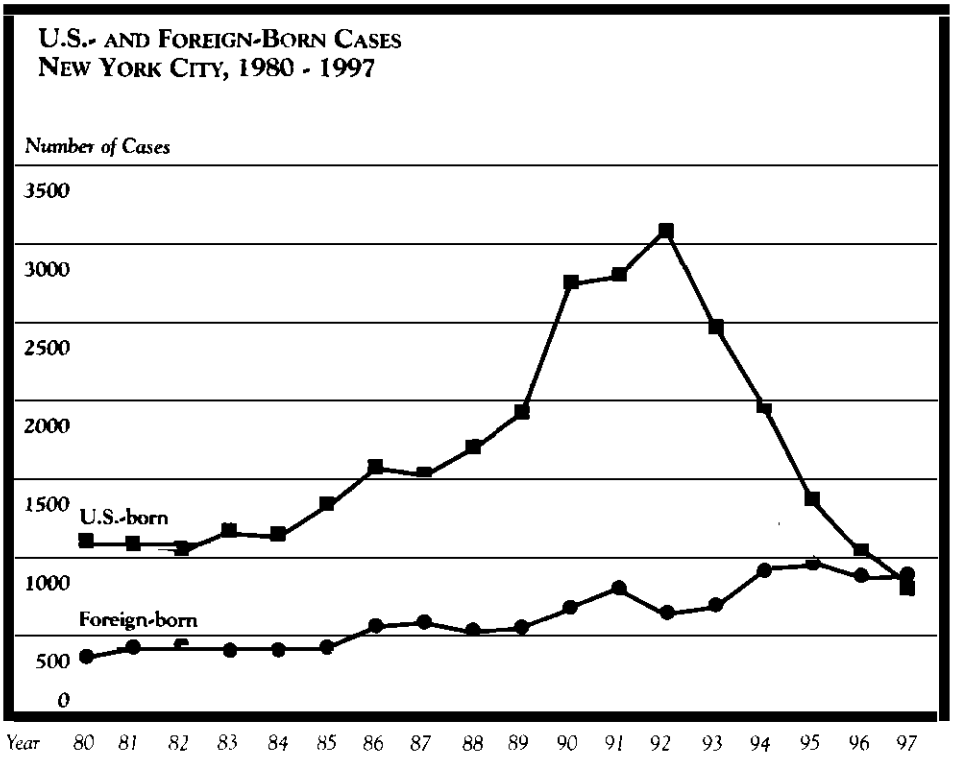
BUREAU OF TUBERCULOSIS CONTROL
NEW YORK CITY DEPARTMENT OF HEALTH



INFORMATION SUMMARY 1997

HIGHLIGHTS

1. In 1997, 1,730 new cases of tuberculosis were reported in New York City, a 15.7% decrease from the 2,053 cases reported in 1996 and a 54.6% decrease from the 3,811 cases reported in 1992, the peak of the current epidemic. New York City's tuberculosis rate in 1997 was 23.6 cases per 100,000 persons, compared with 28.0 in 1996 and 52.0 in 1992.

2. Despite recent progress, New York City's 1997 tuberculosis rate is still over three times the national rate, and is higher than that of any other reporting jurisdiction. The city's rate remains far above the national goal established for tuberculosis control by the year 2000, of 3.5 cases per 100,000 persons.

3. In 1997, 56 of New York City's tuberculosis patients had strains of *Mycobacterium tuberculosis* that were resistant to at least isoniazid and rifampin (the two most important medications available to treat tuberculosis), a 33.3% decrease from the 84 multidrug-resistant tuberculosis cases reported in 1996 and an 87.3% decrease from the 441 cases reported in 1992.

4. Directly observed therapy (DOT) and intensive case management continue to result in high rates of completion of therapy: of the cohort of patients diagnosed in 1996 who remained alive during treatment and did not move out of New York City 1,503 (93.2%) have completed treatment.

5. Improved case management and infection control procedures have reduced transmission of infectious tuberculosis and led to decreases in the diagnosis of active tuberculosis in settings where it was flourishing in 1992: homeless shelters, prisons and hospitals. As the epidemic has been brought under better control among persons born in the United States, an increase has been observed in the proportion of total cases that are foreign born. In 1997, among cases with known country of birth, the number of foreign-born cases surpassed the number born in the United States for the first time: 884 of 1997 cases were foreign-born (51.9%) and 820 U.S. born (48.1%). In contrast, in 1992, only 17.7% of tuberculosis cases diagnosed in New York City were foreign born.

6. The proportion of total cases who are infected with the Human Immunodeficiency Virus was somewhat lower in 1997 than in previous years: 448 (25.9%) of 1997 cases were known to be HIV positive, compared with 633 (30.8%) of 1996 cases.

7. To reduce the burden of tuberculosis on future generations of New Yorkers, the Department of Health and the medical community must place greater emphasis on ensuring that persons infected with *Mycobacterium tuberculosis*, but without active disease, complete a course of preventive therapy, especially if they are recently infected contacts to active cases or otherwise at high risk for progression to active disease. The rate of completion of preventive therapy among those who started preventive therapy in 1996 illustrates the magnitude of the challenge that lies ahead: 62.4% of persons who started preventive therapy in 1996 are known to have completed.

Public health law mandates that health care providers report two groups to the New York City Department of Health within 24 hours of detection:

1. All suspected and confirmed tuberculosis cases
2. All children younger than 5 years with positive tuberculin skin tests

Health care providers must also report contacts to active cases of tuberculosis.

Mycobacteriology and pathology laboratories are required to report to the New York City Department of Health any findings that suggest or confirm tuberculosis.

Information on ordering reporting forms is on the inside back cover.

NEW YORK CITY DEPARTMENT OF HEALTH
BUREAU OF TUBERCULOSIS CONTROL

INFORMATION SUMMARY: 1997

MISSION STATEMENT

The mission of the Bureau of Tuberculosis Control is to prevent the spread of tuberculosis and eliminate it as a public health problem in New York City. There are two main goals of the tuberculosis control program:

1 To identify all individuals with suspected or confirmed tuberculosis disease and ensure their appropriate treatment, ideally on a regimen of directly observed therapy.

2 To ensure that individuals who are at high risk for progression from infection to active disease (e.g., contacts of active cases, immunocompromised individuals, recent immigrants from areas where tuberculosis is widespread) receive preventive treatment and do not develop disease.

The Bureau achieves its goals through direct patient care, education, surveillance, and outreach. Mandated activities include

1 Ensuring that suspected and confirmed cases of tuberculosis identified in all facilities in New York City are reported to the Bureau and documented on the computerized, confidential tuberculosis disease registry;

2 Conducting intensive case interviews and maintaining an effective outreach program so that tuberculosis cases remain under medical supervision until completion of a full course of treatment;

3 Monitoring and documenting the treatment status of all individuals with active tuberculosis;

4 Setting standards and guidelines, and providing consultation, on the prevention, diagnosis, and treatment of tuberculosis infection and disease in New York City;

5 Ensuring that all identified contacts to active cases receive appropriate follow up;

6 Operating chest clinics throughout New York City to provide state-of-the-art care free to persons with suspected or confirmed tuberculosis disease and their close contacts in accordance with New York State Public Health Law 2202, Article 22, Title 1.

OVERVIEW OF ACTIVITIES
BUREAU OF TUBERCULOSIS CONTROL

The Bureau of Tuberculosis Control operates a multifaceted program that integrates clinical services, outreach services, directly observed therapy, epidemiology and surveillance, and education and training. To ensure that treatment for tuberculosis meets acceptable standards, the Bureau monitors care received by every patient diagnosed with active tuberculosis in New York City, regardless of whether the patient receives treatment in a Department of Health clinic. The Bureau's activities are directed toward meeting objectives established by the Centers for Disease Control and Prevention for treatment of patients with tuberculosis and prevention of tuberculosis in persons infected with the causative organism, *Mycobacterium tuberculosis* (see Appendix 1 for a list of these objectives). Program monitoring and evaluation are critical components of the Bureau's activities. Internal reports monitor trends and identify problems on a timely basis. Bureau staff use Continuous Quality Improvement, breakthrough projects, and audits to review problems, propose changes for improvement, and monitor progress following the implementation of changes.

Directly Observed Therapy

Directly observed therapy (DOT) is a program in which individuals with active tuberculosis ingest their medication under the direct observation of a trained health care worker. This program ensures that persons with active disease receive individual attention and optimal medical supervision through their entire course of treatment. DOT is provided through Department of Health (DOH) clinics and outreach services, and private providers funded by the New York State Department of Health, Medicaid, and Ryan White Care Act Funds. Although it is labor intensive, DOT reduces hospitalizations, decreases the costs of medical care, and increases the number of individuals completing a full course of antituberculosis treatment. DOT is now the standard of care for individuals with tuberculosis.

Clinical Services

The Clinical Services Unit operates ten chest clinics located throughout the City (see inside back cover). These clinics provide specialty care, including DOT, for individuals with active tuberculosis. The clinics also provide preventive therapy, especially to individuals at high risk for developing tuberculosis. Services include tuberculin skin testing, chest x-rays, sputum induction, blood tests, medical and nursing care, medications, social services, and HIV counseling and testing. All care is confidential, state-of-the-art, and free of charge to the patient.

In 1997, the Bureau's chest clinics provided care to 2,950 patients with confirmed or suspected tuberculosis. The Bureau has led the drive to implement effective preventive therapy programs for persons infected with tuberculosis in New York City: 72.4% (7,931/10,954) of all persons who started preventive therapy in 1997 did so at Department of Health Chest Clinics. Of 1,730 patients who were diagnosed with tuberculosis in 1997, 672 (38.8%) received some or all of their care in the Bureau's chest clinics. These clinics provided care to a high proportion of patients with multidrug-resistant tuberculosis: of the 95 cases with multidrug-resistant tuberculosis prevalent in December 1997, 41 (43.2%) had received some or all of their treatment at Bureau chest clinics. A large proportion of patients served by these clinics were foreign born or uninsured. Of the 50,374 seen in 1997 for curative, preventive, or evaluative care, 65.6% were foreign born while 50.1% of patients with confirmed or suspected tuberculosis and 67.6% of patients receiving preventive therapy were without Medicaid or any other insurance.

Outreach Services

The Bureau's outreach workers educate, interview, and monitor hospitalized patients and outpatients; evaluate contacts of individuals with tuberculosis disease and ensure appropriate medical follow-up of contacts; and update patient information on the Bureau's citywide tuberculosis registry. Outreach staff provide medical case management, locate and return patients to medical care, travel throughout the city to observe individuals as they ingest their medication, and test contacts of individuals with tuberculosis. Specialized outreach groups offer tuberculosis control services at the 30th Street Shelter, at Rikers Island Correctional Facility, and at single-room occupancy hotels in Manhattan and the Bronx. The city operates a controlled treatment center at Goldwater Memorial Hospital for use when all other efforts have been exhausted, so that the most difficult-to-treat patients

can complete a full course of treatment while the public health is safeguarded.

In 1997, outreach workers were responsible for providing DOT in the residences, places of employment, or other meeting places of 862 tuberculosis patients who could not attend clinic on a regular schedule, and for returning to clinical care an average of 33 patients per month who had become non-adherent to therapy or who missed clinic appointments. Bureau outreach workers are playing an important role in efforts to increase completion of preventive therapy among patients at high risk for disease progression. They are instrumental both in interviewing patients to elicit the names of contacts, and in ensuring that contacts are appropriately evaluated and referred for medical care, if indicated.

The magnitude of the effort required to evaluate contacts to all potentially infectious tuberculosis cases is not captured by considering only confirmed tuberculosis cases: outreach workers must interview every patient who is initially reported to the Department of Health with a sputum smear positive for acid-fast bacilli (AFB). In New York City, 44.8% of the patients initially reported to the Department of Health in 1997 with AFB-positive sputum smears were eventually found to be infected with a mycobacterium other than *Mycobacterium tuberculosis*. Thus, in 1997, outreach and clinic workers were assigned to interview 539 patients suspected to have tuberculosis on the basis of positive sputum AFB smears but eventually found not to have tuberculosis.

In 1997, outreach staff visited over 75 hospital and community clinics to educate staff about the importance of reporting preventive therapy initiation and completion. This effort resulted in 95 non-DOH clinics reporting preventive therapy activities to the Department of Health.

Epidemiology and Surveillance

The Surveillance and Central Registry staff ensures that all data reported to the Bureau are entered into a computerized tuberculosis registry. In addition to entering demographic and clinical data for the 1,730 confirmed cases reported in 1997, Central Registry staff entered data for 3,405 persons with suspected tuberculosis who were never confirmed as cases. Surveillance staff review the medical records of individuals with suspected tuberculosis and no bacteriologic evidence of disease to help determine whether such persons should be considered confirmed cases on the basis of clinical or radiographic findings: in 1997, surveillance workers reviewed medical records for 1,375 suspected cases, and their efforts contributed to the confirmation of tuberculosis disease in 329 patients who had no bacteriologic evidence of tuberculosis. A survey of pathology laboratories conducted by surveillance staff in 1997 showed that there was some under-reporting of patients with biopsy findings suggestive of tuberculosis; expanded surveillance of pathology laboratories will continue in 1998. Surveillance staff also ensure that reporting is done in a timely and thorough manner by auditing laboratories throughout the City, and they help investigate possible instances of laboratory contamination.

Registry data are routinely analyzed by the Surveillance and Epidemiology staff to identify outbreaks, trends, and possible laboratory contamination, and to research issues of clinical and operational importance. In 1997, epidemiology staff conducted 16 investigations to determine whether infectious tuberculosis patients had infected contacts in schools or workplaces. Surveillance and epidemiology staff investigated approximately 115 cases that had been confirmed but that had questionable bacteriologic findings; they identified 32 patients whose positive *Mycobacterium tuberculosis* cultures had resulted from laboratory contamination, and informed the medical providers of those patients that further evaluation was warranted and that medical treatment for tuberculosis might be unnecessary.

Education and Training

In addition to conducting orientation and on-going in-service training for Department of Health (DOH) staff and non-DOH professionals, the Education and Training staff educates the public about tuberculosis. During 1997, the unit provided 3,300 training sessions for DOH staff; seminars and conferences for 350 non-DOH professionals, including a conference on Preventive Therapy for Tuberculosis, attended by over 200 health care workers; educational sessions for 14,600 members of the general public; and 2,200 responses to telephone inquiries. We also develop and distribute educational brochures, flyers, posters, publications, videos, and technical articles in

English and various foreign languages. In 1997, 371,000 such publications and materials were distributed.

METHODS

Case Counting

Cases counted in 1997 were those verified during that year and reported to the Centers for Disease Control and Prevention (CDC) as confirmed cases. Only clinical and demographic characteristics of cases are reported to the CDC; no case identifiers are provided.

Some 1997 cases were first suspected of having disease in 1996; likewise, some individuals first suspected of having tuberculosis in late 1997 will be counted in 1998 if active tuberculosis is confirmed in 1998. Individuals who submitted a specimen for mycobacteriology culture in late 1997 were included in the 1997 count if their culture was reported to be positive for any species in the *Mycobacterium tuberculosis* complex (*M. tuberculosis*, *M. bovis*, *M. africanum*, *M. microti*) by January 31, 1998. A certain proportion of each year's counted cases are not culture confirmed. These cases never had a positive culture for *Mycobacterium tuberculosis* and were instead verified because their clinical symptoms and/or radiographic signs improved while they were on anti-tuberculosis medications. More complete identification and verification of tuberculosis among persons without bacteriologic confirmation of disease has, in recent years, led to some surveillance artifact when longitudinal trends are considered. This is especially true of tuberculosis cases in children, who tend to be culture-negative. It is expected that cases that are counted and reported to the CDC on the basis of a rapid diagnostic test (e.g., *Mycobacterium tuberculosis* direct tests such as *GEN-PROBE® AMPLIFIED™ Mycobacterium tuberculosis* Direct Test or *ROCHE® AMPLICOR™ Mycobacterium tuberculosis* [PCR] Test) will be confirmed by a positive *Mycobacterium tuberculosis* culture; if, after investigation, cases without bacteriologic confirmation are found to have no clinical or radiographic evidence of tuberculosis disease, they are removed from the list of cases reported for the year.

Rate Calculation

This report uses 1990 census figures for New York City to calculate case rates per 100,000 population. Case rates from years before 1991 were based on the 1980 census. Rates for racial/ethnic and age groups are based on numbers given in the census. According to the 1990 census, the total New York City population of "Asians and other" is 528,879 and includes 18,924 persons of "other" race/ethnicity; in reports published by the Bureau of TB Control since 1991, the figure of 528,879 is used to calculate rates among Asians in New York City.

Age-adjusted case rates are provided in the section of the report on the geographic distribution of cases. Age standardization is a numerical technique that adjusts age-specific observed rates in population groups to a standard population age distribution so that different populations can be compared. Age standardization of the rates removes age differences between populations as a possible explanation for the differences in rates.

Since denominators used to calculate rates are derived from the 1990 census, rates included here do not reflect the significant numbers of immigrants who have entered New York City since 1990. Therefore, whenever possible, absolute numbers as well as crude and/or age-adjusted rates are compared.

In comparisons of U.S.-born cases with foreign-born cases, persons from Puerto Rico, the U.S. Virgin Islands, and all U.S. territories are considered U.S. born. Ascertainment and reporting of place of birth have improved in the past three years, accounting for part of the increase in reported foreign-born cases since 1990.

Analysis by Race/Ethnicity

Information on race/ethnicity is based on patient self-report and categorized as White, Black, Hispanic, or Asian. In the past, collecting information on race/ethnicity facilitated the identification of increasing tuberculosis trends among Asians and alerted the Bureau of Tuberculosis Control of the need for intensified outreach in this community. Analyzing this information also helps to document the need for staff who speak languages other than English.

Analysis by Geographic Area

The Bureau of Tuberculosis Control occasionally receives requests from other health agencies and community-based organizations for data aggregated by geographic areas other than health districts. In the text of this report, data are presented by health districts; included in Appendix 2 is a table presenting 1997 cases by zip codes, which may be aggregated to yield numbers of cases for United Hospital Fund neighborhoods and other geographic areas.

Reporting Requirements

It is the timely and complete reporting of cases by medical providers throughout the city that makes it possible for the Bureau of Tuberculosis Control to analyze trends and improve case management. New York City Health Code section 11.03 (a) requires written reports to the New York City Department of Health, within 24 hours, of all suspected and confirmed cases of tuberculosis; of children under five years with positive tuberculin skin tests; and of the results of laboratory bacteriologic examinations that suggest or confirm tuberculosis.

Physicians are also required to test (or refer to the Department for testing) household contacts of cases and to notify the Department of the test results or referrals. Further, the Department may require household and non-household contacts to be tested and re-examined as needed. Physicians are also required to report when a "case" ceases to receive anti-tuberculosis treatment and the reason for the cessation, as well as any other information required by the Department. Information on ordering reporting forms is included on the back cover of this report.

Introduction

(Table 1, Figure 1)

This report presents information on the demographic and clinical characteristics of tuberculosis cases confirmed in New York City in 1997 as well as on efforts to increase completion of preventive therapy by persons infected with the organism that causes tuberculosis.

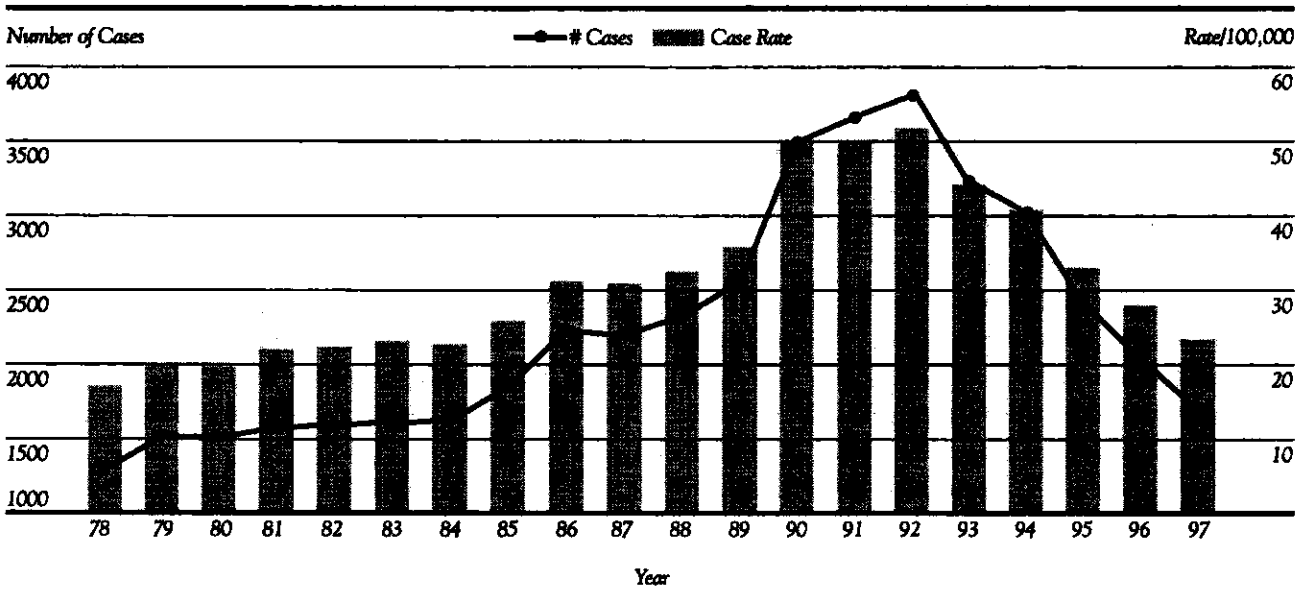
In 1997, the number of tuberculosis cases confirmed in New York City declined for the fifth consecutive year, to a total of 1,730. This is a 15.7% decrease from the 2,053 cases reported in 1996. Using the population recorded in the 1990 census as a denominator, the city's 1997 tuberculosis case rate is 23.6 tuberculosis cases per 100,000 persons, compared with a rate of 28.0 recorded in 1996. Using an estimate of the city's 1997 population did not change the overall rate.

The lowest number of tuberculosis cases ever recorded in New York City (1,307) was in 1978 when there was a case rate of 17.2 per 100,000. For 14 years after 1978, the number of cases rose fairly steadily, to peak in 1992 at 3,811 cases and a rate of 52.0 per 100,000. The number of cases reported in 1997 is 54.6% lower than the number reported in 1992. The drop in culture-confirmed cases between 1992 and 1997 is even more dramatic: the number of culture-confirmed cases reported in 1997 (1,401) is 59.3% lower than the number reported in 1992 (3,442).

New York City's recent tuberculosis epidemic started approximately six years before the nationwide epidemic. Fueled by increasing numbers of tuberculosis cases in New York City and other major urban centers, the national epidemic started in 1986 and peaked at 26,673 cases in 1992, yielding a national case rate of 10.5 per 100,000 population. Between 1992 and 1997, the number of cases nationally decreased by 6,818, to 19,855 cases in 1997. With 2,081 fewer cases in 1997 than in 1992, New York City contributed 30.5% to the national decrease in tuberculosis between those years.

While New York City has made great progress in its struggle against tuberculosis over the past five years, the number of cases reported in the city in 1997 is still 32.4% higher than the number reported in 1978. New York City's 1997 rate of 23.6 tuberculosis cases per 100,000 population is 3.2 times the national rate of 7.4 per 100,000 and higher than that of any other reporting jurisdiction in the country. In 1997, New York City contributed 8.7% of the nation's total 19,855 reported tuberculosis cases. In order for the nation as a whole to reach the goal set for tuberculosis control by the year 2000 (3.5 cases per 100,000

Figure 1
Tuberculosis Cases and Rates
New York City, 1978 - 1997



population), the campaign against tuberculosis must be maintained, especially by New York City and other major urban centers.

New York City has in recent years essentially experienced two tuberculosis epidemics, one among persons born in the United States, among whom infection with HIV and various social problems have been important contributing factors, and the other among foreign-born persons who come to the United States from countries with high rates of tuberculosis. In 1997, the proportion of tuberculosis cases known to be HIV infected (25.9%) was lower than that recorded in recent years (for example, 30.8% in 1996). This decrease was limited to U.S.-born cases; the percent of HIV infected foreign-born cases increased slightly. In 1997, for the first time, among cases with a known country of birth, the proportion of foreign-born tuberculosis cases exceeded the proportion of U.S.-born cases. The trend toward a higher proportion of female cases continued, from 27.8% in 1986 to 39.0% in 1997. Assuring that women have adequate access to tuberculosis control services is essential to meeting their health needs as well as to maintaining effective control over tuberculosis among children, who may be more likely to have contact with care-givers who are women.

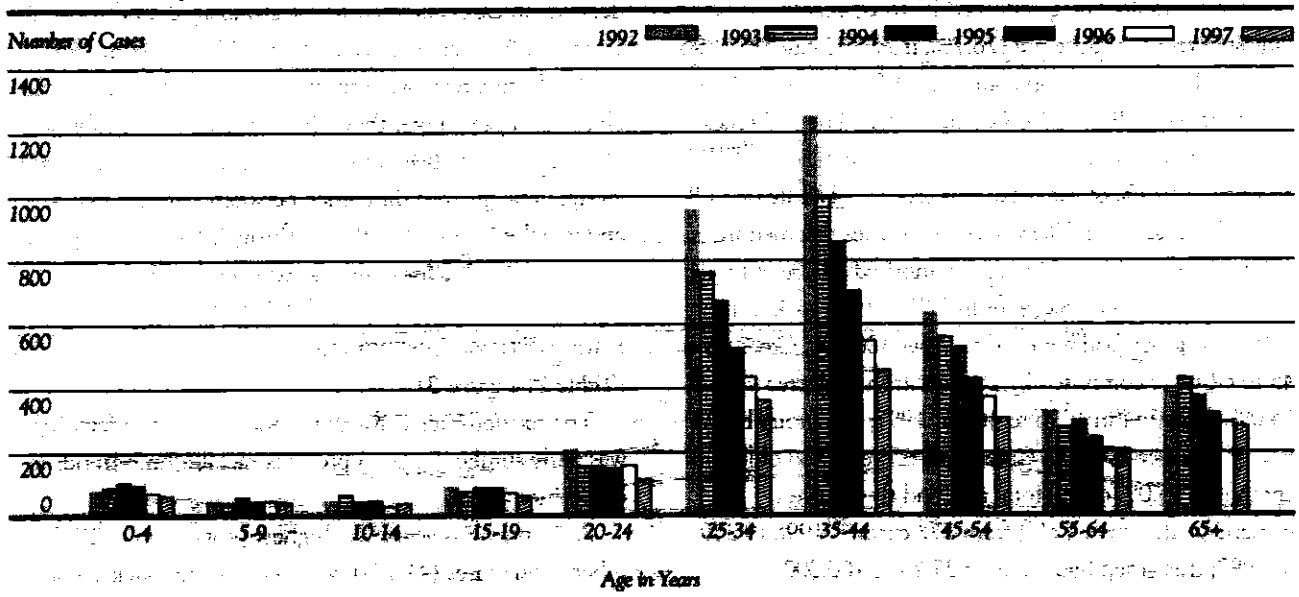
The first step in controlling the tuberculosis epidemic—ensuring the complete treatment of infectious cases—has been taken. If the city is to further reduce the future burden of tuberculosis, it is important to offer preventive therapy to persons who became infected with *Mycobacterium tuberculosis* through their exposure to active cases during the recent epidemic, and to others who are infected with *Mycobacterium tuberculosis* and at high risk for progression to active disease. The final section of this report analyzes the status of preventive therapy programs in New York City in 1997.

Age Distribution
(Table 2, Figure 2)

In 1997, people with active tuberculosis ranged in age from less than one year to 100 years old. Tuberculosis case rates were highest in the group aged 35 through 44 years (38.7 per 100,000) and lowest in the group aged 5 through 9 years (3.9 per 100,000). All age groups, except that consisting of persons aged 10 through 14 years, had fewer tuberculosis cases in 1997 than in 1996. Please see Figure 2 for a description of cases by age group since 1992. Table 2 presents cases and case rates by age group, race/ethnicity, and sex in 1997.

In areas where tuberculosis is well controlled, a higher

Figure 2
Tuberculosis Cases by Age
New York City, 1992 - 1997



proportion of cases tend to be elderly. An increase in the proportion of younger cases suggests that tuberculosis control efforts may be disintegrating. In New York City, the proportion of tuberculosis cases aged younger than 65 years increased from 78.9% in 1978 to 90.4% in 1992, while overall tuberculosis rates rose from 17.2 per 100,000 in 1978 to 52.0 cases per 100,000 in 1992. After 1992, when tuberculosis control efforts increased, the proportion of cases in the group aged younger than 65 years fell to a 1997 level of 85.0%, as overall tuberculosis rates decreased.

The 66 cases that occurred in 1997 among children younger than 10 years represent 3.8% of total cases. The incidence of tuberculosis in this age group declined by 22.4%, from 85 cases in 1996, to yield a 1997 rate of 6.8 per 100,000. Within the past three years, surveillance to identify culture-negative pediatric tuberculosis cases has increased in New York City. Thus, the decrease in tuberculosis among younger children, who are regarded as sentinel cases, is particularly encouraging, as it suggests a decline in recent transmission of tuberculosis.

The group aged 10 through 14 years experienced a 42.9% increase in cases from 1996 to 1997, from 14 to 20 cases, and had a 1997 rate of 4.4 per 100,000; children in this age group are especially vulnerable to progression to active disease, as are children younger than five years. Cases among older adolescents, aged 15 through 19 years, decreased by 17.2% between 1996 and 1997, from 58 to 48; this group had a case rate of 10.2.

Among adults, the group aged 20 to 24 years had the largest percentage decrease (28.7%, from 136 cases in 1996 to 97 in 1997); this group comprised 5.6% of the total and had a rate of 16.8 per 100,000 population. The 340 cases that occurred among persons aged 25 through 34 years comprised 19.7% of the total; this group had a rate of 24.8 and a decrease of 18.5% from the 417 cases recorded in 1996. Cases aged 35 to 44 years comprised 25.0% of total cases and decreased 18.0%, from 527 in 1996 to 432 in 1997; this group had a rate of 38.7 per 100,000. Cases aged 45 to 64 years comprised 27.1% of total and decreased 14.0%, from 544 in 1996 to 468 in 1997; this group had a rate of 33.0 per 100,000. Cases aged 65 years and older comprised 15.0% of the total and had the smallest percentage decrease, 4.8%, from 272 cases in 1996 to 259 in 1997; this group had a rate of 27.2 per 100,000.

The age distribution of the 884 foreign-born cases resembled that seen among U.S.-born cases: 745 (84.3%) of foreign-born cases were younger than 65 years and 139 (15.7%) were 65 years and older, compared with 703 (85.7%) of U.S.-born cases younger than 65 years and 117 (14.3%) 65 and older. Of foreign-born cases, the largest proportion was in the group aged 25 to 34 years (22.7%, 201 cases) and of U.S.-born cases the largest proportion was in the group aged 35 to 44 years (27.7%, 227 cases).

Distribution by Sex
(Table 2)

As in previous years, the incidence rate of tuberculosis among males in 1997 was approximately twice the incidence rate among females: 30.7 per 100,000 among males vs. 17.3 per 100,000 among females. In 1997, as in four of the past five years, the annual decrease in tuberculosis cases was smaller among females than among males: from 1996 to 1997 cases declined 14.0% among females and 16.8% among males. The proportion of cases who are female has increased gradually but steadily from 27.8% in 1986 to 39.0% in 1997. It will be important to investigate reasons for this trend, including possible associations with trends in new HIV infections and with trends in immigration.

Among adult males, the greatest percentage decrease in cases between 1996 and 1997 occurred in the group aged 20 through 24 years (35.1% decrease, from 74 in 1996 to 48 in 1997). Among adult females, the greatest percentage decrease in cases occurred in the group aged 25 through 34 years (27.9% decrease, from 190 in 1996 to 137 in 1997).

While case rates were similar for males and females in all age groups younger than 25 years, there were substantial differences between males and females in all older age groups. The greatest difference between rates for males and females occurred in the 45 through 54 year age group (55.7 per 100,000 for males vs. 20.4 for females).

Racial/Ethnic Distribution
(Table 2, Figure 3)

The race/ethnicity distribution for males and females was fairly similar. Figure 3 presents racial/ethnic trends in cases since 1985.

As in previous years, the highest proportion of 1997 tuberculosis cases (41.7%) occurred among Blacks. The

721 cases reported among Blacks in 1997 gave this group a case rate of 39.0 per 100,000, second only to that for Asians. The number of tuberculosis patients who are Black decreased by 19.4% from the 894 recorded in 1996. Age-specific incidence rates in 1997 peaked in the 45 through 54 year age group for Black males (108.9 per 100,000) and in the 35 through 44 year age group for Black females (52.2 per 100,000).

The 483 Hispanic cases represented 27.9% of total 1997 tuberculosis cases. Hispanics had a case rate of 27.1 per 100,000. The number of tuberculosis patients who are Hispanic decreased by 19.9% from the 603 recorded in 1996. Age-specific incidence rates in 1997 peaked in the 45 through 54 year age group for Hispanic males (71.9 per 100,000) and in the group aged 65 years and older for Hispanic females (37.5 per 100,000).

The 342 cases among Asians accounted for 19.8% of the 1997 total. Asians had a case rate of 64.7, higher than that for any other racial/ethnic group. The number of cases recorded among Asians in 1997 increased 1.8% from that recorded in 1996 (336). For Asian males and females, the highest tuberculosis rates in 1997 were observed among those aged 65 years and older (330.7 per 100,000 among males and 106.1 per 100,000 among females). The rate among elderly Asian males exceeded that of all other racial/ethnic age groups. It should be noted, however, that denominators for these groups are relatively small.

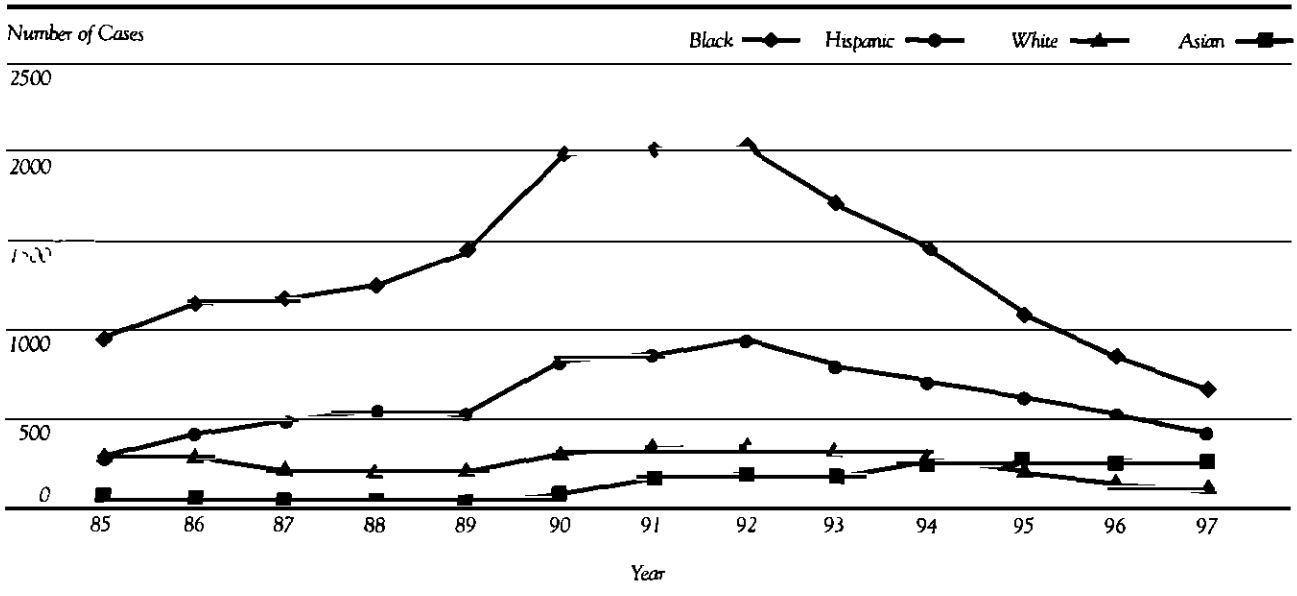
The 184 cases among Whites accounted for 10.6% of the 1997 total. Whites had a case rate of 5.8 per 100,000, lower than that for any other racial/ethnic group. The number of tuberculosis patients who are White decreased by 16.4% from the 220 recorded in 1996. Among White males and females, the highest tuberculosis rates in 1997 were observed among those aged 65 years and older (19.8 per 100,000 among males and 5.9 per 100,000 among females).

Geographic Distribution
(Table 3, Figures 4-5)

Incidence rates by health district of residence were calculated for 1997; age-adjusted and crude rates are presented in Table 3. Please see Figure 4 for a map of health districts.

Figure 5 illustrates the number of tuberculosis cases contributed by each borough and the proportion of foreign-born cases in each borough. Between 1996 and 1997, the number of new tuberculosis cases decreased in all boroughs except for Staten Island: in Staten Island, the number of tuberculosis cases increased by 14.3%, from 28

Figure 3
Tuberculosis Cases by Race/Ethnicity
New York City, 1985 - 1997



in 1996 to 32 in 1997. Brooklyn, Manhattan, and Queens contributed the largest proportions of total New York City cases and had decreases of 7.6%, 28.0% and 15.4% respectively. The proportion of foreign-born cases was highest in Queens (76.7%). Between 1996 and 1997, the number of foreign-born cases decreased in all boroughs except Queens, which experienced a 1.0% increase from 296 in 1996 to 299 in 1997 and Staten Island, which had the same number of foreign-born cases (12 in 1996 and 1997).

The three districts with the highest age-adjusted case rates in 1997 were Central Harlem, Bedford, and Mott Haven. In past years, age-adjusted tuberculosis case rates in Central Harlem consistently exceeded 100 per 100,000; therefore, the 45.6% decline in Central Harlem's age-adjusted case rate since 1996, to 61.6 per 100,000 in 1997, is remarkable. Smaller decreases in age-adjusted case rates between 1996 and 1997 were observed in the two other health districts with the highest age-adjusted tuberculosis rates in 1997 (22.9% in Mott Haven and 12.0% in Bedford). Other districts that experienced substantial decreases in age-adjusted tuberculosis rates between 1996 and 1997 were Washington Heights and the Lower West Side in Manhattan, Fordham-Riverdale in the Bronx, Bushwick in Brooklyn, and Jamaica East and Corona in Queens.

Age-adjusted case rates increased substantially since 1996 in Pelham Bay (by 61.7%, from 8.1 per 100,000 in 1996 to 13.1 per 100,000 in 1997) and Morrisania (by 32.8%, from 35.7 to 47.4 per 100,000) in the Bronx, and to a lesser extent in Gravesend, Flushing, Kips Bay-Yorkville, Astoria-Long Island City, Bay Ridge, Flatbush, and Maspeth-Forest Hills. In Pelham Bay, Morrisania, Kips Bay-Yorkville, Bay Ridge, and Gravesend, increases occurred both in U.S.- and foreign-born cases. However, in Pelham Bay and Morrisania the increases were most notable among the foreign born; foreign-born cases increased 75% in Pelham Bay, from 8 in 1996 to 14 in 1997 and 113% in Morrisania from 8 in 1996 to 17 in 1997. In Flatbush, Astoria-Long Island City, Flushing, and Maspeth-Forest Hills, increases occurred only among the foreign born.

Despite overall decreases in age-adjusted case rates from 1996 to 1997, increases among the foreign born were also seen in East Harlem and Riverside in Manhattan, Westchester in the Bronx, Brownsville and Fort Greene in Brooklyn, and Jamaica East in Queens.

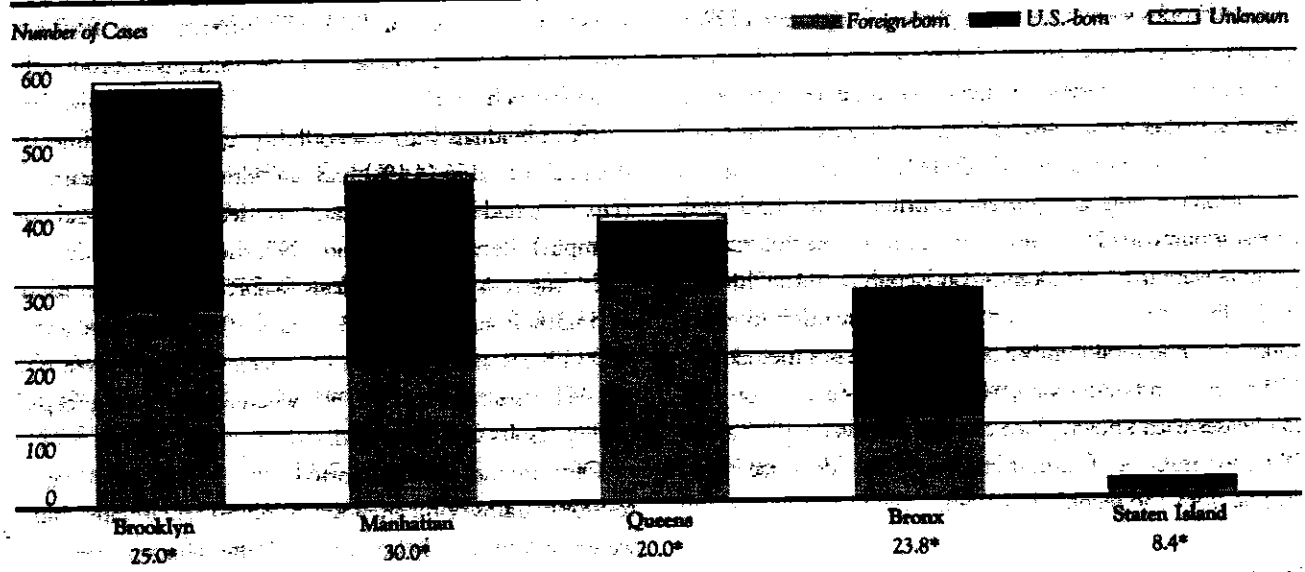
Area of Origin
(Table 4, Figure 6)

In 1997, information about country of origin was available for 1,704 (98.5%) of New York City's tuberculosis cases. Between 1996 and 1997, the number of foreign-born cases declined far less sharply than did the number of U.S.-born cases: foreign-born cases dropped 4.6% from 927 to 884, while U.S.-born cases dropped 23.2% from 1,068 to 820. Among cases with a known place of origin, the proportion of foreign-born cases increased from 46.5% recorded in 1996 to 51.9% in 1997, for the first time exceeding the proportion of U.S.-born cases. Figure 6 illustrates trends in numbers of foreign-born cases since 1980: between 1980 and 1997, the number of foreign-born tuberculosis patients more than doubled. In 1997, the rate among foreign-born persons in New York City was 42.4 cases per 100,000, compared with a rate of 15.6 among U.S.-born persons; however, the number of foreign-born persons in New York City has increased substantially since the 1990 census,[1]

[1] *New York City Department of City Planning. The Newest New Yorkers, 1990- 1994: An analysis of Immigration into New York City in the Early 1990s. New York: 1996.*

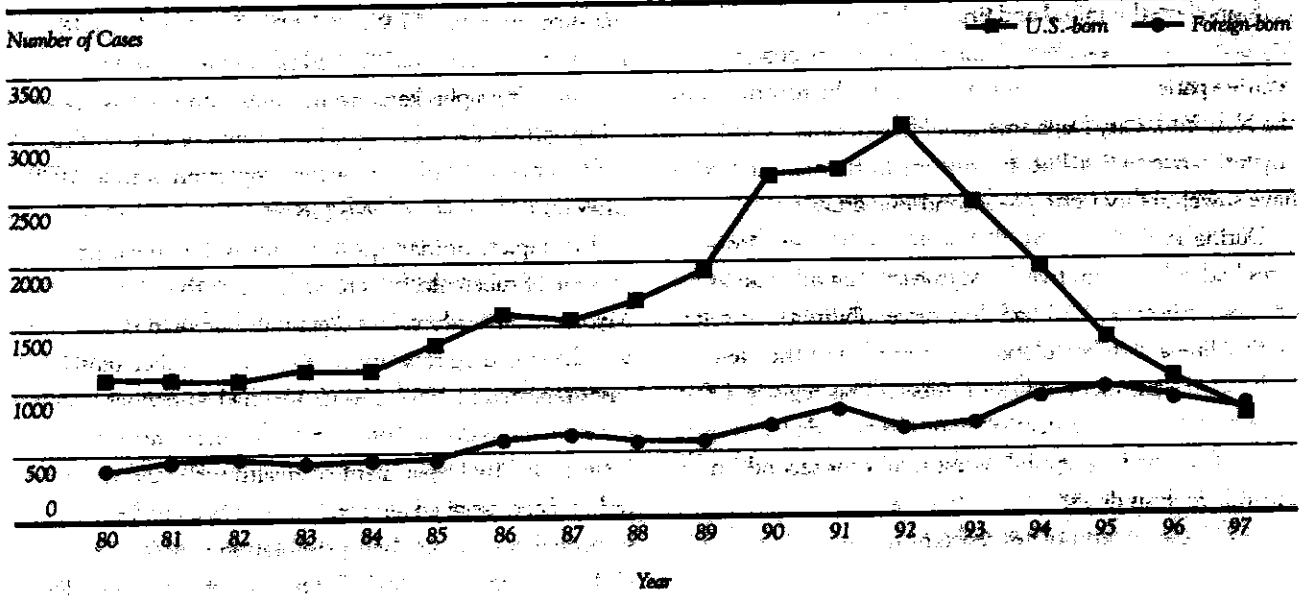
Figure 4
Health Center Districts, New York City

FIGURE 5
TUBERCULOSIS CASES BY PLACE OF BIRTH AND BOROUGH
NEW YORK CITY, 1997



* Rate per 100,000 population

FIGURE 6
U.S.- AND FOREIGN-BORN CASES*
NEW YORK CITY, 1980–1997



*Starting in 1991, Puerto Rico and U.S. Virgin Islands included as U.S.-born

meaning that the tuberculosis rate among foreign-born persons may be lower than 42.4 per 100,000.

A total of 91 countries other than the United States or U.S. territories were reported as places of origin for 1997 tuberculosis patients. The Caribbean area, which accounted for the largest foreign-born group, contributed 241 (14.1%) of total cases with known place of origin; Central America contributed 200 (11.7%), the second largest foreign-born group; Asia contributed the third largest group with 158 cases (9.3%). More tuberculosis patients were from the Dominican Republic (94), China (91), Haiti (88), and Ecuador (57) than any other foreign countries. The total number of U.S.-born cases includes 100 cases from Puerto Rico, which comprised 5.9% of total cases with known place of origin; between 1996 and 1997, the number of cases from Puerto Rico decreased by 26.5%, from 136 recorded in 1996.

Drug Resistance

(Table 5)

In accordance with guidelines issued by the Centers for Disease Control and Prevention and the American Thoracic Society, the New York City Department of Health recommends that susceptibility testing be performed on the initial and final isolates of *Mycobacterium tuberculosis* obtained from every culture-positive patient. Susceptibility results must be reported to the New York City Department of Health. Isolates with any resistance to first-line anti-tuberculosis drugs[2] should have susceptibility testing to second-line drugs.[3]

During 1997, 1,401 (81.0%) of the city's tuberculosis cases had cultures positive for *Mycobacterium tuberculosis*. Of these, 1,366 (97.5%) had drug susceptibility test results for first-line anti-tuberculosis drugs recorded in the New York City Department of Health tuberculosis registry. Of those with first-line susceptibility results recorded, 289 (21.2%) also had susceptibility test results for second-line anti-tuberculosis drugs.

Of 217 cases with isolates resistant to any first-line drugs, 189 (87.1%) had susceptibility results available for second-line drugs. Among those missing susceptibility results for second-line drugs, however, were 6 cases with isolates resistant only to PZA; mono-resistance to PZA is a marker for M. *bovis* and second line testing is not routinely done for such cases.

Of individuals with susceptibility results for first-line drugs, 56 of 1,366 (4.1%) had multidrug-resistant strains (i.e., they had isolates resistant to at least isoniazid and rifampin). Between 1996 and 1997, the number of multidrug-resistant tuberculosis (MDRTB) cases decreased by 33.3%, from 84 MDRTB cases in 1996. The number of MDRTB cases reported in 1997 decreased by 87.3% from the 441 cases reported in 1992, when reporting of susceptibility results was first mandated.

Of those individuals reported in 1997 with multidrug-resistant strains of tuberculosis, 5 (8.9%) had isolates that were resistant to only isoniazid and rifampin, a decrease from the 19.0% seen in 1996. In 1997, 12 MDRTB cases (21.4%) had isolates resistant to isoniazid, rifampin, and one other first-line drug (vs. 15.5% in 1996); 15 (26.8%) had isolates resistant to isoniazid, rifampin, and two other first line drugs (vs. 19.0% in 1996); and 6 (10.7%) had isolates resistant to isoniazid, rifampin, and three other first-line drugs (vs. 17.9% in 1996). The remaining 18 MDRTB patients (32.1%) had isolates resistant to most first-line drugs plus kanamycin; cases with this susceptibility pattern decreased by 25.0% from the 24 recorded in 1996 but accounted for a higher proportion of total MDR cases than they did in 1996 (28.6%).

Incomplete or inadequate treatment for an earlier episode of tuberculosis increases the risk that the *Mycobacterium tuberculosis* organisms harbored in a patient will develop drug resistance. Of the 1,730 tuberculosis cases reported in 1997, 100 (5.8%) had a previous history of tuberculosis documented on their current records in the New York City Department of Health tuberculosis registry or had been assigned a record number as a confirmed or suspected case before their presentation in 1997. Three (5.4%) patients with MDRTB had previously received anti-tuberculosis medications compared with 49 (2.9%) patients with non-MDRTB.

In 1997, similar proportions of MDRTB and non-MDRTB cases were known to have worked in the health

[2] *First-line anti-tuberculosis drugs include isoniazid, rifampin, ethambutol, pyrazinamide, and streptomycin.*

[3] *Second-line anti-tuberculosis drugs include all anti-tuberculosis drugs other than those listed under footnote 2.*

care field; 3.6% (2/56) of MDRTB cases and 3.3% (55/1674) of non MDRTB cases were health care workers. In 1996, 11.9% (10/84) of MDRTB cases and 2.3% (45/1,969) of non-MDRTB cases were healthcare workers. In 1997, as in previous years, a higher proportion of cases with MDRTB were HIV infected (39.3%), compared with non-MDRTB cases (25.4%). However, the difference in proportion with HIV infection among cases with MDRTB and those with non-MDRTB is not as great in 1997 as in previous years.

Of the 1,366 individuals with susceptibility results to first-line drugs, 120 (8.8%) had strains of *Mycobacterium tuberculosis* resistant to a single first-line drug; of these, 46 (38.3%) had isolates resistant to isoniazid alone, 42 (35.0%) to streptomycin alone, and 22 (18.3%) to rifampin alone. Forty-one 1997 cases (3.0% of all those with susceptibility results available) had isolates resistant to two or more first-line drugs but were not classified as MDRTB; all but one of these (97.6%) were resistant at least to isoniazid and thirty-four (82.9%) were resistant to at least isoniazid and streptomycin.

The emergence of drug-resistant strains of *Mycobacterium tuberculosis* is fostered by the lack of adequate resources to ensure appropriate and complete treatment of tuberculosis patients. In 1997, more (66.1%) MDRTB cases were U.S. born than foreign born and the proportion of MDRTB cases among U.S.-born patients with first-line susceptibility results was higher (5.6%) than among foreign-born patients (2.8%). Among patients with first-line susceptibility results, 9.7% (64/659) of U.S. born were resistant to a single drug compared with 7.3% (50/686) of foreign born. However, a higher proportion of foreign-born than U.S.-born tuberculosis cases with susceptibility results were resistant to isoniazid, either alone or in combination with other drugs, but still sensitive to rifampin: 8.3% (57/686) among foreign born vs. 3.8% (25/659) among U.S. born. Foreign-born cases were more likely than U.S.-born cases to have isolates resistant to two or more anti-tuberculosis drugs but not classifiable as multidrug-resistant (4.8% [33/686] of foreign-born cases vs. 0.9% [6/659] of U.S.-born cases); 87.2% (34/39) of all cases resistant to two or more drugs had isolates resistant to at least isoniazid and streptomycin.

Of 217 patients aged 65 and older with first-line susceptibility results, five (2.3%) had multidrug-resistant strains of *Mycobacterium tuberculosis* and an additional eleven (5.1%) had strains resistant to isoniazid but susceptible to rifampin. In populations where more than 3% of tuberculosis patients have isolates resistant to isoniazid, alone or in combination with other drugs, the Centers for Disease Control and Prevention recommend that treatment for tuberculosis be initiated with four anti-tuberculosis drugs until susceptibility results are available, in order to prevent development of multidrug-resistance in strains that are at first resistant to isoniazid but susceptible to rifampin. Medical practitioners sometimes assume that elderly patients do not require initial therapy with four anti-tuberculosis drugs. In New York City, unless susceptibility results are known for a given patient from the outset of treatment, all patients should initially be started on four drugs regardless of age.

Sociomedical Factors

(Table 6)

Information about such social factors as substance abuse, incarceration, homelessness, and occupation is important for effective tuberculosis control. The presence of these factors may predict poor adherence and increased likelihood of adverse reactions to prescribed anti-tuberculosis drug regimens or suggest a high risk for infection with the human immunodeficiency virus. A history of homelessness or work in certain fields (e.g., health care) may predict difficulties in assuring patient adherence or suggest possible sites where the infection may have been contracted.

It is frequently difficult to elicit information about substance abuse and occupation from patients. Nevertheless, with more intensive efforts over the past two years to interview patients and enter information about social variables into the tuberculosis registry, the proportion of cases missing information about social variables has decreased. In 1997, no more than 8.8% of patients were missing information about any one social variable. Among those with available information, 78 (4.9%) had used illegal injectable drugs, 188 (11.8%) had used illegal non-injectable drugs, and 198 (12.4%) had abused alcohol in the 12 months prior to treatment for tuberculosis. In 1996, information on substance abuse was available for approximately 90.0% of cases: of these, 122

(6.6%) had used illegal injectable drugs, 257 (14.0%) had used illegal non-injectable drugs, and 281 (15.2%) had abused alcohol.

All 1997 cases had information available on incarceration: 44 (2.5%) had been incarcerated at the time of diagnosis, the same percentage as in 1996 (52/2,053). Of the 1,578 (91.2%) cases with information available on occupation in 1997, 59 (3.7%) had worked in the health care field or as correctional employees, compared with 58 of 1,837 (3.2%) in 1996. All 1997 cases had information available on homelessness, and 79 (4.6%) had been homeless at diagnosis or at some point during their treatment; of the 2,053 cases recorded in 1996, 99 (4.8%) had been homeless at diagnosis or at some point during their treatment.

Mortality
(Table 7)

Mortality figures presented in this year's report are based on statistics issued by the Bureau of Health Statistics and Analysis of the New York City Department of Health. In 1997, there were 55 deaths in New York City with tuberculosis listed as the underlying cause of death on the death certificate. The crude tuberculosis mortality rate for 1997 was 0.8 per 100,000. There were an additional 77 deaths for which tuberculosis was listed as a secondary cause. Of these deaths, 51 (66.2%) listed AIDS or HIV infection as the underlying cause of death.

Tuberculosis and HIV Infection
(Tables 8-9)

Since 1990, the Department of Health has collected information on the HIV serostatus of individuals with active tuberculosis. This information is necessary for the public health control of tuberculosis and for management of individual patients (e.g., to determine the appropriate duration of anti-tuberculosis treatment and to guard against adverse interactions between anti-tuberculosis and anti-HIV drugs).

Table 8 presents the reported HIV serostatus of individuals with active tuberculosis by age and sex. Since not all individuals with tuberculosis undergo testing for HIV, and since not all known HIV test results are reported to the Bureau of Tuberculosis Control, the proportion of HIV-seropositive cases reported in this table is a minimum estimate of the actual proportion of tuberculosis cases who are HIV infected.

In 1997, 73.5% (1,272/1,730) of New York City tuberculosis cases had a known and reported HIV status, an increase from 69.0% (1,416/2,053) in 1996. In all but the 15 through 19 year age group, HIV status was more likely to be known for males than for females: 75.6% of males and 70.3% of females had a known HIV status. HIV status was most likely to be known for males aged 20 through 24 years (93.8%) and females aged 25 through 34 years (81.0%). HIV status was more likely to be known for U.S.-born cases than for foreign-born cases: 77.1% (632/820) of U.S.-born cases had a known HIV status vs. 71.0% (628/884) of foreign-born cases.

In 1997, for the first time since the HIV status of active tuberculosis cases was recorded, the overall proportion of cases known to be HIV infected declined below 30.0%. Of 1997 tuberculosis cases, 25.9% were reported as HIV seropositive and 47.6% were reported as HIV seronegative. In 1997, among both male and female tuberculosis cases, highest proportions of HIV-infected cases were recorded in the group aged 35 through 44 years.

Table 9 presents the distribution of HIV infection by sex from 1992 through 1997. While the proportion of persons with tuberculosis who were HIV infected declined slightly between 1995 and 1996, on the whole HIV seropositivity varied only slightly from year to year before 1997. The decline in proportion of HIV-infected cases since 1996 was greater among males than females.

While HIV infection among U.S.-born patients declined from 45.9% in 1996 to 39.4% in 1997, the proportion of HIV infection among foreign-born patients increased from 13.4% to 13.8% in 1997. As the HIV epidemic makes inroads into regions outside the United States that are increasingly represented among countries of birth of New York City cases, it is important that efforts be made to increase the proportion of foreign-born cases who are tested and to report these test results to the Department of Health; even though HIV seropositivity precludes legal immigration to the U.S., undocumented immigrants are not likely to have been tested.

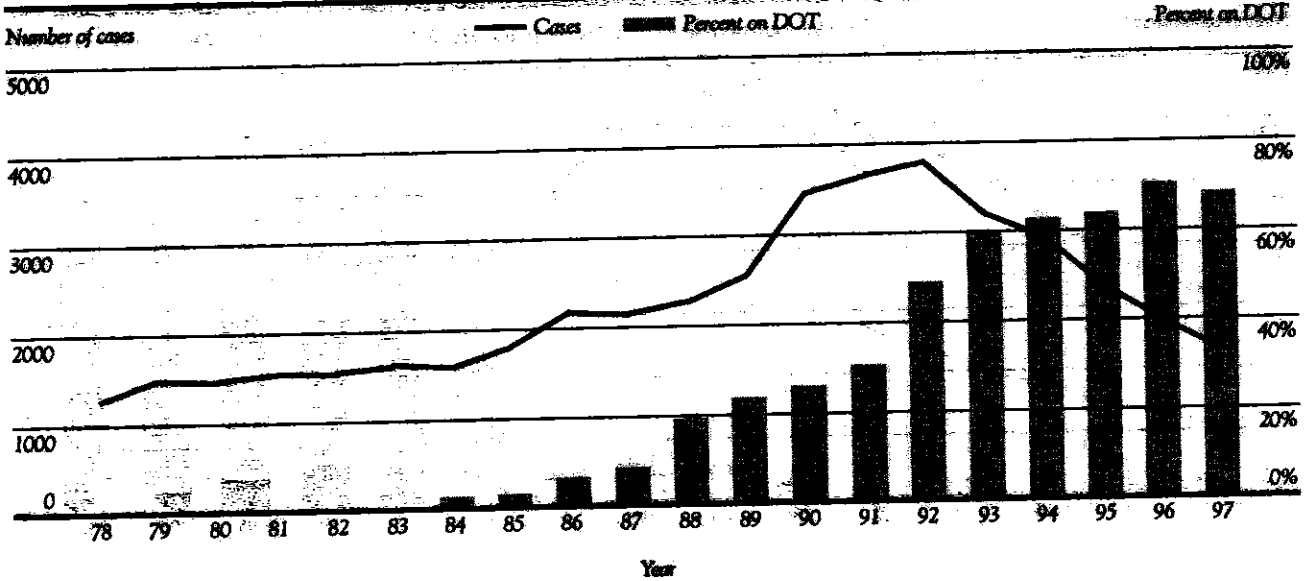
Directly Observed Therapy (DOT) and Completion of Therapy

(Table 10, Figures 7-9)

Figure 7 illustrates the proportion of tuberculosis patients counted in a given year who were on directly observed therapy during some or all of the year in which they were counted, among all those counted in the year who were eligible for DOT (i.e., patients who were diagnosed while alive and had the opportunity to receive some or all of their therapy as outpatients). The proportion of patients on DOT has increased steadily from very low levels in the mid-1980s and early 1990s (e.g., from 8.6% in 1987 to 68.6% in 1997). Although the number of cases on DOT has decreased since 1994, reflecting the declining prevalence of patients with active tuberculosis, the proportion of eligible patients who were on DOT continued to increase, from 62.4% in 1994 to 70.3% in 1996; the proportion of cases on DOT decreased slightly to 68.6% in 1997. The proportion of patients on DOT is higher among those who receive treatment in Department of Health chest clinics, where DOT is considered the standard of care: of the 113 eligible patients confirmed in 1997 who received all treatment to date in DOH chest clinics, 71.7% were on DOT for some or all of their therapy while among the 841 eligible patients confirmed in 1997 who received none of their treatment in DOH chest clinics, 57.3% were on DOT for some or all of their therapy (Figure 8). Patients with infectious and/or multidrug-resistant tuberculosis are an especially high priority for DOT. Of patients confirmed in 1997, 77.0% (455/591) of eligible patients with pulmonary tuberculosis and positive respiratory smears received DOT compared with 63.0% (550/873) of those without positive respiratory smears; 86.8% of MDRTB patients received DOT compared with 68.2% of non-MDRTB patients. Of U.S.-born patients, 74.4% received DOT compared with 64.0% of foreign-born patients.

Figure 9 shows the distribution of patients on DOT as of December 31, 1997, by type of provider. It should be noted that prevalence figures for a given year include patients reported before and during that year, as well as patients who may be strongly suspected of having tuberculosis but not confirmed. Non-Department of Health facilities, which are funded by the New York State Department of Health, Medicaid, and Ryan White Care

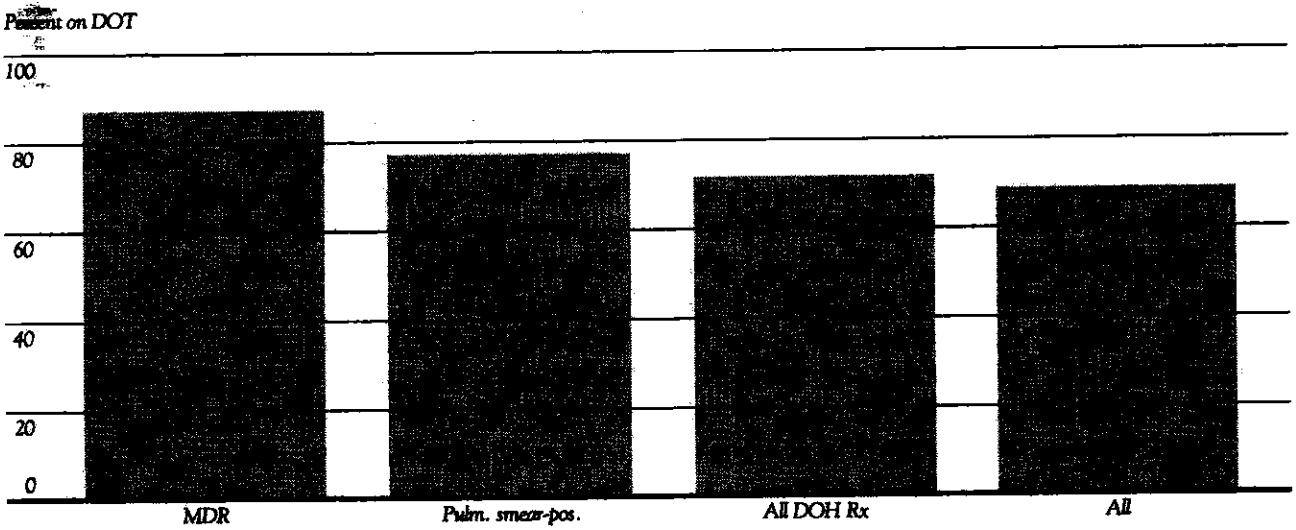
Figure 7
Tuberculosis Cases on Directly Observed Therapy*
New York City, 1978–1997**



* *Of those who were diagnosed while alive and received some treatment on an outpatient basis.*

** *Before 1995, cases on DOT are of cases still known to have had tuberculosis.*

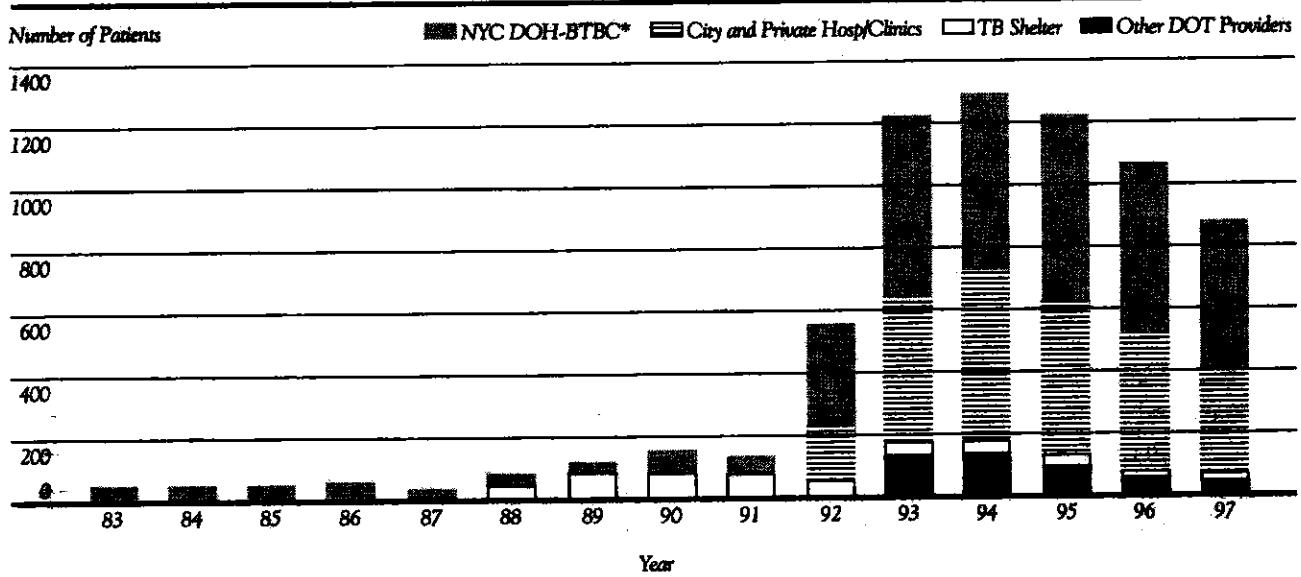
FIGURE 8
PERCENT ELIGIBLE* TUBERCULOSIS PATIENTS ON DOT**
NEW YORK CITY, 1997



* *Eligible patients were those diagnosed while alive and who received some treatment on an outpatient basis*

** *Cases ever on DOT in the year when counted*

FIGURE 9
TUBERCULOSIS PATIENTS ON DIRECTLY OBSERVED THERAPY AS OF DECEMBER 31 BY TYPE OF PROVIDER
NEW YORK CITY, 1983–1997



* *New York City Department of Health, Bureau of Tuberculosis Control*

Act Funds, provided DOT to 327 (37.3%) of the 876 cases who were receiving DOT at that point. Department of Health Clinics and Outreach provided DOT to 227 (25.9%) cases and 249 (28.4%) cases respectively.

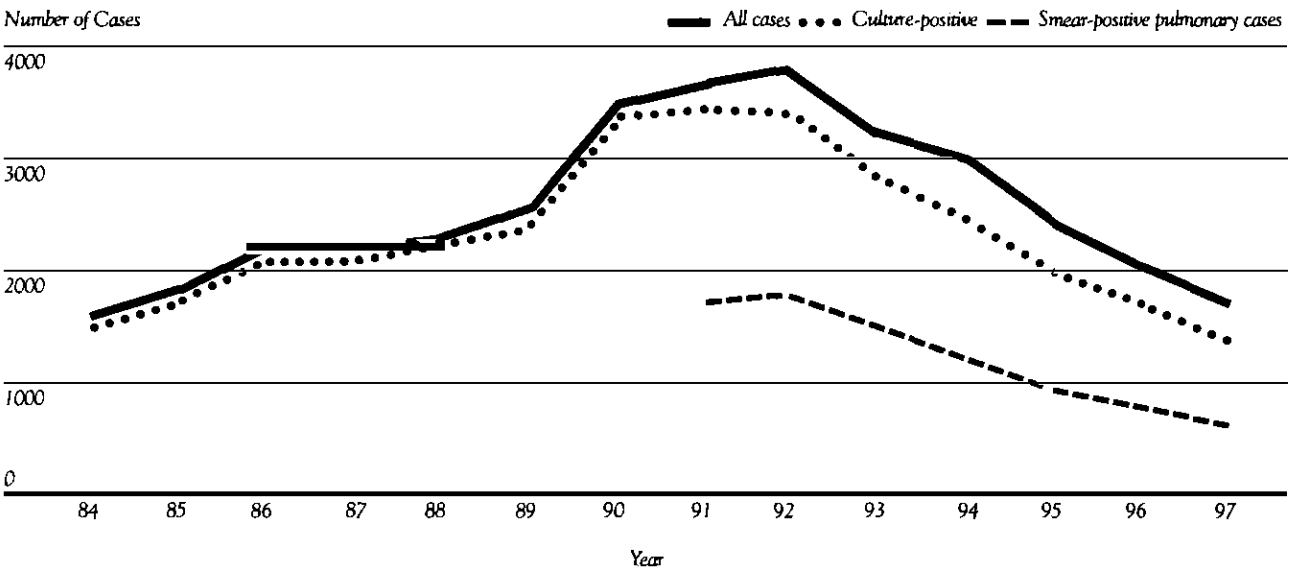
According to guidelines issued by the Centers for Disease Control and Prevention and American Thoracic Society, patients with confirmed or suspected tuberculosis should receive an initial regimen consisting of four drugs (isoniazid, rifampin, ethambutol, and pyrazinamide), unless susceptibilities of their *Mycobacterium tuberculosis* isolates are known from the start of therapy or unless there are justified medical contraindications. Among patients with confirmed tuberculosis in 1997 who were started on anti-tuberculosis therapy and survived for at least two weeks following the start of therapy, 84.9% (1319/1553) were started on these four drugs within two weeks of the start of therapy.

The effectiveness of DOT and intensive case management in increasing completion of therapy among patients diagnosed with tuberculosis in 1996 is illustrated in Table 10. Completion data are presented for 1996 instead of 1997 in order to allow enough time for patients who require a year of treatment to complete therapy. In order to remain consistent with data presented in past years, the formula used to calculate the completion index for this table is the same as that which has been used previously. According to this formula, of the cohort of 1,612 patients diagnosed in 1996 who remained alive during treatment and did not move out of New York City, 1,503 (93.2%) completed treatment. The completion index increases to 94.8% if patients with multidrug-resistant tuberculosis, who require extended therapy, are excluded from the index.

Site of Disease, Bacteriology, and Pathology *(Table 11, Figure 10)*

In 1997, pulmonary tuberculosis was the primary site of disease for 1,344 (77.7%) of all cases. Of persons with extrapulmonary disease, either alone or in combination with pulmonary disease, lymphatic tuberculosis was the most common form of disease, followed by bone and joint disease. Of all cases reported in 1997, 223 (12.9%) had both pulmonary and extrapulmonary disease. Of 1,344 cases with pulmonary disease, 652 (48.5%) had a positive smear for acid-fast bacilli (AFB) from either sputum or another respiratory specimen.

Figure 10
Trend of Tuberculosis Cases
New York City, 1984 - 1997*



* *Data on smear-positive pulmonary cases not available before 1991*

Of the 1,730 tuberculosis cases verified in 1997, 329 (19.0%) had no positive bacteriologic culture for *Mycobacterium tuberculosis*. These cases were determined to have tuberculosis because of their clinical and/or radiographic improvement while on anti-tuberculosis medications. Figure 10 illustrates trends, since 1984, in all verified cases and in culture-positive cases. The identification of non-culture-confirmed tuberculosis cases requires active surveillance and case confirmation by Bureau of Tuberculosis Control staff. Before New York City's tuberculosis control program was strengthened, these tuberculosis cases tended to comprise less than 10.0% of total. Since 1992, the proportion of cases not confirmed by positive cultures has increased from 9.7% to 19.0%. While this increase most likely reflects surveillance artifact, it could also arise from detection of tuberculosis cases earlier in their course of disease.

Figure 10 also shows trends in the number of tuberculosis patients with sputum smears positive for AFB. In developing countries, where facilities for cultures are frequently lacking, tuberculosis is often diagnosed only through sputum microscopy. Therefore, to increase comparability between numbers of AFB smear-positive cases in New York City and developing countries, only smears from sputum are included in the figure, not smears from all respiratory specimens; also, positive sputum smears are included regardless of the patient's culture results. Comparisons between tuberculosis rates in developed and developing countries are tenuous due to substantial under-reporting in many developing countries, but are best made in terms of incidence of sputum-smear-positive pulmonary cases. The 652 such cases that occurred in New York City in 1997 yielded an incidence rate of 8.9 per 100,000. According to the World Health Organization, rates of sputum-smear-positive tuberculosis in some developing countries are as follows: Ecuador (50.9 per 100,000), India (31.1 per 100,000), Dominican Republic (30.9 per 100,000), and China (11.9 per 100,000). In these countries, the extent of under-reporting is estimated to range from 41% (India) to 66% (China).

Of the 1,730 tuberculosis cases recorded in New York City in 1997, 534 are recorded in the Department of Health tuberculosis registry as having had tissue biopsies. Most of these cases (88.4% [472/534]) had bacteriologic findings (from either the specimen which was biopsied or another) that suggested or confirmed tuberculosis; 11.6% (62/534 and 3.6% of all 1,730 cases), however, had pathology rather than bacteriology findings suggestive of tuberculosis, reinforcing the importance of reporting by pathology laboratories of findings suggestive of tuberculosis (e.g. caseating or non-caseating granulomas).

Prevention of Future Tuberculosis Disease *(Table 12)*

There are several categories of TB-infected persons who are at high risk for progression to active disease: contacts to active cases whose tuberculin skin test has recently converted from negative to positive; persons who are HIV infected or at high risk for HIV infection or otherwise immunocompromised, children under 5 years of age; some persons who have recently arrived in the United States from areas of the world where tuberculosis remains endemic; and persons with certain medical conditions.

Two of the national objectives for preventive therapy concern contacts to infectious tuberculosis cases (Appendix 1). The Bureau of TB Control has expanded its efforts to ensure that all contacts to patients 15 years and older[4] with culture-confirmed pulmonary or laryngeal disease are evaluated, and that contacts found eligible for preventive therapy receive it. The following discussion refers only to contacts identified in 1996, as not all contacts to cases confirmed in 1997 have yet been identified. Also, all contacts are considered, whether they received treatment in Department of Health clinics or elsewhere. In 1996, 84.4% (7,595/9,000) of identified contacts were examined. Many of the remainder were casual contacts for whom testing was not indicated because close contacts were tuberculin skin test (TST) negative. Of contacts younger than 15 years and eligible to start preventive therapy, 411 were documented to have started preventive therapy; of contacts 15 years and older who were eligible to start preventive therapy, 1,652 were

[4] *Investigations are also conducted to find contacts to children with tuberculosis who are younger than 15 years, but in such cases, the "contact" is in fact considered a potential source case, i.e., a person with active tuberculosis who may have infected the child.*

documented to have started preventive therapy.

Starting a patient on preventive therapy is only the beginning of the drive to increase levels of preventive therapy; a course of preventive therapy lasts from six to twelve months, depending on a patient's HIV status and age. In order for patients to benefit from the full measure of protection that it offers, they must complete their course of therapy. The completion index is calculated as [total completed/(total started-number whose therapy was discontinued for medical reasons or who moved out of New York City or died prior to completion)]. In 1996, of infected contacts aged less than 15 years who started on preventive therapy, 139 had to discontinue therapy for medical reasons or moved or died prior to completion; of those remaining, 72.1% (196/272) completed at least 6 months of preventive therapy. Among infected contacts aged 15 years or older, 175 had to discontinue for medical reasons or moved or died prior to completion; of those remaining, 60.6% (896/1,477) completed at least 6 months of preventive therapy.

The Department of Health has been leading efforts to increase preventive therapy among contacts to active cases and others at high risk of progression to active disease. Some of the CDC objectives on preventive therapy concern program-supported preventive services, which are those offered in Department of Health chest clinics: these objectives apply to all persons, contacts and others, who are evaluated for preventive therapy in Department of Health chest clinics. In 1996, of the 5,739 persons who were tuberculin skin tested in DOH chest clinics and found to have positive reactions, 4,929 (85.9%) were evaluated within two weeks; in 1997, this proportion increased to 94.5% (4,025/4,260). In 1996, of the 5,739 evaluated, 3,453 (60.2%) were found to be eligible for preventive therapy. Of these, 2,901 (84.0%) started preventive therapy. In 1996, 9,088 additional persons who were referred to the chest clinics with positive TST results from other providers were evaluated at the chest clinics and started on preventive therapy. During 1996, of those 11,989 individuals who started preventive therapy, 704 were lost, moved, and/or died, and 5,788 completed therapy, for a completion index of 51.3%. Efforts to ensure completion of treatment for preventive patients in DOH chest clinics vary in intensity depending on the patient's risk of developing active disease. Therefore, completion rates for patients treated at DOH chest clinics vary for different groups. Those the Bureau considered at high risk (contacts, immunocompromised, recent converters, persons with radiographic evidence of tuberculosis in the past, and children under 5 years) had a 1996 completion index of 64.4%. In order to assure higher levels of preventive therapy completion, the Bureau of Tuberculosis Control is adopting a case management approach for those at highest risk of progression to active disease that is similar to the way patients with active disease are managed (e.g., patients are assigned to a case manager who helps to remind the patients to take their medication and the status of patients on directly observed preventive therapy is reviewed on a quarterly basis).

An Expanded Contact Investigation (ECI) Unit was created in October 1995 within the Bureau of Tuberculosis Control to allow rapid evaluation of possible transmission of tuberculosis by infectious patients in congregate settings (e.g., within schools or other institutions, or within workplaces). When indicated, mass skin testing and effective education about tuberculosis are provided. In 1997, sixteen epidemiologic investigations were conducted as a result of an exposure to a person with infectious TB in a congregate setting (Table 12). In all of these investigations, the person with TB was older than 14 years of age and had pulmonary disease. In all but one of these investigations, the index case was both smear-positive for AFB and culture-positive for *Mycobacterium tuberculosis*; 9 (56%) of the index cases had cavitation on chest radiograph. Results of the investigations were classified according to the likelihood of tuberculosis transmission to contacts in the congregate setting; transmission was considered unlikely in 9 (56%) of the investigations, possible in 1 (6%), probable in 5 (31%), and could not be assessed in one setting because of the low proportion of contacts who were tested. The total number of contacts tested in these investigations was 290; 48 (17%) of those tested were found to be infected and were referred for medical evaluation. In addition, 339 persons with no known exposure to the index case requested testing; 23 (7%) of these were infected and were referred for medical evaluation.

Nine (56%) of the investigations were conducted among persons who would be highly susceptible to

progression to active disease after infection: five were in schools or day care centers, two were in alcohol and drug treatment centers, one was in a residential facility for person with AIDS, and one was in a kidney dialysis center. In half of the investigations, either the index patient or the majority of contacts were from countries where TB is endemic. This points to the importance of safeguarding patient confidentiality, including immigration status, in order to effectively conduct contact investigations and protect public health.

Through continued emphasis on complete treatment of patients with active tuberculosis and with additional emphasis on preventive therapy, the New York City Department of Health, in cooperation with providers throughout New York City, will continue to reduce the city's burden of tuberculosis.

TABLES

TABLE 1
TUBERCULOSIS INCIDENCE
NEW YORK CITY, 1920–1997

Year	Number*	Rate Per 100,000**	Culture-Positive Cases	Smear-Positive Pulmonary Cases+ (Rate Per 100,000)	Multidrug-resistant Cases++
1920	14,035	246.9			
1930	11,821	170.2			
1940	8,212	110.0			
1950	6,518	98.0			
1960	4,699	60.4			
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	27.2			
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	1,527		
1985	1,843	26.0	1,785		
1986	2,223	31.4	2,181		
1987	2,197	31.1	2,157		
1988	2,317	32.8	2,241		
1989	2,545	36.0	2,405		
1990	3,520	49.8	3,372		
1991	3,673	50.2	3,484	1,747 (23.9)	366
1992	3,811	52.0	3,442	1,791 (24.5)‡‡	441
1993	3,235	44.2	2,854	1,506 (20.6)	296
1994	2,995	40.9	2,479	1,242 (17.0)	176
1995	2,445	33.4	2,014	962 (13.1)	109
1996	2,053	28.0	1,721	820 (11.2)	84
1997	1,730	23.6	1,401	652 (8.9)	56

* *For "phthisis," or pulmonary cases, 1920-1940, thereafter, all forms of tuberculosis.*

** *Population based on census data for each decade*

\+ *Patients with a sputum smear positive for acid-fast bacilli regardless of culture result.*

++ *Resistant to at least isoniazid and rifampin. Drug susceptibility made mandatorily reportable during 1991; figure from that year is not complete. Number for 1997 is preliminary because drug susceptibility tests have not yet been performed and results reported on some patients' isolates*

‡ *Case definition revised in 1978 to include persons who had verified disease in the past and were discharged or lost to supervision for more than 12 months and had verified disease again*

‡‡ *This information was estimated for 1992; exact figures not available.*

TABLE 2
TUBERCULOSIS INCIDENCE (RATES PER 100,000) BY RACE/ETHNICITY, SEX, AND AGE IN YEARS
NEW YORK CITY, 1997

	Age Group *N* *Rate*										
Race/Sex	*0–4*	*5–9*	*10–14*	*15–19*	*20–24*	*25–34*	*35–44*	*45–54*	*55–64*	*65+*	*Total*
White, total	1 0.7	0 0.0	3 2.4	0 0.0	2 0.9	21 3.7	39 8.0	27 7.9	18 5.2	73 11.2	**184** **5.8**
Males	0 0.0	0 0.0	2 3.1	0 0.0	1 1.0	13 4.5	29 11.9	23 13.9	10 6.2	49 19.8	**127** **8.5**
Females	1 1.3	0 0.0	1 1.6	0 0.0	1 0.9	8 2.8	10 4.1	4 2.2	8 4.4	24 5.9	**57** **3.4**
Black, total	27 17.7	8 5.6	6 4.1	14 9.6	33 21.5	131 39.4	207 75.9	135 67.8	85 59.6	75 47.0	**721** **39.0**
Males	17 22.1	3 4.1	0 0.0	5 7.0	17 23.9	73 49.1	126 107.2	91 108.9	54 93.3	35 63.6	**421** **50.9**
Females	10 13.3	5 7.0	6 8.2	9 12.1	16 19.4	58 31.5	81 52.2	44 38.1	31 36.6	40 38.3	**300** **29.4**
Hispanic, total	11 6.6	7 4.7	6 4.1	18 12.4	38 22.8	108 31.2	130 49.9	85 48.6	40 33.2	40 36.8	**483** **27.1**
Males	7 8.3	4 5.3	4 5.4	10 13.5	22 26.3	68 40.7	82 68.1	57 71.9	28 53.9	14 35.5	**296** **34.8**
Females	4 4.9	3 4.1	2 2.8	8 11.2	16 19.3	40 22.4	48 34.2	28 29.3	12 17.5	26 37.5	**187** **20.0**
Asian, total	9 23.6	3 9.2	5 15.1	16 43.1	24 54.6	80 66.6	56 58.8	37 65.6	41 108.4	71 207.2	**342** **64.7**
Males	7 35.4	1 5.9	1 5.9	10 52.7	8 36.7	49 79.8	31 62.9	28 96.6	26 142.1	51 330.7	**212** **79.2**
Females	2 10.9	2 12.7	4 24.6	6 33.1	16 72.2	31 52.8	25 54.4	9 32.8	15 76.8	20 106.1	**130** **49.8**
TOTAL	48 9.4	18 3.9	20 4.4	48 10.2	97 16.8	340 24.8	432 38.7	284 36.7	184 28.5	259 27.2	**1730** **23.6**
Males	31 11.9	8 3.4	7 3.1	25 10.5	48 17.1	203 30.5	268 50.4	199 55.7	118 41.0	149 41.7	**1056** **30.7**
Females	17 6.8	10 4.5	13 5.8	23 9.8	49 16.5	137 19.4	164 28.0	85 20.4	66 18.5	110 18.4	**674** **17.3**

TABLE 3
CRUDE AND AGE-ADJUSTED TUBERCULOSIS RATES
NEW YORK CITY, 1992–1997

Borough	*Health District*	*Cases*	*Rates per 100,000 population*						
			1997 Crude+	*1997 Age-Adjusted**	*1996 Age-Adjusted**	*1995 Age-Adjusted**	*1994 Age-Adjusted**	*1993 Age-Adjusted**	*1992 Age-Adjusted**
Manhattan	Central Harlem	69	59.7	61.6	113.2	115.3	121.6	181.7	240.2
	East Harlem	43	33.8	35.2	45.4	60.3	71.5	73.1	95.8
	Kips Bay-Yorkville	30	12.7	10.3	9.3	10.9	14.8	14.4	19.1
	Lower East Side	102	42.6	40.0	45.7	51.3	74.8	69.5	101.5
	Lower West Side	74	25.1	22.7	33.3	29.9	45.9	44.8	77.9
	Riverside	48	23.0	21.4	21.8	32.0	41.1	59.0	72.1
	Washington Heights	81	30.4	31.7	51.4	36.6	49.1	52.9	60.9
	Total Manhattan	**447**	**30.0**						
Bronx	Fordham-Riverdale	42	17.1	18.1	29.0	24.5	34.6	27.5	37.8
	Morrisania	58	40.1	47.4	35.7	75.4	74.4	109.3	96.5
	Mott Haven	51	39.3	47.7	61.9	61.3	87.7	107.8	168.2
	Pelham Bay	29	13.3	13.1	8.1	13.3	21.1	20.1	20.3
	Tremont	68	35.7	45.2	47.6	56.7	88.5	76.0	105.8
	Westchester	38	13.8	13.9	16.7	26.0	19.8	34.0	35.8
	Total Bronx	**286**	**23.8**						
Brooklyn	Bay Ridge	35	14.7	13.5	12.7	20.2	18.6	20.1	15.9
	Bedford	105	45.1	48.2	54.8	68.4	82.3	89.1	107.5
	Brownsville	83	29.8	32.0	33.4	51.8	58.9	54.2	71.6
	Bushwick	48	26.3	29.1	45.8	61.1	72.8	83.3	83.1
	Flatbush	113	22.5	23.0	22.5	32.1	36.0	39.2	36.6
	Fort Greene	47	31.3	32.6	37.5	57.9	88.5	110.3	120.1
	Gravesend	50	17.6	18.5	14.3	20.2	23.6	21.9	20.4
	Red Hook-Gowanus	24	22.7	22.1	25.0	25.7	34.3	49.6	48.7
	Sunset Park	37	21.7	23.1	24.7	31.1	29.3	29.8	27.7
	W'burg-Grnpt.	33	21.2	23.1	24.0	30.3	45.6	52.2	59.3
	Total Brooklyn	**575**	**25.0**						
Queens	Astoria-L.I.C.	67	28.3	27.2	24.7	32.8	38.7	29.5	35.3
	Corona	87	29.9	29.0	42.6	45.3	39.5	44.5	56.3
	Flushing	91	19.9	18.9	16.4	19.9	18.4	17.3	14.6
	Jamaica East	60	17.8	18.1	28.3	28.7	35.9	33.7	34.0
	Jamaica West	50	13.8	13.9	18.7	23.5	26.2	25.2	21.5
	Maspeth-Forest Hills	35	13.0	12.5	12.3	10.6	20.4	18.5	12.3
	Total Queens	**390**	**20.0**						
Staten Island	Richmond	32	8.4	8.7	7.7	10.4	17.7	15.3	17.8
TOTAL NYC		**1730**	**23.6**	**23.6**	**28.0**	**33.4**	**40.9**	**44.2**	**52.0**

\+ *1997 crude rates are based on the 1990 Census for New York City*
* *1992-1997 age-adjusted rates are based on the New York City 1990 Census by the method of direct adjustment.*

TABLE 4
TUBERCULOSIS CASES BY AGE IN YEARS AND AREA OF BIRTH
NEW YORK CITY, 1997

	Age Groups										
Area of Birth	*0–4*	*5–9*	*10–14*	*15–19*	*20–24*	*25–34*	*35–44*	*45–54*	*55–64*	*65+*	*Total*
Africa [1]	0	0	1	0	8	19	19	3	2	1	**53**
Asia [2]	0	1	3	7	11	19	27	20	17	53	**158**
Canada	0	0	0	0	0	0	0	0	0	1	**1**
Caribbean [3]	3	2	1	8	16	42	67	50	32	20	**241**
Central/S.America [4]	1	1	2	10	30	59	46	26	11	14	**200**
Europe [5]	1	0	3	0	0	4	8	9	4	33	**62**
Indo/Pakistan [6]	2	0	0	9	8	37	12	10	12	6	**96**
Middle East [7]	0	0	0	0	1	3	5	0	1	1	**11**
Southeast Asia [8]	0	1	0	0	4	18	14	6	9	10	**62**
Total Non-USA	**7**	**5**	**10**	**34**	**78**	**201**	**198**	**124**	**88**	**139**	**884**
USA*	41	12	10	13	18	121	204	125	77	99	720
Puerto Rico	0	1	0	1	0	10	23	28	19	18	100
Total USA	**41**	**13**	**10**	**14**	**18**	**131**	**227**	**153**	**96**	**117**	**820**
Unknown	**0**	**0**	**0**	**0**	**1**	**8**	**7**	**7**	**0**	**3**	**26**
Total	**48**	**18**	**20**	**48**	**97**	**340**	**432**	**284**	**184**	**259**	**1730**

* *Includes the U.S. Virgin Islands (3)*

[1] Ivory Coast (10), Guinea (7), Senegal (5), The Gambia (4), Mauritania (4), Other (23)
[2] China (91), Korea (35), Taiwan (23), Hong Kong (9)
[3] Dominican Republic (94), Haiti (88), Jamaica (29), Cuba (13), Barbados (6), Trinidad & Tobago (4), Other (7)
[4] Ecuador (57), Mexico (38), Peru (19), Honduras (19), Guyana (18), Colombia (15), Guatemala (9), El Salvador (8), Other (17)
[5] Former Soviet Union (22), Poland (12), Yugoslavia (4), Romania (4), Other (20)
[6] India (45), Pakistan (23), Bangladesh (15), Nepal (9), Afghanistan (4)
[7] Yemen (7), Israel (2), Iran (1), Turkey (1)
[8] Philippines (35), Vietnam (15), Other (12)

TABLE 5
DRUG RESISTANCE BY AGE GROUP

	N (%)	
Susceptibilities	*< 65 years*	*65 and older*
Tested for susceptibility to first-line drugs of those with positive cultures	1,149 (98.0)	217 (94.8)
Multidrug-resistant (INH+RIF resistant)	51 (4.4)	5 (2.3)
Isoniazid-resistant and rifampin-susceptible	75 (6.5)	11 (5.1)
Resistant to first-line drugs other than INH or RIF	69 (6.0)	6 (2.8)
Susceptible to all first-line drugs	954 (83.0)	195 (89.9)

DRUG RESISTANCE BY PLACE OF BIRTH

	N (%)		
Susceptibilities	*U.S.-born*	*Foreign-born*	*Unknown*
Tested for susceptibility to first-line drugs of those with positive cultures	659 (98.1)	686 (96.9)	21 (100.0)
Multidrug-resistant (INH+RIF resistant)	37 (5.6)	19 (2.8)	0 (0.0)
Isoniazid-resistant and rifampin-susceptible	25 (3.8)	57 (8.3)	4 (19.0)
Resistant to first-line drugs other than INH or RIF	45 (6.8)	26 (3.8)	4 (19.0)
Susceptible to all first-line drugs	552 (83.8)	584 (85.1)	13 (61.9)

TABLE 6
SOCIAL CHARACTERISTICS OF TUBERCULOSIS CASES
NEW YORK CITY, 1997

*Social characteristic**	*# (%) of total cases for whom information is available*	*# reporting characteristic (% of cases with available information)*
Injection drug use in 12 months before diagnosis	1592 (92.0)	78 (4.9)
Non-injection drug use in 12 months before diagnosis	1591 (92.0)	188 (11.8)
Alcohol abuse in 12 months before diagnosis	1593 (92.1)	198 (12.4)
Homeless at diagnosis or any time during treatment	1730 (100.0)	79 (4.6)
Resident of correctional facility at time of diagnosis	1730 (100.0)	44 (2.5)
Resident of long-term care facility at time of diagnosis	1730 (100.0)	45 (2.6)
Health care or correctional facility worker in 24 months before diagnosis	1578 (91.2)	59 (3.7)

* *Categories not mutually exclusive*

TABLE 7
TUBERCULOSIS DEATHS AND RATE (PER 100,000)
NEW YORK CITY, 1910–1997

Year	*# Deaths*	*Rate*
1910	8,832	197.5
1920	7,915	144.1
1930	4,574	68.2
1940	3,680	50.0
1950	2,173	27.4
1960	824	10.6
1970	432	5.5
1980	143	2.0
1981	155	2.2
1982	168	2.4
1983	151	2.1
1984	168	2.4
1985	155	2.2
1986	186	2.6
1987	219	3.1
1988	247	3.5
1989	233	3.3
1990	250	3.5
1991	241	3.3
1992	199	2.7
1993	166	2.3
1994	129	1.8
1995	94	1.3
1996	67	0.9
1997	55	0.8

TABLE 8
HIV STATUS OF TUBERCULOSIS CASES BY SEX AND AGE
NEW YORK CITY, 1997

	N (%)								
	Females			*Males*			*Total*		
Age	*HIV(+)*	*HIV(–)*	*NA**	*HIV(+)*	*HIV(–)*	*NA*	*HIV(+)*	*HIV(–)*	*NA*
0–4	0 (0.0)	7 (41.2)	10 (58.8)	1 (3.2)	13 (41.9)	17 (54.8)	1 (2.1)	20 (41.7)	27 (56.3)
5–9	2 (20.0)	1 (10.0)	7 (70.0)	0 (0.0)	4 (50.0)	4 (50.0)	2 (11.1)	5 (27.8)	11 (61.1)
10–14	1 (7.7)	7 (53.8)	5 (38.5)	0 (0.0)	5 (71.4)	2 (28.6)	1 (5.0)	12 (60.0)	7 (35.0)
15–19	1 (4.3)	15 (65.2)	7 (30.4)	0 (0.0)	16 (64.0)	9 (36.0)	1 (2.1)	31 (64.6)	16 (33.3)
20–24	5 (10.2)	32 (65.3)	12 (24.5)	6 (12.5)	39 (81.3)	3 (6.3)	11 (11.3)	71 (73.2)	15 (15.5)
25–34	32 (23.4)	79 (57.7)	26 (19.0)	64 (31.5)	108 (53.2)	31 (15.3)	96 (28.2)	187 (55.0)	57 (16.8)
35–44	67 (40.9)	65 (39.6)	32 (19.5)	127 (47.4)	96 (35.8)	45 (16.8)	194 (44.9)	161 (37.3)	77 (17.8)
45–54	28 (32.9)	37 (43.5)	20 (23.6)	77 (38.7)	84 (42.2)	38 (19.1)	105 (37.0)	121 (42.6)	58 (20.4)
55–64	8 (12.1)	34 (51.5)	24 (36.4)	21 (17.8)	55 (46.6)	42 (35.6)	29 (15.8)	89 (48.4)	66 (35.9)
65+	3 (2.7)	50 (45.5)	57 (51.8)	5 (3.4)	77 (51.7)	67 (45.0)	8 (3.1)	127 (49.0)	124 (47.9)
TOTAL	**147 (21.8)**	**327 (48.5)**	**200 (29.7)**	**301 (28.5)**	**497 (47.1)**	**258 (24.4)**	**448 (25.9)**	**824 (47.6)**	**458 (26.5)**

* *Not available*

TABLE 9
HIV STATUS OF TUBERCULOSIS CASES BY SEX
NEW YORK CITY, 1992–1997

	N (%)					
	Females		*Males*		*Total*	
Year	*HIV (+)*		*HIV (+)*		*HIV (+)*	
92	297	(25.1)	983	(37.4)	1281	(33.6)
93	308	(27.5)	760	(35.9)	1068	(33.0)
94	244	(23.5)	767	(39.2)	1011	(33.8)
95	226	(25.4)	575	(37.0)	801	(32.8)
96	204	(26.0)	429	(33.8)	633	(30.8)
97	147	(21.8)	301	(28.5)	448	(25.9)

TABLE 10
COMPLETION INDEX FOR ACTIVE CASES DIAGNOSED IN 1996

	N=1,947*			
Outcome	*Number of Cases*	*Percent*	*Completion Index***	*Completion Index without MDR Cases*
Completed Therapy	1,503	77.2	93.2	94.8
Died prior to completing treatment	251	12.9		
Prolonged Therapy	56	2.9		
Refused/Stopped Therapy	12	0.6		
Lost	41	2.1		
Moved+	84	4.3		

* *Excludes patients found not to have TB and those who were reported at death.*
** *Completion Index = Number Completed/(Total Number–Number Moved–Number Died)*
\+ *Patients are categorized as moved only if their transfer to another jurisdiction is confirmed.*

TABLE 11
TUBERCULOSIS CASES BY PRIMARY SITE OF DISEASE
NEW YORK CITY, 1997

	Number of Cases	*(%)*
Pulmonary	1,344	(77.7)
Lymphatic	149	(8.6)
Bone/Joint	66	(3.8)
Pleural	52	(3.0)
Miliary	30	(1.7)
Meningeal	28	(1.6)
Genitourinary	21	(1.2)
Peritoneal	14	(0.8)
Other	26	(1.5)
Total	**1,730**	**(100.0)**
Both Pulmonary and Extrapulmonary	**223**	**(12.9)**

TABLE 12
EPIDEMIOLOGIC INVESTIGATIONS OF TB EXPOSURE IN CONGREGATE SETTINGS[1], N=16
NEW YORK CITY, 1997

Site	*Contacts*			*Self-referred*	
	Number identified	*Number tested (%)*	*Number positive (%)*	*Number tested*	*Number positive (%)*
School					
Day Care Center	44	23 (52)	0 (0)	29	0 (0)
Elementary School Bus	15	14 (93)	5 (36)	0	0 (0)
Special Education School	27	15 (56)	0 (0)	32	3 (9)
High School A	19	13 (68)	2 (15)	88	4 (5)
High School B	37	27 (73)	2 (7)	41	3 (7)
College	16	4 (25)	1 (25)	3	0 (0)
Worksite					
Factory	12	4 (33)	0 (0)	0	0 (0)
Bank	46	42 (91)	10 (24)	25	1 (4)
Construction Co	3	2 (67)	1 (50)	0	0 (0)
Dentist's Office	15	14 (93)	0 (0)	0	0 (0)
Dialysis Center	76	61 (80)	14 (23)	22	6 (27)
US Postal Office	36	30 (83)	5 (17)	0	0 (0)
Drug Tx Program					
Alcohol and Drug Tx Ctr. A	29	14 (48)	0 (0)	9	0 (0)
Alcohol and Drug Tx Ctr. B	13	13 (100)	6 (46)	76	3 (4)
SRO Hotel	40	10 (25)	1 (10)	13	3 (23)
Social Club	4	4 (100)	1 (25)	1	0 (0)
Total	**432**	**290 (67)**	**48 (17)**	**339**	**23 (7)**

[1]*Three investigations (not shown on table) were conducted to evaluate a cluster of TB cases in a community.*
[2]*Persons who did not have known exposure to a person with TB, but requested tuberculin skin testing.*

APPENDICES

APPENDIX 1

The CDC's objectives for tuberculosis control programs nationwide may be categorized as pertaining to surveillance, case management, and prevention. These objectives are as follow:

Management and Surveillance of active tuberculosis cases

1. At least 90% of newly diagnosed tuberculosis cases will complete a course of therapy recommended by the American Thoracic Society/CDC.
2. For at least 95% of tuberculosis cases, all information requested in the national reporting form (the expanded Report of a Verified Case of Tuberculosis) will be available.
3. The impact of multidrug-resistant tuberculosis will be measured and documented.
4. Drug susceptibility testing will be performed routinely and in a timely fashion on at least the initial isolate from 90% of tuberculosis cases.
5. A system will be developed to accurately measure outcomes of MDRTB surveillance, case management, and contact investigation.

Prevention

1. At least 95% of close contacts of infectious tuberculosis cases will be examined, with at least 95% of infected contacts younger than age 15 years and at least 75% of infected contacts age 15 years and older starting preventive therapy.
2. At least 90% of infected contacts younger than age 15 years who start preventive therapy and at least 75% of infected contacts age 15 years and older who start preventive therapy will complete a minimum of 6 continuous months of preventive therapy.
3. At least 95% of TST-positive persons identified through program-supported screening will be clinically evaluated for tuberculosis within 2 weeks of TST.
4. At least 90% of persons with TB infection identified through program-supported screening who have no evidence of clinical TB or medical contraindications will start preventive therapy.
5. At least 75% of persons with TB infection identified through program-supported screening who start preventive therapy will complete a minimum of 6 months of preventive therapy.

APPENDIX 2

TUBERCULOSIS CASES BY UNITED HOSPITAL FUND NEIGHBORHOOD AND ZIP CODE: NEW YORK CITY, 1997

UHF Neighborhood	Zip Code	1997 TB
MANHATTAN		
Washington Heights	10032	18
	10033	17
	10034	8
	10040	10
Cent. Harlem	10026	16
Morningside Hghts	10027	27
	10030	12
	10031	24
	10039	17
East Harlem	10029	29
	10035	16
	10037	6
Upper West Side	10023	5
	10024	8
	10025	28
Upper East Side	10021	13
	10028	-
	10044	
	10128	-
Chelsea-Clinton	10001	6
	10011	21
	10018	-
	10019	-
	10020	-
	10036	7
Gramercy Park	10010	-
	10016	25
	10017	-
	10022	-
Greenwich Village	10012	6
	10013	14
	10014	-
Union Square	10002	50
	10003	16
	10009	10
Lower Manhattan	10004	-
	10005	-
	10006	-
	10007	-
	10038	-
	10280	-
BRONX		
Kingsbridge-Riverdale	10463	7
	10471	-
Northeast Bronx	10464	-
	10466	12
	10469	-
	10470	-
	10475	-
Fordham-Bronx Park	10458	13
	10467	18
	10468	22
Pelham-Throgs Neck	10461	-
	10462	9
	10465	-
	10472	12
	10473	10
Crotona-Tremont	10453	20
	10457	20
	10460	13

UHF Neighborhood	Zip Code	1997 TB
BRONX (continued)		
High Bridge-Morrisania	10451	10
	10452	26
	10456	30
Hunts Point-Mott Haven	10454	12
	10455	11
	10459	17
	10474	5
BROOKLYN		
Greenpoint	11206	22
	11211	18
	11222	5
	11237	10
Downtown-Heights-Slope	11201	12
	11205	9
	11215	9
	11217	7
	11231	8
Bedford Stuyvesant-Crown Hts.	11212	38
	11213	23
	11216	21
	11221	44
	11225	19
	11233	28
	11238	19
East New York	11207	20
	11208	12
	11239	5
Sunset Park	11220	15
	11232	9
Borough Park	11204	11
	11218	9
	11219	15
East Flatbush-Flatbush	11203	21
	11210	7
	11226	48
	11230	17
Canarsie-Flatlands	11234	5
	11236	20
Bensonhurst-Bay Ridge	11209	10
	11214	6
	11228	5
Coney Island, Sheepshead Bay	11223	10
	11224	11
	11229	10
	11235	17
QUEENS		
Long Island-Astoria	11101	10
	11102	-
	11103	6
	11104	11
	11105	5
	11106	18
West Queens	11368	24
	11369	-
	11370	16
	11371	-
	11372	18
	11373	38
	11377	18
	11378	-

UHF Neighborhood	Zip Code	1997 TB
QUEENS (continued)		
Flushing-Clearview	11354	16
	11355	38
	11356	-
	11357	-
	11358	-
	11359	-
	11360	-
Bayside-Little Neck	11361	5
	11362	-
	11363	-
	11364	-
Ridgewood-Forest Hills	11374	6
	11375	7
	11379	-
	11385	12
Fresh Meadows	11365	-
	11366	-
	11367	-
Southwest Queens	11414	-
	11415	-
	11416	-
	11417	-
	11418	5
	11419	-
	11420	-
	11421	-
Jamaica	11412	5
	11423	-
	11430	-
	11432	21
	11433	-
	11434	10
	11435	8
	11436	-
Southeast Queens	11001	-
	11004	-
	11411	-
	11413	10
	11422	-
	11426	-
	11427	-
	11428	-
	11429	6
Rockaway	11691	15
	11692	-
	11693	-
	11694	-
	11697	-
STATEN ISLAND		
Port Richmond	10302	-
	10303	-
	10310	-
Stapleton	10301	-
	10304	9
	10305	-
Willowbrook	10314	-
South Beach	10306	-
	10307	-
	10308	-
	10309	-
	10312	-
OTHER		

- means < 5 cases

To order copies of the TB76 or laboratory/pathology report forms, call or mail the enclosed order form to:
Edwin Rivera
Bureau of Tuberculosis Control
225 Broadway, 22nd floor, Box 72B
New York, NY 10007
Tel: (212) 442-5100

To order copies of the TB78 (preventive therapy) report forms, call or mail the enclosed order form to
Marcia Hampton
Bureau of Tuberculosis Control
225 Broadway, 22nd floor, Box 72B
New York, NY 10007
Tel: (212) 442-5100

TB CHEST CLINICS:

BRONX

Morrisania Chest Clinic
1309 Fulton Ave., Room 255
Bronx, NY 10456
Tel. (718) 901-6537/8

BROOKLYN

Bedford Chest Clinic
485 Throop Ave., Room 208A
Brooklyn, NY 11221
Tel. (718) 574-2462/3

Brownsville Chest Clinic
259 Bristol Street, Room 239
Brooklyn, NY 11212
Tel. (718) 495-7256/7/8

Bushwick Chest Clinic
335 Central Ave.
Brooklyn, NY 11221
Tel (718) 573-4898

Fort Greene Chest Clinic
295 Flatbush Ave. Ext.,
Room 222
Brooklyn, NY 11201
Tel. (718) 643-8357/8

MANHATTAN

Chelsea Chest Clinic
303 9th Ave., Room 137
New York, NY 10031
Tel. (212) 239-1790/49/57

Washington Heights Chest Clinic
600 West 168th St. Room 201
New York, NY 10032
Tel. (212) 304-5420/1

QUEENS

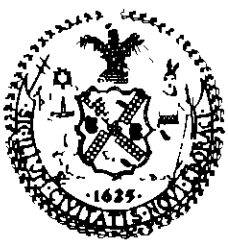
Corona Chest Clinic
34-33 Junction Blvd., Room 120
Queens, NY 11372
Tel. (718) 476-7635/36/37

Far Rockaway Chest Clinic
67-10 Rockaway Beach Blvd.,
Room 201
Queens, NY 11692
Tel. (718) 474-2100/1

STATEN ISLAND

Richmond Chest Clinic
51 Stuyvesant Place, Room 408
Staten Island, NY 10301
Tel. (718) 983-4525/26

RETURN TO
MARIE DOESNVILLE



THE CITY OF NEW YORK
DEPARTMENT OF HEALTH

Rudolph W. Giuliani
Mayor

Neal L. Cohen, M.D.
Commissioner of Health