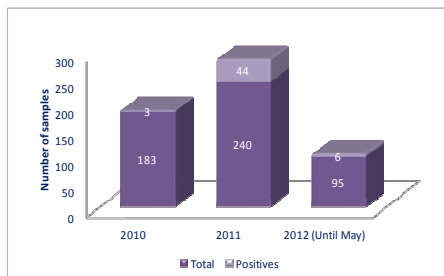


Figure 1. Number of samples of water analyzed, per year.

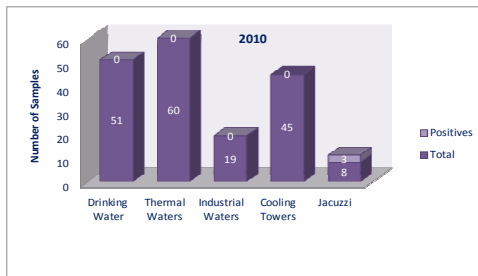


Figure 2. Number of samples of water analyzed in 2010 by sampling area.

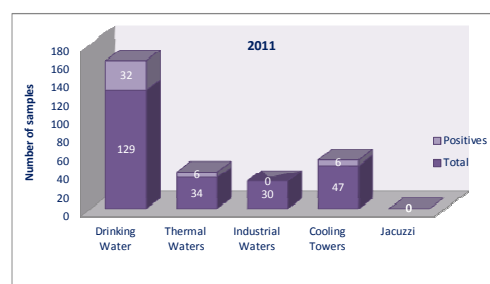


Figure 3. Number of samples of water analyzed in 2011 by sampling area.

Table 1. Distribution of serogroup of *Legionella* for sampling point in a total of 53 positive samples.

	Showers	Taps	Sprinklers	Thermal Waters	Jacuzzi	Cooling Towers
<i>Legionella pneumophila</i> Serogroup 1	27	1	1		2	2
<i>Legionella pneumophila</i> Serogroup 2-15			1	6		2
<i>Legionella</i> spp. não <i>pneumophila</i>	5	3		4	1	2

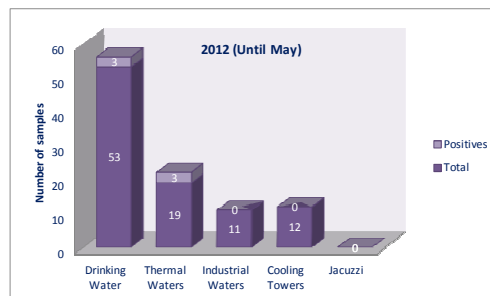


Figure 4. Number of samples of water analyzed by sampling area.

DISCUSSION AND CONCLUSION

- The increase of samples analyzed in 2011 was due to six outbreaks.
- Drinking water systems are the sampling area with more positive results, and there is no legal requirement for *Legionella* in such waters.
- In positive water samples *Legionella pneumophila* serogroup 1 predominates, preferably in showers.
- Implement a monitoring water plan for health-care facilities, nursing homes and other buildings used by people more susceptible to infections by *Legionella*, like immunocompromised people.
- Importance of prevention through planning and maintaining infrastructures, by water quality monitoring, water treatment and additional treatment in case of contamination. It is easy to prevent, but difficult to eliminate.
- Competent authorities must legislate to minimize the impact of *Legionella* in Public Health.

REFERENCES

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- 4- Leoni, E. et al. *Legionella* waterline colonization: detection of *Legionella* species in domestic, hotel and hospital hot water systems. Journal of Applied Microbiology, 98:2 (2005) 373-379.