# WE ARE ALL UNITED

## BY THE AIR WE BREATHE

NEW YORK CITY BUREAU OF TUBERCULOSIS CONTROL ANNUAL SUMMARY, 2016

**›› 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 manage 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
- Perform timely reviews of discharge and treatment plans submitted by hospitals and providers
- Operate state-of-the-art chest centers for TB screening, diagnosis and treatment at no cost to the patient
- Ensure that 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
- Ensure data confidentiality

**ABOUT THIS REPORT:** This report covers calendar year 2016 and provides robust surveillance data, summaries of core program activities and highlights. The data reflect the most complete information available as of January 17, 2017. For additional details on the use of denominators and definitions in this report, please see Technical Notes (page 33).

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March 24, 2017

Dear Colleagues,

The New York City Health Department is deeply committed to protecting the health and well-being of all New Yorkers. This year's World TB Day theme, "Unite to End TB," serves as an important reminder that eliminating tuberculosis can only be achieved through local and global collaboration. Now more than ever, working in partnership with patients, communities, health care providers, laboratories, advocates, policy makers and other key stakeholders is crucial to our success.

The NYC Bureau of Tuberculosis Control (BTBC) provides confidential TB diagnostic, treatment and care services at no cost to patients, regardless of their immigration or insurance status. We offer services and educational materials in patients' preferred languages to accommodate our diverse patient population. We provide state-of-the-art testing and treatment, including the blood-based QuantiFERON®-TB Gold In-Tube test for TB infection, shorter-course treatment regimens for TB infection and video-based directly observed therapy. The combined efforts of BTBC and community providers have contributed to an 85% decrease in the number of TB cases in NYC between 1992 and 2016.

Despite these achievements, the rate of decline in TB incidence in NYC has plateaued. In 2016, there were 565 confirmed cases of TB disease, corresponding to an incidence of 6.9 per 100,000 and a decline of less than 2% from 2015. TB affects individuals across New York City of all age groups, races and backgrounds, yet some groups remain disproportionately affected by TB. In 2016, 85% of all TB cases occurred in people born outside of the United States (U.S.), the rates among U.S.-born non-Hispanic Blacks and non-Hispanic Asians were almost four times higher than the rate among U.S.-born non-Hispanic Whites, and several neighborhoods had TB rates that were more than twice as high as the citywide rate.

Many challenges remain on the path to TB elimination, including the uncertain future of public health funding, the potential impact of recent immigration policies and changes to the Affordable Care Act. In the face of these obstacles, the Health Department remains fully committed to working with our partners to provide patient-centered, human rights- and social justice-based care to all individuals and communities affected by TB.

I commend BTBC staff and all of our partners on our accomplishments to date and look forward to our continued collaboration in the year ahead. United in our efforts, we can make significant strides toward ending TB in NYC.

Sincerely,

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

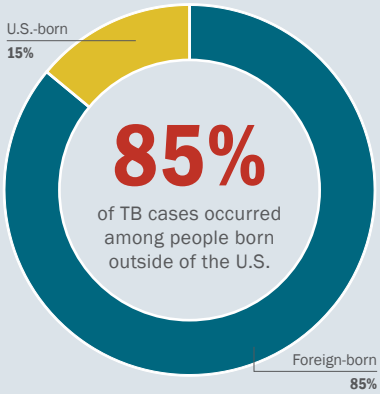
# TUBERCULOSIS

## IN NEW YORK CITY, 2016


**565** Number of tuberculosis (TB) cases verified in NYC in 2016

**6.9** NYC citywide TB rate in 2016 per 100,000 people

### COUNTRY OF BIRTH




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

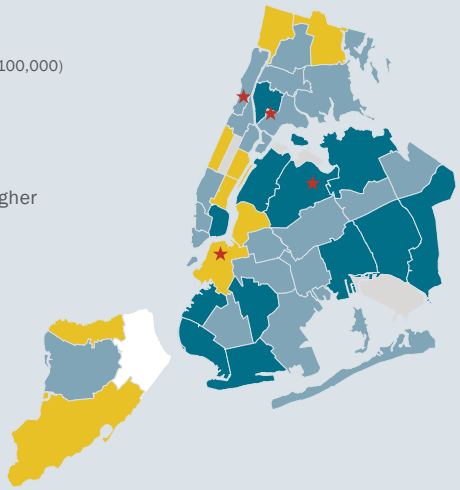
- China **124**
- United States (U.S.) **85**
- Mexico **34**
- Philippines **30**
- Bangladesh **26**
- Dominican Republic **22**
- Haiti **22**
- Ecuador **21**
- India **21**
- Guyana **15**

**64%** Proportion of foreign-born patients residing in the U.S. for more than five years at time of TB diagnosis

**67** Countries of birth represented among patients with TB disease

### TB IN NYC NEIGHBORHOODS

- Above citywide TB rate (7.0 to 20.2 per 100,000)
- At or below citywide TB rate (2.9 to 6.9 per 100,000)
- At or below provisional national TB rate (0.9 to 2.9 per 100,000)
- No NYC TB cases
- ★ Health Department Chest Center location

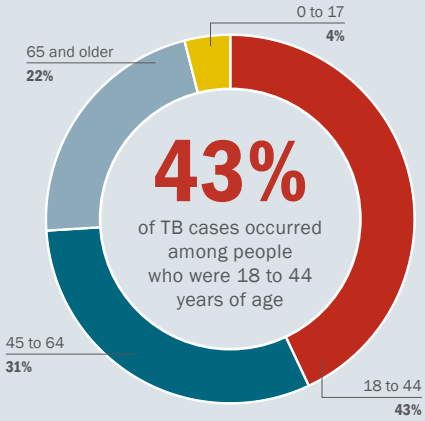


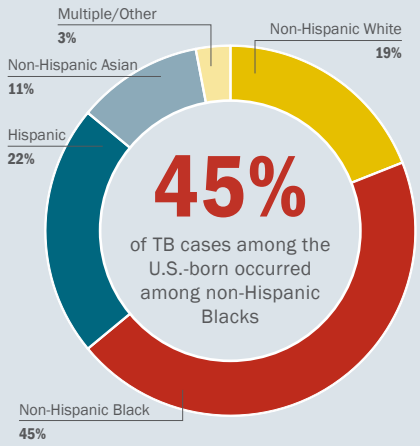
**12** Number of United Hospital Fund neighborhoods with a TB rate higher than the 2016 citywide TB rate

**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

**61%** of TB cases occurred among males



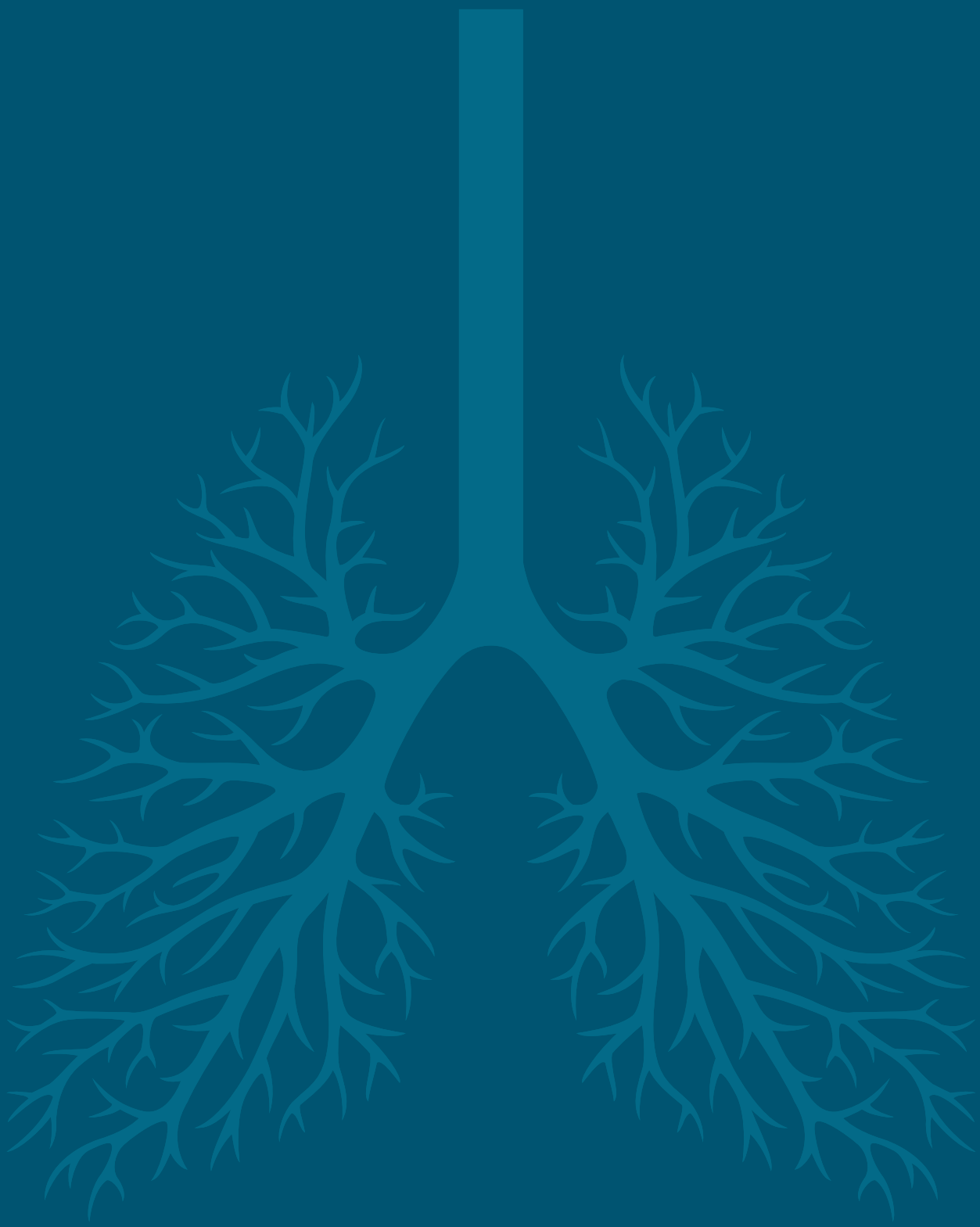




### CLINICAL CHARACTERISTICS

**79%** Proportion of TB cases with a pulmonary disease site

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

**11** Number of TB cases identified in 2016 with a multidrug-resistant strain

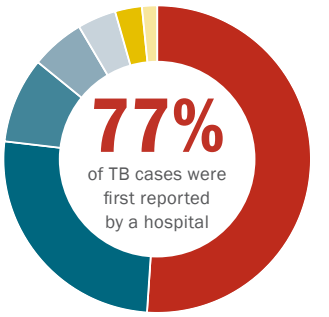


# CORE ACTIVITIES

**SURVEILLANCE IN 2016:**

- **565** cases of confirmed TB disease were reported to the Health Department
- **3,363** individuals with suspected TB disease and **73** children younger than 5 years old with latent TB infection were reported to the Health Department
- **106** facilities reported at least one TB case; nearly half (42%) of all cases were reported by 11 facilities

**FIGURE 1:** Initial reporter of confirmed tuberculosis cases verified in 2016 by reporter type, New York City




| | |
|---|---|
| Non-public hospital | 51% |
| Public hospital | 26% |
| Community provider | 9% |
| Health Department chest center | 6% |
| Commerical laboratory | 4% |
| Non-NYC reporter | 3% |
| Other | 2% |

## 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 old with a positive test for TB infection, associated chest imaging results and treatment initiated

Health Department staff review all submitted reports for completeness and timeliness and determine whether patients are eligible for case management. Staff also coordinate with other health departments to ensure continuity of care for TB patients working or living outside of NYC.

The Health Department maintains a state-of-the-art electronic registry and case management system (Maven version 5.4.2, Conduent Public Health Solutions, Florham Park, NJ) that includes information for all reported patients, as well as people exposed to infectious TB patients (contacts). BTBC staff use this data to conduct case management activities, monitor TB trends, prepare surveillance reports, report de-identified data to the state health department and CDC, and identify data quality and reporting issues.

›› **NEW IN 2016** Changes in TB reporting requirements were made to the NYC Health Code in 2016. These changes are effective as of January 2017 and affect both health care providers and laboratorians. Previously, for children younger than 5 years of age, providers were required to report positive tests for TB infection. In order to better understand latent TB diagnoses in this group, the Health Code now requires the following:

- Providers and laboratorians are now required to report any child younger than 5 years old who has a positive test for latent TB infection (e.g., tuberculin skin test or blood-based interferon-gamma release assay); ***and***
- For such children, providers are also required to report the result of the chest X-ray, as well as the name and dose of any medication that has been initiated for the treatment of latent tuberculosis infection

›› *For additional information about NYC TB reporting requirements, see pages 30-31.*

## CLINICAL SERVICES

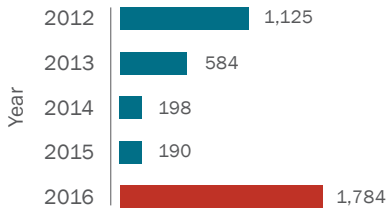
The Health Department is the leading provider of TB care in NYC. TB-related services are provided at four chest centers located in the Bronx, Brooklyn, Manhattan and Queens. Health Department physicians working at the chest centers are specialists in internal medicine, pulmonary medicine, infectious diseases, pediatrics and occupational health. Anyone with symptoms of TB disease or a positive test for TB infection is eligible for medical evaluation and treatment at a Health Department chest center at no cost to the individual.

The Health Department provides TB diagnostic services, including testing for

**HEALTH DEPARTMENT CHEST CENTERS IN 2016:**

- Health Department chest centers provided TB-related services during **33,248** patient encounters
- **305** (54%) patients with active TB disease received some or all of their TB care at a Health Department chest center
- **3,361** individuals were referred to Health Department chest centers for TB evaluation from community health care providers, social service providers, hospitals and other jurisdictions
- Chest center staff performed **3,764** tests for latent TB infection; **22%** were positive
- **1,195** patients started treatment for latent TB infection at a Health Department chest center
- Chest center staff performed **3,661** tests for HIV; **12** tests had a positive result
- BTBC was notified of **1,784** Class A and B immigrants arriving in NYC and needing TB evaluation in 2016, a more than ninefold increase over 2015 (190). To date, **952** (53%) have received initial evaluation for TB infection or disease. Evaluation is pending for the remaining patients

**FIGURE 2:** Number of notifications for immigrants and refugees newly arrived to New York City and requiring TB evaluation, 2012-2016




latent TB infection (using the latest generation blood-based QuantiFERON®-TB Gold [QFT] test and tuberculin skin test [TST]), sputum induction, and chest radiographs, as well as providing medical evaluation, treatment for TB disease and latent TB infection and directly observed therapy (DOT) services.

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

**HIV TESTING AND COUNSELING SERVICES:** BTBC provides rapid HIV testing and HIV counseling services in its chest centers and refers patients with HIV infection to health care providers who specialize in HIV treatment. Anonymous HIV testing and counseling are also available at BTBC chest centers independent of need for TB services.

**EVALUATION OF NEWLY ARRIVED IMMIGRANTS AND REFUGEES:** Persons 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., 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 Centers for Disease Control and Prevention (CDC). The destination city must arrange for the individual to be re-evaluated for TB. 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 center for re-evaluation.

›› *For additional information about chest center locations and services, see page 34.*

## CASE MANAGEMENT

The Health Department provides case management for NYC residents diagnosed with or suspected of having TB disease and for contacts of TB patients who are on treatment for latent TB infection, regardless of where they are receiving their TB care.

Case management activities include patient education, comprehensive patient interviews, medical chart reviews, contact identification, contact evaluation and DOT. Health Department staff also conduct patient home assessments to determine whether infectious TB patients can be isolated at home, perform monthly monitoring for adherence to medical appointments and treatment, and provide general patient support. Other case management activities include locating patients who are non-adherent to treatment or evaluation recommendations and returning them to medical supervision, transferring patient care between NYC and other jurisdictions and working with community providers and City, State and federal programs.

**CASE MANAGEMENT IN 2016:**

- Case management was initiated or continued for **1,091** confirmed TB cases and for **1,407** patients newly suspected of having TB disease
- BTBC field staff conducted **3,298** facility visits to review medical records, interview patients and meet with treating physicians, infection control practitioners and discharge planners
- BTBC field staff made **1,807** home visits to promote treatment adherence, return patients to medical supervision, conduct patient interviews, conduct contact investigations and conduct home assessments
- **3,595** contacts were identified for **428** potentially infectious TB cases; **2,716** have been evaluated to date and **509** had a new positive TB test result
- **384** eligible patients with confirmed TB disease were enrolled in DOT through the Health Department or another health care provider; **184** were enrolled exclusively in face-to-face DOT; **200** received some or all of their DOT through VDOT
- Health Department staff provided approximately **40,911** DOT observations for **817** patients with suspected or confirmed TB disease or latent TB infection
- **70** patients were evaluated for a regulatory order, **12** were placed on mandatory DOT and **8** were detained in the hospital to complete required therapy or until no longer considered infectious

**CONTACT INVESTIGATION:** The Health Department routinely conducts contact investigations among household and social contacts and in congregate settings (e.g., worksites, schools and health care-associated settings). The Health Department seeks to identify and evaluate individuals exposed to infectious TB patients, ensure appropriate treatment among contacts diagnosed with TB disease or latent TB infecton, and determine if transmission has occurred in order 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 New York City, 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 centers and at homes, worksites and other locations as requested by the patient. DOT is also available through three NYC Health+Hospitals facilities.

DOT is designed to be convenient for patients and can be performed during or outside of traditional business hours. DOT can be conducted either face-to-face (in-person observation) or through video conferencing (VDOT).

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

**REGULATORY ACTION:** For infectious patients 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 care. This may include compulsory evaluation, mandatory DOT and/or involuntary hospitalization to complete TB therapy.

**MEDICAL CONSULTATION:** Health Department physicians conduct standardized 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, review of treatment plans and review of discharge plans for hospitalized patients.

›› *To obtain expert medical consultation regarding TB, call the **TB Hotline** at 347-396-7400 or call 311.*

## 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, which inform TB treatment regimens. Genotype results identify whether TB strains are genetically related (i.e., clustered), which helps the Health Department identify false positive culture results, detect outbreaks and determine where TB transmission may be occurring.

Health Department staff review all clustered cases and use an algorithm to prioritize and assign cases for further epidemiologic investigation. Potential false positive culture results and possible instances of contamination are

### DRUG SUSCEPTIBILITY TESTING AND GENOTYPING IN 2016:

- **564** isolates were submitted to NYC and New York State public health laboratories for **435** (96%) culture-confirmed TB cases; conventional genotype results were available for **353** (81%) cases
- **49** false positive investigations were initated in 2016; **5** investigations were closed as confirmed contamination; **28** were closed as unlikely contamination; **14** were closed as inconclusive because the potential source of the contamination could not be determined or a genotype was unobtainable; **2** investigations are ongoing
- WGS results were available for **375** (82%) culture-confirmed TB cases

### BTBC PARTICIPATION IN ADVISORY GROUPS AND CONSORTIA IN 2016:

- Advisory Council for the Elimination of TB • CDC/Infectious Disease Society of America (IDSA)/ American Thoracic Society (ATS) National Multidrug Resistant TB Guidelines Writing Committee • CDC National Epidemic and Economic Modeling Agreement • CDC TB Education & 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 Work-group, Survey Committee, Society for Epidemiology in TB Control) • Northeast Regional Training and Medical Consultation Center Medical Advisory Board

promptly investigated to ensure that patients are not placed on anti-TB medications unnecessarily.

›› **NEW IN 2016:** New laboratory diagnostics (e.g., whole genome sequencing [WGS]) and nucleic-acid amplification tests (e.g., Cepheid's Xpert® MTB/ RIF and Hain Lifescience's GenoType MTBDRplus]) are now being routinely used in mycobacteriology laboratories in acute care hospitals, commercial laboratories and public health reference laboratories. These tests can rapidly confirm the presence of *M. tb* and provide information on the presence of mutations in specific genes that are known to predict drug resistance. However, 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 empiric tuberculosis treatment. When there is discordance between phenotypic and mutation results, providers should consult with the Health Department.

## COMMUNITY AND PROVIDER OUTREACH

Community- and provider-based outreach efforts help the Health Department detect, treat and prevent TB in populations and neighborhoods with a high TB burden. Outreach efforts seek to increase knowledge of TB and TB risk, reduce barriers to TB-related and other health care services, increase TB screening among high-risk individuals and ensure medical evaluation and treatment for infected individuals. Outreach activities include:

1. Tailored community education and awareness
2. Education and training of non-Health Department health care providers
3. Community-based testing in high burden populations

The Health Department also develops TB educational materials that are culturally and linguistically appropriate, and utilizes various media outlets to raise awareness about TB throughout NYC.

›› *For more information about TB educational materials that are available through the Health Department, see pages 30-31 or email* ***TBtraining@health.nyc.gov.***

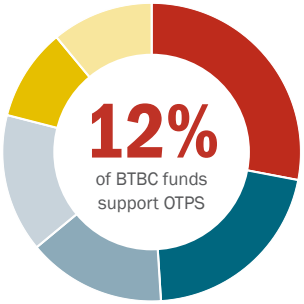
## TRAINING AND COLLABORATION

The Health Department coordinates trainings and meetings to discuss best practices in TB management and foster collaboration with partners within and outside of NYC. Health Department physicians and other staff also present on TB-related topics at Grand Rounds at hospitals and outpatient facilities, and coordinate TB Rounds with hospitals throughout the city. The Health Department also co-sponsors an annual conference on World TB Day, giving providers an opportunity to learn about updated TB care guidelines and recommendations.

›› *To request a lecture, Grand Rounds presentation or provider training, or for more information about TB conferences, email* ***TBtraining@health.nyc.gov.***

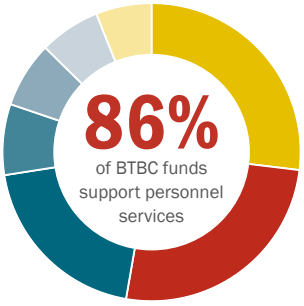
## BTBC FUNDS AND STAFFING, 2016

**FIGURE 3:** BTBC funding distribution for other-than-personnel services (OTPS) by type, 2016




| | |
|---|---|
| Medications/supplies | 28% |
| Patient support services | 21% |
| Laboratory testing services | 15% |
| Electronic medical records | 15% |
| Chest radiograph services | 10% |
| Other | 11% |

**FIGURE 4:** BTBC staff by job function, 2016




| | |
|---|---|
| Case Manager | 27% |
| Administrative staff | 20% |
| Nurse | 8% |
| Physician | 7% |
| DOT staff | 7% |
| Epidemiologist | 6% |
| Other | 26% |

## FUNDING & ADMINISTRATION

BTBC receives City, State and federal funding. The operating budget for the fiscal period of July 1, 2015, through June 30, 2016, was approximately $15.6 million, excluding activities performed by non-Health Department personnel. Of this budget, 12% supported other-than-personnel services (OTPS), 86% supported personnel services and 2% went toward indirect costs. These funds support all TB prevention and control activities, from hiring staff to operating the Health Department chest centers. BTBC staff work to ensure that funds are allocated, monitored and utilized efficiently.

## PROGRAM EVALUATION

The Health Department uses a series of performance indicators to compare BTBC's performance to national standards and to ensure that program objectives are being met. These indicators help identify programmatic issues and areas of 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 for both cases and contacts.

Performance indicators and targets are developed in coordination with our partners within the Health Department and our funders, including the New York State Department of Health (NYS DOH) and the CDC. Certain performance indicators must be reported to the NYS DOH and the CDC.

**TABLE 1:** Select performance measures, national targets[1] and New York City performance outcomes, 2014-2015[2]

| Performance measure[2] | 2014 | 2015 | 2020 TARGET |
|---|---|---|---|
| **Treatment and case management for persons with active TB** | | | |
| Initiated TB treatment within 7 days of specimen collection[3] | 91% | 89% | 97% |
| Sputum culture conversion within 60 days of treatment initiation[4] | 76% | 77% | 73% |
| Completed treatment within 365 days of initiation[5] | 95% | 94% | 95% |
| **Contact Investigation** | | | |
| Eligible cases with contacts elicited[6] | 97% | 94% | 100% |
| Eligible contacts evaluated[7] | 79% | 80% | 93% |
| Eligible contacts who initiated treatment for TB infection[8] | 82% | 81% | 91% |
| Eligible contacts who completed treatment for TB infection[9] | 77% | -- | 81% |

1. Definitions for performance measures and national indicators are established by the CDC. The 2020 targets were set in 2015. For additional information, see: cdc.gov/tb/programs/evaluation/indicators/default.htm. 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 US 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.

### 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 the following: conducting research projects to inform TB prevention, care and management policies and practices; collaborating on epidemiologic and clinical studies to advance TB research; pursuing funding opportunities; and mentoring new researchers and students to develop research skills for future public health careers.

In 2016, NYC TB Research Consortium participants included Albert Einstein College of Medicine, Columbia University, Drexel University, Johns Hopkins University, Bureau of TB Control at the New York City Health Department, Public Health Research Institute at Rutgers University, the Treatment Action Group (TAG) and Yale University.

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

**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.

## RESEARCH

The Health Department actively participates in TB research. This includes observational studies on the epidemiology of TB 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 in the U.S. and abroad.

### BTBC STAFF PUBLICATIONS IN PEER-REVIEWED JOURNALS, 2016:

- Bhatraju P, Patrawalla P, Trieu L, Ahuja SD, Marchione S, Douyon F, Horowitz HW, Leibert E. Errors in isolation of patients with infectious tuberculosis at a public teaching hospital in New York. *Int J Tuberc Lung Dis.* 2016 Sep;20(9):1168-73.
- Chuck C, Robinson E, Macaraig M, Alexander M, Burzynski J. Enhancing management of tuberculosis treatment with video directly observed therapy in New York City. *Int J Tuberc Lung Dis.* 2016 May; 20(5):588–593.
- Drobnik A, Breskin A, Fuld J, Chan C, Hadler J, Tabaei B, Stennis N, Ahuja S, Wu W, Varma JK. Diabetes Among People With Tuberculosis, HIV Infection, Viral Hepatitis B and C, and STDs in New York City, 2006-2010. *J Public Health Manag Pract.* 2016 Dec 16. [Epub ahead of print].
- Isaac BM, Masonbrink A, Kennedy J, Greene SK, Hennessy RR, Rosen JB, Trieu L, Ngai S, Morse SS, Weiss D. Reportable Bacterial Infections among New York City-Born Infants, 2001–2009 *J Pediatr.* 2016 Jul;174:218-225.e4.
- Robbins RS, Perri BR, Ahuja SD, Anger HA, Sullivan Meissner J, Shashkina E, Kreiswirth BN, Proops DC. Exploring genotype concordance in epidemiologically linked cases of tuberculosis in New York City. *Epidemiol Infect*. 2017 Feb;145(3):503-514.
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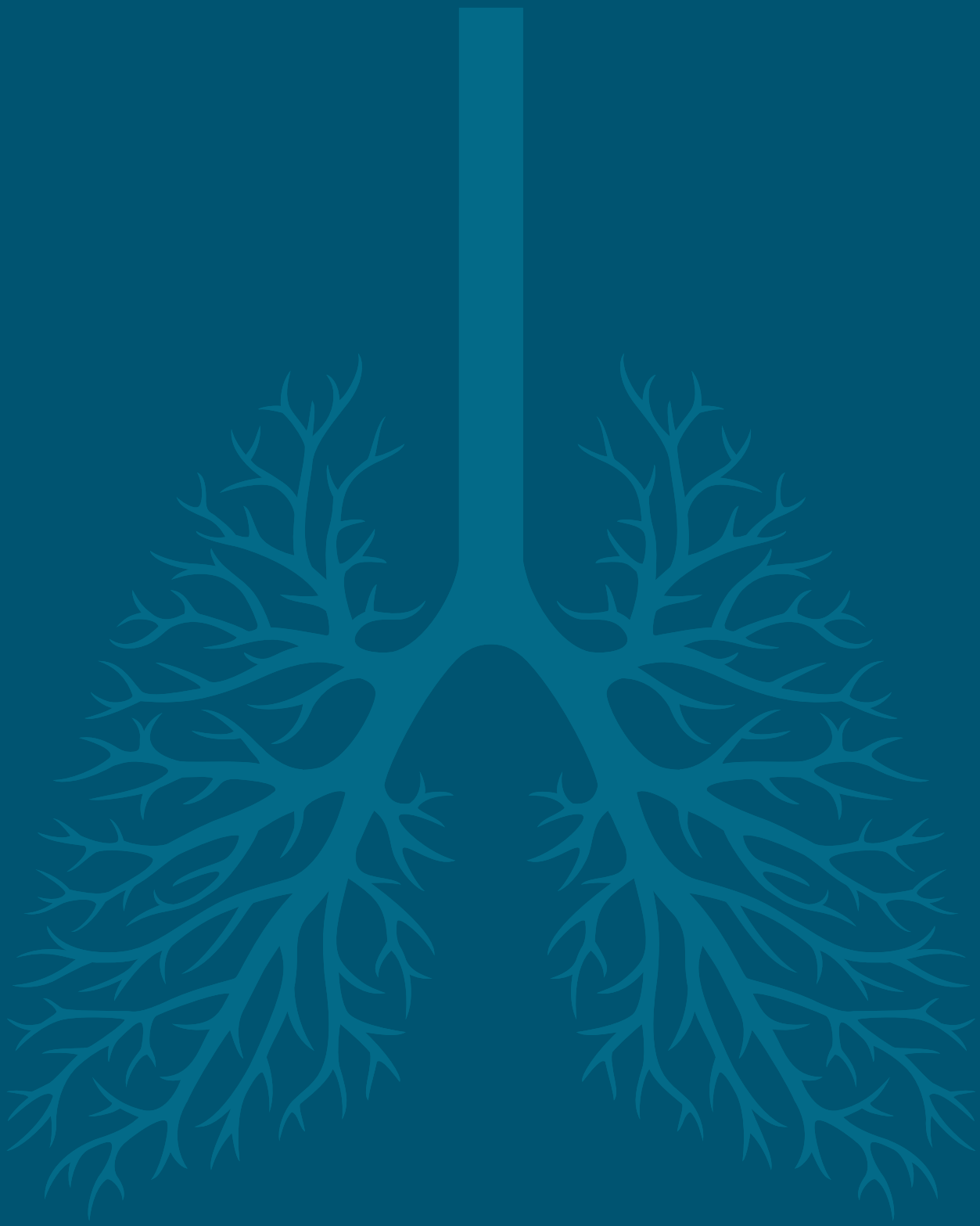
- Zelnick JR, O'Donnell MR, Ahuja SD, Chua A, Sullivan Meissner J. Health care provider perspectives on tuberculosis care for foreign-born populations in New York City. *Int J Tuberc Lung Dis.* 2016 Dec; 20(12):1625–1632.



# PROFILE OF TB CASES

## THE EPIDEMIOLOGY OF TB IN NYC

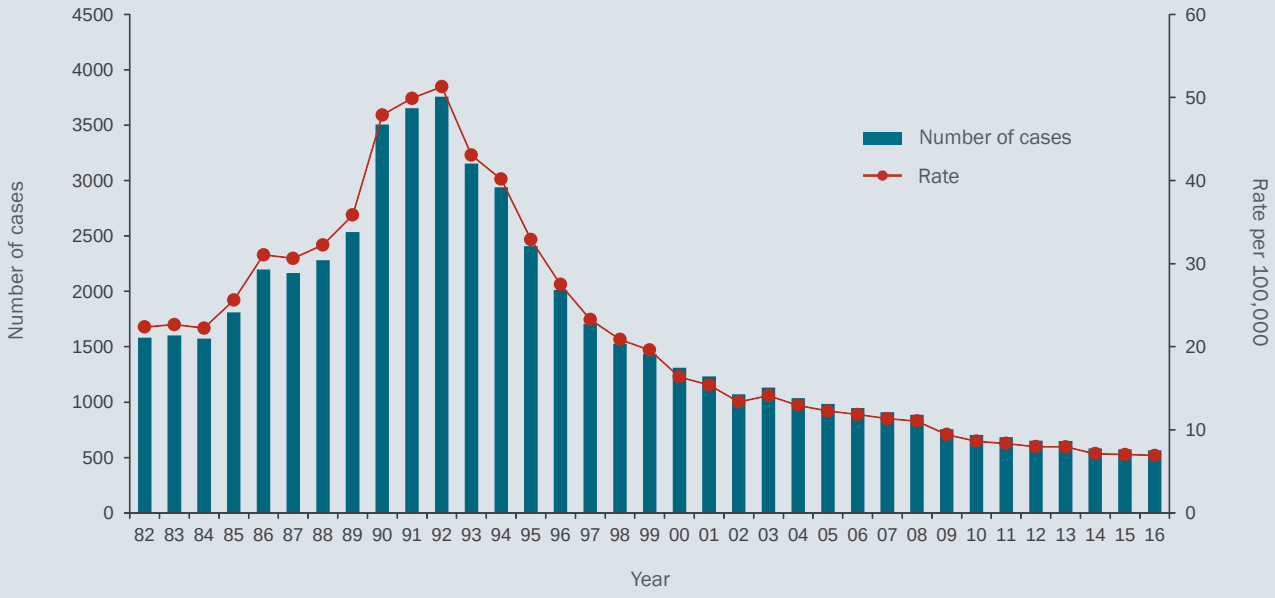
NYC has demonstrated significant declines in TB incidence over the past 25 years, with an 85% overall decline in TB burden between 1992 and 2016. Over the last decade, however, the rate of decline has slowed. From 2005 to 2014, NYC experienced a 6% average annual decrease in the number of cases compared to a 10% average annual decrease between 1992 and 2004. Since 2014, the number of cases has decreased by less than 2% each year.

**565** Number of TB cases verified in NYC in 2016

**6.9** NYC citywide TB rate in 2016 per 100,000 people

**1.7%** Proportion decrease in the number of TB cases between 2015 and 2016

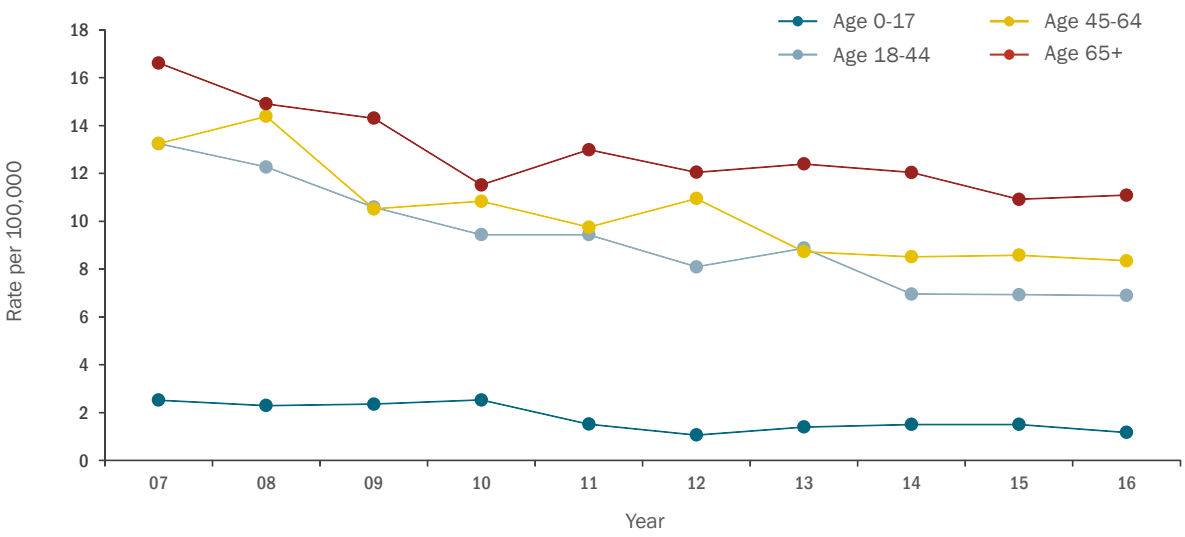
**FIGURE 5:** Tuberculosis cases and rates,[1] New York City, 1982-2016




1. Rates are based on decennial Census data

# AGE AND SEX

**FIGURE 6:** Tuberculosis rates[1] by age group in years, New York City, 2007-2016



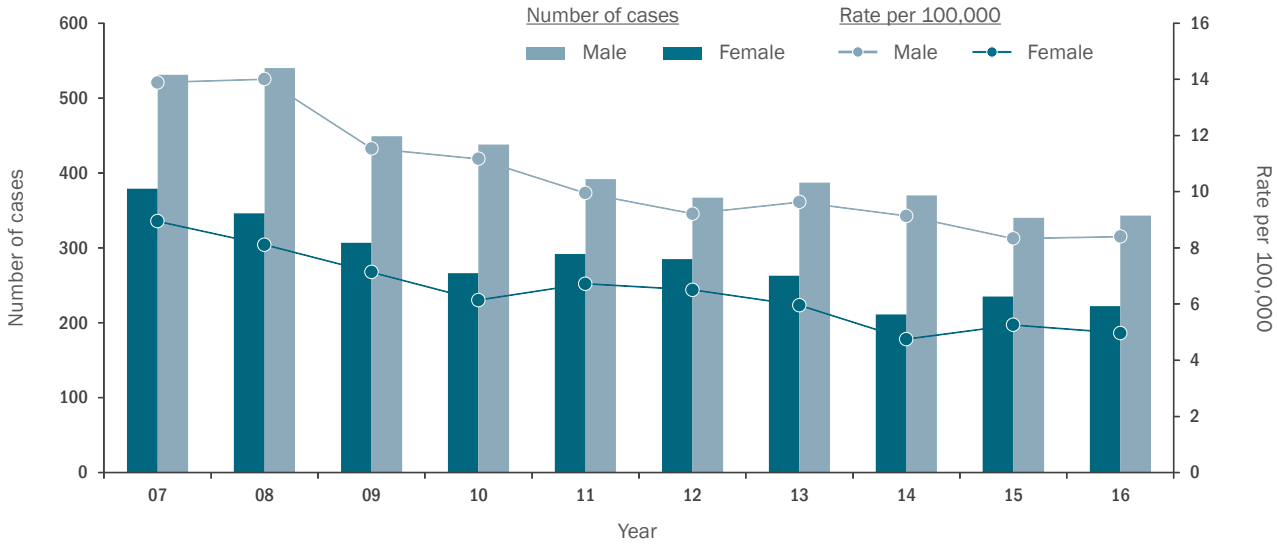

1. Rates are based on Health Department population estimates, modified from U.S. Census Bureau interpolated intercensal population estimates, 2000-2015. Updated August 2016.

**43%** Proportion of TB cases occuring among people 18-44 years of age

**7** Number of TB cases occuring among children younger than 5 years of age

**61%** Proportion of TB cases occuring among males

**FIGURE 7:** Tuberculosis cases and rates[1] by sex, New York City, 2007-2016

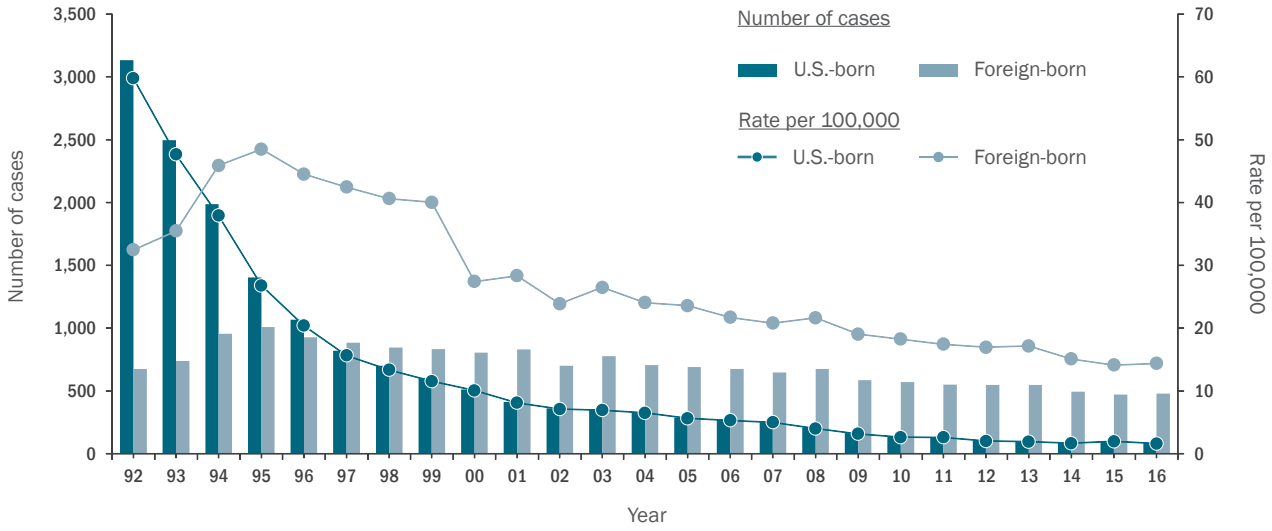



1. Rates are based on Health Department population estimates, modified from U.S. Census Bureau interpolated intercensal population estimates, 2000-2015. Updated August 2016.

# BIRTH IN THE UNITED STATES AND RACE/ETHNICITY

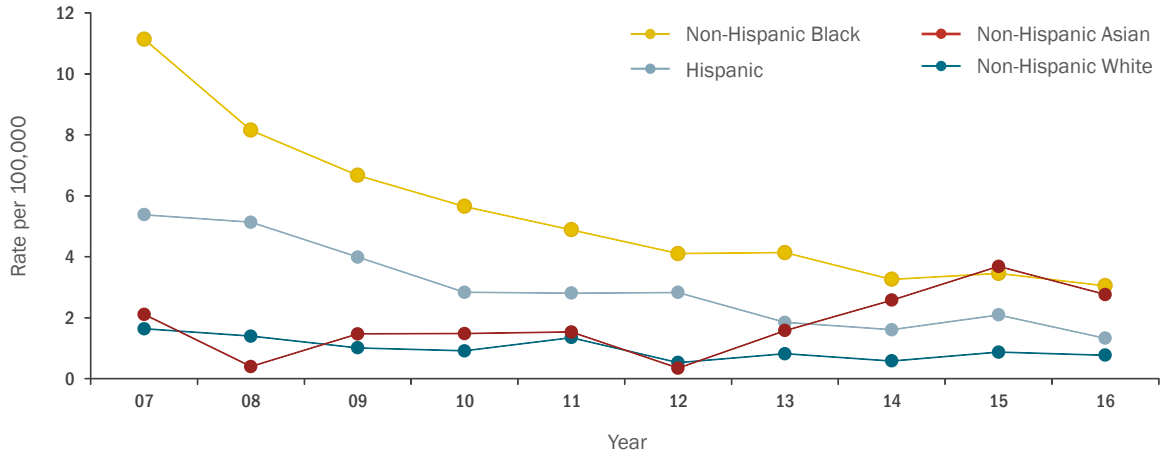
In 2016, 85% of NYC TB cases were among patients born outside of the U.S., and the TB rate among the foreign-born was more than nine times the U.S.-born rate (14.4 and 1.6 per 100,000, respectively). Among patients born in the U.S., rates among non-Hispanic Blacks and non-HIspanic Asians were almost four times higher than the rate among non-Hispanic Whites (3.1, 2.8 and 0.8 per 100,000, respectively). More than half (57%) of cases among patients younger than 18 occured in patients born in the U.S.

**FIGURE 8:** Tuberculosis cases and rates[1] by birth in the United States (U.S.),[2] New York City, 1992-2016




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.

**FIGURE 9:** Tuberculosis rates[1] among people born in the United States (U.S.)[2] by race/ethnicity, New York City, 2007-2016




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. U.S.-born includes individuals born in the U.S. and U.S. territories.

## ›› CHANGING TB EPIDEMIOLOGY AMONG THE FOREIGN-BORN, 2010-2016

During recent years, the proportion of foreign-born cases has remained stable at approximately 85%. Despite this steady trend, there have been shifts in the epidemiology of TB among the foreign-born. In 2016, foreign-born patients were older, with a median age of 48 years compared to 42 years in 2010. Additionally, the proportion of patients who had lived in the U.S. for more than five years at time of TB diagnosis has increased, from 56% in 2010 to 64% in 2016.

**FIGURE 10:** Proportion of foreign-born patients who had lived in the United States (U.S.) for more than five years at time of diagnosis, New York City, 2010-2016

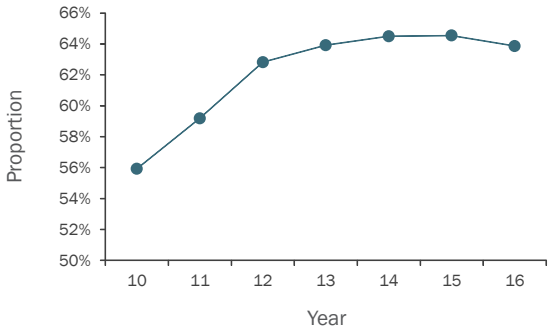
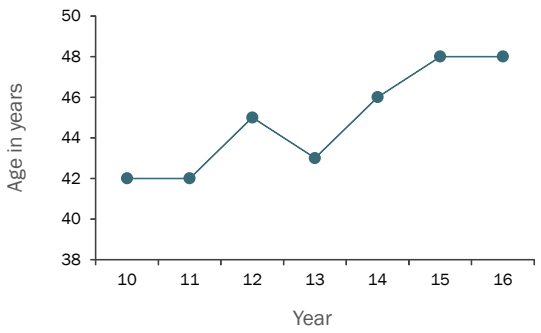



**FIGURE 11:** Median age in years at time of diagnosis among foreign-born patients, New York City, 2010-2016




**85%** Proportion of TB cases among people born outside of the U.S.

**48** Median age in years at time of diagnosis among foreign-born patients

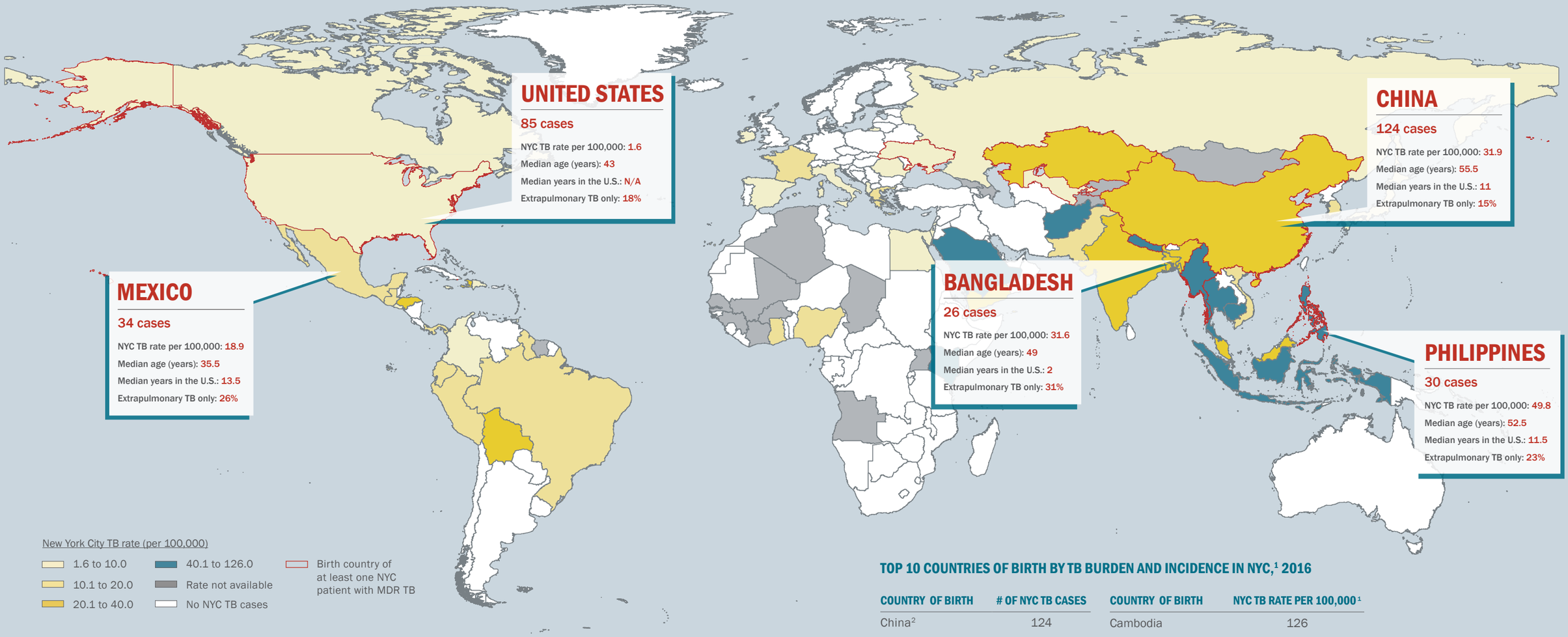
**64%** Proportion of patients residing in the U.S. for more than five years at time of TB diagnosis

**TABLE 2:** Select demographic characteristics of tuberculosis cases by birth in the United States (U.S.),[1] New York City, 2015-2016

| Characteristics | 2015 | | | | | | | 2016 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U.S.-born[1] | | Foreign-born | | Total | | | U.S.-born[1] | | Foreign-born | | Total | |
| | n | % | n | % | n | % | | n | % | n | % | n | % |
| Age Group | | | | | | | | | | | | | |
| 0-17 | 17 | 17 | 10 | 2 | 27 | 5 | | 12 | 14 | 9 | 2 | 21 | 4 |
| 18-44 | 38 | 37 | 206 | 44 | 244 | 42 | | 31 | 36 | 212 | 44 | 243 | 43 |
| 45-64 | 24 | 23 | 157 | 33 | 181 | 31 | | 28 | 33 | 148 | 31 | 176 | 31 |
| 65+ | 24 | 23 | 99 | 21 | 123 | 21 | | 14 | 16 | 111 | 23 | 125 | 22 |
| Sex | | | | | | | | | | | | | |
| Female | 42 | 41 | 193 | 41 | 235 | 41 | | 31 | 36 | 191 | 40 | 222 | 39 |
| Male | 61 | 59 | 279 | 59 | 340 | 59 | | 54 | 64 | 289 | 60 | 343 | 61 |
| Race/ethnicity | | | | | | | | | | | | | |
| White Non-Hispanic | 18 | 17 | 21 | 4 | 39 | 7 | | 16 | 19 | 33 | 7 | 49 | 9 |
| Black Non-Hispanic | 43 | 42 | 78 | 17 | 121 | 21 | | 38 | 45 | 70 | 15 | 108 | 19 |
| Hispanic | 30 | 29 | 110 | 23 | 140 | 24 | | 19 | 22 | 105 | 22 | 124 | 22 |
| Asian Non-Hispanic | 12 | 12 | 253 | 54 | 265 | 46 | | 9 | 11 | 248 | 52 | 257 | 45 |
| Multiple/Other | 0 | 0 | 10 | 2 | 10 | 2 | | 3 | 4 | 24 | 5 | 27 | 5 |
| Time in the U.S. (at reporting) | | | | | | | | | | | | | |
| < 1 year | n/a | n/a | 59 | 13 | 59 | 13 | | n/a | n/a | 62 | 13 | 62 | 13 |
| 1-5 years | n/a | n/a | 108 | 23 | 108 | 23 | | n/a | n/a | 110 | 23 | 110 | 23 |
| > 5 years | n/a | n/a | 304 | 65 | 304 | 65 | | n/a | n/a | 303 | 64 | 303 | 64 |
| Total | 103 | 18 | 472 | 82 | 575 | - | | 85 | 15 | 480 | 85 | 565 | - |

1. U.S.-born includes individuals born in the U.S. and U.S. territories.

**FIGURE 12:** Tuberculosis cases, rates[1] and select characteristics by patient country of birth,[2,3] New York City, 2016




## COUNTRY OF BIRTH

NYC TB incidence, TB burden, patient characteristics and TB risk factors differ substantially across patient country of birth. As a result, reducing 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.

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

**67** Number of countries of birth represented among patients with TB disease in 2016

### TOP 10 COUNTRIES OF BIRTH BY TB BURDEN AND INCIDENCE IN NYC,[1] 2016

| COUNTRY OF BIRTH | # OF NYC TB CASES |
|---|---|
| China[2] | 124 |
| U.S.[3] | 85 |
| Mexico | 34 |
| Philippines | 30 |
| Bangladesh | 26 |
| Dominican Republic | 22 |
| Haiti | 22 |
| Ecuador | 21 |
| India | 21 |
| Guyana | 15 |

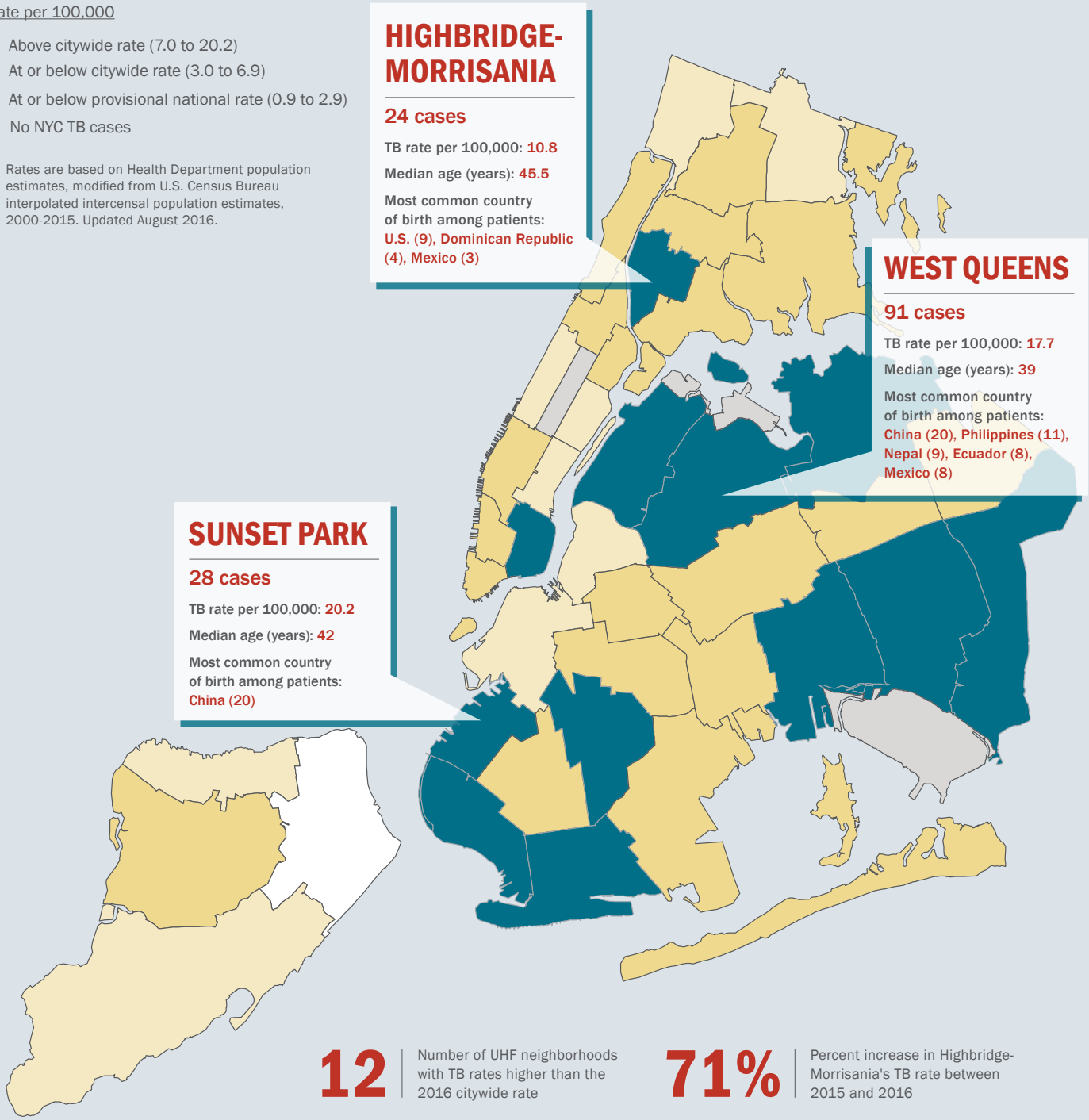
| COUNTRY OF BIRTH | NYC TB RATE PER 100,000[1] |
|---|---|
| Cambodia | 126 |
| Burma | 116 |
| Nepal | 109 |
| Saudi Arabia | 65 |
| Afghanistan | 57 |
| Indonesia | 53 |
| Thailand | 51 |
| Philippines | 50 |
| Kenya | 43 |
| Bolivia | 34 |

1. Rates are based on 2015 American Community one-year Sample data.
2. China includes individuals born in mainland China, Hong Kong, Taiwan and Macau.
3. U.S.-born includes individuals born in the U.S. and U.S. territories.

# TB IN NEW YORK CITY NEIGHBORHOODS

Queens continued to have the greatest number of TB cases in 2016 with 241 cases (43% of all NYC cases) and a rate of 10.3 per 100,000. The United Hospital Fund (UHF) neighborhood with the highest TB rate was Sunset Park in Brooklyn, with a rate of 20.2 per 100,000, which is more than double the citywide rate. Twelve UHF neighborhoods (29%) had TB rates that exceeded the overall NYC rate and 32 (76%) exceeded the national rate. Twenty-one percent of TB patients lived in a neighborhood with very high area-based poverty.

**FIGURE 13:** Tuberculosis rates[1] by United Hospital Fund (UHF) neighborhood, New York City, 2016

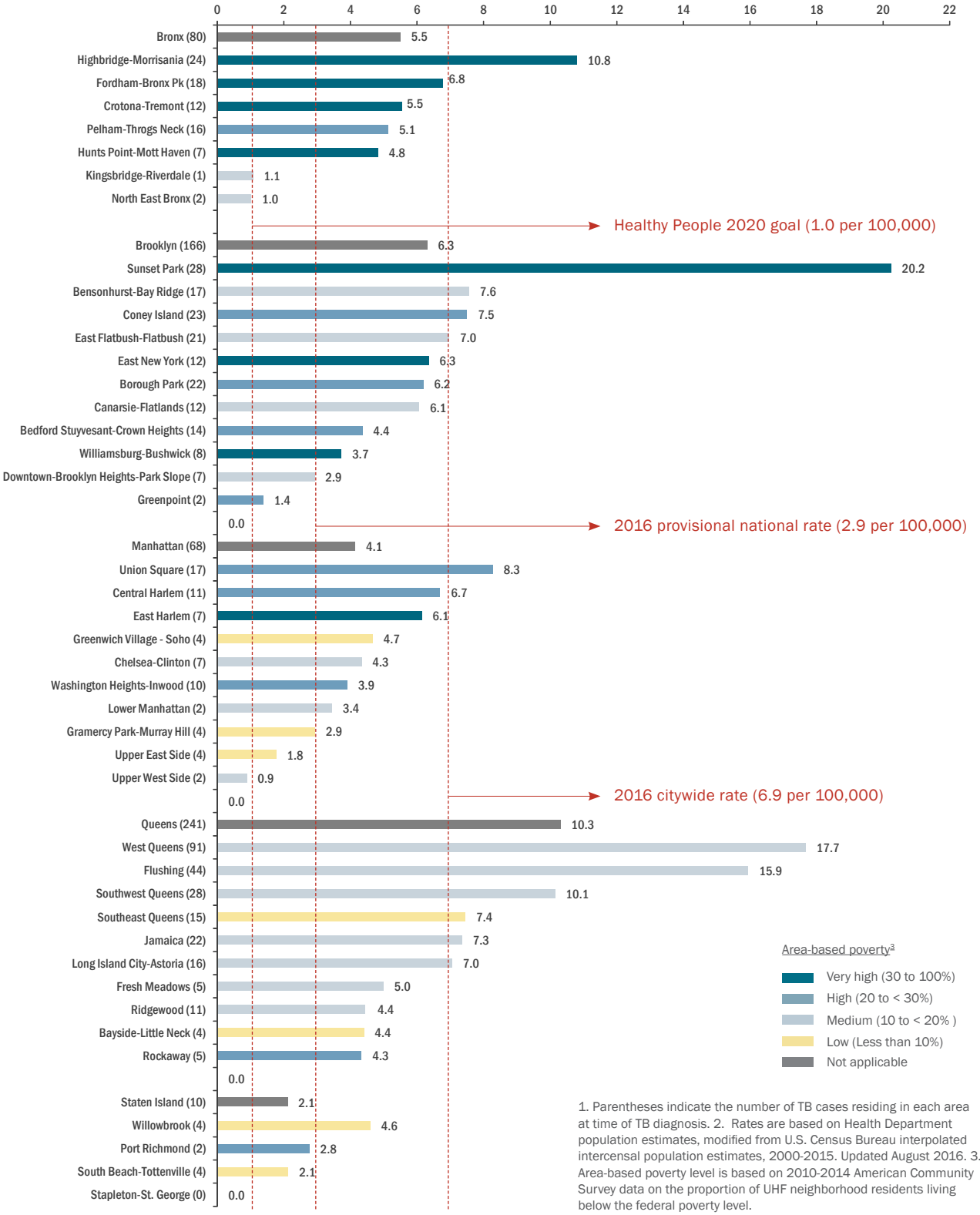



1. Rates are based on Health Department population estimates, modified from U.S. Census Bureau interpolated intercensal population estimates, 2000-2015. Updated August 2016.

**12** Number of UHF neighborhoods with TB rates higher than the 2016 citywide rate

**71%** Percent increase in Highbridge-Morrisania's TB rate between 2015 and 2016

**FIGURE 14:** Tuberculosis cases[1] and rates[2] by borough, United Hospital Fund (UHF) neighborhood and area-based poverty level,[3] New York City, 2016




1. Parentheses indicate the number of TB cases residing in each area at time of TB diagnosis. 2. Rates are based on Health Department population estimates, modified from U.S. Census Bureau interpolated intercensal population estimates, 2000-2015. Updated August 2016. 3. Area-based poverty level is based on 2010-2014 American Community Survey data on the proportion of UHF neighborhood residents living below the federal poverty level.

# SOCIAL CHARACTERISTICS

**FIGURE 15:** Tuberculosis rates[1] by area-based poverty level[2-5] and birth in the United States (U.S.),[6] New York City, 2016

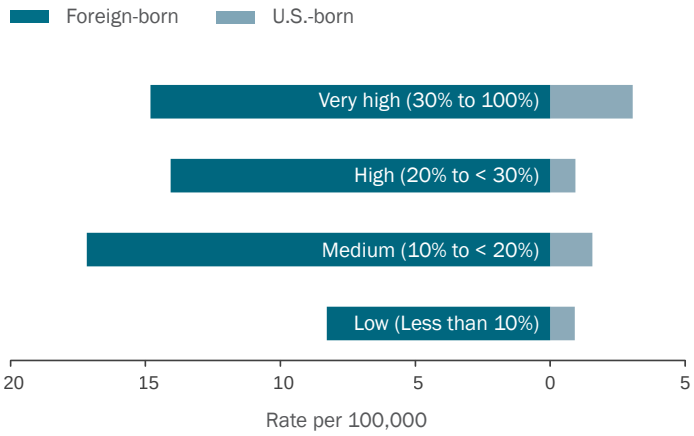



**TABLE 3:** Tuberculosis rates[1] by area-based poverty level[2,3] and birth in the United States (U.S.),[4] New York City, 2016

| Area-based poverty level[2] | U.S.-born rate | Foreign-born rate | Total NYC rate |
|---|---|---|---|
| Very high (30 to 100%) | 3.0 | 14.8 | 7.2 |
| High (20 to < 30%) | 0.9 | 14.1 | 6.5 |
| Medium (10 to < 20%) | 1.6 | 17.2 | 8.3 |
| Low (Less than 10%) | 0.9 | 8.3 | 3.0 |

1. Rates are based on 2011-2015 American Community Survey data. 2. Area-based poverty level is based on 2010-2014 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. ZCTA 10803 and 11096 are not included in the denominator data because they have not been assigned a poverty category. There are no 2016 cases from these ZCTAs. 5. ZCTA 10000, 10048, 10281, 11251, 11695 are not included in the demoninator data because they are not included in the ACS 2011-2015 American Community Survey Data. There are no 2016 cases from these ZCTAS 6. U.S.-born includes individuals born in the U.S. and U.S. territories.

**TABLE 4:** Select social and geographic characteristics of tuberculosis cases by birth in the United States (U.S.),[1] New York City, 2015-2016

| Characteristics | 2015 | | | | | | 2016 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U.S.-born[1] | | Foreign-born | | Total | | U.S.-born[1] | | Foreign-born | | Total | |
| | n | % | n | % | n | % | n | % | n | % | n | % |
| Borough of residence | | | | | | | | | | | | |
| Manhattan | 26 | 25 | 59 | 13 | 85 | 15 | 16 | 19 | 52 | 11 | 68 | 12 |
| Bronx | 21 | 20 | 66 | 14 | 87 | 15 | 21 | 25 | 59 | 12 | 80 | 14 |
| Brooklyn | 32 | 31 | 139 | 29 | 171 | 30 | 30 | 35 | 135 | 28 | 165 | 29 |
| Queens | 19 | 18 | 199 | 42 | 218 | 38 | 16 | 19 | 226 | 47 | 242 | 43 |
| Staten Island | 5 | 5 | 9 | 2 | 14 | 2 | 2 | 2 | 8 | 2 | 10 | 2 |
| Homeless[2] | 6 | 6 | 18 | 4 | 24 | 4 | 11 | 13 | 5 | 1 | 16 | 3 |
| Employed[2,3] | 37 | 43 | 228 | 49 | 265 | 48 | 25 | 34 | 226 | 48 | 251 | 46 |
| Health care worker[2,3] | 4 | 11 | 28 | 12 | 32 | 12 | 0 | 0 | 21 | 9 | 22 | 9 |
| Drug use[2,3] | 14 | 14 | 17 | 4 | 31 | 5 | 17 | 20 | 17 | 4 | 34 | 6 |
| Excessive alcohol use[2,3] | 1 | 1 | 3 | 1 | 4 | 1 | 2 | 2 | 6 | 1 | 8 | 1 |
| Neighborhood poverty[4] | | | | | | | | | | | | |
| Very high (30 to 100%) | 40 | 39 | 105 | 22 | 145 | 25 | 37 | 44 | 97 | 20 | 134 | 24 |
| High (20 to < 30%) | 26 | 25 | 123 | 26 | 149 | 26 | 11 | 13 | 122 | 25 | 133 | 24 |
| Medium (10 to < 20%) | 24 | 23 | 210 | 44 | 234 | 41 | 27 | 32 | 226 | 47 | 253 | 45 |
| Low (< 10%) | 13 | 13 | 34 | 7 | 47 | 8 | 10 | 12 | 35 | 7 | 45 | 8 |
| **Total** | **103** | **18** | **472** | **82** | **575** | - | **85** | **15** | **480** | **85** | **565** | - |

1. U.S.-born includes individuals born in the U.S. and U.S. territories. 2. In the 12 months before TB diagnosis. 3. Among patients 18 years of age and older.
4. Area-based poverty level is based on 2010-2014 American Community Survey data on the proportion of ZIP code residents living below the federal poverty limit. Cases were assigned to a ZIP code based on their residence at TB diagnosis.

# SITE OF DISEASE

**FIGURE 16:** Tuberculosis cases by disease site, New York City, 2016 (n=565)

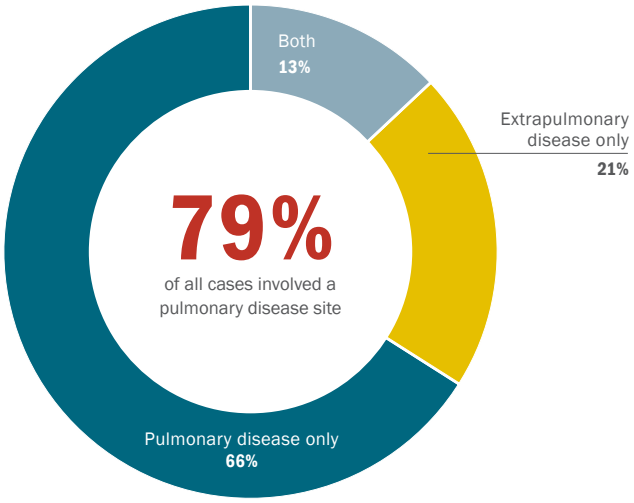


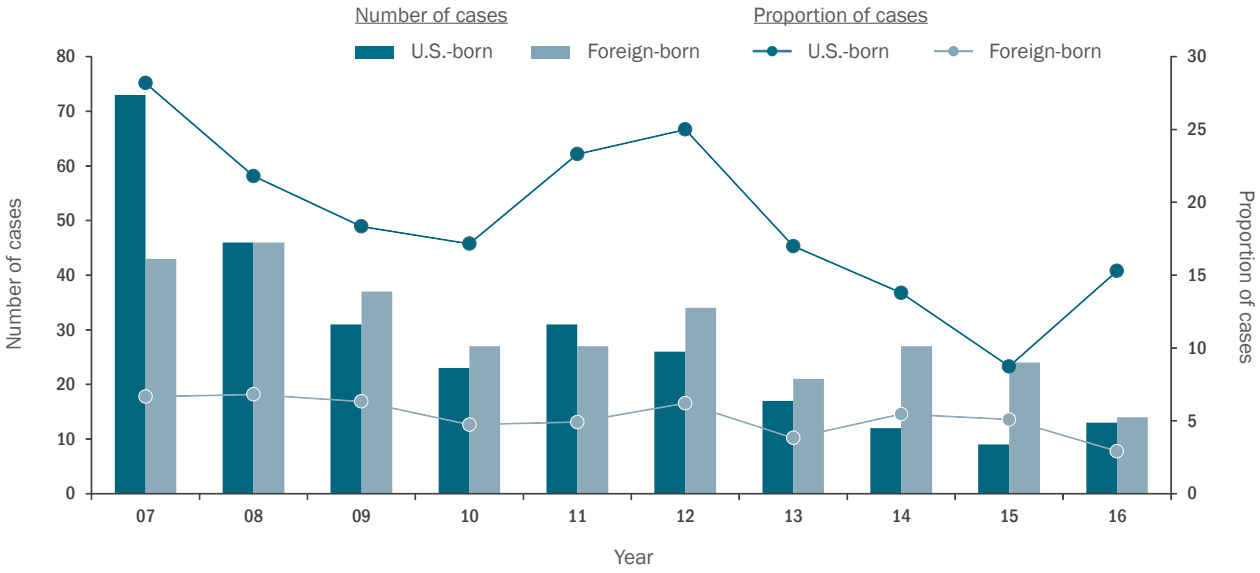

**TABLE 5:** Disease site[1] among tuberculosis cases with any extrapulmonary disease, New York City, 2016 (n=195)

| Disease site | Number | Percent |
|---|---|---|
| Any extrapulmonary | 195 | - |
| Lymphatic | 67 | 34 |
| Pleural | 47 | 24 |
| Bone/Joint | 33 | 17 |
| Meningeal | 10 | 5 |
| Genitourinary | 9 | 5 |
| Peritoneal | 17 | 9 |
| Laryngeal | 2 | 1 |
| Other | 34 | 17 |

1. Categories are not mutually exclusive.

# HIV INFECTION

**FIGURE 17:** Human immunodeficiency virus (HIV) infection among tuberculosis cases by birth in the United States (U.S.),[1] New York City, 2007-2016




1. U.S.-born includes individuals born in the U.S. and U.S. territories.

**5%** Proportion of patients with TB disease who were known to be HIV-infected

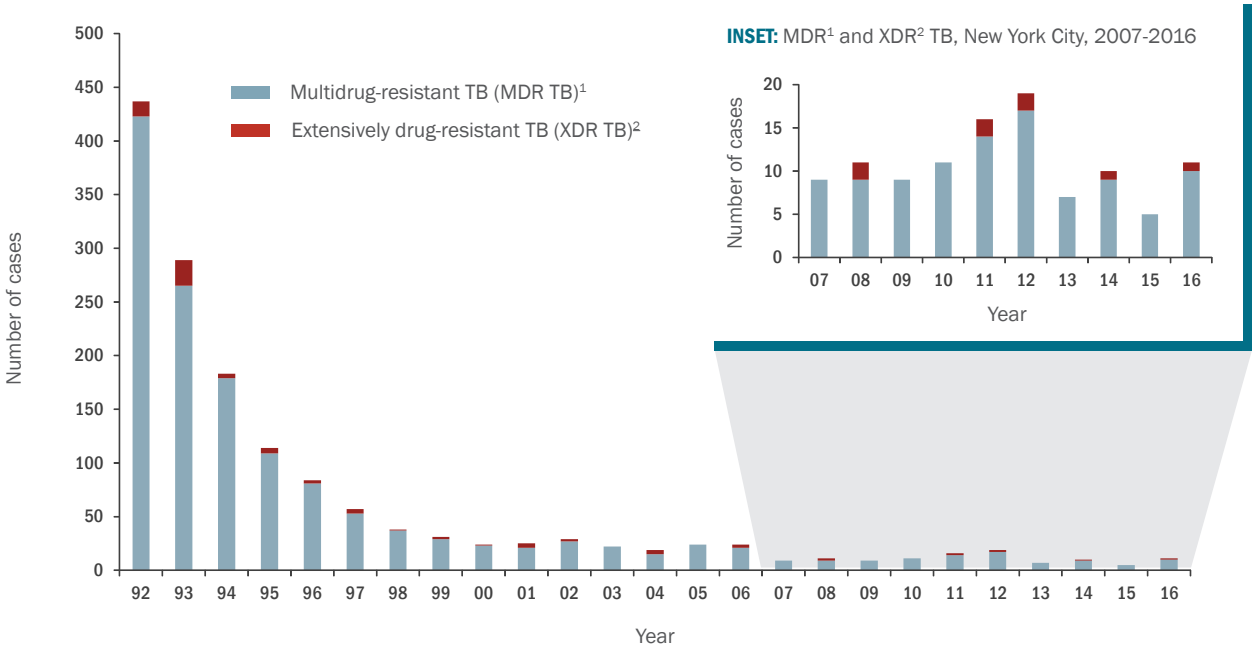
**15%** Proportion of U.S.-born patients known to be HIV-infected

**77%** Percent decrease in the number of HIV-infected TB patients over the last 10 years

# DRUG RESISTANCE

Drug resistance continues to be a challenge to TB prevention and care efforts, both globally and locally. In 2016, the number of cases with an MDR TB strain in NYC more than doubled compared to 2015. Eleven patients diagnosed in 2016 had TB strains resistant to isoniazid and rifampin, the two most important and effective drugs in the TB treatment regimen. Of these, one patient had an extensively drug-resistant (XDR) TB strain—characterized by additional resistance to a second-line injectable medication and a fluoroquinolone—and five patients were only one drug away from having an XDR TB strain. Prompt diagnosis, appropriate treatment and prevention of drug resistance remain crucial to successfully reducing—and ultimately eliminating—TB in NYC.

**FIGURE 18:** Multidrug resistance[1] among tuberculosis cases, New York City, 1992-2016



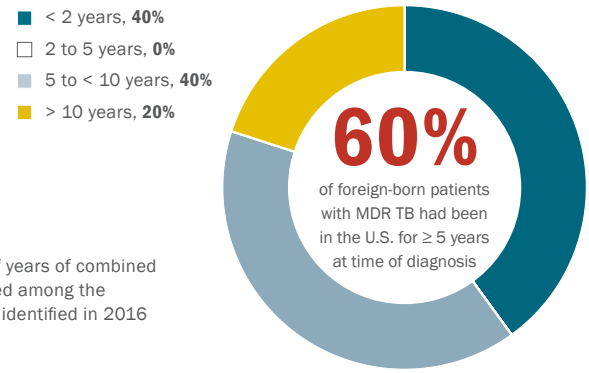

1. Multidrug-resistant (MDR) TB is defined as resistance to at least isoniazid and rifampin. 2. Extensively drug-resistant (XDR) TB is defined as resistance to at least isoniazid and rifampin plus a fluoroquinolone and a second-line injectable anti-TB medication.

**TABLE 6:** Select characteristics among patients diagnosed with multidrug-resistant (MDR) tuberculosis,[1] New York City, 2016 (n=11)

| Characteristics | |
|---|---|
| Median age (range) | 33 (27-74) |
| Number born outside of the U.S. (%) | 10 (91%) |
| Region of birth among foreign-born patients | |
| Number of patients born in Asia (%) | 6 (60%) |
| Number of patients born in the former Soviet Republic (%) | 4 (40%) |
| Number with a pulmonary site of disease (%) | 10 (91%) |

1. Multidrug-resistant TB is defined as resistance to at least isoniazid and rifampin.

**FIGURE 19:** Number of years in the United States at time of diagnosis among foreign-born patients diagnosed with multidrug-resistant tuberculosis,[1] New York City, 2016 (n=10)




**11** Number of multidrug-resistant TB cases identified in 2016

**22** Minimum number of years of combined treatment anticipated among the **11** MDR TB patients identified in 2016

# CULTURE CONFIRMATION

**FIGURE 20:** Number and proportion of culture-confirmed tuberculosis cases among all tuberculosis cases, New York City, 2007-2016

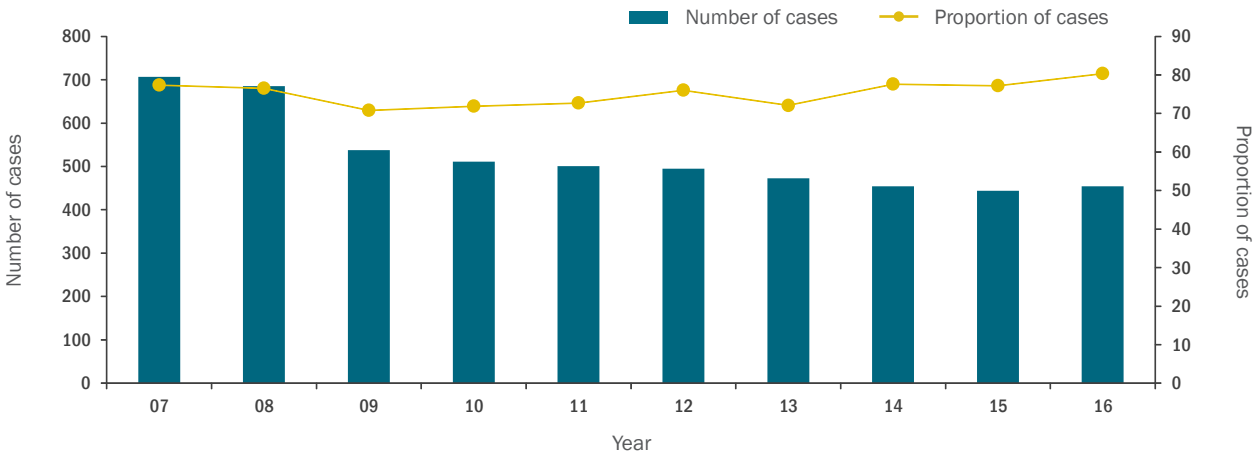



**TABLE 7:** Select clinical characteristics of tuberculosis cases by birth in the United States (U.S.),[1] New York City, 2015-2016

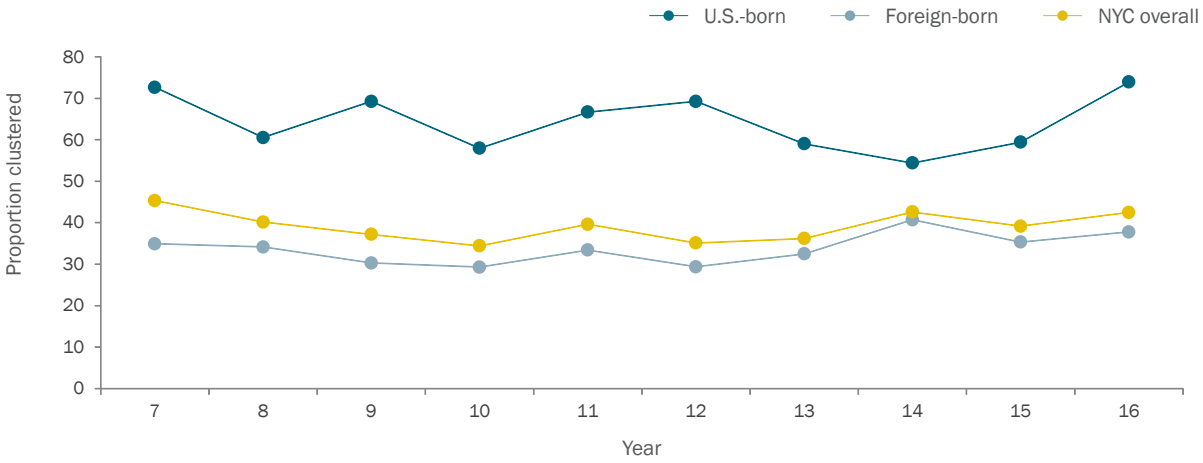
| Characteristics | 2015 | | | | | | | 2016 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U.S.-born[1] | | Foreign-born | | Total | | | U.S.-born[1] | | Foreign-born | | Total | |
| | n | % | n | % | n | % | | n | % | n | % | n | % |
| Ever respiratory smear positive | 45 | 51 | 203 | 54 | 248 | 54 | | 36 | 51 | 193 | 51 | 229 | 51 |
| Sputum smear positive | 41 | 89 | 199 | 97 | 240 | 95 | | 29 | 81 | 193 | 98 | 222 | 95 |
| NAA positive[2] | 1 | 11 | 4 | 22 | 5 | 19 | | 4 | 67 | 5 | 22 | 9 | 31 |
| Culture positive | 71 | 69 | 373 | 79 | 444 | 77 | | 64 | 75 | 390 | 81 | 454 | 80 |
| Pulmonary only site of disease | 73 | 71 | 300 | 64 | 373 | 65 | | 54 | 64 | 316 | 66 | 370 | 65 |
| Extra-pulmonary only site of disease | 15 | 15 | 98 | 21 | 113 | 20 | | 15 | 18 | 105 | 22 | 120 | 21 |
| Both pulmonary and extra-pulmonary | 15 | 15 | 74 | 16 | 89 | 15 | | 16 | 19 | 59 | 12 | 75 | 13 |
| Cavities present on chest x-ray ever[3] | 22 | 25 | 98 | 26 | 120 | 26 | | 20 | 29 | 79 | 21 | 99 | 22 |
| Multidrug resistance[4] | 0 | 0 | 5 | 1 | 5 | 1 | | 1 | 2 | 10 | 3 | 11 | 3 |
| Extensive drug resistance[5] | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 1 | 0 | 1 | 0 |
| Non-MDR INH resistance[4] | 2 | 3 | 39 | 10 | 41 | 9 | | 3 | 5 | 31 | 8 | 34 | 8 |
| Non-MDR RIF resistance[4] | 0 | 0 | 1 | 0 | 1 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| History of TB disease | 1 | 1 | 31 | 7 | 32 | 6 | | 7 | 8 | 34 | 7 | 41 | 7 |
| HIV status | | | | | | | | | | | | | |
| Infected | 9 | 9 | 24 | 5 | 33 | 6 | | 13 | 15 | 14 | 3 | 27 | 5 |
| Not infected | 68 | 66 | 380 | 81 | 448 | 78 | | 51 | 60 | 389 | 81 | 440 | 78 |
| Refused testing | 21 | 20 | 58 | 12 | 79 | 14 | | 15 | 18 | 54 | 11 | 69 | 12 |
| Not offered/done or unknown | 5 | 5 | 10 | 2 | 15 | 3 | | 6 | 7 | 23 | 5 | 29 | 5 |
| TNF-alpha antagonist therapy[6] | 4 | 4 | 6 | 1 | 10 | 2 | | 2 | 2 | 9 | 2 | 11 | 2 |
| Non-HIV related immunosuppression | 5 | 5 | 19 | 4 | 24 | 4 | | 5 | 6 | 22 | 5 | 27 | 5 |
| Diabetes | 13 | 13 | 98 | 21 | 111 | 19 | | 11 | 13 | 93 | 19 | 104 | 18 |
| **Total** | **103** | **18** | **472** | **82** | **575** | - | | **85** | **15** | **480** | **85** | **565** | - |

1. U.S.-born includes individuals born in the U.S. and U.S. territories. 2. Among patients with negative culture and NAA performed. 3. Percent is among patients with a pulmonary site of disease. 4. Multidrug-resistant (MDR) TB is defined as resistance to at least isoniazid and rifampin. Percent is among patients with susceptibility testing for isoniazid and rifampin performed. 5. Extensively drug-resistant (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 for isoniazid, rifampin, any fluoroquinolone, and any second-line injectable anti-TB medication performed. 6. Use within 24 months before TB diagnosis

# GENOTYPING AND CLUSTERING

Health Department staff review genotyping results as they are received and assign cases with exact-matching or similar genotypes to clusters. Clustered cases are reviewed, prioritized and assigned for further epidemiologic investigation based on a number of factors, including cluster size and growth, patient demographic, clinical and social characteristics and evidence of recent (within 2 years), local TB transmission among cluster patients.

**FIGURE 21:** Proportion of culture-confirmed clustered[1,2] tuberculosis cases by birth in the United States (U.S.),[3,4] New York City, 2007-2016[5]




1. Cases were defined as clustered if they had similar or exact-matching spacer oligonucleotide typing (spoligotype) and IS6110 restriction fragment length polymorphism (RFLP) results as at least one other previously counted NYC tuberculosis case. Genotyping results prior to 2001 were excluded. 2. Proportion is among cases with valid and complete genotype results available. 3. U.S.-born includes individuals born in the U.S. and U.S. territories. 4. Excludes cases with unknown country of birth. 5. Genotyping data for 2016 are preliminary and reflect results available at time of publication.

**42%** Proportion of cases that were clustered among all culture-confirmed cases

**70%** Proportion of **933** clusters identified since 2001 comprised of 2 or 3 cases

**44** Number of NYC clusters with 3 or more cases identified between 2014 and 2016

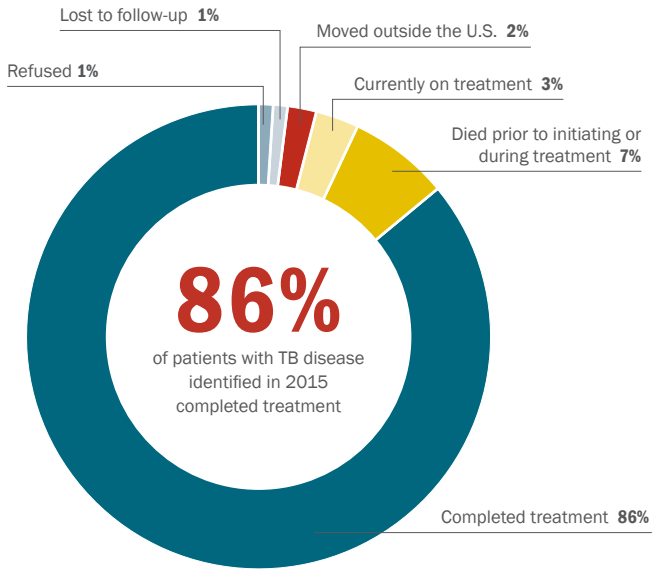
**TABLE 8:** Select characteristics among high-priority genotype clusters with at least five tuberculosis cases identified between 2014 and 2016,[1] New York City

| | Year strain was first identified in NYC | Total number of cluster cases[2] | Characteristics among cases identified between January 1, 2014, and December 31, 2016 | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Number of cluster cases identified between 2014-2016 | Proportion of cases among males | Proportion of cases among patients born in the U.S.[3] | Median patient age (range) | Proportion of cases involving pulmonary site of disease | Most common borough of residence among patients (%) |
| Cluster A | 1990 | 226 | 16 | 75% | 50% | 58 (18-78) | 88% | Manhattan (44%) |
| Cluster B | 2006 | 20 | 16 | 81% | 6% | 24 (17-31) | 100% | Brooklyn (94%) |
| Cluster C | 1988 | 140 | 11 | 82% | 64% | 65 (25-86) | 82% | Bronx (36%) |
| Cluster D | 2011 | 13 | 8 | 75% | 50% | 28 (24-36) | 100% | Bronx (100%) |
| Cluster E | 1991 | 54 | 5 | 100% | 80% | 34 (5-61) | 60% | Brooklyn (60%) |
| Cluster F | 1992 | 34 | 5 | 60% | 40% | 63 (30-65) | 100% | Queens (60%) |
| Cluster G | 2010 | 15 | 5 | 100% | 20% | 28 (19-38) | 100% | Brooklyn (100%) |

1. Cluster is defined as two or more cases with similar or exact-matching IS*6110* restriction fragment length polymorphism (RFLP) and spacer oligonucleotide typing (spoligotype) results 2. Includes NYC TB cases identified since 2001. 3. U.S.-born includes individuals born in the U.S. and U.S. territories.

# TREATMENT OUTCOMES AND MORTALITY

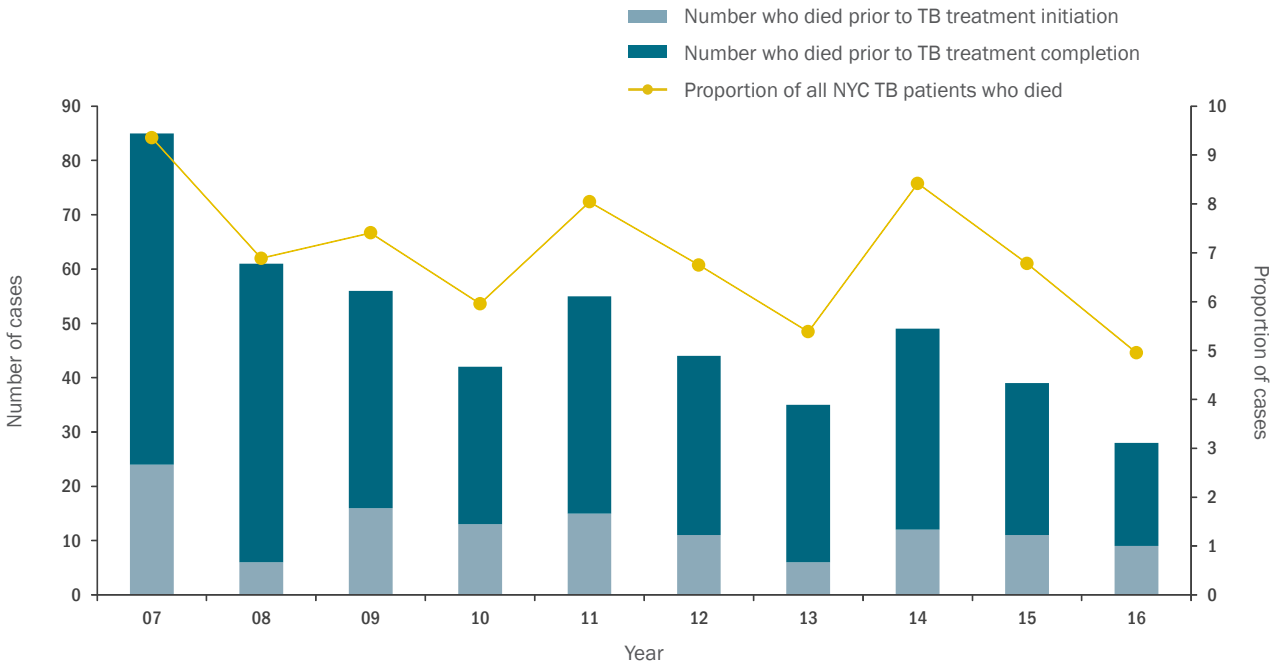
**FIGURE 22:** Treatment outcomes for tuberculosis cases counted in 2015,[1] New York City (n=575)




| Treatment outcome[1] | Number (%) |
|---|---|
| Completed treatment | 496 (86%) |
| Currently on treatment | 20 (3%) |
| Refused | 5 (1%) |
| Moved outside of the United States | 11 (2%) |
| Lost to follow up | 4 (1%) |
| Died | 39 (7%) |

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

**FIGURE 23:** Number and proportion of patients with tuberculosis disease who died[1] before or during treatment, New York City (NYC), 2007-2016




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.

# 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 in order to assess whether testing of additional contacts may be warranted. Multi-institutional partnerships have played a key role in the success of contact investigations in non-household settings.

**FIGURE 24:** Contact investigations in non-household settings[1] by site type, New York City, 2016 (n=60)


**TABLE 9:** Contact investigation outcomes in non-household settings[1] by number of exposed contacts, New York City, 2016 (n=60)

| | ≥ 15 exposed contacts | < 15 exposed contacts | Total |
|---|---|---|---|
| | n (%) | n (%) | n (%) |
| Number of sites | 27 | 33 | 60 |
| Likely transmission[2] | 8 (31%) | 5 (18%) | 13 (24%) |
| Transmisison could not be assessed | 1 (4%) | 5 (15%) | 6 (10%) |
| Total number of contacts | 1248 | 185 | 1,433 |
| Median contacts per site (range) | 25 (15-164) | 5 (1-14) | 12 (1-164) |
| Contacts eligible for testing[3] | 1,208 (97%) | 180 (97%) | 1,388 (97%) |
| Contacts tested | 1,039 (86%) | 171 (95%) | 1,210 (87%) |
| Contacts with a positive TB test result | 77 (7%) | 30 (18%) | 107 (9%) |

1. Excludes health care-associated investigations (n=151).
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.

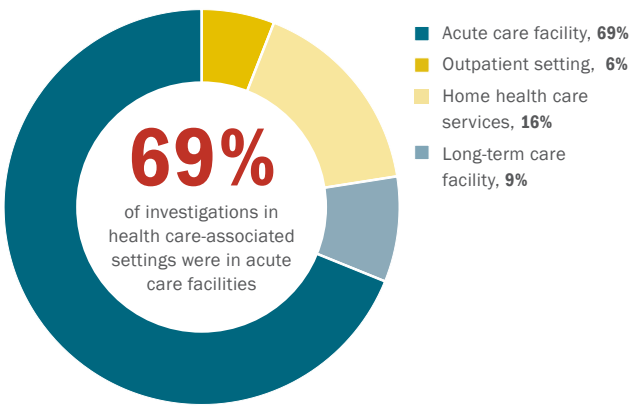
## ›› TB EXPOSURES IN HEALTH CARE-ASSOCIATED SETTINGS IN NEW YORK CITY, 2016:

Health care-associated TB exposures remain a concern, as most individuals with TB disease are diagnosed in acute care settings. In 2016, **125** patients with infectious TB disease in NYC were associated with an exposure in a health care setting. Transmission was assessed as likely at sites associated with 4% of these patients.

**151** Number of investigated TB exposures that occurred in health care-associated settings in NYC

**125** Number of TB patients with infectious TB disease associated with an exposure in a health care-associated setting in NYC

**FIGURE 25:** Contact investigations in health care-associated settings by site type, New York City, 2016 (n=151)



# APPENDIX

**TABLE 10:** Tuberculosis cases and rates[1] by select characteristics, New York City, 1900-2016

| Year | Number of TB cases | Rate per 100,000 | Culture + cases | Sputum smear + cases | Sputum smear + 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 | Not available | Not available |
| 2016 | 565 | 6.9 | 454 | 222 | 2.7 | 11 | 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.

## REPORTING SUSPECTED AND CONFIRMED TUBERCULOSIS CASES

Medical, dental, osteopathic and other health care providers and administrators of hospitals or other institutions who provide 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 by overnight mail, by fax or by telephone.

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

- Smear (from any anatomic site) positive for acid-fast bacilli
- Nucleic acid amplification (NAA) test (e.g., Roche's COBRAS® AMPLICOR, Gen-Probe® Amplified™ *Mycobacterium Tuberculosis* (MTD) test, GeneXPert®, Hain Lifescience GenoType MTBDRplus) result positive for *Mycobacterium tuberculosis* (*M. tuberculosis*) complex
- Culture positive 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
- Clinical suspicion of pulmonary or extrapulmonary TB such that the physician or other health care provider has initiated or intends to initiate isolation or treatment for TB disease with two or more anti-TB medications
- ›› **NEW** Laboratories and providers must report positive tuberculin skin test (TST) or blood-based test for latent TB infection results for any child younger than 5 years old (on the day of specimen collection up to the day of their fifth birthday), regardless of whether the child has received BCG vaccination. For these patients, providers must also report chest imaging results and any prophylactic medication initiated for latent TB infection.

Reporting should never be delayed pending identification of *M. tuberculosis* with a 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.

### PROVIDER REPORTING

Health care providers in New York City are encouraged to submit reports electronically through a NYCMED account. Alternatively, providers may fax a completed URF to BTBC at **347-396-7579**. 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 AFB smear (including specimen source, date specimen obtained and accession number, if available)
- Results of radiologic exams (X-ray or imaging)
- Any treatment information

### MICROBIOLOGY AND PATHOLOGY LABORATORIES

Laboratories are required to report via the New York State's 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

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 (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 papr 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 stage, clinical status and treatment being provided
- Dates and results of sputum and X-ray exams
- Any other information required by the department

To facilitate submission of 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.

## REPORTING TUBERCULOSIS-RELATED EVALUATION AND TREATMENT OF CONTACTS

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

## SUBMITTING HOSPITAL DISCHARGE AND TUBERCULOSIS TREATMENT PLANS

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. Providers must also submit a proposed treatment plan on the "TB Treatment Plan" form within one month of treatment initiation for all persons newly diagnosed with TB disease [Health Code §11.21(a)(2)].

**Download the Hospital Discharge Approval Request Form (TB354):** **http://www1.nyc.gov/assets/doh/downloads/pdf/tb/tb-hospital-discharge-form.pdf**

To facilitate discharge planning, refer to the **Hospital Discharge Planning Checklist**: **http://www1.nyc.gov/assets/doh/downloads/pdf/tb/tb-discharge-checklist.pdf**

**Download the TB Treatment Plan**: **http://www1.nyc.gov/assets/doh/downloads/pdf/tb/tb-treatment-plan-inst.pdf**

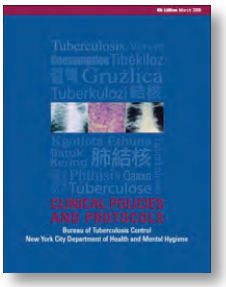
## INQUIRIES AND FORMS

- To inquire further about reporting procedures, call **311** and ask for the BTBC Surveillance Unit or go to **nyc.gov** and search **TB REPORTING REQUIREMENTS**
- To obtain a URF, go to nyc.gov and search **URF**
- To create a NYCMED account, go to nyc.gov and search **NYC MED** or go to: **https://a816-healthpsi.nyc.gov/NYCMED/Account/Login**
- To obtain a Patient Services Form, go to nyc.gov and search **TB 65**

# TB 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. Materials are available at **nyc.gov** (search "tuberculosis") or by calling **311**.

### CLINICAL POLICIES AND PROTOCOLS



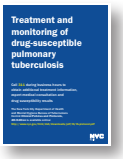

*4th Edition.* Describes policies, protocols and recommendations for the prevention, treatment and management of TB

### PATIENT BROCHURE


*Learn About Tuberculosis: What Everyone Should Know*

General information in an easy-to-read format for all audiences. Available in English, Spanish, Chinese, Korean, French and Haitian Creole

### POCKET-SIZED REFERENCE GUIDE FOR PROVIDERS




*Treatment and monitoring of drug-susceptible pulmonary tuberculosis*

Provides concise information about treatment and monitoring for pulmonary TB

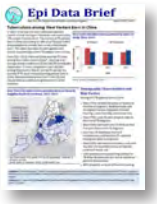
### "YOU CAN STOP TB" EDUCATIONAL POSTERS


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 findings from Health Department programs and projects. For more information and to access recently published reports, go to **nyc.gov** and search "epi data."

### NYC INTERACTIVE HEALTH DATA 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/**

## ›› ADDITIONAL RESOURCES AVAILABLE THROUGH OUR PARTNERS

**TB IN THE UNITED STATES:** A fact sheet for health care providers from the CDC about "strengthening existing systems to prevent transmission of infectious TB disease and increasing efforts to detect and treat latent TB infection before it progresses to infections TB." Go to **cdc.gov** and search "U.S. TB snapshot"

**EDUCATIONAL MATERIALS FROM THE GLOBAL TB INSTITUTE:** This website includes patient educational materials, clinical guidelines, training guides, and webinars **http://globaltb.njms.rutgers.edu/educationalmaterials/productlist.html**

**EDUCATIONAL MATERIALS FOR PATIENTS ABOUT LATENT TB INFECTION:** These materials, developed by the Massachusetts Department of Health, aim to teach patients about TB infection and motivate them to start and complete treatment if diagnosed. Go to **mass.gov** and search "TB patient materials"

# TECHNICAL NOTES

1. Data for 2016 are preliminary and reflect the most complete information available as of January 17, 2017.

2. Data prior to 2016 have been updated since the release of the 2015 report. Data for these years reflect the final numbers and may differ from official estimates presented in previous reports.

3. Tuberculosis (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.

4. Age groupings have been changed from previous reports; as such, count data for earlier years may differ from previous reports.

5. In all tables presenting data by birth in the United States (U.S), column sums may not equal applicable totals due to missing or unknown data.

6. 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.

7. 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.

8. 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 foreign-born.

9. 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 limit. 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.

10. 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.

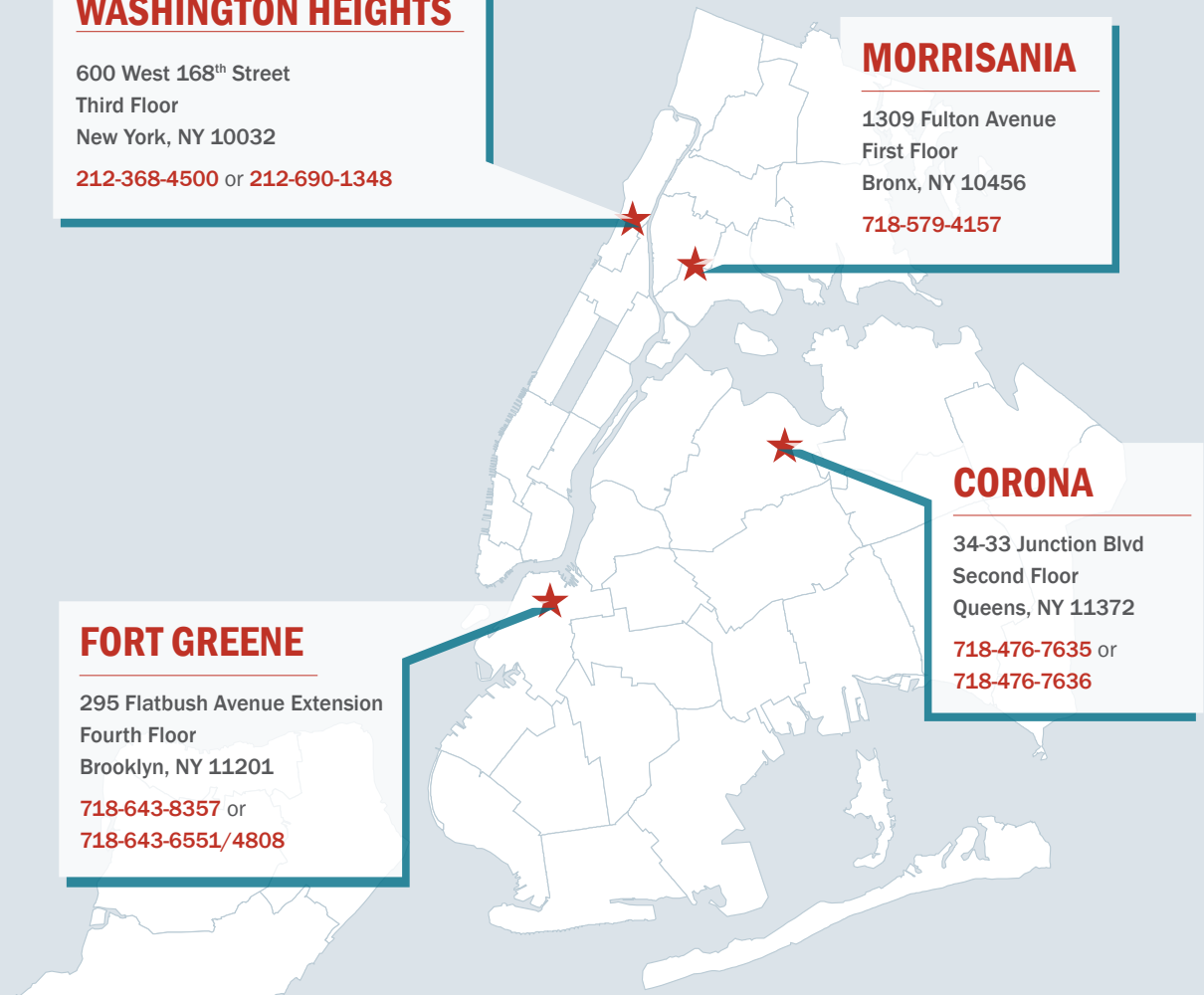
11. Data presented on HIV status reflect information as collected by BTBC. Misclassification of HIV status may occur if a patient refused to disclose known status and/or refused to be tested for HIV while under care for TB disease.

12. 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.

13. Product names are provided for identification purposes only; their use does not imply endorsement by the Health Department.

# NEW YORK CITY HEALTH DEPARTMENT CHEST CENTERS

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



## WASHINGTON HEIGHTS

600 West 168th Street
Third Floor
New York, NY 10032

212-368-4500 or 212-690-1348

## MORRISANIA

1309 Fulton Avenue
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 Avenue Extension
Fourth Floor
Brooklyn, NY 11201

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

### THE HEALTH DEPARTMENT PROVIDES AN ARRAY 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 video-based DOT

### ADDITIONAL CLINICAL SERVICES PROVIDED AT EACH CHEST CENTER 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 CENTER OR CALL 311**


NYC
Health