LEGIONELLA: Clinical and environmental distribution in Tunisia

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INTRODUCTION(1)

- The *Legionella* was first identified in 1976
- Outbreak among members of the American Legion in Philadelphia
- 25000 cases of legionellosis are indexed annually in the world
- 1000 to 2000 cases are diagnosed each year In France

Bellevue-Stradford

INTRODUCTION(2)

- *Legionella* are widely distributed in natural (lakes, rivers…) and artificial water systems

✓ Cooling towers
✓ Shower
✓ Spa and swimming pools
✓ Medical respiratory equipment

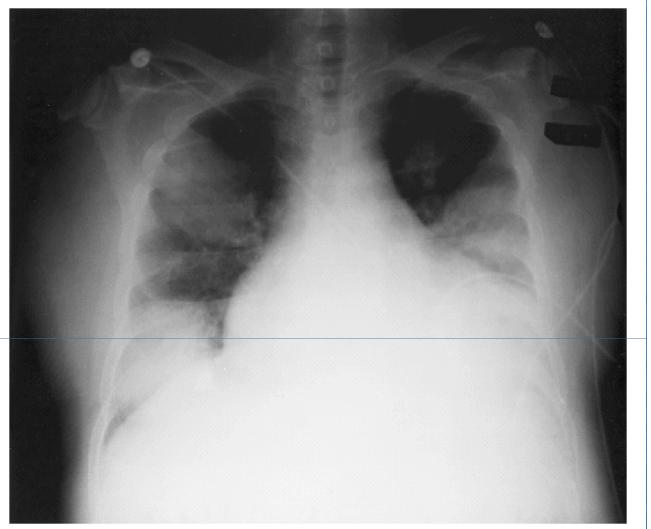
INTRODUCTION(3)

- *Legionella* is an aerobic Gram negative organism not easily detected and culture is fastidious

- 48 species of *Legionella* with 64 distinct serogroups

✓ *Legionella pneumophila* serogroup 1 is the most common pathogenic species
✓ Other species such as *L.longbeachae* and *L.micdadei* also cause disease

CLINICAL PRESENTATION



- Clinical symptoms of Legionnaires' disease occur 2-10 days after exposure
- Clinical signs include fever, non productive cough, headache, myalgisis, dyspnoea, diarrhoea…
- Clinical signs are not very specific and do not allow to differentiate this disease from the other respiratory infections
- Only a bacteriological diagnosis could characterize Legionellosis

OBJECTIVES

- To determine the incidence of legionellosis cases over 15 years
- Search of *Legionella* in the environment
- Serotyping of strains of *Lp*
- Molecular typing *Lp* 1: PFGE

SAMPLES

- Collected between 1990 to 2005.

- ✓ Respiratory secretions (BAL)
- ✓ Serum
- ✓ Urine

} Clinical cases

- ✓ Water → Environment

DIAGNOSTIC OF CLINICAL CASES

- Direct fluorescent antibody
- Culture
- Urinary Antigen detection
- Serology: - seroconversion

- high single title

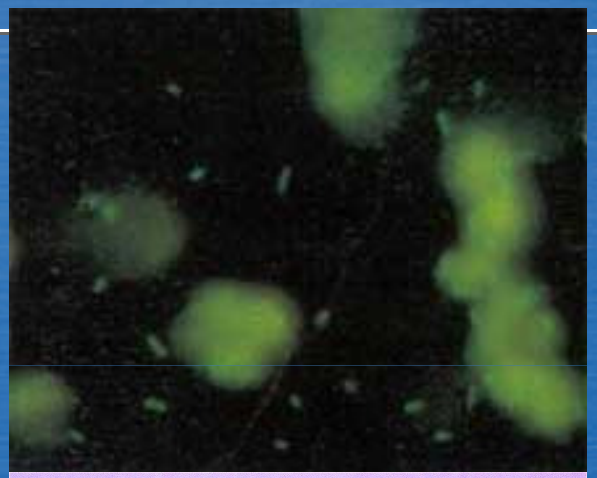
Confirmed cases

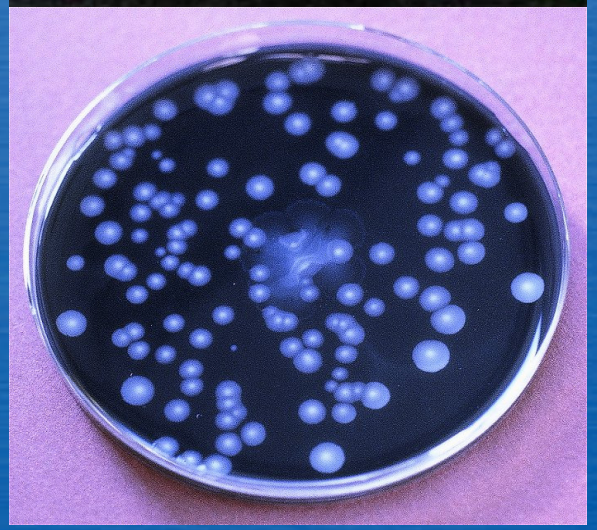
Probable cases

DIAGNOSTIC(1)

- ❖ Detection of *Legionella*
  - ✓ Direct fluorescent antibody

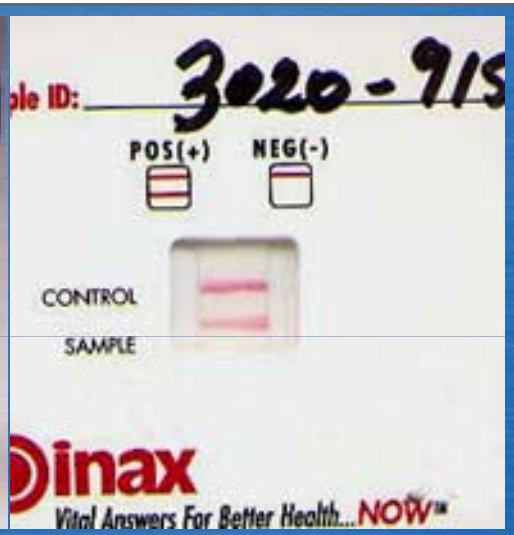
- ❖ Culture (Gold standard)
  - ✓ BCYE
  - ✓ Aspect in « verre fritté » (3-10 days)





DIAGNOSTIC(2)

- ❖ Urinary antigen detection
  - ✓ Rapid
  - ✓ Sensibility 80 to 90%
  - ✓ Specificity 97%



- ❖ Serology (2 serum 3-6 weeks)
  - ✓ Indirect immunofluorescent assay (IFA)
    - Seroconversion (Increase 4X antibody)
    - single high titter (presumptive diagnosis)

RESULT

Number of cases of legionellosis in Tunisia

Number of cases	1990-1995	1996-2000	2001-2005	Total
Suspicious cases	72	473	489	1034
Cases diagnosed in Tunisia	4	14	5	23
Cases reported by EWGLI	10	22	28	60

Risk factors
Confirmed cases

Sex ratio:4

Average age : 42,4 years (26 – 65years)

Risk factors	Nb	%
Smokers	16	70
Diabetes	2	8
Immunodeficient /corticotherapy	2	8
Hospital	2	8
Hotel	6	26
Other (building)	3	13

LEGIONELLA IN ENVIRONMENT

- A preliminary survey of hospital water systems: (Hot and cold water)

✓ 2004-2005

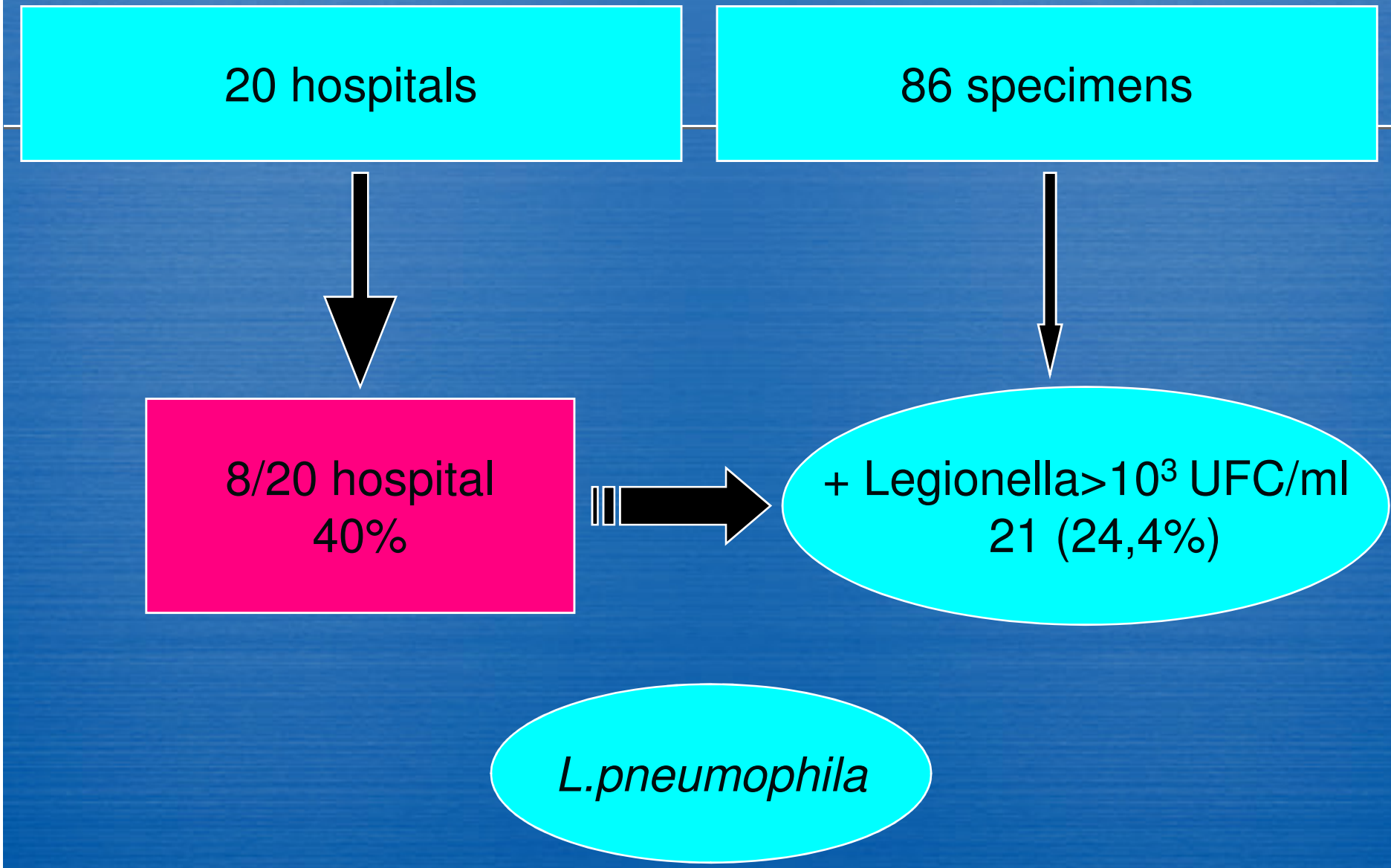
✓ 20 Tunisian hospitals:

➢ university hospitals (Reanimation, pneumology, cardiology)

➢ Regional hospitals

✓ 86 water samples were analysed according to French standard recommendations AFNOR T90-431

Control of hospital water system



L.pneumophila serogroups distribution in clinical and environmental isolates

strains	*Legionella pneumophila*	
	Serogroup 1	*serogroup 2-15*
Clinical 15	15 (100%)	0
Hospital 21	6 (28.5%)	15 (71.5%)

Comparative distribution of clinical and environmental isolates *L.pneumophila* serogroups

Doleans A. and al Journal of Clinical Microbiology, Jan.2004, p.458-460 Vol 42 No.1

Strains	*Legionella pneumophila*	
	Serogroup 1	Serogroup 2-14
Clinical 256	247 (96,4%)	9 (3,6%)
Environmental 2073	776 (37,4%)	1297 (62,6%)

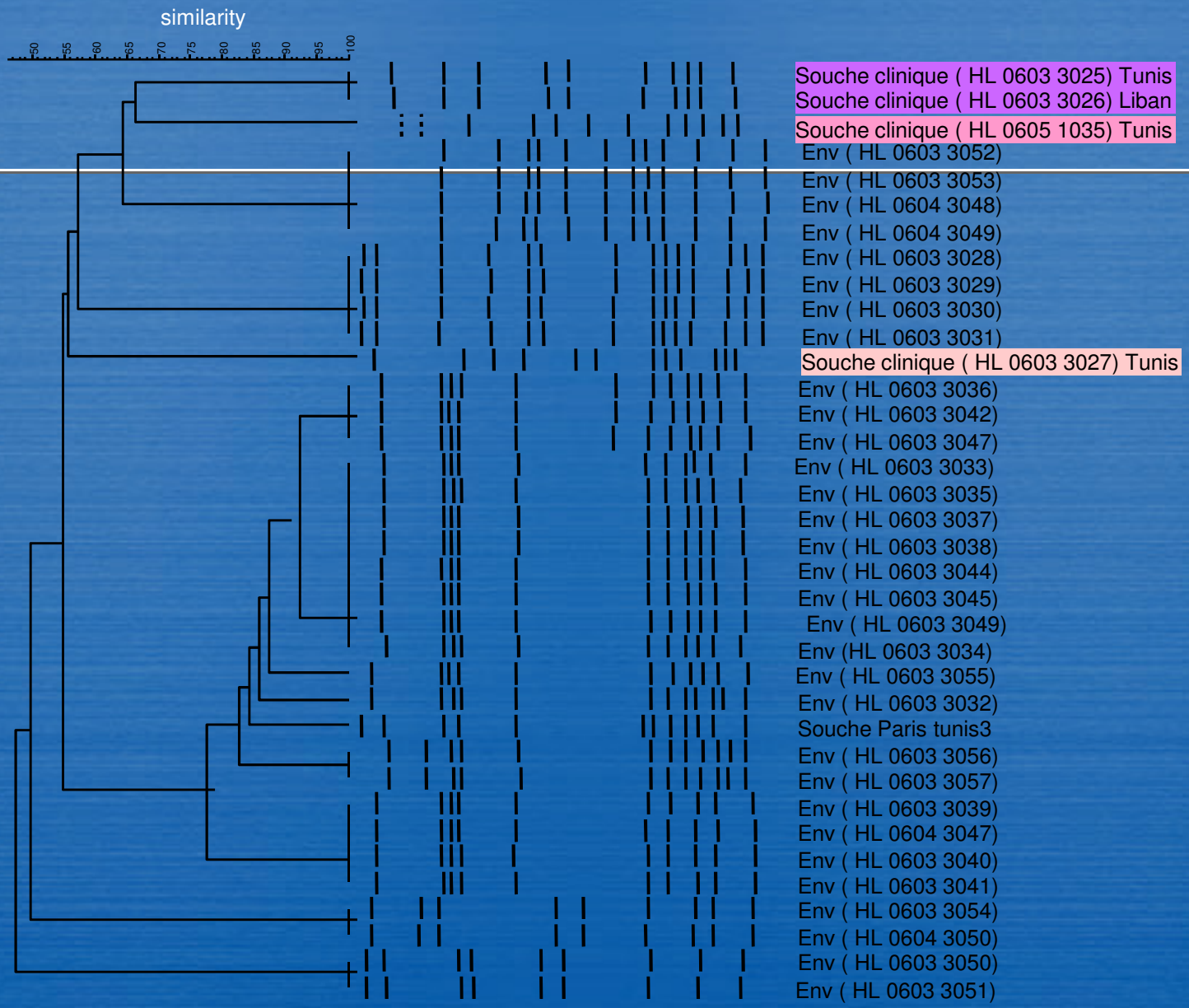
Comparison *Lp* 1 by PFGE

- 35 strains of *Lp* serogroup 1:

✓ 4 clinical strains
✓ 31 environmental strains (14 different establishments)

- PFGE with *Sfi I* restriction enzyme

Schematic representation of PFGE profiles



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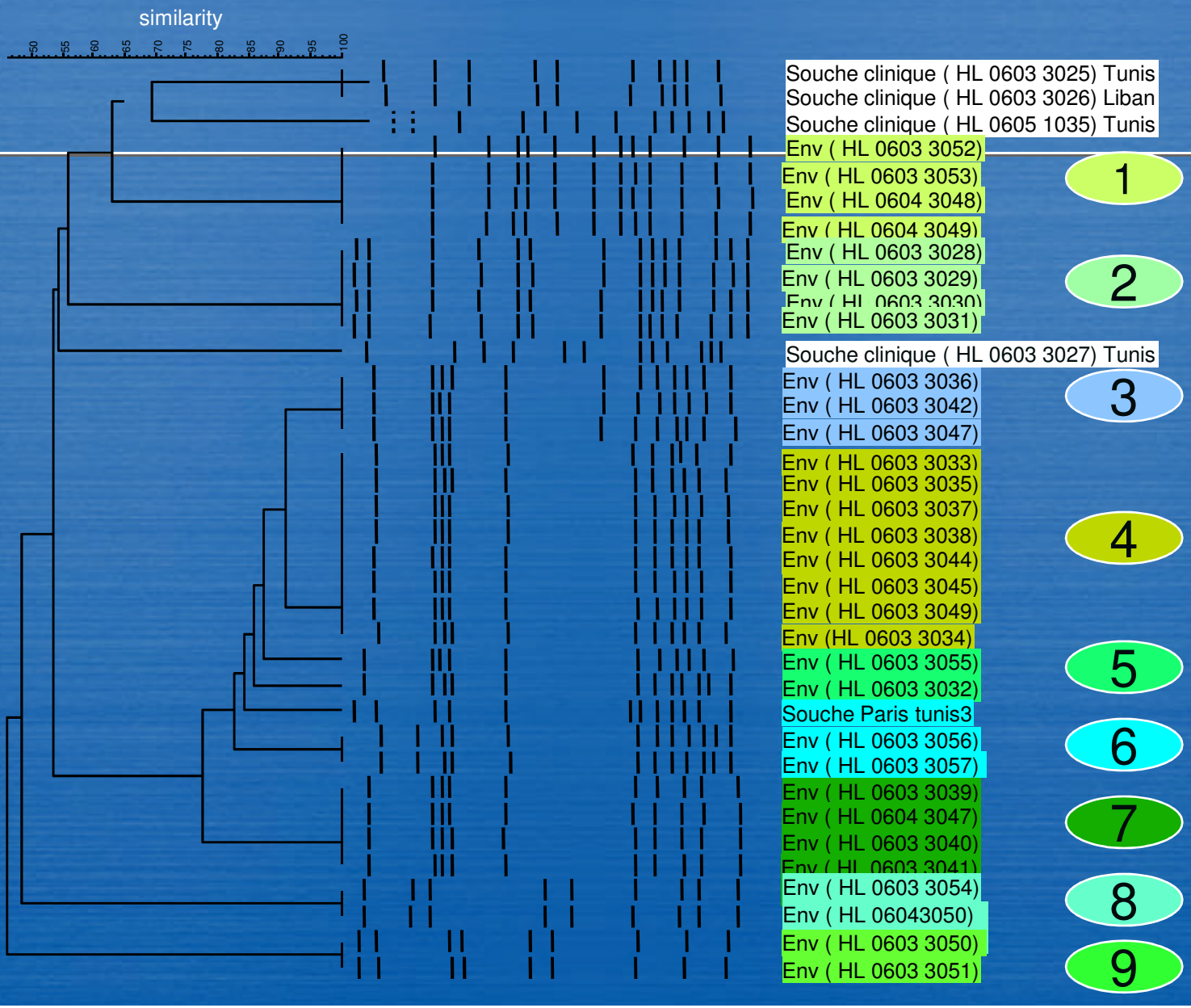

CONCLUSION

- Clinical and epidemiological data concerning *legionella* remain fragmented because of:

✓ Absence of rules regulating the notification of the disease

✓ Absence of prospective investigation establishing legionellosis prevalence during respiratory infections

✓ For lack of sensitizing of the medical profession

- Although water control in hotels and hospitals is starting off, it is still not systematic. It should be regulated and enforced