

# Pattern of reactive serological tests for syphilis in different population groups attending the University College Hospital Ibadan (1976–1985)

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## Summary

A review of the reactive serological tests for syphilis was carried out. An overall seroreactivity of 5.1% was obtained over the 10-year period reviewed. A subtle but steady rise in the incidence of syphilitic infections was noted, from 7 to 10 new cases per 1000 population between 1970 and 1975. The predictive characteristics obtained from the screening tests show that the tests are reliable diagnostic tests when the results are carefully interpreted, and the medical personnel can be alerted of the prevalence of syphilitic infections.

## Résumé

Une revue de la sérologie syphilitique a été faite. En moyen, il ya eu une séroréactivité de 5.1% au cours d'une période de 10 ans. Entre 1970 et 1975 il ya eu une augmentation dans l'incidence des affections syphilitiques, de 7 à 10 nouveaux cas pour 1000 personnes dans la population générale. Les paramètres prédictifs des tests de dépistage montrent que ces tests sont dépendables comme test diagnostique, lorsque les résultats sont interprétés avec caution. Le personnel médical est alerté sur la prévalence des affections syphilitiques.

## Introduction

Syphilis had an upsurge in incidence in the early 1960s after an initial decline in prevalence

following the wide therapeutic use of penicillin in the 1940s [1,2]. In the Southern part of Nigeria, yaws was eradicated in the 1950s through a campaign jointly sponsored by UNICEF and WHO by mass administration of procaine penicillin with aluminium monostearate [3]. The eradication of yaws was presumed to remove the cross-immunity against venereal syphilis which is caused by *Treponema pallidum*, a close relation of *T. pertenue*, the aetiological agent of yaws [4].

The recognition of syphilis poses a difficult diagnostic problem in this environment. This is mainly due to a peculiar social factor resulting in self-medication with antibiotics and the traditional non-patronage of hospitals, a practise which is prevalent among the general population of most of our big towns and cities.

Patients are rarely seen during the two early stages of the disease at which time there might be sufficient signs to make a clinical diagnosis. Late syphilis can only be diagnosed with certain specialized paraclinical investigations [5]. One such investigation is the serological test for syphilis (STS) [6–12].

With the social background mentioned above, STS remains the mainstay of diagnosis of syphilis in this environment. In addition to its screening and diagnostic usefulness it is the most appropriate determinant of incidence and prevalence of syphilitic disease in our environment since reporting of cases is inadequate.

In the present study we attempted to determine the incidence and prevalence of syphilis through a retrospective analysis of results of STS obtained in the University College Hospital, Ibadan over a period of 10 years (1976–1985). It was also intended to bring to light the importance of these tests as an indispensable

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tool in the public health dispensation. Additionally, one would be able to gain an insight into the effect that the removal of cross-immunity through eradication of yaws would have had on the incidence of venereal syphilis.

### Materials and methods

The results of two serological tests for syphilis used in this hospital over a 10-year period (1976–1985) were collected. They were analysed according to departments, test type and specimens. The two tests used were the Venereal Disease Reference Laboratory (VDRL) test and the *T. pallidum* haemagglutination (TPHA) test. Test samples included sera and cerebrospinal fluid (CSF). The departments included the Antenatal Clinic (ANC), Special Treatment Clinic (STC — Venereal Disease Clinic), Blood Bank (Donors), Out-patient Departments (OPD), wards and sources outside the hospital.

### Results

During the 10 years under review 41,233 blood samples and 10 CSF samples were received and tested with the VDRL test. On the whole 2088 (5.1%) sera were reactive with the VDRL test while none of the CSF was reactive (Table 1). Table 2 shows a breakdown of samples tested by year and by departments. The Antenatal Clinic sent in the largest number of specimens (24,463) while 12,364 specimens were received

from the Special Treatment Clinic. A total of 755 samples reactive by the Rapid Plasma Reagin (RPR) test were received from the Blood Bank. Out-patient departments sent in 1320 specimens, while 1080 were received from the different wards of the hospital. Hospitals and clinics in and outside Ibadan sent 1197 specimens for testing during the same period. A group of 'unknowns' included all samples without a particular source department, there were 54 such specimens.

A breakdown of VDRL test-reactive sera by department and by titres is shown in Table 3. On the whole, 1103 sera were reactive at 1:1 (neat serum); 575 at 1:2; 243 at 1:4; 90 at 1:8; 45 at 1:16; 25 at 1:32; 6 at 1:64 and 1 at 1:128 titre. During the same period 17,278 samples of the total received were tested with the TPHA test of which 1325 (7.7%) were reactive. Table 4 shows a breakdown of results obtained by year for TPHA- and VDRL-tested specimens. Agreement between the two tests used is shown by a two-by-two contingency table (Table 5).

### Discussion

Since yaws was eradicated in Southern Nigeria through the mass campaign of 1954, coupled with a relative improvement in the living conditions of the general population and increased literacy, a reactive serological test for syphilis is probably not due to yaws. However, conditions abound in this environment which can lead to biological false positive STS results.

Table 1. Distribution of specimens tested and total reactive with the VDRL test, by departments

	Total tested	Total reactive	Percentage reactive
ANC	24,463	574	2.3
STC	12,364	848	6.9
Donors*	755	429	56.8
OPD	1320	84	6.4
Wards	1080	60	5.6
Outside UCH	1197	91	7.6
Unknown	54	2	3.7
Total	41,233	2088	89.3
CSF	10	—	—

\*Only RPR-reactive sera were sent for VDRL/TPHA testing. Total donors for the period under review was 26,979.

Table 2. Total tested with the VDRL test by year over 10 years

Department	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	Total
ANC	2626	2464	2605	2090	2473	2831	2853	2251	2391	1879	24,463
STC	1027	1129	1308	991	1294	1334	1274	1151	1492	1364	12,364
Donors	80	108	136	150	186	78	17	—	—	—	755
OPD	244	172	117	88	97	100	129	132	144	97	1320
Wards	179	191	149	91	107	85	79	78	60	61	1080
Outside UCH	317	268	244	58	39	60	56	43	58	54	1197
Unknown	10	6	7	1	10	7	7	—	—	6	54
Total	4483	4338	4566	3469	4206	4495	4415	3655	4145	3461	41,233
CSF	1	—	—	—	1	—	3	3	—	2	10*

\*None were reactive.

Table 3. Breakdown of reactive sera by titres

Department	Total tested	Titres								Total reactive
		1:1	1:2	1:4	1:8	1:16	1:32	1:64	1:128	
ANC	24,463	371	150	38	9	5	1	0	0	574
STC	12,364	426	235	115	46	19	5	2	0	848
Donors	755	184	135	60	24	10	12	3	1	429
OPD	1320	49	17	11	4	3	0	0	0	84
Wards	1080	35	11	4	1	2	6	1	0	60
Outside UCH	1197	37	26	15	6	6	1	0	0	91
Unknown	54	1	1	0	0	0	0	0	0	2
Total	41,233	1103	575	243	90	45	25	6	1	2088

Table 4. Breakdown of VDRL- and TPHA-tested sera over 10 years

Year	Total tested by VDRL and TPHA	VDRL+		VDRL-		TPHA+		TPHA-	
		VDRL+	TPHA+	VDRL-	TPHA-	VDRL-	TPHA+	VDRL-	TPHA-
1976	3940	58	90	141	3651				
1977	3731	107	192	123	3309				
1978	3171	176	250	153	2592				
1979	2283	136	120	54	1973				
1980	2237	165	86	82	1904				
1981	693	49	32	25	587				
1982	498	12	8	10	468				
1983	60	2	3	1	54				
1984	342	9	41	4	288				
1985	323	11	26	7	279				
Total	17,278	725	848	600	15,105				

therefore, results from these tests must be interpreted with caution, especially with the non-specific reaginic tests. Fischman and Mundt [13] claimed that VDRL is more sensitive in detecting antibodies against *T. pallidum* rather than

residual yaws. It is probable then, that reactive results obtained with the VDRL test in the present review could only be either diagnostic of venereal syphilis or biological false positives.

Osoba [3] obtained 2.89% sero-reactivity

Table 5. Agreement between TPHA and VDRL tests

	TPHA		
	Positive	Negative	Total
VDRL			
Positive	725	848	1573
Negative	600	15,105	15,705
Total	1325	15,953	17,278

VDRL test sensitivity  $725/1325 = 54.7\%$ .

VDRL test specificity  $15,105/15,953 = 94.7\%$ .

Overall VDRL test accuracy  $(725 + 15,105)/17,278 = 91.6\%$ .

with the VDRL test in a prospective study (1968–1970) carried out in this hospital. The present review covering a period of 10 years, beginning 6 years later, has revealed a sero-reactivity of 5.1% with the VDRL test. An examination of figures obtained by us compared to those obtained by Osoba indicates that there is an upward trend in the sero-reactivity to STS in the different patient populations tested. In the TPHA test 7.7% were reactive. If this test is taken as the specific test for syphilis the sero-reactivity with TPHA should be taken as the prevalence of syphilitic disease in the general population. During the first half of the period under review (1976–1982) donors' blood was screened routinely with the RPR test. Reactive specimens were sent to the Serology Laboratory of the Department of Medical Microbiology where they were tested by the VDRL and TPHA methods. A total of 26,979 donor blood samples were screened, of which 755 (2.8%) were reactive with the RPR test. Of these (RPR-reactive sera) 429 (56.8%) were reactive with the VDRL test. If this is expressed as a fraction of the donors screened, the sero-reactivity by VDRL among donors would be 1.6%. Allowing for biological false positives and therefore considering a titre of 1 in 4 as significant, then 110 (0.41%) would be reactive. Overall, 410 (0.995%) sera were reactive at a titre of 1 in 4. If this represents new cases of syphilis in the general population then the incidence of syphilis will be approximately 10 per 1000 population, an increase of 3 cases per 1000 over values obtained by Osoba. This esti-

mation is generous and conservative, considering that there is actually a sharp increase in the number of new cases of other STDs as demonstrated by figures from our STD Clinic.

This review has demonstrated unequivocally that venereal syphilis has been increasing. Health personnel should be aware of this fact and should have a high index of suspicion in order to curtail the steady, though subtle, rise in the incidence of venereal syphilis. In the absence of dark-ground microscopy, serological tests for syphilis remain indispensable diagnostic tools in tertiary health-care centres.

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