

**Leptospirosis survey in the Pacific: Progress report, August 2004**

The collaborative research project “Multi-centre survey on incidence and public health impact of leptospirosis in the Pacific” was developed and accepted for funding by WHO in 2003 (see article in *Inform'ACTION No 16*). Although still only partially achieved, we thought it would be worthwhile sharing the preliminary findings with all PPHSN members.

Between August 2003 and June 2004, nine Pacific Island countries and territories (PICTs) have accepted to participate in the study: Palau, Vanuatu, Wallis and Futuna, Fiji Islands, Cook Islands, Tonga, Tuvalu, French Polynesia and Guam. The Federated States of Micronesia also responded positively in July 2004, but this country is not included in the present report.

The confirmation tests are LabNet L2 laboratories: Guam Public Health Laboratory, Mataika House (Fiji Islands), Malardé Institute (French Polynesia) and New Caledonia Pasteur Institute (the latter being also the reference and pilot site).

**Preliminary results**

As of August 2004, two among the nine PICTs that have joined the study had produced some activity. In the four sites covered by these territories, evidence of human leptospirosis was highlighted. Those sites are not to be named in this interim report, as the final results are to be submitted for a scientific publication and in order not to stigmatise on inactive sites.

<b>Total population enrolled (including the four sites)</b>	<b>80</b>
<b>Patients having tested positive for leptospirosis lab tests</b>	<b>27</b>

Even if study populations are small, it seems probable that in one island a real outbreak occurred during the second quarter of 2004, as more samples than from the other sites were collected and 50% of them were positive for leptospirosis tests. In the three other sites, the rate of positives among the samples was around 20%, suggesting sporadic cases occurring in a moderate endemic context. As it is usually seen, most of the suspect and the confirmed cases involved young men, suggesting occupational or professional exposures.

**Serogroups identified**

<b>Serovar</b>	<b>TOTAL</b>	<b>%</b>
<b><i>Australis</i></b>	10	37.04
<b><i>Autumnalis</i></b>	2	7.41
<b><i>Ballum</i></b>	1	3.70
<b><i>Canicola</i></b>	1	3.70
<b><i>Icterohaemorrhagiae</i></b>	10	37.04
<b><i>copenhageni</i></b>		
<b>Coagglutination*</b>	1	3.70
<b>Undetermined**</b>	2	7.41
<b>TOTAL</b>	<b>27</b>	<b>100.00</b>

\* Highest MAT titre given by two or more serovars

\*\* Cases confirmed only by a positive PCR on a single sample

Two major *Leptospira* serovars were identified: *Australis australis* and *Icterohaemorrhagiae copenhageni*. The latter is related to a reservoir maintained in rats, whereas the other could be linked with pigs.

## Potential high-risk activities

Island	Site 1		Site 2		Site 3		Site 4	
<b>Total patients</b>	36		12		22		10	
<b>Leptospirosis diagnosis</b>	Positive	Not confirmed	Positive	Not confirmed	Positive	Not confirmed	Positive	Not confirmed
<b># cases</b>	18	18	2	10	5	17	2	8
<b>Activities</b>								
Swimming (fresh water)	1 6%	6 33%	0 0%	4 40%	3 60%	5 29%	2 100%	1 13%
Fishing (fresh water)	2 11%	5 28%	0 0%	1 10%	0 0%	3 18%	1 50%	1 13%
Hunting	0 0%	0 0%	2 100%	2 20%	1 20%	0 0%	0 0%	0 0%
<b>Contact with animals</b>								
Cattle	2 11%	0 0%	0 0%	4 40%	0 0%	3 18%	0 0%	0 0%
Horses	0 0%	0 0%	1 50%	7 70%	0 0%	0 0%	0 0%	0 0%
Dogs	14 78%	10 56%	2 100%	9 90%	4 80%	12 71%	1 50%	1 13%
Pigs	15 83%	16 89%	1 50%	7 70%	0 0%	3 18%	2 100%	7 88%
Rats	14 78%	10 56%	0 0%	4 40%	3 60%	3 18%	2 100%	5 63%

The potential high-risk activities reported in the questionnaires are slightly different depending on the island, although the number of cases was not high enough to allow proper statistical analysis:

- in site 1: contact with dogs or rats is more frequently reported in confirmed patients;
- in site 2: hunting activity is mentioned for the two confirmed cases but only in 20% of the nonconfirmed ones; and
- bathing in fresh water and contact with rats are the possible principal exposure situations in site 3.

The contact with pigs is also likely to be a source of human contamination, especially in two islands, but cannot be evaluated here as this exposure is reported in about 90% of all patients recruited from both islands.

## Analysis

Statistical analysis are done using the software Excel 2002™ (Microsoft®) and EpiInfo 2002™ (CDC).

**Tests done**

# Samples		Initial sample	Late sample
		27	14
Days after the beginning of onset	Median	7	24
	Range	2–34	9–82
% tested	DipStick	82%	57%
	IgM EIA	93%	86%
	MAT	100%	100%
	PCR	48%	0%
% positive	DipStick	<b>64%</b>	<b>88%</b>
	IgM EIA	<b>84%</b>	<b>100%</b>
	MAT	<b>55%</b>	<b>100%</b>
	PCR	54%	-

On initial samples, the most sensitive test appears to be the microplate IgM assay (84%), whereas the dipstick is only positive in 64% of positive cases. At this stage, the MAT is only exhibiting a positive titre in 55% of patients.

On late samples, both microplate EIA and the MAT have a sensitivity of 100%, the MAT having here the advantage of designating the serovar involved, this being a valuable information for tracking the source of contamination.

The PCR has a lower sensitivity than could have been expected on early samples (54%), but this is probably due to nonoptimal conservation and shipping conditions, that may result in a significant degradation of DNA.

Therefore, the strategy initially proposed in the protocol seems adequate for the laboratory diagnostic of leptospirosis in the field conditions of the Insular Pacific region, and it is also confirmed that paired sera are likely to increase the rate of confirmation.

**Clinical features**

Symptom reported	Leptospirosis cases			Nonconfirmed cases			P
	Yes		No	Yes		No	
Headache	25	100%	0	40	82%	9	0.02
Muscle pain	21	62%	13	43	86%	7	0.01
Jaundice	5	21%	19	10	21%	38	1
Haemorrhage	2	9%	21	6	13%	42	0.64
Pulmonary syndrome	6	25%	18	11	24%	35	0.92
Meningitis	1	4%	23	4	9%	42	0.49
Conjunctiva suffusion	18	75%	6	19	40%	28	<b>0.005</b>
Renal syndrome	3	13%	20	9	19%	39	0.54

At the time of the first contact with medical practitioner, the most frequent initial presentation of suspect cases include fever, headache and muscle pain associated to elevated CRP, transaminases and creatinin.

The most specific signs associated with confirmed cases are conjunctiva suffusion and increased ALAT over two- fold the normal upper range.

***Initial nonspecific biological findings***

Initial lab tests	Unit	Abnormal if	Leptospirosis cases			Nonconfirmed cases		
			# reported	Mean value	Median	# reported	Mean value	Median
<b>Creatinin</b>	µmol/l	> 120	14	110	97	22	122	88
<b>CRP</b>	mg/l	> 5	11	<b>168</b>	163	21	<b>113</b>	109
<b>ALAT</b>	IU/l	> 40	15	<b>84</b>	70	22	<b>54</b>	39
<b>ASAT</b>	IU/l	> 40	15	58	44	22	53	35
<b>Platelets</b>	10 <sup>3</sup> /mm <sup>3</sup>	< 150	13	167	158	17	218	197
<b>Leukocytes</b>	10 <sup>3</sup> /mm <sup>3</sup>	> 10	13	11.9	12	20	10.4	10

***Conclusion and perspectives***

Although limited, the preliminary findings of this study have allowed a tentative description of human leptospirosis in the four sites that sent reports of activities. Some possible risk exposures were found to be more frequently associated with confirmed cases: contact with rats, dogs or pigs, hunting and swimming in fresh water. The pattern of association was not similar in the four sites.

Leptospirosis is likely to be endemic in the four islands, but a probable outbreak has occurred in one country/territory, so the implementation of local testing in the frame of this study was particularly timely. Health authorities in this particular country/territory have initiated specific control measures as a response to this epidemic.

In light of these interesting preliminary results, the coordinators would like to strongly encourage the countries and territories that have not been able to carry out the survey, to do so in order to achieve this important study.

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