TUBERCULOSIS IN NEW YORK CITY 1984-1985

NEW YORK LUNG ASSOCIATION
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It's important every so often to take a look backward for it enables us to recognize how far we've come - and also to assess how much further we have to go.

At the turn of the century tuberculosis was the scourge of the city. This prompted a group of courageous volunteers to organize the first Committee on the Prevention of Tuberculosis - which later became the New York Lung Association.

Although no longer rampant as in those early years, tuberculosis nevertheless poses a renewed health threat to many of our city's residents. As shown in this report, the incidence of new cases of tuberculosis is rising.

The data in the report were compiled by the New York City Department of Health. It is published by the New York Lung Association as a service to the Department of Health, and to the medical community and people of our city.

The New York Lung Association remains committed to the elimination of tuberculosis and will continue to work toward this goal.

Edith Ewenstein

Edith Ewenstein,
General Director

THE CITY OF NEW YORK
COMMISSIONER OF HEALTH
Stephen C. Joseph, M.D., M.P.H.

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March 1987

To the Mayor and the Citizens of New York City:

Tuberculosis morbidity rates increased again in New York City during 1984 and 1985, continuing the trend first noted five years ago, while mortality rates decreased during these two years to an all-time low in 1985. Of major concern are the disease rates among 25-44 year old black and Hispanic males and the increasing rate among young children less than five years of age. Central Harlem and the Lower East Side had the highest rates during both years.

We continue to be concerned about the possible association between tuberculosis and the Human Immunodeficiency, or AIDS, Virus. We are working, in conjunction with the New York State Department of Health and the Federal Centers for Disease Control, on a series of investigations which are examining the nature of this possible association. These cooperative efforts have already resulted in new national and state guidelines for the treatment of tuberculosis infection in persons with AIDS.

Tuberculosis has been associated historically with crowded living conditions among the poor. During the past few years, homelessness and congregate shelter living have increased both in our city and throughout the nation, and we have implemented special programs to detect and treat tuberculosis in these settings. We are also making efforts to curb the spread of this disease throughout the City.

Because of unanticipated delays, this report represents the tuberculosis experience of both 1984 and 1985. We will return to our annual reporting system with the 1986 report.

Sincerely,

Stephen C. Joseph, M.D., M.P.H.
Commissioner of Health

Tuberculosis 1984-1985. Summary and Discussion

Tuberculosis is becoming, once again, a significant health problem in New York City. Although the incidence rate declined by 72% between 1960 and 1978, this trend has been reversed and rates have increased by 50% since that year. The increase, however, is restricted to morbidity only; the mortality rate continues to decrease, and reached its lowest point at 1.3 per 100,000 in 1985. The changing pattern of tuberculosis reflects changing trends occurring among various demographic groups in New York City.

In both 1984 and 1985, the incidence rates were higher among males, with the rate peaking at 70 per 100,000 in the 35-44 year age group. Asians had the highest crude rate in 1984, and the second highest rate in 1985, although these rates are based on small numbers. Among the other racial and ethnic groups, blacks continue to have the greatest tuberculosis morbidity, followed by Hispanics and whites. The highest rate in any group occurred in 1985 among black males who were between 35-44 years of age; their rate was 230 per 100,000, up 30% from 1984.

Among the very young (0-4 years) rates were high for blacks and Hispanics, especially the former. In addition, rates among black and Hispanic children born during 1984 and 1985 were higher than rates among others in this age group, and these rates increased by 30% during the two year period in recently born blacks and tripled among Hispanics.

Within different neighborhoods of the city in 1985, the age-adjusted incidence rates ranged from 5 per 100,000 in Maspeth/Forest Hills, Queens to 111 in Central Harlem. One-quarter of all newly reported cases during the two years described in this report were born outside the mainland United States, with the greatest number among Puerto Rican and Haitian migrants in 1984 and 1985, respectively.

In order to further monitor and deal with tuberculosis cases occurring in different neighborhoods and demographic groups, the New York City Department of Health has been engaged in a number of special projects during the past several years. The Supervised Therapy Program (STP) is a program which utilizes outreach workers to provide therapy to individuals who might otherwise not obtain it because of a variety of social and psychological problems, including drug and alcohol addiction and homelessness. During 1984 and 1985, there was 94% continuity of therapy for those enrolled in the program. The Department of Health is also participating with the Centers for Disease Control and several other cities in two special projects: the Drug Resistance Study, and Study 21. The first of these determines resistance to 10 commonly used anti-tuberculosis drugs. Ten percent of those who never were previously treated for tuberculosis and who were enrolled in tuberculosis treatment programs in New York City were found to be resistant to isoniazid, which is twice the rate reported for all study areas combined, although the number enrolled is small. Study 21 is a multicenter clinical trial which compares a six-month therapeutic regimen of isoniazid and rifampin, supplemented with pyrazinamide during the first two months, with a nine-month control regimen using only the first two of these drugs. Results of this study will be reported next year.

These programs have been established as a response to the dramatic changes which have occurred during the past five years in the pattern of tuberculosis incidence in New York City. In 1979, the age-specific incidence rates, for all race and sex groups combined, followed the traditional pattern with a peak in the 0-4 age group, a decline during the adolescent years, followed by a gradual increase with increasing age. During the past several years, rates have reached their highest level in the highest risk groups (blacks and Hispanics) among those of age 25-44. Among whites, the highest rates occur among those of age 65 and over, while Asians experience the highest rates in the 55 and over age group.

The recent trend in tuberculosis incidence includes three components: the rate has been increasing during the last six years, and the rate of increase in 1985 was greater than it has been since the beginning of the decade; the highest incidence rates in the high risk groups are found in the 25-44 year age group, and not in the older age groups; incidence rates among the very young have increased, with those less than one year of age having the highest rates.

What can account for these changes? Various conditions are predisposing to an increase in tuberculosis incidence. A more vigorous case-finding campaign since the late 1970's may have resulted in an apparent increase. An influx of immigrants from countries where tuberculosis is endemic, in addition to an increase in intravenous drug use, may have resulted in a concomitant actual increase in the number of tuberculosis cases. Finally, an increase in poverty, often considered a predisposing factor, may be associated with the increase in incidence. These factors, when examined individually and in combination, however, still do not fully account for the recent increase in tuberculosis incidence.

In the late 1970's more funding was made available for tuberculosis case finding. The immediately ensuing increase in incidence may therefore have been a reflection of improved data collection, although the increase in incidence between 1984 and 1985 cannot be attributed to the funding increase in the 1970's.

Of the newly reported tuberculosis cases during 1979-1985, 26% occurred among persons born outside the United States. In 1984-1985, a comparable figure of 27% indicates that the increase in cases is not due to an increase of persons from outside the U.S., many of whom are from areas where tuberculosis is endemic.

Intravenous drug abuse is and has been a major problem in New York City for decades, and abusers have been especially susceptible to tuberculosis. The population of abusers within the last several years, however, is estimated to have remained relatively

constant at about one-quarter of a million people. Indirect indicators suggest that heroin use has remained stable in the past few years. In 1981, heroin/morphine emergency room episodes in the New York City area totaled 3,007. In 1984, this figure was 3,633. In 1979, there were 472 deaths due to narcotism, while there were 427 such deaths in 1984. Treatment admissions with heroin as the primary drug of abuse totaled 24,360 and 13,260 in 1979 and 1984, respectively.

Social and economic factors associated with tuberculosis risk, such as poverty, unemployment, overcrowding, and homelessness, have been increasing in New York City and nationally, but morbidity has generally been decreasing in other parts of the country, so these factors cannot entirely account for the increasing rate. Between 1979 and 1984, there was a 21% increase in the number of persons living below the poverty level in New York City, while a comparable 23% increase in the United States occurred at the same time. Although poverty has increased by similar percentages, there has, however, been no comparable national increase in tuberculosis rates.

Between 1979 and 1984 in New York City, there was a slight decrease (33% to 32%) in the percentage of blacks living below the poverty level, while there was a 25% increase among Hispanics in this category. As was previously noted, blacks continue to have the greatest tuberculosis morbidity. Poverty levels, when taken alone, obviously are not strong determinants of tuberculosis trends. In the aggregate, all of these factors do not adequately explain the changes in morbidity patterns recently observed.

Certainly, the relationship between Human Immunodeficiency Virus (HIV) infection, or AIDS, and tuberculosis must be, and is being, examined closely. There is substantial indirect evidence for an association. The age, sex and racial/ethnic groups which have the highest rates of intravenous drug abuse and an increasing proportion of AIDS cases are those groups noted to have the highest incremental rate of tuberculosis. In addition, examination of neighborhood rates reveals that those areas with high drug abuse and

:DS rates have high tuberculosis rates. This association is not ıly occurring in New York City but is being observed nationally; ıose cities and states with the highest incidence of AIDS are the ıme places with the highest incremental rates of tuberculosis.

ı order to look at this association more directly, the Department Health has undertaken several investigations. Initially, we mpared the 1981 - 1984 tuberculosis registry, for males aged -54, with the AIDS and the methadone maintenance registries. In 81, less than 10% of tuberculosis cases were on both the AIDS and thadone registries, while in 1984, more than a quarter were on ese registries.

second study matching the AIDS and tuberculosis registries was ıdertaken to determine common risk factors among those with both seases. In a preliminary analysis, from 1979 - 1985, 5% of the 545 AIDS cases were diagnosed as having tuberculosis. In ldition, it was found that, compared to AIDS patients without ıberculosis, tuberculosis/AIDS patients were more often black (53% : 30%) or Hispanic (30% vs 23%) and intravenous drug abusers (50% : 28%). In another preliminary ongoing study, the Department of ealth found that 20 of 48 (42%) male tuberculosis cases, among ıose 25-44 years of age tested positive for HIV, although the equence of infection has not been established. These findings are ot surprising. There are many infections associated with HIV, and : is reasonable to hypothesize that tuberculosis is one of these. ıese studies, as well as studies on childhood tuberculosis, are ore closely examining the relationship between tuberculosis and :DS. The Department of Health feels that it would be prudent to ıse public health policies on an assumption of association. Both DS and tuberculosis are urgent public health problems. Of course, ıe social and economic problems which are doubtless associated with ıese diseases, especially among narcotics abusers, must also be ldressed.

The tuberculosis incidence rate in New York City declined slightly in 1984 (23 per 100,000) and rose again in 1985 (26 per 100,000), continuing the general trend of increasing rates since 1979 (Table 1 and Figure 1). The number of newly reported cases rose from 1307 in 1978 to 1843 in 1985, a 41% increase during this seven year period. The 1985 incidence rate was 13% higher than the rate in 1984, which is the largest annual increase since the rate began to rise. The tuberculosis mortality rate has remained stable at approximately 2 per 100,000 since 1979.

Tuberculosis trends in New York City contrast starkly with national trends. While tuberculosis incidence rates have decreased steadily in the United States since 1976, New York City has experienced only two years of marked decline during this period. Between 1976 and 1978 the rate fell 37% in New York City and, as noted, has risen steadily thereafter. Since 1983, the NYC incidence rate has been more than twice as high as the U.S. rate.

Distribution by Sex, Age, and Racial/Ethnic Groups

During the past several years, tuberculosis has become more concentrated among males. The male:female ratio increased from 2.0:1 in 1983 to 2.3:1 in 1985. Between 1984 and 1985, the incidence rate among males increased 15%, with a corresponding 9% increase among females (Tables 2A-4B, Figures 2A and 2B).

The distribution of tuberculosis within different age groups among males and females reveals distinctly different patterns of infection. During 1984 and 1985, the rates were similar for those under the age of 10; between 10 and 19 years of age, rates were higher among females in 1984 and higher among males in 1985; for the age group 20-24 years, rates were again essentially similar.

Beginning with the 25 year age group, incidence rates among males and females diverge sharply. The rate among males more than tripled during both years between the age groups 20-24 and 35-44, while rates among females in these age groups remained rather constant. Between the ages of 45-64, rates among females declined and rose again at 65+ years of age during both years, while among males the rates peaked among 35-44 year olds and declined steadily thereafter during both 1984 and 1985. It should be noted that incidence rates among males in the high risk age groups of 25-34 and 35-44 years increased 26% and 19%, respectively, during the two year period of this report.

Overall, tuberculosis incidence rates increased among whites, Hispanics, and blacks between 1984 and 1985, with the latter experiencing the largest increase. There was a slight decline among Asians.

Rates among whites declined between 1979 and 1984 and then increased slightly in 1985. Rates among blacks increased between 1979 and 1983, declined somewhat in 1984, and rose sharply in 1985 - a 16% increase over the 1984 rate. Among Hispanics, rates rose between 1979 and 1982, declined slightly in 1983, and rose again in 1984 and 1985. Rates among Asians are based on small numbers, but it is noteworthy that they experienced the highest rate in 1984 and the second highest in 1985. In that year, there was more than a six-fold difference in incidence rates between whites and blacks - 9.5 per 100,000 vs 60 per 100,000 (Tables 2A-4B, Figure 3).

Trends among males within the 25-44 year age group are of particular interest (Figure 4). Rates among these males increased in each of the race/ethnic groups between 1984 and 1985. The largest proportional increase (37%) was seen among whites, while the largest absolute increase (78 per 100,000) was observed among blacks. Within both 1984 and 1985, rates among blacks in this age group were ten times higher than among whites, while Hispanics had rates which were approximately four times higher than those among whites.

Beyond the age of 45, male incidence patterns between 1984 and 1985 and within the racial/ethnic groups differed. The highest incidence rate (170 per 100,000) in 1984 occurred among Asians in the 65 years and older age group while the highest age-specific rate (233 per 100,000) in 1985 was observed among blacks in the age group 35-44.

Among females of age 25-44, both the greatest proportional increase (68%) and the largest absolute increase (8 per 100,000) was seen among Hispanics. The highest incidence rates in both 1984 and 1985 were observed among Asian women in the age groups 55-64 years and 65 years and older, respectively.

Tuberculosis among Young Children

Tuberculosis among young children (0-4) should be examined differently from disease among older children and adults for several reasons. Firstly, the diagnosis of tuberculosis among those under the age of five is often based solely on clinical criteria and not on bacteriological confirmation. Secondly, disease in this age group is more likely to be associated with hematogenous spread, and is associated with more severe outcomes and higher case-fatality rates. Thirdly, when tuberculosis occurs among young children, the disease generally results from recent transmission and not reactivation.

In view of the recent increase in the tuberculosis incidence rate, the increasing concern about the re-emergence of this disease as a serious public health problem, and the general absence of bacteriological confirmation among the very young, we must be concerned about possible detection bias - that is, clinicians may be more likely to make a clinical diagnosis of tuberculosis among young children now than during 1960-1979, when rates were declining and clinicians might have been less likely to consider clinical diagnoses.

Between 1980 and 1983, the number of cases of tuberculosis in those under the age of five decreased from 37 to 29 (7.1/100,000 to 5.6/100,000). In 1984 the number increased to 41 and it further

increased to 46 in 1985 (7.9 and 8.7/100,000 respectively). As with adult tuberculosis, the greatest proportion of cases occurred among black infants, who accounted for two-thirds of cases in this age group during the last two years (Tables 5A and 5B). Between 1983 and 1985, therefore, the number of cases in this age group increased almost 60% which, although based on small numbers, is nevertheless cause for concern (Figure 5).

In 1984, 12 of the 41 cases (30%) were diagnosed among those less than one year of age, while in 1985 this proportion increased to almost 50% (22 of 46). The general finding of a sizeable increase among those less than five years of age and more specific finding of a great increase among those less than one year of age, requires scrutiny. A special study examining tuberculosis in the young, and its relation to AIDS and other risk factors, has been undertaken by the Department of Health.

Intra-City Geographic Variation

Table 6 presents age-adjusted tuberculosis incidence rates for the health districts within each of the five boroughs of New York City for 1980, 1984 and 1985. The highest rates during these years were seen in Manhattan, followed by Brooklyn, the Bronx, Queens, and Staten Island. The largest proportional increase (36%) occurred in Queens while the greatest absolute increase was observed in Manhattan. Staten Island was the only borough in which the incidence rate declined between 1980 and 1985.

Manhattan

The largest absolute and proportional increases between 1980 and 1985 were seen in Central Harlem, while modest increases occurred in East Harlem, the Lower East Side, Riverside, and Washington Heights. Overall, Manhattan had a 16% increase in incidence rates between 1980 and 1985.

Bronx

The incidence rate in the Bronx increased 23% during the six year period of observation, with the largest increase occurring in Morrisania. Mott Haven, Tremont, and Westchester also experienced an increase during this period.

Brooklyn

Brooklyn had the smallest proportional increase in incidence rates of all boroughs between 1980 and 1985, although there were sizeable increments in Brownsville, Bedford, Flatbush, and Bushwick.

Queens

As noted, Queens experienced the greatest proportional increase in incidence during the six year period, although after Staten Island, they had the lowest age-adjusted incidence rates for each of the three years presented. There were, however, substantial increases in Jamaica West, Corona, and Jamaica East.

Staten Island

Staten Island, which is a single health district, had the lowest incidence rates during each of the three years and, as indicated, was the only borough that experienced a decline between 1980 and 1985.

Distribution by Country of Birth

During both 1984 and 1985, approximately three-quarters of all newly reported cases occurred among individuals born within the United States, while 14% were reported from among those born on the Caribbean Islands. In all, cases were reported among individuals born in 70 different countries (Tables 7A and 7B).

Reactivated Cases

Patients who were previously treated for tuberculosis are counted as new cases if they have not been under medical supervision for twelve months and are diagnosed again with disease.

There were 56 reactivated cases in 1984, which represents a 55% increase from the 36 reactivators reported in 1983. The number of reactivated cases reported in 1985 was 71, which again is a 27% increase over the number reported in 1984 (Tables 8 and 9).

Approximately 80% of reactivators during these two years were males, and half occurred among those in the age group 25-44. Reactivators accounted for 2.2% of all incident cases in 1983, 3.4% in 1984, and 3.8% in 1985, although these proportions are much lower than the 9% reported in 1980.

Sources of Reports

In 1984, 87% of all incident cases were reported to the Department of Health by either voluntary or municipal hospitals, while the corresponding figure for 1985 was 85%. During these two years, municipal hospitals in the Health and Hospitals Corporation reported approximately 40% of all incident cases, which is somewhat lower than the proportions reported in 1982 and 1983.

Tuberculosis Among Refugees and Aliens

Before immigrants come to the United States, they are screened for tuberculosis by the Public Health Service's Foreign Quarantine Service. The tuberculosis screening procedures for refugees consist of a medical interview, a general physical examination, and for persons fifteen years of age and older (1 year of age for Indochinese refugees), a chest x-ray. Those under 15 years of age receive a chest x-ray if clinically indicated, or if they were members of a family where one or more family members had an abnormal chest x-ray. Those with abnormal results on chest x-ray are then classified for tuberculosis control purposes as either having, or suspected of having, tuberculosis in an active state (Class A), or as infected, with no evidence of active disease (Class B). Other entrants who visit primarily on a temporary visa, such as students, are not screened overseas.

In New York City during 1984, 71 Class A aliens (immigrants and/or refugees) and 756 Class B aliens were screened, of whom one and none, respectively were discovered to have active pulmonary tuberculosis on the basis of a positive culture for M. tuberculosis. In 1985, 147 Class A aliens and 1,050 Class B aliens were screened; in all, four were confirmed cases, all among Class A aliens. Table 10 summarizes these data for the years 1972 to 1985.

Tuberculosis Mortality*

In 1984, there were 202 deaths in New York City with tuberculosis listed as either a primary or secondary cause of death, which is the criterion used for calculation of mortality rates since 1977. In 1985, there were 161 deaths due to tuberculosis. The crude death rates for these two years were 2.8 and 2.3 per 100,000 population. Tables 11A and 11B summarize the mortality data.

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* Deaths counted by the Bureau of Tuberculosis are at slight variance with those official numbers in the Summary of Vital Statistics for 1984-1985, issued by the Bureau of Health Statistics and Analysis.

INTERVENTION ACTIVITIES AND SPECIAL PROJECTS

CONTACT SUMMARY

Table 12 highlights the degree of success the TB program has had preventing future disease. Since it is widely known that infected contacts are among those at greatest risk of progressive disease, the greatest impact in reducing future disease can be made by identifying close contacts and starting them on a course of preventive treatment. In 1984 the complement of Public Health Advisors identified 3,152 contacts, for a contact index (the number of contacts identified per case interviewed) of 3.5 (3.7 in 1983). Of the contacts identified, 2,830 (90%) were examined, of whom 818 (29%) were found to be infected without disease. This compares with 3,075 (90%) examined in 1983, among whom 926 (28%) were determined to be infected without disease. In 1984, 513 (63%) of the infected contacts were started on preventive medication, which is identical to the proportions in 1982 and 1983. If infected contacts are not started on a course of preventive treatment, morbidity in New York will increase in the future. It is estimated that 5% (the national average) of the newly infected individuals who are not covered by isoniazid prevention will develop disease within the first two years of infection. An extensive discussion on this subject was included in the annual report for 1982.

DRUG RESISTANCE, PRIMARY AND ACQUIRED

Drug resistant disease must be approached as a multifactorial problem. One or more of the following factors will influence the outcome of treatment: (1) whether resistance is primary or acquired; (2) whether resistance is to one or multiple drugs; (3) whether patients are compliant.

Primary drug resistance among previously untreated individuals with tuberculosis is relatively rare both locally and nationally, although acquired drug resistance is a major problem in New York City which results from either a failure of the patient to take drugs regularly or from a failure of health-care providers to properly prescribe them. The Department of Health has initiated a program of direct supervision of patients using short-course and observed intermittent therapy to limit the occurrence of acquired resistance.

The Department of Health, through the Bureau of Tuberculosis Control and Laboratories, has participated in the Centers for Disease Control (CDC) Primary Drug Resistance Study for several years.

In all, 1,750 cultures among those with no prior history of treatment and 427 with a prior history have been examined by the CDC, of which 99 and 19, respectively, are from New York City. Resistance to ten anti-tuberculosis drugs was determined.

The highest primary resistance rate for New York City cultures among those with no prior treatment history was 10% for isoniazid while the resistance rate to any of the ten agents tested by the CDC was 5.6%. Although the number of cultures among patients with a prior treatment history is still small, 26% of all cultures tested nationally were resistant to one or more of those drugs as of October, 1984. For New York City cultures, 9 of 19 (47%) were resistant. Resistance to isoniazid in this group was 42% for New York City cultures and 22% nationally. Further study is required before definitive conclusions can be reached about these observations.

STUDY 21

The U.S. Public Health Service, through the National Centers for Disease Control, has selected three nationally recognized New York City municipal hospitals to participate in their therapy trial Study 21.

The primary purpose of this multicenter clinical trial is to compare the efficacy, toxicity, and acceptability of a six month regimen of isoniazid and rifampin supplemented with pyrazinamide for the first two months, with a control regimen of nine months of isoniazid and rifampin. All patients in the study have pulmonary tuberculosis. The secondary purpose of this trial is to determine the acceptability of supervised twice-weekly therapy for patients who fail to adhere to the self-administered daily regimens. Participants who are unreliable in self-administering medication will be switched to directly administered twice weekly therapy as recommended in the joint American Thoracic Society/Centers for Disease Control short course chemotherapy statement.

In all, 279 patients have been admitted to the study in New York City. Of these, 49 (18%) were subsequently found to be ineligible due to a negative, resistant, or atypical pretrial culture, prior therapy, drugs contraindicated, or the presence of other non-tuberculosis illnesses. Of the 230 eligible patients, 52 (23%) have withdrawn from the study. Of the remaining 178 patients, 58 (33%) are currently receiving therapy, of whom 28 (48%) are currently compliant. One hundred twenty (43%) of those entering the study have completed therapy and have entered the observation phase.

SUPERVISED THERAPY PROGRAM (STP)

Supervised tuberculosis therapy is designed to provide adequate therapy to those individuals who would otherwise not be able to obtain it due to a wide variety of social and psychological problems, such as alcoholism and homelessness. By employing outreach workers who present medicine to patients in their home, other places of residence, or on the street, the Department of Health has had significant success in treating this patient population, as is demonstrated by a 94% continuity of therapy index for 1984 and 1985 and an 82% bacteriology index (conversion of sputum) within 3 months.

Medical facilities throughout New York City are encouraged to refer tuberculosis patients meeting the criteria for STP admission to the Department of Health in order to initiate an evaluation and follow-up. The criteria for admission to the STP are:

1. frequently missed clinical appointments
2. drug resistance
3. mental incompetence
4. chronic alcoholism
5. failure to respond to therapy
6 continued positive bacteriology
7. failure to self-administer medication
8. more than two hospital admissions for TB
9. a living condition conducive to noncompliance

During 1984 and 1985, 305 patients were referred for supervision, of whom 114 (37%) were located and enrolled. This group represents those who are most difficult to manage and who have eluded proper clinic-based therapy for months or years.

Continuity and Completion of Drug Therapy

A major component of the Department of Health's responsibility is to render patients with disease noninfectious (conversion of positive sputum to negative) and to ensure that they remain noninfectious. This can now be accomplished in as few as nine uninterrupted months of therapy with regimens containing a core of isoniazid and rifampin. A measure of effectiveness as a control program is the percentage of enrolled patients who complete nine uninterrupted months of therapy. From the first quarter of 1979 through the last quarter of 1984, the proportions have varied from a low of 31% (January-March 1984) to a high of 76% (January-March 1981). The average for all individuals under continuous treatment is 54%. There are several reasons for such unacceptably low percentages of continuity of therapy. When patients begin to feel better after a few months of treatment they are much more difficult to motivate. In addition, patients with social problems such as alcoholism and homelessness present different motivational challenges. Direct supervision of therapy is one approach to solving problems of drug continuity. It has been shown, although on a limited basis here in New York, that with directly supervised therapy, patients can be expected to attain in excess of 90% completion (see the Supervised Therapy Program section of this report).

Tuberculosis patients generally must present in clinic monthly and ingest daily medicine. This arrangement allows for delinquency from clinic appointments and noncompliance with drugs of which the Department of Health may be unaware until weeks or months after the fact. By that time the opportunity for the patient to be continuous for therapy has already been lost.

Bacteriologic Conversion of Sputum

One of the objectives of the New York City Department of Health is that all individuals who are infected with disease and are able to transmit infection to others should be rendered non-infectious, provided the anti-tuberculosis agents prescribed are effective and the patients adhere to the regimen. With the current initial therapeutic regimen of isoniazid and rifampin for uncomplicated disease, over 75% of the cases reported with positive sputum should convert within three months and 95% within six months.

Unfortunately, due to a variety of reasons, these expectations have not been met. Take, for example, a typical cohort of 250 patients reported from July 1 to September 31, 1983, each with an initial positive sputum. At three months following their initial positive sputum, only 74 had documented evidence of sputum conversion. An accounting of the 176 without negative sputum yielded the following: (a) 101 patients had no additional sputums collected following the initial sputum collection; (b) 23 patients had a follow-up positive sputum, but no further sputums were obtained subsequent to the positive; (c) 37 patients were positive at three months; (d) 4 patients had specimens obtained that were not sputum; (e) 2 patients died; and (f) 9 patients had sputums pending. The large proportion who had no additional sputums collected makes it impossible to achieve the program objective of sputum conversion. For many years the Bureau has been striving to convince physicians of the importance of follow-up sputum collections to document conversion as a means of accurately monitoring the efficacy of therapy and to assure that the patient is *no longer communicable.*

Table 1
Tuberculosis Incidence
New York City, 1960-1985

Year	Number[1]	Rate[2] Per 100,000
1960	4,699	60.4
1961	4,360	56.0
1962	4,437	57.0
1963	4,891	62.9
1964	4,207	53.7
1965	4,242	53.3
1966	3,663	45.6
1967	3,542	43.6
1968	3,224	39.7
1969	2,951	36.4
1970	2,590	32.8
1971	2,572	32.6
1972	2,275	28.8
1973	2,101	26.6
1974	2,022	25.6
1975	2,151	27.2
1976	2,151	27.3
1977	1,605	21.1
1978	1,307	17.2
1979	1,530	20.1
1980	1,514	19.9
1981	1,582	22.4
1982	1,594	22.5
1983	1,651	23.4
1984	1,629	23.0
1985	1,843	26.0

1. Case definition revised in 1978 to reflect the inclusion of persons who had verified disease in the past and were discharged or lost to supervision for more than 12 months and have verified disease again.

2. Population based on 1960, 1970, and 1980 census. Linear extrapolation was used between intercensal years.

Table 2A

Tuberculosis Incidence Rates (per 100,000) in Males,
by Race/Ethnicity and Age
New York City, 1984

Race	Age 0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-64	65+	Total
White	0	0	0	2.6	5.5	9.2	20.0	17.4	24.1	16.4	12.3
Black	18.2	16.1	2.5	5.8	38.0	143.7	178.8	129.3	127.2	99.6	79.8
Hispanic	6.7	3.0	1.4	8.5	26.1	58.1	76.0	52.9	75.3	56.5	34.9
Asian	20.5	10.9	0	11.7	57.4	51.8	65.2	84.3	138.5	170.4	29.4
Total	8.3	6.1	1.0	5.0	19.2	48.4	72.1	62.2	50.7	32.5	34.1

Table 2B

Tuberculosis Incidence Rates (per 100,000) in Males
by Race/Ethnicity and Age
New York City, 1985

Race	Age 0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-64	65+	Total
White	3.5	2.4	0	4.4	2.7	14.9	23.0	24.4	21.4	20.2	14.9
Black	21.0	5.8	2.5	13.9	62.3	167.5	233.1	155.5	109.7	99.6	93.8
Hispanic	12.2	5.9	1.4	9.9	29.3	72.3	73.5	46.0	66.9	60.5	37.5
Asian	0	10.8	11.8	35.0	22.9	91.7	54.3	67.5	62.9	60.5	37.5
Total	11.3	4.8	1.5	9.7	23.1	61.1	85.9	57.3	43.1	36.4	39.2

Table 3A

Tuberculosis Incidence Rates (per 100,000) in Females,
By Race/Ethnicity and Age
New York City, 1984

Race	0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-64	65+	Total
White	0	1.3	0	.9	4.5	1.9	5.9	4.5	3.6	11.5	5.0
Black	18.3	5.9	4.9	7.7	40.3	48.5	37.9	26.2	25.7	44.7	28.5
Hispanic	7.0	1.5	1.4	4.1	12.1	13.1	10.2	17.4	20.7	46.4	11.9
Asian	0	0	0	49.0	103.6	55.2	63.4	35.2	100.9	63.5	49.3
Total	7.8	2.7	14.0	5.2	18.6	18.0	18.2	12.9	11.9	19.0	13.5

Table 3B

Tuberculosis Incidence Rates (per 100,000) in Females,
by Race/Ethnicity and Age
New York City, 1985

Race	0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-64	65+	Total
White	2.5	0	0	0	1.3	6.7	3.9	5.8	5.4	7.6	4.8
Black	22.6	8.8	1.2	11.0	47.3	53.0	41.9	33.3	38.6	42.1	32.5
Hispanic	1.4	3.1	2.9	6.8	17.5	16.8	22.4	24.1	12.4	29.3	13.9
Asian	10.5	0	25.1	24.5	51.8	66.2	51.9	52.8	25.2	114.4	46.7
Total	8.6	3.6	2.0	5.9	18.6	22.8	20.7	17.1	12.8	15.1	14.7

Table 4A

Tuberculosis Incidence Rates (per 100,000)
by Race/Ethnicity and Age, Sexes Combined
New York City, 1984

Race	Age 0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-64	65+	Total
White	0	0	0	1.8	4.9	5.6	12.8	10.6	12.8	13.4	8.4
Black	18.3	11.0	3.7	6.8	39.3	89.7	97.9	69.9	67.6	64.5	51.5
Hispanic	6.9	2.3	1.4	6.2	18.4	33.4	40.1	33.0	43.9	50.2	22.6
Asian	10.4	5.6	0	29.9	81.7	56.6	64.3	60.3	119.7	116.1	54.1
Total	8.0	4.5	1.6	5.1	18.9	32.4	43.4	35.4	29.0	13.6	23.0

Table 4B

Tuberculosis Incidence Rates (per 100,000)
By Race/Ethnicity and Age, Sexes Combined
New York City, 1985

Race	Age 0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-64	65+	Total
White	3.0	1.2	0	2.2	2.0	10.8	13.4	14.6	12.6	12.4	9.5
Black	21.8	7.3	1.9	12.5	53.9	102.5	123.4	85.0	66.9	62.9	59.9
Hispanic	6.9	4.6	2.2	8.3	22.9	41.9	45.6	33.8	35.6	41.1	24.9
Asian	5.2	5.6	18.3	30.0	38.1	78.5	53.2	60.3	44.1	154.9	52.8
Total	10.0	4.2	1.8	7.8	20.7	40.9	51.2	35.5	26.1	23.2	26.0

Table 5A

Tuberculosis Incidence Rates (per 100,000 Births) by Race/Ethnicity and Age
Children Under 5 Years Only
New York City, 1984

	Age in months					
	0-11 Rate (N)	12-23 Rate (N)	24-35 Rate (N)	36-47 Rate (N)	48-59 Rate (N)	Total Rate (N)
White	(0)	(0)	(0)	(0)	2.9 (1)	0.6 (1)
Black	28.6 (10)	26.1 (9)	5.8 (2)	9.0 (3)	9.3 (3)	15.9 (27)
Hispanic	6.1 (2)	24.9 (8)	(0)	3.3 (1)	(0)	7.0 (11)
Asian	(0)	(0)	24.8 (1)	28.5 (1)	(0)	10.0 (2)
Total	11.3 (12)	16.1 (17)	2.9 (3)	4.9 (5)	4.0 (4)	7.9 (41)

Denominator populations are the number of births to New York City residents 1980-1984

Table 5B

Tuberculosis Incidence Rates (per 100,000 births), by Race/Ethnicity and Age
Children Under 5 Years Only,
New York City, 1985

	Age in months					
	0-11	12-23	24-35	36-47	48-59	Total
	Rate (N)	Rate (N)	Rate (N)	Rate (N)	Rate (N)	Rate (N)
White	5.9 (2)	(0)	5.9 (2)	(0)	(0)	2.3 (4)
Black	37.2 (14)	20.0 (7)	11.6 (4)	8.7 (3)	9.0 (3)	16.0 (31)
Hispanic	18.7 (6)	(0)	6.3 (2)	3.1 (1)	3.3 (1)	6.2 (10)
Asian	(0)	(0)	22.2 (1)	(0)	(0)	4.6 (1)
Total	20.0 (22)	6.6 (7)	8.5 (9)	3.8 (4)	3.9 (4)	8.7 (46)

Denominator populations are the number of
births to New York City residents 1981-1985

Table 6

Age-adjusted Tuberculosis Incidence Rates
By Health District
New York City, 1980, 1984, and 1985

Borough	Health District	Rates per 100,000 Pop. 1985	1984	1980
Manhattan	1 Central Harlem	110.9	90.7	78.6
	2 East Harlem	31.3	41.9	27.5
	3 Kips Bay-Yorkville	9.5	12.4	9.9
	4 Lower East Side	73.6	70.9	68.3
	5 Lower West Side	33.8	45.2	34.6
	6 Riverside	30.4	22.5	27.9
	7 Washington Heights	30.4	24.1	26.5
	Mean	45.2	43.9	39.0
Bronx	1 Fordham-Riverdale	16.6	15.4	16.5
	2 Morrisania	51.8	42.6	31.4
	3 Mott Haven	32.5	26.6	28.8
	4 Pelham Bay	9.2	8.0	9.8
	5 Tremont	39.0	38.1	33.3
	6 Westchester	12.9	11.2	9.3
	Mean	22.7	20.2	18.4
Brooklyn	1 Bay Ridge	7.7	7.8	8.8
	2 Bedford	58.0	49.2	46.7
	3 Brownsville	38.9	28.8	21.4
	4 Bushwick	46.7	39.4	37.0
	5 Flatbush	29.6	18.9	18.2
	6 Fort Greene	56.7	43.2	55.2
	7 Gravesend	10.9	3.2	13.2
	8 Red Hook-Gowanus	18.4	23.7	24.2
	9 Sunset Park	11.6	13.4	15.8
	0 Williamsburg-GPT	29.9	29.4	27.0
	Mean	30.7	26.2	26.7
Queens	1 Astoria-L.I.C.	19.9	13.8	17.7
	2 Corona	25.1	26.0	13.5
	3 Flushing	8.3	7.0	10.3
	4 Jamaica East	27.4	23.6	17.8
	5 Jamaica West	19.9	15.7	8.6
	6 Maspeth-Forest Hills	5.2	5.9	5.7
	Mean	17.6	15.3	12.9
Staten Island	1 Richmond	6.4	3.8	7.3

Table 7A

Distribution of Age-Specific Tuberculosis
By Area of Birth, New York City, 1984

	Age Groups										
	0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-64	65+	Total
USA	37	15	7	15	70	260	266	169	166	173	1,178
Caribbean	1	2	1	5	18	69	50	34	27	22	229
S.E. Asia	0	1	0	1	2	6	5	0	0	1	16
East Europe	0	0	0	0	0	1	0	2	1	3	7
Indo/Pakistan	0	0	0	2	4	9	7	2	1	1	26
Central/South America	0	0	0	3	12	19	12	6	4	4	60
Other	0	2	0	4	8	26	22	10	15	26	113
Total Non-USA	1	5	1	15	44	130	96	54	48	57	451

Table 7B

Distribution of Age-Specific Tuberculosis By Area of Birth, New York City, 1985

	Age Groups										
	0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-64	65+	Total
USA	40	15	5	32	76	339	335	214	145	167	1,368
Caribbean	2	2	1	5	27	84	50	27	30	14	242
S.E. Asia	0	0	0	1	0	3	2	1	1	1	9
East Europe	0	0	0	0	0	1	1	2	2	2	8
Indo/Pakistan	1	0	0	2	2	12	3	0	0	1	21
Central/South America	0	2	2	3	9	19	13	6	2	6	62
Other	0	1	1	1	11	34	22	17	13	33	133
Total USA	3	5	4	12	49	153	91	53	48	54	475

Table 8

Newly Reported Tuberculosis Cases with
Disease Again (Reactivations) By Sex and Age
New York City, 1984 and 1985

SEX	Age and Calendar Year													
	1984	1985	1984	1985	1984	1985	1984	1985	1984	1985	1984	1985	1984	1985
	20-24		25-34		35-44		45-54		55-64		65+		Total	
MALE	0	2	9	10	13	17	9	11	9	8	6	8	46	56
FEMALE	2	2	4	5	3	4	0	1	0	0	1	3	10	15
TOTAL(%)	2	4	13	15	16	21	9	12	9	8	7	11	56	71

Table 9

Newly Reported Tuberculosis Cases With
Disease Again (Reactivation) By Borough of Residence and Age
New York City, 1984 and 1985

Borough of Residence	Age and Calendar Year													
	1984	1985	1984	1985	1984	1985	1984	1985	1984	1985	1984	1985	1984	1985
	20-24		25-34		35-44		45-54		55-64		65+		Total	
Manhattan	0	2	5	3	4	12	5	4	5	7	1	3	20	31
Bronx	0	0	2	3	1	2	1	2	1	0	2	2	7	9
Brooklyn	1	1	6	5	7	6	2	5	2	1	2	2	20	20
Queens	1	1	0	4	4	1	1	1	0	0	2	4	8	11
Staten Island	0	0	0	0	0	0	0	0	1	0	0	0	1	0
Total	2	4	13	15	16	21	9	12	9	8	7	11	56	71

Table 10

Aliens, Immigrants, and Refugees
1972-1985

	CLASS A				CLASS B				
Year	Number Screened	Started on Therapy	Percent on Therapy	Number Confirmed**	Number Screened	Started on Prevention*	Percent on Prevention	Number Confirmed**	Class A & B Total
1972	18	3	16.6	0	160	42	26.2	0	178
1973	119	38	32.0	0	968	192	19.8	0	1,087
1974	127	25	19.6	0	1,677	167	10.0	0	1,804
1975	170	23	13.5	0	1,210	273	22.5	0	1,380
1976	145	33	22.7	0	968	53	5.4	0	1,113
1977	129	7	5.4	3	1,129	46	4.0	0	1,258
1978	184	4	2.1	2	998	58	5.8	0	1,182
1979	129	10	7.7	4	786	34	4.3	0	915
1980	86	37	21.0	6	788	128	16.2	0	874
1981	124	10	8.0	2	700	52	7.2	1	824
1982	113	35	31.0	4	883	20	2.2	0	996
1983	52	11	12.0	5	774	6	0.7	0	826
1984	71	23	32.0	1	756	180	24.0	0	827
1985	147	72	49.0	4	1,050	62	6.0	0	1,197
Totals	1,614	331	20.5	31	12,847	1,313	10.2	1	14,461

*Only patients who warranted treatment are included. The others were found not to require treatment for tuberculosis.

**These were diagnosed to have TB according to C.D.C. criteria.

Table 11A

Tuberculosis Mortality
Primary and Secondary Causes
Reported Before or at Death
by Site of Disease
1984

Site of Disease	Primary		Secondary		Totals				
	Reported before Death	Reported at Death	Reported before Death	Reported at Death	Primary	Secondary	P & S	Reported before Death	Reported at Death
Pulmonary	131	9	27	1	140	28	168	158	10
Extra Pulmonary	30	4	0	0	34	0	34	30	4
Pleural	0	0	0	0	0	0	0	0	0
Lymphatic	0	0	1	0	0	0	0	0	0
Bone/Joint	0	0	0	0	0	0	0	0	0
Genitourinary	0	0	0	0	0	0	0	0	0
Miliary	21	1	0	0	25	0	25	21	0
Meningeal	9	0	0	0	9	0	9	9	0
Peritoneal	0	0	0	0	0	0	0	0	0
Total	161	13	27	01	174	28	202	188	14

Table IIB
Tuberculosis Mortality
Primary and Secondary Causes
Reported Before or at Death
by Site of Disease
1985

Site of Diseases	Primary: Reported before Death	Primary: Reported at Death	Secondary: Reported before Death	Secondary: Reported at Death	Totals: Primary	Totals: Secondary	Totals: P & S	Totals: Reported before Death	Totals: Reported at Death
Pulmonary	24	13	30	23	37	53	90	54	36
Extra Pulmonary	23	10	15	23	33	38	71	38	33
Pleural	1	0	2	0	1	2	3	3	0
Lymphatic	0	0	1	0	0	1	1	1	0
Bone/Joint	0	0	0	0	0	0	0	0	0
Genitourinary	0	0	0	0	0	0	0	0	0
Miliary	12	9	7	15	21	22	43	19	24
Meningeal	7	1	5	4	8	9	17	12	5
Peritoneal	3	0	0	4	3	4	7	3	4
Total	47	23	45	46	70	91	161	92	69

Table 12

Summary of Close Contacts Identified and Examined*

	1981	1982	1983	1984	1985 (6 mos.)
Identified	2827 (2.4/case)	3164 (3.0/case)	3310 (3.7/case)	3152 (3.5/case)	1719 (3.8/case)
Examined	2612 (92%)	2915 (92%)	3075 (90%)	2830 (90%)	1558 (91%)
Not Infected	1753 (67%)	1896 (65%)	2071 (70%)	1870 (66%)	1053 (68%)
Not Infected on Treatment	675	233	306	265	228
Infected without Disease	812 (31%)	929 (32%)	926 (28%)	818 (29%)	437 (28%)
Infected on Treatment	652	587	524	513	328
Infected with Disease	47 (1.8%)	53 (1.8%)	78 (2.6%)	142 (5.0%)	68 (4.4%)
Tuberculin Status Unknown	0 (0.0%)	37 (1.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)

*Contact index is based on those cases requiring contact investigation and not on all cases identified.

Tuberculosis Morbidity and Mortality Rates (per 100,000 Pop.)

New York City, 1960-1985

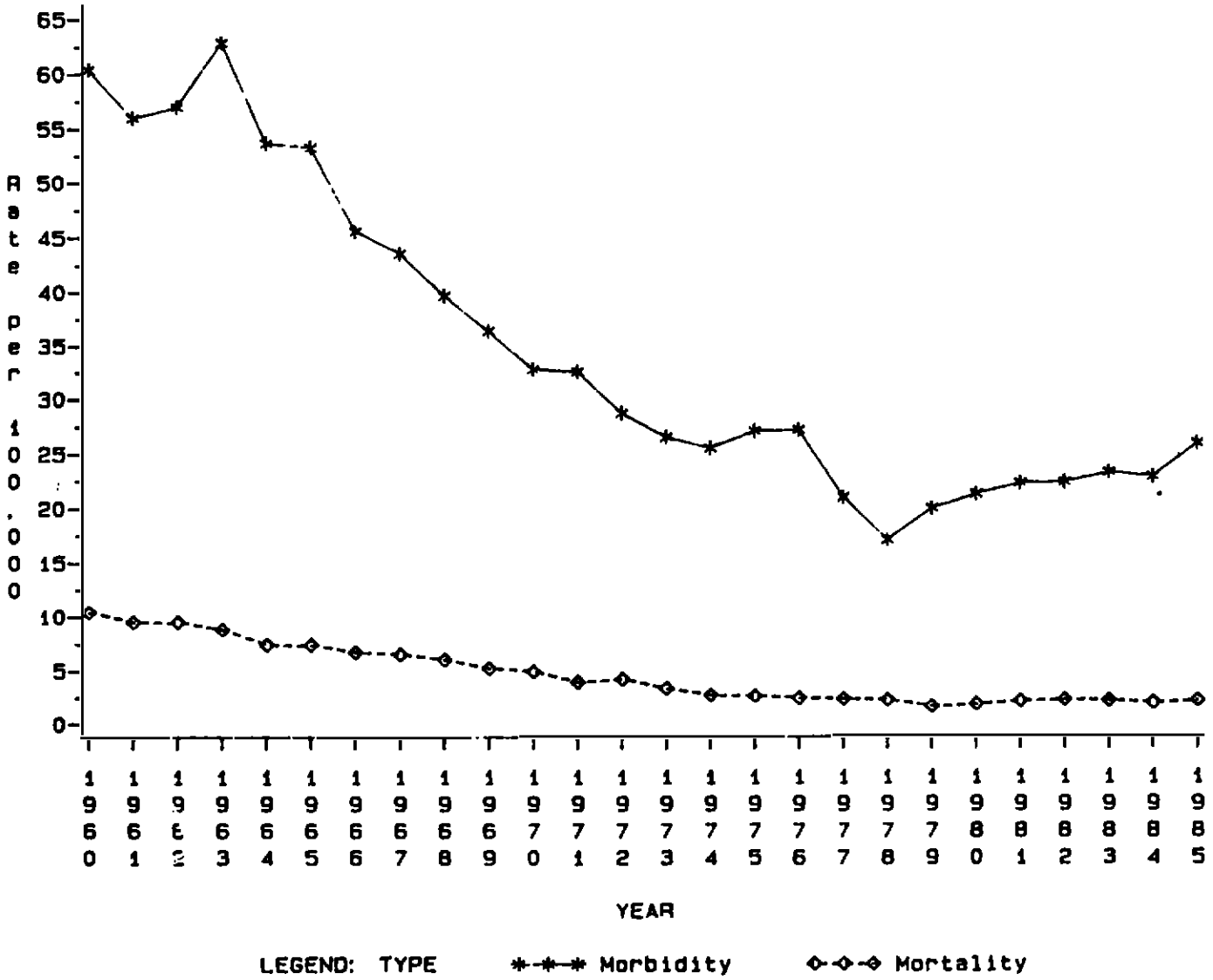


FIGURE 2A

Tuberculosis Rates in New York City, 1984

Rates per 100,000 Population, By Sex and Age

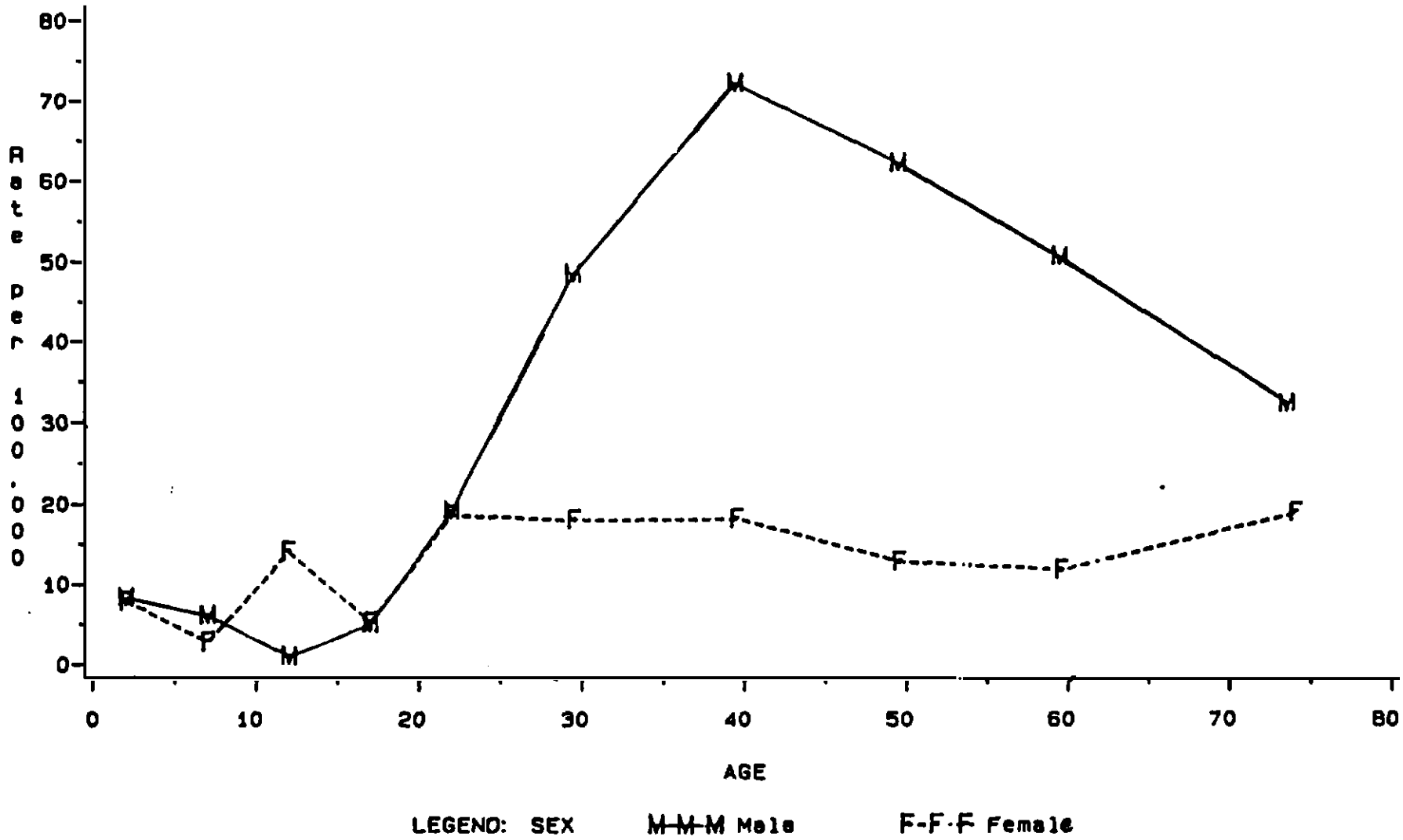


FIGURE 2B

Tuberculosis Rates in New York City, 1985

Rates per 100,000 Population, By Sex and Age

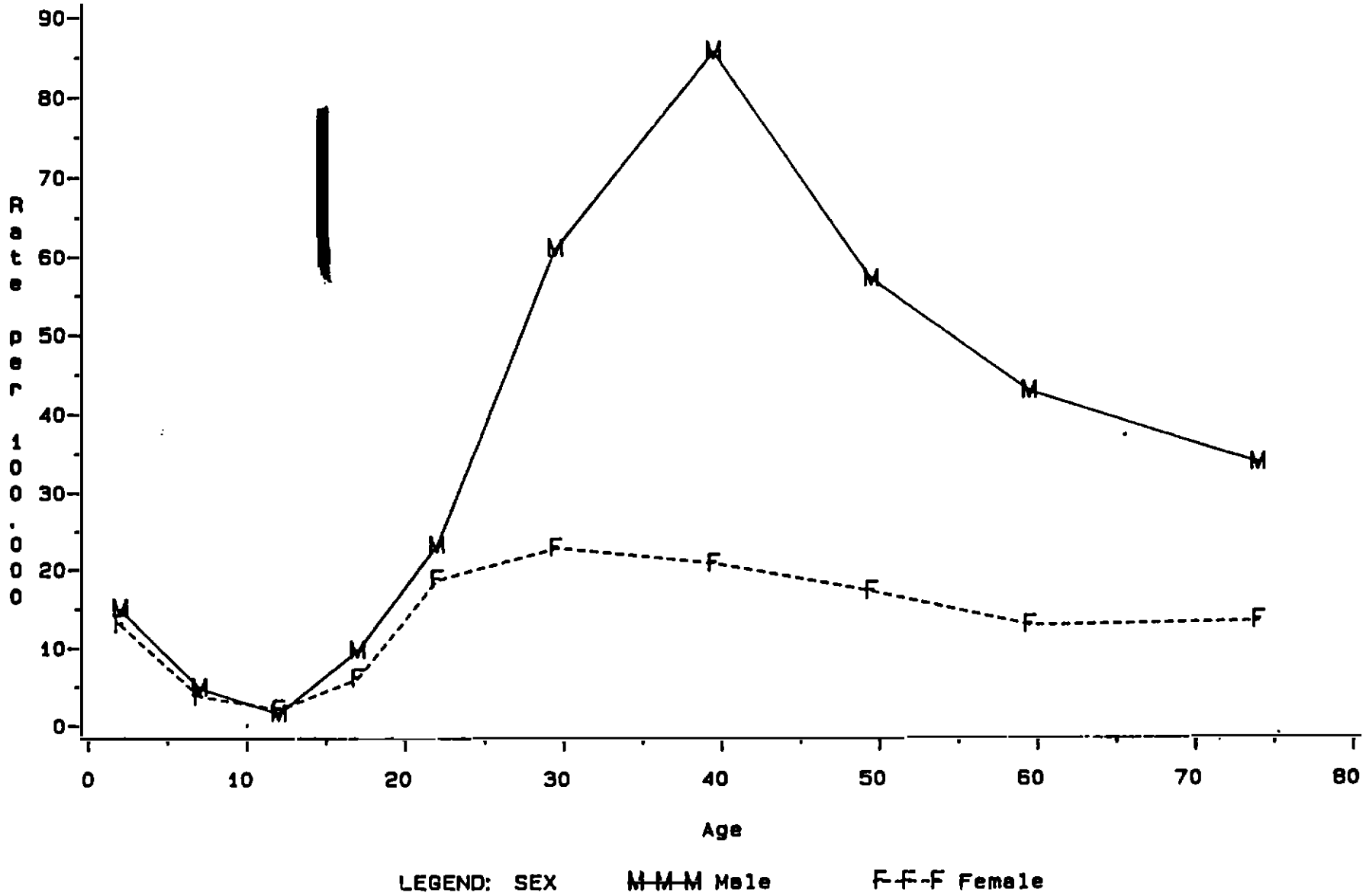


FIGURE 3

Tuberculosis Incidence per 100,000, New York City, 1979–1985

By Race

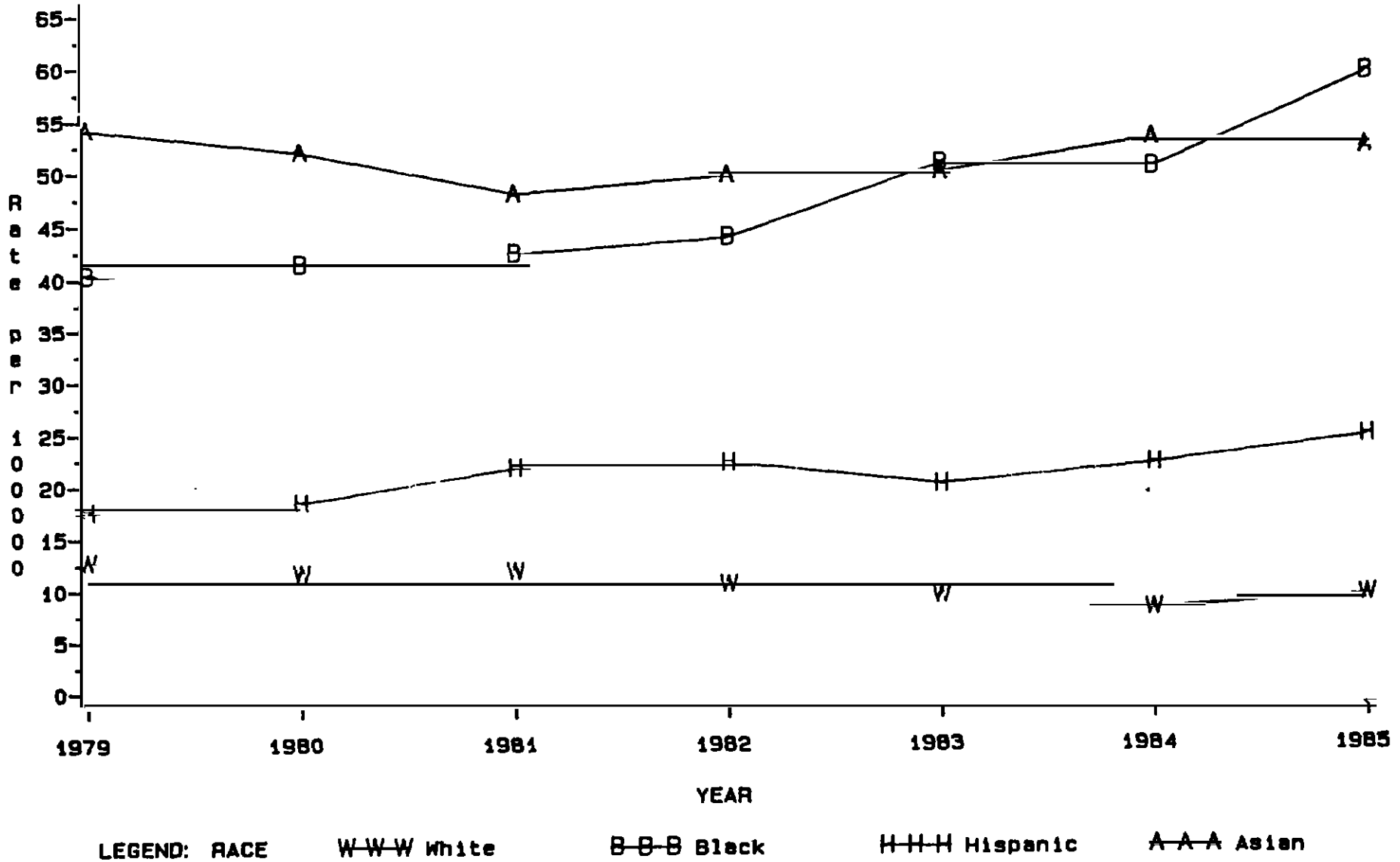


FIGURE 4

Tuberculosis Incidence per 100,000, New York City, 1979–1985

Males ages 25–44 only, by Race

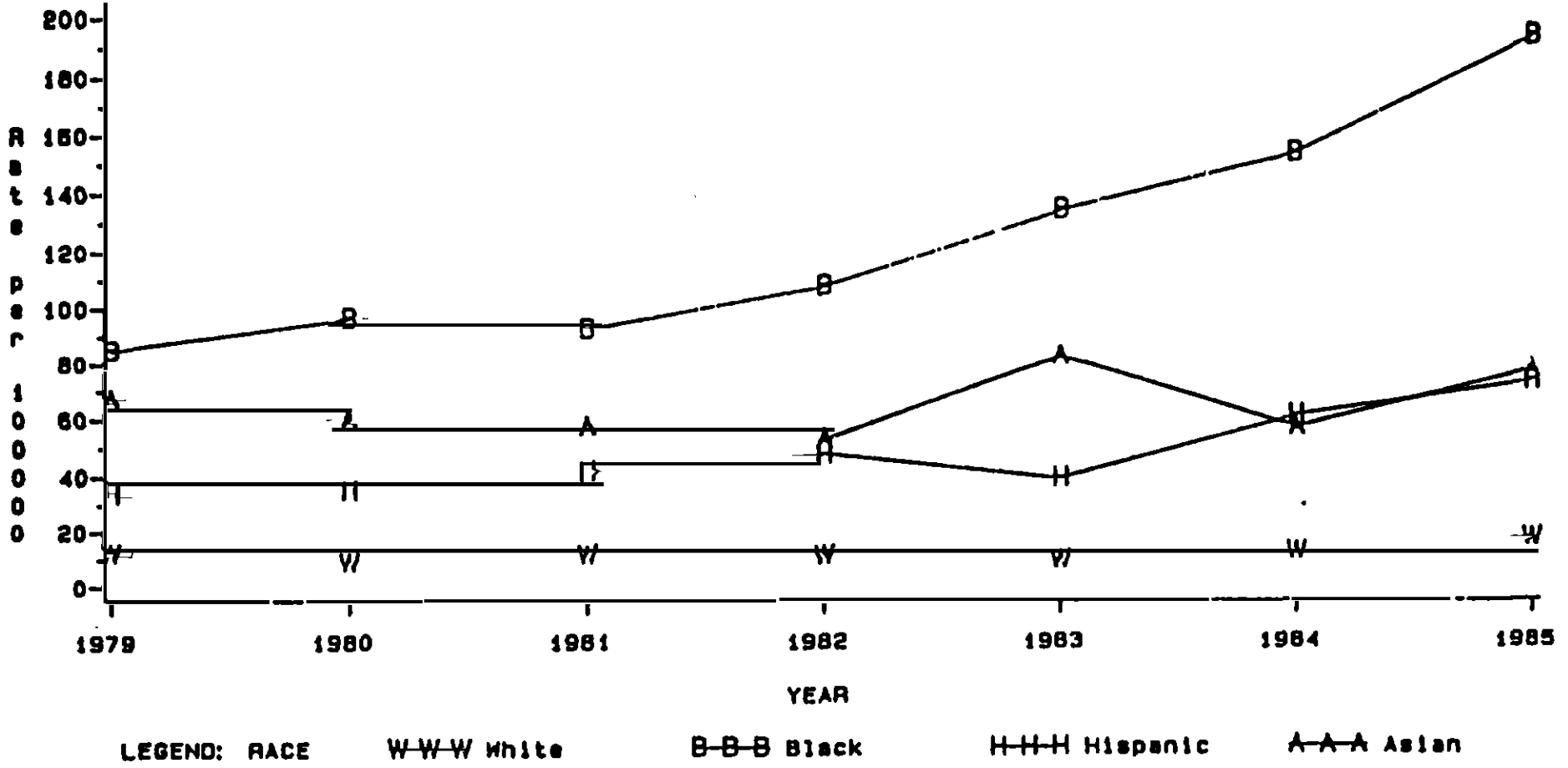
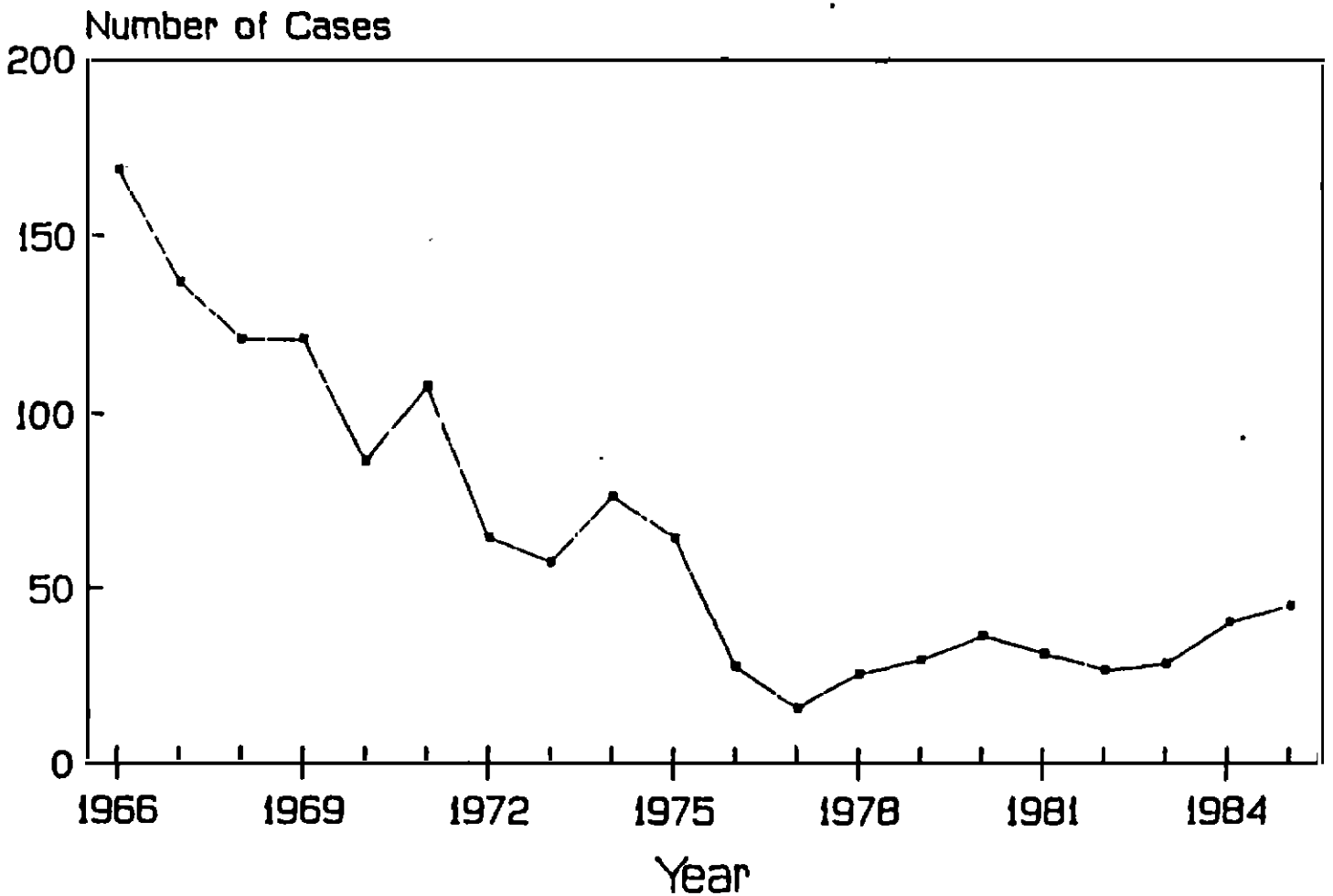


FIGURE 5

Cases of Tuberculosis in Children 0-4 1966-1985



RETURN TO
MARIE DORSAINVILLE