# Parasitic Infections in a New York City Hospital: Trends from 1971 to 1984

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**Abstract:** We report the frequency of parasitic infections 1971–84 in a major New York City Medical Center whose catchment area includes many immigrants from Dominican Republic. Infection with 7,803 parasites was documented in 41,958 laboratory specimens. Trends were toward fewer total specimens being sent and fewer still being positive, although a rise in *G. lamblia, E. histolytica,* and *Cryptosporidium* is apparent in recent years. Parasitology laboratories should provide similar data to alert clinicians to the parasites prevalent locally. (*Am J Public Health* 1986; 76:1024–1026.)

## *Introduction*

The frequency of parasitic infections varies widely within geographic regions of North America.[1-5] New York City has seen more parasitic infections and disease than most other regions of the United States.[6,7] Columbia-Presbyterian Medical Center (CPMC) is situated in the Washington Heights area of northern Manhattan, the focus of a large community of immigrants from Dominican Republic. Parasitology laboratory records were used as a sentinel data source from 1971–84, enabling secular trends to be recognized.

## *Methods*

All specimens sent to the CPMC parasitology laboratory have been handled and screened for evidence of parasites by the same technician since 1968, except for the four weeks of a yearly vacation. Specimens include routine or purged stools, rectal swabs, sticky tape tests, blood, urine, sputum, CSF, and duodenal drainages. Stool samples are concentrated with formalin-ether and are examined directly. Trichrome and other standard stains are then used for specific diagnosis. Techniques did not change in any substantial way through the 1971–84 period, except for the addition of a stool sugar flotation test for *Cryptosporidium* in 1982, supplanted by a modified cold Kinyoun technique in 1983.[8] The total number of specimens sent and the monthly number of positive specimens for a given parasitic infection were determined for 1971–84. The number of "cases" was estimated by deleting redundant positives. Since the data collection system does not account for mixed infections in a single individual, an equation of a single isolate with a single unique positive specimen will somewhat overestimate the actual number of infected individuals. Calculation of total "cases" per total clinic visits and admissions each year (termed incidence) permitted use of linear regression techniques to measure trends.

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## *Results*

From 1971 to 1984, 41,958 specimens were examined; 7,803 parasites were identified. The total number of specimens and the number of positive specimens decreased from 1971 to 1977, while a net increase was observed from 1978 to 1984 (Figure 1). An overall decline in incidence was apparent from 1971–84 ($\beta = -0.068$, $r^2 = .63$). Incidence was fairly constant from month to month within a given year.

Intestinal protozoa accounted for 53.4 per cent of all parasitic isolates seen from 1971 to 1984 (Figure 2). Nonpathogenic species, primarily *Endolimax nana* and *Entamoeba coli,* accounted for 66.8 per cent of the protozoal isolates (35.1 per cent of all isolates). Pathogenic intestinal protozoa accounted for 18.3 per cent of all isolates. *Giardia lamblia* accounted for 75.4 per cent of all pathogenic protozoa (Figure 3); *Entamoeba histolytica* accounted for 20.1 per cent of all pathogenic protozoa. Although not recognized before 1983 at CPMC, *Cryptosporidium* represented 13.8 per cent of pathogenic protozoa seen in 1983 and 1984. Blood protozoa represented only 0.9 per cent of all parasitic isolates. There was only a slight difference in incidence of protozoal infection over the 14 year period ($\beta = -0.031$, $r^2 = .18$). The shape of the incidence curve is non-linear, however.

Intestinal nematodes were found in 38.3 per cent of all positive isolates. *Trichuris trichiura* declined 82 per cent from 1971 to 1978, but was still the most frequently identified organism within this category until 1984, when *Strongyloides stercoralis* was the most frequently diagnosed nematode (Figure 4). The number of positive pinworm isolates has decreased 95 per cent over the 14-year period. *T. trichiura* represented 44.0 per cent of all nematode isolates during the study period; *S. stercoralis,* 17.8 per cent; hookworm, 17.7 per cent; *E. vermicularis,* 10.9 per cent; and *A. lumbricoides,* 9.5 per cent. Trematodes and cestodes were seen rarely, only 1.7 per cent and 1.2 per cent of all isolates, respectively (Figure 2). A declining trend of incidence of nematode, trematode, and cestode infections was evident ($\beta = -.104$, $r^2 = .66$).

## *Discussion*

Parasitic isolations were seen more often in the early 1970s at CPMC than they are now, although the trend has been upward since 1977 (Figure 1). Laboratory-based surveys of parasitic infections will not necessarily reveal true community prevalence due to selection biases. A laboratory-based survey can be useful, nonetheless, as a marker of secular changes occurring in frequencies of parasitic infections in a given community, since selection biases are likely to occur with some consistency from year to year.

It is not surprising that *T. trichiura* was seen frequently in the early 1970s; a 1966 survey of Puerto Rican 6-year old school children revealed 76 per cent prevalence of trichuriasis and rates in Dominican Republic are thought to have been similarly high.[9] Ascaris has decreased to a lesser degree. A survey in Luxembourg also noted a decreasing trend for these two nematodes in that country.[10] In contrast, the frequency of reported Ascaris in Canada[11] and the US as a whole[12] has been quite stable. Strongyloides, with its potential for autoinfection particularly in immunosuppressed

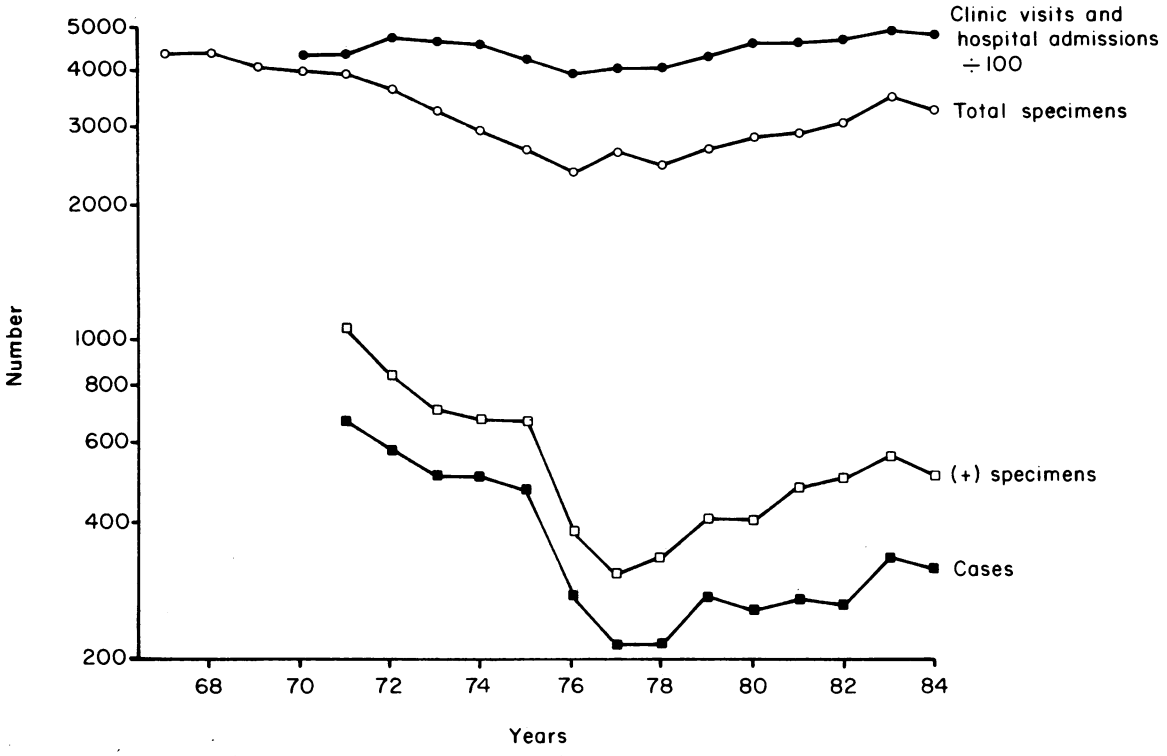


**FIGURE 1—Total Number of Specimens, Positive Specimens, and 'Cases' of Parasitic Infections Diagnosed at Columbia Presbyterian Medical Center (CPMC) from 1971 to 1984 (Number of clinic visits and hospital admissions divided by 100 are given.) "Cases" estimates the number of infected individuals with the exclusion of repetitive positive specimens.**

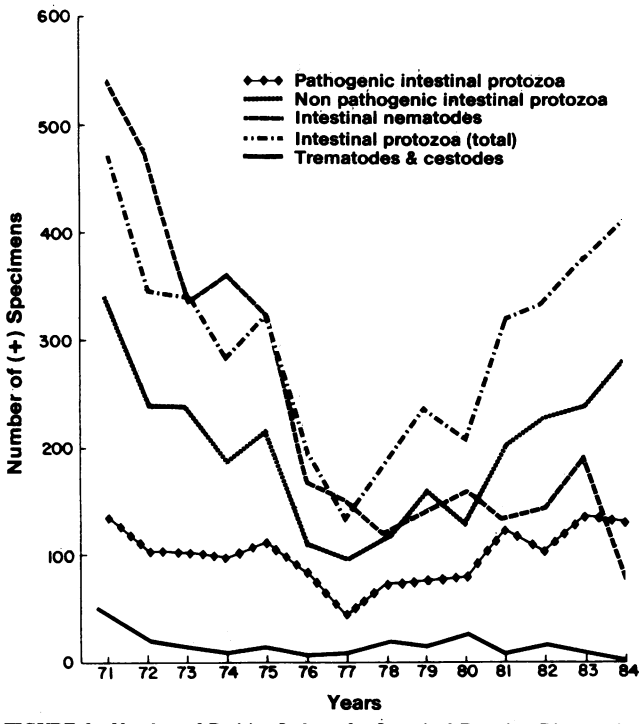


**FIGURE 2—Number of Positive Isolates for Intestinal Parasites Diagnosed at CPMC from 1971 to 1984**

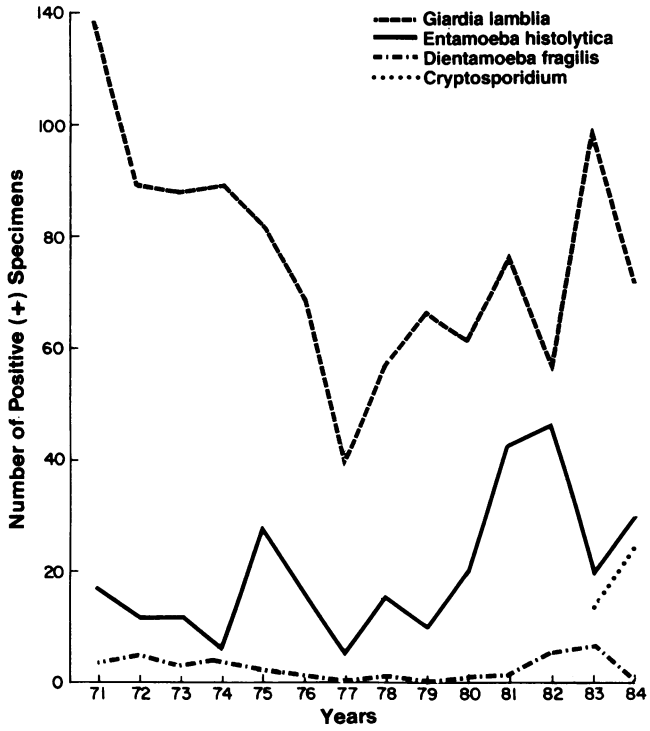


**FIGURE 3—Number of Positive Isolates of Pathogenic Intestinal Protozoa Diagnosed at CPMC from 1971 to 1984**

persons, is the most common helminth diagnosed in 1984 at CPMC. The present study shows pinworm infections to be surprisingly uncommon. The downward trend is similar to that reported in California,[13] making pinworm far less prevalent than estimated in the 1970s.[4,14] The proportion of all CPMC clinic patients seen in pediatrics has not declined during this period (S. Vermund, unpublished data).

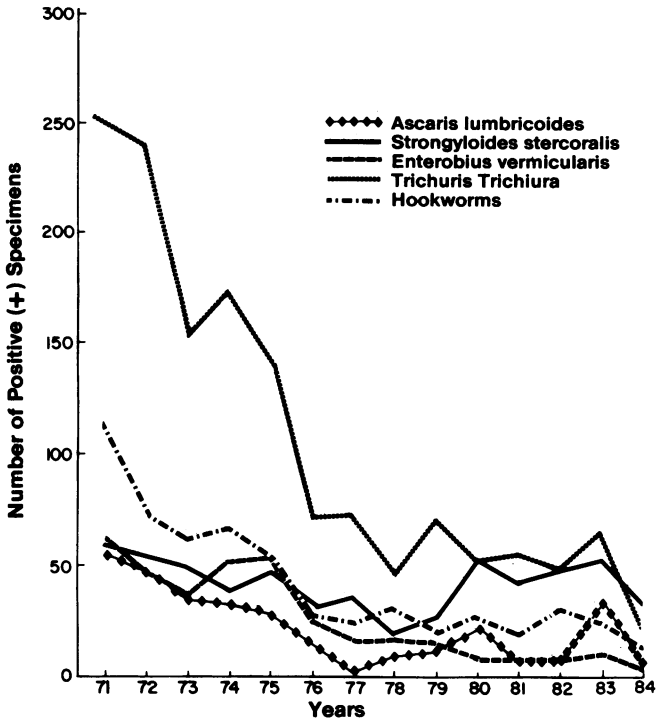


**FIGURE 4—Number of Positive Isolates of Pathogenic Intestinal Nematodes Diagnosed at CPMC from 1971 to 1984**

The net increase in parasites isolated at CPMC from 1976 to 1984 is fully explained by the rise in intestinal protozoa (Figure 2). Non-pathogenic protozoa were the most frequently identified parasites in this period, indicating fecal contamination and fecal-oral transmission in the population.[3,14] Giardiasis is the most common parasitic infection in recent years in our hospital, as is the case elsewhere in the US.[12] Monthly frequency is quite consistent in our data, probably reflecting the importance of endemic disease, both local and imported.[15,16] Amoebiasis is also seen with increasing frequency in the 1980s, as is *Cryptosporidium*. We do not yet know whether the rise in sexually transmitted protozoa in homosexuals noted in New York in 1978 is relevant to our population.[17] Although our analysis found infection due to trichomonads to be very uncommon (1.1 per cent of positive isolates for both *T. vaginalis* and *T. hominis*), the numbers are not very useful since patients are usually both diagnosed and treated at the clinic where they are seen, without laboratory confirmation.

The Washington Heights area of New York City currently has one of the largest concentrations of Dominicans outside Dominican Republic. One might anticipate that the parasitic infection rates in this area would have increased. This was not the case from 1971 to 1977, when a decline was seen. A possible explanation is that since the main migration occurred several years earlier, many persons may have been treated while in others the parasite may have died out with the absence of reinfection. This impression is supported by the continued low frequency of reported nematodes, which are largely "imported".

We believe that laboratory-based monitoring of trends in frequency of parasitic infections can increase awareness in medical practitioners, a crucial factor in determining accurate prevalence data.[5] Parasitic infections may otherwise remain undetected. Laboratory-based surveillance should be a routine part of any hospital or clinic parasitic diagnostic service taking its place beside routine bacteriologic laboratory summaries and antibiotic sensitivities.

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