TUBERCULOSIS IN NEW YORK STATE

2020

Annual Statistical Report

Bureau of Tuberculosis Control

NEW YORK STATE | Department of Health

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Executive Summary

MORBIDITY & MORTALITY

- From 2019 to 2020, tuberculosis (TB) morbidity decreased in New York State. The 2020 total of 606 cases (445 cases in New York City, 161 cases in the remainder of New York State) represents a 19.6 percent decrease from the 754 cases reported in 2019. Nationally, there was a 19.4 percent decrease in morbidity. Since the most recent peak epidemic in 1992 with 4,574 cases, there was an 86.8 percent decrease in New York State compared to a national decline of 73.1 percent.
- In New York State (exclusive of New York City), the number of TB cases decreased 14.4 percent from 188 cases in 2019 to 161 cases in 2020. The number of TB cases in New York City decreased by 21.4 percent from 566 cases in 2019 to 445 cases in 2020. In 2020, the nation reported 7,174 cases, down 19.4 percent from the 8,904 cases reported in 2019.
- New York State is ranked fourth nationally for TB morbidity with an incidence rate of 3.0 per 100,000 population in 2020. This rate is influenced by New York City, which had a TB case rate of 5.1 per 100,000. In comparison, New York State (exclusive of New York City) reported an incidence rate of 1.4 per 100,000.

GEOGRAPHIC DISTRIBUTION

- Three counties – Nassau, Suffolk, and Westchester – reported 57.8 percent of the TB cases in New York State (exclusive of New York City) in 2020.

RACE-ETHNICITY

- In 2020, Asians continued to have the highest incidence rates of TB statewide (14.0 per 100,000). White, non-Hispanics had the lowest incidence rate of 0.5 per 100,000.

NON-U.S.-BORN

- Statewide, the proportion of non-U.S.-born cases increased from 84.1 percent (N=634) in 2019 to 85.1 percent in 2020 (N=516). People born in China comprised the greatest number of non-U.S.-born TB cases (N=63) in New York City while those born in India comprised the greatest number of non-U.S.-born TB cases (N=22) in the remainder of the state.

DRUG SUSCEPTIBILITY

- Among individuals with drug susceptibilities reported in 2020, 6 cases from New York City had multidrug-resistant TB (MDR TB), which was 45% lower than reported in 2019. In New York State (exclusive of New York City) there was one MDR TB case reported in 2020, which was the same as reported in 2019.

TB IN THE PRISONS

- Since 1991, the number of TB cases among the New York State Department of Corrections and Community Supervision (DOCCS) inmate population has been continually declining. In the five-year period from 2016 to 2020, only one new case was reported.

TUBERCULOSIS CASES AND RATES

Table 1. Tuberculosis Cases and Rates, * New York State, 1960-2020

Year	New York State (Exclusive of New York City)		New York City		New York State (Total)	
	No.	Rate	No.	Rate	No.	Rate
1960	2,376	26.4	4,699	60.4	7,075	42.2
1961	2,052	22.3	4,360	56.3	6,412	37.8
1962	2,005	21.4	4,437	56.7	6,442	37.5
1963	1,865	19.6	4,891	61.7	6,756	38.7
1964	1,715	17.8	4,207	52.7	5,922	33.6
1965	1,627	16.6	4,242	53.0	5,869	33.0
1966	1,633	16.5	3,663	45.7	5,296	29.5
1967	1,527	15.2	3,542	44.4	5,069	28.1
1968	1,475	14.5	3,224	40.5	4,699	25.9
1969	1,384	13.5	2,951	37.4	4,335	23.9
1970	1,275	12.3	2,590	32.8	3,865	21.2
1971	1,180	11.3	2,572	32.5	3,752	20.4
1972	1,176	11.2	2,275	29.0	3,451	18.8
1973	1,009	9.6	2,101	27.4	3,110	17.1
1974**	844	8.1	2,022	26.6	2,866	15.9
1975	1,041	9.9	2,893	38.6	3,934	21.8
1976	916	8.7	2,156	29.0	3,072	17.1
1977	829	7.9	1,605	22.0	2,434	13.6
1978	753	7.1	1,307	18.2	2,060	11.6
1979	699	6.6	1,530	21.5	2,229	12.6
1980	780	7.4	1,514	21.4	2,294	13.1
1981	641	6.1	1,582	22.4	2,223	12.7
1982	674	6.4	1,594	22.5	2,268	12.9
1983	658	6.2	1,651	23.1	2,309	13.1
1984	616	5.8	1,630	22.6	2,246	12.7
1985	638	6.0	1,843	25.5	2,481	13.9
1986	615	5.8	2,223	30.6	2,838	15.9
1987	615	5.8	2,197	30.1	2,812	15.7
1988	688	6.5	2,317	31.8	3,005	16.8
1989	657	6.2	2,545	34.8	3,202	17.8
1990	656	6.1	3,520	48.1	4,176	23.2
1991	748	7.0	3,673	50.2	4,421	24.6
1992	763	7.2	3,811	52.0	4,574	25.4
1993	717	6.7	3,235	44.2	3,952	22.0
1994	641	6.0	2,995	40.9	3,636	20.2
1995	621	5.8	2,445	33.4	3,066	17.0
1996	535	5.0	2,053	28.0	2,588	14.4
1997	535	5.0	1,730	23.6	2,265	12.6
1998	442	4.1	1,558	21.3	2,000	11.1
1999	377	3.5	1,460	19.9	1,837	10.2
2000	412	3.8	1,332	16.6	1,744	9.2
2001	415	3.8	1,261	15.7	1,676	8.8
2002	350	3.2	1,084	13.5	1,434	7.6
2003	340	3.1	1,140	14.2	1,480	7.8
2004	324	3.0	1,039	13.0	1,363	7.2
2005	305	2.8	984	12.3	1,289	6.8
2006	317	2.9	954	11.9	1,271	6.7
2007	261	2.4	914	11.4	1,175	6.2
2008	305	2.8	895	11.2	1,200	6.3
2009	246	2.2	760	9.5	1,006	5.3
2010	243	2.2	711	8.7	954	4.9
2011	221	2.0	689	8.4	910	4.7
2012	215	1.9	651	8.0	866	4.5
2013	217	1.9	656	8.0	873	4.5
2014	202	1.8	585	7.2	787	4.1
2015	188	1.7	577	7.1	765	3.9
2016	203	1.8	565	6.9	768	4.0
2017	193	1.7	613	7.5	806	4.2
2018	191	1.7	559	6.8	750	3.9
2019	188	1.7	566	6.9	754	3.9
2020	161	1.4	445	5.1	606	3.0

*Rate calculations are based on 2020 United States decennial Census data, per 100,000 population
**Figures after 1974 reflect a nationally revised case definition that includes reactivated cases
Source: New York State Department of Health Bureau of Tuberculosis Control

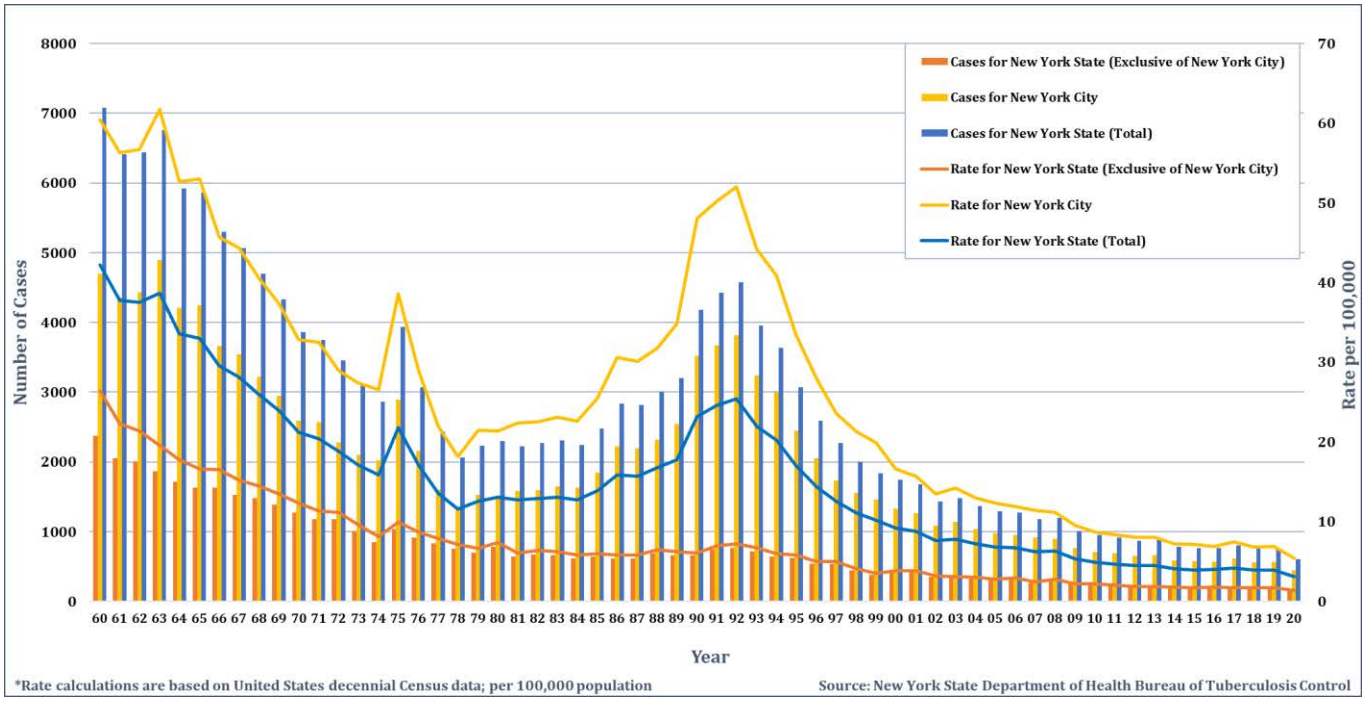
TUBERCULOSIS CASES AND RATES

From 2019 to 2020, TB cases and rates decreased in New York State, including New York City. In 2020, a total of 606 cases were reported in New York State, representing a 19.6 percent decrease from the 754 cases reported in 2019 and a 91.4 percent decrease from the 7,075 cases reported in 1960. Almost three-quarters of the state's TB morbidity is concentrated in New York City.

In 2020, New York City reported 73.4 percent (N=445/606) of the total cases despite only having 43.6 percent of the state population. The rest of the state reported 161 cases, which was a 14.4 percent decrease compared to the 188 reported in 2019.

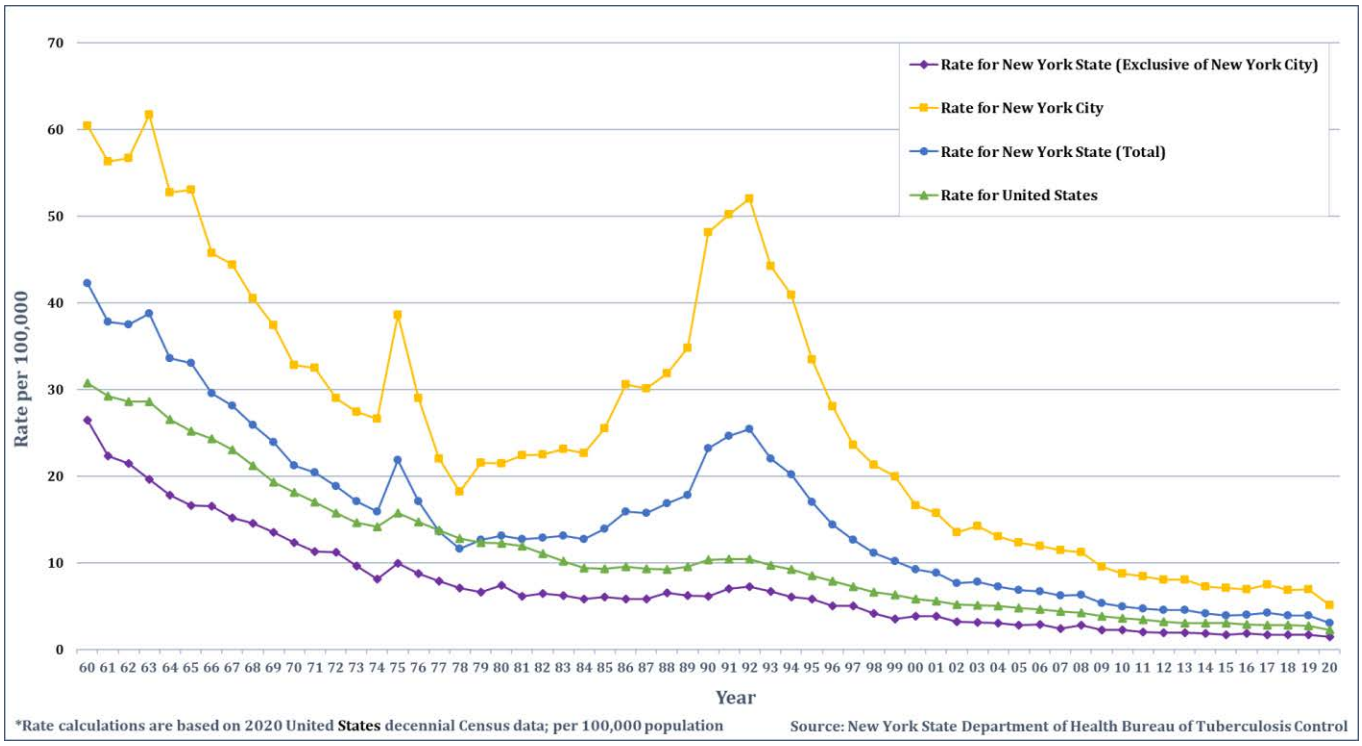
The rate of TB in New York State is greatly influenced by the high morbidity in New York City. Outside of New York City, the rate in 2020 was 1.4 per 100,000 population, while New York City reported a rate of 5.1 per 100,000, resulting in an overall rate of 3.0 per 100,000 population for the whole state.

Figure 1. Tuberculosis Cases and Rates, * New York State, 1960-2020



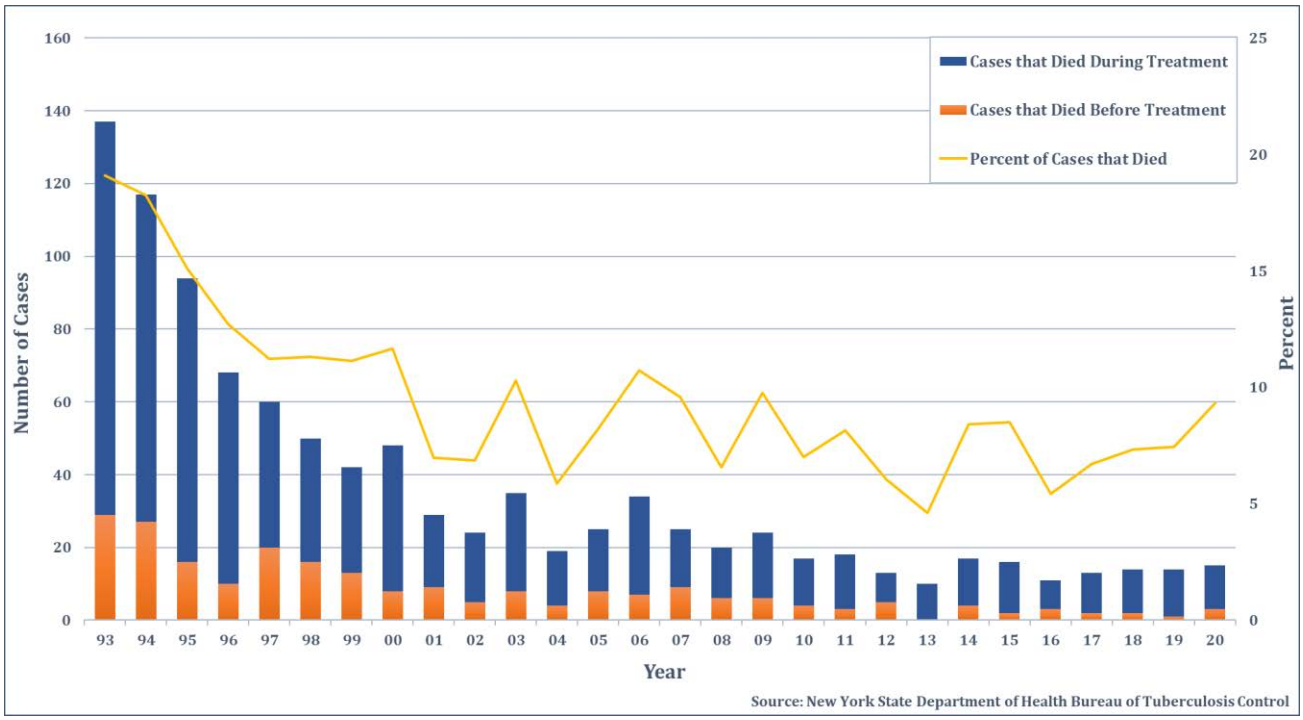
Over the last 50 years, there have been two peaks in TB morbidity where the number and rate of TB substantially increased. The peak in 1975 can be explained by a change in the case definition to include reactivated TB cases. The increase that began in the mid-1980s and extended through the early 1990s was mainly driven by the resurgence of TB cases in New York City. This rise was largely due to two factors. One was the HIV/AIDS epidemic that started in the early 1980s. The other was the reduction of TB control resources combined with the rise in high-risk populations such as non-U.S.-born and homeless individuals.

Figure 2. Tuberculosis Case Rates*, New York State and the United States, 1960-2020



Historically, TB case rates in New York State (exclusive of New York City) have been lower than the national average, while case rates in New York City have exceeded national rates. In 2020, the national case rate was 2.2 per 100,000 population and ranged from 0.4 to 7.9 per 100,000 population across all the states. New York State ranked third based on the number of cases (N=606) and fourth based on incidence rate (3.0 per 100,000 population), but these rankings were largely influenced by New York City which, by itself, would have ranked third nationally based on number of cases (N=445) and third based on incidence rate (5.1 per 100,000 population).

Figure 3. Number and Percent of Deaths Among Tuberculosis Cases, New York State (Exclusive of New York City), 1993-2020



The number and percent of deaths among TB cases in New York State (exclusive of New York City) decreased considerably following the last epidemic that peaked in the early 1990s. This decline in mortality slowed by 1997 and has varied each year since 2000. The deaths portrayed in Figure 3 were not all TB-related.

Among the reported TB cases in New York State (exclusive of New York City), there were 15 total deaths in 2020. The cause of death was known to be TB-related for four (26.7%) of these cases. Of these four, three were over 65 years of age.

GEOGRAPHIC DISTRIBUTION

Table 2. Tuberculosis Cases and Rates* by County, New York State, 2016-2020

County	2016		2017		2018		2019		2020	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
Albany	2	0.7	8	2.6	4	1.3	5	1.6	5	1.6
Allegany	0	---	0	---	0	---	2	4.1	0	---
Broome	3	1.5	2	1.0	4	2.0	1	0.5	2	1.0
Cattaraugus	0	---	1	1.2	0	---	0	---	0	---
Cayuga	1	1.2	1	1.2	2	2.5	0	---	0	---
Chautauqua	0	---	1	0.7	0	---	0	---	0	---
Chemung	2	2.3	0	---	1	1.1	0	---	0	---
Chenango	0	---	0	---	0	---	0	---	0	---
Clinton	0	---	0	---	1	1.2	1	1.2	0	---
Columbia	0	---	3	4.8	0	---	2	3.2	0	---
Cortland	0	---	0	---	0	---	0	---	0	---
Delaware	1	2.1	0	---	0	---	0	---	0	---
Dutchess	1	0.3	4	1.3	3	1.0	3	1.0	2	0.7
Erie	13	1.4	5	0.5	13	1.4	3	0.3	15	1.6
Essex	0	---	0	---	0	---	1	2.5	0	---
Franklin	0	---	0	---	0	---	0	---	0	---
Fulton	0	---	1	1.8	0	---	2	3.6	0	---
Genesee	2	3.3	1	1.7	2	3.3	3	5.0	0	---
Greene	1	2.0	0	---	0	---	0	---	1	2.1
Hamilton	0	---	0	---	0	---	0	---	0	---
Herkimer	0	---	0	---	0	---	1	1.5	0	---
Jefferson	0	---	1	0.9	0	---	0	---	1	0.9
Lewis	1	3.7	0	---	0	---	0	---	0	---
Livingston	1	1.5	0	---	1	1.5	1	1.5	0	---
Madison	0	---	0	---	0	---	0	---	0	---
Monroe	24	3.2	14	1.9	16	2.1	15	2.0	8	1.1
Montgomery	1	2.0	0	---	0	---	0	---	0	---
Nassau	38	2.8	40	3.0	43	3.2	51	3.8	40	2.9
Niagara	2	0.9	1	0.5	1	0.5	1	0.5	0	---
Oneida	8	3.4	9	3.8	4	1.7	4	1.7	4	1.7
Onondaga	17	3.6	6	1.3	6	1.3	8	1.7	9	1.9
Ontario	0	---	0	---	1	0.9	0	---	1	0.9
Orange	7	1.9	9	2.4	7	1.9	7	1.9	5	1.2
Orleans	0	---	0	---	2	4.7	1	2.3	0	---
Oswego	1	0.8	0	---	0	---	1	0.8	0	---
Otsego	0	---	0	---	1	1.6	0	---	0	---
Putnam	0	---	1	1.0	1	1.0	1	1.0	1	1.0
Rensselaer	2	1.3	1	0.6	1	0.6	2	1.3	2	1.2
Rockland	4	1.3	14	4.5	11	3.5	10	3.2	6	1.8
Saratoga	1	0.5	0	---	0	---	0	---	0	---
Schenectady	2	1.3	0	---	0	---	1	0.6	1	0.6
Schoharie	0	---	0	---	0	---	0	---	0	---
Schuyler	0	---	0	---	0	---	0	---	1	5.6
Seneca	0	---	0	---	0	---	0	---	0	---
St. Lawrence	0	---	1	0.9	0	---	1	0.9	0	---
Steuben	0	---	0	---	0	---	2	2.0	0	---
Suffolk	34	2.3	34	2.3	24	1.6	31	2.1	30	2.0
Sullivan	1	1.3	2	2.6	2	2.6	0	---	0	---
Tioga	0	---	0	---	1	2.0	0	---	0	---
Tompkins	2	2.0	2	2.0	3	3.0	2	2.0	2	1.9
Ulster	1	0.5	0	---	1	0.5	1	0.5	0	---
Warren	1	1.5	0	---	0	---	0	---	0	---
Washington	0	---	0	---	0	---	0	---	0	---
Wayne	1	1.1	0	---	0	---	0	---	1	1.1
Westchester	28	3.0	31	3.3	35	3.7	24	2.5	23	2.3
Wyoming	0	---	0	---	0	---	0	---	0	---
Yates	0	---	0	---	0	---	0	---	1	4.0
New York State Total (Exclusive of New York City)	**203**	**1.8**	**193**	**1.7**	**191**	**1.7**	**188**	**1.7**	**161**	**1.4**
Bronx	82	5.9	106	7.7	81	5.8	90	6.5	81	5.5
Kings	166	6.6	184	7.3	173	6.9	153	6.1	116	4.2
New York	67	4.2	64	4.0	82	5.2	74	4.7	56	3.3
Queens	240	10.8	247	11.1	204	9.1	227	10.2	176	7.3
Richmond	10	2.1	12	2.6	19	4.1	22	4.7	16	3.2
New York City Total	**565**	**6.9**	**613**	**7.5**	**559**	**6.8**	**566**	**6.9**	**445**	**5.1**
STATE TOTAL	**768**	**4.0**	**806**	**4.2**	**750**	**3.9**	**754**	**3.9**	**606**	**3.0**

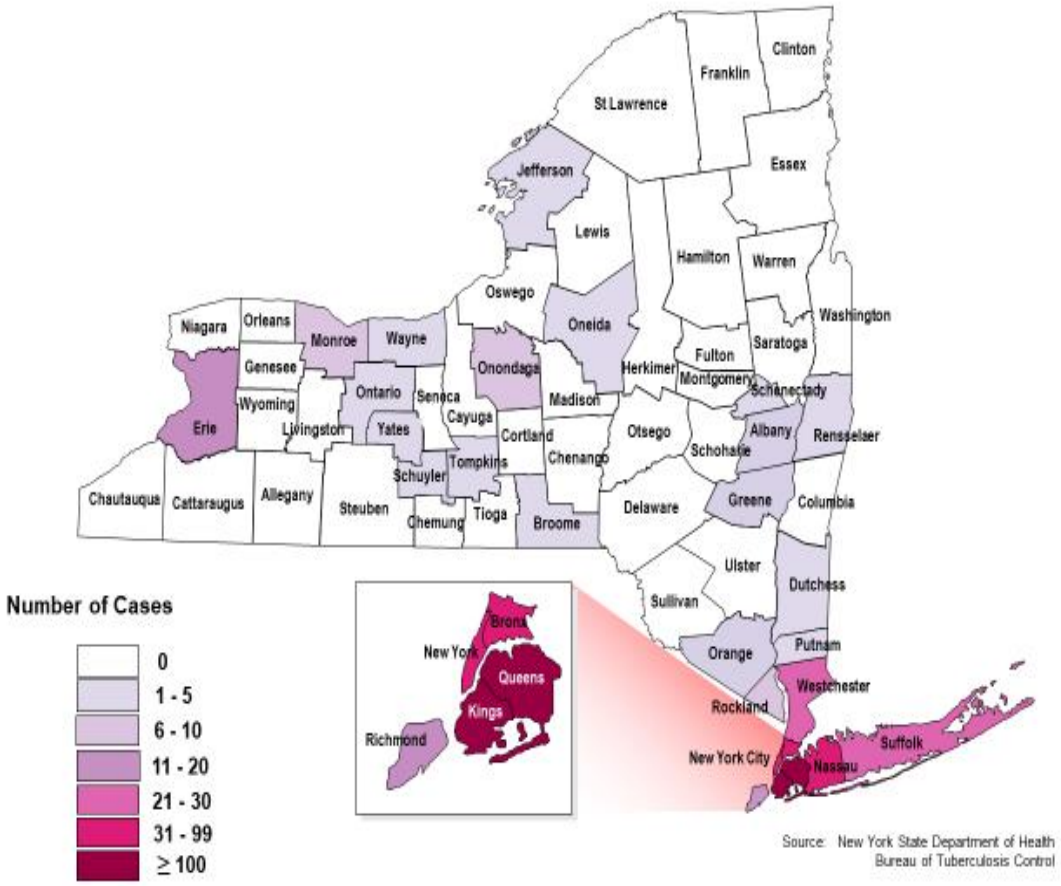
*Rate calculations are based on 2020 United States Census data; per 100,000 population

Source: New York State Department of Health
Bureau of Tuberculosis Control

GEOGRAPHIC DISTRIBUTION

TB morbidity is unevenly distributed across NYS and varies greatly among counties. In 2020, all five boroughs of New York City and 22 (38.6%) of the 57 upstate counties reported at least one TB case. Higher numbers of cases were seen in the metropolitan areas. More than half of all TB morbidity reported for NYS (exclusive of New York City) was concentrated in Nassau, Suffolk, and Westchester counties (57.8%, N=93/161).

Figure 4. Distribution of Tuberculosis Cases, New York State, 2020



DEMOGRAPHIC CHARACTERISTICS

Table 3. Tuberculosis Cases and Rates* by Gender, Age, and Race/Ethnicity‡, New York State, 2020**

Demographic Characteristics		New York State (Exclusive of New York City)		New York City		New York State (Total)	
		No.	Rate	No.	Rate	No.	Rate
Gender	Male	103	1.9	272	7.0	375	4.7
	Female	58	1.0	173	4.0	231	3.1
Age Group	Under 5 years	2	0.3	2	0.4	4	0.3
	5-9	2	0.3	2	0.4	4	0.3
	10-14	0	---	3	0.6	3	0.4
	15-19	3	0.4	10	1.9	13	1.0
	20-24	19	2.5	32	5.0	51	3.6
	25-34	22	1.7	77	5.5	99	3.7
	35-44	22	1.5	64	5.5	86	3.3
	45-54	22	1.2	56	5.1	78	2.7
	55-64	21	1.5	70	7.9	91	4.0
	65+	48	3.0	129	13.0	177	6.8
Race/Ethnicity‡	White, non-Hispanic	20	0.3	31	1.1	51	0.5
	Black, non-Hispanic	23	2.3	79	4.4	102	3.7
	Hispanic	47	3.2	112	4.5	159	4.0
	Asian	71	13.1	198	14.4	269	14.0
	American Indian	0	---	1	5.2	1	1.8
	Pacific Islander	0	---	0	---	0	---
	Multiple Races	0	---	11	3.7	11	1.5
	Other/Unknown	0	---	13	10.7	13	6.6
TOTAL CASES		**161**	**1.4**	**445**	**5.1**	**606**	**3.0**

*Rate for age groups and gender are based on 2010 United States Census data; per 100,000 population
**Age calculations are based on date of birth and report date
‡ Rate calculations are based on 2020 United States Census data; per 100,000 population

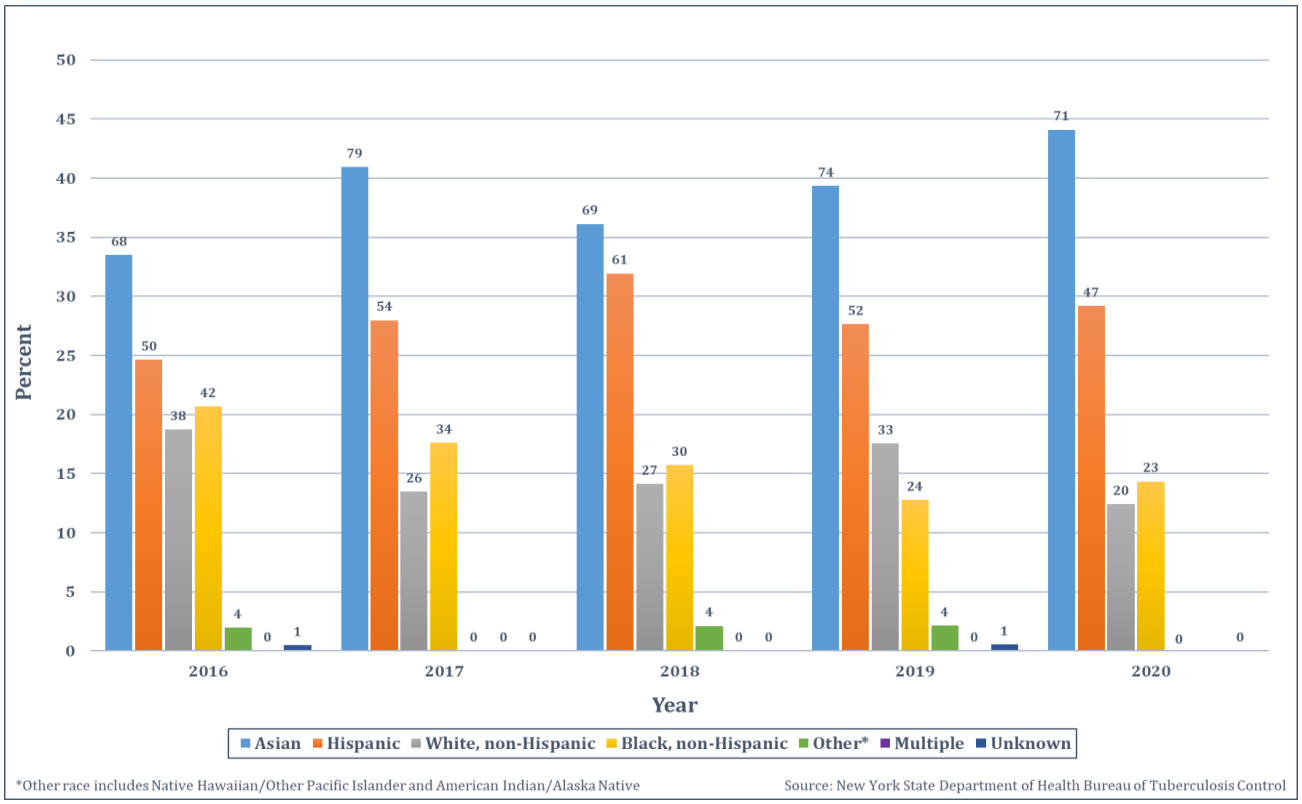
Source: New York State Department of Health
Bureau of Tuberculosis Control

Statewide, in 2020, the lowest incidence rates of TB were seen among the high-risk pediatric population (<15 years old). The highest rate was seen among those 65 years and older with 6.8 per 100,000 which was a significant decrease from the previous year's rate of 8.8 per 100,000.

White, non-Hispanics continued to have the lowest incidence rate in New York State (0.5 per 100,000), while Asians continued to have the highest rate (14.0 per 100,000). The rate for white, non-Hispanics in New York City was almost four times greater than in the rest of the state (1.1 per 100,000 and 0.3 per 100,000, respectively).

DEMOGRAPHIC CHARACTERISTICS

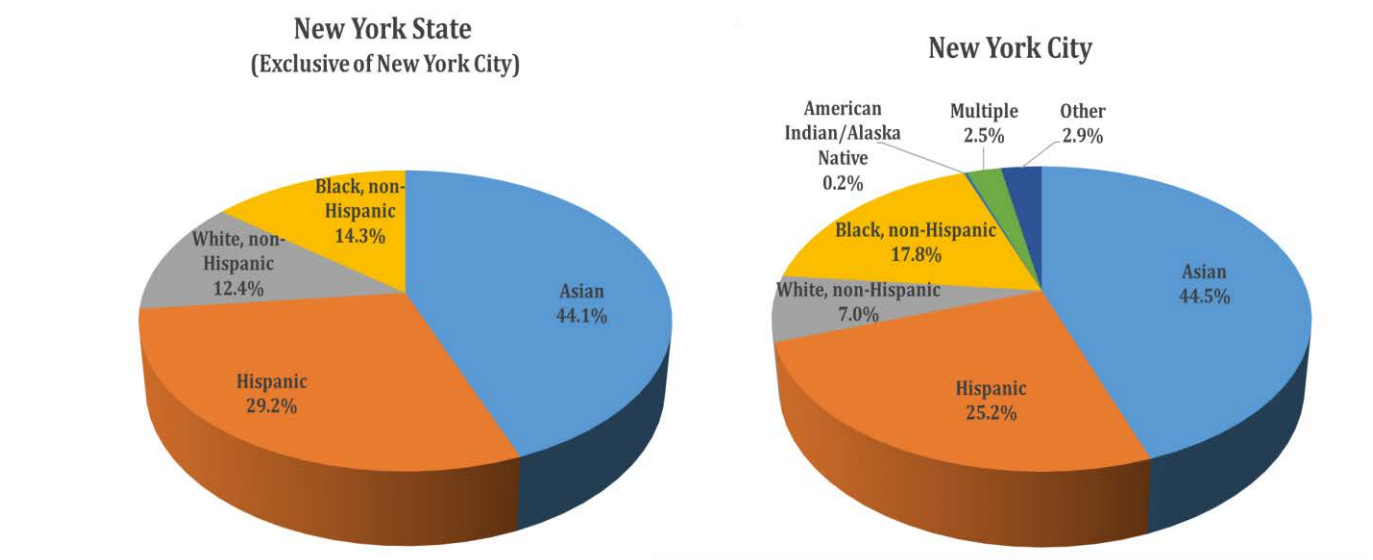
Figure 5. Number and Percent of Tuberculosis Cases by Race/Ethnicity, New York State (Exclusive of New York City), 2016-2020



Over the last five years most TB cases reported in New York State (exclusive of New York City) have been of Asian and Hispanic descent. Since 2015, Asians have continued to represent a larger percentage of reported cases than any other racial/ethnic group.

In 2020, most of the TB cases in New York State (exclusive of New York City) continued to be Asian or Hispanic (N=71 and N=47, respectively). Although there has been variability over the last five years, the proportion of Asian cases seen in 2020 was 11.9 percent higher than that seen in 2019 (44.1% and 39.4%, respectively), whereas the proportion of Hispanic cases in 2020 was 5.4 percent higher than in 2019 (29.2% and 27.7%, respectively).

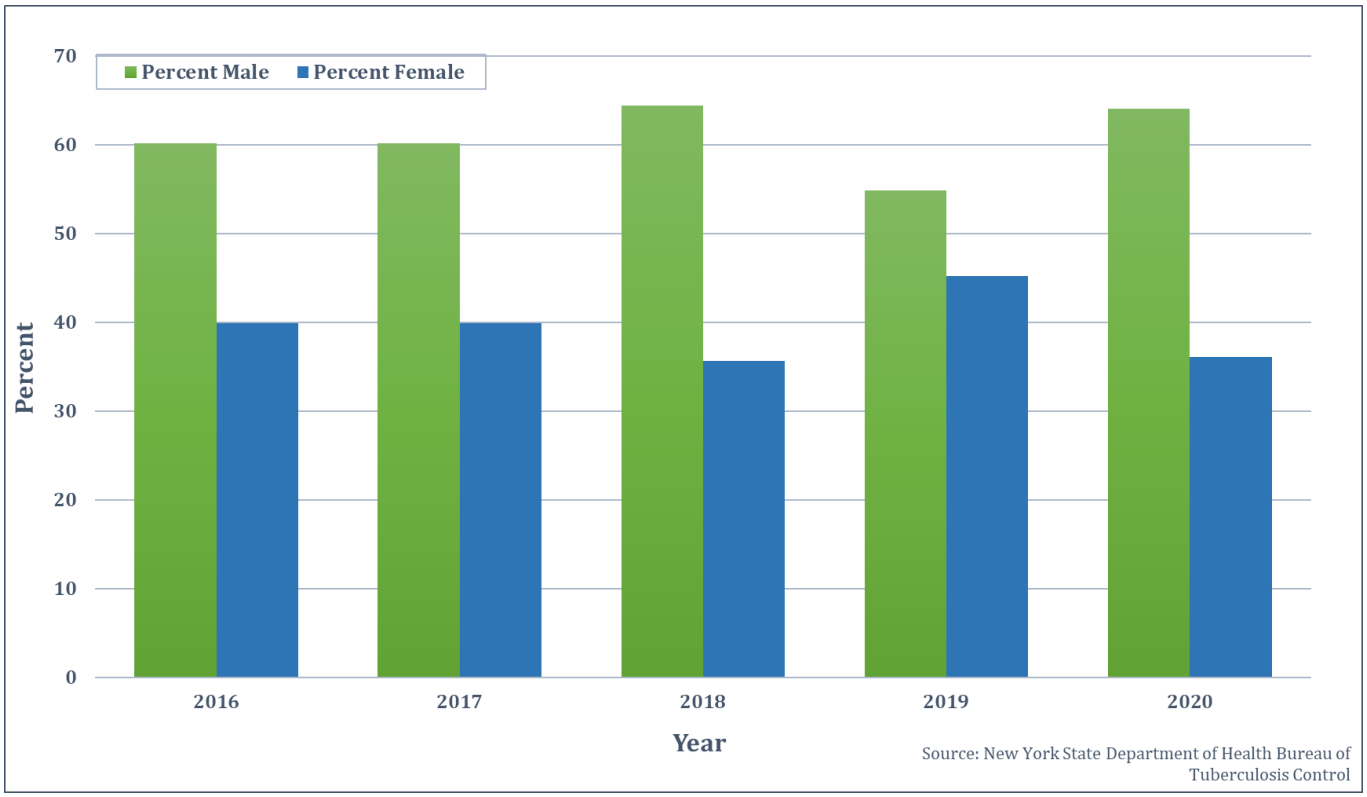
Figure 6. Race/Ethnicity of Tuberculosis Cases, New York State, 2020



Source: New York State Department of Health Bureau of Tuberculosis Control

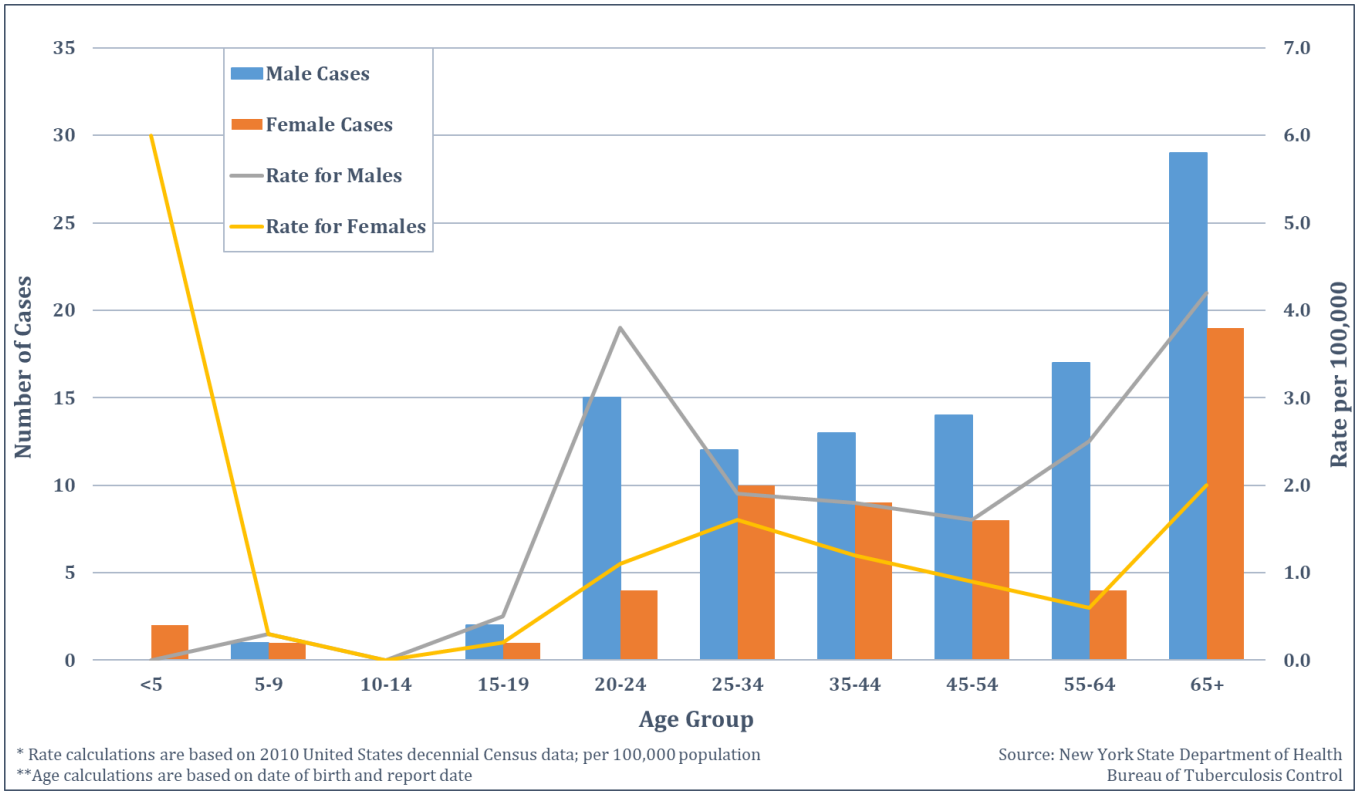
In 2020, the proportion of White, non-Hispanic cases in New York State (exclusive of New York City) was nearly twice that seen in New York City (12.4% and 7.0%, respectively), whereas the proportion of Asian cases in New York City was nearly identical to that of the rest of the state (44.5% and 44.1%, respectively).

Figure 7. Percent of Tuberculosis Cases by Gender, New York State (Exclusive of New York City), 2016-2020



Over the last five years, males have consistently comprised a higher proportion of TB cases compared to females in New York State (exclusive of New York City). In 2020, 64 percent (N=103/161) of reported cases were male and 36 percent (N=58/161) were female, matching 2018 for the largest disparity in the last five years.

Figure 8. Tuberculosis Cases and Rates* by Age and Gender, New York State (Exclusive of New York City), 2020**



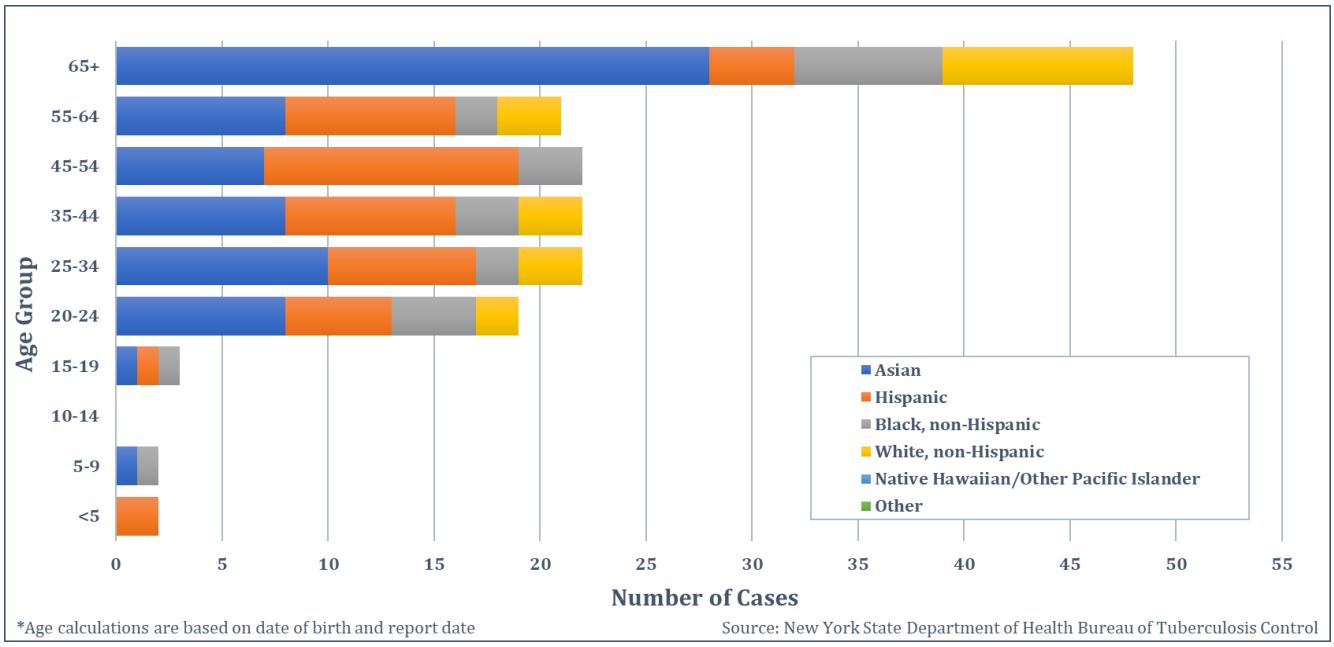
* Rate calculations are based on 2010 United States decennial Census data; per 100,000 population
**Age calculations are based on date of birth and report date

Source: New York State Department of Health
Bureau of Tuberculosis Control

In 2020, the difference in TB morbidity between males and females in New York State (exclusive of New York City) varied depending on age. The number of cases and rate per 100,000 were higher for males than females in all cases greater than 15 years of age.

The largest gender gap is seen the 55–64-year age group, where the case rate for males was four times greater than that of females (2.5 per 100,000 for males: 0.6 per 100,000 for females).

Figure 9. Tuberculosis Cases by Age* and Race/Ethnicity, New York State (Exclusive of New York City), 2020



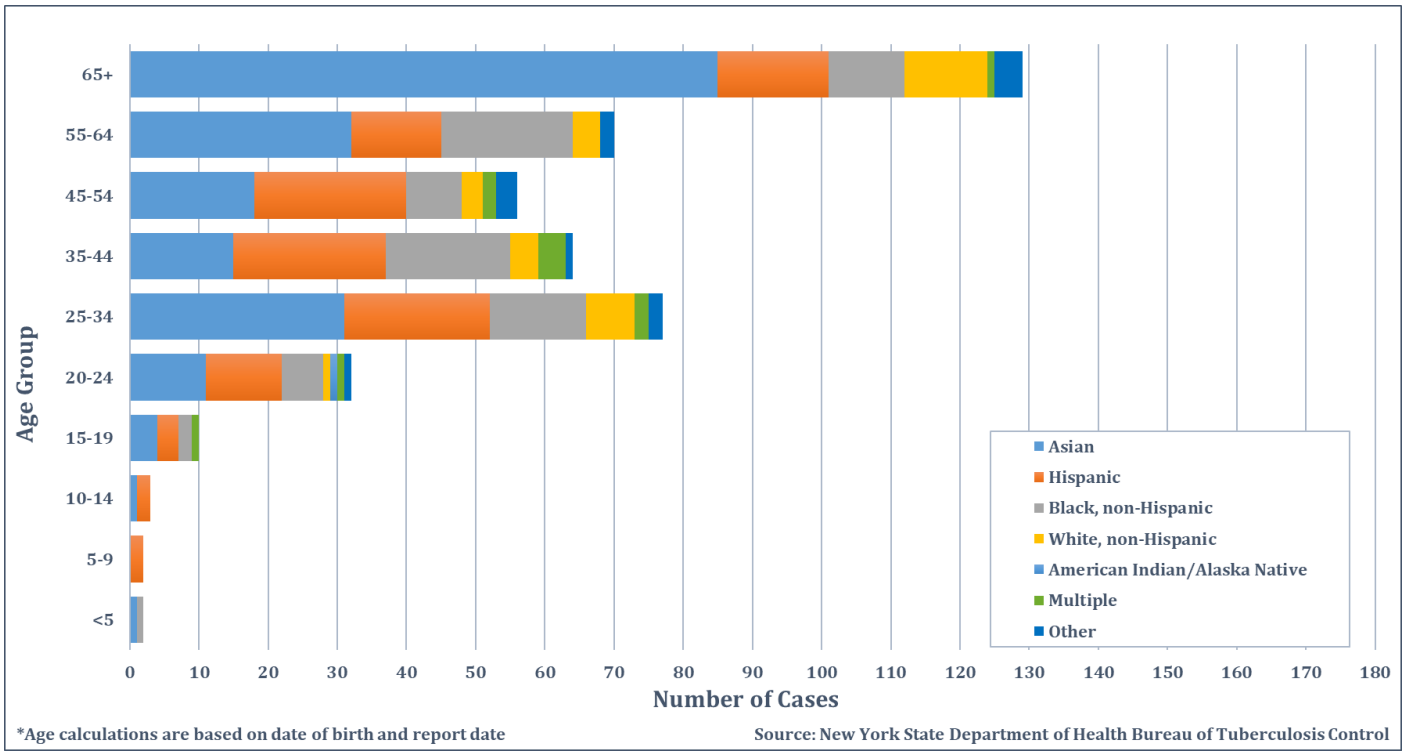
*Age calculations are based on date of birth and report date

Source: New York State Department of Health Bureau of Tuberculosis Control

In 2020, 48 (29.8%) cases in New York State (exclusive of New York City) were 65 years of age and older. Of these cases, 28 (58.3%) were Asian and nine (18.8%) were white, non-Hispanic.

The second largest number of TB cases reported by age group in 2020 for New York State (exclusive of New York City) was 22, comprising three age groups: 25-34, 35-44, and 45-54. Of these 66 cases, 25 (37.9%) were Asian and 27 (40.9%) were Hispanic.

Figure 10. Tuberculosis Cases by Age* and Race/Ethnicity, New York City, 2020



*Age calculations are based on date of birth and report date

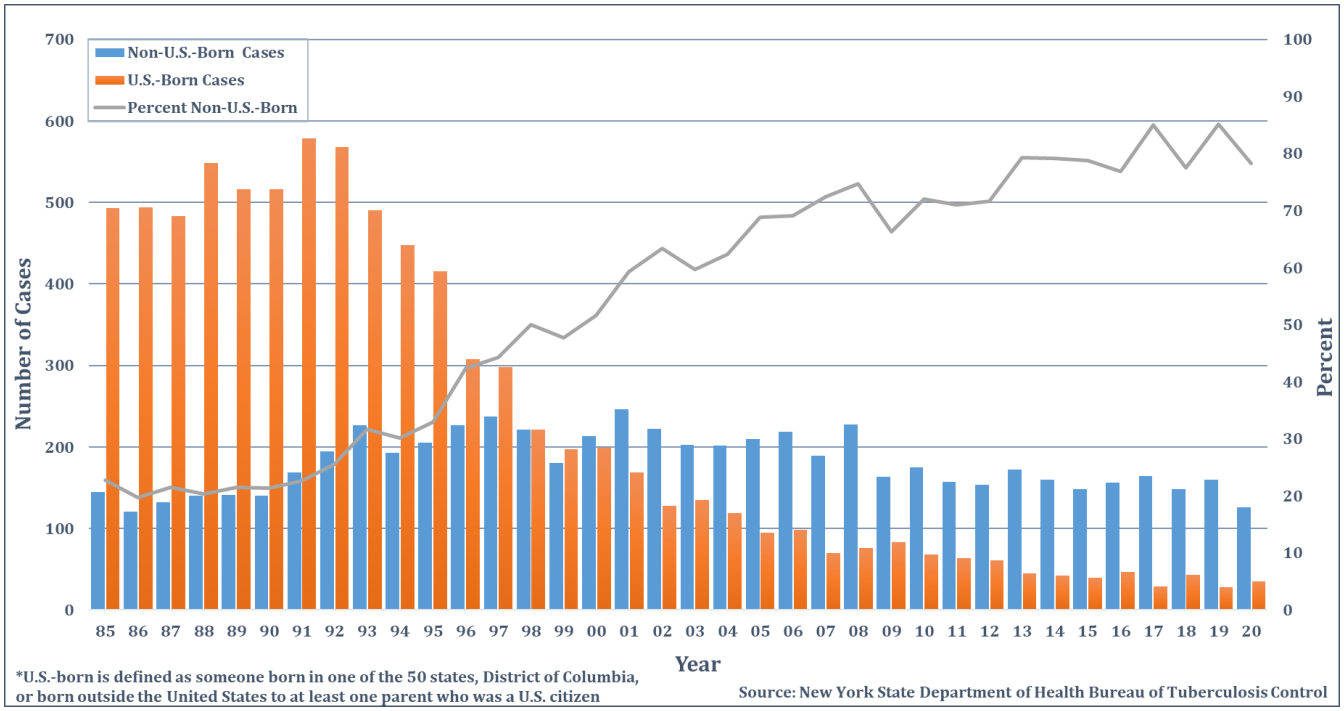
Source: New York State Department of Health Bureau of Tuberculosis Control

In New York City, the largest number of TB cases reported in 2020 was seen in the 65 years and older age group (N=129). Among these 129 cases, 85 (65.9%) were Asian and 16 (12.4%) were Hispanic.

In 2020, the second largest number of TB cases in New York City was identified in the 25-34 age group (N=77). In this age group, 31 (40.3%) cases were Asian and 21 (27.3%) were Hispanic.

TUBERCULOSIS IN THE NON-U.S.-BORN

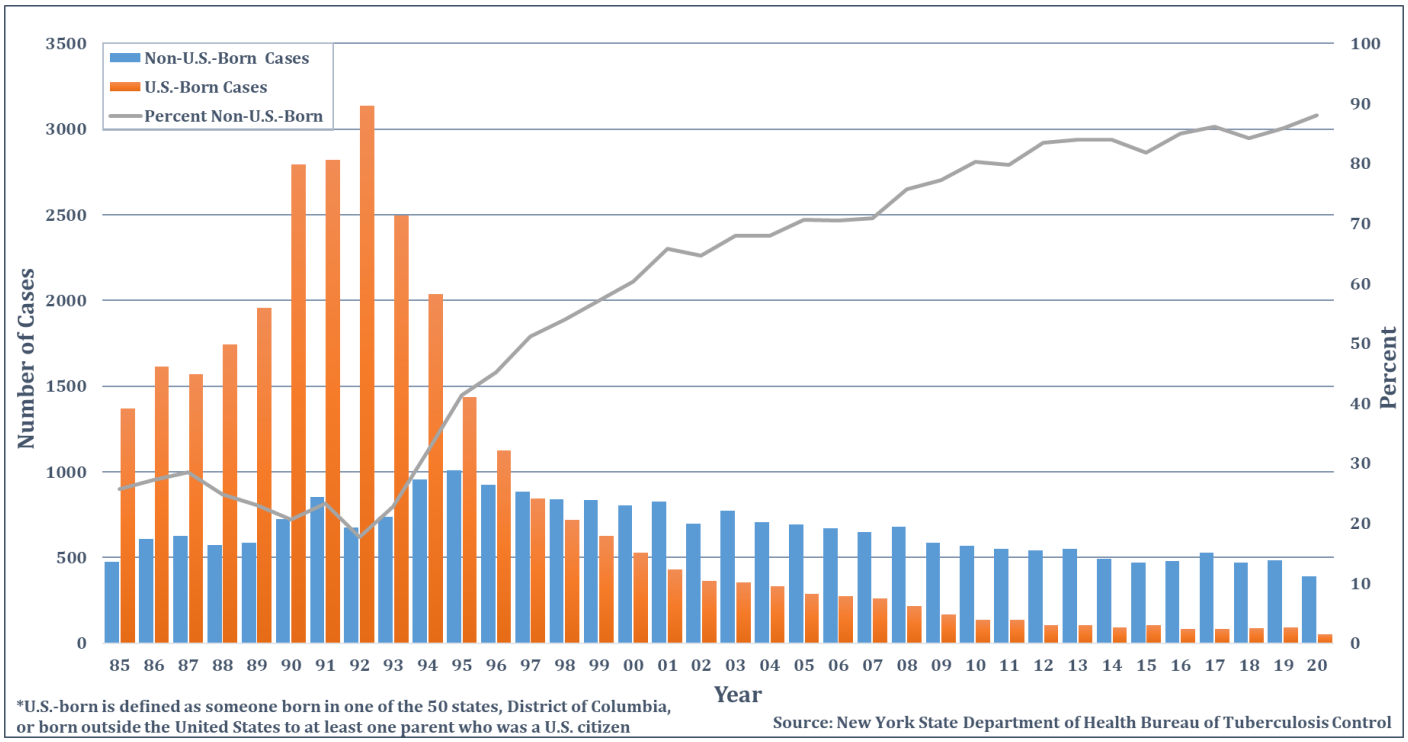
Figure 11. Number and Percent of Tuberculosis Cases by U.S.-Born* and Non-U.S.-Born Status, New York State (Exclusive of New York City), 1985-2020



In 2020, there were 126 non-U.S.-born cases in New York State (exclusive of New York City); a 21.3 percent decrease from the 160 reported in 2019. The percentage of non-U.S.-born cases decreased from 85.1 percent in 2019 to 78.3 percent in 2020.

TUBERCULOSIS IN THE NON-U.S.-BORN

Figure 12. Number and Percent of Tuberculosis Cases by U.S.-Born* and Non-U.S.-Born Status, New York City, 1985-2020



In New York City, the number of non-U.S.-born TB cases decreased from 485 in 2019 to 390 in 2020. However, the proportion of cases increased from 85.7 percent in 2019 to 87.6 percent in 2020.

TUBERCULOSIS IN THE NON-U.S.-BORN

Table 4. Tuberculosis Cases by Country of Origin*, New York State, 2020

Country	New York State (Exclusive of New York City)	New York City	New York State (Total)
United States	35	51	86
China	9	63	72
India	22	20	42
Bangladesh	2	35	37
Ecuador	10	22	32
Philippines	11	21	32
Mexico	5	24	29
Dominican Republic	2	25	27
Haiti	7	15	22
Pakistan	6	13	19
Guyana	0	18	18
Korea, South	2	13	15
Peru	4	7	11
Nepal	2	8	10
El Salvador	8	2	10
Burma	4	5	9
Vietnam	4	4	8
Honduras	3	5	8
Ukraine	1	6	7
Colombia	1	5	6
Guatemala	0	5	5
Uzbekistan	1	4	5
Thailand	1	4	5
Trinidad and Tobago	0	5	5
Other Countries	21	64	85
Unknown	0	1	1
TOTAL CASES	**161**	**445**	**606**

*Only countries representing ≥5 TB cases are named
**Puerto Rico and other U.S. Territories are considered separately for the purpose of this table

Source: New York State Department of Health Bureau of Tuberculosis Control

In 2020, there were 74 different countries (not including the United States) that represented the 606 TB cases reported in New York State, 24 of which were represented by at least five cases. As in previous years, the most common country of origin for non-U.S.-born TB cases reported by New York State (exclusive of New York City) was India (N=22) and for New York City, the most common country was China (N=63).

Table 5. Number and Percent of Tuberculosis Cases by U.S.-Born* and Non-U.S.-Born Status, New York State (Exclusive of New York City), 2020

County	Total Number	U.S.-Born Number	Non-U.S.-Born Number	Non-U.S.-Born Percent
Albany	5	0	5	100.0
Allegany	0	0	0	0.0
Broome	2	0	2	100.0
Cattaraugus	0	0	0	0.0
Cayuga	0	0	0	0.0
Chautauqua	0	0	0	0.0
Chemung	0	0	0	0.0
Chenango	0	0	0	0.0
Clinton	0	0	0	0.0
Columbia	0	0	0	0.0
Cortland	0	0	0	0.0
Delaware	0	0	0	0.0
Dutchess	2	1	1	50.0
Erie	15	5	10	66.7
Essex	0	0	0	0.0
Franklin	0	0	0	0.0
Fulton	0	0	0	0.0
Genesee	0	0	0	0.0
Greene	1	0	1	100.0
Hamilton	0	0	0	0.0
Herkimer	0	0	0	0.0
Jefferson	1	1	0	0.0
Lewis	0	0	0	0.0
Livingston	0	0	0	0.0
Madison	0	0	0	0.0
Monroe	8	3	5	62.5
Montgomery	0	0	0	0.0
Nassau	40	10	30	75.0
Niagara	0	0	0	0.0
Oneida	4	0	4	100.0
Onondaga	9	3	6	66.7
Ontario	1	0	1	100.0
Orange	5	2	3	60.0
Orleans	0	0	0	0.0
Oswego	0	0	0	0.0
Otsego	0	0	0	0.0
Putnam	1	0	1	100.0
Rensselaer	2	0	2	100.0
Rockland	6	0	6	100.0
St. Lawrence	0	0	0	0.0
Saratoga	0	0	0	0.0
Schenectady	1	0	1	100.0
Schoharie	0	0	0	0.0
Schuyler	1	0	1	100.0
Seneca	0	0	0	0.0
Steuben	0	0	0	0.0
Suffolk	30	2	28	93.3
Sullivan	0	0	0	0.0
Tioga	0	0	0	0.0
Tompkins	2	2	0	0.0
Ulster	0	0	0	0.0
Warren	0	0	0	0.0
Washington	0	0	0	0.0
Wayne	1	1	0	0.0
Westchester	23	4	19	82.6
Wyoming	0	0	0	0.0
Yates	1	1	0	0.0
TOTAL CASES	**161**	**35**	**126**	**78.3**

*U.S.-born is defined as someone born in one of the 50 states, District of Columbia, or born outside the United States to at least one parent who was a U.S. citizen.
Source: New York State Department of Health Bureau of Tuberculosis Control

In 2020, there were 126 non-U.S.-born TB cases reported in New York State (exclusive of New York City). Over half (61.1%, N=77/126) of these cases were identified in Nassau, Suffolk, and Westchester, alone. Among the other counties that reported at least four non-U.S.-born cases, Albany, Oneida, and Rockland reported the highest non-U.S.-born percentage (100.0%) while Monroe reported the lowest percentage (62.5%). The number and percentage varied in the remaining counties with non-U.S.-born cases.

Table 6. Length of Time Non-U.S.-Born Tuberculosis Cases were in the United States Prior to Diagnosis, New York State (Exclusive of New York City), 2020

Length of Time in the U.S. (Years)	No.	%
<1	3	2.4
1-5	28	22.2
6-10	22	17.5
11-15	17	13.5
16-20	11	8.7
21-30	20	15.9
31-40	13	10.3
41-50	5	4.0
51-60	2	1.6
61-70	2	1.6
Unknown	3	2.4

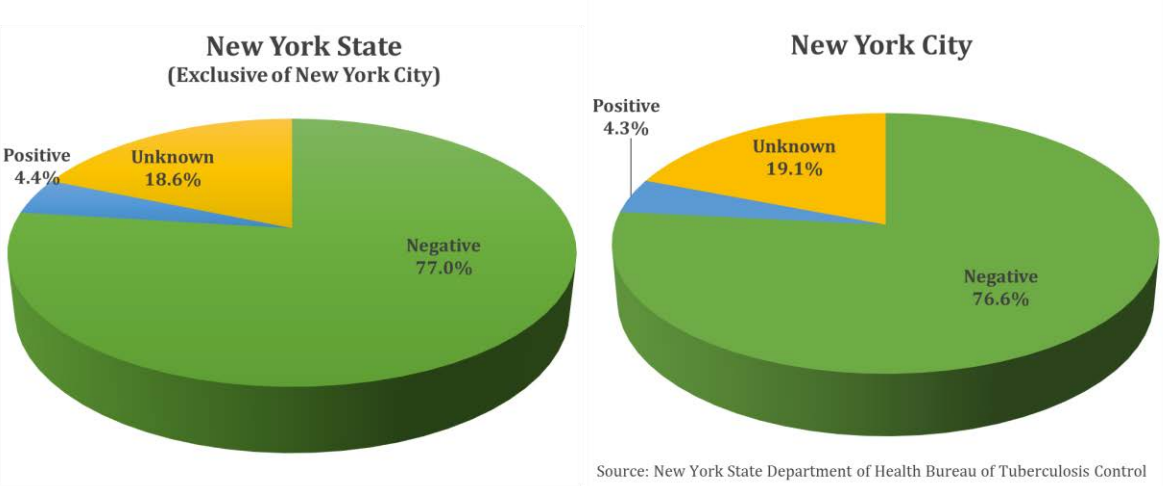
Source: New York State Department of Health
Bureau of Tuberculosis Control

In 2020, 24.6 percent (N=31/126) of non-U.S.-born TB cases in New York State (exclusive of New York City) were diagnosed within five years of entering the U.S. Only three (9.7%) of these 31 cases entered the U.S. within one year prior to diagnosis.

HIV CO-INFECTION

Knowledge of HIV status is essential for the proper management of patients with TB. HIV infection impairs the immune system leaving individuals at greater risk of becoming infected with TB and developing active disease.

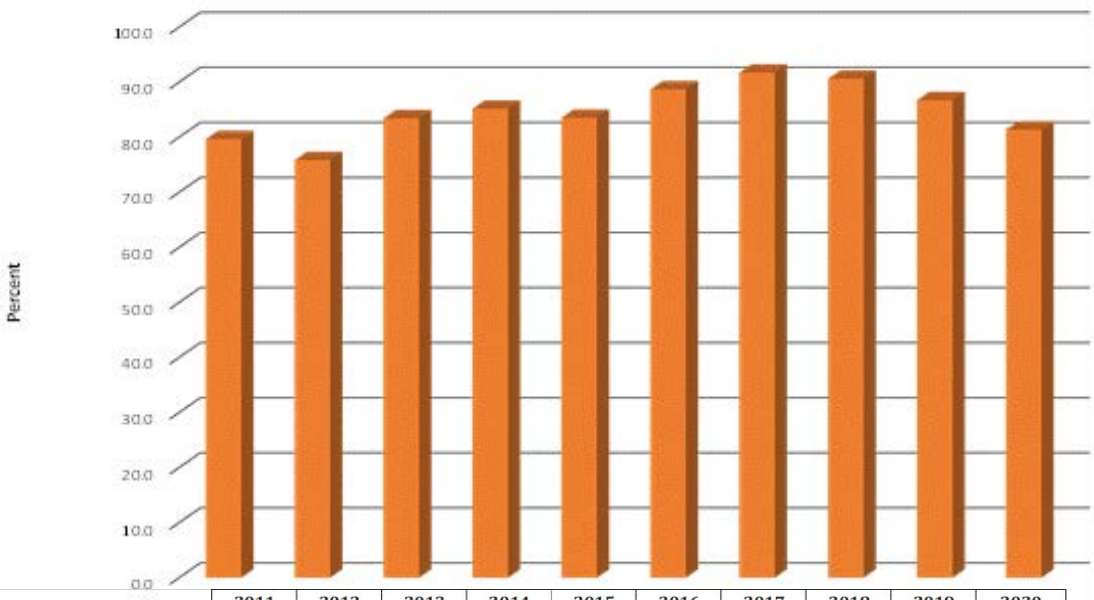
Figure 13. HIV Status for Tuberculosis Cases, New York State, 2020



In 2020, 81.4 percent (N=131/161) of TB cases in New York State (exclusive of New York City) and 80.9 percent (N=360/445) of cases in New York City had a known HIV status. The proportion of cases with co-infection in New York State (exclusive of New York City) was 4.4 percent similar to that of New York City at 4.3 percent. Individuals missing HIV testing information and those who were not offered or had refused testing were considered to have an unknown status.

Figure 14. Number and Percent of Tuberculosis Cases Who Have Been Tested for HIV, New York State (Exclusive of New York City), 2011-2020

Source: New York State Department of Health Bureau of Tuberculosis Control



	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Percent of Cases with an HIV Test Result	79.6	75.8	83.4	85.1	83.5	88.7	91.7	90.6	86.7	81.4
Number of Cases with an HIV Test Result	176	163	181	172	157	180	177	173	163	131
Total Number of Cases	221	215	217	202	188	203	193	191	188	161

Source: New York State Department of Health Bureau of Tuberculosis Control

In New York State (exclusive of New York City), the proportion of TB cases with a known HIV status has generally increased over the last decade, however a decline was noted in 2019 and 2020. In 2020, 81.4 percent (N=131/161) of TB cases had a documented HIV result.

TB cases under five years old and those between 5-9 years old had the lowest proportion of known HIV results (50%, N=1/2 and 0%, N=0/2, respectively), while those in the 20-24- and 35-44- year age groups had the highest proportion of known HIV results (100%, N= 19/19; 95.5%, N=21/22, respectively).

HIV CO-INFECTION

Table 7a. HIV Status for Tuberculosis Cases, New York State (Exclusive of New York City), 2016-2020

HIV Test Result	2016		2017		2018		2019		2020	
	No.	%	No.	%	No.	%	No.	%	No.	%
Negative	170	83.7	171	88.6	164	85.9	157	83.5	124	77.0
Positive	10	4.9	6	3.1	9	4.7	6	3.2	7	4.4
Refused	7	3.4	9	4.7	11	5.8	12	6.4	15	9.3
Not Offered	12	5.9	6	3.1	5	2.6	9	4.8	11	6.8
Missing/Unknown	4	2.0	1	0.5	2	1.0	4	2.1	4	2.5
TOTAL CASES	203		193		191		188		161	

Source: New York State Department of Health
Bureau of Tuberculosis Control

In 2020, 18.6 percent (N=30/161) of TB cases in New York State (excluding New York City) had an unknown HIV status (refused, not offered or missing/unknown), which was the highest percentage in the last five years. Among these 30 cases, 50.0 percent (N=15) refused testing. Of these 15 cases, 10 (66.7%) were over 55 years old.

Table 7b. HIV Status for Tuberculosis Cases by Gender, New York State (Exclusive of New York City), 2020

HIV Test Result	Male		Female		Total	
	No.	%	No.	%	No.	%
Negative	83	80.6	41	70.7	124	77.0
Positive	5	4.9	2	3.5	7	4.4
Refused	8	7.8	7	12.1	15	9.3
Not Offered	5	4.9	6	10.3	11	6.8
Missing/Unknown	2	0.9	2	3.4	4	2.5
TOTAL CASES	103		58		161	

Source: New York State Department of Health
Bureau of Tuberculosis Control

In New York State (exclusive of New York City), the proportion of TB cases with a known HIV status was greater among males compared to females in 2020 (85.5% and 74.1%, respectively). Of the seven cases with HIV co-infection, 71.4 percent (N=5/7) were male.

REASONS FOR EVALUATION

Table 8a. Primary Reason for Evaluation of Tuberculosis Cases, New York State (Exclusive of New York City), 2015-2020

Primary Reason for Evaluation	2016		2017		2018		2019		2020	
	No.	%	No.	%	No.	%	No.	%	No.	%
TB Symptoms	93	45.8	92	47.7	90	47.1	87	46.3	77	47.8
Abnormal Chest Radiograph	45	22.2	44	22.8	50	26.2	46	24.5	45	28.0
Incidental Lab Result	42	20.7	37	19.2	30	15.7	39	20.7	32	19.9
Contact Investigation	6	3.0	3	1.6	5	2.6	3	1.6	4	2.5
Targeted Testing	7	3.4	4	2.1	4	2.1	4	2.1	0	0.0
Immigration Medical Exam	1	0.5	7	3.6	1	0.5	1	0.5	0	0.0
Employment/Administrative	2	1.0	1	0.5	0	0.0	4	2.1	0	0.0
Health Care Worker	1	0.5	0	0.0	3	1.6	1	0.5	0	0.0
Unknown	6	3.0	5	2.6	8	4.2	3	1.6	3	1.9
TOTAL CASES	203		193		191		188		161	

Source: New York State Department of Health
Bureau of Tuberculosis Control

In 2020, 47.8 percent (N=77/161) of TB cases in New York State (exclusive of New York City) were evaluated because of TB symptoms. The second most common reason for evaluation was an abnormal chest radiograph (28%, N=45/161) followed by an incidental lab result (19.9%, N=32/161). Over the past five years, these have continued to be the three most frequently reported reasons for evaluation.

Table 8b. Primary Reason for Evaluation of Tuberculosis Cases by U.S.-Born* and Non-U.S.-Born Status, New York State (Exclusive of New York City), 2020

Primary Reason for Evaluation	U.S.-Born		Non-U.S.-Born		Total	
	No.	%	No.	%	No.	%
TB Symptoms	15	42.9	62	49.2	77	47.8
Abnormal Chest Radiograph	6	17.1	39	31.0	45	28.0
Incidental Lab Result	10	28.6	22	17.5	32	19.9
Contact Investigation	3	8.6	1	0.8	4	2.5
Targeted Testing	0	0.0	0	0.0	0	0.0
Immigration Medical Exam	0	0.0	0	0.0	0	0.0
Employment/Administrative Testing	0	0.0	0	0.0	0	0.0
Health Care Worker	0	0.0	0	0.0	0	0.0
Unknown	1	2.9	2	1.6	3	1.9
TOTAL CASES	35		126		161	

*U.S.-born is defined as someone born in one of the 50 states, District of Columbia, or born outside the United States to at least one parent who was a U.S. citizen

Source: New York State Department of Health
Bureau of Tuberculosis Control

Overall, the primary reasons for evaluation were similar among non-U.S.-born cases when compared to U.S.-born cases in New York State (exclusive of New York City). Incidental laboratory results, however, made up 28.6 percent of primary reasons for evaluation among the U.S.-born compared to 17.5 percent among non-U.S.-born.

RISK FACTORS

Aside from the commonly collected risk factors, such as HIV status, drug/alcohol usage, occupation and country of birth, there are additional medical and exposure risk factors that are associated with TB. Medical risk factors are conditions that weaken an individual's immune defenses against TB and may complicate the management of the disease. Exposure risk factors are those that place an individual at increased risk of TB transmission.

Table 9a. Additional Risk Factors* Among Tuberculosis Cases, New York State (Exclusive of New York City), 2016-2020

Additional Risk Factors		2016		2017		2018		2019		2020	
		No.	%	No.	%	No.	%	No.	%	No.	%
Medical Risk	Diabetes Mellitus	36	17.7	33	17.1	38	19.9	30	16.0	26	16.1
	Immunosuppression (not HIV/AIDS)	11	5.4	9	4.7	13	6.8	15	8.0	20	12.4
	Incomplete LTBI Therapy	4	2.0	5	2.6	3	1.6	5	2.7	3	1.9
	End-Stage Renal Disease	4	2.0	5	2.6	9	4.7	5	2.7	1	0.6
	Post-OrganTransplantation	1	0.5	1	0.5	2	1.0	1	0.5	0	0.0
	TNF-α Antagonist Therapy	4	2.0	2	1.0	3	1.6	2	1.1	3	1.9
Exposure Risk**	Contact of Infectious TB Patient	10	4.9	8	4.1	9	4.7	12	6.4	13	8.1
	Contact of MDR-TB Patient	0	0.0	0	0.0	0	0.0	0	0.0	1	0.6
	Missed Contact	0	0.0	1	0.5	1	0.5	0	0.0	0	0.0
Other Risk	Other Factors	34	16.7	25	13.0	20	10.5	25	13.3	29	18.0
None	No Additional Factors	116	57.1	117	60.6	107	56.0	107	56.9	77	47.8
TOTAL CASES		203		193		191		188		161	

*Categories are not mutually exclusive
**Within the last 2 years
LTBI = Latent Tuberculosis Infection

Source: New York State Department of Health

In 2020, 52.2 percent of TB cases reported having an additional medical risk factor. Among these cases, diabetes was the most reported risk factor with 16 percent (N=26/161) of cases in New York State (exclusive of New York City) had diabetes; the second lowest proportion observed in the last five years.

Table 9b. Additional Risk Factors* Among Tuberculosis Cases by Gender, New York State (Exclusive of New York City), 2020

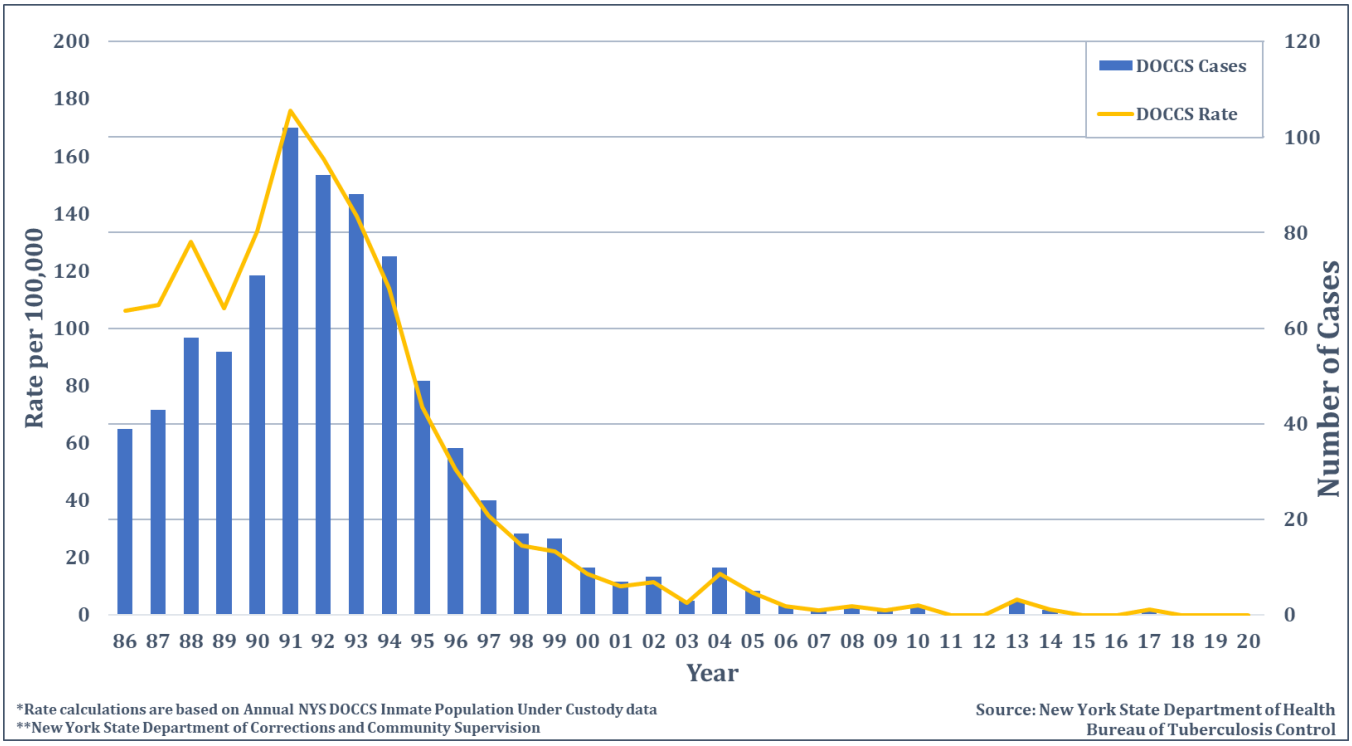
Additional Risk Factors		Male		Female		Total	
		No.	%	No.	%	No.	%
Medical Risk	Diabetes Mellitus	18	17.5	8	13.8	26	16.1
	Immunosuppression (not HIV/AIDS)	13	12.6	7	12.1	20	12.4
	Incomplete LTBI Therapy	2	1.9	1	1.7	3	1.9
	End-Stage Renal Disease	1	1.0	0	0.0	1	0.6
	Post-OrganTransplantation	0	0.0	0	0.0	0	0.0
	TNF-α Antagonist Therapy	2	1.9	1	1.7	3	1.9
Exposure Risk**	Contact of Infectious TB Patient	7	6.8	6	10.3	13	8.1
	Contact of MDR-TB Patient	0	0.0	1	1.7	1	0.6
	Missed Contact	0	0.0	0	0.0	0	0.0
Other Risk	Other Factors	18	17.5	11	19.0	29	18.0
None	No Additonal Factors	50	48.5	27	46.6	77	47.8
TOTAL CASES		103		58		161	

*Categories are not mutually exclusive
**Within the last 2 years
LTBI = Latent Tuberculosis Infection

Source: New York State Department of Health Bureau of Tuberculosis Control

In 2020, 51.5 percent of male TB cases in New York State (exclusive of New York City) had at least one additional risk factor compared to 53.4 percent female cases. The male cases had a higher proportion than females with diabetes (17.5% vs 13.8%, respectively).

Figure 15. Tuberculosis Cases and Rates* Among DOCCS Inmates, New York State (Exclusive of New York City), 1986-2020**



During the late 1980s and early 1990s, a substantial proportion of TB cases reported by New York State (exclusive of New York City) were in the New York State Department of Corrections and Community Supervision (DOCCS) inmate population. Among the DOCCS inmate population, there has been a notable decline in cases since 1991 when 102 new cases (176 per 100,000 inmates) were reported. In 2020, no new TB cases were reported among the DOCCS inmate population.

RISK FACTORS

There is an increased risk of TB transmission for residents and staff of congregate settings (e.g., correctional facilities and long-term care facilities) due to the close proximity and prolonged contact with others. Residents of congregate settings may also have significant comorbidities that amplify this risk even further.

Table 10. High-Risk Congregate Setting at the Time of Diagnosis for Tuberculosis Cases, New York State (Exclusive of New York City), 2016-2020

Congregate Setting at Time of TB Diagnosis		2016		2017		2018		2019		2020	
		No.	%	No.	%	No.	%	No.	%	No.	%
Correctional Facility	Juvenile Facility	1	0.5	0	0.0	0	0.0	0	0.0	0	0.0
	Local Jail	0	0.0	0	0.0	1	0.5	1	0.5	0	0.0
	State Prison	0	0.0	1	0.5	0	0.0	0	0.0	0	0.0
	Federal Prison	1	0.5	0	0.0	0	0.0	2	1.1	0	0.0
	Other Facility	0	0.0	0	0.0	0	0.0	1	0.5	0	0.0
Long-Term Care Facility	Alcohol/Drug Treatment	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Hospital-Based	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Mental Health Residence	0	0.0	0	0.0	0	0.0	1	0.5	0	0.0
	Nursing Home	4	2.0	3	1.6	2	1.0	3	1.6	1	0.6
	Residential	2	1.0	0	0.0	0	0.0	0	0.0	0	0.0
	Other Long-Term Care	0	0.0	1	0.5	0	0.0	0	0.0	0	0.0
	Unknown	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
TOTAL CASES		203		193		191		188		161	

Source: New York State Department of Health
Bureau of Tuberculosis Control

The number and percentage of cases diagnosed while residing in a congregate setting varied over the last five years in New York State (exclusive of New York City), but was highest in 2019 (4.3%, N=8/188) and lowest in 2020 (0.6%, N=1/161). In 2020, the single case was diagnosed in a nursing home.

Table 11. Homelessness Among Tuberculosis Cases Within the Past Year, New York State (Exclusive of New York City), 2016-2020

The homeless population is at increased risk of acquiring or transmitting TB to others as homelessness is often accompanied by other risk factors associated with TB, such as substance abuse, HIV infection, and inadequate medical care. A person is considered to be homeless if they don't have a fixed, regular nighttime residence. These individuals may live on the streets, alternate between many temporary residences, or reside in privately or publicly supervised shelters.

Year	Homeless Cases	
	No.	%
2016	5	2.5
2017	7	3.6
2018	5	2.6
2019	5	2.7
2020	1	0.6

Source: New York State Department of Health
Bureau of Tuberculosis Control

From 2016 to 2020, an average of 2.5 percent (N=23/936) of TB cases in New York State (exclusive of New York City) were homeless within the 12 months prior to diagnosis. In 2020, 0.6 percent (N=1/161) of TB cases were homeless.

RISK FACTORS

Substance abuse weakens the immune system which can leave people more infectious or at greater risk of becoming infected and developing active TB. Also, the drugs used to treat TB can be toxic to the liver so substance abuse, such as excess alcohol use, can increase the damaging effects of treatment.

Table 12. Substance Abuse* Among Tuberculosis Cases Within the Past Year, New York State (Exclusive of New York City), 2016-2020

Substance Abuse	2016		2017		2018		2019		2020	
	No.	%	No.	%	No.	%	No.	%	No.	%
Injection Drug Use	0	0.0	2	1.0	1	0.5	0	0.0	0	0.0
Non-Injection Drug Use	8	3.9	6	3.1	10	5.2	3	1.6	4	2.5
Excess Alcohol Use	14	6.9	17	8.8	19	9.9	6	3.2	7	4.3
TOTAL CASES	**203**		**193**		**191**		**188**		**161**	

*Categories are not mutually exclusive

Source: New York State Department of Health
Bureau of Tuberculosis Control

In New York State (exclusive of New York City), excess alcohol use has been the most commonly reported form of substance abuse among TB cases over the last five years. There were seven cases (4.3%) in 2020 with reported alcohol abuse, representing a 34.4 percent increase from the 2019 rate of 3.2 precent. In 2020, there was one case that reported both drug and alcohol abuse.

DRUG RESISTANCE

The first-line drugs used for treating TB disease are isoniazid (INH), rifampin (RIF), pyrazinamide (PZA), ethambutol (EMB), and less commonly streptomycin (SM), but there are other second-line drugs that can be used when necessary. Most TB strains are susceptible to all first-line drugs, but resistance to one or more can occur, which could complicate the management of the disease. Multidrug-resistant TB (MDR TB) is caused by a TB strain that is resistant to at least INH and RIF. Extensively drug resistant TB (XDR TB) is MDR TB with additional resistance to second-line drugs, such as any fluoroquinolone (levofloxacin, moxifloxacin, and ofloxacin) and at least one of the injectable drugs (amikacin, kanamycin, and capreomycin). Drug susceptibility testing (DST) is performed whenever possible to identify any drug resistance.

Table 13. Phenotypic Drug Susceptibility Results for Culture-Confirmed Tuberculosis Cases, New York State (Exclusive of New York City), 2016-2020

First-Line Drug Susceptibility Results		2016		2017		2018		2019		2020	
		No.	%	No.	%	No.	%	No.	%	No.	%
Positive Culture		**150**	**---**	**142**	**---**	**151**	**---**	**150**	**---**	**136**	**---**
Susceptibility Test Reported		**148**	**98.7**	**138**	**97.2**	**130**	**86.1**	**81**	**54.0**	**81**	**59.6**
Susceptibility Test Results	Susceptible to all first-line drugs	125	84.5	120	87.0	104	80.0	64	79.0	60	74.1
	INH and RIF resistant (MDR TB)	0	0.0	2	1.4	2	1.5	1	1.2	1	1.2
	INH resistant, RIF susceptible	12	8.1	7	5.1	13	10.0	15	18.5	12	14.8
	RIF resistant, INH susceptible	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Resistance other than INH and RIF	11	7.4	9	6.5	11	8.5	1	1.2	11	13.6

*1 case had extensively drug resistant TB (XDR TB)
INH = Isoniazid; RIF = Rifampin; MDR TB = Multidrug-resistant TB

Source: New York State Department of Health Bureau of Tuberculosis Control

Over the last five years, there have been 729 culture-confirmed TB cases in New York State (exclusive of New York City). Phenotypic DST results have been reported for 79.3 percent (N=578/729) of these cases, most (81.8%, N=473) of which have been susceptible to all first-line TB drugs.

Since March 2016, in addition to phenotypic DST, New York State Wadsworth Center for Laboratories and Research has been performing Whole Genome Sequencing (WGS) on the first isolate for each TB case. Toward the end of 2018, Wadsworth Laboratories changed its protocol to focus primarily on WGS and perform phenotypic DST only when genetic mutations suggestive of resistance were identified. As a result of this change, in 2020 only 59.6 percent (N=81/136) of cases had phenotypic DST results. Of the remaining 55 culture-confirmed cases (40.4%) without phenotypic DST results, 54 had molecular DST results by WGS that indicated susceptibility to all first line drugs.

Table 14. Molecular Drug Susceptibility Testing Method and Mutations in the Gene Targets* Associated with Resistance to Select Tuberculosis Drugs for Culture-Confirmed Tuberculosis Cases, New York State (Exclusive of New York City), 2020

Medication	Gene Target	Whole Genome Sequencing			Pyrosequencing			GeneXpert		
		No. Cases with Test Done	No. Mutations	%	No. Cases with Test Done	No. Mutations	%	No. Cases with Test Done	No. Mutations	%
Rifampin	rpoB	131	1	0.8	28	0	0.0	7	1	14.3
Isoniazid	katG	131	3	2.3	29	1	3.4	---	---	---
	inhA	131	0	0.0	28	1	3.6	---	---	---
	oxyR-ahpC promoter region	130	0	0.0	---	---	---	---	---	---
	mabA-inhA promoter region	131	6	4.6	---	---	---	---	---	---
	mabA	131	1	0.8	---	---	---	---	---	---
Pyrazinamide	pncA	131	3	2.3	---	---	---	---	---	---
	pncA promoter region	130	1	0.8	---	---	---	---	---	---
Ethambutol	embB	130	1	0.8	---	---	---	---	---	---
	embC-embA promoter region	131	0	0.0	---	---	---	---	---	---
Streptomycin	rpsL	131	5	3.8	---	---	---	---	---	---
	rrs 512, 513, 516, 906	131	1	0.8	1	0	0.0	---	---	---
Fluoroquinolones	gyrA	131	2	1.5	1	0	0.0	---	---	---
	gyrB	131	0	0.0	1	0	0.0	---	---	---
Injectables	rrs 1400	129	0	0.0	1	0	0.0	---	---	---

Source: New York State Department of Health
Bureau of Tuberculosis Control

In 2020, 96.3 percent (N=131/136) of culture-confirmed cases in New York State (exclusive of New York City) had at least one type of molecular DST performed. Among the 131 cases with WGS results, there were 22 high-confidence mutations identified that were predictive of resistance to first-line drugs. Another two mutations were identified for the fluoroquinolones, which are second line drugs.

Figure 16. Number and Percent of Multidrug-Resistant Tuberculosis Cases*, New York State, 2016-2020

Over the last five years, there were nine times as many MDR TB cases in New York City compared to the remainder of the state (N=54 and N=6, respectively). In 2020, the proportion of cases in New York City reported with MDR TB decreased as compared to the previous four years. During the same period, the trend for the rest of the state has fluctuated between zero and two cases. In 2020, one (1.2%) MDR TB case was reported for New York State (exclusive of New York City), whereas in New York City there were 6 (1.6%) MDR TB cases reported.

GENOTYPING

Table 15. Tuberculosis Genotyping Summary for Tuberculosis Cases, New York State (Exclusive of New York City), 2016-2020

Genotyping		2016		2017		2018		2019		2020	
		No.	%	No.	%	No.	%	No.	%	No.	%
Initial Positive Cultures		**154**	**---**	**146**	**---**	**157**	**---**	**150**	**---**	**138**	**---**
False Positives	**Total False Positives**	**4**	**---**	**4**	**---**	**4**	**---**	**1**	**---**	**1**	**---**
	Control strain	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0
	Contamination	0	0.0	0	0.0	1	0.6	0	0.0	1	0.7
	M. bovis BCG	4	2.6	3	2.1	3	2.0	1	0.7	1	0.7
True Positives	**Total True Positives**	**150**	**---**	**142**	**---**	**153**	**---**	**149**	**---**	**136**	**---**
	Isolates Available	149	---	141	---	151	---	149	---	134	---
	Complete Genotype*	147	98.7	136	96.5	151	100.0	147	98.7	118	88.1
	Partial Genotype	147	98.7	138	97.9	151	100.0	147	98.7	130	97.0
	No Result	2	1.3	3	2.1	2	2.1	2	1.3	4	3.0

*Complete genotype means having both a spoligotype and MIRU result
MIRU = mycobacterial interspersed repetitive unit

Source: New York State Department of Health
Bureau of Tuberculosis Control

New York State requires that all initial positive cultures be submitted for genotyping. Beginning in 2004, real time spoligotyping and subsequent restriction fragment length polymorphism (RFLP) testing were performed at the Department's Wadsworth Center for Laboratories and Research, but as of 2009 RFLP was discontinued. In addition, the CDC-sponsored National Tuberculosis Genotyping Program has performed mycobacterial interspersed repetitive unit (MIRU) and spoligotyping, both of which are needed for a genotype to be considered complete.

In 2020, 98.5 percent (N=134/136) of positive cultures in New York State (exclusive of New York City) were available for genotyping. Of these 134 isolates, 88.1 percent (N=118) had a complete genotype (spoligotype and MIRU result).

SITE OF DISEASE

The primary site of disease for most TB cases is pulmonary, but extrapulmonary involvement also occurs. TB is spread from person to person through airborne transmission, so cases with pulmonary involvement have the greatest potential to infect others.

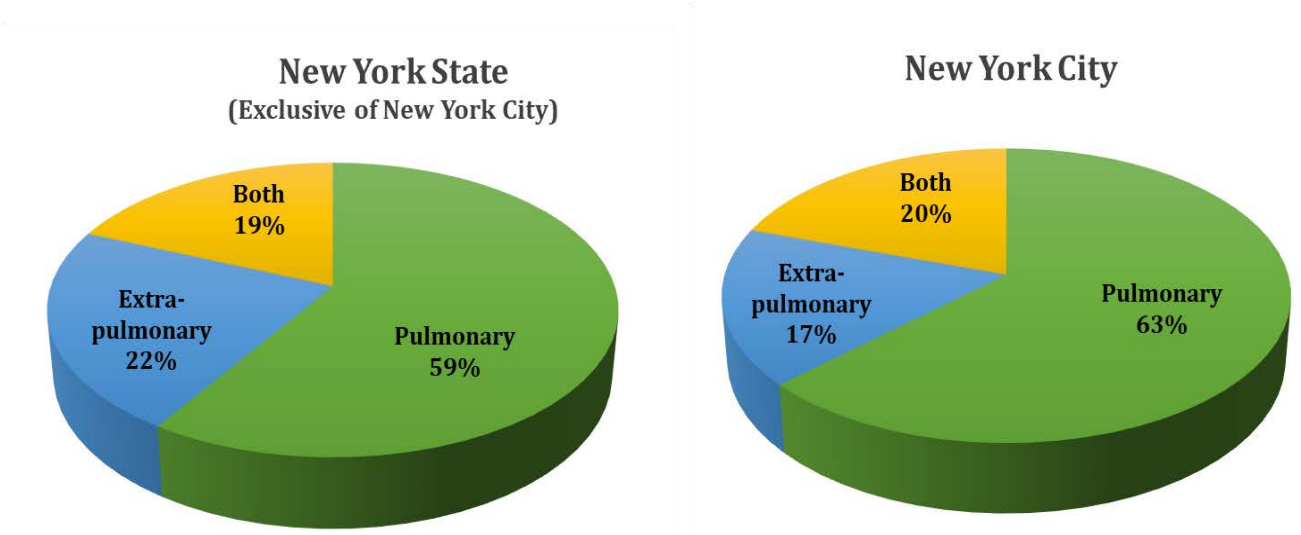
Table 16. Primary Site of Disease for Tuberculosis Cases, New York State (Exclusive of New York City), 2016-2020

Primary Site of Disease	2016		2017		2018		2019		2020	
	No.	%	No.	%	No.	%	No.	%	No.	%
Pulmonary	115	56.7	122	63.2	119	62.3	115	61.2	95	59.0
Extrapulmonary	63	31.0	48	24.9	49	25.7	49	26.1	36	22.4
Both	25	12.3	23	11.9	23	12.0	24	12.8	30	18.6
TOTAL CASES	203		193		191		188		161	

Source: New York State Department of Health
Bureau of Tuberculosis Control

In the last five years, the proportion of TB cases with pulmonary disease ranged from 69 to 77.6 percent in New York State (exclusive of New York City). The highest proportion of cases with pulmonary TB was observed in 2020 (77.6%) and the lowest was seen in 2016 (69.0%).

Figure 17. Primary Site of Disease for Tuberculosis Cases, New York State, 2020



Source: New York State Department of Health Bureau of Tuberculosis Control

Of TB cases in New York City, 83 percent (N=368/445) had pulmonary disease compared to 77.6 percent (N=125/161) of cases in the rest of the state. Among these 493 pulmonary cases throughout the state, 118 also had disease in one or more extra-pulmonary sites.

SITE OF DISEASE

Table 17. Extra-Pulmonary Sites of Disease* for Tuberculosis Cases, New York State, 2020

Extra-Pulmonary Site of Disease	New York State (Exclusive of New York City)	New York City	New York State (Total)
Lymphatic	25	55	80
Pleural	14	56	70
Bone/Joint	7	20	27
Genitourinary	4	8	12
Peritoneal	2	19	21
Meningeal	2	4	6
Laryngeal	0	2	1
Other	16	32	48

Source: New York State Department of Health
Bureau of Tuberculosis Control

There were 231 cases in New York State with at least one extra-pulmonary site of disease in 2020. Among these cases, the most common sites of disease were lymphatic (N=80), pleural (N=70), and bone/joint (N=27).

COMPLETION OF THERAPY

Table 18. Treatment Status for Tuberculosis Cases*, New York State (Exclusive of New York City), 2015-2019

Treatment Status	2015		2016		2017		2018		2019	
	No.	%	No.	%	No.	%	No.	%	No.	%
Open	0	0.0	0	0.0	0	0.0	1	0.5	4	2.2
Complete	161	87.5	185	93.0	176	92.1	165	87.3	154	83.2
Died	14	7.6	8	4.0	11	5.8	12	0.0	18	9.7
Uncooperative/Refused	2	1.1	1	0.5	1	0.5	1	0.5	3	1.6
Lost	0	0.0	1	0.5	0	0.0	2	1.1	1	0.5
Adverse Treatment Event	1	0.5	0	0.0	0	0.0	1	0.5	0	0.0
Other	6	3.3	4	2.0	3	1.6	7	3.7	5	2.7
TOTAL CASES	184		199		191		189		185	

*Excludes patients found not to have TB, those who were reported at death and those who never started treatment

Source: New York State Department of Health Bureau of Tuberculosis Control

In New York State (exclusive of New York City), the average treatment completion rate for TB cases who were alive at diagnosis and started treatment between 2015 and 2019 (the most recent year for which completion information is available) was 88.7 percent (N=841/948). The completion rate for 2019 was 83.2 percent.

Table 19. Treatment Status for Tuberculosis Cases* Reported in 2019, New York State (Exclusive of New York City)

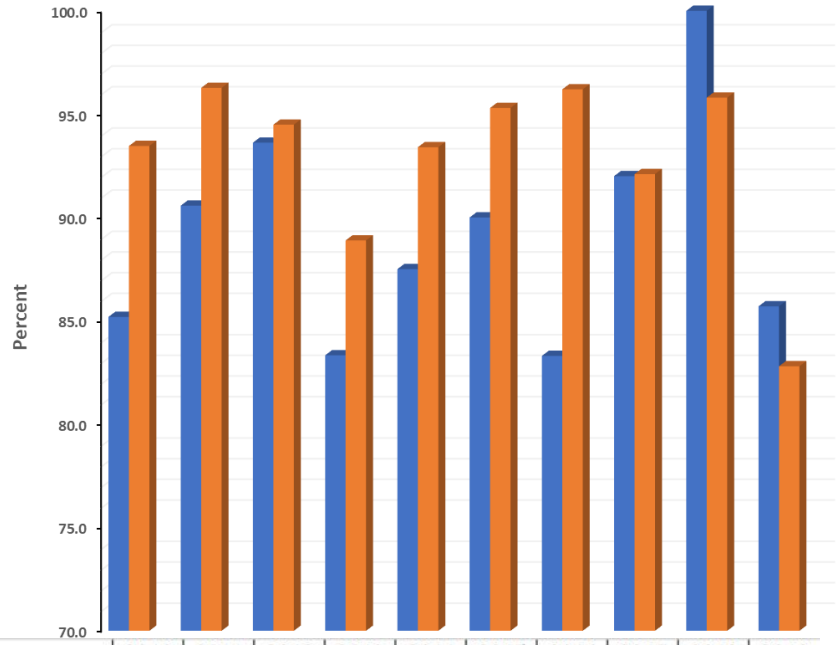
Treatment Status	Non-MDR TB		MDR TB		Total	
	No.	%	No.	%	No.	%
Complete	153	83.2	1	100.0	154	83.2
Died	18	9.8	0	0.0	18	9.7
Uncooperative/Refused	3	1.6	0	0.0	3	1.6
Lost	1	0.5	0	0.0	1	0.5
Adverse Treatment Event	0	0.0	0	0.0	0	0.0
Open	4	2.2	0	0.0	4	2.2
Other	5	2.7	0	0.0	5	2.7
TOTAL CASES	184		1		185	

*Excludes patients found not to have TB, those who were reported at death and those who never started treatment
MDR TB = Multidrug-resistant TB

Source: New York State Department of Health Bureau of Tuberculosis Control

For the 185 TB cases in New York State (exclusive of New York City) who were alive at diagnosis and who started treatment in 2019, 83.2 percent (N=154/185) completed treatment. The single MDR TB case completed TB treatment.

Figure 18. Percent of Tuberculosis Cases Who Completed Treatment Within 12 Months*, by U.S.-Born and Non-U.S.-Born Status, New York State (Exclusive of New York City), 2010-2019**



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Percent of U.S.-Born Cases	85.2	90.6	93.6	83.3	87.5	90.0	83.3	92.0	100.0	85.7
Percent of Non-US-Born Cases	93.5	96.3	94.5	88.9	93.4	95.3	96.2	92.1	95.8	82.8
Total	91.3	94.7	94.3	87.8	92.3	94.3	93.1	92.1	96.7	83.2

*Among those eligible to complete within 12 months
**U.S.-born is defined as someone born in one of the 50 states, District of Columbia, or born outside the United States to at least one parent who was a U.S. citizen.

Source: New York State Department of Health
Bureau of Tuberculosis Control

For 2019 (the most recent year for which complete information is available), 83.2 percent (N=154/185) of patients in New York State (exclusive of New York City) eligible^ to complete treatment within 12 months, did so.

In 2019 U.S.-born patients had 85.7 percent treatment completion rate while non-U.S.-born had 82.8 percent completion rate, in sharp contrast to the prior year when rates were significantly higher (100.0% and 95.8%, respectively).

^Patients with rifampin resistance, those with meningeal TB, and children under 15 who have disseminated TB (miliary TB or evidence of miliary TB on chest radiograph, or a positive blood culture) are ineligible to complete within 12 months so they are excluded. Those who were never started on treatment, were dead at diagnosis, or who died while on treatment are also excluded. Effective January 2009, the CDC revised the definition of who is eligible to complete treatment to also exclude patients who moved out of the country while on treatment.

CONTACTS TO INFECTIOUS TUBERCULOSIS CASES

People who come in close contact with an infectious TB case for a prolonged period are at high risk of becoming infected. Since TB is spread person to person by breathing in airborne particles from another infected individual, pulmonary TB cases who are exhibiting symptoms, such as coughing, are most likely to transmit TB to others. For newly diagnosed cases, investigations are conducted to identify close contacts who may have been infected. Once contacts are identified, they are notified of their exposure and efforts are made to get each contact evaluated. Upon evaluation, if a contact has a positive tuberculin skin test (TST) or a positive Interferon-Gamma Release Assay, further evaluation is done to determine if the infection is active TB disease or Latent Tuberculosis Infection (LTBI). Treatment options for the condition are then discussed. Individuals who have been recently infected have a greater risk of their infection developing into active TB disease, so it is important for LTBI patients to complete treatment.

Table 20. Number and Percent of Infectious Tuberculosis Cases with Contacts Identified, New York State (Exclusive of New York City), 2010-2019

Year	Total Infectious Cases	Infectious Cases with Contacts Identified	
		No.	%
2010	73	72	98.6
2011	80	78	97.5
2012	75	75	100.0
2013	63	62	98.4
2014	72	72	100.0
2015	72	72	100.0
2016	50	49	98.0
2017	54	53	98.1
2018	69	67	97.1
2019	61	59	96.7

Source: New York State Department of Health
Bureau of Tuberculosis Control

In 2019 (the most recent year for which complete information is available), 96.7 percent (N=59/61) of infectious TB cases in New York State (exclusive of New York City) had contacts identified, a slight decline of 0.4 percent from the previous year. This is below the state objective of 98.0 percent for 2019.

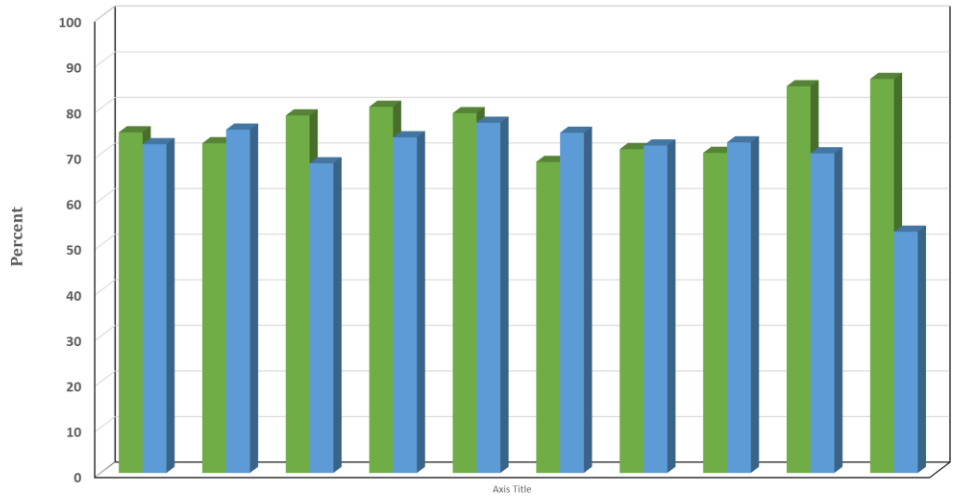
Table 21. Number and Percent of Contacts to Infectious Tuberculosis Cases Evaluated for Latent Tuberculosis Infection, New York State (Exclusive of New York City), 2010-2019

Year	Total Contacts Identified	Contacts Evaluated	
		No.	%
2010	2,253	2,027	89.9
2011	3,662	3,049	83.3
2012	1,851	1,587	85.7
2013	1,462	1,215	83.1
2014	1,843	1,571	85.2
2015	1,922	1,431	74.5
2016	933	725	77.7
2017	1,714	1,417	82.7
2018	1,509	1,359	90.1
2019	1,344	784	58.3

Source: New York State Department of Health
Bureau of Tuberculosis Control

Of contacts to infectious cases, 58 percent (N=784/1,344) in New York State (exclusive of New York City) were evaluated for LTBI in 2019 (the most recent year for which complete information is available). This was a 35.3 percent decrease from the previous year (58.3% and 90.1%, respectively) and is below the New York State objective of 94 percent. The low percent of contacts evaluated resulted from large contact investigations on college campuses that took place between semesters, thus making it difficult to perform complete evaluations.

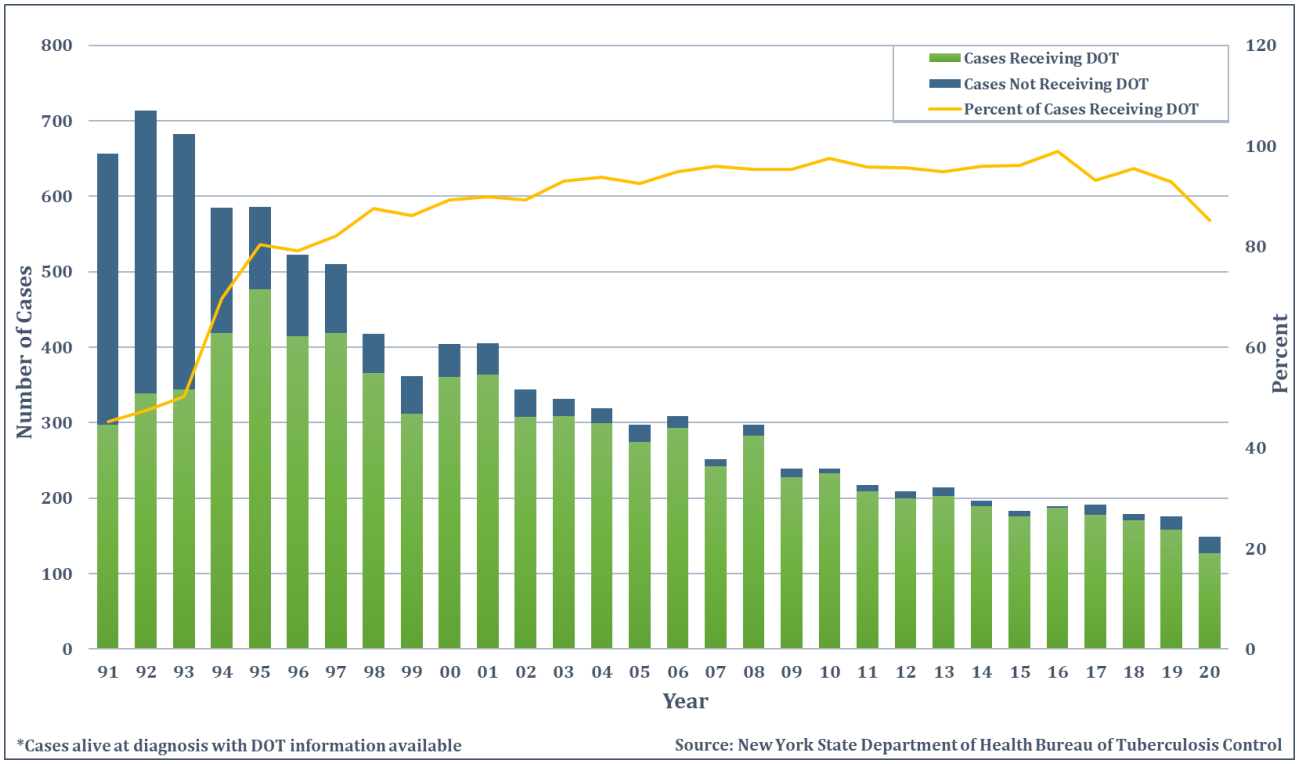
Figure 19. Number and Percent of Contacts to Infectious Tuberculosis Cases Placed on Treatment for Latent Tuberculosis Infection and Completed*, New York State (Exclusive of New York City), 2010-2019



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Percent of Contacts who Started Treatment	74.7	72.3	78.4	80.3	78.9	68.2	71.0	70.2	84.8	86.4
Number of Contacts who Started Treatment	219	263	178	159	198	122	71	80	117	51
Percent of Contacts who Completed Treatment	72.1	75.3	67.9	73.6	76.8	74.6	71.8	72.5	70.1	52.9
Number of Contacts who Completed Treatment	158	198	121	117	152	91	51	58	82	27

Among the contacts to infectious cases in New York State (exclusive of New York City) who were evaluated in 2019 (the most recent year for which complete information is available), 7.5 percent (N=59/784) were diagnosed with LTBI. Of these contacts, 86 percent (N=51/59) were started on a treatment regimen and 52.9 percent (N=27/51) of those who started treatment completed the prescribed regimen. The proportion starting treatment was below the 2019 state target of 92 percent. The proportion of contacts with LTBI that completed treatment, 52.9 percent, also were below the 93 percent target for 2019.

Figure 20. Number and Percent of Tuberculosis Cases* Receiving Any Directly Observed Therapy, New York State (Exclusive of New York City), 1991-2020



In New York State (exclusive of New York City) the proportion of cases receiving directly observed therapy (DOT) has been increasing since the early 1990s when it was first actively promoted by the New York State Department of Health, local health units, and others. In 1991, 45.2 percent (N=297/657) of TB cases on treatment received at least part of their therapy as DOT. By 2003, the proportion of cases receiving a portion of their treatment as DOT more than doubled and by 2016 it reached the highest at 98.9 percent (N=187/189). In 2020, this percentage dropped to 86.1 percent (N=130/151) from 92.9 percent (N=158/170) in 2019.

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