# UNITE TO STOP TB NYC


NEW YORK CITY BUREAU OF TUBERCULOSIS CONTROL • ANNUAL SUMMARY • 2017

**›› MISSION:** The Bureau of Tuberculosis Control (BTBC) aims to prevent the spread of tuberculosis (TB) and eliminate it as a public health problem in New York City (NYC)

## GOALS

**1** Identify all individuals with suspected and confirmed TB disease and ensure their appropriate treatment, ideally on directly observed therapy (DOT)

**2** Ensure that individuals at high risk for progression from latent TB infection to TB disease complete treatment and do not develop disease

## ACTIVITIES

- Maintain a surveillance system for all TB cases and their contacts, all people suspected of having TB disease and children younger than 5 years of age with latent TB infection
- Ensure that providers and laboratories report suspected and confirmed TB cases to the New York City Health Department
- Conduct intensive case management to ensure that TB patients remain under medical supervision until treatment completion, with DOT as the standard of care
- Conduct contact investigations to identify individuals with TB disease or latent TB infection and ensure appropriate treatment
- Detect and respond to outbreaks to prevent the spread of TB
- Set standards and guidelines and consult on all aspects of TB control, including prevention, diagnosis and treatment of TB disease and latent TB infection
- Provide medical consultation and perform timely reviews of discharge plans submitted by hospitals and providers
- Operate state-of-the-art chest clinics for TB screening, diagnosis and treatment at no cost to the patient
- Ensure that all positive cultures for *Mycobacterium tuberculosis* are sent to the NYC Public Health Laboratory for drug susceptibility testing and genotyping analysis
- Use data to monitor trends, inform programmatic decision-making and conduct research and evaluation
- Align funding allocations with program priorities
- Collaborate with community-based organizations and health care providers to improve TB prevention and management
- Support advocacy to maintain and improve the TB public health infrastructure
- Ensure data confidentiality

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**ABOUT THIS REPORT:** This report covers calendar year 2017 and provides robust surveillance data, summaries of core program activities and highlights. The data reflect the most complete information available as of January 22, 2018. For additional details on the use of denominators and definitions in this report, please see Technical Notes (page 32).

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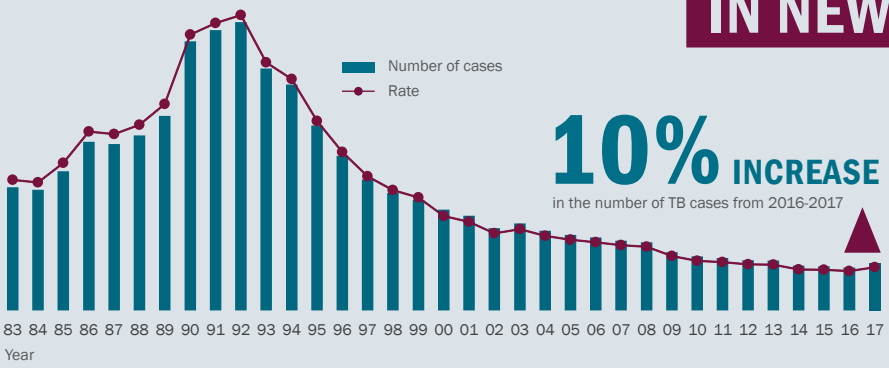
# TUBERCULOSIS

## IN NEW YORK CITY, 2017

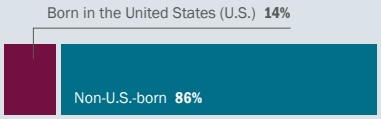



**10% INCREASE** in the number of TB cases from 2016-2017

**613** Number of TB cases verified in NYC in 2017

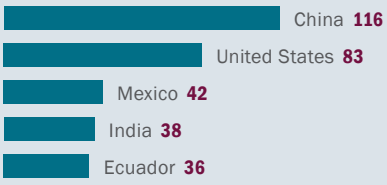
**7.5** NYC citywide TB rate per 100,000 people

### COUNTRY OF BIRTH




**75** Number of countries of birth represented among patients with TB disease

**MOST COMMON COUNTRIES OF BIRTH AMONG PATIENTS:**




### MULTIDRUG RESISTANCE

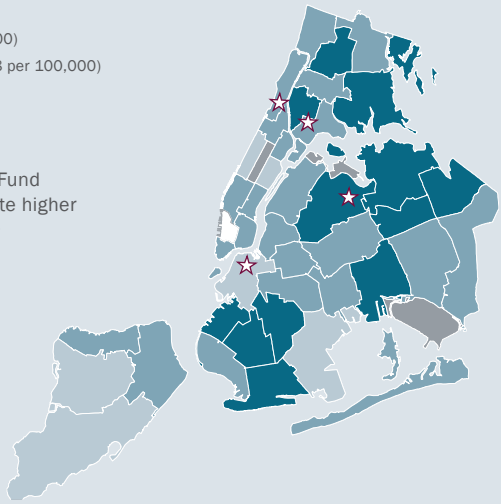
**14** Number of patients diagnosed in 2017 who had multidrug-resistant (MDR) TB, defined as a TB strain resistant to isoniazid and rifampin, the two most important and effective drugs in the TB treatment regimen

**1** Number of patients diagnosed in 2017 who had extensively drug resistant (XDR) TB; five patients had a resistance pattern only one drug away from XDR TB

**7** Median number of drugs to which there was known drug resistance among MDR TB cases (Range 3-12)

### TB IN NYC NEIGHBORHOODS

- Above citywide TB rate (7.6 to 20.2 per 100,000)
- At or below citywide TB rate (2.9 to 7.5 per 100,000)
- At or below provisional national TB rate (0.9 to 2.8 per 100,000)
- No NYC TB cases
- ☆ Health Department chest clinic location

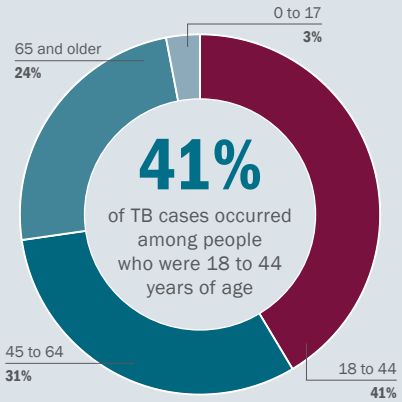


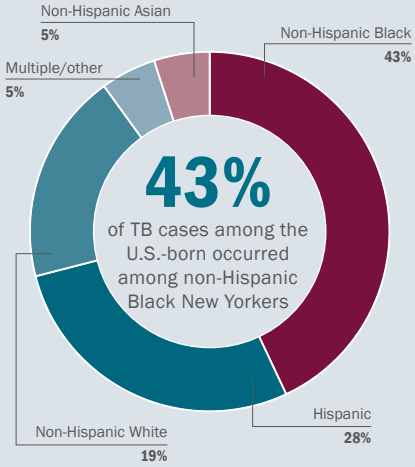
**12** Number of United Hospital Fund neighborhoods with a TB rate higher than the 2017 citywide rate

**The Health Department provides TB services free of charge to ALL PATIENTS, regardless of their immigration status, insurance status or ability to pay**

### DEMOGRAPHIC CHARACTERISTICS

**63%** of TB cases occurred among males




### CLINICAL CHARACTERISTICS

**5%** Proportion of TB cases among patients known to be HIV-infected

**80%** Proportion of TB cases with a pulmonary site of disease

**83%** Proportion of TB cases with a positive culture

March 24, 2018

Dear Colleagues,

This year, we are reminded of the challenges we face in controlling tuberculosis (TB). In last year's report, the Health Department highlighted the slowing decline of TB cases and incidence rates in New York City (NYC). In 2017, the number of new TB cases in NYC rose 10%, from 556 to 613, with incidence rates increasing from 6.8 per 100,000 to 7.5 per 100,000. This is the first increase in NYC since 2003* and the largest increase in the last 25 years.

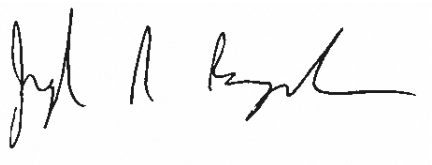
TB cases were identified in almost every neighborhood in NYC in 2017 and the disease continues to affect patients across races, nationalities, ages and income levels. Fourteen patients had multidrug-resistant (MDR) TB, including one patient who had extensively drug-resistant (XDR) TB and five patients who had a resistance pattern only one drug away from XDR TB. These patients come from countries around the world—including the United States—reminding us that TB is not just a global crisis but a local one.

As local, national and global conversations turn to the possibility of TB elimination, we must remain fully committed to combatting this curable and preventable disease. To do so, we must continue to work alongside communities to increase access to quality care, maintain our critical public health infrastructure in the face of funding challenges, invest in research and strengthen our collaborations with key partners including health care providers, laboratories and patients.

We have innovative tools at our disposal that can help us make further headway against TB. The Health Department's TB chest clinics offer state-of-the-art diagnostic, treatment and care modalities regardless of patient immigration status or ability to pay. Our efforts to diagnose, treat and prevent TB have been improved with new rapid diagnostics, shortened preventive therapies and remote video-enabled directly observed therapy. Our dedicated staff and partners work tirelessly to ensure that patients and their contacts receive high-quality care and successfully complete treatment.

United, we can continue to reduce TB transmission and infection, cut rates of disease and deliver compassionate, high-quality care to our patients and communities. Thank you for joining our efforts and for your ongoing commitment to fighting TB.

Sincerely,



Joseph N. Burzynski, MD, MPH
Assistant Commissioner, Bureau of Tuberculosis Control

* NYC reported a 5.7% increase in the number of TB cases from 2002-2003, partially attributable to a change in surveillance practices.

# CORE ACTIVITIES

## REPORTING AND SURVEILLANCE

Health care providers and laboratories are required to report to the New York City Health Department:

1. All patients with confirmed TB disease
2. Anyone suspected of having TB disease
3. Children younger than 5 years of age with a positive test for TB infection

Staff of the Health Department's Bureau of TB Control (BTBC) review all submitted reports for completeness and timeliness and determine whether patients are eligible for case management. The Health Department maintains an electronic registry and case management system (Maven version 5.4.3.1, Conduent Public Health Solutions, Florham Park, NJ) that includes information for all reported patients and people exposed to infectious TB patients (contacts). This data is used to conduct case management activities, ensure TB treatment completion, monitor epidemiologic trends, detect and respond to TB outbreaks, prepare surveillance reports, report aggregated data to the State health department and the Centers for Disease Control and Prevention (CDC) and identify data quality and reporting issues. BTBC also coordinates with health departments in other jurisdictions to ensure continuity of care for TB patients working or living outside of NYC.

›› *For additional information about NYC TB reporting requirements, see pages 28-29.*

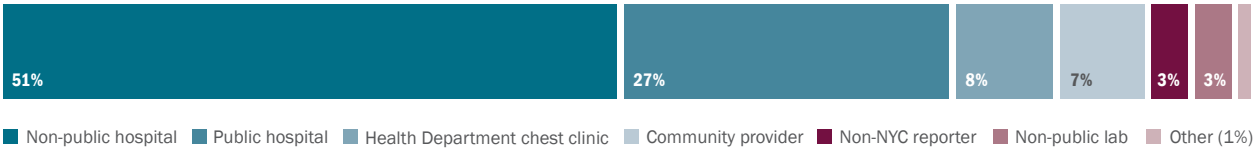
**›› HEALTH CODE CHANGE: CHILDREN YOUNGER THAN 5 WITH A POSITIVE TEST FOR TB INFECTION:** The NYC Health Code now requires health care providers to report the following for any child younger than 5 years of age with a positive test for TB infection (e.g., tuberculin skin test [TST] or blood- based interferon-gamma release assay [IGRA]):

- Quantitative and qualitative test results
- Chest radiograph results
- Name and dose of any medication that has been initiated for the treatment of latent TB infection

### REPORTING AND SURVEILLANCE HIGHLIGHTS, 2017:

- **613** cases of confirmed TB disease were verified by the Health Department.
- **3,449** individuals with suspected TB disease and **72** children younger than 5 years of age with latent TB infection were reported to the Health Department.
- **106** facilities reported at least one TB case; nearly half (**49%**) of all cases were reported by **14** facilities.

**FIGURE 1:** Initial reporter of confirmed tuberculosis cases verified in 2017 by reporter type, New York City (NYC)




## CLINICAL SERVICES

The Health Department is the leading provider of TB care in NYC. TB-related services are provided at four chest clinics located in the Bronx, Brooklyn, Manhattan and Queens. Health Department physicians working at the chest clinics are specialists in internal medicine, preventive medicine, pulmonary medicine, infectious diseases, pediatrics and

occupational health. Anyone with symptoms of TB disease or a positive test for latent TB infection is eligible for medical evaluation and treatment at a Health Department chest clinic at no cost to the individual.

The Health Department provides TB diagnostic services, including testing for latent TB infection (using blood-based QuantiFERON®-TB Gold In-Tube [QFT] test and TST), sputum induction, chest radiographs, medical evaluation, treatment for TB disease and latent TB infection, and DOT services.

The majority of patients evaluated and treated at Health Department chest clinics are referred by NYC health care providers, other health departments and social service providers. Chest clinic staff also refer patients to other medical professionals for further evaluation and treatment of non-TB related conditions as indicated.

**EVALUATION OF NEWLY ARRIVED IMMIGRANTS AND REFUGEES:** People applying for permanent U.S. immigration status and refugee status are screened for TB as part of their overseas medical examination. If the pre-immigration examination finds clinical suspicion of TB, a Class A designation is given and the applicant is not allowed to travel until treatment is completed or the patient is no longer infectious. If findings suggest non-infectious TB (i.e., latent TB infection or old TB), the applicant is given a Class B designation and travel clearance, and the applicant's destination is notified by the CDC. The destination city must notify the individual of the need for TB re-evaluation. BTBC follows up with all immigrants and refugees arriving in NYC with Class A or B status. The majority come to a Health Department chest clinic for re-evaluation.

**HIV TESTING AND COUNSELING SERVICES:** BTBC staff provide rapid HIV testing and HIV counseling services at Health Department chest clinics and refer patients with HIV infection to health care providers who specialize in HIV treatment. Anonymous HIV testing and counseling are also available at chest clinics independent of need for TB services.

›› *For additional information about chest clinic locations and services, see page 33.*

**CLINICAL SERVICES HIGHLIGHTS, 2017:**

- Health Department chest clinics provided TB-related services to **8,653** unique patients during **34,665** encounters.
- **337** (55%) patients with TB disease received some or all of their TB care at a Health Department chest clinic.
- **3,631** individuals were referred to Health Department chest clinics for TB evaluation (i.e., TB testing, chest radiograph and medical exam) by community health care providers, social service providers, hospitals and other jurisdictions.
- BTBC was notified of **1,942** Class A and B immigrants arriving in NYC; of those, **1,735** were eligible for TB evaluation. As of January 22, 2018, **1,082** (62%) had received initial evaluation for TB disease or latent TB infection.

## CASE MANAGEMENT

TB case management activities include patient education, comprehensive patient interviews, medical chart reviews, contact identification, contact evaluation and DOT. BTBC staff conduct home assessments to determine whether infectious TB patients can be isolated at home, provide general patient support, transfer patient care between NYC and other jurisdictions and work with community providers and City, State and federal programs. Case managers also perform monthly monitoring for adherence to medical appointments and treatment and locate patients who are non-adherent to treatment and help them return to medical supervision. The Health Department provides TB case management for NYC residents diagnosed with or suspected of having TB disease and their associated contacts, regardless of where they are receiving their TB care.

**CONTACT INVESTIGATION:** The Health Department routinely conducts contact investigations among household and social contacts and in congregate settings (e.g., worksites, schools, health care-associated settings). The Health Department identifies and evaluates individuals exposed to infectious TB patients, ensures appropriate treatment among contacts diagnosed with TB disease or latent TB infection, and determines if transmission has occurred to assess whether further testing is needed.

**DIRECTLY OBSERVED THERAPY (DOT):** DOT is the standard of care for managing patients with suspected or confirmed TB disease in NYC, regardless of where they are treated. During DOT, a patient is observed by a health care worker while ingesting anti-TB medications. The Health Department provides DOT services at all chest clinics and at homes, worksites and other locations as requested by the patient. The Health Department also provides video DOT (vDOT) for many patients. VDOT is convenient for patients and enables continuity of DOT services outside of traditional business hours and when patients travel. DOT is also available through three NYC Health+Hospitals facilities: Elmhurst Hospital, Kings County Hospital and Bellevue Hospital Center.

›› *To learn more about the DOT program or to enroll a patient, call **311**.*

**REGULATORY ACTION:** For patients with infectious TB who may pose a danger to the public's health, the Health Department has the authority under the NYC Health Code to legally mandate compliance with TB treatment. This may include compulsory evaluation, mandatory DOT and/or involuntary hospitalization to complete TB therapy.

**MEDICAL CONSULTATION:** Health Department physicians conduct reviews for all patients with suspected or confirmed TB disease and consult with community providers on TB treatment and patient management. This includes consultation for patients with drug-resistant TB and review of hospital discharge plans.

›› *To obtain expert medical consultation regarding TB, call the TB hotline at **844-713-0559** or call **311**.*

### CASE MANAGEMENT HIGHLIGHTS, 2017:

- Case management was initiated for **613** newly confirmed TB cases and **1,455** patients suspected of having TB disease. Case management activities were continued for **414** previously diagnosed cases and were also conducted for **99** patients with TB verified outside of NYC.
- **3,294** contacts were identified for **447** potentially infectious TB cases; **2,380** (72%) contacts were evaluated as of January 22, 2018, and **539** (23%) had a new positive TB test result.
- **400** eligible patients with confirmed TB disease were enrolled in DOT through the Health Department or another health care provider. **179** were enrolled exclusively in face-to-face DOT; **221** received some or all of their DOT through vDOT. Health Department staff provided approximately **39,237** DOT observations for **753** patients with suspected or confirmed TB disease or latent TB infection.

## DRUG SUSCEPTIBILITY TESTING AND GENOTYPING

The NYC Health Code mandates that a portion of the initial isolate from all culture-positive TB patients be sent to the NYC Public Health Laboratory for drug susceptibility testing (DST) and genotyping.

DST results identify drug resistance profiles for TB strains and inform treatment regimens and the clinical management of patients with TB disease. Molecular-based laboratory diagnostics (e.g., nucleic-acid amplification tests) are now being routinely used in acute care hospitals, commercial laboratories and public health reference laboratories. These tests can rapidly confirm the presence of *M. tuberculosis* and provide information on the presence of mutations in specific genes that are known to predict drug resistance. Though results from these tests do not replace phenotypic data obtained through conventional methods, mutation results from tests obtained on the specimen are typically available first and should be used by the patient's provider to customize empirical TB treatment. When there is discordance between phenotypic and mutation results, providers should consult with the Health Department.

Genotype results identify whether TB strains are genetically related (i.e., clustered), which helps the Health Department identify false positive laboratory results, detect outbreaks and identify where TB transmission may be occurring. Potential false positive culture results and possible instances of contamination are promptly investigated to ensure that patients are not placed on anti-TB medications unnecessarily.

In 2017, BTBC changed its cluster definition from "cases having isolates with matching restriction fragment length polymorphism analysis (RFLP) and spacer oligonucleotide typing (spoligotype) results" to "cases with matching spoligotype and 24-loci mycobacterial interspersed repetitive unit–variable number tandem repeat (MIRU) results."

›› **UNIVERSAL WHOLE GENOME SEQUENCING:** In 2017, BTBC collaborated with New York State (NYS) Wadsworth Center and the NYC public health laboratory to conduct whole genome sequencing (WGS) for all patients with culture-positive *M. tuberculosis*. WGS detects mutations associated with drug resistance and allows staff to characterize and compare TB strains to inform outbreak detection and investigation activities.

**DRUG SUSCEPTIBILITY TESTING AND GENOTYPING HIGHLIGHTS, 2017:**

- Isolates were submitted to NYC and NYS public health laboratories for **496** (98%) of 506 culture-confirmed TB cases; of these, phenotypic DST results were available for **496** (100%) cases and molecular DST results were available for **487** (98%) cases.
- Genotype results were available for **486** (96%) culture-positive TB cases; WGS results were available for **467** (92%) culture-positive TB cases.
- **45** false positive investigations were initiated, of which **9** investigations confirmed a false positive result. **21** were closed as unlikely false positive and **12** were inconclusive. **3** investigations were ongoing as of January 22, 2018.

## TRAINING, OUTREACH AND COLLABORATION

BTBC engages various stakeholders to advance efforts to detect, treat and prevent TB throughout NYC.

**BTBC STAFF** support patients through treatment completion, provide guidance to physicians based on BTBC guidelines and educate communities about TB. Educational materials developed by the CDC and BTBC are used to supplement staff training, which is delivered by experts from BTBC and the Northeastern TB Center of Excellence for Training, Education and Medical Consultation. All staff are trained on the basics of TB and TB control. Supplemental training, job aids and electronic resources support the development of skills in case management, infection control, cultural competency, health equity and other topics.

**COMMUNITIES WITH HIGH TB BURDEN** are engaged as partners in efforts to increase TB knowledge and encourage community members to seek care when needed. Community-based organizations, elected representatives and other partners help deliver culturally and linguistically appropriate educational messaging though community events and via print and electronic media. They also support TB screening efforts at health fairs and mobile van-based testing events.

**INDIVIDUALS AT HIGH RISK FOR TB** are the focus of targeted community-based testing events and efforts to increase TB screening and reduce barriers to accessing health care services. BTBC staff link individuals with latent TB infection who are identified at community events to medical evaluation and treatment. Educational materials developed for individuals at high risk for TB are used in the community and in Health Department chest clinics.

**HEALTH CARE PROVIDERS** collaborate with BTBC in many capacities and are offered opportunities to discuss and learn about TB testing, diagnosis, and treatment. BTBC experts provide TB presentations, case management conferences, and clinical consultation at hospitals and outpatient facilities throughout the city. BTBC also co-sponsors an annual medical conference in honor of World TB Day to discuss best practices and update providers on the latest TB care guidelines and recommendations. For updated TB care guidelines, visit **nyc.gov/health** and search for "tuberculosis."

›› *To order educational materials (see page 30), call 311 or visit nyc.gov/health and search "tuberculosis." To request a lecture or Grand Rounds presentation, or for more information about TB conferences, please email* ***TBtraining@health.nyc.gov****.*

**OUTREACH AND TRAINING HIGHLIGHTS, 2017:**

- BTBC staff presented **12** medical talks at various hospitals and outpatient facilities throughout the city.
- BTBC hosted **11** community-based events in collaboration with community partners, including the Office of Assemblyman Felix Ortiz, Charles B. Wang Community Health Center, Academy of Medical and Public Health Services, Mixteca, YWCA Flushing, Philippine Nurses Association, MetroPlus, Chinese Planning Council, Ascension Church in Queens and St. Sebastian Church in Queens.
- BTBC tested **313** individuals during community-based events, mobile van testing sessions and community health fairs; **89** (28%) had a positive result and were referred for follow-up medical evaluation and care.

›› **BTBC PARTICIPATION IN ADVISORY GROUPS AND CONSORTIA IN 2017:** Advisory Council for the Elimination of TB • CDC/Infectious Disease Society of America/American Thoracic Society National Multidrug Resistant TB Guidelines Writing Committee • CDC RVCT Revision Workgroup • CDC TB Education and Training Network • CDC TB Epidemiologic Studies Consortium Board of Advisors • CDC TB Program Evaluation Network • CDC TB Outbreak Detection Workgroup • CDC TB Trials Consortium • National TB Controllers Association (Board of Directors, Latent TB Infection Reporting Workgroup, National Society of TB Clinicians, Survey Committee, Society for Epidemiology in TB Control) • Northeastern TB Center of Excellence for Training, Education and Medical Consultation Training and Medical Consultation Center Medical Advisory Board

## PROGRAM EVALUATION

The Health Department uses a series of performance indicators to compare BTBC's performance to national standards and ensure that program objectives are being met. These indicators help identify programmatic issues and areas for improvement in case management and contact investigation and inform program planning and policy decisions. Indicators include goals for culture conversion, contact evaluation and treatment completion. Performance indicators and targets are developed in coordination with Health Department partners and funders, including the NYS Department of Health (NYS DOH) and the CDC. Certain performance indicators must be reported to the NYS DOH and the CDC.

**COHORT REVIEW:** One of the Health Department's primary tools for evaluating its TB control program is the quarterly cohort review process. Four to six months after a patient's TB diagnosis, BTBC's Assistant Commissioner and other BTBC staff review case management activities, treatment status and data quality for all NYC patients with confirmed TB disease and their contacts. Successes and challenges in patient care and case management are used to inform programmatic changes and identify training needs. (*For the most recent performance indicators, see page 26.*)

## RESEARCH

The Health Department actively participates in TB research, including observational studies on TB epidemiology in NYC and clinical research through the CDC TB Trials Consortium (TBTC), which conducts national and international studies to develop new treatment regimens for TB disease and latent TB infection. NYC TB data are presented at meetings and conferences locally, nationally and internationally.

**NYC TB RESEARCH CONSORTIUM:** The Health Department leads the NYC TB Research Consortium, which brings together health department, academic, laboratory and other researchers to collaborate on projects focusing on TB in NYC. The group's activities include research to inform TB prevention, care and management policy and practice; epidemiologic and clinical studies; pursuing funding opportunities; and mentoring researchers and students to develop research skills for future public health careers. To date, NYC TB Research Consortium participants have included Albert Einstein College of Medicine, Columbia University, Drexel University, Johns Hopkins University, Public Health Research Institute at Rutgers University, the Treatment Action Group (TAG) and Yale University.

### BTBC STAFF PUBLICATIONS IN PEER-REVIEWED JOURNALS, 2017:

- Burzynski J. The Use of Modeling to Compare Tuberculosis Dynamics in Four U.S. States. *Am J Respir Crit Care Med.* 2017 Oct 15;196(8):953-954.
- Fojo AT, Stennis N, Azman A, Kendall EA, Shrestha S, Ahuja SD, Dowdy DW. Current and future trends of tuberculosis in New York City: a dynamic model. *Lancet Public Health.* 2017 Jul 2: e323–30
- Fox GJ, Benedetti A, Cox H, Koh WJ, Viiklepp P, Ahuja S, Pasvol G, Menzies D; Collaborative Group for Meta-Analysis of Individual Patient Data in MDR-TB. Group 5 drugs for multidrug-resistant tuberculosis: individual patient data meta-analysis. *Eur Respir J.* 2017 Jan 3;49(1)
- Levanon Seligson A, Parvez FM, Lim SW, Singh T, Mavinkurve M, Harris TG, Kerker B. Public Health and Vulnerable Populations: Morbidity and mortality among people ever-incarcerated in NYC jails, 2001–2005. *J Correct Health Care.* 2017 Oct;23(4):421-436.
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- Slutsker JS, Trieu L, Crossa A, Ahuja SD. Using Reports of Latent Tuberculosis Infection among Young Children to Identify Tuberculosis Transmission in New York City, 2006—2012. *Am J Epidemiol.* 2017 Nov 8. [Epub ahead of print]
- Smith SE, Pratt R, Trieu L, Barry PM, Thai DT, Ahuja SD, Shah S. Epidemiology of Pediatric Multidrug-Resistant Tuberculosis in the United States, 1993-2014. *Clin Infect Dis.* 2017 Oct 16;65(9):1437-1443..
- Stennis NL, Sullivan Meissner J, Bhavnani D, Kreiswirth B, Ahuja SD, Tuberculosis disease among Mexico-born individuals living in New York City, 2001-2014. *Int J Tuberc Lung Dis* 21(6):657–663.

›› *For more information about research at BTBC or to join the NYC TB Research Consortium, contact* ***TB-epi@health.nyc.gov***

## FUNDING AND ADMINISTRATION

BTBC receives City, State and federal funding. The operating budget for the fiscal period of July 1, 2017, through June 30, 2018 was approximately $14.8 million. Of this budget, 13% supported other-than-personnel services (OTPS), 84% supported personnel services and 3% went toward indirect costs. These funds support all TB prevention and control activities, from hiring staff to operating Health Department chest clinics. BTBC staff work to ensure that funds are allocated, monitored and utilized efficiently.

### BTBC FUNDING AND STAFFING, JULY 1, 2017 THROUGH JUNE 30, 2018

**FIGURE 2:** Bureau of Tuberculosis Control (BTBC) funding distribution for other-than-personnel services (OTPS) by type

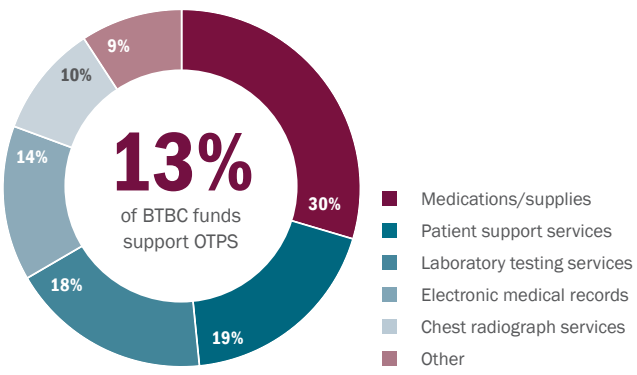
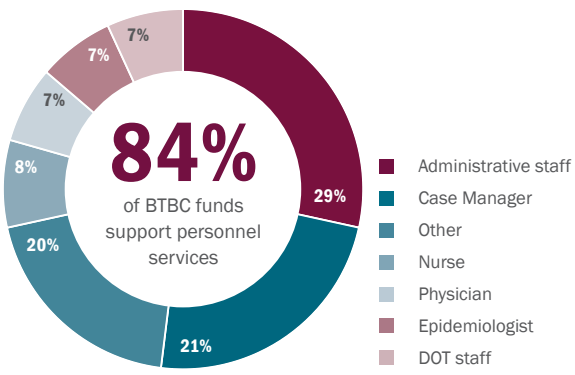



**FIGURE 3:** Bureau of Tuberculosis Control (BTBC) staff[1] by job function (n=174)

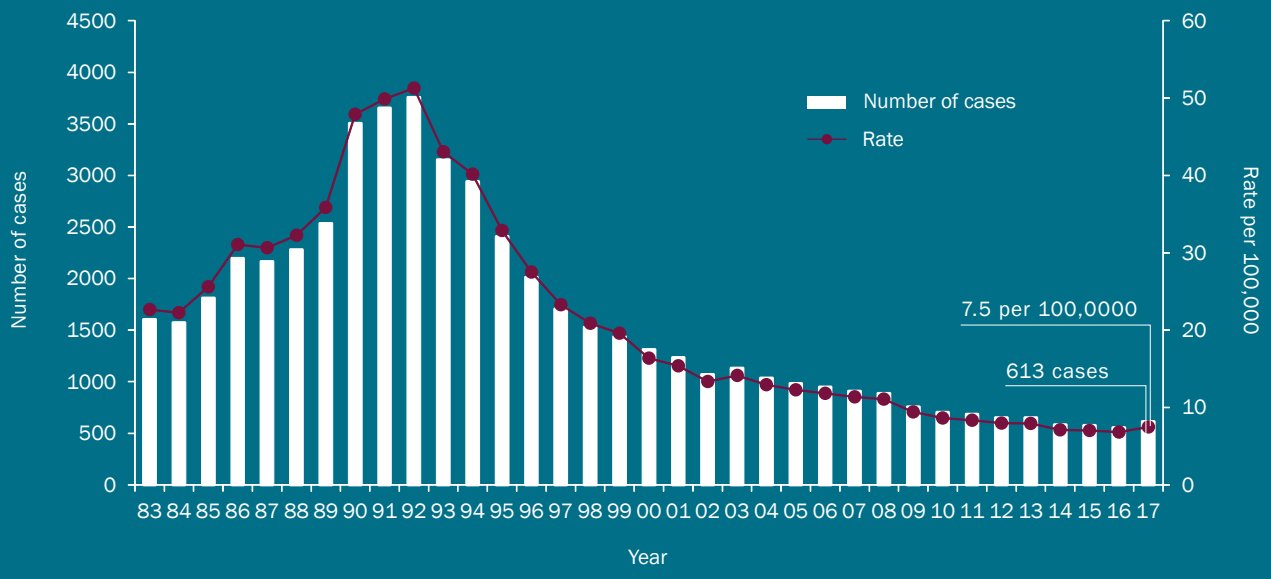



1. Excludes 36 non-Health Department personnel assigned to BTBC

# PROFILE OF TB CASES

In 2017, the number of confirmed tuberculosis (TB) cases in New York City increased to 613, a **10% increase** from 2016. This is the largest increase in the number of TB cases since 1992.

**FIGURE 4:** Tuberculosis cases and rates,[1] New York City, 1983-2017




**1983-1992:**

**Overall increase: 134%**
**Average annual increase: 11%**

**1992-2003:**

**Overall decrease: 70%**
**Average annual decrease, 1992-2002: 10%**
**One-year increase, 2002-2003: 6%**

**2003-2017:**

**Overall decrease: 46%**
**Average annual decrease, 2004-2016: 5%**
**One-year increase, 2016-2017: 10%**

1. Rates are based on decennial census data

# TB EPIDEMIOLOGY IN NYC, 1983-2017

**1983-1992:** From 1983 to the peak of the NYC TB epidemic in 1992, the number of TB cases increased 134%, from 1,603 to 3,755 cases. This drastic increase was attributed to multiple factors including the emergence of the HIV/AIDS epidemic, poor infection control practices in health care facilities, increases in poverty and homelessness, increases in immigration from TB-endemic countries and the reduction in public health infrastructure to control TB.

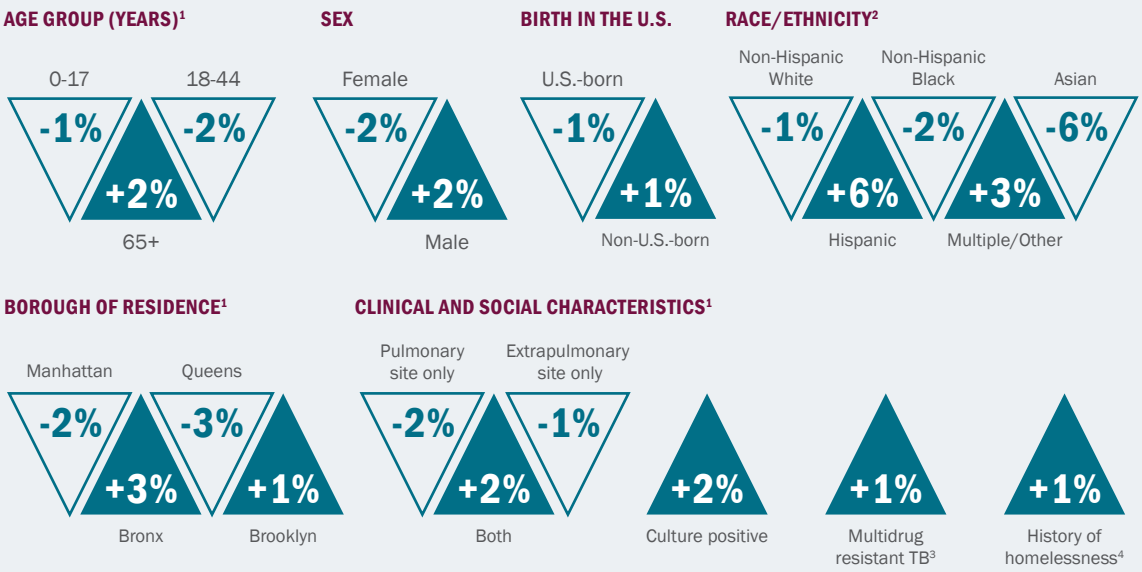
**1992-2003:** With renewed investment in TB control and the advent of anti-retroviral therapies, TB cases declined 72% overall between 1992 and 2002, with an average annual decrease of 10%. In 2003, NYC experienced a 6% increase in cases, which was attributed to a change in case counting methods and increased transmission of TB among homeless individuals.

**2003-2017:** From 2003 to 2016, the decline in cases slowed, with an average 5% decrease each year. Overall, the number of cases fell 51%, from 1,132 in 2003 to a record low of 556 cases in 2016. Resources for TB control also decreased during this period. In 2017, NYC again saw growth in the number of cases to 613. This 10% increase is the largest increase in the number of TB cases in NYC since 1992.

## ›› A CLOSER LOOK AT THE INCREASE, 2017

In 2017, there were no changes in surveillance definitions or TB case counting criteria and there were no large outbreaks identified. Analyses of demographic characteristics indicate increases among patients 65 and older, males, non-U.S. born patients, U.S.-born Hispanic patients and patients residing in the Bronx and Brooklyn. Analyses of clinical and social characteristics show an increase in patients with culture-positive TB disease, patients with both pulmonary and extrapulmonary disease sites, and patients experiencing homelessness. The number of multidrug-resistant TB cases also increased from 11 in 2016 to 14 in 2017.

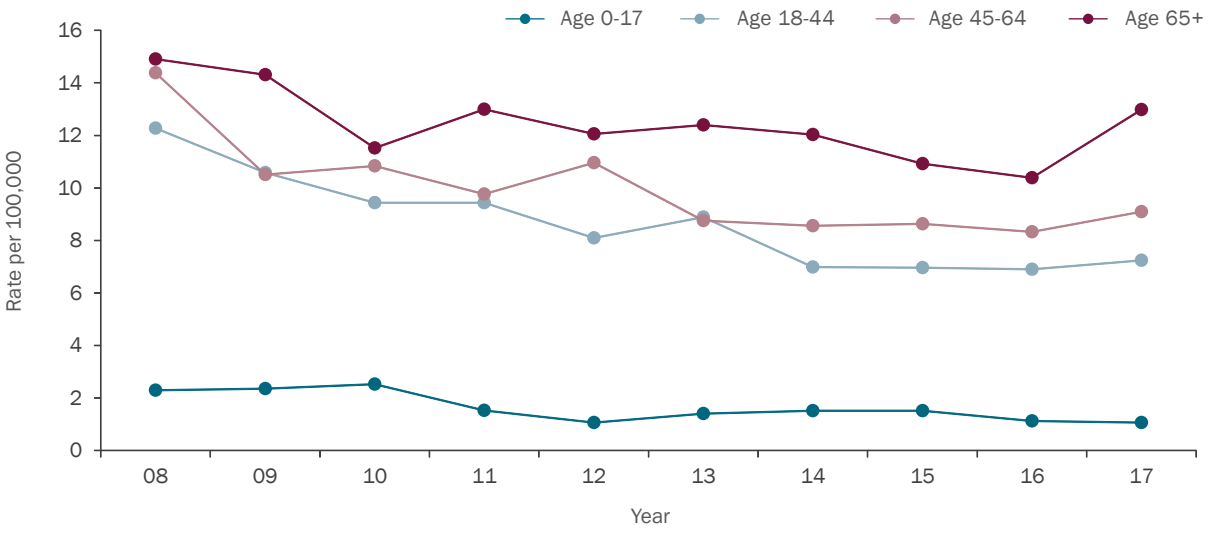
**FIGURE 5:** Percent change in proportion for select characteristics among tuberculosis cases, 2016 to 2017, New York City




1. There was no change between 2016 and 2017 in the proportion of cases among patients 45-64 years of age, patients living in Staten Island at time of TB diagnosis or patients with HIV infection. Change in clustering proportion could not be assessed due to a change in genotyping and clustering methods. 2. Race/ethnicity is among patients born in the U.S. 3. MDR TB is defined as resistance to at least isoniazid and rifampin. 4. In the 12 months before TB diagnosis.

# AGE AND SEX

**FIGURE 6:** Tuberculosis rates[1] by age group in years, New York City, 2008-2017




1. Rates are based on New York City Health Department population estimates, modified from U.S. Census Bureau interpolated intercensal population estimates, 2000-2016. Updated September 2017.

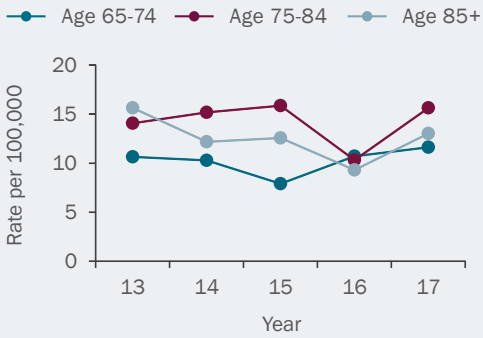
**FIGURE 7:** Tuberculosis cases by sex, New York City, 2017


## ›› TB AMONG PEOPLE OLDER THAN 65 YEARS OF AGE IN NYC

Every year, the highest rates of TB in NYC are seen among patients 65 years of age and older. In 2017, there were 150 TB cases in this age group for an incidence rate of 13.0 per 100,000, which is more than twice the TB rate among those under 65 years of age (6.3 per 100,000).

This also represents a 25% increase in the number of cases among patients 65 of age and older compared to 2016, which may be attributable to growth in this segment of the NYC population. Within this group, people 75-84 years of age experienced a 51% increase in the number of TB cases between 2016 and 2017 and had the highest rate of TB in 2017 (15.6 per 100,000) when compared to those 65-74 years of age (11.6 per 100,000) and those older than 85 (13.0 per 100,000).

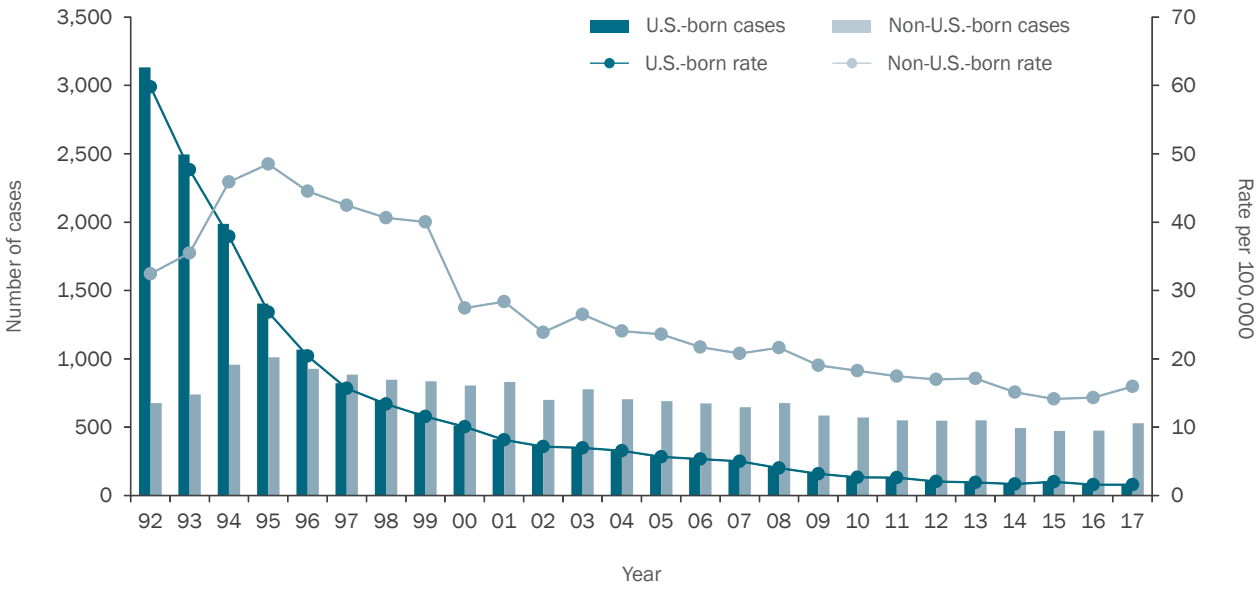
**FIGURE 8:** Tuberculosis rates[1] among adults older than 65 by age group in years, New York City, 2013-2017




1. Rates are based on New York City Health Department population estimates, modified from U.S. Census Bureau interpolated intercensal population estimates, 2000-2016. Updated September 2017.

# BIRTH IN THE UNITED STATES

**FIGURE 9:** Tuberculosis cases and rates[1] by birth in the United States (U.S.),[2,3] New York City, 1992-2017



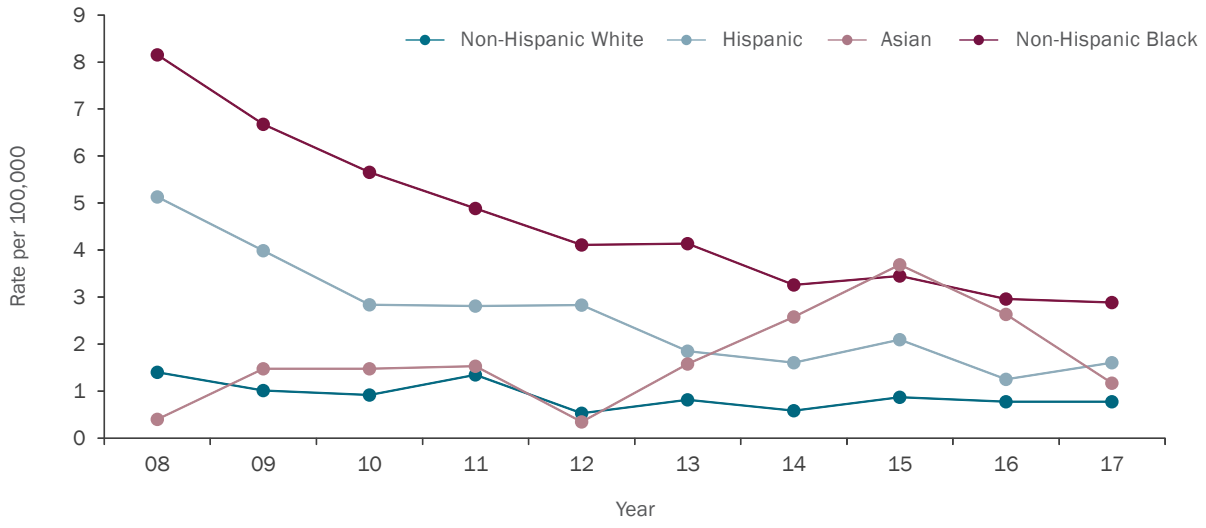

1. Rates prior to 2000 are based on 1990 U.S. Census data. Rates for 2000-2005 are based on 2000 U.S. Census data. Rates after 2005 are based on one-year American Community Survey data for the given year or the most recent available data. 2. U.S.-born includes individuals born in the U.S. and U.S. territories.
3. Excludes cases with unknown country of birth.

**86%** Proportion of cases among patients born outside of the U.S.

**7** Median number of years in the U.S. at time of TB diagnosis among non-U.S.-born patients

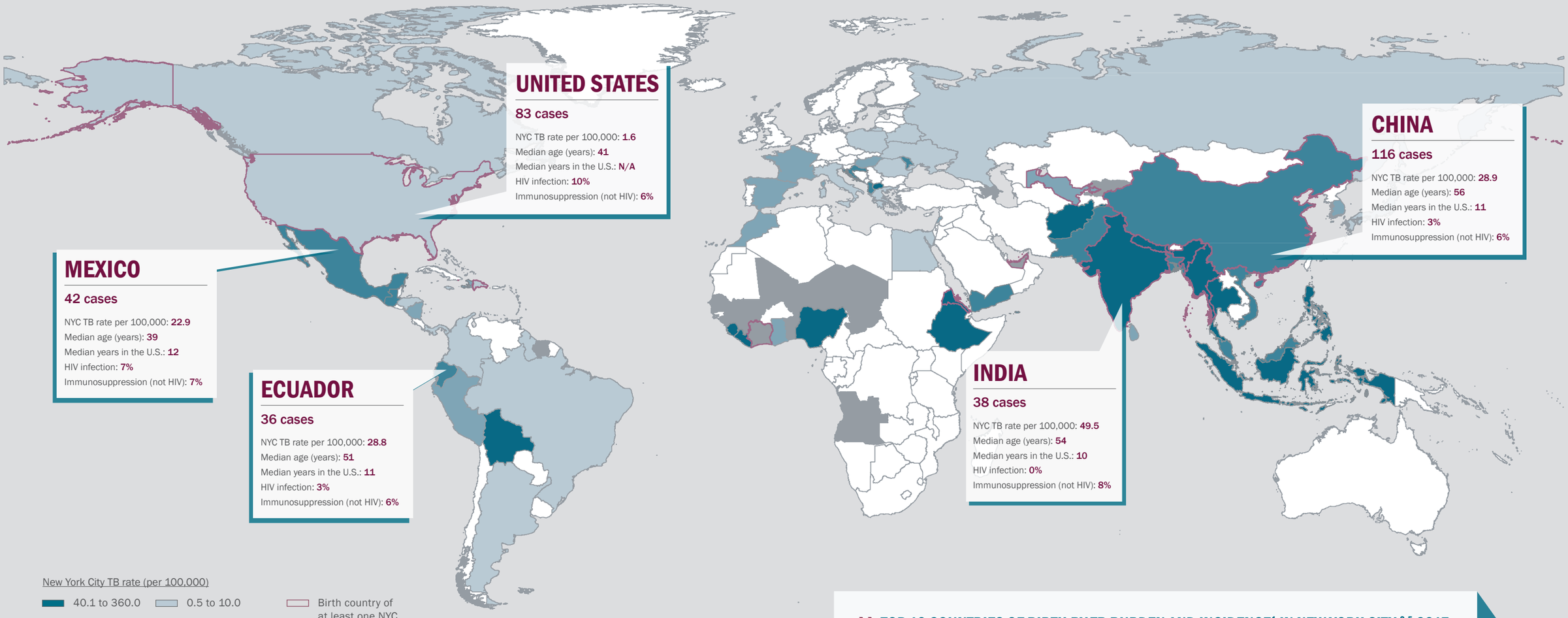
**43%** Proportion of cases among U.S.-born patients that occurred in non-Hispanic Black individuals

**FIGURE 10:** Tuberculosis rates[1] by race/ethnicity[2] among patients born in the United States (U.S.),[3,4] New York City, 2008-2017




1. Rates are based on one-year American Community Survey Public Use Microdata Sample data for the given year or the most recent available data.
2. Data shown does not include patients with multiple, other, or unknown race/ethnicity. 3. U.S.-born includes individuals born in the U.S. and U.S. territories.
4. Excludes cases with unknown country of birth.

**FIGURE 11:** Tuberculosis cases, rates[1] and select characteristics by patient country of birth,[2-6] New York City, 2017




## COUNTRY OF BIRTH

NYC TB incidence, TB burden, patient characteristics and TB risk factors differ substantially across patient country of birth. As a result, addressing TB in NYC requires identifying and understanding these differences and designing tailored, sustainable interventions in partnership with the communities most affected by TB.

**1.6** TB rate per 100,000 among people born in the U.S.

**15.9** TB rate per 100,000 among people born in a country other than the U.S.

**75** Number of countries of birth represented among patients with TB disease in 2017

### TOP 10 COUNTRIES OF BIRTH BY TB BURDEN AND INCIDENCE[1] IN NEW YORK CITY,[2-5] 2017

| Country of birth | #NYC cases |
|---|---|
| China[4] | 116 |
| United States (U.S.)[5] | 83 |
| Mexico | 42 |
| India | 38 |
| Ecuador | 36 |
| Dominican Republic | 31 |
| Bangladesh | 27 |
| Philippines | 25 |
| Haiti | 19 |
| Nigeria | 15 |

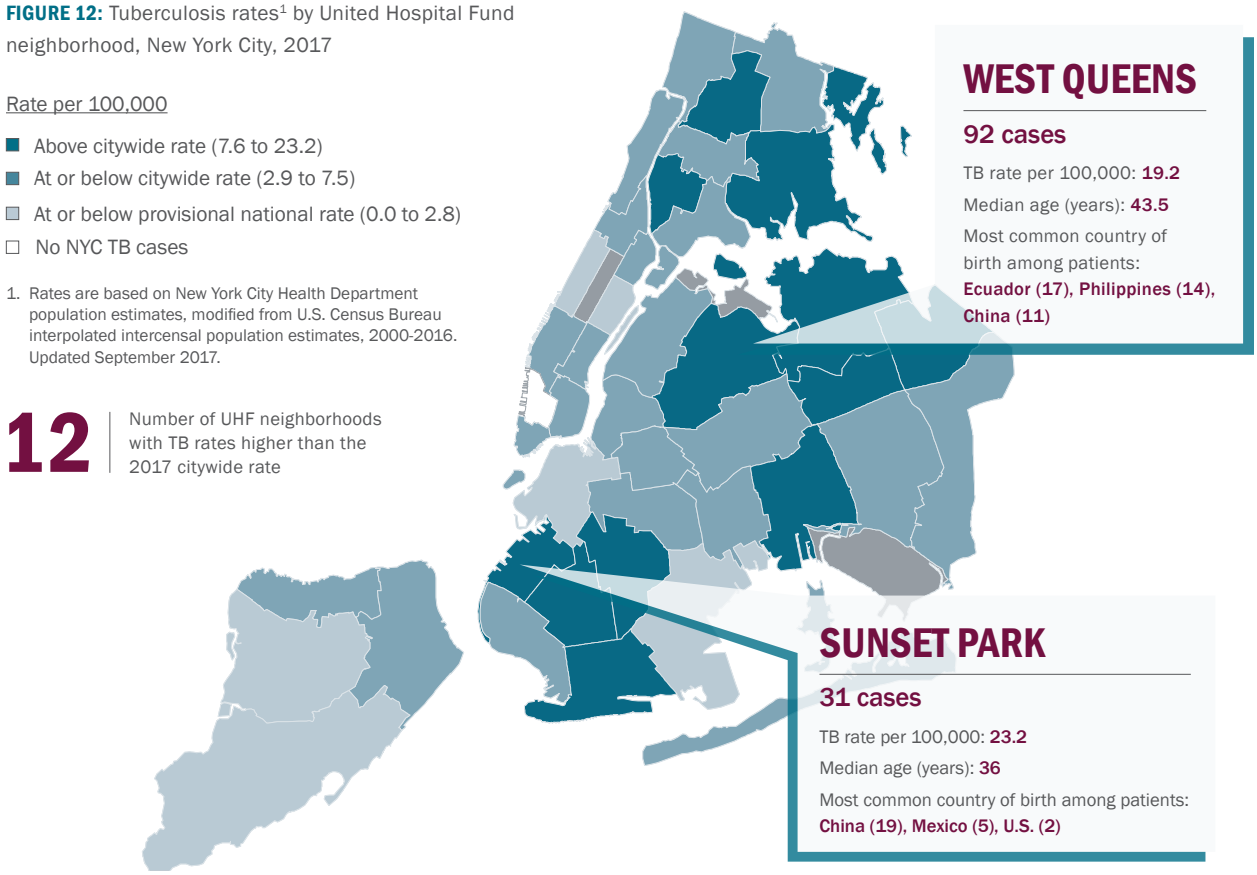
| Country of birth | NYC TB rate per 100,000 |
|---|---|
| Eritrea (1 case) | 360 |
| Sierra Leone (4 cases) | 225 |
| Bolivia (3 cases) | 130 |
| Burma (8 cases) | 118 |
| Indonesia (4 cases) | 112 |
| Ethiopia (3 cases) | 93 |
| Nepal (10 cases) | 86 |
| Liberia (3 cases) | 78 |
| Afghanistan (3 cases) | 66 |
| Nigeria (15 cases) | 57 |

1. Rates are based on 2016 American Community Survey one-year sample data.
2. Two cases in 2017 were among patients with unknown country of birth.
3. There were 16 countries for which rate could not be calculated due to insufficient population data
4. China includes individuals born in mainland China, Hong Kong, Taiwan and Macau.
5. U.S.-born includes individuals born in the U.S. and U.S. territories.
6. Immunosuppression due to having a medical condition, not including HIV/AIDS, or use of immunosuppressive therapy
7. MDR TB is defined as resistance to at least isoniazid and rifampin.

# TB IN NYC NEIGHBORHOODS

Queens continued to have the highest TB burden in 2017 with 247 cases and a rate of 10.6 per 100,000. The United Hospital Fund (UHF) neighborhood with the highest TB rate was Sunset Park, Brooklyn, with a rate of 23.2 per 100,000, more than triple the citywide rate. Twelve (29%) UHF neighborhoods had TB rates that exceeded the overall NYC rate and 35 (83%) exceeded the national rate. Fifty-one percent of TB patients lived in a neighborhood with high or very high area-based poverty.

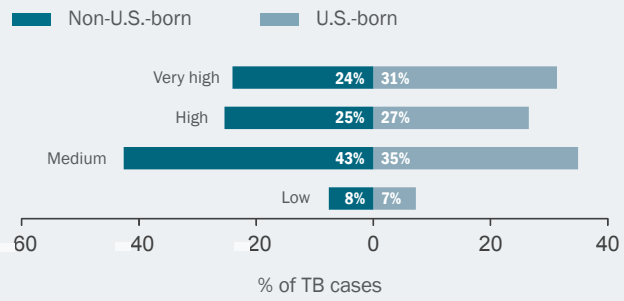
**FIGURE 12:** Tuberculosis rates[1] by United Hospital Fund neighborhood, New York City, 2017




1. Rates are based on New York City Health Department population estimates, modified from U.S. Census Bureau interpolated intercensal population estimates, 2000-2016. Updated September 2017.

**12** Number of UHF neighborhoods with TB rates higher than the 2017 citywide rate

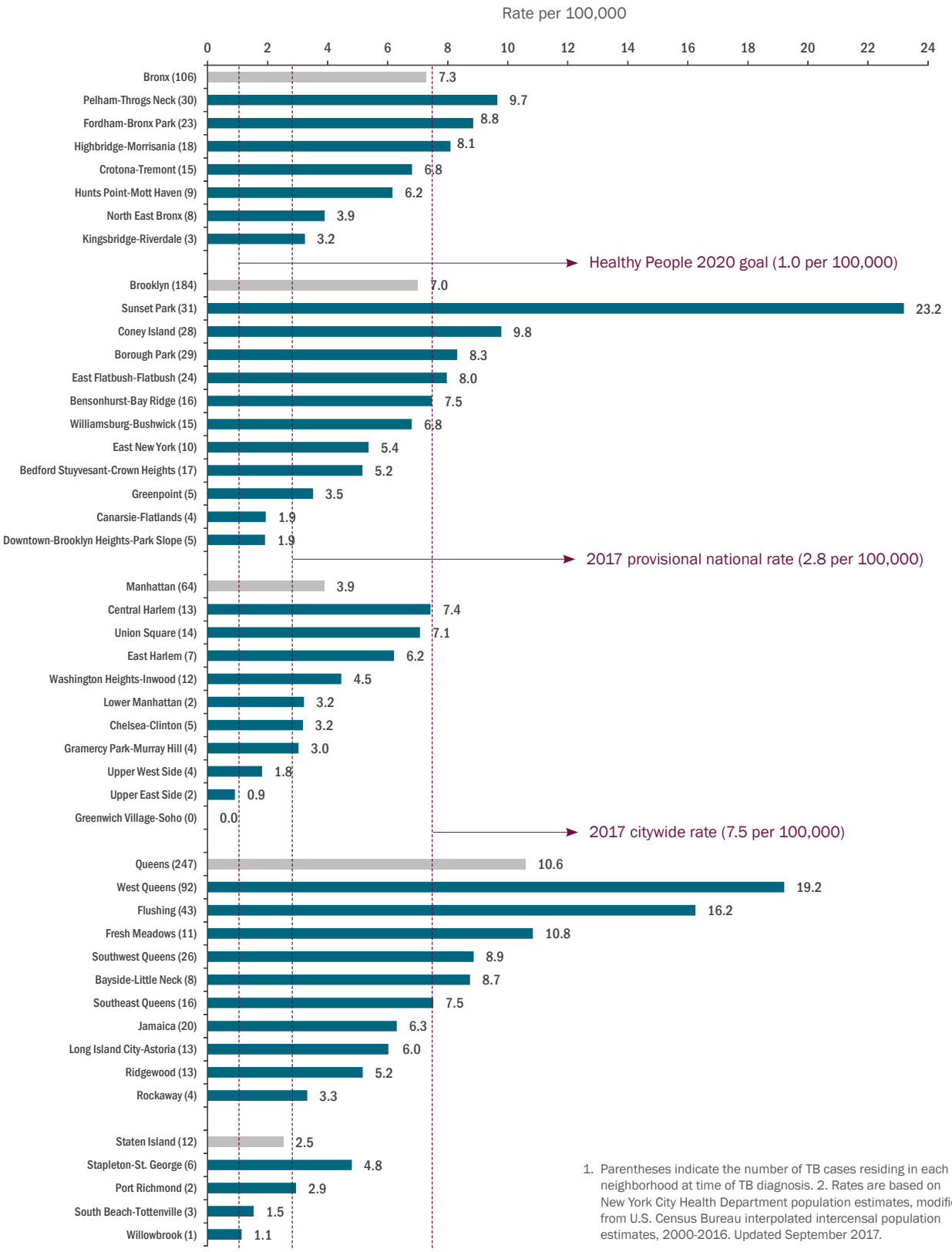
**FIGURE 13:** Proportion of tuberculosis (TB) cases and TB rates[1] by area-based poverty level[2-3] and birth in the United States (U.S.),[4-5] New York City, 2017




| Area-based poverty level[2] | U.S.-born rate | Non-U.S.-born rate | Total NYC rate |
|---|---|---|---|
| Very high (30 to 100%) | 2.1 | 18.7 | 8.2 |
| High (20 to < 30%) | 2.1 | 16.3 | 8.3 |
| Medium (10 to < 20%) | 1.6 | 17.4 | 8.3 |
| Low (< 10%) | 0.5 | 8.4 | 2.8 |

1. Rates are based on 2012-2016 American Community Survey data. 2. Area-based poverty level is based on 2011-2015 American Community Survey data on the proportion of ZIP code residents living below the federal poverty level. 3. Cases were assigned to a ZIP code based on their residence at TB diagnosis. 4. U.S.-born includes individuals born in the U.S. and U.S. territories. 5. Two cases in 2017 were among patients wth unknown country of birth.

**FIGURE 14:** Tuberculosis cases[1] and rates[2] by borough and United Hospital Fund (UHF) neighborhood, New York City, 2017




1. Parentheses indicate the number of TB cases residing in each neighborhood at time of TB diagnosis. 2. Rates are based on New York City Health Department population estimates, modified from U.S. Census Bureau interpolated intercensal population estimates, 2000-2016. Updated September 2017.

**TABLE 1:** Select demographic, social and geographic characteristics of tuberculosis cases by birth in the United States (U.S.),[1,2] New York City, 2016-2017

| Characteristics | 2016 | | | | | | | 2017 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U.S.-born[1] | | Non-U.S.-born | | Total | | | U.S.-born[1] | | Non-U.S.-born | | Total | |
| | n | % | n | % | n | % | | n | % | n | % | n | % |
| Age group | | | | | | | | | | | | | |
| 0-17 | 12 | 15 | 8 | 2 | 20 | 4 | | 16 | 19 | 3 | 1 | 19 | 3 |
| 18-44 | 30 | 37 | 211 | 45 | 241 | 43 | | 28 | 34 | 224 | 42 | 253 | 41 |
| 45-64 | 28 | 34 | 147 | 31 | 175 | 31 | | 22 | 27 | 169 | 32 | 191 | 31 |
| 65+ | 12 | 15 | 108 | 23 | 120 | 22 | | 17 | 20 | 132 | 25 | 150 | 24 |
| Sex | | | | | | | | | | | | | |
| Female | 28 | 34 | 189 | 40 | 217 | 39 | | 27 | 33 | 197 | 37 | 225 | 37 |
| Male | 54 | 66 | 285 | 60 | 339 | 61 | | 56 | 67 | 331 | 63 | 388 | 63 |
| Race/ethnicity | | | | | | | | | | | | | |
| White non-Hispanic | 16 | 20 | 31 | 7 | 47 | 8 | | 16 | 19 | 31 | 6 | 47 | 8 |
| Black non-Hispanic | 37 | 45 | 70 | 15 | 107 | 19 | | 36 | 43 | 81 | 15 | 117 | 19 |
| Hispanic | 18 | 22 | 104 | 22 | 122 | 22 | | 23 | 28 | 132 | 25 | 157 | 26 |
| Asian non-Hispanic | 9 | 11 | 248 | 52 | 257 | 46 | | 4 | 5 | 259 | 49 | 263 | 43 |
| Multiple/other | 2 | 2 | 21 | 4 | 23 | 4 | | 4 | 5 | 23 | 4 | 27 | 4 |
| Time in the U.S. (at reporting) | | | | | | | | | | | | | |
| < 1 year | n/a | n/a | 60 | 13 | 60 | 13 | | n/a | n/a | 68 | 13 | 68 | 13 |
| 1-5 years | n/a | n/a | 109 | 23 | 109 | 23 | | n/a | n/a | 121 | 23 | 121 | 23 |
| > 5 years | n/a | n/a | 304 | 64 | 304 | 64 | | n/a | n/a | 326 | 63 | 326 | 63 |
| Borough of residence | | | | | | | | | | | | | |
| Manhattan | 16 | 20 | 51 | 11 | 67 | 12 | | 9 | 11 | 55 | 10 | 64 | 10 |
| Bronx | 20 | 24 | 59 | 12 | 79 | 14 | | 21 | 25 | 84 | 16 | 106 | 17 |
| Brooklyn | 30 | 37 | 132 | 28 | 162 | 29 | | 35 | 42 | 148 | 28 | 184 | 30 |
| Queens | 14 | 17 | 225 | 47 | 239 | 43 | | 16 | 19 | 231 | 44 | 247 | 40 |
| Staten Island | 2 | 2 | 7 | 1 | 9 | 2 | | 2 | 2 | 10 | 2 | 12 | 2 |
| Homeless[3] | 10 | 12 | 6 | 1 | 16 | 3 | | 9 | 11 | 14 | 3 | 23 | 4 |
| Employed[3,4] | 25 | 36 | 233 | 50 | 258 | 48 | | 31 | 46 | 223 | 42 | 254 | 43 |
| Health care worker[3,4] | 0 | 0 | 22 | 9 | 22 | 9 | | 2 | 6 | 14 | 6 | 16 | 6 |
| Drug use[3,4] | 18 | 22 | 17 | 4 | 35 | 6 | | 16 | 19 | 12 | 2 | 28 | 5 |
| Excessive alcohol use[3,4] | 4 | 5 | 13 | 3 | 17 | 3 | | 2 | 2 | 23 | 4 | 25 | 4 |
| Neighborhood poverty[5] | | | | | | | | | | | | | |
| Very high (30 to 100%) | 36 | 44 | 95 | 20 | 131 | 24 | | 26 | 31 | 127 | 24 | 155 | 25 |
| High (20 to < 30%) | 11 | 13 | 121 | 26 | 132 | 24 | | 22 | 27 | 134 | 25 | 156 | 25 |
| Medium (10 to < 20%) | 25 | 30 | 226 | 48 | 251 | 45 | | 29 | 35 | 225 | 43 | 254 | 41 |
| Low (< 10%) | 10 | 12 | 32 | 7 | 42 | 8 | | 6 | 7 | 40 | 8 | 46 | 8 |
| **Total** | **82** | **15** | **474** | **85** | **556** | - | | **83** | **14** | **528** | **86** | **613** | - |

1. U.S.-born includes individuals born in the U.S. and U.S. territories. 2. Column sums may not equal applicable totals due to missing country of birth data. 3. In the 12 months before TB diagnosis. 4. Among patients 18 years of age and older. 5. Area-based poverty level is based on 2011-2015 American Community Survey data on the proportion of ZIP code residents living below the federal poverty level. Cases were assigned to a ZIP code based on their residence at TB diagnosis.

# CLINICAL CHARACTERISTICS

**FIGURE 15:** Tuberculosis cases by disease site, New York City, 2017

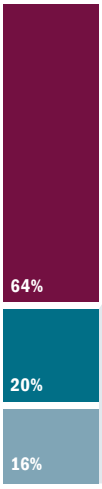



**TABLE 2:** Disease site among tuberculosis cases with extrapulmonary disease,[1] New York City, 2017 (n=224)

| Disease site | Number of cases | Percent |
|---|---|---|
| Any extrapulmonary site | 224 | |
| Lymphatic | 88 | 39 |
| Pleural | 58 | 26 |
| Bone/Joint | 25 | 11 |
| Meningeal | 15 | 7 |
| Genitourinary | 11 | 5 |
| Peritoneal | 17 | 8 |
| Laryngeal | 2 | 1 |
| Other | 45 | 20 |

1. Categories are not mutually exclusive.

Pulmonary disease only
Extrapulmonary disease only
Both pulmonary and extrapulmonary disease sites

**FIGURE 16:** Proportion of culture-confirmed tuberculosis cases among all tuberculosis cases, New York City, 2017

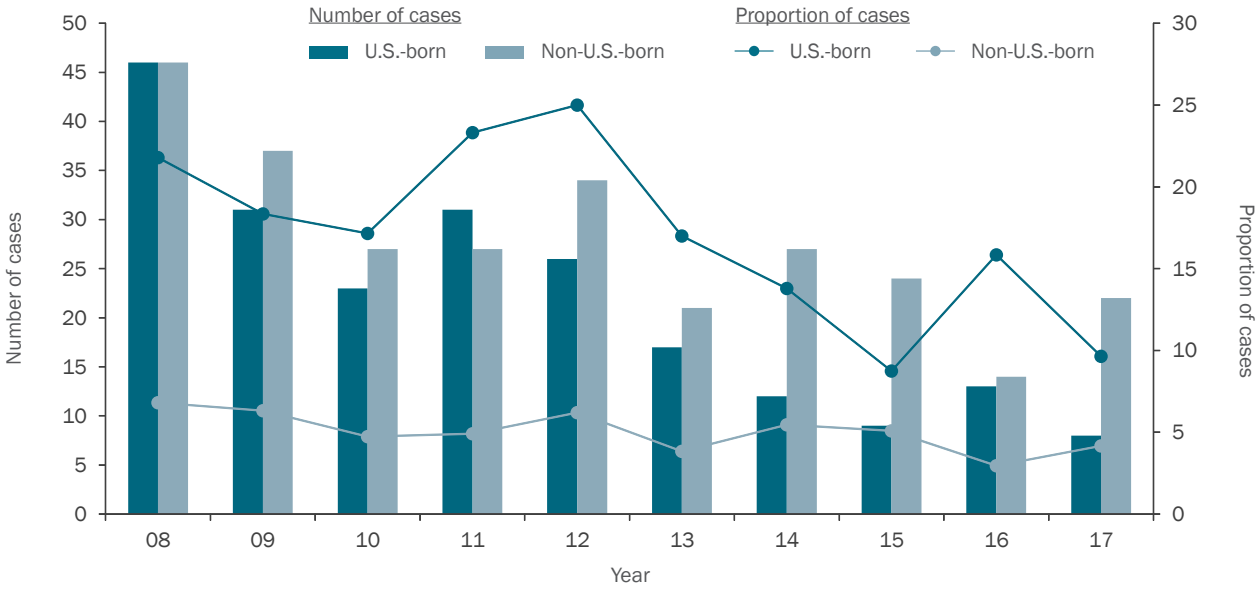

Culture-positive (506)
Clinically confirmed (107)

**80%** Proportion of cases with a pulmonary site of disease

**8** Number of patients who previously had at least one other documented episode of TB disease in NYC

**5%** Proportion of TB cases among patients known to have HIV infection

**FIGURE 17:** HIV infection among tuberculosis cases[1] by birth in the United States (U.S.),[2,3] New York City, 2008-2017

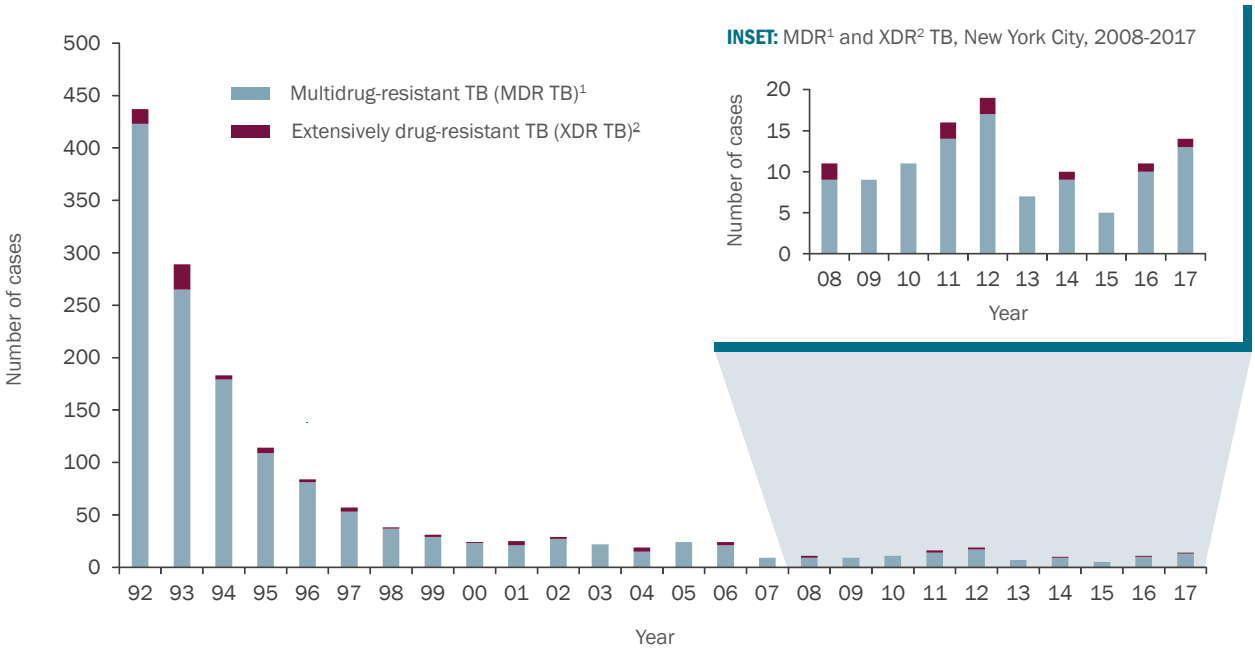



1. Excludes cases with unknown country of birth. 2. U.S.-born includes individuals born in the U.S. and U.S. territories. 3. 110 patients in 2017 had an unknown HIV status.

# DRUG RESISTANCE

Drug resistance continues to be a challenge to TB prevention and care efforts. Fourteen patients diagnosed in 2017 had MDR TB, defined as a TB strain resistant to isoniazid and rifampin, the two most important and effective drugs in the TB treatment regimen. Of these, one patient had an XDR TB strain, characterized by additional resistance to a second-line injectable medication and a fluoroquinolone. Five patients had a resistance pattern only one drug away from XDR TB.

**FIGURE 18:** Multidrug resistance[1] among tuberculosis cases, New York City, 1992-2017




1. MDR TB is defined as resistance to at least isoniazid and rifampin. 2. XDR TB is defined as resistance to at least isoniazid and rifampin plus a fluoroquinolone and a second-line injectable anti-TB medication.

## ›› USING MOLECULAR-BASED TESTING TO DETECT DRUG RESISTANCE

Molecular-based tests (e.g. pyrosequencing, WGS, Hain Lifescience GenoType MTBDRplus) are now being used routinely in acute care hospitals, commercial laboratories and public health reference laboratories. These tests can rapidly detect mutations associated with drug resistance, which helps health care providers ensure that patients are placed on effective regimens sooner. In 2017, the median time in days from TB case verification to identification of an MDR TB strain was 26 (range: 0 to 102).

**FIGURE 19:** Laboratory method used to first identify resistance to both isoniazid and rifampin among cases with a multidrug-resistant tuberculosis strain, New York City, 2017 (n=14)

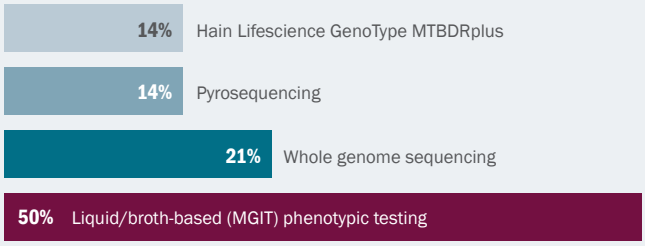
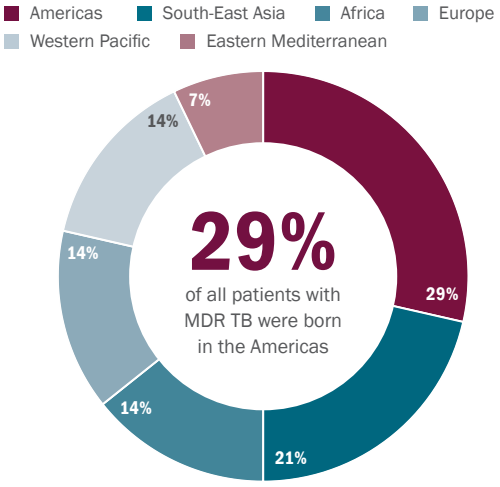


**TABLE 3:** Select characteristics among patients diagnosed with multidrug-resistant (MDR) tuberculosis,[1] New York City, 2017 (n=14)

| Characteristics | |
|---|---|
| Median age (range) | 41 (19-80) |
| Number born outside of the United States (U.S.) (%) | 12 (86%) |
| Years in the U.S. among non-U.S.-born patients (%) | |
| < 5 years | 5 (42%) |
| 5-10 years | 4 (33%) |
| > 10 years | 3 (25%) |
| Pulmonary site of disease (%) | 12 (86%) |
| Median number of drugs to which there was known resistance among MDR TB cases[2] (range) | 7 (3-12) |
| Median number of contacts identified around patients with MDR TB (range) | 3 (0-155) |

1. MDR TB is defined as resistance to at least isoniazid and rifampin.
2. Resistance to any fluoroquinolone was counted once

**FIGURE 20:** Region of birth[1] among patients diagnosed with multidrug-resistant tuberculosis, New York City, 2017 (n=14)




1. Based on World Health Organization regional definitions

**TABLE 4:** Select clinical characteristics of tuberculosis cases by birth in the United States (U.S.),[1,2] New York City, 2016-2017

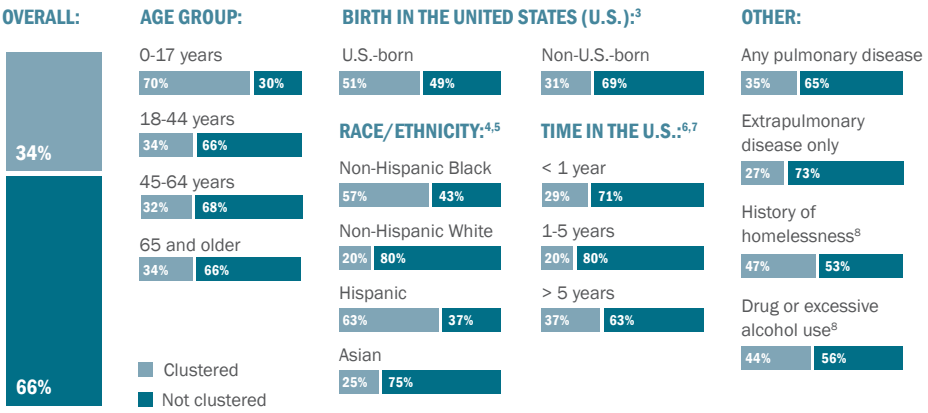
| Characteristics | 2016 | | | | | | 2017 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U.S.-born[1] | | Non-U.S.-born | | Total | | U.S.-born[1] | | Non-U.S.-born | | Total | |
| | n | % | n | % | n | % | n | % | n | % | n | % |
| Ever respiratory smear positive | 36 | 52 | 194 | 52 | 230 | 52 | 29 | 46 | 239 | 56 | 269 | 55 |
| Sputum smear positive | 29 | 81 | 196 | 99 | 225 | 96 | 26 | 90 | 225 | 93 | 251 | 93 |
| Nucleic amplification assay positive[3] | 3 | 60 | 3 | 14 | 6 | 23 | 2 | 20 | 4 | 27 | 6 | 24 |
| Culture positive | 62 | 76 | 386 | 81 | 448 | 81 | 58 | 70 | 446 | 84 | 506 | 83 |
| Pulmonary only site of disease | 53 | 65 | 308 | 65 | 361 | 65 | 53 | 64 | 334 | 63 | 389 | 63 |
| Extra-pulmonary only site of disease | 13 | 16 | 103 | 22 | 116 | 21 | 20 | 24 | 103 | 20 | 123 | 20 |
| Both pulmonary and extra-pulmonary | 16 | 20 | 63 | 13 | 79 | 14 | 10 | 12 | 91 | 17 | 101 | 16 |
| Cavities present on chest x-ray ever[4] | 23 | 33 | 81 | 22 | 104 | 24 | 17 | 27 | 92 | 22 | 109 | 22 |
| Multidrug (MDR) resistance[5] | 1 | 2 | 10 | 3 | 11 | 2 | 2 | 4 | 12 | 3 | 14 | 3 |
| Extensive drug resistance (XDR)[6] | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 2 | 0 | 0 | 1 | 0 |
| Non-MDR isoniazid resistance[5] | 3 | 5 | 32 | 8 | 35 | 8 | 3 | 5 | 36 | 8 | 39 | 8 |
| Non-MDR rifampin resistance[5] | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 2 | 0 |
| History of TB disease | 7 | 9 | 33 | 7 | 40 | 7 | 4 | 5 | 29 | 5 | 33 | 5 |
| HIV status | | | | | | | | | | | | |
| Infected | 13 | 16 | 14 | 3 | 27 | 5 | 8 | 10 | 22 | 4 | 31 | 5 |
| Not infected | 50 | 61 | 400 | 84 | 450 | 81 | 58 | 70 | 414 | 78 | 472 | 77 |
| Refused testing | 16 | 20 | 52 | 11 | 68 | 12 | 9 | 11 | 62 | 12 | 71 | 12 |
| Not offered/done or unknown | 3 | 4 | 8 | 2 | 11 | 2 | 8 | 10 | 30 | 6 | 39 | 6 |
| Non-HIV related immunosuppression | 5 | 6 | 25 | 5 | 30 | 5 | 5 | 6 | 30 | 6 | 35 | 6 |
| TNF-alpha antagonist therapy[7] | 2 | 2 | 9 | 2 | 11 | 2 | 2 | 2 | 8 | 2 | 10 | 2 |
| Diabetes | 10 | 12 | 94 | 20 | 104 | 19 | 9 | 11 | 107 | 20 | 116 | 19 |
| **Total** | **82** | **15** | **474** | **85** | **556** | - | **83** | **14** | **528** | **86** | **613** | - |

1. U.S.-born includes individuals born in the U.S. and U.S. territories. 2. Column sums may not equal applicable totals due to missing country of birth data.
3. Among patients with negative culture and nucleic amplification assay performed. 4. Percent is among patients with a pulmonary site of disease. 5. MDR TB is defined as resistance to at least isoniazid and rifampin. Percent is among patients with susceptibility testing performed for isoniazid and rifampin. 6. XDR TB is defined as resistance to at least isoniazid and rifampin plus a flouroquinilone and a second-line injectable anti-TB medication. Percent is among patients with susceptibility testing performed for isoniazid, rifampin, any fluoroquinolone and any second-line injectable anti-TB medication. 7. Use within 24 months before TB diagnosis

# GENOTYPING AND NYC CLUSTERS

The Health Department changed its TB genotyping methods in 2017 and now uses spacer oligonucleotide typing analysis and 24-loci mycobacterial interspersed repetitive unit–variable number tandem repeat analysis to characterize TB strains and define TB clusters. Clustered cases are reviewed, prioritized and assigned for epidemiologic investigation based on factors including cluster growth, patient characteristics and evidence of recent, local TB transmission. The availability of whole genome sequencing (WGS) has enabled further differentiation of strains and informs cluster detection, prioritization and investigation activities.

**FIGURE 21:** Proportion clustered[1] among tuberculosis cases with a complete genotype[2] by select patient characteristics, New York City, 2017 (n=440)




1. Defined as a case with an isolate that has exact-matching 24-loci mycobacterial interspersed repetitive unit–variable number tandem repeat (MIRU) results and spacer oligonucleotide typing (spoligotyping) results to another NYC case verified since January 1, 2009. 2. Having both spoligotype and MIRU results; 440 (87%) cases verified in 2017 had a complete genotype as of January 22, 2018. 3. U.S.-born includes individuals born in the U.S. and U.S. territories; two cases had unknown country of birth. 4. Among patients born in the U.S. 5. Excludes four patients with unknown or multiple race/ethnicity. 6. Among patients born outside the U.S. 7. Time in the U.S. is not available for all patients. 8. In the 12 months before TB diagnosis.

**34%** Proportion of culture positive cases with a clustered isolate

**47%** Proportion of cases among patients younger than 18 with no obtainable genotype

**92%** Proportion of culture positive cases with WGS results available

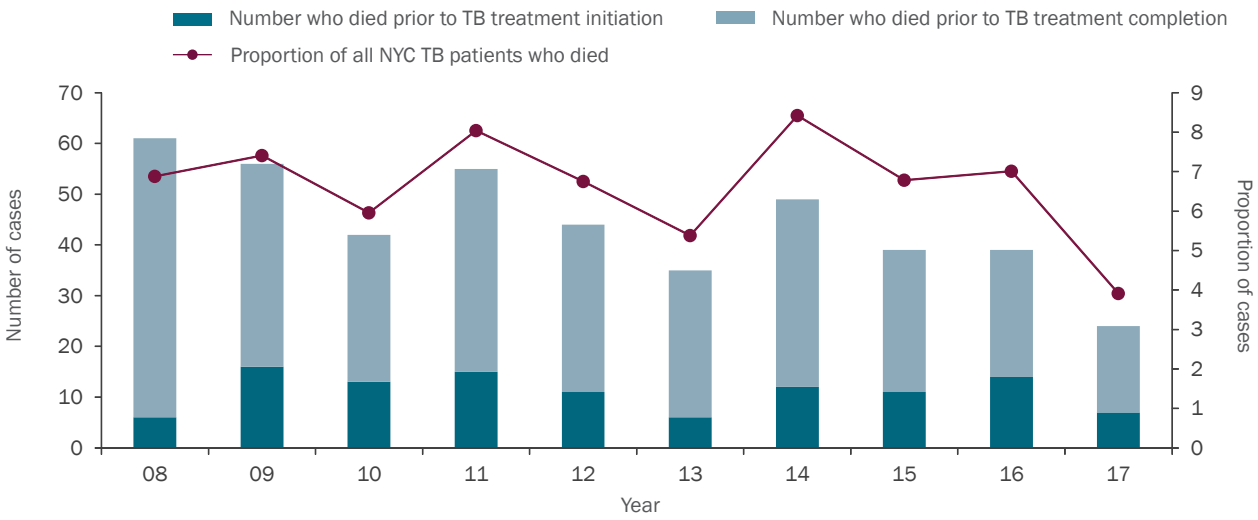
**TABLE 5:** Characteristics of select high-priority[1] tuberculosis (TB) clusters,[2] New York City, 2017

| | Cluster A | Cluster B[3] | Cluster C | Cluster D | Cluster E | Cluster F |
|---|---|---|---|---|---|---|
| Number of cases identified from January 1, 2015 to December 31, 2017 | 11 | 8 | 7 | 6 | 6 | 5 |
| Proportion of cases among males[4] | 64% | 75% | 71% | 83% | 83% | 80% |
| Proportion of patients born in the United States (U.S.)[4,5] | 27% | 88% | 14% | 17% | 100% | 60% |
| Median patient age in years (range)[4] | 30 (20-70) | 31 (16-59) | 27 (17-40) | 29 (19-38) | 35 (24-65) | 40 (18-53) |
| Most common borough of residence at time of TB diagnosis (%)[4] | Queens (55%) | Manhattan (63%) | Brooklyn (86%) | Brooklyn (100%) | Bronx (100%) | Manhattan (40%) Brooklyn (40%) |
| Proportion of patients reporting history of homelessness[4,6] | 9% | 0% | 0% | 0% | 0% | 20% |
| Proportion of patients reporting history of drug use or excessive alcohol use[4,6] | 18% | 50% | 14% | 17% | 83% | 20% |
| Proportion of patients with pulmonary disease[4] | 82% | 88% | 100% | 83% | 100% | 60% |
| Clusters in which patients reported history of transient work[4,6] | | | ✓ | ✓ | | ✓ |
| Clusters in which social network links were identified among patients[4] | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Clusters in which patients were linked to the same geographically-concentrated area[4,7] | | ✓ | ✓ | ✓ | | |

1. Includes clusters with five or more cases identified in three years and evidence of recent, local TB transmission 2. Clusters include cases whose isolate has exact-match or similar spacer oligonucleotide typing and 24-loci mycobacterial interspersed repetitive unit–variable number tandem repeat results. 3. Includes one case counted outside of NYC with matching genotype results and epidemiologic links to other patients in the cluster. 4. Among cluster cases identified between January 1, 2015 and December 31, 2017. 5. U.S.-born includes individuals born in the U.S. and U.S. territories. 6. In the 12 months before TB diagnosis. 7. Within a 10-block radius or less

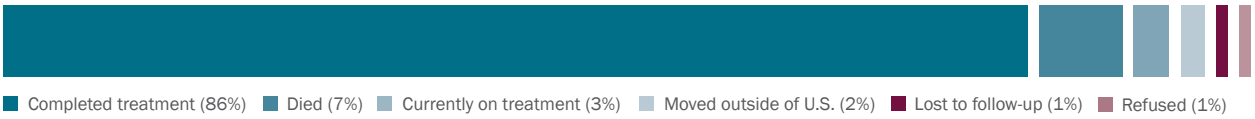
# MORTALITY AND TREATMENT COMPLETION

**FIGURE 22:** Number and proportion of patients with tuberculosis (TB) who died[1] before or during treatment, New York City (NYC), 2008-2017




1. A death is defined as any patient who died prior to or during TB treatment, regardless of the cause of death. This excludes any patient who died after the completion of TB treatment.

**FIGURE 23:** Treatment outcomes for tuberculosis (TB) cases counted in 2016,[1] New York City (n=556)




1. Treatment outcomes are not reported for the current year to allow sufficient time for follow-up.

**TABLE 6:** Select performance measures, national targets[1] and New York City performance outcomes, 2015-2016[2]

| Indicator | 2015 | 2016 | 2020 target |
|---|---|---|---|
| **Treatment and case management for persons with active tuberculosis (TB)** | | | |
| Initiated TB treatment within seven days of specimen collection[3] | 89% | 91% | 97% |
| Sputum culture conversion within 60 days of treatment initiation[4] | 77% | 75% | 73% |
| Completed treatment within 365 days of initiation[5] | 94% | 93% | 95% |
| **Contact investigation** | | | |
| Eligible cases with contacts elicited[6] | 94% | 96% | 100% |
| Eligible contacts evaluated[7] | 81% | 81% | 93% |
| Eligible contacts who initiated treatment for TB infection[8] | 82% | 83% | 91% |
| Eligible contacts who completed treatment for TB infection[9] | 78% | 66% | 81% |

1. Definitions for performance measures and national indicators are established by the CDC. The 2020 targets were set in 2015. For additional information, visit: cdc.gov. 2. Performance measures are not reported for the current year to allow sufficient time for follow-up. 3. Of TB patients with positive acid-fast bacilli (AFB) sputum-smear results who are alive at diagnosis. 4. Of TB patients with positive sputum culture results who were alive at diagnosis and have initiated treatment. Excludes patients who died within 60 days of initiating treatment. 5. Excludes patients who never started on anti-TB medications, those who died or moved outside of the U.S. within 365 days of treatment initiation, those with any rifampin resistance, those with meningeal TB and children 14 years of age or younger with disseminated TB. 6. Of AFB sputum smear-positive TB cases. 7. Of contacts to AFB sputum smear-positive TB cases counted in the year of interest. 8. Of contacts to AFB sputum smear-positive TB cases who have newly diagnosed TB infection. 9. Of contacts to sputum AFB smear-positive TB cases with newly diagnosed TB infection and started treatment.

# CONTACT INVESTIGATION IN NON-HOUSEHOLD SETTINGS

The Health Department uses multiple methods to identify and interrupt TB transmission, including contact investigations in non-household settings (e.g., worksites, schools and health care facilities). The Health Department investigates TB exposures at these sites to identify and evaluate contacts, to ensure appropriate treatment for contacts with TB disease or latent TB infection and to determine if transmission has occurred and assess whether testing of additional contacts may be warranted.

**FIGURE 24:** Contact investigations in non-household settings[1] by site type, New York City, 2017 (n=69)

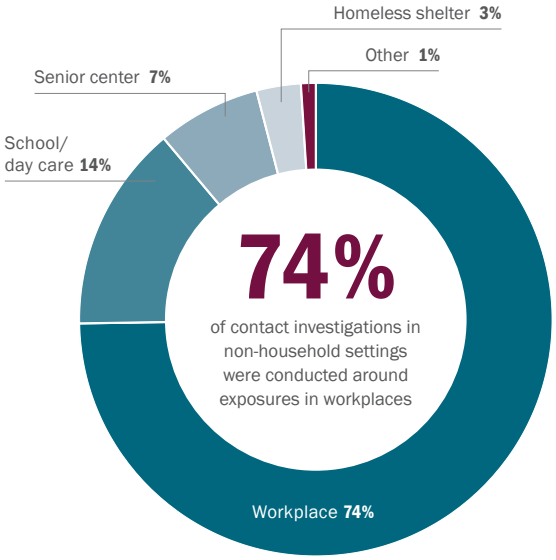



**TABLE 7:** Contact investigation outcomes in non-household settings[1] by number of exposed contacts, New York City, 2017 (n=69)

| | ≥ 15 exposed contacts | < 15 exposed contacts | Total |
|---|---|---|---|
| | n (%) | n (%) | n (%) |
| Number of sites | 28 | 41 | 69 |
| Likely transmission[2] | 8 (31%) | 7 (19%) | 15 (24%) |
| Transmission could not be assessed | 2 (7%) | 5 (12%) | 7 (10%) |
| Total number of contacts | 849 | 249 | 1,098 |
| Median contacts per site (range) | 25 (15-89) | 6 (1-14) | 10 (1-89) |
| Contacts eligible for testing[3] | 810 (95%) | 233 (94%) | 1,043 (95%) |
| Contacts tested | 709 (88%) | 207 (89%) | 916 (88%) |
| Contacts with a positive TB test result | 75 (11%) | 28 (14%) | 103 (11%) |

1. Excludes health care-associated investigations (n=153)
2. Proportion calculated among investigations where transmission could be assessed
3. Contacts eligible for testing are defined as contacts without a known history of TB disease or documented positive test for TB infection who were alive subsequent to the diagnosis of the infectious TB case to whom they were exposed

## ›› TB EXPOSURES IN HEALTH CARE-ASSOCIATED SETTINGS IN NYC, 2017

TB exposures in health care-associated settings remain an important concern in NYC, as most individuals with TB disease are diagnosed in acute care facilities. In 2017, the Health Department conducted contact investigations around exposures in **153** health care-associated sites for **125** patients with infectious TB disease. Of these, 71% of investigations occurred in a hospital or acute care clinic.

**FIGURE 25:** Contact investigations in health care-associated settings by site type, New York City, 2017 (n=153)


1. Includes hospitals and acute care clinics

# APPENDICES

# TB REPORTING REQUIREMENTS

Medical, dental, osteopathic and other health care providers and administrators of hospitals or other institutions providing care and treatment—or their designees, including infection control practitioners—are required by the NYC Health Code §§11.03 and 11.05 to report all patients, alive or deceased, with suspected or confirmed TB disease to the New York City Health Department within 24 hours of diagnosis or clinical suspicion. Medical providers must report these patients even though microbiologists and pathologists are also required to report findings consistent with TB. Note that the reports must be submitted using the Universal Reporting Form (URF) and must be received by the Health Department within 24 hours of diagnosis or clinical suspicion, whether sent electronically, by express or overnight mail, by fax or by telephone.

## HEALTH CARE PROVIDERS

Health care providers in NYC are encouraged to submit reports electronically through a NYCMED account. Alternatively, providers may fax a completed URF to BTBC at **844-713-0557**. Information reported on the URF should be as complete as possible. The following essential information must be included when the report is submitted to the Health Department:

- Information needed to identify and locate the individual (e.g., name, telephone, address, date of birth)
- Provider information (e.g., physician's name, reporting facility, phone number, email)
- Results of acid-fast bacilli (AFB) smear (including specimen source, date specimen obtained and accession number)
- Results of radiologic exams (X-ray or imaging)
- Any treatment information
- Quantitative and qualitative results from tuberculin skin test (TST) or blood-based test (IGRA) for children younger than 5 years of age with latent TB infection

► **Reporting should never be delayed pending identification of *M. tuberculosis* with an NAA test or culture. Patients should be reported whenever TB is suspected, even if bacteriologic evidence of disease is lacking or treatment has not been initiated. If TB treatment is initiated after submitting the initial disease report, the provider is required to submit a corrected report.**

► **For more information and to download related forms, call 311 and ask for the BTBC Surveillance Unit or go to nyc.gov and search "TB reporting requirements." To download a URF, go to nyc.gov and search "URF." To create a NYCMED account, go to nyc.gov and search for "NYCMED."**

### ›› IT IS MANDATORY TO REPORT PATIENTS WHO MEET ANY OF THE FOLLOWING CRITERIA:

- Positive NAA test result (e.g., Roche's COBRAS® AMPLICOR, Gen-Probe® Amplified™ *Mycobacterium Tuberculosis* [MTD] test, GeneXPert®, Hain Lifescience GenoType MTBDRplus) for *M. tuberculosis* complex
- Positive culture for *M. tuberculosis* complex, including: *M. tuberculosis, M. africanum, M. bovis-BCG, M. caprae, M. canetti, M. microti, M. pinnipedii, M. bovis, M. dassie, M. mungi, M. orygis*
- Biopsy, pathology or autopsy findings consistent with TB disease, including caseating or necrotizing granulomas in biopsy of lung, lymph nodes or other specimens
- Positive smear (from any anatomical site) for AFB
- Clinical suspicion of pulmonary or extrapulmonary TB such that the health care provider has initiated or intends to initiate isolation or treatment for TB disease with two or more anti-TB medications
- Any child younger than 5 years of age (on the day of specimen collection up to the day of the fifth birthday), with a positive TST or IGRA result, regardless of whether the child has received a bacille Calmette-Guerin (BCG) vaccination. For these patients, providers must also report chest imaging results and any preventive medication initiated for latent TB infection

## MICROBIOLOGY AND PATHOLOGY LABORATORIES

Laboratories are required to report via the NYS Electronic Clinical Laboratory Reporting System (ECLRS). Per the NYC Health Code sections §§13.03 and 13.05, the following results must be reported to the Health Department, whether confirmed or presumptive, for patients alive or deceased, within 24 hours of obtaining test results:

- AFB-positive smears (regardless of anatomic site)
- NAA test results and cultures positive for *M. tuberculosis* complex
- Results of susceptibility tests performed on *M. tuberculosis* complex cultures
- Biopsy, pathology or autopsy findings consistent with TB disease, including but not limited to presence of AFB on smear and caseating and/or necrotizing granulomas that are consistent with TB in the lung, lymph nodes or other specimens
- Any culture or NAA result associated with an AFB-positive smear (even if negative for *M. tuberculosis* complex)
- For patients with a positive TB diagnostic laboratory result, all subsequent TB diagnostic laboratory results (negative or positive) from specimens collected within one year of the most recent positive result

›› Health Code §13.05(a) also mandates that a portion of the initial culture be sent for DNA analysis to the NYC Public Health Laboratory (455 First Avenue, Room 236; New York, NY 10016) within 24 hours of observing growth of *M. tuberculosis* complex in a culture from any specimen. A specimen submitted to the Health Department for drug susceptibility testing meets this requirement unless the Health Department notifies otherwise.

## REPORTING PATIENT FOLLOW-UP AND SUBMITTING HOSPITAL DISCHARGE AND TREATMENT PLANS

Health Code §11.21(a)(3) requires the treating physician to report whether the patient completed treatment and the outcome of the patient's treatment (i.e., cured, failed, relapsed, lost, moved, refused), or whether treatment was discontinued if the patient was found not to have TB or for another reason.

Physicians must assist the Health Department to evaluate persons suspected of having TB and to follow up with patients. Case managers will contact the treating physicians to request updates and ensure that appropriate treatment and monitoring is being conducted. Health care providers must provide access to necessary paper and electronic medical records to authorized Health Department staff as requested. [Health Code §11.03(e)]

Additionally, as per Health Code §11.21(a)(1), the treating physicians or persons in charge of facilities must submit monthly clinical status reports for patients with TB disease, which must include at least:

- Name, address and telephone number(s) of the patient
- Whether treatment is still ongoing
- The clinical status and treatment being provided
- Dates and results of sputum and X-ray exams
- Any other information required by the Health Department

► **To download forms related to hospital discharge plans and reporting patient services, go to nyc.gov and search for "TB reporting requirements."**

To facilitate mandatory monthly patient status reports, the Health Department created the "Report of Patient Services" form (TB 65). This form, or a report containing the same information, must be submitted to the patient's case manager.

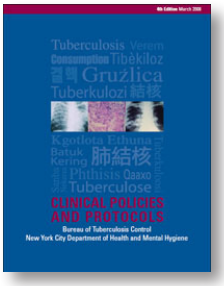
Per Health Code §11.21(b), when requested by the Health Department, medical providers are also required to report all information on the evaluation, testing and treatment of individuals who have been in contact with a person with TB disease.

Health Code §11.21(a)(4) requires health care providers to submit a discharge plan to the Health Department for review and approval prior to discharging infectious TB patients from the hospital. The Hospital Discharge Approval Request Form (TB354) must be submitted 72 hours before the planned discharge date and must be approved by the Health Department prior to discharge.

# EDUCATIONAL RESOURCES FOR PROVIDERS AND THE PUBLIC

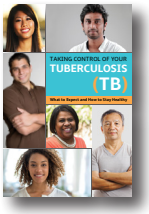
The Health Department has a selection of culturally, technically and linguistically tailored TB education materials that are available to patients, the general public and health care providers. To access materials, visit **nyc.gov** and search for "tuberculosis" or call **311**.

### CLINICAL POLICIES AND PROTOCOLS




*4th Edition.* Describes policies, protocols and recommendations for the prevention, treatment and management of TB. The 5th Edition will be available in 2018.

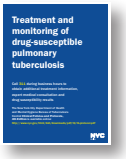
### PATIENT BROCHURE




*Taking Control of Your Tuberculosis (TB): What to Expect and How to Stay Healthy*

General information for patients starting treatment for latent TB infection or active TB disease. Available in 18 languages.

### POCKET-SIZED REFERENCE GUIDE FOR PROVIDERS




*Treatment and monitoring of drug-susceptible pulmonary tuberculosis*

Provides concise information about treatment and monitoring for pulmonary TB.

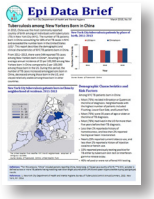
### "YOU CAN STOP TB" EDUCATIONAL POSTERS


Provides basic TB information and includes illustrations with captions. Available in English, Spanish, French, Haitian Creole, Hindu, Urdu, Bengali, Tibetan, Tagalog and Chinese; available in hard copy or digital formats.

### "GET TESTED"/"GET TREATED" POSTERS


These 11x17 posters highlight the benefits of TB testing and encourage evaluation and treatment for symptoms of TB disease. These posters are only available in Chinese.

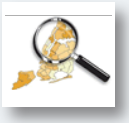
### NYC HEALTH EPI DATA BRIEFS




Epi Data Briefs are short publications that highlight data from Health Department programs and projects. For more information and to access recently published reports, go to **nyc.gov** and search for "epi data."

**HEALTH CARE PROVIDERS AND OTHERS CAN CALL THE TB PROVIDER HOTLINE AT 844-713-0559 FOR EXPERT MEDICAL CONSULTATION AND TO REPORT AND REFER TB CASES**

## ›› NEW YORK CITY INTERACTIVE HEALTH DATA IS AVAILABLE ONLINE



**EPIQUERY** is an interactive, user-friendly system designed to guide users through basic data analyses. Reported TB cases and case rates are available by select demographic and geographic characteristics. On a citywide level, select characteristics that are important to TB epidemiology are also available, including country of birth and HIV infection. To access TB EpiQuery, go to: **https://a816-healthpsi.nyc.gov/epiquery/**

**NEW YORK CITY NEIGHBORHOOD HEALTH ATLAS** provides data on about 100 measures related to social factors and health, including TB, for 188 neighborhoods. The data provide a comprehensive and granular view of neighborhood health and its potential determinants, serving as a useful resource for the promotion of health and health equity in our neighborhoods, visit **nyc.gov** and search for "health atlas."

**TABLE 8:** Tuberculosis cases and rates[1] by select characteristics, New York City, 1900-2017

| Year | Number of TB cases | Rate per 100,000 | Cases with positive culture | Cases with positive sputum smear | Sputum smear positive rate per 100,000 | Multidrug-resistant cases[2] | Deaths attributable to TB[3] | Death rate per 100,000 |
|---|---|---|---|---|---|---|---|---|
| 1900 | 11997 | 349.0 | | | | | 9630 | 280.2 |
| 1910 | 32065 | 672.7 | | | | | 10074 | 211.3 |
| 1920 | 14035 | 249.7 | | | | | 7915 | 140.8 |
| 1930 | 11821 | 170.6 | | | | | 4574 | 66.0 |
| 1940 | 9005 | 120.8 | | | | | 3680 | 49.4 |
| 1950 | 7717 | 97.8 | | | | | 2173 | 27.5 |
| 1960 | 4699 | 60.4 | | | | | 824 | 10.6 |
| 1970 | 2590 | 32.8 | | | | | 432 | 5.5 |
| 1971 | 2572 | 32.6 | | | | | 316 | 4.0 |
| 1972 | 2275 | 28.8 | | | | | 335 | 4.2 |
| 1973 | 2101 | 26.6 | | | | | 259 | 3.3 |
| 1974 | 2022 | 25.6 | | | | | 215 | 2.7 |
| 1975 | 2151 | 27.2 | | | | | 208 | 2.6 |
| 1976 | 2151 | 27.2 | | | | | 187 | 2.4 |
| 1977 | 1605 | 20.3 | | | | | 175 | 2.2 |
| 1978 | 1307 | 16.6 | | | | | 188 | 2.4 |
| 1979 | 1530 | 19.4 | | | | | 121 | 1.5 |
| 1980 | 1514 | 21.4 | | | | | 143 | 2.0 |
| 1981 | 1582 | 22.4 | | | | | 155 | 2.2 |
| 1982 | 1583 | 22.4 | | | | | 168 | 2.4 |
| 1983 | 1603 | 22.7 | | | | | 151 | 2.1 |
| 1984 | 1573 | 22.2 | 1485 | | | | 168 | 2.4 |
| 1985 | 1811 | 25.6 | 1756 | | | | 155 | 2.2 |
| 1986 | 2197 | 31.1 | 2156 | | | | 186 | 2.6 |
| 1987 | 2166 | 30.6 | 2129 | | | | 219 | 3.1 |
| 1988 | 2281 | 32.3 | 2205 | | | | 246 | 3.5 |
| 1989 | 2535 | 35.8 | 2404 | | | | 236 | 3.3 |
| 1990 | 3506 | 47.9 | 3384 | | | | 256 | 3.5 |
| 1991 | 3653 | 49.9 | 3462 | 1826 | 24.9 | 385 | 245 | 3.3 |
| 1992 | 3755 | 51.3 | 3401 | 1855 | 25.3 | 437 | 200 | 2.7 |
| 1993 | 3151 | 43.0 | 2784 | 1529 | 20.9 | 287 | 166 | 2.3 |
| 1994 | 2941 | 40.2 | 2433 | 1280 | 17.5 | 183 | 133 | 1.8 |
| 1995 | 2408 | 32.9 | 1996 | 1001 | 13.7 | 114 | 94 | 1.3 |
| 1996 | 2013 | 27.5 | 1693 | 873 | 11.9 | 84 | 67 | 0.9 |
| 1997 | 1705 | 23.3 | 1383 | 708 | 9.7 | 57 | 55 | 0.8 |
| 1998 | 1528 | 20.9 | 1232 | 611 | 8.3 | 38 | 52 | 0.7 |
| 1999 | 1436 | 19.6 | 1124 | 571 | 7.8 | 31 | 49 | 0.7 |
| 2000 | 1311 | 16.4 | 1043 | 516 | 6.4 | 24 | 44 | 0.5 |
| 2001 | 1232 | 15.4 | 938 | 454 | 5.7 | 24 | 33 | 0.4 |
| 2002 | 1071 | 13.4 | 819 | 436 | 5.4 | 29 | 30 | 0.4 |
| 2003 | 1132 | 14.1 | 865 | 428 | 5.3 | 22 | 34 | 0.4 |
| 2004 | 1036 | 12.9 | 793 | 395 | 4.9 | 19 | 31 | 0.4 |
| 2005 | 983 | 12.3 | 745 | 378 | 4.7 | 24 | 21 | 0.3 |
| 2006 | 947 | 11.8 | 705 | 354 | 4.4 | 23 | 18 | 0.2 |
| 2007 | 909 | 11.4 | 707 | 379 | 4.7 | 9 | 16 | 0.2 |
| 2008 | 886 | 11.1 | 685 | 339 | 4.2 | 11 | 18 | 0.2 |
| 2009 | 757 | 9.5 | 539 | 281 | 3.5 | 9 | 25 | 0.3 |
| 2010 | 705 | 8.6 | 511 | 265 | 3.2 | 11 | 26 | 0.3 |
| 2011 | 684 | 8.4 | 501 | 264 | 3.2 | 16 | 32 | 0.4 |
| 2012 | 652 | 8.0 | 495 | 271 | 3.3 | 19 | 15 | 0.2 |
| 2013 | 650 | 8.0 | 473 | 258 | 3.2 | 7 | 17 | 0.2 |
| 2014 | 582 | 7.1 | 454 | 243 | 3.0 | 10 | 31 | 0.4 |
| 2015 | 575 | 7.0 | 444 | 240 | 2.9 | 5 | 20 | 0.2 |
| 2016 | 556 | 6.8 | 447 | 225 | 2.8 | 11 | Not available | Not available |
| 2017 | 613 | 7.5 | 506 | 251 | 3.1 | 14 | Not available | Not available |

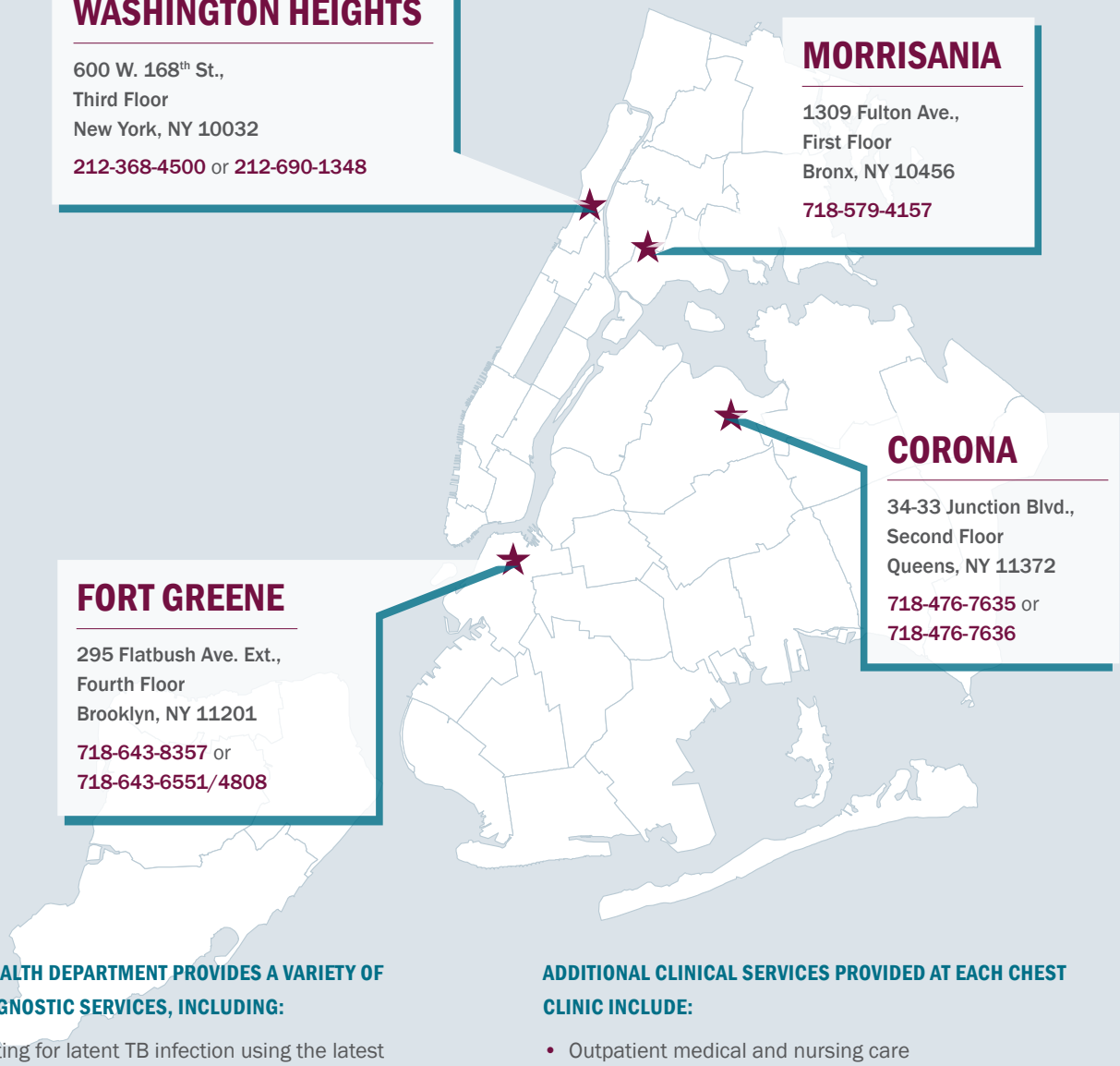
1. Rates are based on decennial census data. 2. Multidrug-resistant (MDR) TB is defined as resistance to at least isoniazid and rifampin. 3. Data on TB deaths are obtained from the Health Department's Office of Vital Statistics. Deaths recorded in a given year may include cases diagnosed in a previous year.

# TECHNICAL NOTES

- Data for 2017 are preliminary and reflect the most complete information available as of January 22, 2018.
- Data prior to 2017 have been updated since the release of the 2016 report. Data for these years reflect the final numbers and may differ from official estimates presented in previous reports.
- TB became a reportable disease on January 19, 1897. From 1920-1940, only cases of pulmonary TB were reportable. Beginning in 1978 the TB case definition was amended to consider people who had verified TB disease 12 or more months before their current diagnosis as incident cases of TB disease.
- Age groupings have been changed from previous reports; as a result, count data for earlier years may differ from previous reports.
- In all tables presenting data by birth in the U.S, column sums may not equal applicable totals due to missing or unknown data.
- In all tables where data is presented by geography, column sums may not equal applicable totals due to missing or unknown data.
- Reported rates for earlier years may differ from previous reports due to corrected data and changes in the denominators used to calculate rates. The sources of denominator data are indicated throughout the report.
- The Health Department calculates population estimates based on modified U.S. Census Bureau interpolated intercensal estimates. Data are modified to account for population undercounts in northwest Queens and southern Brooklyn because of erroneously deleted housing units and housing units mislabeled as vacant. Population estimates are updated as new data become available. Therefore, rates may differ from previously reported rates.
- U.S.-born refers to patients born in the 50 states, District of Columbia or other U.S. territories and outlying areas, including American Samoa, Baker Island, Guam, Howland Island, Jarvis Island, Johnston Atoll, Kingman Reef, Midway Island, Navassa Island, Northern Mariana Islands, Palmyra Atoll, Puerto Rico, U.S. Minor Outlying Islands, U.S. Pacific Islands, Virgin Islands and Wake Island. All others with a known country of birth are considered non-U.S.-born.
- Area-based poverty is defined using patients' ZIP code of residence at the time of TB diagnosis. Poverty level by ZIP code is based on the most recent American Community Survey five-year sample data on the proportion of census tract residents living below the federal poverty level. Patients with addresses outside of NYC, addresses unable to be geocoded to a ZIP code or located in ZIP codes where poverty level could not be determined were not assigned to a poverty level.
- The definition of excessive alcohol use has been changed from previous reports. The current definition of excessive alcohol use, used in this report, is based on national definitions of binge drinking and heavy alcohol use from the Substance Abuse and Mental Health Services Administration.
- The geographic distribution of cases is presented by the 42 United Hospital Fund neighborhoods. These neighborhoods consist of adjoining ZIP codes that approximate NYC Community Planning Districts and contain an average of 200,000 individuals.
- Data presented on HIV status reflect information as collected by BTBC. Misclassification of HIV status may occur if a patient refused to disclose known status and/or refused to be tested for HIV while under care for TB disease.
- The definition of a genotype cluster has been changed from previous reports due to a change in genotyping methods used by BTBC. The current definition of a clustered case, used in this report, is a case whose isolate has exact-matching spacer oligonucleotide typing (spoligotyping) and 24-loci mycobacterial interspersed repetitive unit–variable number tandem repeat (MIRU) results.
- Data on TB deaths are obtained from the NYC Office of Vital Statistics. Deaths recorded in a given year may include cases diagnosed in a previous year.
- Product names are provided for identification purposes only; their use does not imply endorsement by the Health Department.

# NEW YORK CITY HEALTH DEPARTMENT CHEST CLINICS

Eligible patients can be referred to one of four Health Department chest clinics located throughout NYC for TB testing, radiography, sputum induction and treatment as needed. All chest clinic services, including medication, are provided at no cost to the patient and regardless of immigration status or insurance status.



## WASHINGTON HEIGHTS

600 W. 168th St.,
Third Floor
New York, NY 10032

212-368-4500 or 212-690-1348

## MORRISANIA

1309 Fulton Ave.,
First Floor
Bronx, NY 10456

718-579-4157

## CORONA

34-33 Junction Blvd.,
Second Floor
Queens, NY 11372

718-476-7635 or
718-476-7636

## FORT GREENE

295 Flatbush Ave. Ext.,
Fourth Floor
Brooklyn, NY 11201

718-643-8357 or
718-643-6551/4808

### THE HEALTH DEPARTMENT PROVIDES A VARIETY OF TB DIAGNOSTIC SERVICES, INCLUDING:

- Testing for latent TB infection using the latest generation blood-based QuantiFERON®-TB Gold test and tuberculin skin tests
- Sputum induction
- Chest radiographs
- Medical evaluation
- Treatment for TB disease and latent TB infection
- DOT services, including vDOT

### ADDITIONAL CLINICAL SERVICES PROVIDED AT EACH CHEST CLINIC INCLUDE:

- Outpatient medical and nursing care
- Phlebotomy services
- Social services referrals
- HIV education and testing regardless of person's need for TB care
- TB evaluation for newly arrived immigrants and refugees referred by the CDC

**›› TO MAKE AN APPOINTMENT OR TO REFER A PATIENT, CALL THE INDIVIDUAL CHEST CLINIC OR CALL 311**


NYC
Health