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## A Study of Patient Populations in New York City Tropical Disease Clinics

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### *Abstract*

The New York City Department of Health operates four tropical disease clinics under the direction of its Division of Tropical Diseases. These clinics manage 8,000 patients and 25,000 patient visits per year. A survey was conducted of 1,590 patients seen during the three month period, April–June 1972, at three of the four tropical disease clinics. The results of this survey reveal that the two clinics which serve communities of recent immigrants from the tropics are similar in terms of their patient characteristics.

The clinic which serves as a city-wide referral clinic is composed of a heterogeneous patient population. As a consequence, its patients differ markedly from those of the other two in many ways. The geographic distribution of various types of parasitic diseases within the city correlates well with the immigrant groups present in a given area reflecting in large measure the disease problems found in immigrants' countries of origin.

### **Introduction**

The Division of Tropical Diseases of the New York City Department of Health has provided treatment and diagnostic services for several decades for patients suffering from parasitic and tropical diseases. At the present time, the division maintains four clinics in the city where free diagnostic and treatment services are provided for city residents and where diagnostic and consultative services are made available to private physicians and medical institutions. Each clinic possesses a diagnostic laboratory with a full time staff of trained technicians. The division's activities are carried out by a staff of three full-time physicians, twenty-three part time physicians and a staff of nurses, clerks and paramedical personnel. In addition to the diagnostic, treatment and consultative services provided, the staff of the division investigates reported cases of certain parasitic diseases, confirms the diagnosis and assists in the implementation of the necessary treatment and control measures. The division also conducts an ongoing education program in tropical diseases for the city's medical community through lectures and the clinical conferences which compose the New York City Tropical Disease Rounds.

In recent years, the four clinics operated by the division have handled approximately 25,000 patient visits per year. The average annual budget for the division is \$300,000, excluding the maintenance costs of the physical facilities in

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which clinics are located, these being paid from the budgets of the health centers.

The four tropical disease clinics are located in those geographic areas of the city where parasitic disease problems are most prevalent among the indigenous populations. The population in these areas is primarily composed of recent immigrants from tropical and sub-tropical areas. It is estimated that of the city's total population of eight million, approximately a million and a half have immigrated into New York City in the past twenty years from tropical or sub-tropical areas. Two clinics are located in the borough of Manhattan, at the Washington Heights Health Center and at the Lower East Side Health Center. One is located at the Morrisania Health Center in the Bronx and one at the Bushwick Health Center in Brooklyn. There are no Department of Health tropical disease clinics in the city's remaining two boroughs of Queens and Richmond.

The purpose of this study was to determine and compare the characteristics of the patient populations of the three most active tropical disease clinics, Washington Heights, Morrisania and the Lower East Side, to explore the similarities and differences among the patients seen at these clinics and to determine the geographic distribution of each of the three clinics' patient populations, patient sources of referral and the kinds of tropical disease problems presented by each population group.

## **Methods**

The three most active tropical disease clinics were selected for the study, Washington Heights, Morrisania and the Lower East Side. In each of these clinics a randomized sample of records of 530 patients who had attended the clinic during the three month period of April–June, 1972 was examined in detail. A total of 1,590 patient records were thus studied. For each patient, identifying data, including name, address, age, sex, birthplace, recent travel history, clinic appointment date, source of referral and diagnosis were recorded. In reviewing the clinics' monthly reports for the previous two year period, we found no seasonal variation with respect to the attendance, the incidence or types of diseases seen in the clinics and concluded that the three month sample was a valid representation of the population seen in a given year.

## **Results**

### **Geographic distribution of patients**

Virtually all of the patients studied, who used the Morrisania clinic, lived in the Bronx and over 75.0 percent of them lived within a one-and-a-half mile radius of the clinic building. Ninety percent of the patients seen at the Washington Heights clinic lived on Manhattan's west side, over half of them being located within a mile and a half of the clinic. In contrast to these two clinics, which are located in the communities they serve, is the Lower East Side clinic. Patients seen here come from all areas of the city, the only significant geographic concentration of them being in the middle and lower parts of Manhattan. There is no physical clustering of patients around the Lower East Side clinic as there is around Morrisania and Washington Heights.

Table 1. Birthplaces of patients, tropical disease clinics, April-June, 1972, New York City

Clinic	Total	U.S. born		Old immi- grants *		Recent immi- grants **		Characteristics of recent immigrants
		No.	%	No.	%	No.	%	
Morrisania	530	169	31.9	6	1.1	355	66.9	Majority from Puerto Rico
Washington Heights	530	164	30.9	10	1.8	356	67.2	Majority from Dominican Republic
Lower East Side	530	276	52.0	117	22.0	137	26.0	Mixture of all foreign born
Total	1,590	609	38.9	133	8.4	848	52.7	

\* Old immigrant – arrived in the U.S. over three years ago.

\*\* Recent immigrant – arrived in U.S. within the last three years.

### Immigrant status and travel history

The patients at both the Morrisania and Washington Heights clinics, are for the most part recent immigrants to the U.S.A. (Table 1). In the Lower East Side clinic, the majority of patients are either U.S. born and old immigrants (in the U.S.A. for three years or more), but 62.0% of them had traveled outside of the United States during the previous six years. This is in sharp contrast to the small number of Morrisania and Washington Heights patients who gave a history of recent travel. The Morrisania and Washington Heights clinics serve a low-income, recently immigrated population, whereas the Lower East Side clinic serves a more affluent and traveling middle class population which is U.S. born.

### Referral pattern

The majority of Morrisania and Washington Heights patients are self-referred by either friends, neighbors or family members. Clinics and hospitals are the second largest referring source for these patients whereas private physicians constitute the smallest source of referral (Table 3).

By contrast, the majority of Lower East Side clinic patients are referred to the clinic by private physicians for diagnosis. These patients are usually sent back to their private physicians for treatment once the diagnosis is made by the clinic laboratory. This further explains the geographic distribution pattern of patients seen at this clinic. Because this clinic is situated in a business area, it has no neighborhood popula-

*Table 2. Recent travel history of tropical disease clinic patients, April–June, 1972, New York City \**

Clinic	Total No.	Patients who recently traveled	
		No.	%
Morrisania	530	85	16.0
Washington Heights	530	106	20.0
Lower East Side	530	329	62.0
Total	1,590	520	36.4

\* These figures are based on those patients who lived in the United States prior to their travel outside of the United States. Recent travel was defined as travel within the last six years.

*Table 3. Referral source for patients seen at tropical disease clinics April–June, 1972, New York City*

Clinic	Total No. patients	Self referrals		Hospitals – clinics		Private doctors	
		No.	%	No.	%	No.	%
Morrisania	530	360	68.0	106	20.0	64	12.0
Washington Heights	530	318	60.0	139	26.2	73	13.8
Lower East Side	530	73	13.8	106	20.0	351	66.2
Total	1,590	751	47.2	351	22.1	488	30.7

tion per se like the Morrisania and Washington Heights clinics. Over the years it has been used primarily by private physicians for referring patients for diagnosis and treatment. Regardless of the home address, a patient who has a private physician will most likely be referred to the Lower East Side clinic, rather than to any of the other three clinics because of its accessibility and location in a central business area.

#### Patient load

There is a larger number of patient visits per month at the Morrisania and Washington Heights clinics compared to the Lower East Side clinic. However, by contrast, more new patients are seen each month at the Lower East Side clinic. The explanation for these differences lies in the referral pattern. At both the Morrisania and Washington Heights clinics, patient turnover is slow whereas at the Lower East Side clinic

Table 4. Daily average number of visits, new patients, laboratory specimens and examinations, tropical disease clinics, April-June, 1972, New York City \*

Clinic	Average number of patient visits per day	Average number of new patients per day	Average number of return visit patients per day	Average number of specimens per day	Average number of laboratory examinations per day
Morrisania Washington Heights	22	4	18	14	18
Lower East Side	20	5	14	16	21
	17	10	7	18	31

\* Figures based on tropical disease clinic monthly reports.

it is fast. Although these former two clinics see fewer patients per month, they see each patient more often. Patients are self-referred and once a diagnosis is made they return to the clinic several times until treatment is completed.

At the Lower East Side clinic more patients are seen, but once a diagnosis is made they are sent back to their private physicians for treatment and are not usually seen again. Because of this the Lower East Side clinic dispenses less clinical treatment and has a faster turn-over of patients than the other two clinics (Tables 4 and 5).

### Laboratory tests

All stool specimens are examined by direct technique and by the formalin ether method. Where schistosomiasis is suspected the stool is examined by the water sedimentation method.

The larger number of average daily specimens examined in the Lower East Side clinic compared to the other two clinics reflects the greater daily average number of new patients seen by this clinic (Table 4). Almost all new patients require a specimen examination. Thus, the greater number of initial patient visits to a tropical disease clinic, the greater the number of new patient specimens received by the laboratory. Return-visit patients who are being followed up by the tropical disease clinics also give specimens to the laboratory, but they do so at a slower rate than the new patient, initial-visit group.

On the whole, the Lower East Side laboratory does more laboratory tests than either of the other two tropical disease laboratories. This is because the majority of patients seen at the Lower East Side clinic are privately referred by their own physicians who are often unfamiliar



*Table 5. Daily average number of sick patients and clinical treatments, April–June, 1972, New York City tropical disease clinics*

Clinic	Average number of sick patients per day *	Average number of treatments per day **
Morrisania	3.2	6.7
Washington Heights	3.6	4.7
Lower East Side	1.6	2.9

\* Figures based on the study's sample of patients who were diagnosed as having either a pathogenic or non-pathogenic tropical disease within the last year of their most recent clinic appointment.

\*\* Figures based on tropical disease clinic monthly reports – a slightly larger sample than that of the study.

with tropical diseases and thus order and/or expect a wide variety of tests to be performed on their patients. By contrast, clinic physicians at the Morrisania and Washington Heights tropical disease clinics are familiar with these diseases and order the minimum number of relevant laboratory tests. In addition, patients using the Lower East Side clinic come from a geographically heterogeneous population. No unique tropical disease problems are common to this group of patients as a whole. Therefore, the Lower East Side laboratory is prompted to carry out a large number of different screening tests in order to identify a patient's problem. In the Morrisania and Washington Heights laboratories, however, patient populations are more homogeneous and certain tropical diseases are more common to them. In these clinics, patient group membership facilitates the making of presumptive diagnoses by clinic physicians who then order specific laboratory tests.

#### Diseases seen

The major tropical diseases which are seen in the clinics were grouped into the three major categories shown in Table 6. The results of this survey show that many tropical diseases in New York City are concentrated in the Bronx and in upper west side Manhattan (Table 7). Specifically, the pathogenic and non-pathogenic protozoan infections are concentrated in the Bronx and in upper west side Manhattan. Helminthic infections are found primarily in the Bronx. Many of the tropical diseases are brought into the city by recent immigrants and travelers from tropical and sub-tropical areas. It is quite logical to expect a heavy concentration of tropical disease in those areas of such recent immigration settlement. The helminths, many of which require either intermediary

Table 6. Parasites seen at the tropical disease clinics, April–June, 1972, New York City

Category	Examples
Pathogenic protozoa	<i>Entamoeba histolytica</i> , <i>Dientamoeba fragilis</i> , <i>Giardia lamblia</i> , <i>Balantidium coli</i>
Non-pathogenic protozoa	<i>Entamoeba coli</i> , <i>Endolimax nana</i> , <i>Iodamoeba butschlii</i> , <i>Trichomonas hominis</i> , <i>Chilomastix mesnili</i> , <i>Enteromonas hominis</i>
Helminths	<i>Enterobius vermicularis</i> , <i>Ascaris lumbricoides</i> , <i>Trichuris trichiura</i> , <i>Strongyloides stercoralis</i> , <i>Taenia saginata</i> , <i>Diphyllobothrium latum</i> , <i>Schistosoma mansoni</i> , <i>Schistosoma haematobium</i> , <i>Ankylostoma duodenale</i> , <i>Necator americanus</i>

hosts or a specific environment for their development, neither of which are found in New York City, are often brought into the city by patients from somewhere outside of the city and the U.S.A. The high prevalence of helminthic infections found in the Bronx and Washington Heights areas correlates well with the high proportion of recent immigrants in those areas.

The majority of cases of schistosomiasis are found in the Bronx, an area heavily populated with recent immigrants from Puerto Rico. Because the incidence of schistosomiasis is extremely high in Puerto Rico, it is not surprising that a considerable percentage of recent Puerto Rican arrivals from rural areas are infected. The majority of pathogenic and non-pathogenic protozoa are also most likely brought into New York City by patients. However, unlike the helminths, protozoa can be more easily transmitted under the host and environment conditions present within the city. Recent immigration figures may not be sufficient to explain the higher incidence of these protozoa in the upper west side of Manhattan (69.0%) compared to the Bronx (26.0%). There may exist a greater in-city transmission of protozoa in areas of Manhattan than in the Bronx, or there may exist differences in conditions of environmental sanitation between the two areas. Of the Washington Heights patients who were born in the United States and who had no history of recent travel, 44.0 percent had a tropical disease and almost all were found to be protozoan in nature. Whereas, in the Bronx clinic, less than 30.0 percent of those United States born, non-traveling patients were diagnosed as having a protozoan infection. These patients could only have contracted their disease in their surrounding New York City environment since they were never outside of either the United States or New York City. This underscores again the import-



**Table 7.** The comparative prevalence of parasitic diseases seen in New York City by borough of residence of patients, April–June, 1972

Disease category	Total cases	Bronx		Manhattan		Queens		Brooklyn	
		Number of cases	%	Number of cases	%	Number of cases	%	Number of cases	%
Pathogenic protozoan	433	119	27.4	290	67.1	11	2.5	13	3.0
Non-pathogenic protozoan	422	100	23.6	295	69.9	15	3.5	12	3.0
Helminthic	499	269	53.9	213	42.6	10	2.0	7	1.5
Schistosomal	53	43	81.1	5	9.4	1	1.8	4	7.6

ance of the neighborhood environment as a factor which determines the health of a population, at least with respect to tropical diseases.

### Discussion

Tropical diseases are by no means rare in New York City due to the presence in the city of large populations of recent immigrants from tropical and subtropical areas of the world and of city residents who travel to these areas. At the present time the average annual number of patients seen at the four tropical disease clinics of the New York City Department of Health is 8,000. The average annual number of patient visits handled by these four clinics is 25,000. In addition to the four clinics operated by the New York City Department of Health, there are several other clinics associated with voluntary hospitals which provide treatment services for patients with tropical diseases in the city. Also, a certain proportion of patients with these disease problems are diagnosed and treated by private physicians. However, the number of patients given total diagnostic and treatment services by these other facilities and by private physicians is small by comparison with the number managed by the four clinics of the Department of Health. In the past some of these non-Department of Health clinics had heavier patient loads because of the presence of recent immigrants from tropical and sub-tropical areas in the communities they serve. The present day lack of large numbers of new immigrants in these communities accounts for the smaller number of patients seen at these tropical disease clinics.

As shown in Table 1, over half of all the patients seen in the Department's clinics are recent immigrants, primarily from the Caribbean.

For the most part these immigrants live in the lower socio-economic areas of the city, in the Bronx, Manhattan and Brooklyn. Certainly, the incidence of tropical disease among these immigrant groups is much higher than that which is reflected in clinic statistics. The subclinical course of many parasitic infections, coupled with the failure of many recent immigrants to seek medical treatment for even symptomatic infections results in a lower reported incidence of tropical disease among this group. By contrast, the proportion of recently traveled middle and upper income individuals seen at the clinics is artificially high. Many persons in this group actually seek out not only diagnosis and treatment of symptomatic conditions, but also routine screening for parasitic diseases on their return from the tropics. These factors result in the detection of tropical diseases in a high proportion of this group. The conscientious utilization of tropical disease clinic services by middle and upper income individuals and their referring physicians and the under utilization of these same services by low income immigrant groups gives rise to figures which do not accurately reflect the true magnitude of the problem in the latter group.

The data from the study shows that of the 488 patients referred by private physicians, 351 (71.9%) were referred to the Lower East Side clinic. The central location of this clinic in the city and its accessibility by public and private transport have made it the most convenient clinic for private physicians to refer their patients. Unless patients live in close proximity to one of the other clinics, private physicians will refer them to the Lower East Side. Over the years, most referring physicians have become accustomed to utilizing this clinic and thus habitually refer their patients there.

Clinics were originally established in those health centers serving communities where significant tropical disease problems existed. Much of the immigrant Puerto Rican population which once lived around the Lower East Side clinic has moved away into better housing elsewhere. Urban renewal programs in the area have resulted in the demolition of poor tenement housing in which this population once lived and the building of middle income housing, changing the demographic profile of the area considerably. By contrast, the Morrisania clinic still serves primarily Puerto Rican communities. Continued immigration into the Bronx has maintained a stable level of tropical disease problems in the area over the years since the clinic was first established.

The Washington Heights clinic once served the needs of a community which was principally Puerto Rican. However, in recent years, many Puerto Rican families have moved out of the area and new immigrants from the Dominican Republic have moved in. Thus, although the demographic situation in the community has changed, the problem of tropical disease has remained much the same as it was

before. The Bushwick clinic in Brooklyn which was not surveyed in this study was recently established and serves a large community of Puerto Rican immigrants who have become established in the area over the past decade.

Within the limits of budgeting and staffing, all of the four tropical disease clinics are working at full capacity. They are geographically situated in the center of those communities in the city which have need of their services. The Lower East Side clinic serves a heterogenous citywide community and provides a considerable proportion of those diagnostic services which have been provided by the Division of Tropical Diseases to the medical profession in the city for many years.

Future changes in the composition of the city's immigrant population and the aging of the present recent immigrant population will considerably alter the pattern of tropical diseases in New York City. Likewise, geographic shifts of immigrant population groups within the city, such as has recently occurred in Brooklyn, will require the establishment of new clinics or the transfer of existing ones to those areas where there is a need. The importation of tropical diseases into New York City with travelers will no doubt continue at the present and perhaps at higher levels for a long time to come until the incidence of these diseases is lowered in the developing areas of the world through improved environmental sanitation, raised standards of living and disease control programs.

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#### *Zusammenfassung*

Das Gesundheitsdepartement von New York City führt unter der Leitung der Abteilung für Tropenkrankheiten vier Tropenkliniken. An diesen werden jährlich 8000 Patienten behandelt und 25 000 Konsultationen abgehalten. In drei der vier Kliniken wurde von April bis Juni 1972 eine Studie über 1590 Patienten, die in diesen drei Monaten behandelt wurden, durchgeführt. Was die Art der Erkrankungen betrifft, so erweisen die Ergebnisse eine deutliche Ähnlichkeit jener zwei Kliniken, welche Stadtgebiete betreuen, in denen zahlreiche Neueinwanderer aus tropischen Gebieten leben.

Die dritte Klinik dient als Referenzklinik für das ganze Stadtgebiet und betreut eine heterogene Bevölkerung. Ihre Patienten unterscheiden sich wesentlich von denen der beiden andern Kliniken. Im Stadtgebiet entspricht die Verteilung der parasitären Erkrankungen der geographischen Herkunft der Bewohner; die Gesundheitsprobleme einzelner Quartiere sind deshalb weitgehend dieselben wie in den entsprechenden Tropenländern.

*Résumé*

Le Département de la Santé de la Ville de New York fait fonctionner quatre consultations de médecine tropicale sous la direction de sa Division des Maladies Tropicales. Ces consultations reçoivent 8.000 patients et font 25.000 visites par an. Une étude a été réalisée sur 1.590 patients examinés durant la période d'avril à juin 1972, dans trois des quatre consultations de médecine tropicale. Les résultats de cette étude révèlent que les deux consultations qui desservent les communautés d'immigrants récemment arrivés des tropiques sont similaires en ce qui concerne les caractéristiques de leurs patients. La troisième consultation qui fonctionne comme une consultation urbaine normale reçoit des patients d'origine hétérogène. En conséquence, les caractéristiques de ces patients diffèrent sous bien des aspects de celles des deux autres. La distribution géographique des différents types de maladies parasitaires dans la Ville de New York est en corrélation étroite avec l'origine des différents groupes d'immigrants et reflètent dans une large mesure les problèmes de santé rencontrés dans les pays d'origine de ces immigrants.