

## SEROLOGICAL STUDY OF YAWS IN JAVA

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### SYNOPSIS

This report presents the results of serological analyses made by the laboratory of the Treponematoses Control Project, Indonesia, from its establishment in April 1951 until April 1953. All sera were tested quantitatively with the VDRL and Kline slide-tests or the Kahn test, or with all three.

A study of the mean reagin titre in untreated yaws cases showed that the percentage of seronegative reactors among clinically positive cases was low. Less seronegativity was observed among females than males.

Examination of decrease in mean reagin titre after treatment by clinical group showed maximum to minimum decrease in the following sequence : early contagious, early contagious plus hyperkeratosis, ulcerative plus osteo-articular, ulcerative, hyperkeratosis, and osteo-articular lesions. The decrease tended to be greater in females than males and in patients with high than with low titre; it also varied with the age of the patient. No significant variation in decrease was noted when four different PAM treatment schedules were tested comparatively. The percentage of serological cure and improvement with all schedules was highest in the cases with early lesions, and in the younger age-groups.

A study of patients requiring re-treatment at the time of re-survey showed no important difference in mean reagin titre between clinically cured and uncured patients suffering from palmar or plantar hyperkeratosis and ulcerative or osteo-articular lesions.

Serological testing of sera from clinically negative household contacts and non-contacts, with or without previous history of yaws, gave the following results : Among the household contacts, the number of seronegative reactors, while not affected by age-distribution, was significantly higher in the history-positive than in the history-negative groups. The percentage of seropositive reactors was in direct proportion to the prevalence of yaws, the seropositivity-rate being high in villages with a yaws incidence of 11 %-30 %.

The report also contains suggestions for improving the conduct of the anti-yaws campaign.

This article deals with the serological findings of the laboratory of the Treponematoses Control Project, Indonesia. The project—which has as its aim the elimination of yaws as a public-health problem from the archipelago—was established in May 1950 by the Indonesian Government with the technical assistance of the World Health Organization and the financial aid of the United Nations International Children's Emergency Fund (UNICEF, renamed in 1953 United Nations Children's Fund). Beginning with two target areas in the Residencies of Jakarta and Jogjakarta (Mid-Java), the operation has since been extended to West Java, Lesser Sunda Islands, North Sumatra, Kalimantan Barat (West Borneo), and Kalimantan Selatan (South Borneo). At the time of the preparation of this article (April 1953), the project had covered 5,315,982 persons, and 596,485 cases of yaws (11.2%) had been diagnosed and treated.

The laboratory, located at Jogjakarta, the headquarters of the project, began to function in April 1951. Working, in association with a field team of one doctor and nine "mantris",<sup>1</sup> in special control areas, the laboratory attempted to assist in the detection of latent yaws, the verification of clinical diagnoses, studies on the efficacy of treatment schedules with repository penicillin, and the solution of other problems of clinical and epidemiological interest.

### *General description of region*

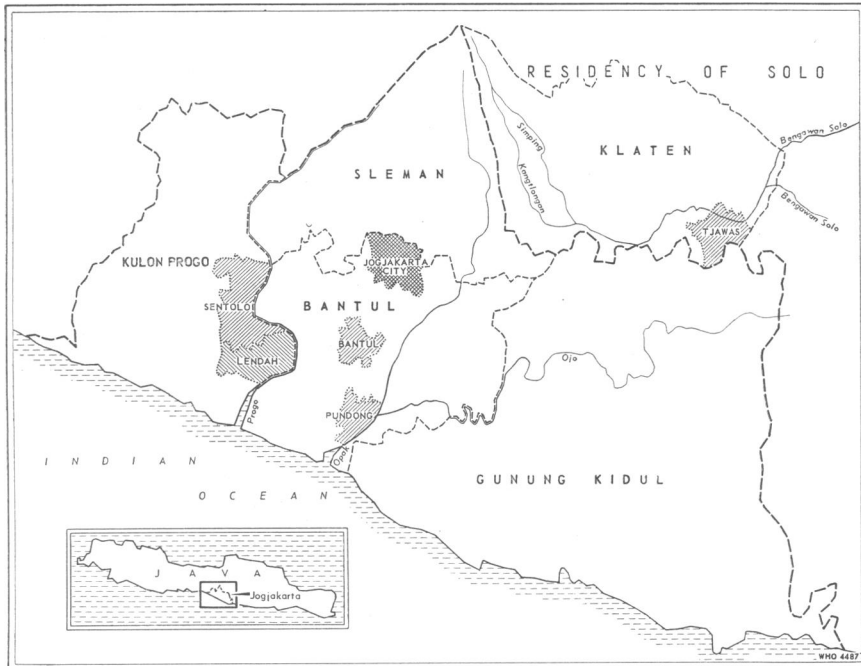
The Residency of Jogjakarta, located in the southern part of Mid-Java, comprises four regencies; the density of population and prevalence of yaws in each regency are given in table I. (See also fig. 1.)

**TABLE I. POPULATION DENSITY AND YAWS PREVALENCE IN REGENCIES OF JOGJAKARTA, 1952**

Regency	Area		Population			Yaws	
	km <sup>2</sup>	square miles	number	per		diagnosed	prevalence (%)
				km <sup>2</sup>	square miles		
Kulon Progo	545	210	270,069	495	1,285	39,965	14.8
Bantul	471	182	414,448	880	2,275	44,462	10.7
Gunung Kidul	1,442	557	447,134	310	800	88,629	19.8
Sleman	506	195	447,396	885	2,295	5,404	1.2

The monsoon season prevails between November and March, with a monthly rainfall between 350 mm and 450 mm (12-18 inches); for the rest

<sup>1</sup> A "mantri" is an indigenous qualified male nurse.

**FIG. 1. RESIDENCY OF JOGJAKARTA, INDONESIA**

----- boundary of Residency      ----- boundaries of Regencies

of the year rainfall varies between 20 mm and 100 mm ( $\frac{3}{4}$ -4 inches). The annual rainfall is highest in the Regency of Sleman (2,100 mm—83 inches); in the other regencies it totals about 1,500 mm (59 inches).

Sleman, a fairly prosperous region situated on the southern slope of the volcano, Mount Merapi, has a good irrigation system and the highest rice production of the four regencies. Gunung Kidul is one of the poorest areas in Java, with barren hills of lime-stone along the coast, and is sparsely populated. According to surveys which have been made, the main food is cassava, which has very poor nutritional value. The general state of health of the people is poor, and it has been known for a long time that nutritional oedema is very common in this area.<sup>2</sup> The Kulon Progo and Bantul coastal regions consist mainly of sea alluvion and collovion, and, in the plains, river alluvion. In general, the soil in Kulon Progo is rather poor because of over-agriculture and soil erosion. The main agricultural products are corn, tapioca, and copra.

<sup>2</sup> Institute of Nutrition Research (1940) *Communication No. 5*, Batavia

## Classification and Methods

### *Classification of lesions*

Yaws is characterized by a variety of lesions, which have been described and classified into 30 different forms by Kodijat<sup>3</sup> (see also fig. 2). It is known that the different forms of lesion tend to occur in a certain sequence, and may overlap each other. For the sake of convenience in making comparative serological studies, the 30 different forms of lesion recorded in the field were grouped into four main categories. This classification basically agrees with that suggested by the participants at the First International Symposium on Yaws, held in Bangkok in 1952.<sup>4</sup>

1. *Early contagious.* Patients with early manifestations of the disease, in which treponemal lesions—such as initial lesion, generalized papilloma, recurrent papilloma including papilloma of the foot (so-called “wet crab”)—are readily demonstrable (fig. 2, I and II, 1-4, 6, and 10).

2. *Plantar and palmar hyperkeratosis.* Thickening, desquamation, deep fissuring of palms and soles (fig. 2, III, 9, and 11-14).

3. *Ulcerative.* Destructive superficial or deep ulcerations—the treponemes are not usually found in these secretions (fig. 2, IV, 16 and 17).

4. *Osteo-articular.* Subjective pain of joints and bones, periosteitis, dactylitis, ankylosis, and contracture (fig. 2, V, 18-25). Because of the relatively smaller number of patients involved in this group, no attempt was made to differentiate between early and late lesions.

Other lesions in the minority group—such as pian datre, macula, papule, tendovaginitis, bursitis, leucoderma, and juxta-articular nodules—were not included in the study since they are not sufficiently associated clinically with any of the four main categories or with each other. Furthermore, the number involved is very small. Active progressive gangosa is classified under ulcerative plus osteo-articular lesions.

The patients' history cards (fig. 2), designed for laboratory use, were filled in by the mantri at the time of examination in the field and were forwarded on the same day to the laboratory with the blood samples. The serological data were recorded and the cards were filed for later reference. During the re-survey, the cards were taken with the team to the field and the condition of each patient checked against the data recorded on his card. Follow-up examinations and serological results were also similarly registered.

<sup>3</sup> Kodijat, R. (1939) *Geneesk. T. Ned.-Ind.* 79, 3018

<sup>4</sup> World Health Organization (1953) *First International Symposium on Yaws Control, Bangkok, 1952*, Geneva, p. 255 (*World Health Organization: Monograph Series*, No. 15)

The approximate occurrence of different forms of lesions can be seen in fig. 3, in which the serological titres of a random group of patients have been analysed. Hyperkeratosis of palms or soles, or both, (palms, 1; palms plus soles, 3; soles, 10) constitute about half of all cases; early contagious lesions plus hyperkeratosis of palms or soles, 23%; early contagious lesions, 14%; and ulcerative and osteo-articular lesions—the remainder—13%.

Since a large number of patients presented a combination of symptoms at the time of survey, it was felt that they represented a special phase of the disease and should be analysed separately. This was particularly true in the case of early contagious plus hyperkeratosis, and ulcerative plus osteo-articular, lesions.

### *Laboratory methods*

The data presented in this study represent serological results obtained from sera collected in the control villages of the Regencies of Bantul and Kulon Progo (Residency of Jogjakarta) and Klaten (Residency of Solo), all situated within 50 km (about 30 miles) of the laboratory (fig. 1). The samples, which were collected in vacutainer tubes, usually reached the laboratory on the afternoon of the day of collection. They were stored in the refrigerator (4°-6°C) and tested within 2-4 days.

All sera were tested quantitatively with two cardiolipin slide-tests—namely, the VDRL (Venereal Disease Research Laboratory, Chamblee, Ga., USA) slide-test, and the Kline slide-test using LaMotte antigen—or with the Kahn test using Difco beef-heart-extract antigen, or with all three. A sample of sera was also tested by a complement-fixation test (Kolmer method, cardiolipin antigen).

It was very important to maintain a uniform level of sensitivity for some length of time to permit the comparison of decrease in the reagin titre in various types of lesion, following a particular dosage of penicillin. This was assured by carefully checking each batch of antigen with known control serum of definite titre which had been used over a period of months. Except at the beginning, when expired antigen from leaking bottles was used, VDRL antigen, provided in 0.5-ml ampoules, produced a high level of uniform sensitivity.

As a check on the reliability of the laboratory methods a special experiment was conducted under ordinary working conditions. A collection of 175 sera was split and tested twice at one-day intervals with quantitative VDRL and Kline tests over a period of four weeks. The difference in the two consecutive tests never exceeded two dilutions, and the correlation between the two tests (0.919 for VDRL and 0.910 for Kline) was high. Half of the sera showed twice the same value of the titre, and 4% showed a discrepancy of two dilutions.

The VDRL test employing antigen of known chemical composition, with its high degree of sensitivity and specificity, is becoming more and more

**FIG. 2. PATIENT'S HISTORY CARD**

**TREPONEMATOSES CONTROL PROJECT INDONESIA.  
LABORATORY**

**Key to Sympt. No. of Yaws lesions (Dr Kodjat):**

1. Papilloma
2. Ulcus
3. Papilloma (generalized)
4. Condyloma
5. Plan dactis (Keratosis pilaris)
6. Ringworm yaws
7. Roseola, Macula
8. Papula
9. Psoriatic framb. (early)
10. Papilloma (palm & sole)
11. Keratoderma
12. Psoriatic framb. (late)
13. Rhagades
14. Keratosis
15. Pigmentary changes
16. Ulcera. seriginous (shallow)
17. Ulcera. crateriform (deep)
18. Arithalgia
19. Hydrarthrosis
20. Arthritis
21. Ankylosis & Contracture
22. Ostealgia
23. Polydactylitis
24. Ostitis
25. Periostitis
26. Tendovaginitis
27. Bursitis
28. Rhinopharyngistis mutilans
29. Nodostis juxta-articularis
30. Gouondu

REMARKS:

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widely used. In order to facilitate intra- and inter-laboratory comparisons, only results obtained with the VDRL test are reported in this article, with the exception of tables II, III, and IX, in which the results of Kline and Kahn tests are also given, to serve as supplementary data.

### Reagin Titre in Untreated Yaws

The results of the serological testing of clinically diagnosed yaws cases from the villages surveyed were analysed according to the classification mentioned earlier. The data on initial and generalized papillomata tend to be limited to patients of over 3-4 years of age, although initial and generalized lesions were observed fairly frequently in infants. Blood was taken at random before the administration of penicillin, no attempt being made to select any particular type of case.

#### *Reagin titre of patients with initial lesions only*

The percentage of seronegative patients from 30 cases with initial lesions is 37 (table II), as compared with 6 in the remainder (522 cases) of the early contagious group (fig. 3). The sense of time of village people may not be very accurate, but more than half of the seronegative results originated from patients with a stated duration of illness of two weeks or less. It is difficult to understand why patients with early yaws of three months' duration should remain seronegative. Table II shows four patients with an initial lesion of three months' duration who reacted negatively to the serological test. Two of these cases had lesion 2 (ulcer)—a fact which, unfortunately, remained unconfirmed by darkfield microscopy. It is possible that these patients had developed a non-specific (non-treponemal) lesion, which had persisted for 4-8 weeks before they became contaminated with *Treponema pertenue*, so that, in fact, they had had yaws infection only 2-3 weeks instead of 2-3 months. It may also be noted from table II that the frequency of lesion 2 increases with the increase in the duration of the illness ( $\leq$  one month, only lesion 1 ; 2-3 months, 5 lesion 1 out of 12).

预览已结束，完整报告链接和二维码如下：

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