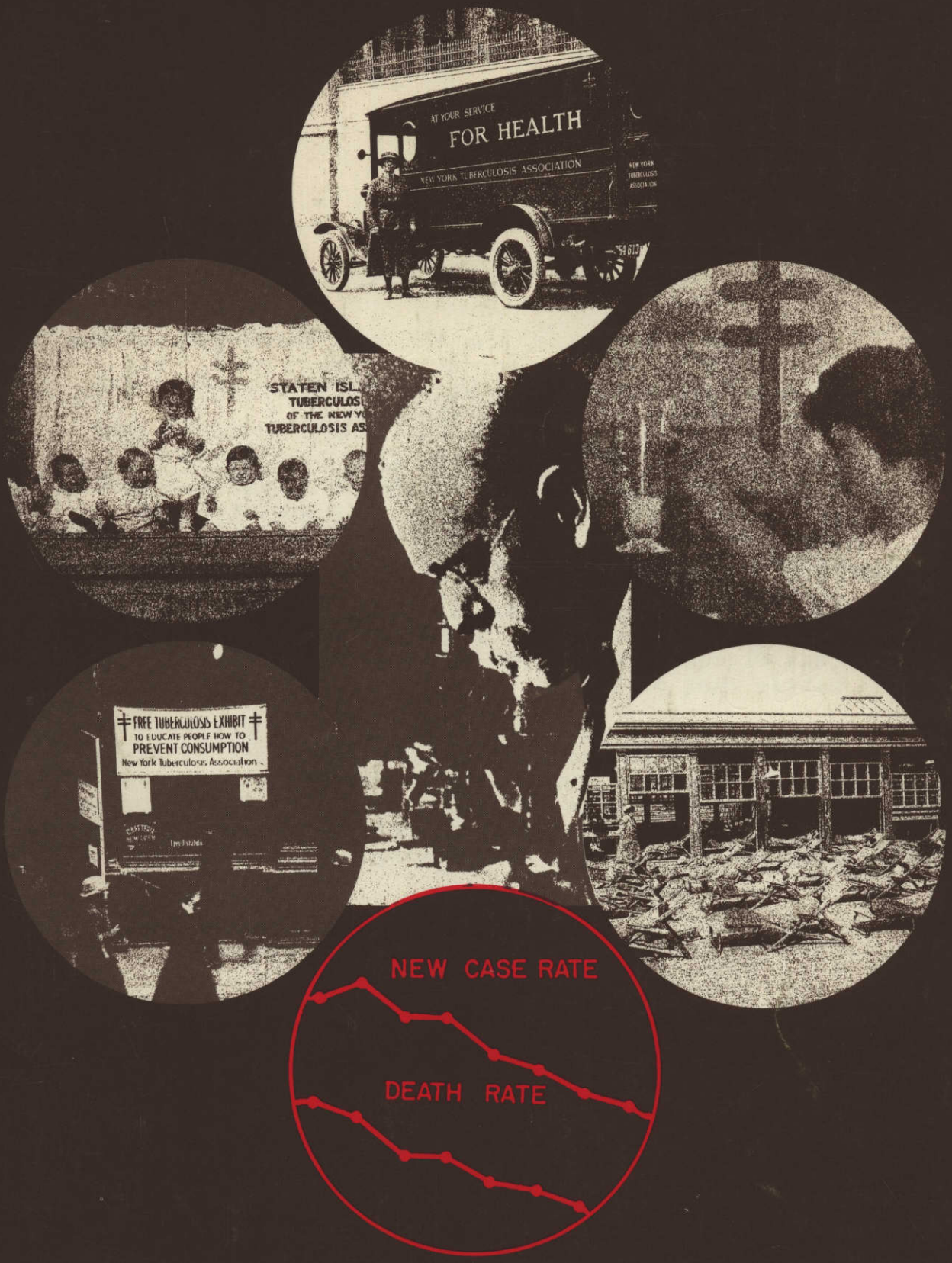
Tuberculosis in New York City

100 Years After Robert Koch's TB Discovery



1981

The tubercle bacillus, the cause of tuberculosis, was discovered in 1882 by scientist Robert Koch. His accomplishment, rewarded with a Nobel Prize for Medicine, paved the way for finding the cure.

Our knowledge has advanced tremendously since then so that today we probably know as much as we need to about the cause, control and cure of TB. Nevertheless it continues to afflict people here in New York and elsewhere.

The New York Lung Association and lung associations throughout the country helped to wage the war against this disease and brought about dramatic changes. The battle must continue.

Tuberculosis in New York City, 1981 was prepared by the Tuberculosis Division of the New York City Department of Health from data which it also collected. The New York Lung Association is pleased to publish this report as a service to the Department of Health, the medical community, and the people of our city.

Edith Ewenstein, CAE
General Director

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E R R A T A

Page 1, Part A, 2nd Paragraph, Line 11 - Change from 21.7 to 22.5.

Page 1, Part B, Paragraph 1, Line 9 - Change ratio from 2:1 to 1:2.

Page 2, Table 1, 1982 TB Case Rate - Change from 21.7 to 22.5.

Page 17, Table 8-B, Change Total New York City Rate for 1982 from 21.7 to 22.5.

Page 17, Table 8-B, Change Total New York City Rate for 1981 from 20.0 to 22.4.

The City of New York

DEPARTMENT OF HEALTH

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TO THE CITIZENS OF NEW YORK CITY:

Prior to 1977 the City of New York witnessed a steady decrease in the number of cases of tuberculosis; since 1977 however the number of cases has remained stable at approximately 1,500 per annum, a rate of 22.4 per 100,00 population. Across the nation over the last 25 years there was a downward trend in the number of new cases of about 5% per annum. Over the past year the national trend seems to have levelled off at 2%, New York City, however, instead of levelling off shows an increase in total number of cases. Good reasons for this decline are not available. It has been suggested that more cases are immigrating into the area e.g. new immigrants and refugees, as this report bears out, they are not responsible for the increase. The health districts with the largest number of cases are the same districts that had high rates in previous years. In other words we are dealing with a pool of infected persons who at some time in their life span break down with disease. Most of the potential patients have lived in New York City all their lives.

The Supervised Therapy Program which brought many patients back to treatment and of whom over 90% completed treatment has come to an end due to the loss of federal funds. It is hoped that some type of funding can be found to continue this worthwhile work. A consistent and sustained effort is required to diminish the extent of the disease.

The Bureau of TB wants to express its gratitude to Mr. George Buynoski, the Assistant Director and Mr. Greg Andrews, Public Health Advisor - CDC, who left us this year. They both made valuable contributions to this program. We wish them well.

Alje Vennema M D

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Director
Bureau of Tuberculosis

AV:hk

TUBERCULOSIS IN NEW YORK CITY, 1981

A. Newly Reported Tuberculosis Cases, 1981 (Table 1, Figure 1)

There were 1,582 new cases of tuberculosis reported in New York City in 1981, an increase of 68 cases (4%) over 1980. The case rate increased from 19.9 in 1980, to 22.4 per 100,000 population in 1981. The increased morbidity may reflect a stronger surveillance effort. Tuberculosis continues to be a serious public health problem in New York City; nationwide, the number of cases and case rates has continued to decline. Morbidity has been increasing in large urban areas.

Since 1977, almost all cases reported are based on bacteriological evidence of M. tuberculosis. The other cases counted are verified by histological examination, or a combination of a positive tuberculin test, radiological findings, clinical evidence and recommendation for treatment with two or more anti-tuberculosis drugs. In 1978, the number of cases reported was 1,307, in 1979 the number of cases rose significantly to 1,530, in 1980 there were 1,540 cases and in 1981 morbidity remained high at 1,582.

In 1981, the number of cases that had "disease again" and those with disease among the young decreased. Of the newly reported cases, 94% were confirmed by bacteriology. The morbidity experienced in 1979-1981 indicates that the City has experienced no decline in incidence.

B. Tuberculosis Mortality (Table 2, Figure 1)

In 1981 there were 150 deaths in New York City with tuberculosis as either the primary or as one of the contributing causes of death. This is an 11% increase in the number of deaths from 1980 and represents a trend for the past two years of increasing deaths due to tuberculosis. The death rate was 2.1 per 100,000 and again represents an increase over 1980 (1.8 per 100,000).

There were 61 cases of tuberculosis found at the time of death. Seventy-seven percent of the deaths occurred in the age groups over 45, and there were no tuberculosis deaths in the 0-19 age group. The ratio of male to female deaths is approximately the same as the ratio for newly reported cases (2:1).

C. Newly Reported Tuberculosis Cases by Site of Disease and by Bacteriologic Status (Table 3, Figure 2)

In 1981, there were 1,338 pulmonary cases (85%) and 244 extrapulmonary cases (15%) reported in New York City. Pulmonary cases increased by 54 (4%) over 1980, and extrapulmonary cases increased by 14 (6%) over 1980. The ratio of pulmonary to extrapulmonary cases has remained fairly stable for the past several years (5.5:1). Among the extrapulmonary cases, the categories which experienced an increase over those reported in 1980 were: lymphatic 80 (66); bone/joint 23 (11); miliary 27 (18); peritoneal 12 (7); and other 16 (11). Those categories which decreased were: pleural 41 (55); genitourinary 34 (41); and meningeal 11 (21). Ninety-four percent of both pulmonary and extrapulmonary cases of tuberculosis were verified by positive culture. This represents a 9% improvement of culture verification for extrapulmonary tuberculosis. Extrapulmonary foci mostly manifest themselves years after the primary has healed. In this type of tuberculosis, lymphatic and hematogenous spread seldom occurs. As a result the age distribution of extrapulmonary TB is different and the disease is mostly not so severe with the exception of meningitis which however appears more quickly after the original primary.

TABLE 1

NEWLY REPORTED TUBERCULOSIS CASES AND RATES, DEATHS AND RATES, NEW YORK CITY, 1960-1981

	TUBERCULOSIS CASES				TUBERCULOSIS DEATHS			
			% CHANGE				% CHANGE	
YEAR	NUMBER	RATE*	NUMBER	RATE	NUMBER	RATE*	NUMBER	RATE
1960	4,699	60.4	-	-	810	10.4	-	-
1961	4,360	56.0	-7.2	-7.3	738	9.5	-8.9	-8.7
1962	4,437	57.0	+1.8	-1.9	740	9.5	+0.3	0
1963	4,891	62.9	+10.2	+10.4	683	8.8	-7.7	-7.4
1964	4,207	53.7	-14.0	-14.6	581	7.4	-15.0	-15.9
1965	4,242	53.3	+0.8	-0.7	592	7.4	+1.9	0
1966	3,663	45.6	+13.6	-14.4	537	6.7	-9.3	-9.5
1967	3,542	43.6	-3.3	-4.4	525	6.5	-2.2	-3.0
1968	3,224	39.7	-9.0	-8.9	485	6.0	-7.6	-7.7
1969	2,951	36.4	-8.5	-8.3	418	5.2	-16.0	-13.3
1970	2,590	32.8	-12.2	-9.9	386	4.9	-7.7	-5.8
1971	2,572	32.6	-0.7	-0.6	310	3.9	-19.7	-20.4
1972	2,275	28.8	-11.5	-11.6	331	4.2	+6.8	+7.7
1973	2,101	26.6	-7.6	-7.6	262	3.3	-20.8	-27.3
1974	2,022	25.6	-3.8	-3.8	215	2.7	-17.9	-22.2
1975	2,151	27.2	+5.4	+6.3	208	2.6	-3.3	-3.8
1976	2,156	27.3	+0.2	+0.4	187	2.4	-10.1	-7.7
1977	1,605	21.1	-25.6	-23.1	175	2.3	-6.4	-4.2
1978	1,307	17.2	-18.6	-18.5	168	2.2	-4.0	-4.3
1979	1,530	20.1	+17.1	+16.9	119	1.6	-29.2	-27.3
1980	1,514	19.9	-1.0	-1.0	135	1.8	+13.4	+12.3
1981	1,582	22.4	+4.5	+12.5	150	2.1	+11.0	+16.6

* Per 100,000 Population

Note: Tuberculosis Deaths include both the primary and contributing cause.

FIGURE 1

RATES of NEWLY REPORTED TUBERCULOSIS CASES and DEATHS NEW YORK CITY, 1960 - 1981

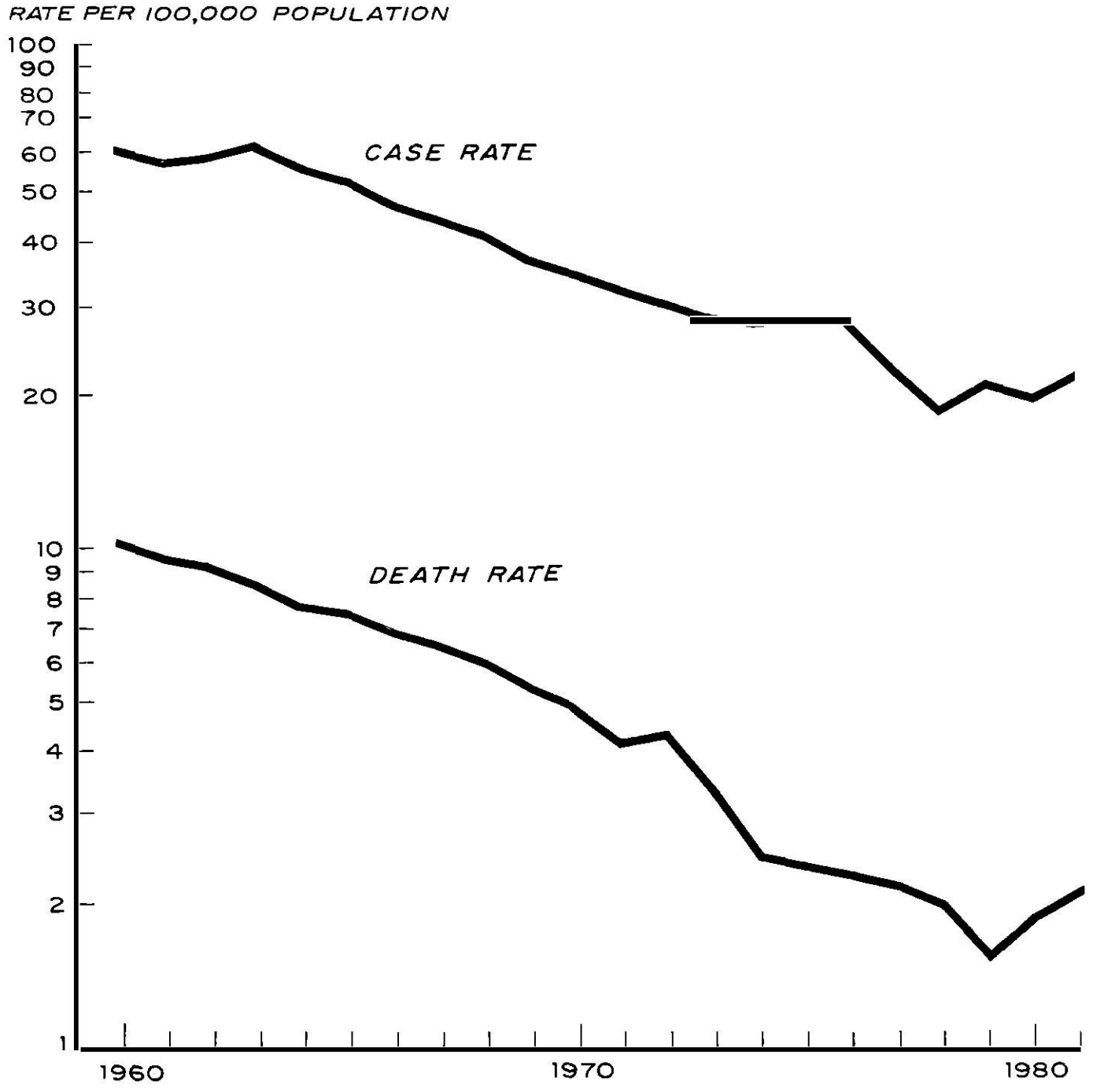


TABLE 2

TUBERCULOSIS CASES FOUND AT TIME OF DEATH BY AGE, RACE AND SEX, NEW YORK CITY, 1981

Age Groups	Total All Races	White		Black		Asian	
		M	F	M	F	M	F
0-4	0	0	0	0	0	0	0
5-9	0	0	0	0	0	0	0
10-14	0	0	0	0	0	0	0
15-19	0	0	0	0	0	0	0
20-24	1	1	0	0	0	0	0
25-34	6	3	1	1	1	0	0
35-44	7	1	0	4	2	0	0
45-54	11	5	0	3	3	0	0
55-64	4	1	0	2	1	0	0
65+	32	14	10	5	1	1	1
Total	61	25	11	15	8	1	1

In a chronic infectious disease like tuberculosis, where immunity never develops to the extent that it prevents repeated episodes of disease and which may eventually, unless treated, lead to death it is difficult to measure the extent of mortality and it is difficult to interpret mortality statistics. It is extremely gratifying that no deaths occurred under the age of nineteen. In addition with improved methods i.e. treatment with isoniazid and rifampin and the proper use of prophylactic INH it is not anticipated that cohorts of children who even in the early years of chemotherapy still had a probability of dying of greater than 10%, will in fact die from tuberculosis.

TABLE 3

NEWLY REPORTED TUBERCULOSIS CASES BY SITE OF DISEASE AND BY BACTERIOLOGIC STATUS, NEW YORK CITY, 1981

PREDOMINANT SITE	TOTAL CASES	BACTERIOLOGIC STATUS			
		POSITIVE		NEGATIVE (3)	NOT DONE
		CULTURE (1)	SMEAR ONLY (2)		
Pulmonary	1,338	1,257	11	12	58
Extra Pulmonary	244	230	5	2	7
Pleural	41	40	1	0	0
Lymphatic	80	78	0	1	1
Bone/Joint	23	22	0	0	1
Genitourinary	34	33	1	0	0
Miliary	27	20	3	1	3
Meningeal	11	10	0	0	1
Peritoneal	12	11	0	0	1
Other	16	16	0	0	0
Total All Sites	1,582	1,487	16	14	65

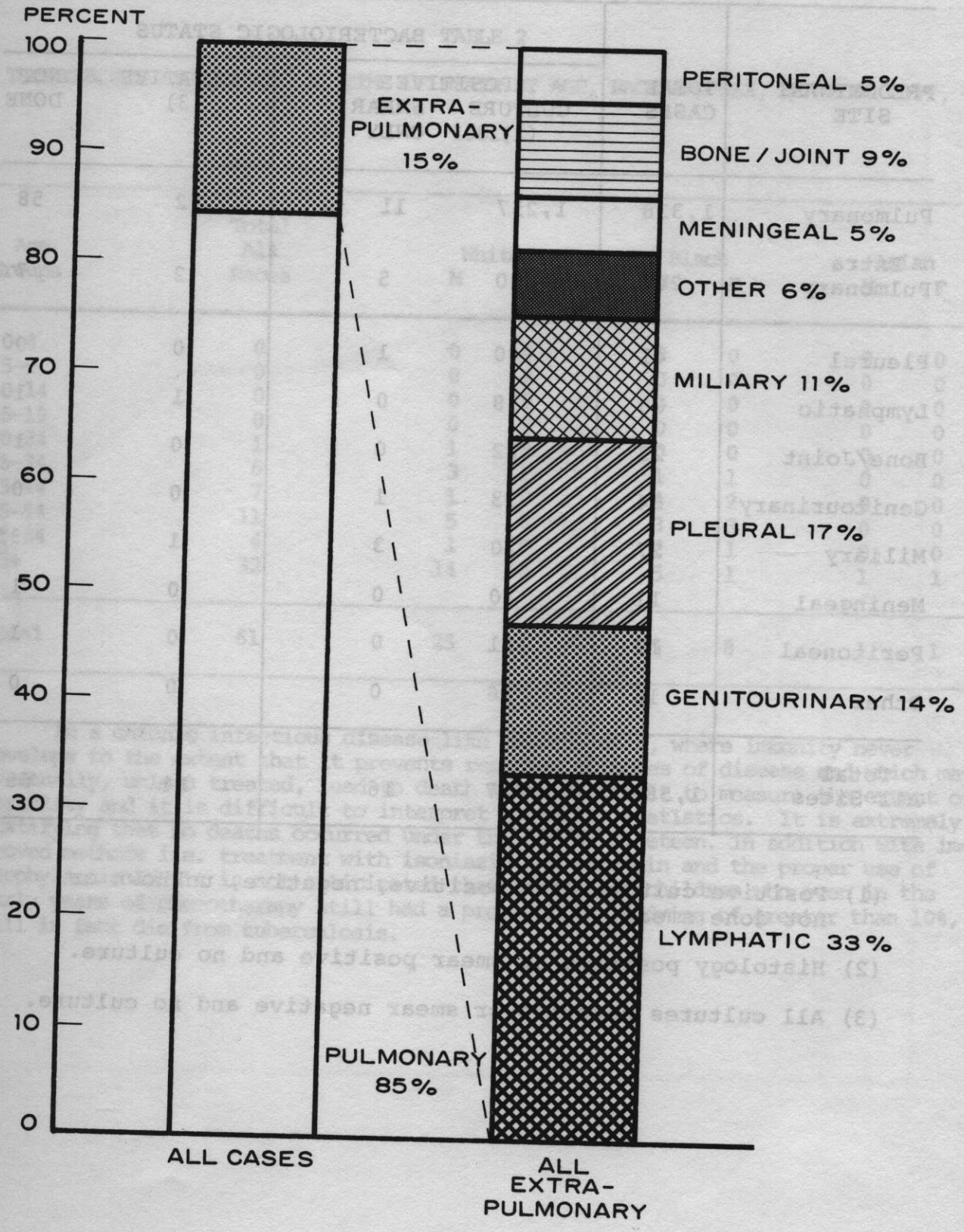
(1) Positive culture with positive, negative, unknown or not done smear.

(2) Histology positive or smear positive and no culture.

(3) All cultures negative or smear negative and no culture.

FIGURE 2

NEWLY REPORTED TUBERCULOSIS CASES BY SITE of DISEASE NEW YORK CITY, 1981



D. Newly Reported Tuberculosis Cases by Age, Race and Sex (Table 4 Figure 3)

1. Age

For the first time since 1976, there has been a decrease in the number of cases reported in children under 3 years of age. Although the decrease from 1980 was only 3 cases, it is significant in that it may indicate a lessening of recent transmission of bacilli. The age group which showed the greatest increase from 1980 to 1981 was the 35-44 age group (+15%) and the greatest decrease was in the 10-14 age group (-11%). The 15-19 age group had exactly the same number of cases in 1980 (42) as in 1981. The age groups 25-64 years represent 67.3% of the total morbidity in 1981, an increase of 6% over 1980.

2. Race (Table 5)

In 1981, 46% (727) of the newly reported cases were whites; 47% (737) were Black, and 7% (118) were Asian. This represents a 9% increase in Whites over 1980, a 1.5% increase in Blacks, and a 1.7% decrease in Asians. While Whites experienced increased morbidity in the 25-64 age groups, Blacks experienced an increase in the 0-9 age groups and in the above-45 age groups. This trend indicates that for Blacks as well as Whites, disease in 1981 was more often seen in the elderly and suggests that more transmission of bacilli occurs among Blacks.

3. Sex

The overall ratio of male to female cases was approximately 2:1 in 1981. This ratio varies for different age groups. For the ages 0-24 years, the number of male and female cases was just about equal; for the age groups 25-44 years, the ratio was 2:1 (male to female); for the age groups 45-64 years, males substantially outnumbered females (3:1); and again males above-65 years of age outnumbered females.

Where tuberculosis services have been well established and where good statistics are available the trend over the past two decades has been for the morbidity and mortality figures to decline especially in the younger age groups, with persistence in the elderly. The latter persistence is greater in males than females. This trend, however, is not obvious in New York City despite the availability of good therapeutic and preventive measures. Changes in the distribution of cases and deaths has an important influence on the organization of tuberculosis services. The presence of a comparatively high number of unknown infectious persons in the higher age groups is a danger to the non-infected children and delays progress towards the eventual eradication of the disease. It is also possible that drug resistant infectiousness due to inadequate treatment is a contributory factor to the occurrence of disease amongst the younger age groups although to what extent we don't know at this moment. In addition it is possible that the lack of decline in the rates and the absence of change in the age distribution of the disease incidence is due to the existence of so-called hard-core unknown infectious cases which may be increasingly hard to find.

FIGURE 3

NEWLY REPORTED TUBERCULOSIS CASES BY AGE AND SEX, NEW YORK CITY, 1981

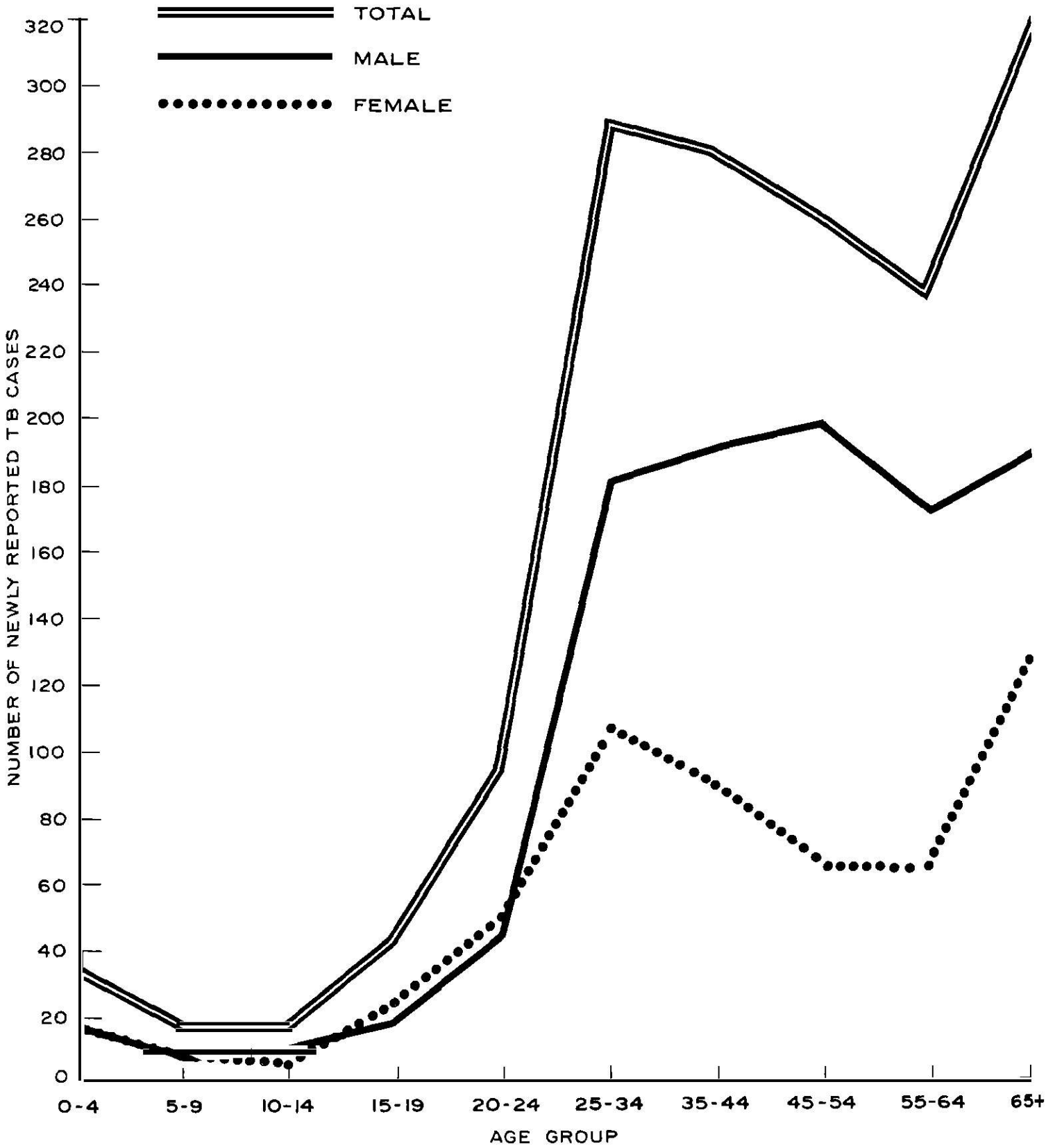


TABLE 4

NEWLY REPORTED TUBERCULOSIS CASES BY AGE, RACE, AND SEX
NEW YORK CITY, 1981

AGE GROUPS	TOTAL ALL RACES #	%	WHITE* M	F	BLACK** M	F	ASIAN M	F
0-4 years	34	2.1	2	8	15	9	0	0
5-9 years	16	1.0	3	4	5	4	0	0
10-14 years	16	1.0	6	2	4	4	0	0
15-19 years	42	2.7	7	5	9	16	2	3
20-24 years	93	5.9	20	13	22	30	2	6
25-34 years	289	18.3	60	36	103	63	18	9
35-44 years	280	17.7	78	37	105	45	8	7
45-54 years	261	16.4	89+	29	93	34	16	1
55-64 years	234	14.9	87	42	71	19	12	3
65+ years	317	20.0	112	87	58	28	19	12
TOTALS	1582	100	464	263	485	252	77	41

* Includes White Hispanics.

** Includes Black Hispanics.

\+ Includes One American Indian.

If one were to plot the figures of Table 4 on a curve it would become apparent that the age distribution for Black patients lies considerably higher than the curve for Whites in the age groups under 45. From this age on the curves are about the same. The Black curve is at its highest around age 25, the White curve at age 65 and above. The Black curve is slightly bimodal at age 30 and age 40. The White curve has only one peak at age 65 and above. This would support the conclusion that considerably more transmission is occurring amongst Blacks than Whites.

TABLE 5

NEWLY REPORTED TUBERCULOSIS CASES, WHITE vs NON-WHITE RACIAL GROUPS, NEW YORK CITY, 1981

YEAR	TOTAL CASES	WHITE*	NON-WHITE**
1960	4,699	2,896	1,803
1961	4,360	2,588	1,772
1962	4,437	2,578	1,859
1963	4,891	2,705	2,186
1964	4,207	2,283	1,924
1965	4,242	2,211	2,031
1966	3,663	1,853	1,810
1967	3,542	1,802	1,740
1968	3,224	1,614	1,610
1969	2,951	1,354	1,597
1970	2,590	1,130	1,460
1971	2,572	879	1,693
1972	2,275	925	1,350
1973	2,101	831	1,270
1974	2,022	843	1,179
1975	2,151	872	1,279
1976	2,156	840	1,316
1977	1,605	771	834
1978	1,307	641	666
1979	1,530	702	828
1980	1,514	668	846
1981	1,582	726	856

* Persons having origins in any of the original peoples of Europe, North Africa, or the Middle East.

** Persons having origins in any of the black racial groups of Africa and origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands

The newly reported cases have shown a decline over the years except since 1977. Over the last five years there has been no appreciable decline in the annual incidence for both cases. Unfortunately there are no reliable figures available for the prevalence of infection for the same period hence we have no idea of what the annual decline was. Actually the question whether or not tuberculosis has been declining in New York City since 1960 can't be answered with certainty. Other Western countries and other cities in the U.S.A. show an annual decline of 5% or more. The general environment of the city allows the tubercle bacilli to survive in their human host.

E. Newly Reported Tuberculosis Cases with Disease Again (Reactivation)
Tables 6,7

Patients who were previously treated for tuberculosis are counted as new cases if they have not been under medical supervision for 12 or more months and are diagnosed again with tuberculosis. The new diagnosis is confirmed by bacteriological findings and recent chest x-rays compatible with active tuberculosis.

In 1981, there were 121 cases with reactivated tuberculosis, a 10% decrease from 1980. This represents a 1% decline in the percentage of total morbidity from 1980 (9%) to 1981 (8%). All cases were over the age of 20 and 35% were under the age of 45, compared to 40% in 1980, while males in the 55-64 age group experienced the largest increase in the number of cases (+8) over 1980 and black females showed the greatest decline in all age groups over 25 years (-15). The age group of 35-44 years, for all races, had a decrease of 12 cases from 1980.

The number of cases of "tuberculosis again" increased marginally in the Bronx and Richmond, and decreased in Kings County, Queens and Manhattan from 1980 to 1981. The proportion of "tuberculosis again" to all new cases reported in 1981 has remained stable in all boroughs except Richmond, where due to the small number of cases the difference is not thought to be significant.

The treatment regimens available today should cure practically all patients. No patient should reactivate, yet results with good drug regimens are disappointing. The most common reasons for these unsatisfactory results are interruption of treatment and premature termination of treatment. As indicated elsewhere in this report and as witnessed in many other city and national programs, some 40% of patients do not take prescribed drugs for the required period of time. Reasons for defaulting are ignorance on the part of the patient of the need to ingest medication for a long period of time. The patient firmly believes that when the symptoms have subsided and he/she is feeling well again that medications are no longer necessary. He/she does not accept the fact that they are in danger even after being told. Side effects when they appear may give the impression that he/she is getting the wrong treatment. The patient is frequently not properly instructed about his/her disease or is dissatisfied with the medical services that are being provided. Inadequate regimens and primary drug resistance are of minor importance in considering reactivations.

TABLE 6

NEWLY REPORTED TUBERCULOSIS CASES WITH DISEASE AGAIN (REACTIVATIONS) BY AGE, RACE, AND SEX, NEW YORK CITY, 1981

AGE GROUPS	TOTAL CASES	WHITE		BLACK		ASIAN	
		M	F	M	F	M	F
0-4 years	0	0	0	0	0	0	0
5-9 years	0	0	0	0	0	0	0
10-14 years	0	0	0	0	0	0	0
15-19 years	0	0	0	0	0	0	0
20-24 years	7	0	0	2	0	0	0
25-34 years	20	1	3	9	7	0	0
35-44 years	20	3	1	11	3	2	0
45-54 years	32	13	3	15	1	0	0
55-64 years	26	14	3	8	0	1	0
65+ years	21	8	7	3	1	2	0
Totals	121	39	17	48	12	5	0

TABLE 7

NEWLY REPORTED TUBERCULOSIS CASES WITH DISEASE AGAIN BY COUNTY OF RESIDENCE, NEW YORK CITY, 19[illegible]

COUNTY OF RESIDENCE	NUMBER OF TB AGAIN CASES		PERCENT OF TOTAL TB AGAIN CASES	
	1981	1980	1981	1980
New York	47	53	39	39
Kings	36	46	30	34
Queens	16	17	13	13
Bronx	19	17	16	13
Richmond	3	2	2	1
TOTAL N.Y.C.	121	135	100	100

F. Newly Reported Tuberculosis Cases with Place of Birth Outside the United States

Of the 1,582 cases reported in New York City in 1981, information relative to the place of origin showed that 460 were born outside the United States. One hundred sixty-nine resided in New York for more than 5 years. Ninety-seven resided in New York for less than 5 years. Fifty-five of the latter arrived in the last 2 years. For the purposes of this analysis, those who were born in Puerto Rico were considered foreign-born. There were 117 cases born in Puerto Rico, the country with the greatest number of cases reported in 1981. With the exception of the Borough of Queens, in all Boroughs the greatest number of foreign-born cases came from Puerto Rico.

Every county demonstrated a different morbidity pattern by place of birth. In Kings County, the second highest number of cases came from Haiti (28); New York County had 25 cases from the Dominican Republic; in the Bronx, the second highest number came from Jamaica (4); Richmond County had 7 cases who were foreign-born, with 2 each from India, Puerto Rico and Ireland and 1 from China; in Queens County, the second highest number came from Puerto Rico (7), the greatest number came from Korea (8).

Fifteen percent of the newly reported cases were born in Europe; 25% were born in Puerto Rico and 22% were from other Spanish-speaking countries; 11% were from non-Spanish-speaking Caribbean countries; 23% from Southeast Asia and other parts of Asia; less than 2% came from Africa. If Puerto Rico were combined with the other Spanish-speaking countries, they would account for 47% of the newly reported cases born outside the United States for 1981 (218).

The possibility of infection being introduced by immigrants from countries where there is a high incidence of the disease is frequently cited to be a serious problem. Fifty-five cases had been here less than two years; presumably they fell ill shortly after arrival.

It is not unusual for people to break down with TB after a stressful experience such as immigration. Foreign-born nationals constituted 460 cases (29%) of the total morbidity of the City of whom 97 acquired or broke down with tuberculosis in the first five years of their stay. It is estimated that foreign-born residents form 33% of the New York City population (1970 census), it therefore stands to reason that a large proportion of cases will occur amongst them. The only satisfactory method of control would be based on chest radiography at or before the time of arrival into the country and perhaps further examination of certain nationality groups after arrival.

County of Residence of Foreign Born

County of Residence	# of Foreign Born Cases	Percent
New York	145	32%
Kings	149	32%
Queens	98	21%
Bronx	61	13%
Richmond	7	2%
TOTAL	460	100%

Cases by Country of Birth

Country	# of Cases
Puerto Rico *	117
China	40
Haiti	37
Dominican Republic	34
Korea	14
Phillipines	14
Ecuador	13
India	12
Italy	12
Peru	10
Soviet Union	10
All Others**	147
TOTAL FOREIGN BORN	460
COUNTRY OF BIRTH NOT SPECIFIED OR NATIVE BORN	1122
TOTAL CASES, 1931	1582

*Although not a country, counted as foreign born
**These countries had less than 10 cases each

G. Geographic Distribution of Newly Reported Tuberculosis Cases and Deaths, N.Y.C., 1981 (Tables 8,9)

The number of newly reported cases in 1981 ranged from a high of 158 (68.9 per 100,000) in Manhattan's Lower East Side health district to a low of 16 (6.4 per 100,000) in Brooklyn's Bay Ridge health district. Case rates ranged from a high of 79.7 per 100,000 (95 cases) in the Central Harlem health district to a low of 5.7 (20 cases) in Richmond County (which has only one health district).

In New York County, the number of cases increased from 554 cases in 1980 to 568 cases in 1981, while the case rate increased from 38.1 to 39.8 per 100,000. Overall, New York County ranked number 1 in both the number of cases and the case rate, but not all health districts showed increased morbidity. Four out of the seven health districts in New York County showed a decrease in the number of cases while five districts reported an increase in the case rate. Central Harlem, for example, had 2 less cases in 1981 (95) than in 1980 (97), but the case rate increased from 61.0 per 100,000 in 1980 to 79.9 in 1981. The East Harlem and Washington Heights health districts reported an increase in both the number of cases and the case rates.

Kings County had the second highest number of new cases (490) and also the next highest case rate, 22.0 per 100,000. Although the number of cases decreased by 10 from 1980, the case rate increased from 20.2 to 22.0, which may be indicative of a population change. The Bedford health district reported the highest number of cases (100) and also the highest case rate (47.9 per 100,000). Three out of ten districts reported an increase in the number of cases, while five out of ten reported an increase in the case rates. The Bushwick health district had no change in the number of cases (52 in 1980 and 1981) but the case rate increased from 25.2 to 31.2 per 100,000. The Bedford, Brownsville, and Red Hook/Gowanus health districts reported an increase in both the number of cases and case rates from 1980 to 1981.

Queens County had the most dramatic increase in 1981. The number of cases rose from 241 to 299 and the case rate increased from 12.3 to 15.8 per 100,000. Only the Flushing health district experienced a decline in the number of cases and yet the case rate remained the same as in 1980 (+22) and the greatest increase in case rate (+7.8). Despite this increase in 1981, Queens County still had a lower case rate than the New York City overall case rate of 22.4 per 100,000.

The Bronx had a slight increase in the number of cases but experienced a disproportionate increase in case rate from 14.1 to 17.5 per 100,000. Apparently the net outflow of the Bronx's population base has had a marked influence on its case rate and may not indicate a significant change in morbidity trends. An example of this phenomenon is the Tremont health district. Although the number of cases decreased by 9, the case rate for the district increased from 17.5 to 19.1 per 100,000 in 1981. Four out of the six health districts did experience an increase in the number of cases as well as an increase in the case rate.

Richmond decreased from 23 cases in 1980 to 20 cases in 1981 and showed a similar decrease in case rate to 5.7 per 100,000. Because of the low population base and the small number of cases reported annually, morbidity has fluctuated since 1977.

Earlier in the decade the number of new cases reported declined; however, over the last five years we have witnessed an average number of 1,500 new cases per annum. Eleven of the 30 health districts experienced a decline in the case rates in 1981. Of those districts that have had an increase, 5 are in Queens (Corona, Jamaica West, Maspeth/Forest Hills, Astoria, and Jamaica East), 4 are in Manhattan (Washington Heights and Kips Bay (Yorkville), Central and East Harlem), 5 are in the Bronx (Morrisania, Mott Haven, Pelham Bay, Tremont, and Westchester) and 5 are in Brooklyn (Bedford, Brownsville, Bushwick, Fort Greene and Red Hook/Gowanus).

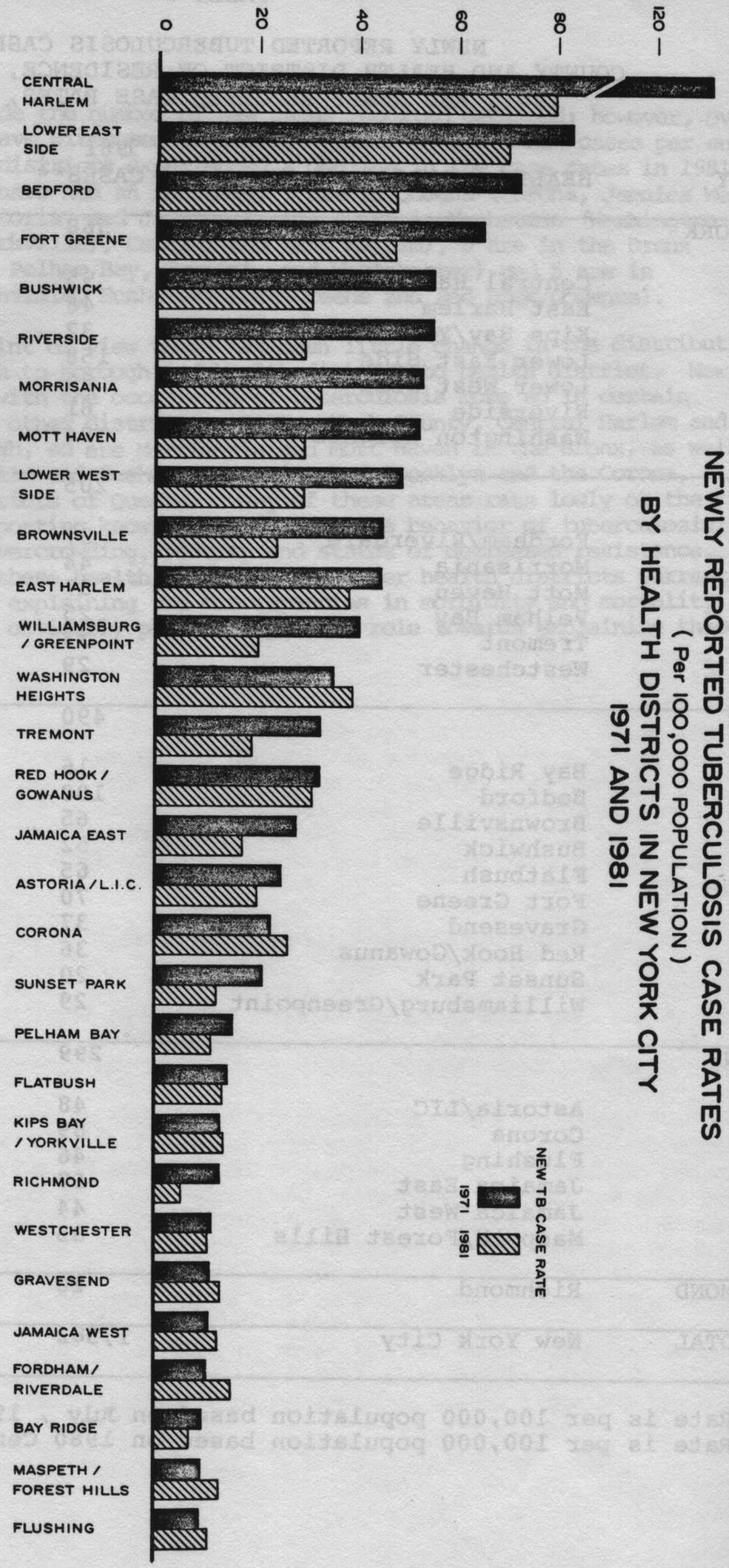
From an analysis point of view there has been little change in the distribution of incidence from borough to borough and health district to health district. New York City is confronted with the occurrence of tuberculosis more so in certain districts as compared to other districts. In New York County, Central Harlem and East Harlem rates are high, so are Morrisania and Mott Haven in the Bronx, as well as the Bedford, Brownsville and Bushwick districts of Brooklyn and the Corona, Astoria and Jamaica districts of Queens. Many of these areas rate lowly on the socio-economic scale, supporting known factors about the behavior of tuberculosis such as that TB favors overcrowding, poverty and states of decreased resistance. The differences between these health districts and other health districts warrant serious consideration in explaining the discrepancies in morbidity and mortality. Environmental conditions obviously play an important role towards explaining these differences.

TABLE 8

NEWLY REPORTED TUBERCULOSIS CASES BY COUNTY AND HEALTH DISTRICT OF RESIDENCE, NEW YORK CITY, 1981, AND NEWLY REPORTED CASE RATES, 1979-1981

COUNTY	HEALTH DISTRICT	1981 CASES**	1981 RATE**	1980 RATE*	1979 RATE*
NEW YORK		568	39.8	38.1	40.4
	Central Harlem	95	79.9	61.0	50.9
	East Harlem	48	38.5	25.6	26.3
	Kips Bay/Yorkville	32	13.8	11.9	11.5
	Lower East Side	158	68.9	69.7	79.0
	Lower West Side	80	29.5	42.5	47.8
	Riverside	61	29.5	29.1	34.3
	Washington Heights	94	38.9	26.6	27.9
BRONX		205	17.5	14.1	14.6
	Fordham/Riverdale	37	15.8	17.8	12.2
	Morrisania	44	32.7	15.2	19.0
	Mott Haven	37	29.8	17.0	18.7
	Pelham Bay	25	11.4	9.7	11.5
	Tremont	33	19.1	17.5	20.8
	Westchester	29	10.2	9.3	8.3
KINGS		490	22.0	20.2	20.1
	Bay Ridge	16	6.4	8.7	9.5
	Bedford	100	47.9	33.5	33.9
	Brownsville	65	24.0	16.9	18.2
	Bushwick	52	31.2	25.2	25.2
	Flatbush	65	13.6	17.4	13.9
	Fort Greene	70	47.4	40.9	39.2
	Gravesend	37	12.8	13.4	14.7
	Red Hook/Gowanus	36	31.5	21.1	25.6
	Sunset Park	20	12.2	14.7	11.9
	Williamsburg/Greenpoint	29	20.4	20.7	24.4
QULENS		299	15.8	12.3	11.3
	Astoria/LIC	48	20.1	17.8	14.9
	Corona	69	26.2	18.4	14.1
	Flushing	46	10.4	10.4	8.5
	Jamaica East	57	17.7	15.7	18.1
	Jamaica West	44	12.6	8.4	6.7
	Maspeth/Forest Hills	35	12.7	6.3	8.7
RICHMOND	Richmond	20	5.7	7.0	6.1
TOTAL	New York City	1,582	22.4	19.9	20.1

* Rate is per 100,000 population based on July , 1976, estimate.
** Rate is per 100,000 population based on 1980 Census data.



NEWLY REPORTED TUBERCULOSIS CASE RATES
(Per 100,000 POPULATION)
BY HEALTH DISTRICTS IN NEW YORK CITY
1971 AND 1981
NEW TB CASE RATE
1971
1981
0
20
40
60
80
120
140
CENTRAL HARLEM
LOWER EAST SIDE
BEDFORD
FORT GREENE
BUSHWICK
RIVERSIDE
MORRISANIA
MOTT HAVEN
LOWER WEST SIDE
BROWNSVILLE
EAST HARLEM
WILLIAMSBURG / GREENPOINT
WASHINGTON HEIGHTS
TREMONT
RED HOOK / GOWANUS
JAMAICA EAST
ASTORIA / L.I.C.
CORONA
SUNSET PARK
PELHAM BAY
FLATBUSH
KIPS BAY / YORKVILLE
RICHMOND
WESTCHESTER
GRAVESEND
JAMAICA WEST
FORDHAM / RIVERDALE
BAY RIDGE
MASPETH / FOREST HILLS
FLUSHING

TABLE 9

TUBERCULOSIS DEATHS AND DEATH RATES BY COUNTY AND HEALTH DISTRICT OF RESIDENCE, NEW YORK CITY, 1980 AND 1981

COUNTY	HEALTH DISTRICT	1981 *DEATHS	1981 RATE***	1980 *DEATHS	1980 RATE**
New York		54	3.8	45	3.1
	Central Harlem	9	7.4	13	8.2
	East Harlem	4	3.2	5	3.6
	Kips Bay-Yorkville	5	2.2	3	1.3
	Lower East Side	11	4.7	3	1.3
	Lower West Side	7	2.6	8	3.2
	Riverside	5	2.4	9	4.2
	Washington Heights	13	5.4	4	1.7
Bronx		20	1.7	18	1.3
	Fordham-Riverdale	3	1.3	5	2.0
	Morrisania	2	1.5	7	3.3
	Mott Haven	4	3.2	1	0.6
	Pelham Bay	3	1.4	1	0.4
	Tremont	4	4.2	1	0.4
	Westchester	4	1.4	3	1.0
Kings		48	2.2	52	2.1
	Bay Ridge	2	0.8	3	1.1
	Bedford	13	6.2	8	3.3
	Brownsville	3	1.1	1	0.3
	Bushwick	6	3.6	13	6.3
	Flatbush	9	1.9	7	1.5
	Fort Greene	5	3.4	10	5.5
	Gravesend	1	0.3	3	1.0
	Red Hook-Gowanus	2	1.7	3	2.2
	Sunset Park	1	0.6	2	1.1
	Williamsburg-Greenpoint	6	4.2	2	1.2
Queens		19	1.0	16	0.8
	Astoria-Long Island City	2	0.8	2	0.8
	Corona	3	1.1	2	0.8
	Flushing	3	0.7	3	0.6
	Jamaica East	3	0.9	6	1.8
	Jamaica West	5	1.4	3	0.8
	Maspeth-Forest Hills	3	1.1	0	0.0
Richmond		3	0.9	4	1.2
	Richmond	3	0.9	4	1.2
NEW YORK CITY TOTAL		144+	2.0	135	1.8

* TB deaths include both primary and contributing cause of death.
** Rate per 100,000 population based on July, 1976, population.
*** Rate per 100,000 population based on Data from 1980 Census.
\+ There were 150 deaths in NYC, of which 144 were NYC residents, 5 were non-residents and 1 was unknown.

Tuberculosis Deaths (Table 9)

All health districts had at least one death in 1981 in which tuberculosis was the primary cause of death. The death rate increased slightly from 1.8 in 1980 to 2.0 in 1981. The county with the greatest death rate was New York County: 3.8 per 100,000, and every district within that county had a death rate greater than the overall New York City death rate. The health district with the greatest death rate was Central Harlem: 7.4 per 100,000. It showed a decrease from 1980 (8.2). Thirteen out of the 30 health districts had death rates greater than the N.Y.C. rate of 2.0 per 100,000. Bedford had the greatest change in death rate from 1980 (3.3) to 1981 (6.2), and Washington Heights had the greatest increase in the number of deaths from 1980 (4) to 1981 (13).

H. Newly Reported Tuberculosis Cases by Source of Report, 1981 (Table 10)

New York County, which reported 46% of new cases in 1980, accounted for 36% in 1981. Kings County reported 32% in 1980 and 31% in 1981. Richmond County decreased from 2% to 1% in 1981. Queens County reported 19% in 1981. This represents an increase of 9% over 1980's reported morbidity. The Bronx also experienced an increase in newly reported cases from 10% in 1980 to 13% in 1981.

In 1981, 54% of the newly reported tuberculosis cases were diagnosed and reported by the private sector as compared with 55% in 1980. From 1978 on, more cases were reported by the private sector than by Department of Health clinics or Health and Hospitals Corporation facilities (public sector). This seems to have levelled off. The numbers remained stable in New York, Kings, and Richmond Counties but not in Queens County and the Bronx. In Queens, there was a 4% increase in the number of newly reported cases by the public sector, whereas in the Bronx, 44% of the newly reported cases were reported by the private sector in 1981 representing a decline of 4%.

Within the public sector, Department of Health clinics reported 9% of the morbidity in 1981, a 5% increase over 1980. In New York and Kings County, there was a decrease in reporting from Health and Hospitals Corporation facilities. Public sector reporting in Queens County for Department of Health Clinics declined in 1981 by 3% and 7% in Health and Hospitals Corporation facilities; hence, a 10% increase in private sector reporting. The Bronx experienced an increase in both Department of Health and Health and Hospitals Corporation facilities' reporting of 15% and a 21% decrease in private sector reporting.

TABLE 10

NEWLY REPORTED TUBERCULOSIS CASES BY SOURCE OF REPORT BY COUNTY, NEW YORK,CITY, 1981

Source Of Report	New York City Totals				New York				Kings				Queens				Bronx				Richmond			
	1981		1980		1981		1980		1981		1980		1981		1980		1981		1980		1981		1980	
	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%
Department Of Health Chest Clinics	149	9	59	4	50	9	7	2	64	13	31	7	21	7	16	10	14	7	5	3	0	0	0	0
Municipal Hospitals	514	33	571	38	178	31	267	39	146	30	191	40	103	35	63	42	87	42	50	32	0	0	0	0
Voluntary* Hospitals	810	51	791	52	316	55	388	56	248	51	235	50	142	48	58	39	85	41	93	60	19	95	17	85
Private Physicians	50	3	51	3	12	2	17	2	15	3	11	2	15	5	13	9	7	3	7	5	1	5	3	15
Others**	59	4	42	3	14	3	12	1	17	3	4	1	15	5	0	0	13	7	0	0	0	0	0	0
TOTALS	1,582	100	1,514	100	570	100	691	100	490	100	472	100	296	100	150	100	206	100	155	100	20	100	20	100

* Includes private, voluntary, and federal hospital facilities.
** Includes 38 cases reported by sources outside of New York City.

Primary Drug Resistance (Table 11)

Resistance to anti-tuberculosis medications presents a problem to the individual patient with disease as well as anyone exposed to them. For those with disease, it is a treatment problem because they may be given drugs which will not be effective. For those exposed, it is a problem because preventive medication may not provide any protection. Although the Bureau does not advocate sensitivity testing at the start of treatment, a careful review of each patient's history should be done to determine whether or not primary resistance has been acquired from the source case. If there is reason to believe that the latter has occurred, sensitivity studies are recommended from the beginning of treatment. The greatest concern for resistance to anti-tuberculosis drugs should be primary resistance to isoniazid (INH). First, INH is included in every initial treatment regimen, and second, INH is the only drug yet proven to be effective for chemoprophylaxis. In 1981 in New York City, primary resistance to INH was 6.6%, an increase from 4.9% in 1980 and 2.4% greater than the nationwide average of 4.2%. In 1980, there were no cases resistant to ethambutol, but in 1981 there were 3 (0.8%). Resistance to streptomycin increased slightly from 4.9% to 5.0%. The rate for rifampin increased from .8% to 1.1% and ethionamide increased from 1.5% to 2.1%.

There has been much discussion on resistance. There are some strains of bacilli that have natural resistance. However, the greatest amount of resistance is more than likely acquired from other patients who became resistant because they acquired drug-resistant bacteria from patients with secondary drug resistance due to inadequate chemotherapy. When these strains are transmitted to another person and produce disease there is no guarantee that they will be inhibited by standard drugs. During transmission the degree of resistance may fall and the proportion of sensitive organisms in the strain may rise. Hence, the above results obtained by non-randomized selection of isolettes may not entirely reflect the in-vivo situation. The so-called zig-zag regimen using single drugs in fast alternating sequence or adding a single drug to a failing regimen is a harmful practice that is unfortunately still being used in New York City. Bacterial drug resistance is due to the selection of resistant mutants. There is no evidence to support progressive adaptation of susceptible bacilli to the drug to which they are exposed. Frequently it is said that cavities harbor resistant bacilli because of fibrosis and poor vascularization and hence the drug can't enter and that hence bacilli adapt, this is not the case. Drug concentration in cavities is high enough to eliminate bacterial populations, if they are not eliminated the bacilli are truly resistant. If the latter is the case, sensitivity testing must be done and a completely new regimen of at least three new drugs must be employed.

TABLE 11 PERCENTAGE OF PRIMARY RESISTANCE - 1981

Drug	Number		New York City %		U.S.A. %	
Resistant	1981	1980	1981	1980	1981	1980
Isoniazid	25	13	6.6	4.9	4.2	4.1
Rifampin	4	2	1.1	0.8	0.2	0.7
Ethambutol	3	0	0.8	0.8	0.3	0.3
Streptomycin	19	13	5.0	4.9	3.8	3.8
PAS	6	4	1.6	1.5	0.8	0.8
Ethionamide	8	4	2.1	1.5	1.1	0.8
Kanamycin	0	0	0.8	0.0	0.1	0.1
Cycloserine	1	1	0.3	0.4	0.1	0.1
Capreomycin	1	0	0.3	0.0	0.1	0.1

Supervised Therapy Program (STP)

During 1981 the Bureau was engaged in a drug treatment program utilizing Public Health Advisers as outreach workers, to medicate patients who were non-compliant to the regular regimen of treatment and hoping thereby to interrupt the transmission of the disease. Supervision is provided on a daily or intermittent (2-3 times per week) basis where the ingestion of medication is directly observed. Progress of treatment is monitored by twice-monthly sputum results, which are taken directly by the outreach worker in the field and by radiological and clinical improvement.

By December, 1981, 169 patients had been identified as candidates for supervised therapy. A total of 98 were located and enrolled in the program. The status of the patients is as follows:

1. Patients no longer on STP

a)	Successfully completed Rx	18
b)	Returned to OPD/Clinic	4
c)	Moved from N.Y.C.	7
d)	Died	7
e)	Lost to supervision	7

2. Patients under supervision as of 12/81 53

Patients, after completion of treatment, are evaluated at three and six months to ensure that they have been cured. There have so far been no reactivations from any of the completed cases. Of the seven patients who died, in only only case could tuberculosis be cited as a contributing cause of death.

Of the 98 patients enrolled, 71 had completed or were current for treatment; hence a drug continuity of 80%. Considering that 95%-100% of these patients were failures in standard treatment programs, the results to date are very encouraging.

Tuberculosis in Refugees and Aliens

When refugees are admitted to the U.S., they are classified for tuberculosis control purposes as active or suspected to be active (Class A) and those considered non-infectious for travel purposes (Class B). Since any individual's status can change significantly by the time they arrive here, all refugees are evaluated upon arrival for determination of current tuberculosis status. In 1981, 124 Class A refugees were screened and evaluated by the Bureau at the Chelsea District Health Center; of those examined ten were discovered to have chest x-ray findings compatible with active pulmonary tuberculosis but only two had positive smears and cultures. Seven hundred (700) Class B refugees were screened also. Of that number, only one had positive bacteriologic findings.

From 1977-1981, 728 Class A refugees have been examined by the Bureau, and as a result, 13 were found to have positive cultures for MTB. During the same period, 4,401 Class B refugees were examined, and only one individual had a positive culture.

New York City Prevalence of Infection Among School Children, 1980-1981 (Table 12)

During the period of March, 1980, through June, 1981, the Bureau of Tuberculosis undertook a prevalence survey of students ages 5-16 in the New York City school system. The primary purpose of the study was to assess the prevalence and risk of infection. A stratified random sample of 120 schools with grades ranging from kindergarten to junior high school was scheduled from each of the City's health districts. The selection included 3 public and 1 parochial school from each district.

The tuberculin test was administered according to the procedures recommended by the Tuberculosis Surveillance and Research Unit of the Int. Union Against TB. This consisted of 0.1 ml of PPD-S injected intracutaneously and read 48 to 72 hours later. Members of the T.S.R.U. were on hand to provide training and technical assistance on this survey. In order for the Bureau to administer this test a consent form was required from the parent of each child.

Of the 120 schools tested comprising 90,099 students, consents were received on 20,683, or 23%. There was a significant difference between the number of consent forms received from students attending parochial schools (34.2%) and those attending public schools (21.5%). Of those with signed consent forms, 86% were given the test. A total of 17,912 students were given the PPD test with 16,186 showing up for the reading. There were 15,522 (95.9%) negative and 664 (4.1%) positive reactions with induration of 10 mm or more. Children in public schools 574 (4.2%) showed a higher percentage positive reactions than children in parochial schools 90 (3.1%). Students with a history of BCG were excluded from the positive findings.

Of the 664 students with a positive PPD medical follow-up information was obtained on 500 or 75%. The remaining 164 had either moved out of New York City or failed to respond to inquiries and field visits made by the Bureau. Where information was obtained 468 or 93.6% of the children received chest x-rays and 375 or 75% were placed on preventive medication.

These figures indicate that tuberculosis infection is more prevalent in New York City school children and greater than 1% in which case CDC advocates skin testing of school children. A prevalence of 4% in positive skin test leads the Bureau to believe that periodic skin testing of selective schools in high incidence areas be conducted.

TABLE 12

TUBERCULIN SKIN TESTING IN N.Y.C. SCHOOLS
1980-1981

	Type School	No. School	Sample Size	No. of Consents	% Consents	Tests Done	% Done	Tests Read	% Read	No. Pos.	% Pos.	No. Neg.	% Neg.	Test Not Read	%
Phase I March-June 1980	Public	26	19,367	5,985	30.9	4,558	76.2	3,880	85.1	101	2.6	3,779	97.4	678	14.9
	Parochial	28	9,484	3,480	36.7	2,865	82.3	2,758	96.3	89	3.2	2,669	96.8	107	3.7
	Total	54	28,851	9,465	32.8	7,423	78.4	6,638	89.4	190	2.9	6,448	97.1	785	10.6
Phase II Oct. 1980-Jan. 1981	Public	34	29,405	6,288	21.4	5,696	90.6	5,253	92.2	258	4.9	4,995	95.1	443	7.8
	Parochial	2	605	18	3.0	18	100.0	18	100.0	1	5.6	17	94.4	0	0.0
	Total	36	30.010	6,306	21.0	5,714	90.6	5,271	92.2	259	4.9	5,012	95.1	443	7.8
Phase III March-June 1981	Public	30	31,238	4,912	15.7	4,775	97.2	4,277	89.6	215	5.0	4,062	95.0	498	10.4
	Parochial	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	30	31,238	4,912	15.7	4,775	97.2	4,277	89.6	215	5.0	4,062	95.0	498	10.4
	TOTAL	120	90,099	20,683	23.0	17,912	86.6	16,186	90.4	664	4.1	15,522	95.9	1,726	9.6

I. Short Course Chemotherapy

There are many drugs now available which offer virtually certain "cure" of tuberculosis, but the major obstacle to effecting complete cure is non-compliance or failure to complete the prescribed regimen. A means of dealing with this problem is to shorten the total duration of chemotherapy, as long as it is as effective as conventional treatment, while at the same time avoiding an increase in toxicity. There has been ample enough experience with chemotherapy regimens, even when drug taking is interrupted, for the Bureau to recommend that nine months of INH 300 mg and Rifampin 600 mg daily (with a minimum of six months therapy after sputum conversion) is sufficient therapy. This represents a substantial decrease over previously suggested treatment regimens of 18-24 months duration. It is important to note that the above regimen is primarily for uncomplicated pulmonary tuberculosis in adults and does not reflect the differing circumstances in special treatment situations such as in primary resistance, childhood tuberculosis, or re-infection.

While short course chemotherapy may not be appropriate for every treatment situation, it is applicable to a significant proportion of newly diagnosed cases. When Isoniazid and Rifampin are given regularly for 9-12 months, the results are excellent. Relapse rates and toxic reactions among patients with drug-susceptible organisms are less than five percent. Patients should remain under surveillance for 12 months after completion of therapy in order to assure the efficacy of this regimen(s). Close scrutiny of all patients on short course chemotherapy minimizes the risks of failure and adverse reactions.

Section II:
Prevalence of Tuberculosis Disease, New York City, December 31, 1981 (Table 13)

As of December 31, 1981, there were 2,636 cases under medical supervision for tuberculosis in New York City. Of that number, approximately 11% (285) were still in hospital and the remainder were ambulatory. During the period from January 1, 1981, to December 31, 1981, 1,985 cases were closed to supervision; 57% had completed therapy; 11% had expired (not necessarily from tuberculosis) and 8% had moved to another jurisdiction, 24% were lost to supervision.

Patients who remained under supervision received their followup care at Department of Health chest clinics, municipal hospitals combined chest clinics, or in the private sector. The private sector reported 58% of new cases of tuberculosis in 1981, but supervised only 38% of the disease prevalence. Department of Health chest clinics reported only 9% of the morbidity, but provided 17% of the ambulatory care. Municipal hospitals reported 33% of new cases and provided 45% of the subsequent medical supervision. These difference impact, to a great extent, on the number of cases lost to supervision since there is quite often a substantial loss of time due to transfer of the patient from in-patient to out-patient care. As long as the majority of cases are diagnosed by the private sector and the majority of ambulatory care is provided by the public sector (62%), patients will be lost to supervision.

Of the total number of cases under supervision at home (ambulatory), only 53% (1,240) were on any medication at the end of December, 1981, 93% (1,154) of those for whom chemotherapy was recommended were on two or more drugs; the remaining 7% (86) were on one drug. The total number of cases with disease who were not on two or more drugs was 1,523, and represented 58% of the disease prevalence under supervision in 1981. These patients are at risk of reactivating with active disease and infecting others with tuberculosis. In addition they are at greater risk of developing secondary drug resistance and therefore presenting a treatment problem for those who they might subsequently infect.

Of the 2,122 patients recommended for two or more anti-tuberculosis medications, 52% were evaluated for bacteriologic status during 1981; 548 (26%) patients should have had bacteriology done because their last known sputum was positive. Without a documented conversion from positive to negative sputum, there is no way to determine whether or not those patients remained infectious and endangered others. The latter problem is even more serious in the private sector where only 31% of those who should have had bacteriology done actually had it performed. The Department of Health chest clinics performed bacteriology on 77% of cases recommended and Health and Hospital Corporation facilities did bacteriology on 63% of cases under supervision and recommended for bacteriology.

TABLE 13

TUBERCULOSIS PROGRAM MANAGEMENT REPORT - CASE REGISTER

TUBERCULOUS DISEASE PREVALENCE, NEW YORK CITY

January 1, 1981, to December 31, 1981

A. Patients Under Supervision at Start of Period 2,686

B. Patients Added During Period 1,935

C. Patients Closed to Supervision During Period 1,985

1. Supervision Completed 1,134
2. Moved out of jurisdiction 164
3. Lost 469
4. Died 218

D. Patients Under Supervision at End of Period 2,636

1. Patients in a general hospital (inpatient) 285
2. Patients at home (ambulatory care)..... 2,351

STATUS OF PATIENT AT HOME AS OF DECEMBER 31, 1981 (same as D - 2)

	TOTAL CASES	TWO OR MORE TB DRUGS	ONE TB DRUG	NO TB DRUGS
CHEMOTHERAPY				
Recommended	2,351	2,122 (i)	143	86
On Drugs	1,240	1,154 (ii)	86	0
Not on Drugs	1,111	968	57	86
BACTERIOLOGY				
Positive within past 3 months	206	186 (iii)	0	20
Negative within past 3 months	519	456 (iv)	62	1
Not Recommended	936	892 (v)	44	0
Recommended, but not done	690	588	37	65

Chemotherapy Index $\frac{(ii)}{(i)} \times 100 = 54\%$

Bacteriology Index $\frac{(iii)+(iv)}{(i)-(v)} \times 100 = 52\%$

SECTION III: CONTROL OF TUBERCULOSIS

A. Introduction

Control of tuberculosis is defined as those mandated activities which involve the protection of public health. The responsible agent for meeting public health obligations is the Bureau of Tuberculosis. These responsibilities concern personal health through the elimination of death, disability, illness, emotional trauma, family disruption, and social stigma. The responsibilities concern public health by the interruption of and prevention of transmission of tubercle bacilli to other members of the population. The program's ultimate goal is to eliminate tuberculosis as a personal and public health problem. Existing prevalence and a steady morbidity indicate that tuberculosis is a disease of significant volume and consequence in New York City.

B. New York City Tuberculosis Control Program General Responsibilities

1. To ensure that all cases of tuberculosis that are suspected or diagnosed in New York City's medical facilities are reported to the Bureau of Tuberculosis; to take measures to ensure that such reporting is done in a timely and thorough manner; and to take corrective action when less than required results occur.

2. To ensure that epidemiologic follow-up is performed on all reported cases of infectious tuberculosis, i.e., contacts to such cases are identified and brought to examination and treatment.

3. To ensure that diseased patients are on effective treatment; to monitor the care of such patients; and to take corrective action to return delinquent/non-compliant patients to medical supervision and treatment.

4. To develop and disseminate Department policies, procedures, and guidelines for the proper management and treatment of tuberculosis.

5. To maintain documents and records, compile data, and information for the purpose of analyzing and assessing the scope and magnitude of the tuberculosis problem in New York City.

C. Basic Tuberculosis Objectives

In order for tuberculosis to be controlled, the following must occur:

1. Persons with disease able to infect others must be rendered noninfectious.

2. Persons with disease who are not able to infect others must must remain noninfectious.

D. Methodology to Achieve Basic Objectives

1. All tuberculosis cases and suspected cases must receive a rapid diagnosis and more importantly, be placed on an effective tuberculosis drug regimen.

2. All tuberculosis cases must be continuous in taking drugs and complete the prescribed course of treatment.

3. All tuberculosis cases with positive sputum must convert to negative

in the shortest possible time.

4. Contacts to infectious tuberculosis must be rapidly identified and brought to examination and treatment.

5. Persons on preventive treatment must be continuous in taking their drug and complete the prescribed course.

E. Performance Indicators

1. Continuity and Completion of Drug Therapy

Cases of tuberculosis started on chemotherapy are evaluated for their continuity of drug therapy during the initial 12 months of treatment and for completion of their prescribed course of drug therapy. Cases are evaluated on a quarterly basis using cohorts of cases reported January-March, April-June, July-September, and October-December of the incidence year. A high level of achievement in this indicator assures the Bureau that infectious cases will become non-infectious and that non-infectious cases will not become infectious. Provided the case has been recommended to be treated with effective anti-tuberculosis drugs and takes the drugs with minimal interruption to completion of the prescribed course, the patient will become non-infectious within a short period of time and will be cured.

The Bureau's optimal objective is to have at least 95% of the cases started on drugs maintain continuity without interruption for 12 consecutive months and have 90% complete the prescribed course of therapy. Table 14 presents the current results of this performance indicator.

Continuity and Completion of Drug Therapy

An integral part of the Bureau's responsibility to render persons with disease non-infectious and to see to it that they remain non-infectious is to ensure that patients remain on effective medication for a sufficient period of time to effect a cure. One measure of the success of a program in achieving this goal would be the percentage of newly diagnosed cases who are continuously on anti-tuberculosis medications for twelve months, no matter what combination of drugs are used in any particular regimen. In addition, the percentage of cases who complete therapy reflect success in meeting the program's objectives.

The most recent data suggest that the Bureau has made significant improvements in both these areas but, as yet, falls short of optimal levels: 95% for continuity and 90% for completion. For the past thirteen quarters, the average for completion of therapy has been 59%, so that there was a 29% improvement in the most recent quarter (January-March, 1981). The average for completion of therapy has been 60% for the past 9 quarters, for which data is available. The January-March, 1980, quarter represents a 27% improvement over that average.

Although treatment regimens have been simplified and the length of treatment shortened considerably, patients' compliance with their proposed therapy remains a problem. Interruption of clinic attendance is sometimes due to serious social and behavioral problems, such as alcoholism and/or drug addiction. In some instances, once the patient's condition improves he or she no longer feels motivated to continue treatment. They fail to recognize that despite their feelings of good health their disease will not be arrested until they complete therapy. For some patients, monitoring of the patient's progress at monthly intervals presents a conflict with work or personal schedules and he/she fails to keep scheduled appointments. In rare instances, patients refuse to comply of their own volition and the Bureau, in order to fulfill its legislated responsibility, seeks to detain individuals in a municipal hospital until they are rendered non-infectious and until they can be placed in a supervised therapy program until completion of therapy. In addition, the introduction of short course chemotherapy regimens alleviates some of the difficulties experienced in the past with non-compliant patients by substanially shortening the length of treatment.

TABLE 14

Twelve Month Continuity of Drug Therapy Percentages for Cases Reported January-March, 1978, to January-March, 1980; and Completion of Drug Therapy Percentages for Cases Reported January-March, 1978, to January-March, 1981, New York City

Cohort of Cases	% of Cases Continuous on Therapy for 12 Months	% of Cases Completing Therapy
Jan.-Mar., 1978	42	45
Apr.-Jun., 1978	78	61
Jul.-Sep., 1978	58	46
Oct.-Dec., 1978	50	56
Jan.-Mar., 1979	57	63
Apr.-Jun., 1979	58	64
Jul.-Sep., 1979	58	67
Oct.-Dec., 1979	52	62
Jan.-Mar., 1980	68	76
Apr.-Jun., 1980	56	
Jul.-Sep., 1980	57	
Oct.-Dec., 1980	61	
Jan.-Mar., 1981	76	

Bacteriologic Conversion of Sputum

One of the objectives of the Bureau of Tuberculosis is to render all those individuals who are infected with disease and are able to transmit infection to others, non-infectious. Provided that the anti-tuberculosis medications prescribed are effective and that the patient takes his/her medication in the manner prescribed, 75% of the cases reported with positive sputum culture may be expected to convert to negative within 3 months, and 95% within 6 months.

As may be seen from Table 15, we have not achieved the expected results. There is no simple explanation for this rather poor performance. Part of the problem may be that follow-up sputa are not being collected routinely either because clinical improvement is perceived as a substitute measure and/or the patient is not able to produce sputum without the assistance of mechanical aids. Another explanation may be that facilities may not recognize that bacteriologic reports of negative results for patients with previously positive culture are helpful in measuring the effectiveness of treatment at present. The Bureau pursues this information aggressively in order to determine just how accurately records are being kept. Bacteriologic conversion of sputum as a performance indicator is a necessary determinant of success.

TABLE 15

Conversion of Positive Sputum Culture Cases of TB at Three and Six Months for Cases Reported January-March, 1979, to July-September, 1981, in Percent, New York City

Cohort of Cases	% of Cases Converting Sputum Culture to Negative	
	Within 3 Months	Within 6 Months
Jan - Mar., 1979	32	41
Apr. - Jun., 1979	35	44
Jul. - Sep., 1979	41	51
Oct. - Dec., 1979	41	53
Jan. - Mar., 1980	26	41
Apr. - Jun., 1980	28	41
Jul. - Sep., 1980	22	49
Oct. - Dec., 1980	35	51
Jan. - Mar., 1981	27	50
Apr. - Jun., 1981	34	53
Jul. - Sep., 1981	40	50

F. Contact Summary (Table 16)

Specific cases of tuberculosis are interviewed by Public Health Advisors for the purpose of determining those individuals who are most at risk of becoming infected and developing disease. All cases of pulmonary and laryngeal tuberculosis are interviewed regardless of age; in addition, childhood converters and children with non-infectious tuberculosis are followed up epidemiologically because they have been the recipients of recent transmission. Contacts who are identified are evaluated according to the criteria which determine the degree of risk and the likelihood of infection. Contacts who have been exposed to a source case who has a high bacillary count and who has shared air space for prolonged periods of time are classified as "close" contacts; those who have had limited exposure to a source case are classified as "casual" contacts. Close contacts are examined and placed on chemoprophylaxsis as deemed appropriate.

In order to prevent non-infected persons from becoming infected and those infected from becoming diseased, at least 95% of the close contacts should be identified and examined; 90% of the latter should complete one year of prophylaxis. The degree to which this is accomplished is interpreted as a measure of the success of any communicable disease control program.

The number of close contacts identified per case continues to be less than expected (1.7 per case) and significantly less than the national average (7.4 per case in 1979). Of the 1,917 contacts identified as close contacts, approximately 93% were examined in 1981 and 58% of the latter were placed on medication for one year, an increase of 30% over 1980. There was a 32% increase in the number of contacts who were not infected but who were placed on prophylaxis. There was an approximately 15% increase in the number of contacts identified. A major improvement is seen in this category of the number not infected but placed on treatment, a 200% increase over 1980.

TABLE 16

Summary of Close Contacts Identified and Examined
1979, 1980, and January-September 30, 1981,
New York City

	1979	1980	1981
# Identified	1,678 (1.7/Case)	2,071 (1.4/Case)	1,917 (1.7/Case)
# Examined	1,384 (82%)	1,854 (90%)	1,783 (93%)
# Not Infected	923 (67%)	1,229 (66%)	1,162 (65%)
# Not Infected, On Treatment	165 (18%)	196 (16%)	554 (48%)
# Infected	428 (31%)	578 (31%)	574 (32%)
# Infected, On Treatment	371 (87%)	425 (74%)	475 (83%)
# With Disease	33 (2.4%)	47 (2.5%)	47 (2.6%)

1981 TUBERCULOSIS INCIDENCE

NEW YORK CITY BY HEALTH DISTRICTS