

Infantile Paralysis in Puerto Rico¹

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FOR MANY YEARS it has been a generally accepted belief that infantile paralysis is a rare or nonexistent entity in tropical and subtropical regions of the world. Sporadic cases have been reported from all civilized countries, but it has been felt that these are comparatively rare in the Caribbean area. However, recent statistics tend to demonstrate that recognition of the disease, rather than the disease itself, has been the missing factor. There have been reports of severe outbreaks from many sections of this area, notably from Panama and Havana, Cuba, and in Puerto Rico there has been a more recent outbreak which at one time seemed to be approaching epidemic proportions. The Crippled Children's Bureau of the Department of Health has compiled statistics to prove definitely that this is not an unique occurrence.

In the two and one-half years of its existence, this Bureau has collected statistics on three hundred and forty-one cases of unquestionably chronic poliomyelitis of vintage preceding 1942. This Bureau has established clinics at the three district hospitals and also throughout the Island. In close coöperation with the local public health units and with the social service division of this insular organization, it has begun to cover the Island fairly completely. Nonetheless, the task implied in endeavoring to contact a population of nearly two million, the majority of which is rural, is gargantuan. The figure of approximately three hundred and fifty cases therefore represents, at best, a small percentage of the total incidence of infantile paralysis, though it would seem that the constant stream of chronic poliomyelitis victims, which is still applying for admission to the clinics, is a better index of the large reservoir of chronic cases that has just been tapped.

The age limitation is another factor to consider in attempting to approximate the incidence of this disease from the number of chronic cases reported. On the program of the Crippled Children's Bureau no one over the age of twenty-one is accepted and this naturally excludes many cases that have been stricken in the twenty year period covered by the survey.

Spontaneous cure is still another factor. It is assumed as a very moderate estimate that at least 50 percent of the involved cases will spontaneously recover, either completely or with such a minor residuum that orthopedic surgical care will not be required. Such an assumption is based upon the recovery statistics for the 1942 outbreak of poliomyelitis now in preparation. Although at least six months should elapse before any true index can be obtained, on the figures available at present over 50 percent of the acute 1942 cases have already recovered and the total with final recovery will be probably much higher than this estimate.

Three hundred cases of chronic poliomyelitis with complete records have been selected for analysis and the effort has been made to study them for the purpose of comparing the 1942 outbreak with the outbreaks of previous years and the clinical picture, presented by these cases, with that of cases reported in the United States.

The first graph demonstrates the incidence of these cases according to the year of onset, with the black squares representing the number of cases recorded annually by the Department of Health of Puerto Rico since 1932, when statistics were first made permanent. Obviously this number is only a small percentage of the cases with residual paralysis reported by the orthopedic surgeons of the Crippled Children's Bureau. The following factors are to be considered in explaining such a discrepancy:

1. The accepted belief of the laity and of the medical profession that poliomyelitis does not occur in Puerto Rico, for which reason infantile paralysis is frequently not included in the differential diagnosis.

2. The large rural incidence of the disease, notorious for striking isolated, out-of-the-way districts rather than crowded slum areas. Many rural victims have been miles away from medical inspection or supervision and only the efforts of efficient social service field workers, coöperating with the local public health units, have enabled the Bureau to ferret out many of them.

3. A high percentage of the cases of fever in Puerto Rico may be safely diagnosed as malaria and may be treated with quinine. Fully 30 percent of the cases of poliomyelitis have the same history: fever, diagnosis of malaria, a quinine injection into the buttock and, when paralysis is noted in the course of the next few days, the diagnosis remains unchanged but is simply complicated by a quinine neuritis of the sciatic nerve. The fact is many times overlooked that the results are purely motor and frequently involve the quadriceps, whose

1. Received for publication March 16, 1943. Read before the Second Annual Meeting of the Puerto Rico Public Health Association, January 30, 1943.

nerve supply through the femoral nerve is far removed from the site of the injection. To complicate the picture still further, several cases that have shown definite evidence of quinine involvement of the sciatic nerve with a typical sensory pattern have been found—cases of typical muscular paralysis and trophic ulcers. One such case has responded well to neurolysis. However, in spite of all the publicity given to poliomyelitis lately, thirty cases of “quinine malaria” poliomyelitis have been seen this year.

There has been a feeling among the laity that the sudden outbreak of 1942 has been due to the presence of soldiers from the United States who have probably acted as carriers. However, as a study of the graph demonstrates, poliomyelitis was well entrenched in the Island before the army camps were ever established. The Bureau has knowledge of two Puerto Ricans who have had poliomyelitis, one forty and the other thirty-two years ago.

The very low incidence of 1920–1924 may be explained on the ground that the majority of these cases has now outgrown the twenty-one year age limit. If it is assumed that approximately 50 percent of the total number of cases stricken will have fairly complete recovery and that many cases in sequestered rural areas have not been contacted yet, then the year 1935 with a report of twenty-seven chronic cases must have been originally somewhat similar to 1942, when seventy-two cases have been reported to the Crippled Children's Bureau and when publicity, training, and increased laboratory facilities have placed the laity and the profession alike on the alert.

The second graph contrasts the age of onset during the 1942 epidemic with that of the twenty-year summary. Note that in both graphs 65 percent of the cases have had onset under three years of age and over 90 percent, under the age of five. This last point is of considerable importance when considering the closing of schools in the presence of an acute outbreak. It is also of interest to note that fifty cases have had onset under the age of one year, the youngest being reported at the age of six weeks. The similarity in these age groupings is further evidence that the incidence of this year's outbreak is very much like that of previous years.

The third graph presents the cases differentiated by rural and urban residence. The twenty year survey shows an urban preponderance of 57 percent, while the 1942 figures show an even division. This difference is unquestionably due to increased social service field work in the outlying districts. Considering that Puerto Rico

is about 65 percent rural, it would seem that the city dwellers have been struck more frequently than the farmers. However, it is felt that if an adequate survey of the rural districts were feasible, these figures would certainly be reversed.

The fourth graph demonstrates the month of onset of the disease in 1942. A survey of previous years in this regard is obviously impossible. The close similarity of this graph to those from the United States is of interest. The sharp upswing beginning in June, ascending to a peak in August, and then decreasing through November with a few sporadic cases in the spring, is somewhat analogous to the graph presented by our more northerly neighbors. There has been considerable discussion lately as to the role temperature and climate play in this seasonal parabola, but the very slight variation from the mean summer temperature, as seen in Puerto Rico, would suggest that temperature is not the important factor in this seasonal variation.

Two maps have been prepared to show the geographical distribution of the cases. The first one demonstrates their distribution from 1920–1941 and has various points of interest. One of these bears relation to the heavily populated centers of Ponce and San Juan with their large concentrations of inhabitants. Paradoxically, San Juan proper, which is one of the most crowded spots in the world, with very inadequate sanitary facilities, has had practically no infantile paralysis. In this map many cases considered as urban come from towns like Jayuya with a population of one thousand eight hundred and Maricao with a population of twelve hundred.

The second chart demonstrates the distribution of cases during the 1942 outbreak. Note how the general scheme of distribution parallels the twenty-year map. It is interesting to see the lack of incidence in the neighborhood of the army bases at Aguadilla, Cayey, Arecibo, and Vega Baja, in spite of the number of continental soldiers and other personnel in such areas. The low incidence in San Juan and the general distribution around the southern and eastern coast lines are similar in these two maps, again bespeaking the similarity of the year 1942 to previous years.

It has been stated that the character of the disease in semitropical climates is mild and we are in accord with this concept. The majority of the three hundred and forty-one chronic cases have involvement of only one lower limb, though most frequently the quadriceps and dorsi flexors of the foot are paralyzed. The vast majority of cases are ambulatory, as severe involvement of the hip and trunk muscula-

tures is rather rare. Only two severe paralytic scoliosis have been encountered and one of them had the acute attack in New York City. Permanent paralysis of the upper extremities is also rarely met; there have been only two severe deltoid and biceps paralysis, though several acute cases of upper arm involvement have been found in 1942. Their rapid recovery rate probably explains why so little arm surgery is seen among the chronic cases.

Sister Elizabeth Kenny to the contrary, spasm is not the outstanding characteristic of infantile paralysis in Puerto Rico. Only a few of the acute cases show any spasm whatsoever and, though many of them were not seen till months after the onset, the mildest contracture was noted in a few and these responded very readily to Kenny therapy. The majority of cases demonstrated a flaccidity that was in striking contrast to the spasm that characterizes cases in the United States, especially those of the Iowa epidemic of 1940 (reported by one of the authors).² No acute or chronic cases with evidence of Bulbar destruction or involvement of the muscles of respiration have been found in Puerto Rico. Even in the acute phase there is little evidence of headache or stiffness of the spine or neck and the degree of prostration is not nearly as marked as in the United States. This is perhaps another reason why the condition has gone undiagnosed so frequently in the tropics.

Study of these cases demonstrates the futility of endeavoring to control the epidemiology of the disease. No two of the cases studied has ever met or contacted each other; many of them were from isolated hillside homes, far from the nearest neighbor. The only tangible factor, which could be obtained, was the frequency with which visits to a swimming pool had preceded the onset of fever by three or four days. Only twelve cases of the 1942 outbreak were of school age, so that the closing of schools has proved unnecessary.

SUMMARY

1. The belief that poliomyelitis is a rare disease in Puerto Rico is fallacious, as evidenced by the seventy-two acute cases registered for 1942 and the three hundred and forty-one cases of chronic poliomyelitis in children under twenty-one years of age collected by the Crippled Children's Bureau.

2. The 1942 outbreak is no new nor unusual happening. The

2. A. Steindler, L. A. Russin, L. Sheplan, and V. Wolkin, "Recent Changes in the Concept of the Treatment of Poliomyelitis," *Arch. Phys. Ther.*, 23:325, 1942.

three hundred and forty-one old cases represent only a small percentage of the total number of chronic paralytics on the Island for the following reasons:

- a. Over 50 percent of the cases undergo spontaneous cure.
- b. Many rural cases have not been contacted.
- c. The Crippled Children's Bureau has placed a twenty-one year age limit.

3. The charts and maps showing geographical, rural and urban distributions, sex and age, demonstrate the marked similarities between the 1942 outbreak and previous cyclic outbreaks.

4. The fact that the monthly incidence chart parallels those registered in the United States, despite the stability of the yearly mean temperature, is good evidence that climate plays a subordinate role in the seasonal variation of the disease.

5. The low incidence adjacent to the large army camps is further evidence that the 1942 outbreak is not a new disease brought by carriers from the United States.

6. The diagnosis has been missed so frequently during the past years for the following reasons:

- a. belief that poliomyelitis does not exist in Puerto Rico;
- b. difficult medical coverage of the backwoods sections of the Island;
- c. confusion of the diagnosis of poliomyelitis with malaria;
- d. mildness of the general symptoms at onset;
- e. absence of adequate laboratory facilities and lack of field workers, which factors have been corrected only in the last few years.

7. The disease is mild in Puerto Rico as evidenced by:

- a. slight general symptoms;
- b. very high percentage of complete recovery;
- c. mildness or absence of spasm and contractures;
- d. mild degree of muscular involvement, usually of the lower limb only.

8. Anticipating an annual summer outbreak, the Crippled Children's Bureau has sent an orthopedic surgeon and physiotherapist to Warm Springs, Georgia, to learn the newer concepts of poliomyelitis therapy. These two trained workers have given lectures and demonstrations to physicians and nurses all over the Island.

Circulars have been written and distributed both in English and Spanish. Special clinics have been established in the district hospitals for the intelligent handling of acute and subacute cases. The Department of Health and the Crippled Children's Bureau have established, as far as possible, the optimum machinery for the handling of poliomyelitis in future outbreaks by dissemination of information and training of personnel.

CONCLUSIONS

1. The total number of cases on file demonstrates that the 1942 outbreak is not an unusually severe or atypical occurrence in Puerto Rico.

2. It signifies that through the increased propagation of knowledge and of laboratory facilities, the awakening of interest in the general physician, the organization of social service field workers, and the sharpening of the diagnostic acumen of the personnel of the Crippled Children's Bureau and of the coöperative associates in public health units, the cases can be diagnosed earlier and more correctly, thus permitting a rapid application of therapy which under modern methods can do so much to mitigate the crippling course of the disease, and thus obviate the tremendous social and economic problems arising therefrom.

INCIDENCE OF POLIOMYELITIS IN PUERTO RICO 1920-1941

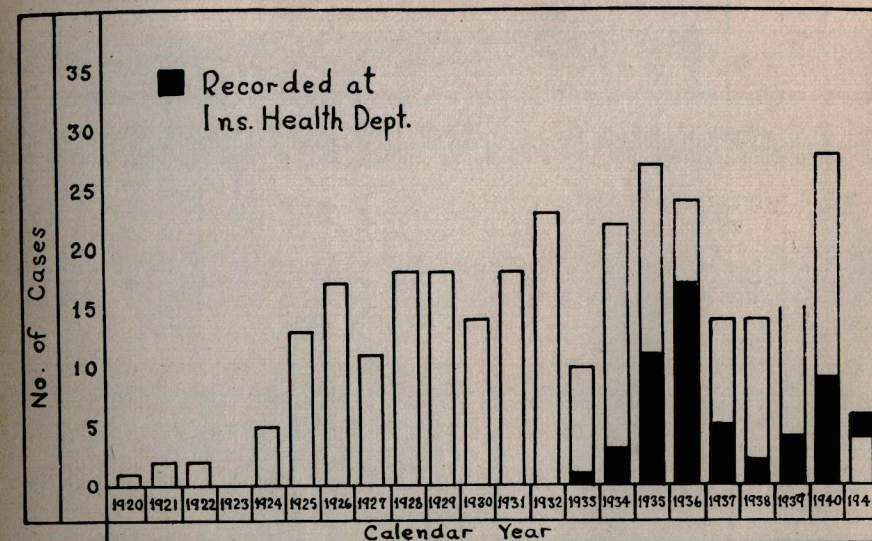


CHART 1

DISTRIBUTION OF POLIOMYELITIS CASES BY AGE AT ONSET. PUERTO RICO

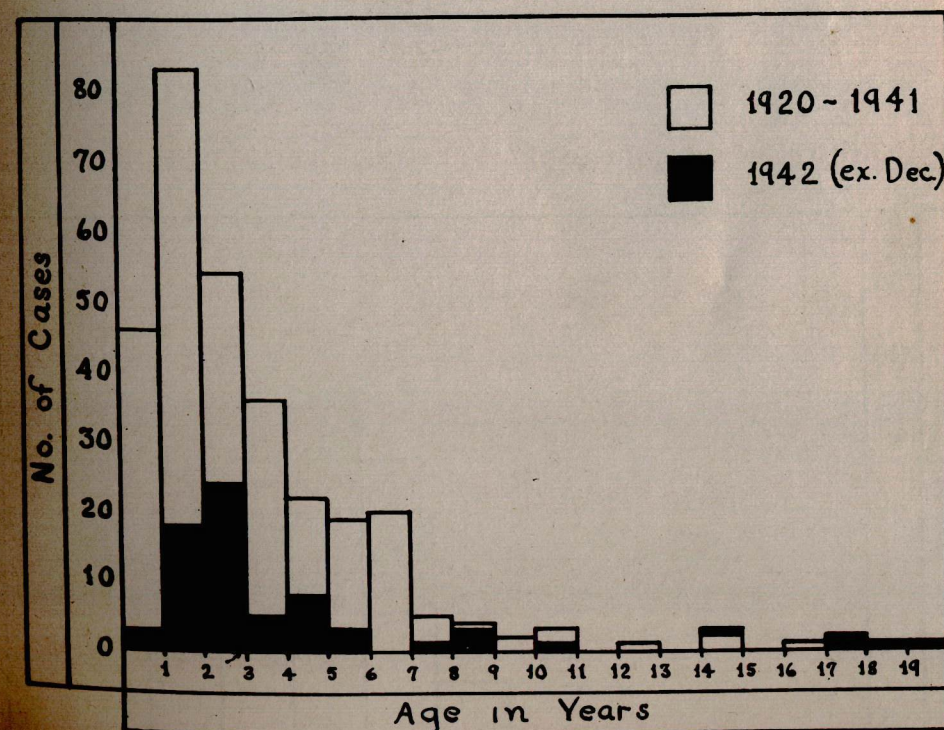


CHART 2

DISTRIBUTION OF POLIOMYELITIS CASES BY SEX and RESIDENCE. PUERTO RICO

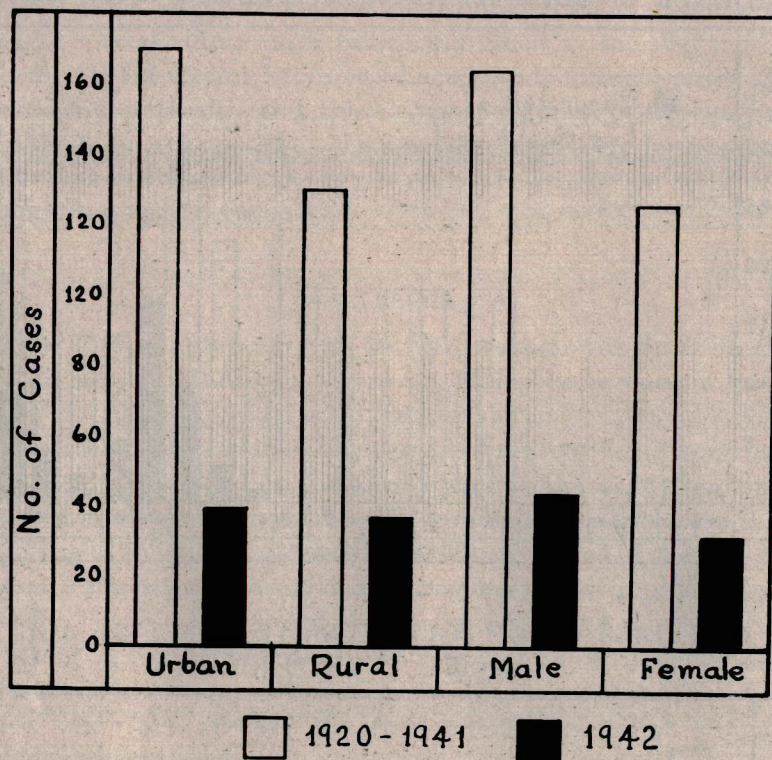


CHART 3

DISTRIBUTION OF POLIOMYELITIS CASES BY MONTH OF ONSET. P.R., 1942

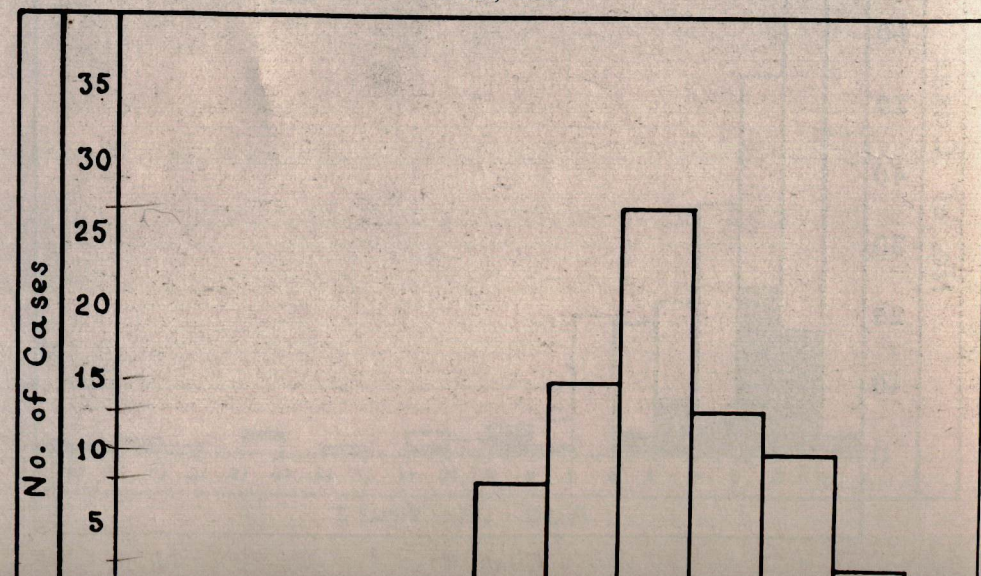


CHART 5



CHART 6

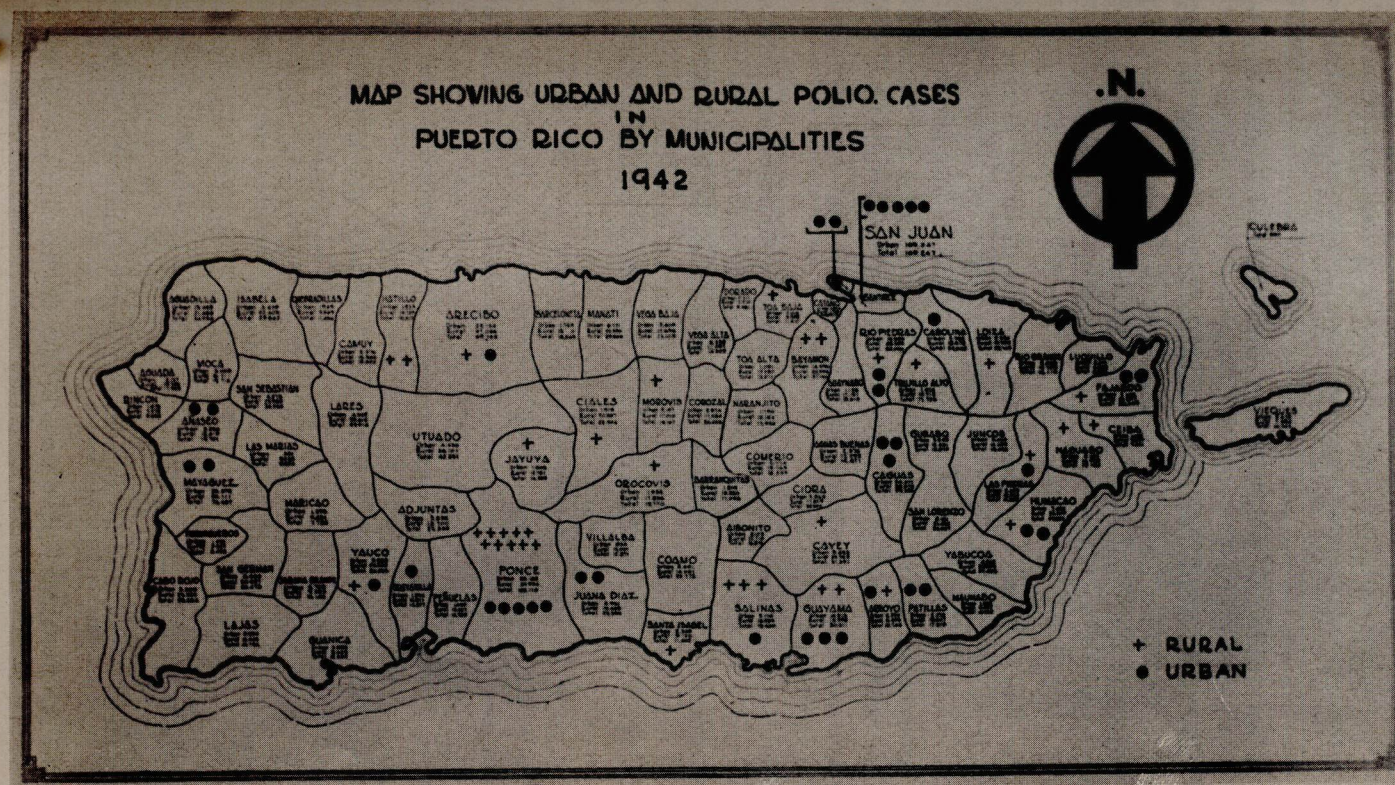


CHART 7