

THE MITSUDA REACTION WITH THE DHARMENDRA ANTIGEN IN VARIOUS GROUPS OF HEALTHY PERSONS IN SURINAM

DR. E. GEHR
Surinam Leprosy Service
Paramaribo, Surinam

In a previous report Gehr and Munder (1) told of the results of tests in five groups of people in Surinam, totaling 522 individuals. Three of the groups were predominantly Creoles, but one group of 147 were Bush Negroes, and another of 72 were East Indians. The antigen used was Dharmendra's, prepared in the bacteriological laboratory of the Paramaribo General Hospital (Director: W. A. Collier), but 1 mgm. of dry powder was suspended in 1 cc. saline and a dose of 0.05 cc. was injected instead of 0.2 cc. of a 1:10,000 suspension as originally recommended by Dharmendra. Both early and late readings were made, but only the data for the late one are used.

Regarding the population of Surinam and the susceptibility to leprosy of the component ethnic types, the Creoles are only 37 per cent of the total but contribute not less than 71 per cent of the cases; in general their lepromin rates were found rather low. The Indonesians, 17 per cent of the population, provide only 11 per cent of the cases; they were not represented in the groups dealt with in the first report. The Bush Negroes, 9.6 per cent of the population, with relatively few known cases of leprosy, were remarkable in that positive lepromin reactions among them were numerous—81 per cent among the adults (the Mitsuda reaction being read in 97 individuals) and 64 per cent among children (50 read).

Since the time of that report the work has been extended, the same methods being used (Dharmendra antigen, dose 0.05 cc.), until now the total number of healthy persons tested is 1,499. None of them had had BCG, nor had they been previously tested with lepromin. These people comprise the following eight groups:

GROUP 1. Personnel. These persons are mostly Creoles, comprising the medical and nursing staffs of the Leprosy Polyclinic in Paramaribo and the government leprosarium at Paranam, 40 km. away.¹

GROUP 2. Contacts. This is another largely Creole group, healthy members of the families of 21 lepromatous, 3 tuberculoid and 3 indeterminate leprosy patients. They, too, were in Paramaribo itself.

GROUP 3. Creoles in Onverwacht, in the coastal zone, 30 km. from Paramaribo.

GROUP 4. Inmates of the mental hospital in Paramaribo, also mostly Creoles.

GROUP 5. East Indians, descendants of immigrants from what now are India and Pakistan, living at Kwatta and Alkmaar, 8 and 20 km. away.

GROUP 6. Indonesians, inhabitants of Tamanredjo, 28 km. distant.

GROUP 7. Bush Negroes. These subjects were in three locations: Santigron, 34 km. from Paramaribo, and Kofikamp and Sarakamp, 136 km. away (the most distant places).

¹ Distances here and in Table 2 are with respect to Paramaribo as the center.

TABLE 1.—*Mitsuda reactions in eight groups of persons, 692 adults and 807 children (total 1,499).*

Groups of persons tested	No.	Adults						No.	Children						Totals ^a						
		0	±	1 +	2 +	3 +	% +		0	±	1 +	2 +	3 +	% +	0	±	1 +	2 +	3 +	% +	
1. Personnel	93	1	4	23	40	25	95	9	2	—	4	2	1	..	102	3	4	27	42	26	94
2. Contacts (Creoles)	45	4	6	10	22	3	78	61	21	7	17	16	—	54	106	25	13	27	38	3	64
3. Creoles, Onverwacht	48	7	4	20	10	7	77	121	50	25	33	12	1	38	169	57	29	53	22	8	49
4. Creoles, Paramaribo	192	59	20	48	51	14	59	—	—	—	—	—	—	—	192	59	20	48	51	14	59
5. East Indians	79	28	15	24	10	2	46	366	251	58	52	3	2	16	445	279	73	77	13	4	21
6. Indonesians	41	14	9	13	4	1	44	75	49	15	9	1	1	15	116	63	24	22	5	2	25
7. Bush Negroes	118	17	8	53	27	13	79	77	13	20	34	8	2	57	195	30	28	87	35	15	70
8. American Indians	76	26	22	19	9	—	37	98	63	17	13	2	3	19	174	89	39	32	11	3	26
Total	692	156	88	210	173	65	65	807	449	142	162	44	10	27	1499	605	229	373	217	75	44

^a For the total of the first four groups, 569 persons predominantly Creole, the percentage of positives was 63. For the 378 adults, the positive rate was 72 per cent.

GROUP 8. American Indians of Bernhardsdorp, Redi Doti, Carolina and Bigi Poika, places from 25 to 96 km. from Paramaribo. Of these localities, the last-named is the only one without known cases of leprosy.

Groups 1 to 4, for the most part Creoles, contain small numbers of East Indians and Indonesians, but those elements show no appreciable differences in reactivity to lepromin from the rest of those groups.

The results of the lepromin tests in these groups are given in Table 1, for adults, children, and in total. As for the ages of the children, the averages did not differ greatly among the various groups; the range was only from 7 to 11.

The locations of the several groups, and subgroups of some of them, together with the percentages of positive lepromin reactions and the leprosy rates of the ethnic groups concerned, are given in Table 2. The "type indices"—i.e., the numbers of lepromatous cases per hundred cases of leprosy—were computed on the basis of the numbers of new cases found in the different ethnic groups during the period 1950-1954; the total

TABLE 2.—Locations of the various groups tested and distances from Paramaribo, with Mitsuda and leprosy rates.

Group	Location	Distance (km)	Lepromin (%)			Leprosy				
			Adult	Children	Total	Rate (%)	Type index			
1. Personnel	{ Paramaribo Paranam	0 40	95	----	95	2.10	25			
2. Contacts	Paramaribo	0								
3. Creoles	Onverwacht	30								
4. Creoles	Paramaribo Mental Hospital	0								
Subtotal			72	45	63					
5. East Indians	Kiwatta	8	—	16	21	0.74	19			
	Alkmaar	20	46	19						
6. Indonesians	Tamanredjo	28	44	15	25	0.45	39			
7. Bush Negroes	Santigron	34	66	44	70	0.29	58			
	Kofikamp	136	81	64						
	Sarakamp									
8. American Indians	{ Bernhardsdorp	25	35	15	26	0.27	(25)			
	Redi Doti	60	7	17						
	Carolina									
		Bigi Poika	96	51				25		

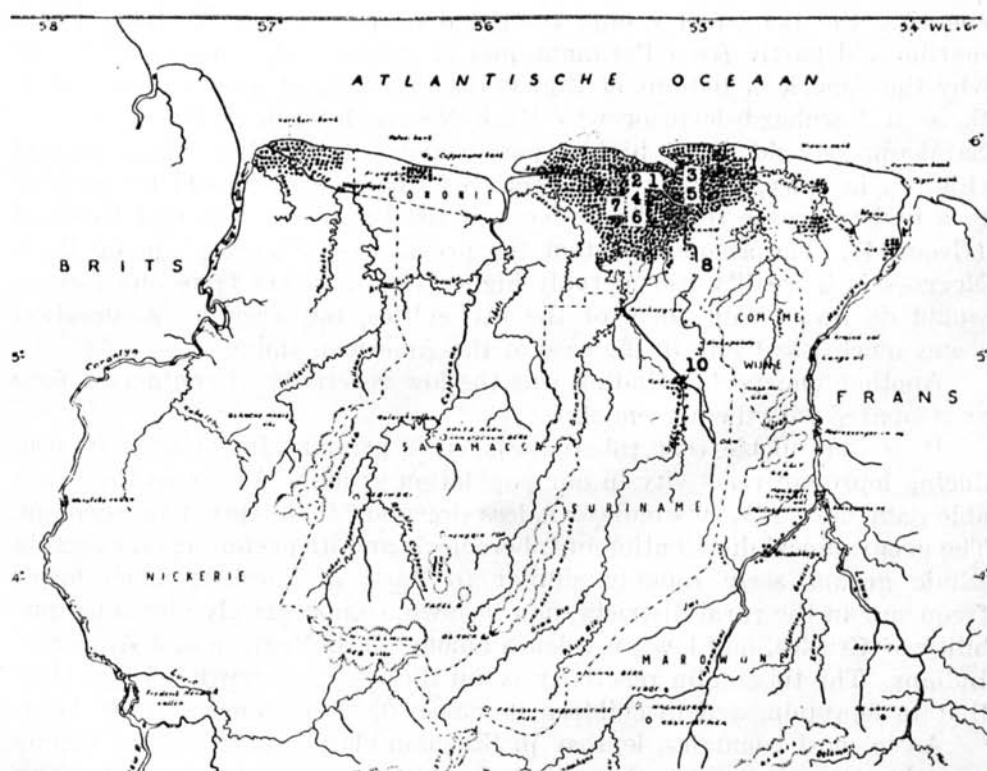
number of new cases found then was 1,005. The figures for American Indians are too small to be of value.

Contrary to our expectation, Table 2 seems to show that the reactivity to lepromin decreases with decreasing prevalence, if the figures for Bush Negroes are left out of consideration. Lampe and Simons (2) reported for 1929 prevalence rates of 1.23 per cent for Creoles, 0.41 per cent for East Indians, and 0.18 per cent for Indonesians. The ratios, 6:2:1, correspond very closely to those of our present prevalence figures (2.1, 0.74, and 0.45% respectively). There is no reason to suppose that an investigator 50 years ago would not have found similar differences in susceptibility.

However that may be, we should have expected the population groups with the highest positive Mitsuda rates to show the lowest leprosy prevalence. At the present time, all population groups have ample opportunities of contact with members of other groups, and intermarriages are not uncommon. This probably does not apply to some American Indian communities in inaccessible parts of the interior (which are not included in our tests), nor was it true to the same extent in the past.

It is unlikely that the discrepancies between known and real prevalence figures are uniform for all our groups. There are 8.5 physicians per 10,000 inhabitants in the town of Paramaribo, 1.6 in the coastal region, and 1.0 in the bush country. Of the Creoles, 30 per cent live in rural districts; of the East Indians, 80 per cent; and of the Indonesians, 90 per cent. East Indians are prone to consult physicians even for minor ailments, whereas Indonesians are very reluctant to do so even for serious complaints. Thus for Bush Negroes and Indonesians the gap between the known and the actual prevalence is probably greater than for the other groups. This might account, at least in part, for the exceptional low prevalence rate of the former group (Table 2), and for the high type indices of both groups—the more conspicuous lepromatous cases being the more easily detected. The difference between the type indices of East Indians and Creoles is too small to explain the much lower Mitsuda positivity of the former group. It would thus seem possible that the actual type index (as distinguished from the index based on known cases) does not differ very much among the different population groups.

If the percentage of lepromin reactors in a population group depended primarily on the prevalence of leprosy in that group as Table 2 seems to show, we should expect this percentage to decrease with increasing distance from the town of Paramaribo. The prevalence of leprosy in Surinam, based on known cases, is 1.0 per cent of the total population; in Paramaribo it is 1.5 per cent, in the rural districts 0.5 per cent. About 70 per cent of our cases come from the town, 30 per cent from the districts. The coastal region, especially Paramaribo and immediate vicinity, supplies the vast majority of our patients. Less than 4 per cent come from the bush country, the habitat of Bush Negroes and the greater part of the American Indians (see Text-fig. 1).



TEXT-FIG. 1. Map of Surinam, to about 4°N latitude, showing the location of leprosy cases (dots). Localities: 1, Paramaribo; 2, Kwatta; 3, Alkmaar; 4, Bernhardsdorp; 5, Tamanredjo; 6, Onverwacht; 7, Santigron; 8, Redi Doti and Carolina; 9, Bigi Poika; 10, Kofikamp and Sarakamp. The cluster of dots around Paramaribo covers too wide an area, as it was not possible to mark separate dots closer together.

The localities in which the tests were done are given in Table 2, together with their approximate distances from Paramaribo. The five places with distances up to 30 km. from Paramaribo (i.e., Kwatta, 8 km.; Alkmaar, 20 km.; Bernhardsdorp, 25 km.; Tamanredjo, 28 km.; and Onverwacht, 30 km.) are situated in the coastal region. The other six places (Santigron, 34 km.; Redi Doti and Carolina, 60 km.; Bigi Poika, 96 km.; and Kofikamp and Sarakamp, 136 km.) are in the bush country. No possible explanation comes to mind why the Bush Negroes at the most remote of these places should be the strongest reactors of all (not counting the personnel group, composed of persons partly from Paramaribo and partly from Paranam, and of course with much contact), or why the American Indians at Bigi Poika should react more strongly than those at Bernhardsdorp, or why Bush Negro children at Kofikamp and Sarakamp should have higher percentages of positives than contact children in town, or why the Creoles of Onverwacht should be positive to a higher degree than the patients of the Paramaribo Mental Hospital (Group 4). The assumption that the prevalence of leprosy among Bush Negroes is in reality considerably higher than appears from our figures would do away with some of the difficulties, but such an assumption seems much less likely in the case of the American Indians.

Another unexpected finding was the low reactivity of contact persons as compared with the personnel.

It is improbable that tuberculosis is of primary importance in producing lepromin reactivity in our population groups. As far as the available data show (3), tuberculosis is less prevalent than leprosy in Surinam. The geographical distribution of tuberculosis and its preference for certain ethnic groups seem roughly similar to those of leprosy; much lower frequency in the rural districts than in town, comparatively high susceptibility of Creoles, and low prevalence among Bush Negroes and American Indians. The tuberculin reactivity is, on the whole, somewhat lower than that to lepromin, and in children it makes its appearance slightly later.

As in most countries, leprosy in Surinam claims more victims among men than among women, the ratio being about 2:1. In our tests, positive Mitsuda reactions occurred slightly more often in men than in women, but the difference was too low to be of statistical significance.

SUMMARY

In an extension of previous work, a total of 1,499 persons in Surinam have been tested with the Dharmendra antigen, the dose 0.05 cc. These people comprise eight groups, four of them predominantly Creole, the others East Indians, Indonesians, Bush Negroes and American Indians. The leprosy rates among these ethnic groups vary from 2.1 per cent for the Creoles (in total) to less than 0.3 per cent for the last two groups, although there may perhaps be more leprosy among these bush-country people than is known.

The results of the lepromin tests show anomalous features in consideration of the leprosy rates and other circumstances, although the total figures are affected by different proportions of children in the different groups. Frequency of positive reactions does not increase with decrease of the frequency of leprosy, but rather the opposite. The Creoles as sampled, representing a group among whom the frequency of the disease is high, gave in total 63 per cent positives (adults 72%) despite the high frequency of the disease among them. The distantly-located Bush Negroes, with relatively little known leprosy, gave 70 per cent positives in total, and as high as 81 per cent for one lot of adults. Other unexpected results are noted.

RESUMEN

Extendiendo previa labor, un total de 1,499 personas de Surinam ha sido comprobado con el antígeno de Dharmendra, a una dosis de 0.05 c.c. Estos individuos comprenden ocho grupos, cuatro de ellos con predominio de criollos, siendo los demás indios orientales, indonesios, negros de la selva e indios americanos. Los índices de lepra para estos grupos étnicos varían de 2.1 por ciento para los criollos (en conjunto) a menos de 0.3 por ciento para los dos últimos grupos, aunque quizás haya más lepra de lo que se sabe entre estos habitantes de la selva.

Los resultados de las pruebas con la lepromina revelan características anómalas en relación con los índices de lepra y otras circunstancias, aunque las cifras totales se ven afectadas por las distintas proporciones de niños en los diversos grupos. La frecuencia de reacciones positivas no aumenta con la disminución de la frecuencia de la lepra, sino más bien lo contrario. Los criollos tomados, representando un grupo en el cual la frecuencia de la lepra es alta, acusaron en conjunto 63 por ciento de positivas (72 por ciento en los adultos), a pesar de la elevada frecuencia del mal en ellos. Los negros de la selva, de ubicación remota, con relativamente poca lepra conocida, mostraron 70 por ciento de positivas en conjunto, y hasta 81 por ciento en un lote de adultos. Se señalan otros resultados inesperados.

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