



Yaws in Polynesia's Wallis and Futuna Islands: a seroprevalence survey

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Abstract

We carried out a serological and clinical survey to determine the prevalence and clinical presentation of yaws on two twin islands in Polynesia: Wallis and Futuna. A total of 264 serum samples were tested for specific *Treponema pallidum* haemagglutinations assay and non-specific rapid plasma reagin: 52 were positive for one or both tests; only one young adult had skin lesion consistent with yaws; and there were no observed cases of secondary or tertiary yaws.

Our results contrast with findings in neighbouring islands, such as Vanuatu, where yaws has been reported to resurge. This difference might be explained by better availability and accessibility of healthcare on Wallis and Futuna, thus allowing widespread use of antibiotics for other bacterial diseases.

Yaws is a non-venereal infection caused by the spirochaete *Treponema pallidum* subspecies *pertenue*. The disease affects populations living in warm and humid subtropical countries, especially children under 15 years, with a peak incidence in the 6 to 10-year-old age range. Direct skin-to-skin contact with exudative lesions is the main route of transmission, together with breaks in the skin caused by injuries, bites, or excoriations.¹

Clinical manifestations occur in three distinct phases. The primary stage is characterised by a papular “raspberry-like” lesion, developed after 3 to 4 weeks of incubation at the *Treponema* inoculation site and ulcerates. This painless cutaneous ulcer may last 3 to 6 months before healing spontaneously. Secondary yaws are smaller skin lesions that teem with widespread disseminated treponemes. At the late stage, bone, cartilage, and soft tissue destruction may occur, leading to irreversible disabling or disfiguration.

Despite strong reduction in geographic extension due to past eradication campaigns targeting treponemal diseases organised by World Health Organization (WHO) during the 1950s, yaws has been reported to be re-emerging in Pacific islands, including Vanuatu² and Solomon Islands.³

To assess yaws prevalence on similar islands, a seroprevalence survey was carried out on Wallis and Futuna, one of France's three Pacific Island groups, located about 600 km North-East of Fiji.

Methods

A clinical and serological survey was conducted from 1–30 August 2010 among patients attending four outpatient clinics and one hospital serving population on both islands.

Wallis has 9207 inhabitants scattered in three districts, each having an outpatients clinic while 4238 inhabitants live on Futuna served by a single clinic.⁴ Included patients agreed with giving additional samples to perform treponemal serology in addition to regular blood analysis they required. Presence of cutaneous or osteo-articular lesions was recorded, as well as trips in endemic areas, such as Vanuatu or Solomon Islands.

All participants gave oral informed consent to participate in the study, after methods and objectives were extensively explained in local language by a native speaker health worker. Oral consent was notified in patient's notes. This procedure was approved by the institutional review board. For children, consent was obtained from a parent or a guardian. No incentives were offered to study participants and no names were recorded. The study protocol was approved by the Wallisian Ministry of Health.

Results

A total of 264 serum samples were tested for specific *Treponema pallidum* Hemagglutinations Assay (TPHA; Biomérieux, Marcy l'Etoile, France) and non-specific Rapid Plasma Reagin (RPR; Fujirebio, Tokyo, Japan) according to the manufacturer's recommendations. Among 222 samples coming from Wallis and 42 from Futuna, 52 (20%) were positive for one or both tests. All positive patients but two were born before 1960 (Table 1).

Table 1. Seroprevalence *Treponema pallidum* haemagglutinations assay (TPHA; specific) and rapid plasma reagin (RPR; non-specific) by age group

Variables	≤15 years n=46 (%)	15–50 years n=83 (%)	≥50 years n=135 (%)
TPHA (+) VDRL(-)	1(2)	1(1)	18(13)
TPHA (+) VDRL (+)	0	0	27(20)
TPHA (-) VDRL (+)	0	0	5(4)
TPHA (-) VDRL (-)	45(98)	82(99)	85(63)

Among those aged 50 or under, one had consistent serology and compatible lesions with primary yaws without any relevant journeys in endemic areas. No case of tertiary yaws has been detected. Patients never travelled in other endemic areas with the exception of two job-seekers, who spent respectively 5 and 10 years in Vanuatu during their twenties.

Discussion

Fifty-year-old plus people were positive for treponemal serology without any symptoms, compatible with serological scarring after healed infections. Past infections had been contracted on Wallis or Futuna, since most subjects did not move to areas with current yaws high endemicity.

The survey demonstrates that yaws was likely to have been a public health problem in the past. Indeed, this finding is consistent with seroprevalence surveys performed during eradication campaigns conducted in the Pacific area over the 1950s.⁵ Since no data after intervention are available in Wallis and Futuna—where yaws is not a recorded condition in clinic statistics—our study provides interesting result on yaws prevalence.

A very low prevalence of non-venereal treponemal disease was found among young age groups. Our result contrasts with findings in Vanuatu, where difficult to diagnose clinically forms of attenuated yaws have resurged. This difference might be explained by the better availability and accessibility of healthcare on Wallis and Futuna, thus allowing widespread use of antibiotics for any infectious disease.

Serological tests cannot distinguish *Treponema pallidum* subspecies. Therefore, positive TPHA may reveal past syphilis infection, possibly lately treated in cases where VDRL is also positive. However, high prevalence of yaws in the region during the 1930s⁶ indicates that serological profiles found in our survey are suggestive of non-venereal treponemal disease. Finally, rare cases of positive VDRL with negative TPHA may reflect false positive due to non-treponemal infections or systemic diseases.

This study was designed to assess the prevalence of present or past yaws on Wallis and Futuna. Due to time and financial constraints, study design focused on people presenting to clinics. This may explain why younger age groups are under-represented. Failure to randomise subjects is the major limitation of this survey.

Yaws was less likely in people able and willing to access health care. However, people live in close proximity to clinics and health facilities provide free care. In addition, included patients were roughly evenly distributed among different districts, limiting a potential selection bias. Nevertheless, a study concentrating on randomly selected 5 to 15-year-old children should be performed to definitely refute resurgence of yaws in Wallis and Futuna.

Competing interests: None.

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