

Evaluation of the efficacy of 3 and 4 months of use microfilters on *Legionella pneumophila* in real life conditions in a healthcare facility

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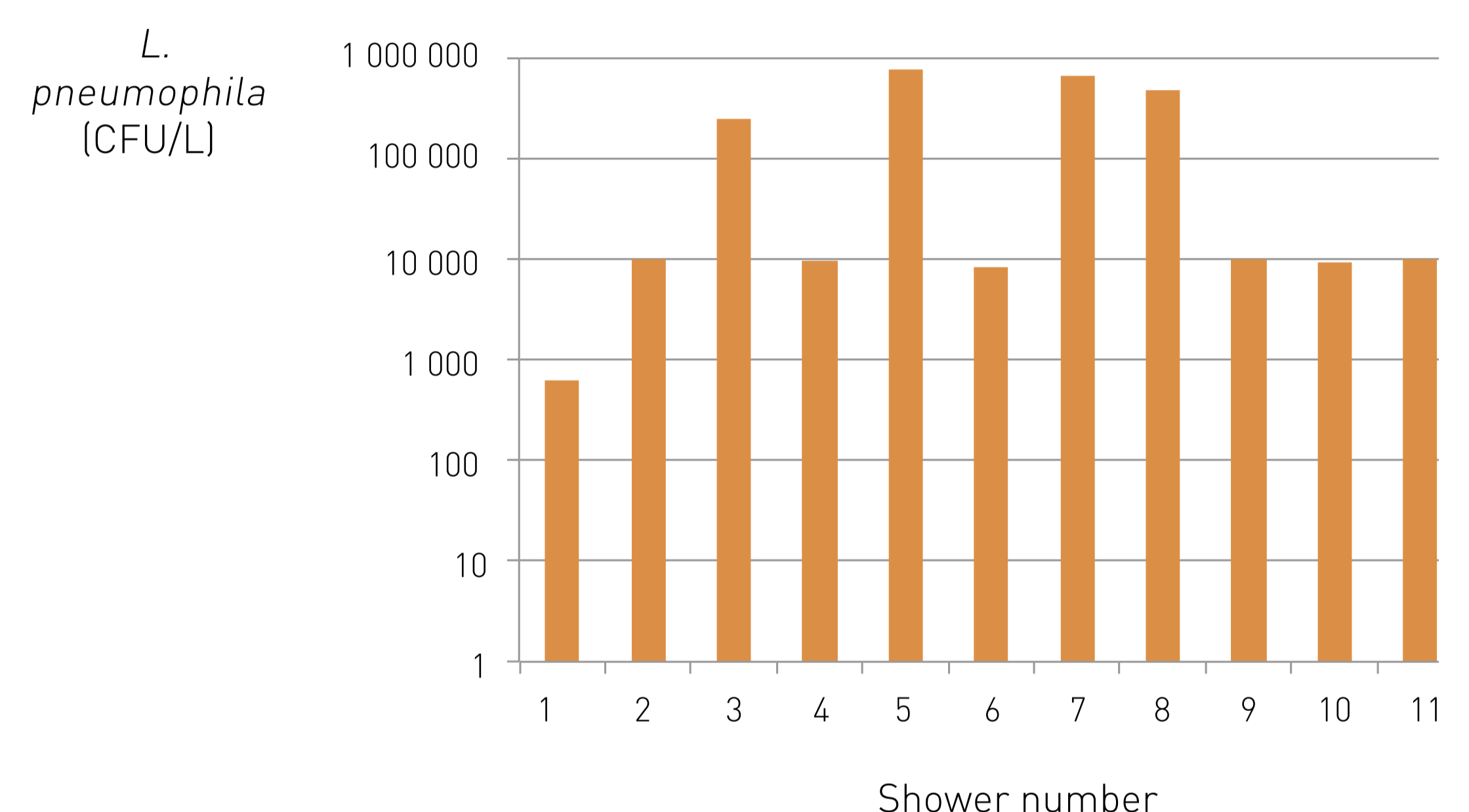
Point-of-use (POU) filters are now validated in laboratory by manufacturers for 3 and even 4 months, using bacterial challenges, such as *Brevundimonas diminuta*, *Pseudomonas aeruginosa* and *Legionella pneumophila*, according to the American Standard Test Method (ASTM) F838. However, evaluation of POU filters in real life conditions in healthcare facilities is rarely conducted. The aim of this study is to assess FILT'RAY^{2G}, our supplier's 3 or 4 months of use (MOU) new POU filters (tubular membrane microfilters with a 0.1mm pore size), placed on showers known to be contaminated by *L. pneumophila* in our hospital.

We studied 6 showers (n° 1-6) equipped with 3-MOU FILT'RAY^{2G}, 6 showers (n°7-12) equipped with 4-MOU FILT'RAY^{2G}, and a control shower equipped with 1-MOU FILT'RAY^{2G}. All MOU filters were placed in the same clinical unit in one of the hospital building, on the same day and in the same conditions of use. The microbiological culture and quantification of *L. pneumophila* was conducted regarding the French standard AFNOR NF T90-431 by an external laboratory. For test showers, a water sample (1st flush) of 500 mL was collected without filter (Day (D) 0) and with filters (D0, Month (M) 1, M2, M3, and M4). Control shower water was also collected monthly before and after changing filter. Water temperature was measured for 1st flush, and 2 minutes after opening.

Table 1 : Monitoring of water temperature during the study

		Mean water temperature from D0 to M3 or M4 (°C)	
		1 st flush	2 minutes after opening
3 Months of Use filters	1	26.7	54.4
	2	26.4	58.3
	3	26.6	57.8
	4	25.9	57.5
	5	28.4	57.0
	6	28.1	57.4
3 Months of Use filters	7	27.5	57.0
	8	27.1	57.6
	9	26.4	58.0
	10	27.3	56.7
	11	26	57.1
	12	24.4	55.7
Control shower		25.8	59.2

Figure 1 : *L. pneumophila* concentration in shower water collected without filters at D0



Without filters, all the 12 showers samples grew positive for *L. pneumophila* (growth range: 630 CFU/L-750,000 CFU/L) at D0 (Fig.1), as well as control shower during the study (growth range: 15,000 - 25,000 CFU/L). Regardless the shower and the month, water temperature was very stable, around 26°C for 1st flush during sample; and around 57°C 2 minutes after opening (Table 1).

Last but not least, with filters, **6/6 (100%) of water samples from 3-MOU filters and 6/6 (100%) of water samples from 4-MOU filters, were negative for *L. pneumophila* in the conditions of the study.**

Despite the limited number of POU filters tested in this investigation, we showed in real life conditions (i.e. mild to heavy contamination of the water network), *L. pneumophila* retention by 3-MOU and 4-MOU filters. Their use should be considered instead of the actual 1or 2-MOU filters to remove durably *L. pneumophila* from the water. However, it would be also interesting to evaluate these new filters for other waterborne pathogens.

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