# An Epidemiological Study of Reported Cases of Typhus Fever in Puerto Rico[1]

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ENDEMIC typhus fever has been recognized with increasing frequency in the United States in recent years, especially in the Southern states. In Georgia, for example, more than three thousand cases were reported in the period 1936–39.

Endemic typhus has its reservoir in rats, hence the term "murine typhus."[2] The etiological agent, one of the Rickettsia group of organisms, is transmitted to man by the rat flea.

Characteristically, the disease presents the following clinical picture: Onset, usually abrupt, with chill, fever, and headache. The fever continues, often with daily remissions for fourteen to seventeen days. About the fifth day of illness, a maculo-papular eruption appears, which may be limited to the trunk. The headache persists and usually is severe. Photophobia and insomnia are common, as is the presence of a dry, hacking cough. The case fatility is low, not exceeding 5 percent.

Endemic typhus closely resembles milder forms of Rocky Mountain spotted fever, which is also caused by one of the Rickettsia and is transmitted to man by ticks. Frequently these diseases can be differentiated with certainty only by cross-immunity tests in the guinea pig. In both diseases the blood of the patient agglutinates B. proteus X-19, often in high dilution.

Pons[3] published an account of eight cases strongly suggestive of typhus fever which had been treated in the Presbyterian Hospital of San Juan between May, 1939, and July, 1939. He says: "The study of these cases was initiated by H. B. Colmore, M.D., to whom must be given the credit of having first seriously considered this diagnostic possibility in the four early cases of the series."

Headache was a prominent symptom in all. The temperature curve showed a sustained or remittent fever during the first eleven to thirteen days, falling by rapid lysis. In six cases a macular eruption

1. Received for publication October 20, 1941.

2. The term, "Murine typhus" is used to differentiate the flea-borne endemic type of the disease, whose natural reservoir is in rats, from the louse-borne epidemic form of typhus.

3. Juan A. Pons, "Is There Brill's Disease in Puerto Rico?" *Bol. Asoc. Méd. de Puerto Rico*, XXXII (June, 1940), 196–201.





was observed, first appearing, according to the patients' statements, on the third to seventh day. Blood cultures, urine and fecal cultures, and agglutination tests were negative for E. typhi. Likewise, agglutination tests were negative for B. abortus, and blood smears were negative for malaria.

The Weil-Felix reaction (B. proteus X-19 agglutination reaction) was performed in all but the first of the series and was positive in three in dilutions of 1:800; 1:640; and 1:400, respectively. Because in no instance was it proved that an increase of agglutinins had occurred during the illness, Pons considered that the evidence was highly suggestive of typhus, but not conclusive.

These cases were not reported to the Insular Health Department at the time of their occurrence. However, a case exhibiting a similar clinical picture with agglutination of proteus X-19 in a dilution of 1:1280, and having onset on August 5, 1939, was reported by Ramón Suárez, M.D.

On January 8, 1941, a letter from Ramos Oller, M.D., was received by the Commissioner of Health, reporting seven cases diagnosed as typhus, six of which he had observed at the Díaz García Clinic and one at the Presbyterian Hospital.

On June 19, 1941, the Commissioner of Health sent a circular letter to all physicians, requesting that all cases of typhus, or suspected typhus, should be reported. The responses to this letter, coupled with reports previously received, brings the total number of cases reported to forty-six, as of September 1, 1941.

These cases have been reviewed with the following findings: ten had onset in 1939; ten, in 1940; and twenty-six, in 1941. Taking both clinical picture and agglutination of B. proteus X-19 as criteria, five of the 1939 series, six of the 1940, and twenty-four of the 1941 series, a total of thirty-five, have been regarded as typhus. Four are considered doubtful, and seven as "not typhus." In every case regarded as an attack of typhus, the agglutination titer for B. proteus X-19 was 1:300, or higher. Table 1 summarizes this information:

TABLE 1

| *Period* | *Clinically and Serologically Positive* | *Doubtful Diagnosis* | *Not Typhus* | *Total* |
|---|---|---|---|---|
| 1939 | 5 | 1 | 4 | 10 |
| 1940 | 6 | 1 | 3 | 10 |
| 1941 (to 9/1) | 24 | 2 | .. | 26 |
| Total | 35 | 4 | 7 | 46 |

A summary of the clinical history of one of the cases is given below to illustrate the course of the disease as well as the laboratory findings:

Case No. 1. *G.C.* Aged 44, white, male cook, living in San Juan. Admitted to Mimiya Hospital Aug. 1, 1941. Discharged Sept. 29, 1941. Recovered.

History (Summary): Sudden onset four days ago, with fever, preceded by a slight chill; severe, splitting, continuous headache. Vomited several times; stools loose. General appearance: flushed face, toxic-injected conjunctivas.

Admission: Fever cause undetermined: (*a*) typhus endemic, mudiagnosis: rine; (*b*) diabetes mellitus; (*c*) lues, tertiary.

Follow up: Aug. 2: The fifth day of continuous, high fever; complains of severe headache and can hardly open eyes. Lives in an old, rat-infested house.

Aug. 5: Skin eruption, appearing like discrete, rose spots over abdomen, chest, axilla, and back, which disappear on pressure. In the afternoon the patient was prostrated and unable to open eyes. Spots, dark, reddish, very prominent, throughout.

Aug. 6: Skin rash, hemorrhagic; lesions look like petechiae. Weil-Felix reported negative from the Health Department laboratory.

Aug. 13: Skin eruption still present, petechial in character on sides of abdomen.

Aug. 15: Fever coming down by rapid lysis after fourteenth day of continuous fever. This is in accordance with typhus endemicus. Patient looks more alert.

Aug. 16: Skin rash still present, but less noticeable. Weil-Felix reaction positive today up to 1:6400.

Laboratory Aug. 1: Malaria, negative. R.B.C. 5,310,000; W.B.C. findings: 4,600; Hb. 120%; Lymps. 24%; Eosin. 4%; Neut. 71%; Monos. 1%.

Aug. 6: Weil-Felix, negative.

Aug. 11: Weil-Felix, positive up to 1:640.

Aug. 15: Weil-Felix, positive up to 1:6400.

Aug. 16: Weil-Felix, positive up to 1:3200.

*Summary of symptoms:* In Table 2 the important symptomatology of thirty-three cases considered as typhus fever has been summarized from hospital records.

The presence of fever and Weil-Felix reaction was noted in all thirty-three cases.

Rash was observed in twenty-nine and was not seen in four.

Headache was marked in twenty-eight cases. In five no statement was made in the history about this symptom.



In only thirteen cases did the history give any record of insomnia, but in twelve of these it was present.

Fifteen histories mentioned photophobia, twelve recording its presence and three, its absence.

Splenic enlargement was noted in eleven of twenty-three cases in which this organ was specifically mentioned in the physical examination.

TABLE 2

| *Symptom* | *Positive* | *Negative* | *Not Known* |
|---|---|---|---|
| Headache | 28 | — | 5 |
| Insomnia | 12 | 1 | 20 |
| Rash | 29 | 4 | |
| Fever | 33 | — | |
| Photophobia | 12 | 3 | 18 |
| Spleen enlargement | 11 | 12 | 10 |
| Weil-Felix | 33 | | |

*Seasonal distribution:* Table 3 gives the month and year of onset of the reported cases. Of the twenty-four cases in 1941, eighteen, or 75 percent, had onset in the months of May to July, inclusive. One must be careful in interpreting this seasonal distribution as it includes only the first eight months of the year 1941, in which a majority of all cases have been reported.

TABLE 3

| *1939* | *Jan.* | *Feb.* | *March* | *April* | *May* | *June* | *July* | *Aug.* | *Sept.* | *Oct.* | *Nov.* | *Dec.* | *Total* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | — | — | — | — | 1 | 1 | 1 | 1 | — | 1 | — | — | 5 |
| 1940 | — | — | — | — | — | — | 1 | — | 2 | 1 | 1 | 1 | 6 |
| 1941 (to 9/1) | 1 | 1 | — | 4 | 6 | 6 | 5 | 1 | | | | | 24 |
| | | | | | | | | | | | | | 35 |

*Geographical distribution:* Thirty of the reported cases lived in San Juan, one lived in Carolina, one in Río Piedras, and one in San Sebastián.

*Age and sex:* The age and sex distribution of the thirty-five positive cases is given in Table 4. The age group from twenty to forty-nine years had 70 percent of cases. There was no case under ten years of age reported.

TABLE 4

| *Age* | *Males* | *Females* | *Total* |
|---|---|---|---|
| 0– 9 | — | — | — |
| 10–19 | 2 | 2 | 4 |
| 20–29 | 3 | 5 | 8 |
| 30–39 | 5 | 4 | 9 |
| 40–49 | 6 | 3 | 9 |
| 50–59 | 2 | — | 2 |
| 60–69 | 1 | — | 1 |
| 70 and over | — | 2 | 2 |
| Total | 19 | 16 | 35 |

*Complications:* One case suffered from a cerebral hemorrhage and paralysis, but recovered; another case suffered from a left-side pleuritis, with recovery; two cases developed bronchopneumonia, one fatal.

## DISCUSSION

Clinically and in capacity to agglutinate B. proteus X-19, the cases which are under discussion appear to be a clinical entity and closely resemble endemic typhus as observed in Georgia, Alabama, Florida, Tennessee, and other Southern states. In general, the course has been mild, only one death having been reported among thirty-two cases.

The geographic and age distribution also resembles those exhibited by murine typhus. The disease in Puerto Rico appears to be chiefly urban, centered in and around San Juan. The fact that one of the patients came from San Sebastián has aroused some discussion, but it is not certain that infection occurred at the place of residence. Rocky Mountain spotted fever, on the other hand, is chiefly a rural disease.

The age distribution is striking. Only one case occurred in an individual under fifteen years of age. It is probable that adults are much more exposed to typhus, but it may be that the disease is overlooked in childhood.

Another factor which makes the diagnosis of typhus fever more likely than that of Rocky Mountain spotted fever is that none of the known vectors of spotted fever are present in Puerto Rico, whereas there is an abundance of rats and their associated ectoparasites.

Although all the evidence at hand indicates that these cases are endemic typhus fever, the possibility exists that they may be some other disease. A mild attack of spotted fever gives very similar clinical pictures. Furthermore, it is not impossible that some other variety of Rickettsia, or even another organism, may be the cause. Complete differentiation and identification can be accomplished only by isolation of the etiological agent in laboratory animals.



Our present knowledge does not permit more than speculation as to how long this disease has been present in Puerto Rico. Arguing by analogy with other areas where the disease is recognized, it seems certain that it has been present in the Island for many more years than is indicated by the reported cases. It is entirely possible that it arrived with the first rats to reach the Island. Furthermore, due to the extensive commerce carried on between Puerto Rico and areas where typhus is endemic, it may have been introduced at any time.