TUBERCULOSIS IN NEW YORK CITY, 2015

NEW YORK CITY BUREAU OF TUBERCULOSIS CONTROL ANNUAL SUMMARY

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

GOALS

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

2 To 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 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 in New York City
- 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 New York City 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 other agencies to improve TB prevention and control
- Ensure data confidentiality

ABOUT THIS REPORT: This report covers calendar year 2015 and provides robust surveillance data, summaries of core program activities and highlights. The data reflect the most complete information available as of February 1, 2016. For additional details on the use of denominators and changes in this report, please see Technical Notes (page 34).

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FIGURES

TABLES

YEAR-AT-A-GLANCE: TUBERCULOSIS IN NEW YORK CITY, 2015

TUBERCULOSIS (TB) CASES AND RATES

577
Number of TB cases verified in NYC in 2015

7.1
NYC citywide TB rate per 100,000 people

<1% Decrease in the number of TB cases in NYC between 2014 and 2015

PATIENT DEMOGRAPHIC AND SOCIAL CHARACTERISTICS

42% of cases were among people 18-44 years of age

There was a **12%** increase in the number of cases among females between 2014 and 2015

8 children younger than age five had TB disease

24 patients were homeless in the year prior to TB diagnosis

6% of cases among adults were among health care workers

21% of patients resided in a neighborhood with at least 30% of residents living below the federal poverty level

COUNTRY OF BIRTH AND RACE/ETHNICITY

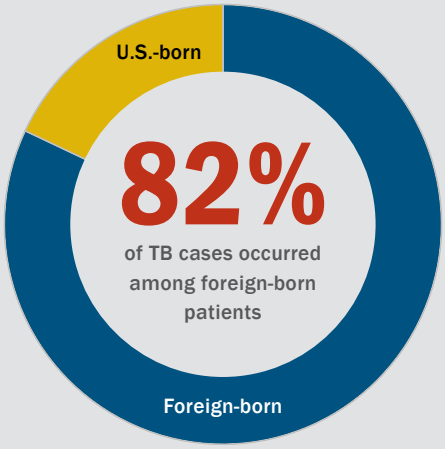
70 countries of birth were represented among patients with active TB disease

23% of all TB cases were among people born in China

64% of foreign-born patients had been living in the U.S. for more than 5 years at the time of TB diagnosis

The TB rate among U.S.-born Asians (3.9 per 100,000) was **11 times higher** in 2015 than it was in 2012

20% Increase between 2014 and 2015 in the number of TB cases among patients born in the U.S.



14.4
Foreign-born TB rate

2.0
U.S.-born TB rate

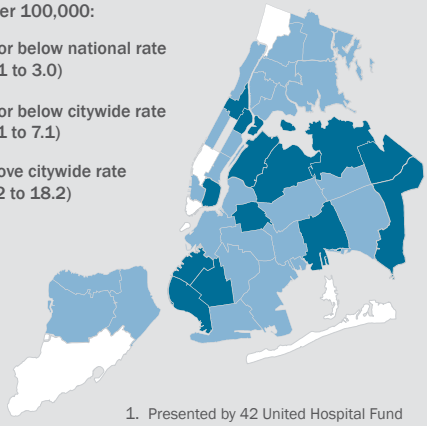
COUNTRY OF BIRTH	# CASES
China[1]	131
United States	104
Mexico	36
Philippines	28
Bangladesh	26
Dominican Republic	24
Ecuador	22
Haiti	22
India	22
Guyana	17
All other countries	144

1. China includes individuals born in mainland China, Hong Kong, Taiwan, and Macau.

TB IN NEW YORK CITY NEIGHBORHOODS[1]

Rate per 100,000:

- At or below national rate (1.1 to 3.0)
- At or below citywide rate (3.1 to 7.1)
- Above citywide rate (7.2 to 18.2)



1. Presented by 42 United Hospital Fund (UHF) neighborhoods.

Sunset Park's TB rate of **18.2** was the highest citywide

There was a **98%** increase in East Harlem's TB rate between 2014 and 2015 (from to 6.2 to 12.3 per 100,000)

13 neighborhoods had a rate that was higher than the citywide rate

100% of UHF neighborhoods had at least one TB case in 2015

CLINICAL CHARACTERISTICS

80% of cases had a pulmonary site of disease

5 cases were multidrug-resistant

6% of patients with TB disease were known to be HIV-infected

36 patients died before initiating or completing treatment, a 27% decrease from 2014

March 24, 2016

Dear Colleagues,

For the last several years, there has been a slowing decline in the incidence of tuberculosis (TB) in New York City (NYC). In 2015, there were 577 confirmed cases of TB disease, corresponding to an incidence of 7.1 per 100,000 and a decline of less than 1% from 2014.

There continues to be a disproportionate burden of TB among the foreign-born population in NYC, with 82% of all TB cases in 2015 born outside of the United States (U.S.). However, for the first time since the peak of NYC's TB epidemic in 1992, we saw an increase in the number of TB cases among people born in the U.S. This increase is especially concerning among the U.S.-born Asian population, which now has the highest rate of TB among all U.S.-born race groups.

To address disparities in disease burden and respond to ongoing outbreaks throughout the city, the NYC Bureau of Tuberculosis Control (BTBC) is committed to working collaboratively with affected populations. We continue to expand our outreach efforts by engaging communities to increase TB awareness, identify and interrupt TB transmission and provide TB screening opportunities. In 2015, we partnered with community organizations, political representatives, health care providers and others in Sunset Park, Brooklyn and the North Bronx to respond to TB outbreaks in these neighborhoods.

Collaboration with health care providers, hospitals and laboratories is also crucial to the success of our program. The majority of TB patients first seek care from hospitals or private providers, highlighting the critical role these partners play in recognizing and diagnosing TB disease. BTBC staff and community providers also continue to work hard to help TB patients successfully complete their TB treatment. BTBC now routinely offers video-based directly observed therapy for patients with TB disease and shorter treatment regimens for latent TB infection in our chest centers as convenient alternatives for our patients. In 2014, NYC exceeded the national target of 95% treatment completion among patients with TB disease.

As substantial declines in TB become more difficult to achieve, continued progress towards the goal of TB elimination will require novel approaches, the engagement of all parts of the health system and partnership with the communities we serve. Over the last two decades, we and our many partners have made great strides in reducing the burden of TB in NYC and have much to be proud of. However, continued dedication and commitment are essential to our ongoing success in the fight against TB.

Sincerely,

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

HEALTH DEPARTMENT CHEST CENTERS IN 2015:

- **351** (61%) patients with active TB disease received some or all of their TB care at a Health Department chest center
- **2,768** individuals with a positive test for latent TB infection were referred to Health Department chest centers from community health care providers, social service providers, hospitals and other jurisdictions
- **68%** of patients with an acid-fast bacilli (AFB)-positive respiratory smear received care at a Health Department chest center
- Health Department chest centers provided TB-related services during **30,875** patient encounters
- Chest center staff performed **3,184** tests for latent TB infection; **16%** were positive
- **961** patients started treatment for latent TB infection at a Health Department chest center
- The Centers for Disease Control and Prevention (CDC) referred **256** immigrants and refugees to the Health Department
- **90%** of 175 referred immigrants and refugees who were eligible for evaluation were seen by a Health Department physician or other NYC provider within 30 days of referral; **98%** completed evaluation for TB disease or latent TB infection
- Chest center staff performed **3,321** tests for HIV, of which **0.2%** were positive

SURVEILLANCE

In NYC, health care providers and laboratories are required to report to the 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 latent TB infection

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) that includes information on all patients reported to the Health Department as well as people exposed to infectious TB patients (contacts). Maven includes all the data needed to assist staff with case management activities, to monitor TB trends, to prepare surveillance reports, to report data to national and State health authorities and to identify data quality and reporting issues.

577 individuals with confirmed TB disease were reported to the Health Department in 2015; **2,977** people with suspected TB disease and **100** children younger than 5 with latent TB infection were also reported

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, 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 an array of TB diagnostic services including testing for latent TB infection using the latest generation blood-based QuantiFERON®-TB Gold (QFT) test and tuberculin skin test (TST), sputum induction, chest radiographs, 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 from social service and health care providers in NYC and from other health departments. Chest center staff also refer patients to other health care professionals for further diagnostic evaluation and treatment of non-TB related conditions, as indicated.

›› *For information about chest center locations and services, see page 35.*

TB CASE MANAGEMENT IN 2015:

- Case management was initiated or continued for **1,093** confirmed TB cases and for **1,393** patients newly suspected of having TB disease
- BTBC field staff conducted **4,206** facility visits to review medical records, interview patients, and meet with treating physicians, infection control practitioners, and discharge planners
- BTBC field staff made **1,421** home visits to promote treatment adherence, return patients to medical supervision, and conduct patient interviews, contact investigations and home assessments
- **4,219** contacts were identified around **421** potentially-infectious TB cases; **3,153** have been evaluated to date and **424** had a new positive TB test result
- **426** eligible patients with confirmed TB disease were enrolled in DOT through the Health Department or another health care provider; **293** were enrolled exclusively in face-to-face DOT; **133** received some or all of their DOT through VDOT
- Health Department staff provided approximately **38,730** DOT observations for **971** patients with suspected or confirmed TB disease or latent TB infection
- **74** patients were evaluated for a regulatory order, **12** were placed on mandatory DOT, and **7** were detained in the hospital to complete required therapy

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 TB care. Case management also occurs for patients incarcerated in Rikers Island Correctional Facility.

Case management activities include patient education on TB, comprehensive patient interviews, contact identification and 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 non-adherent patients and returning them to medical supervision, participating in the transfer of patient care between NYC and other jurisdictions and collaborating with community providers and City, State and federal programs.

CONTACT INVESTIGATION: The Health Department routinely conducts contact investigations in households and congregate settings (e.g., worksites, schools, and health care associated settings) to identify and evaluate individuals exposed to infectious TB patients, determine if transmission has occurred, assess whether further testing may be warranted, and identify and treat individuals with latent TB infection.

DIRECTLY OBSERVED THERAPY (DOT): DOT is NYC's standard of care for managing patients with suspected or confirmed TB disease, regardless of where they are treated. During DOT encounters, a patient is observed by a health care worker while ingesting anti-TB medications. In NYC, DOT is available through the Health Department at all chest centers and in homes, worksites and other locations as requested by the patient. DOT is also available through three NYC Health+Hospitals facilities.

DOT is arranged to be flexible and convenient for patients. Health Department staff perform DOT during and 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 enroll your patient, call 311.*

REGULATORY ACTION: Patients with suspected or confirmed TB disease who are not adherent to TB evaluation or treatment may be subject to regulatory action. For patients who pose a danger to the public's health, the Health Department has the authority under the NYC Health Code to legally mandate that its patients comply with TB care. This may include compulsory evaluation, mandatory DOT and/or involuntary hospitalization to complete TB therapy.

REGIONAL AND NATIONAL ADVISORY GROUPS AND CONSORTIA AMONG BTBC STAFF IN 2015:

- The Advisory Council for the Elimination of Tuberculosis (ACET)
- CDC National Epidemic and Economic Modeling Agreement (NEEMA)
- CDC Tuberculosis Epidemiologic Studies Consortium (TBESC), Board of Advisors
- CDC Tuberculosis Program Evaluation Network (TB PEN)
- CDC Tuberculosis Outbreak Detection Workgroup (ODWG)
- CDC Tuberculosis Trials Consortium (TBTC)
- The National Tuberculosis Controllers Association (NTCA) Board
- The Northeast Regional Training and Medical Consultation Center (RTMCC) Medical Advisory Board

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 culture from all culture-positive TB patients be sent to the NYC Public Health Laboratory for genotyping and drug susceptibility testing (DST). 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 are promptly investigated to ensure that patients are not placed on anti-TB medications unnecessarily.

COMMUNITY AND PROVIDER OUTREACH

The Health Department facilitates the detection, treatment and prevention of TB through several community- and provider-based outreach efforts. These include provider education about TB risk and treatment; engaging community stakeholders in educational activities; assessing barriers to care-seeking and treatment adherence; and developing community-based interventions aimed at increasing knowledge of TB risk and encouraging care-seeking.

The Health Department also provides TB educational materials that are culturally relevant and linguistically appropriate and utilizes various media outlets to more broadly raise awareness about TB within the community, with a specific focus on higher risk neighborhoods and populations.

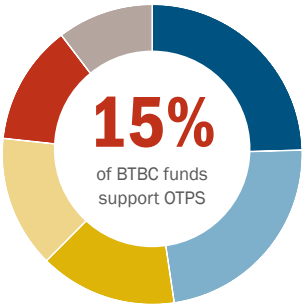
TRAINING AND COLLABORATION

The Health Department hosts a number of trainings and meetings to share and 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 topics at grand rounds at hospitals and outpatient facilities and coordinate TB Rounds with hospitals throughout the city.

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

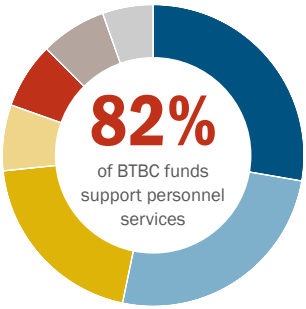
BTBC FUNDS AND STAFFING, 2015

FIGURE 1: BTBC funding distribution for other-than-personnel services (OTPS) by type, 2015



Medications/supplies	25%
Patient support services	15%
Laboratory testing services	14%
Electronic medical records	13%
Chest radiograph services	10%
Other	23%

FIGURE 2: BTBC staff by job function, 2015



	n	%
Case Manager	51	28%
Administrative staff	37	20%
Nurse	13	7%
Physician	13	7%
DOT staff	13	7%
Epidemiologist	10	5%
Other	47	26%

In 2015, the Third Annual NYC Tuberculosis Walk and Rally was organized by the Health Department in partnership with RESULTS, other State and City agencies, nonprofit organizations and volunteers. The NYC TB Walk aimed to raise TB awareness, inspire action and engage community stakeholders. Each year, the Health Department also co-sponsors a World TB Day Conference, which provides attendees with the opportunity to learn about updated TB care guidelines and recommendations, and hosts an Annual TB Genotyping Update meeting, which focuses on developments in the use of genotyping and molecular epidemiology. These events are attended by local, national, and international TB programs, academic, and laboratory colleagues.

›› *For more information about attending these conferences, email* ***TBtraining@health.nyc.gov.***

FUNDING AND ADMINISTRATION

BTBC receives City, State, and federal funding as well as research grant support. The operating budget for the period of July 1, 2014 through June 30, 2015 was approximately $15.5 million, excluding activities performed by non-Health Department personnel. Of this, 15% supported other-than-personnel services (OTPS), 82% supported personnel services and 3% went towards 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 gauge the BTBC's performance as compared to national standards, ensure that program objectives are being met and identify any programmatic issues. Performance indicators and targets are developed in coordination with 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.

Performance indicators are used to identify areas of improvement in case management and include goals for culture conversion, contact evaluation, and treatment completion for both cases and contacts.

One of the Health Department's primary tools for evaluating the TB Control program is the quarterly cohort review process. During cohort review meetings, which occur four to six months after a patient's TB diagnosis, the BTBC's Assistant Commissioner reviews case management and treatment outcomes for all 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. Cohort review also provides an opportunity to assess data completeness and quality.

›› *For performance indicators for 2015, see page 26.*

NYC TB RESEARCH CONSORTIUM:

The Health Department leads the NYC TB Research Consortium, which brings together health department, academic, laboratory, and other esearchers to collaborate on projects focusing on TB in NYC.

The group's activities include performing studies to inform TB control policies and practices; collaborating on epidemiologic, genotyping, and clinical research projects to advance TB research; pursuing funding opportunities; and mentoring new researchers and students to develop research skills for future public health careers.

In 2015, NYC TB Research Consortium participants included Albert Einstein College of Medicine, Columbia University, Drexel University, Johns Hopkins University, the NYC Health Department, New York University Medical College, Rensselaer Polytechnic Institute, Public Health Research Institute at Rutgers University, Touro College School of Social Work, 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.***

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 United States (U.S.) and abroad.

BTBC STAFF PUBLICATIONS IN PEER-REVIEWED JOURNALS, 2015:

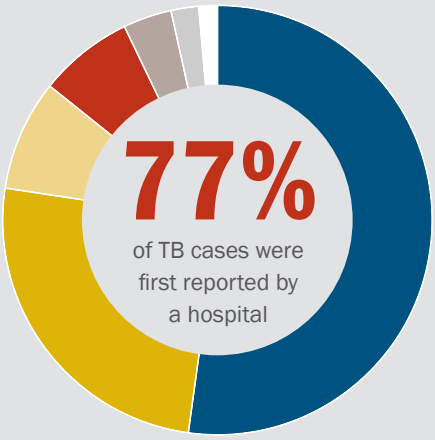
- Anderson JA, Sullivan Meissner J, Ahuja SD, Shashkina E, O'Flaherty T, Proops DC. Confirming *Mycobacterium tuberculosis* transmission from a cadaver to an embalmer using molecular epidemiology. *Am J Infect Control.* 2015 May 1;43(5):543-5.
- Cates J, Trieu L, Proops D, Ahuja SD. Contact investigations around *Mycobacterium tuberculosis* patients without positive respiratory culture. *J Public Health Manag Pract.* Published online ahead of print Apr 10, 2015.
- Crossa A, Kessler J, Harris TG. Enhanced tuberculosis infection treatment outcomes after implementation of QuantiFERON-Gold testing. *PLoS One.* 2015 Sep 15;10(9):e0138349.
- Dawson P, Perri B, Ahuja SD. High tuberculosis strain diversity among New York City public housing residents. *Am J Public Health.* 2016 Mar;106(3):563-8. Published online ahead of print December 21, 2015.
- Gounder PP, Harris TG, Anger H, Trieu L, Meissner JS, Cadwell BL, Shashkina E, Ahuja SD. Risk for tuberculosis disease among contacts with prior positive tuberculin skin test: a retrospective cohort study, New York City. *J Gen Intern Med.* 2015 Jun;30(6):742-8.
- Knight GM, Dharan NJ, Fox GJ, Stennis N, Zwerling A, Khurana R, Dowdy DW. Bridging the gap between evidence and policy for infectious diseases: How models can aid public health decision-making. *Int J Infect Dis.* 2016 Jan 1;62(1):53-9. Published online ahead of print November 3, 2015.
- Sanderson JM, Proops DC, Trieu L, Santos E, Polsky B, Ahuja SD. Increasing the efficiency and yield of a tuberculosis contact investigation through electronic data systems matching. J Am Med Inform Assoc. *J Am Med Inform Assoc.* 2015 Sep;22(5):1089-93.
- Stennis NL, Burzynski JN, Herbert C, Nilsen D, Macaraig M. Treatment for tuberculosis infection with three months of rifapentine and isoniazid in New York City Health Department clinics. *Clin Infect Dis. Clin Infect Dis.* 2016 Jan 1;62(1):53-9. Published online ahead of print September 3, 2015
- Trieu L, Proops DC, Ahuja SD. Moxifloxacin prophylaxis against MDR TB, New York, New York, USA. *Emerg Infect Dis.* 2015 Mar;21(3):500-3.
- Verdugo D, Fallows D, Ahuja SD, Schluger N, Kreiswirth B, Mathema B. Epidemiologic correlates of pyrazinamide resistant *Mycobacterium tuberculosis* in New York City. *Antimicrob Agents Chemother.* 2015 Oct;59(10):6140-50.

PARTNERSHIP IN THE FIGHT AGAINST TB

With the majority TB patients first seeking care outside of the Health Department, BTBC relies on outside providers and laboratories to recognize and report TB. Working with other health care providers, hospitals and laboratories to ensure that TB is accurately diagnosed and effectively treated is an essential part of our program's success.

REPORTING

FIGURE: Initial reporter of confirmed TB cases verified in 2015 by type, New York City



Laboratories are required to report individuals with reportable conditions through New York State's Electronic Clinical Laboratory Reporting System (ECLRS). In 2015, BTBC certified one laboratory for reporting via ECLRS, bringing the total number of certified laboratories to **33** (92% of all eligible).

121 facilities reported at least one TB case to the Health Department in 2015

40% of cases were reported by one of the 10 most common reporting facilities

TEN MOST COMMON REPORTING FACILITIES FOR CONFIRMED TB CASES, NYC, 2015:

Facility	# Cases
Elmhurst Hospital Center	41
New York-Presbyterian Queens	36
Bellevue Hospital Center	25
Maimonides Medical Center	25
Fort Greene Chest Center	21
NYU Lutheran Medical Center	17
New York-Presbyterian Weill Cornell	17
Kings County Hospital Center	16
Mount Sinai Hospital	16
New York-Presbyterian Columbia University Medical Center	13

TREATMENT

93% of TB cases in 2015 were first treated by a non-Health Department health care provider

39% of TB cases in 2015 were treated exclusively by a non-Health Department health care provider

80% of eligible patients with active TB disease were enrolled in DOT; **133** (31%) received some or all of their DOT through video DOT

22% of patients with TB disease received some or all of their DOT through a non-Health Department health care provider

HIV TESTING

83% of patients with TB disease had a known HIV status

76% of patients with an unknown HIV status refused testing (compared to 83% in 2014)

TB PROVIDER HOTLINE: 347-396-7400

EDUCATIONAL RESOURCES FOR HEALTH CARE PROVIDERS

The Health Department has a selection of culturally, technically and linguistically appropriate TB education materials that are available to patients, the general public and health care providers. Materials are available at nyc.gov or by calling 311.

CLINICAL POLICIES AND PROTOCOLS

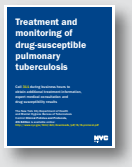
4th Edition. Describes policies, protocols and recommendations for the prevention, treatment and management of TB

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



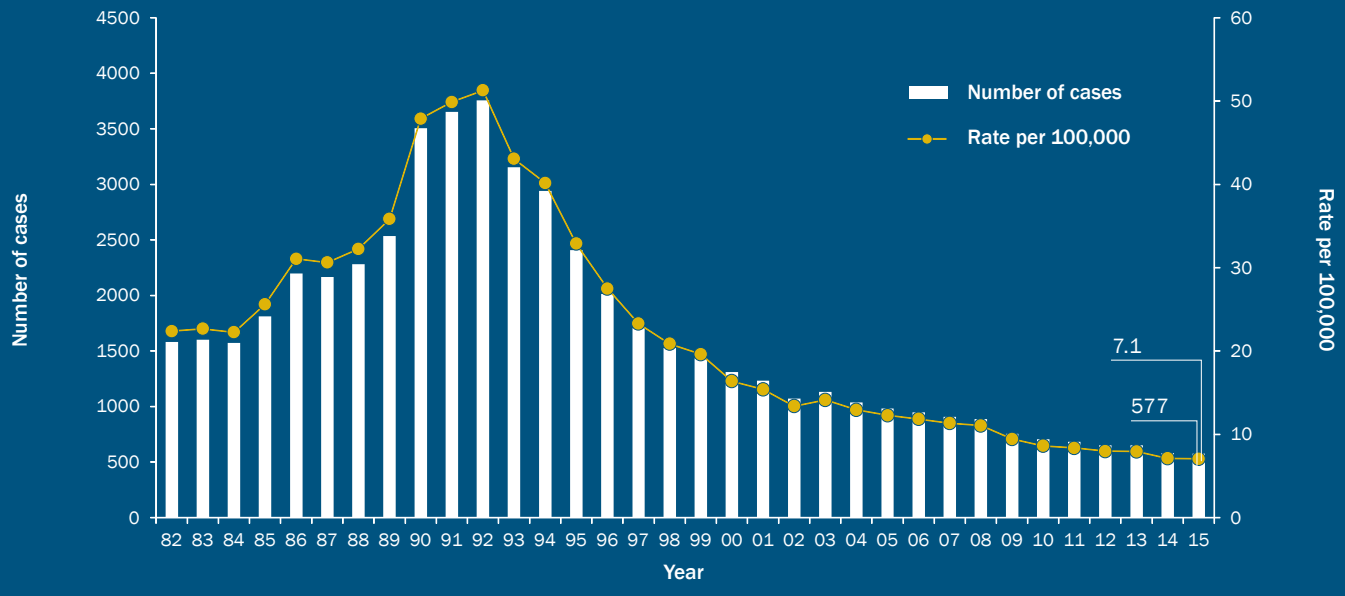
Treatment and monitoring of drug-susceptible pulmonary tuberculosis

Provides concise information about treatment and monitoring for pulmonary TB

In 2015, there were **577** confirmed TB cases in NYC, a decrease of less than 1% from 2014. The incidence remained stable at 7.1 per 100,000.

As the decline in TB incidence slows, the need to maintain core TB control activities, adapt to the changing epidemiology of TB and collaborate with community stakeholders remains essential.

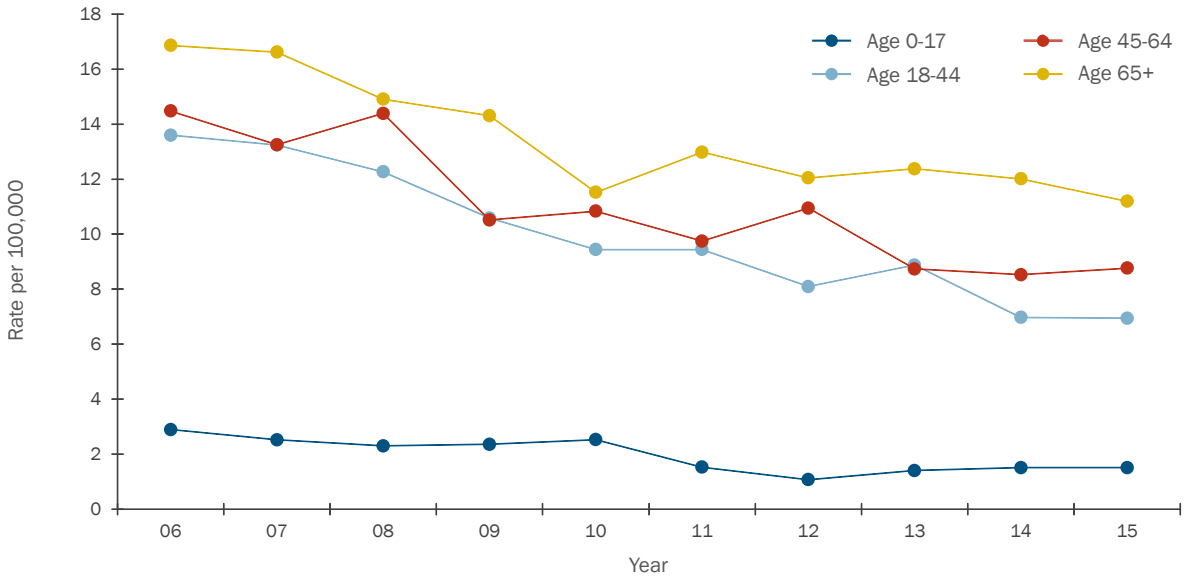
FIGURE 3: Tuberculosis cases and rates,[1] New York City, 1982-2015



1. Rates are based on decennial Census data.

AGE AND SEX

FIGURE 4: Tuberculosis rates[1] by age in years, New York City, 2006-2015



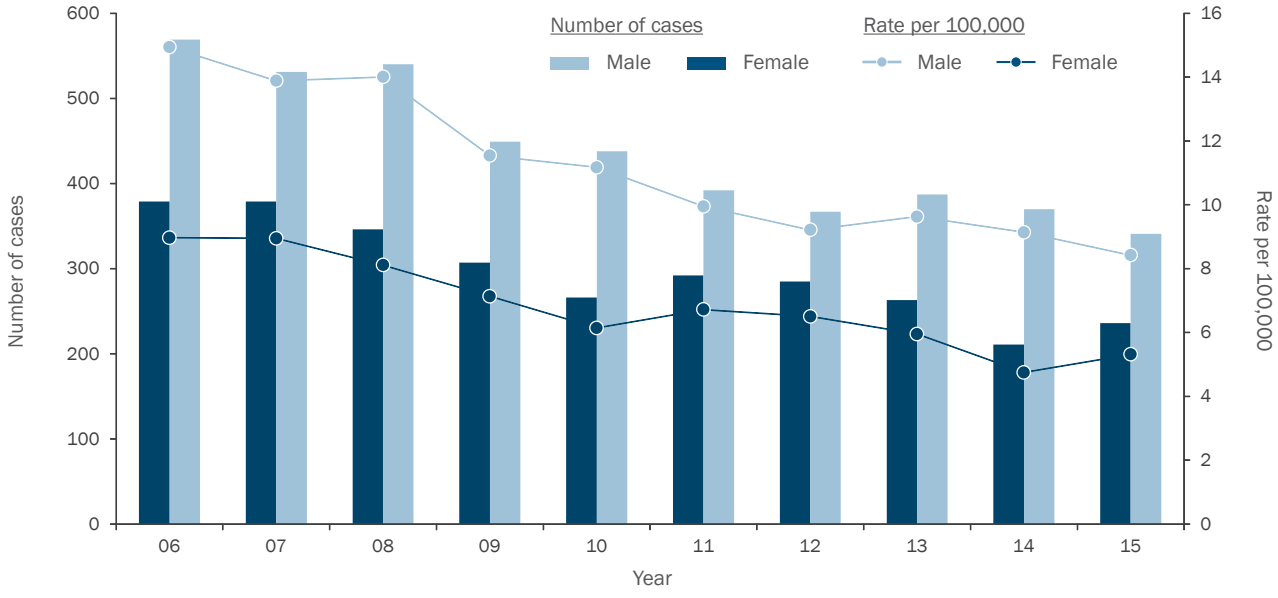
1. Rates are based on NYC Health Department population estimates, modified from U.S. Census Bureau interpolated intercensal population estimates, 2000-2014. Updated October 2015.

42% Proportion of cases occuring among people 18-44 years of age

8 Number of TB cases among children younger than age 5

12% Percent increase in the number of TB cases among females between 2014 and 2015

FIGURE 5: Tuberculosis cases and rates[1] by sex, New York City, 2006-2015

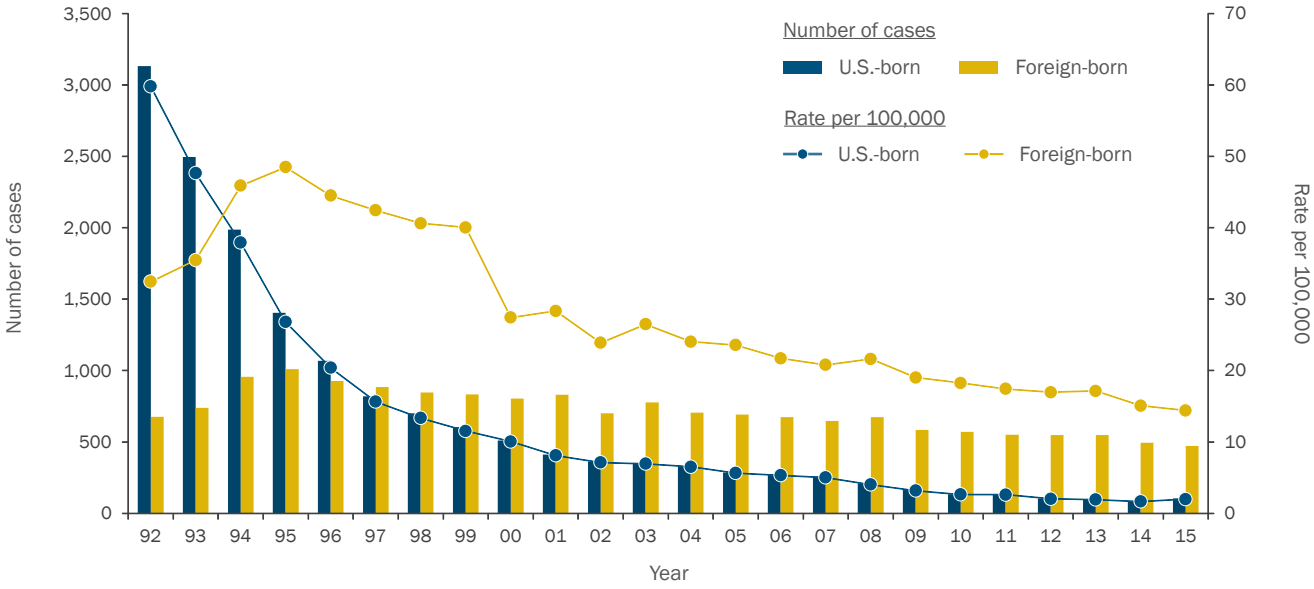


1. Rates are based on NYC Health Department population estimates, modified from U.S. Census Bureau interpolated intercensal population estimates, 2000-2014. Updated October 2015.

BIRTH IN THE UNITED STATES AND RACE/ETHNICITY

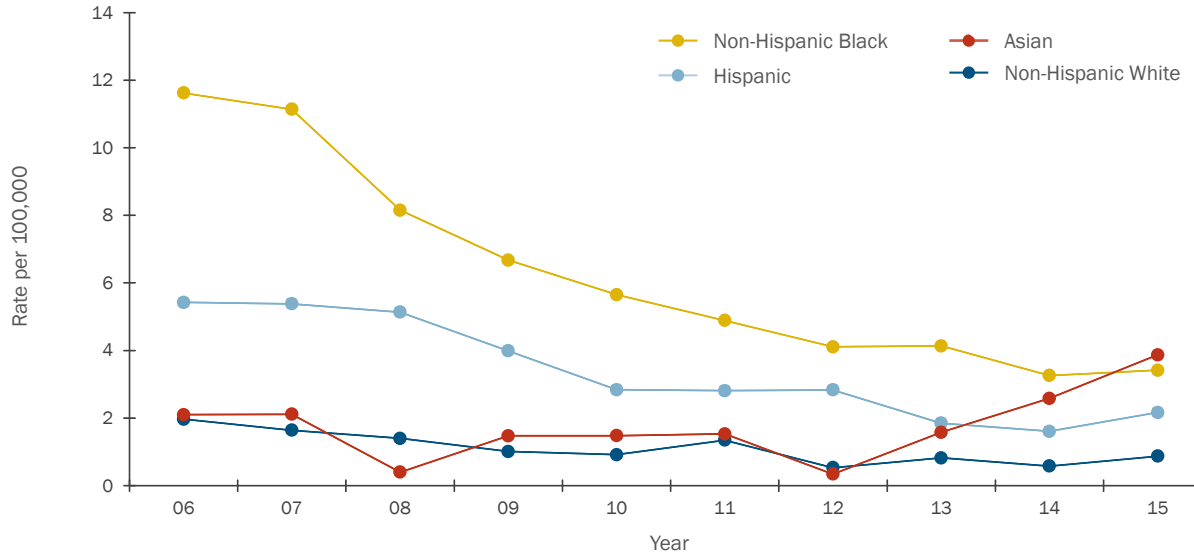
In 2015, 82% of NYC TB cases were among patients born outside of the U.S., and the TB rate among the foreign-born was more than seven times the U.S.-born rate (14.4 and 2.0 per 100,000, respectively). However, for the first time since 1992, there was an increase in the number of U.S.-born cases, from 87 in 2014 to 104 in 2015. Among the U.S.-born, the number of cases increased in each race category, with a 50% increase in two groups: U.S.-born non-Hispanic Whites and U.S.-born Asians.

FIGURE 6: Tuberculosis cases and rates[1] by birth in the United States,[2,3] New York City, 1992-2015



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 1-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.

FIGURE 7: Tuberculosis rates[1] among persons born in the United States[2] by race/ethnicity, New York City, 2006-2015



1. Rates are based on 1-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.

TABLE 1: Select demographic characteristics of tuberculosis cases by birth in the United States,[1] New York City, 2014-2015

Characteristics	2014						2015					
	U.S.-born[1]		Foreign-born		Total[2]		U.S.-born[1]		Foreign-born		Total[2]	
	n	%	n	%	n	%	n	%	n	%	n	%
Age Group												
0-17	11	13	16	3	27	5	17	16	10	2	27	5
18-44	24	28	221	45	245	42	38	37	205	43	244	42
45-64	31	36	146	30	178	31	25	24	158	33	183	32
65+	21	24	111	22	132	23	24	23	99	21	123	21
Sex												
Female	33	38	178	36	211	36	43	41	193	41	236	41
Male	53	61	316	64	370	64	61	59	279	59	341	59
Race/ethnicity												
White Non-Hispanic	12	14	24	5	36	6	18	17	20	4	38	7
Black Non-Hispanic	41	47	87	18	128	22	43	41	77	16	120	21
Hispanic	23	26	121	24	145	25	31	30	110	23	141	24
Asian	8	9	233	47	241	41	12	12	243	51	256	44
Multiple/Other	3	3	29	6	32	5	0	0	22	5	22	4
Time in the U.S. (at reporting)												
<1 year	n/a	n/a	67	14	67	14	n/a	n/a	60	13	60	13
1-5 years	n/a	n/a	108	22	108	22	n/a	n/a	108	23	108	23
> 5 years	n/a	n/a	318	65	318	65	n/a	n/a	302	64	302	64
Total	87	15	494	85	582	-	104	18	472	82	577	-

1. U.S.-born includes individuals born in the U.S. and U.S. territories.
2. One case in 2014 and one case in 2015 had unknown country of birth. As such, totals may not equal the sum of U.S.-born and foreign-born.

472 Number of TB cases among people born outside of the U.S.

20% Percent increase in the number of TB cases among patients born in the U.S. between 2014 and 2015

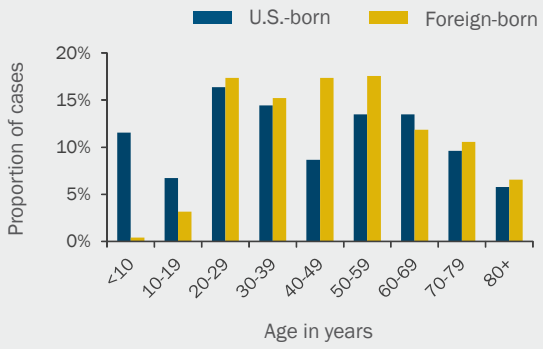
3.9 TB rate per 100,000 among U.S.-born Asians

UNDERSTANDING THE INCREASE IN THE NUMBER OF TB CASES AMONG THE U.S.-BORN:

In 2015, 19% of U.S.-born patients were under the age of 20. The characteristics of these young patients reflect the evolving epidemiology of TB among the U.S.-born population in NYC. Among the U.S.-born this year, the greatest increase in TB rates was seen among Asians, while the smallest increase was among non-Hispanic Blacks.

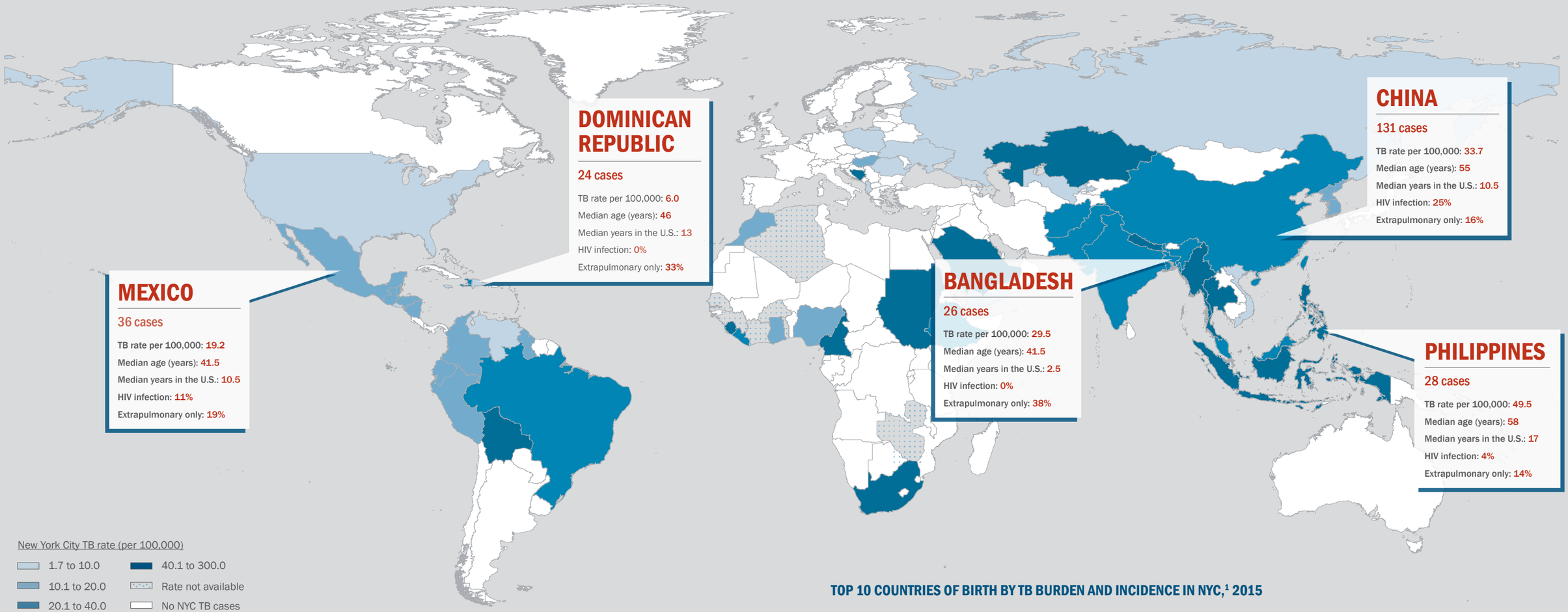
Country of birth information for parents or guardians was available for 94% of pediatric U.S.-born patients; all but one had at least one known foreign-born parent or grandparent. It is essential to recognize this risk group and adapt testing and treatment strategies to these changes in our population.

FIGURE 8: Proportion of tuberculosis cases by birth in the United States[1] and age, New York City, 2015



1. Excludes cases with unknown country of birth.

FIGURE 9: Tuberculosis cases and rates[1] by country of birth,[2,3,4] New York City, 2015



TB AMONG THE FOREIGN-BORN IN NYC

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

70 Number of countries of birth represented among TB patients in 2015

64% Proportion of foreign-born patients residing in the U.S. for more than 5 years at time of TB diagnosis

14.4 TB rate per 100,000 among people born outside of the U.S.

TOP 10 COUNTRIES OF BIRTH BY TB BURDEN AND INCIDENCE IN NYC,[1] 2015

COUNTRY OF BIRTH[2]	# CASES
China[3]	131
United States[4]	104
Mexico	36
Philippines	28
Bangladesh	26
Dominican Republic	24
Ecuador	22
Haiti	22
India	22
Guyana	17

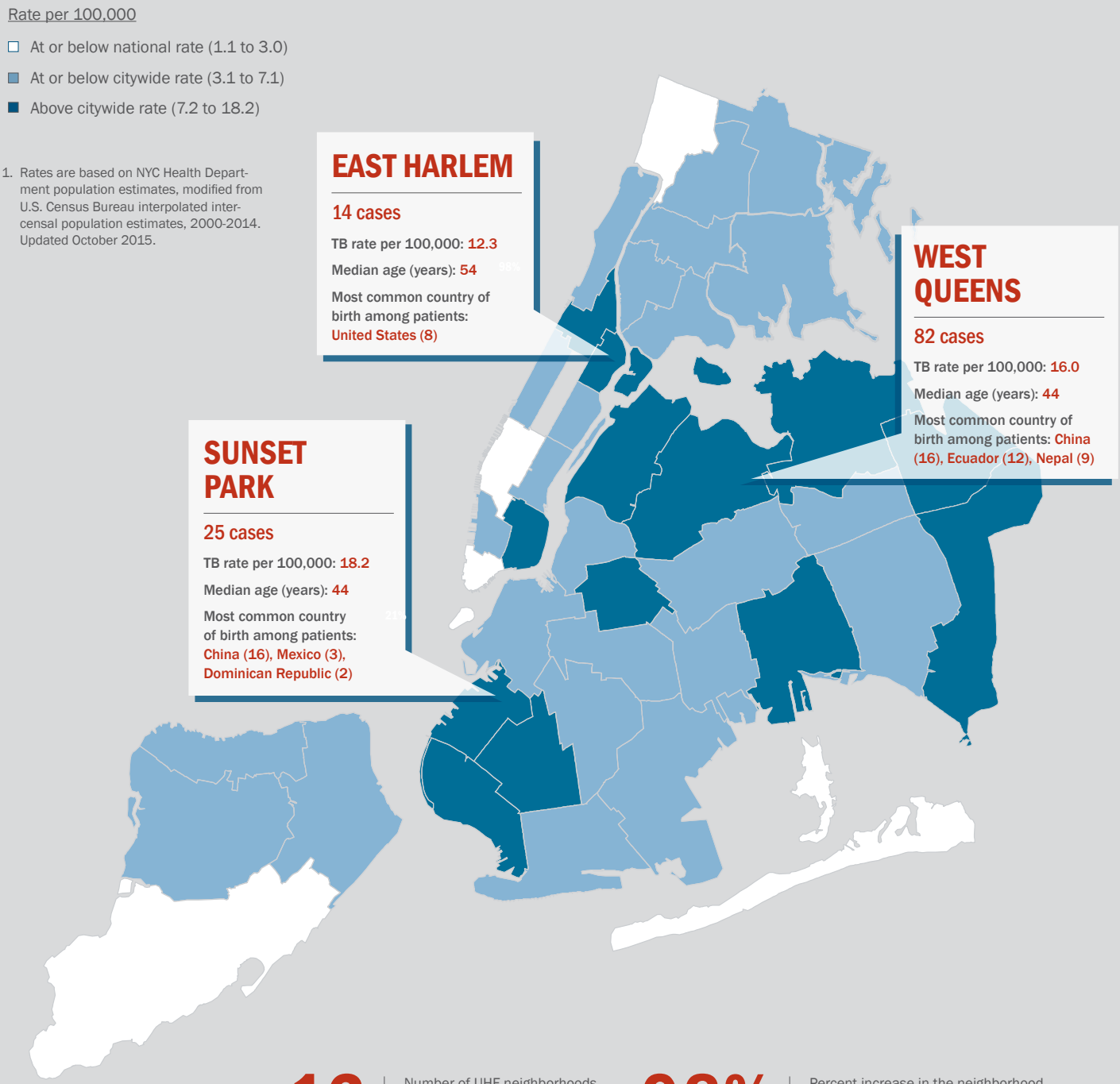
COUNTRY OF BIRTH	NYC RATE PER 100,000[1]
Sudan	324
Nepal	124
Cameroon	114
Saudi Arabia	109
Bolivia	83
Burma	82
Indonesia	78
Thailand	63
Sierra Leone	53
Bosnia and Herzegovina	52

1. Rates are based on 2014 American Community Survey Public Use Microdata Sample data.
2. One case had unknown country of birth
3. China includes individuals born in mainland China, Hong Kong, Taiwan and Macau.
4. 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 2015 with 219 cases (38% of all NYC cases) and a rate of 9.4 per 100,000. The United Hospital Fund (UHF) neighborhood with the highest rate of TB was Sunset Park in Brooklyn with a rate of 18.2 per 100,000, more than double the citywide rate. Thirteen UHF neighborhoods (31%) had TB rates that exceeded the overall NYC rate and 37 (88%) exceeded the national rate. Twenty-one percent of TB patients lived in a neighborhood with very high area-based poverty.

FIGURE 10: Tuberculosis rates[1] by United Hospital Fund (UHF) neighborhood, New York City, 2015

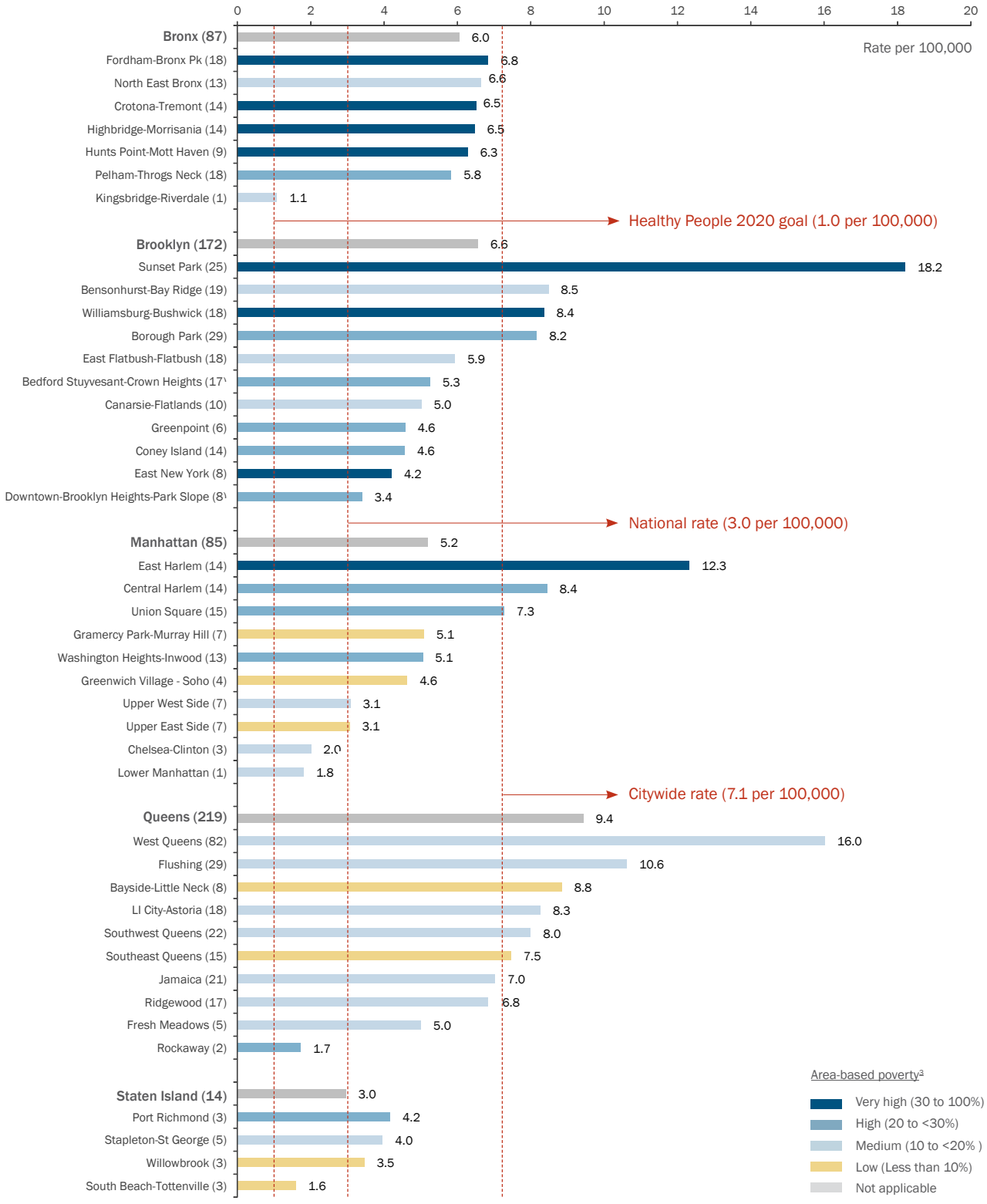


1. Rates are based on NYC Health Department population estimates, modified from U.S. Census Bureau interpolated intercensal population estimates, 2000-2014. Updated October 2015.

13 Number of UHF neighborhoods with TB rates higher than the 2015 citywide rate

98% Percent increase in the neighborhood of East Harlem's TB rate between 2014 and 2015

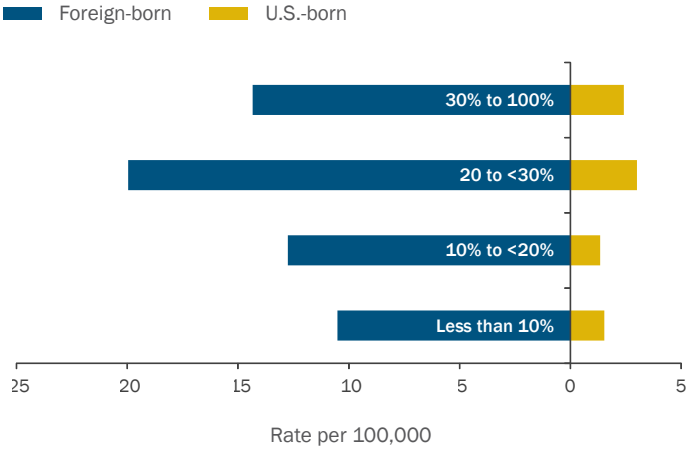
FIGURE 11: Tuberculosis cases[1] and rates[2] by borough, United Hospital Fund (UHF) neighborhood, and area-based poverty level,[3] New York City, 2015



1. Parentheses indicate the number of TB cases residing in each area at time of TB diagnosis. 2. Rates are based on NYC Health Department population estimates, modified from U.S. Census Bureau interpolated intercensal population estimates, 2000-2014. Updated October 2015. 3. 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.

SOCIAL CHARACTERISTICS

FIGURE 12: Tuberculosis rates[1] by area-based poverty level[2,3] and birth in the United States,[4,5] New York City, 2015



Area-based poverty level[2]	U.S.-born rate	Foreign-born rate	Total NYC rate
Very high (30 to 100%)	2.4	14.4	6.6
High (20 to <30%)	3.0	20.0	10.2
Medium (10 to <20%)	1.4	12.8	6.2
Low (Less than 10%)	1.5	10.5	4.0

1. Rates are based on 2010-2014 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. U.S.-born includes individuals born in the U.S. and U.S. territories. 5. One case had unknown country of birth.

TABLE 2: Select social and geographic characteristics of tuberculosis cases by birth in the United States,[1] New York City, 2014-2015

Characteristics	2014						2015					
	U.S.-born[1]		Foreign-born		Total[2]		U.S.-born[1]		Foreign-born		Total[2]	
	n	%	n	%	n	%	n	%	n	%	n	%
Borough of residence												
Manhattan	22	25	51	10	73	13	26	25	59	13	85	15
Bronx	18	21	79	16	98	17	21	20	66	14	87	15
Brooklyn	30	34	162	33	192	33	33	32	138	29	172	30
Queens	13	15	196	40	209	36	19	18	200	42	219	38
Staten Island	4	5	6	1	10	2	5	5	9	2	14	2
Homeless[3]	7	8	13	3	20	3	6	6	18	4	24	4
Employed[3,4]	23	30	226	47	249	45	37	43	223	48	260	47
Health care worker[3,4]	5	22	18	8	23	9	4	11	28	13	32	12
Drug use[3]	13	15	9	2	22	4	14	13	17	4	31	5
Excessive alcohol use[3]	2	2	10	2	13	2	1	1	3	1	4	1
Neighborhood poverty[5]												
Very high (30 - 100%)	28	32	115	23	144	25	29	28	92	19	122	21
High (20 - <30%)	28	32	200	40	228	39	36	35	175	37	211	37
Medium (10 - <20%)	20	23	148	30	168	29	23	22	163	35	186	32
Low (<10%)	11	13	31	6	42	7	16	15	42	9	58	10
Total	87	15	494	85	582	-	104	18	472	82	577	-

1. U.S.-born includes individuals born in the U.S. and U.S. territories. 2. One case in 2014 and one case in 2015 had unknown country of birth. 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 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.

CLINICAL CHARACTERISTICS

FIGURE 13: Tuberculosis cases by disease site, New York City, 2015 (n=577)

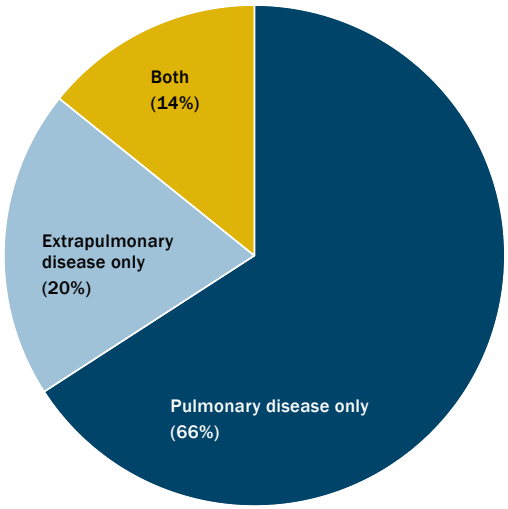


TABLE 3: Disease site[1] among tuberculosis cases with any extrapulmonary disease, New York City, 2015 (n=197)

Disease site	Number	Percent
Any extrapulmonary	197	-
Lymphatic	82	42
Pleural	60	30
Bone/joint	24	12
Meningeal	11	6
Genitourinary	8	4
Peritoneal	12	6
Laryngeal	2	1
Other	30	15

1. Categories are not mutually exclusive.

80% Proportion of all TB cases that involved a pulmonary disease site

1 Number of patients with a meningeal disease site that were younger than 18

77% Proportion of cases with a positive *Mycobacterium tuberculosis* culture

FIGURE 14: Number and proportion of culture-confirmed tuberculosis cases among all tuberculosis cases, New York City, 2006-2015

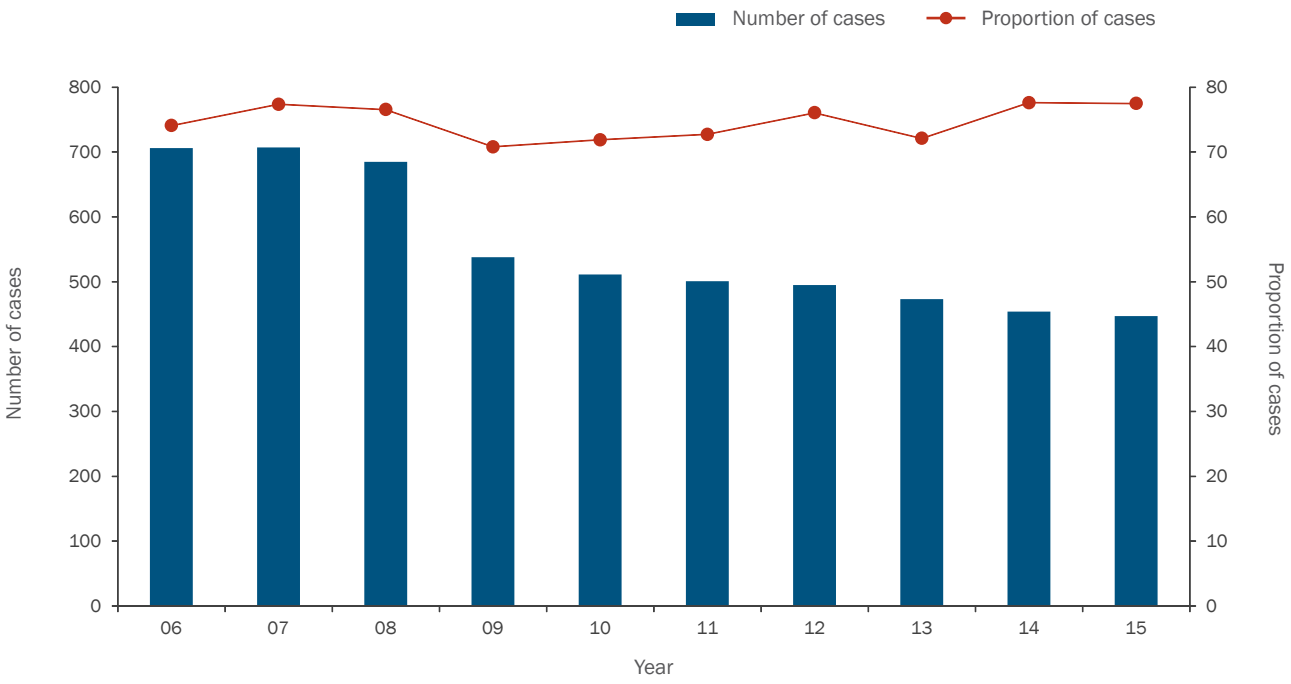
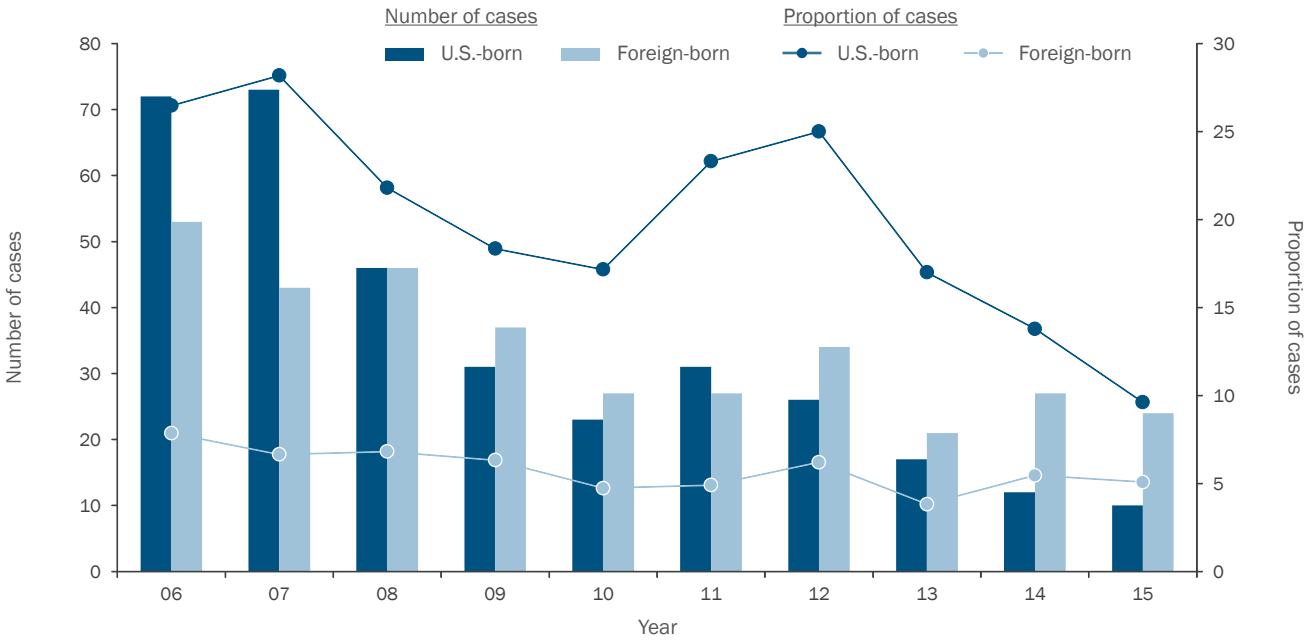
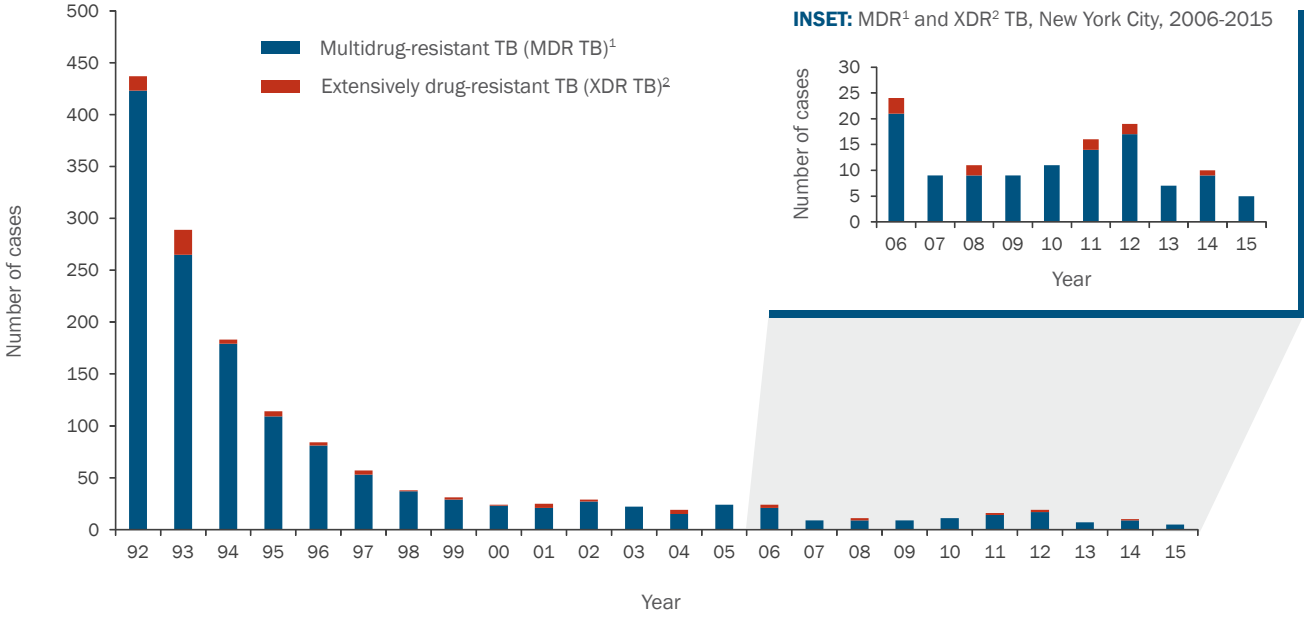


FIGURE 15: Human immunodeficiency virus (HIV) infection among tuberculosis cases by birth in the United States,[1,2] New York City, 2006-2015



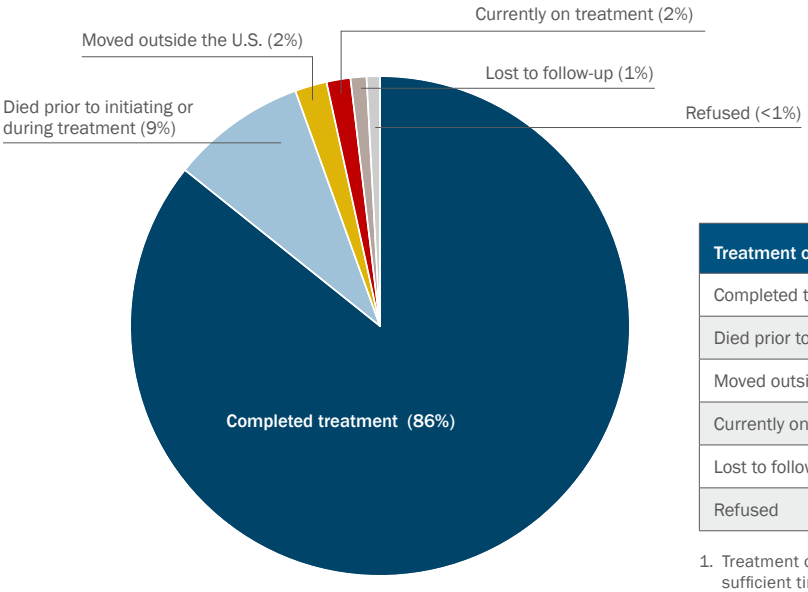
1. U.S.-born includes individuals born in the U.S. and U.S. territories. 2. Excludes cases with unknown country of birth.

FIGURE 16: Multidrug resistance[1] among tuberculosis cases, New York City, 1992-2015



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.

FIGURE 17: Treatment outcomes for tuberculosis cases counted in 2014,[1] New York City (n=582)



Treatment outcome[1]	Number	Percent
Completed treatment	499	86
Died prior to initiating or during treatment	51	9
Moved outside of the U.S.	12	2
Currently on treatment	9	2
Lost to follow-up	6	1
Refused	5	<1

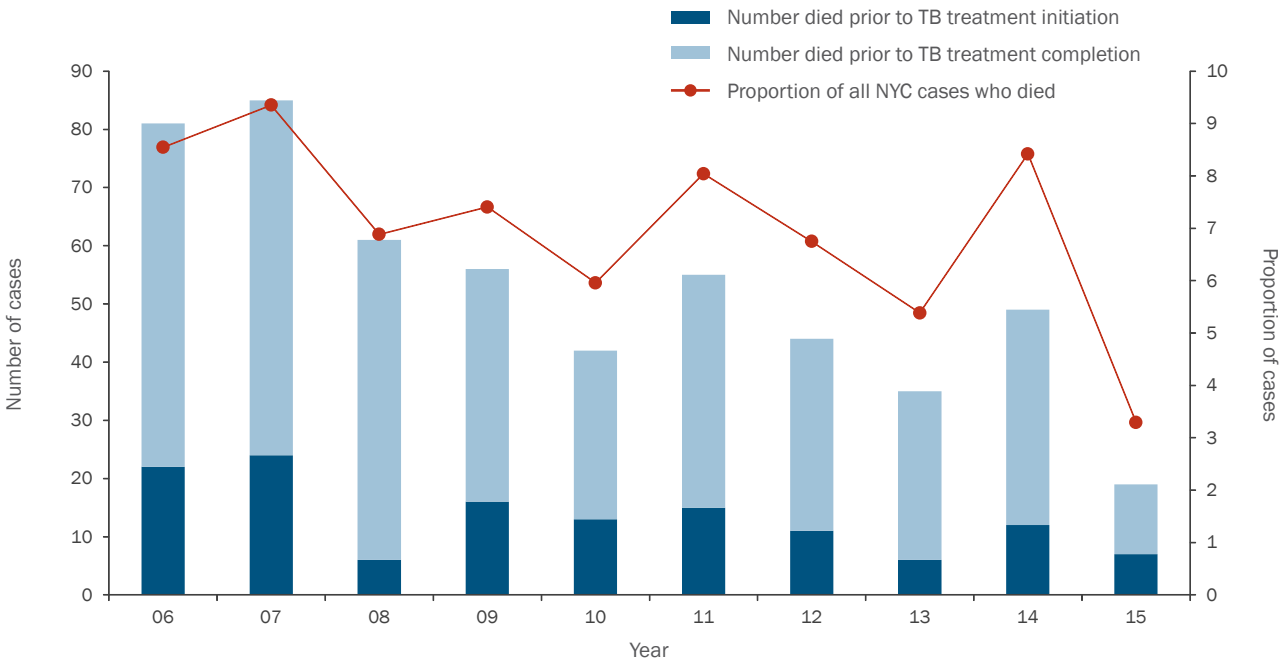
1. Treatment outcomes are not reported for the current year to allow sufficient time for follow-up.

6% Proportion of all patients with TB disease who were known to be HIV-infected

5 Number of multidrug-resistant TB cases in 2015

27% Percent decrease in the number of patients who died before initiating or completing TB treatment between 2014 and 2015

FIGURE 18: Number and proportion of tuberculosis cases who died[1] before or during treatment, New York City, 2006-2015



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.

TABLE 4: Select performance measures, national targets,[1] and New York City performance outcomes, 2012-2014[2]

Performance measure[2]	2012	2013	2014	2020 target
Treatment and case management of persons with active TB				
Initiated TB treatment within 7 days of specimen collection[3]	89%	86%	90%	**97%**
Sputum culture conversion within 60 days of treatment initiation[4]	77%	73%	76%	**73%**
Completed treatment within 365 days of initiation[5]	94%	95%	96%	**95%**
Contact Investigation				
Cases with contacts elicited[6]	95%	96%	97%	**100%**
Contacts evaluated[7]	83%	84%	81%	**93%**
Contacts who initiated treatment for TB infection[8]	80%	81%	80%	**91%**
Contacts who completed treatment for TB infection[9]	69%	78%	79%	**81%**

1. Definitions for performance measures and national indicators are established by the U.S. Centers for Disease Control and Prevention (CDC). The 2020 targets were set in 2015. For additional information, see: http://www.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.

TABLE 5: Select clinical characteristics of tuberculosis cases by birth in the United States,[1] New York City, 2014-2015

Characteristics	2014							2015					
	U.S.-born[1]		Foreign-born		Total[2]			U.S.-born[1]		Foreign-born		Total[2]	
	n	%	n	%	n	%		n	%	n	%	n	%
Ever respiratory smear positive	27	31	225	46	252	43		46	44	205	43	251	44
Sputum smear positive	25	93	218	97	243	96		41	89	198	97	239	95
Culture positive	58	67	395	80	454	78		72	69	374	79	447	77
NAA positive[3]	3	43	7	35	10	37		1	11	4	22	5	19
Pulmonary only site of disease	50	57	323	65	373	64		75	72	305	65	380	66
Extra-pulmonary only site of disease	20	23	90	18	110	19		17	16	98	21	115	20
Both pulmonary and extra-pulmonary	17	20	81	16	99	17		12	12	69	15	82	14
Cavitary chest x-ray ever[4]	18	27	77	19	95	20		22	25	97	26	119	26
Multidrug resistance[5]	1	2	9	2	10	2		0	0	5	1	5	1
Extensively drug resistant[6]	0	0	1	1	1	1		0	0	0	0	0	0
Non-MDR INH resistance[5]	5	8	36	9	41	9		3	4	37	10	40	9
Non-MDR RIF resistance[5]	0	0	0	0	0	0		0	0	1	0	1	0
History of TB disease	6	7	37	7	43	7		1	1	30	6	31	5
HIV Status													
Infected	12	14	27	5	39	7		10	10	24	5	34	6
Not infected	54	62	380	77	435	75		67	64	375	79	443	77
Refused	16	18	74	15	90	15		19	18	57	12	76	13
Not offered/done or unknown	5	6	13	3	18	3		8	8	16	3	24	4
Total	**87**	**15**	**494**	**85**	**582**	-		**104**	**18**	**472**	**82**	**577**	-

1. U.S.-born includes individuals born in the U.S. and U.S. territories. 2. One case in 2014 and one in 2015 had unknown country of birth. As such, totals may not equal the sum of U.S.-born and foreign-born. 3. Among patients with negative culture and NAA performed. 4. Percent is among patients with a pulmonary site of disease. 5. 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. 6. 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.

TABLE 6: Tuberculosis cases and rates[1] by select characteristics, New York City, 1900-2015

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	11,997	349.0					9,630	280.2
1910	32,065	672.7					10,074	211.3
1920	14,035	249.7					7,915	140.8
1930	11,821	170.6					4,574	66.0
1940	9,005	120.8					3,680	49.4
1950	7,717	97.8					2,173	27.5
1960	4,699	60.4					824	10.6
1970	2,590	32.8					432	5.5
1971	2,572	32.6					316	4.0
1972	2,275	28.8					335	4.2
1973	2,101	26.6					259	3.3
1974	2,022	25.6					215	2.7
1975	2,151	27.2					208	2.6
1976	2,151	27.2					187	2.4
1977	1,605	20.3					175	2.2
1978	1,307	16.6					188	2.4
1979	1,530	19.4					121	1.5
1980	1,514	21.4					143	2.0
1981	1,582	22.4					155	2.2
1982	1,583	22.4					168	2.4
1983	1,603	22.7					151	2.1
1984	1,573	22.2	1,485				168	2.4
1985	1,811	25.6	1,756				155	2.2
1986	2,197	31.1	2,156				186	2.6
1987	2,166	30.6	2,129				219	3.1
1988	2,281	32.3	2,205				246	3.5
1989	2,535	35.8	2,404				236	3.3
1990	3,506	47.9	3,384				256	3.5
1991	3,653	49.9	3,462	1,826	24.9	385	245	3.3
1992	3,755	51.3	3,401	1,855	25.3	437	200	2.7
1993	3,151	43.0	2,784	1,529	20.9	287	166	2.3
1994	2,941	40.2	2,433	1,280	17.5	183	133	1.8
1995	2,408	32.9	1,996	1,001	13.7	114	94	1.3
1996	2,013	27.5	1,693	873	11.9	84	67	0.9
1997	1,705	23.3	1,383	708	9.7	57	55	0.8
1998	1,528	20.9	1,232	611	8.3	38	52	0.7
1999	1,436	19.6	1,124	571	7.8	31	49	0.7
2000	1,311	16.4	1,043	516	6.4	24	44	0.5
2001	1,232	15.4	938	454	5.7	24	33	0.4
2002	1,071	13.4	819	436	5.4	29	30	0.4
2003	1,132	14.1	865	428	5.3	22	34	0.4
2004	1,036	12.9	793	395	4.9	19	32	0.4
2005	983	12.3	745	378	4.7	24	21	0.3
2006	947	11.8	705	354	4.4	23	19	0.2
2007	909	11.4	707	379	4.7	9	16	0.2
2008	886	11.1	685	339	4.2	11	21	0.3
2009	757	9.5	539	281	3.5	9	26	0.3
2010	705	8.6	511	265	3.2	11	27	0.3
2011	684	8.4	501	264	3.2	16	32	0.4
2012	652	8.0	495	271	3.3	19	18	0.2
2013	650	8.0	473	258	3.2	7	17	0.2
2014	582	7.1	454	243	3.0	10	-	-
2015	577	7.1	447	239	2.9	5	-	-

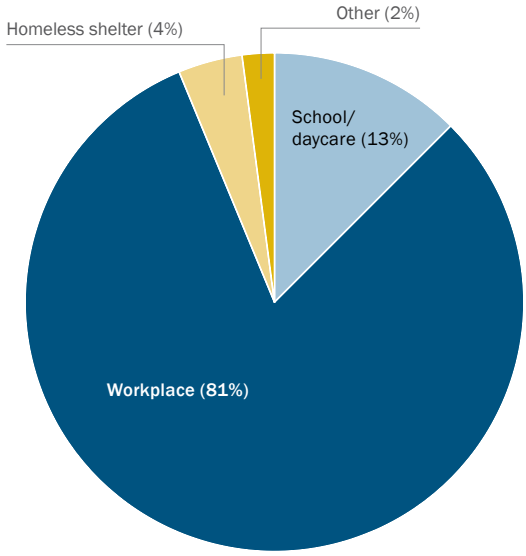
1. Rates are based on decennial Census data. 2. Multidrug-resistant (MDR) TB is defined as resistance to at least isoniazid and rifampin. 3. Data on TB deaths are obtained from the NYC Health Department's Office of Vital Statistics. Deaths recorded in a given year may include cases diagnosed in a previous year. This data was not available for the years 2014 and 2015.

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-associated facilities). The Health Department investigates TB exposures at these sites to identify and evaluate contacts, determine if transmission has occurred, assess whether further testing may be warranted and identify and treat individuals with TB infection.

Multi-institutional and multi-disciplinary partnerships have played a key role in the success of contact investigations in congregate settings. The Health Department works closely with City and federal programs, such as the NYC Department of Homeless Services, NYC Office of School Health, NYC Bureau of Correctional Health Services and the CDC Division of Global Migration and Quarantine.

FIGURE 19: Epidemiologic investigations in non-household settings[1] by site type, number of exposed contacts and transmission assessment, New York City, 2015 (n=48)



	≥15 exposed contacts	<15 exposed contacts	Total
Number of sites	18	30	48
Transmission likely[2]	4 (24%)	5 (19%)	9 (21%)
Number of contacts	1,133	204	1,337
Contacts eligible for testing[3]	1,091 (96%)	192 (94%)	1,283 (96%)
Contacts tested	847 (78%)	173 (90%)	1,020 (80%)
Contacts with a positive TB test result	42 (5%)	22 (13%)	64 (6%)

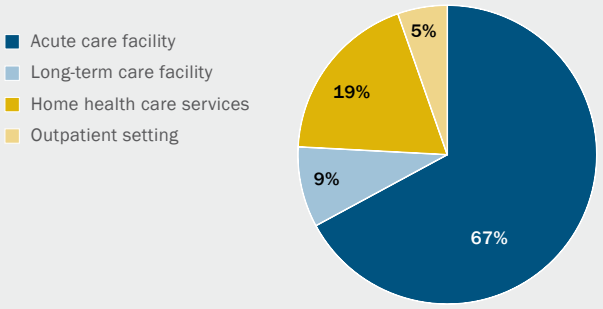
1. Excludes health care-associated investigations (n=149).
2. Proportion calculated among investigations where transmission could be assessed.
3. Contacts eligible for testing are defined as contacts without a known history of TB disease or documented positive test for TB infection who were alive subsequent to the diagnosis of the infectious TB case to whom they were exposed.

TB EXPOSURES IN HEALTH CARE- ASSOCIATED SETTINGS IN NEW YORK CITY IN 2015:

Health care-associated TB exposures remain a concern, as most individuals with TB are diagnosed in an acute care setting. In 2015, 117 patients with TB disease in NYC were associated with an exposure in a health care setting. Transmission at these sites was infrequently found.

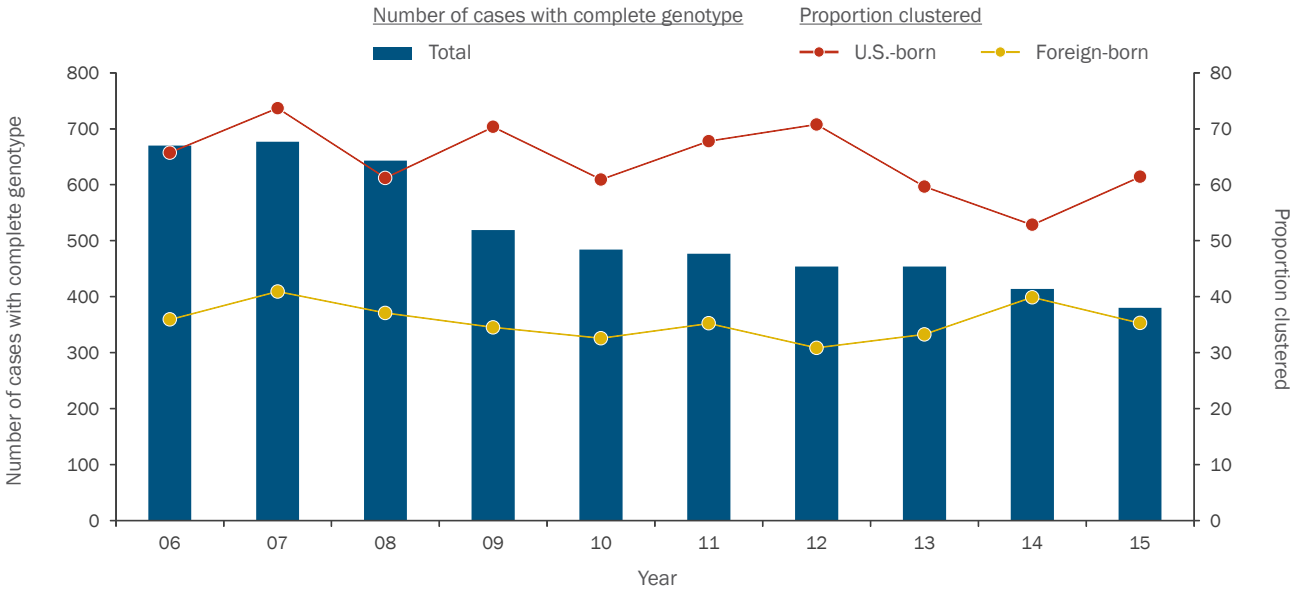
149 Number of investigated TB exposures that occurred in health care-associated settings in NYC

FIGURE 20: Epidemiologic investigations in health care settings by site type, New York City, 2015 (n=149)



GENOTYPING AND CLUSTERING

FIGURE 21: Number of culture-positive tuberculosis cases with complete genotype[1] and proportion clustered[2] by birth in the United States,[3,4] New York City, 2006-2015



1. Complete genotype is defined as a valid spacer oligonucleotide typing analysis (spoligotype) and IS*6110* restriction fragment length polymorphism analysis (RFLP) result. 2. Cases were defined as clustered if they had similar or exact-matching RFLP and spoligotype results to at least one other TB case counted in NYC since January 1, 2001. 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.

39% Proportion of cases that were clustered among all culture-positive cases in 2015

70% Proportion of 881 NYC clusters identified since 2001 comprised of 2 or 3 cases

43 Number of NYC clusters with 3 or more cases identified since 2013

TABLE 7: Number of culture-positive tuberculosis cases with complete genotype[1] and proportion clustered[2] by most common countries of birth among tuberculosis cases,[3,4,5] New York City, 2015

Country of birth	Number of cases	Number of cases with complete genotype	Number of cases clustered	Percent clustered
1. China	131	99	36	36
2. United States	104	57	35	61
3. Mexico	36	23	10	43
4. Philippines	28	24	5	21
5. Bangladesh	26	14	2	14
6. Dominican Republic	24	17	7	41
7. Ecuador	22	15	10	67
8. Haiti	22	12	3	25
9. India	22	16	6	38
10. Guyana	17	11	7	64

1. Complete genotype is defined as a valid spacer oligonucleotide typing analysis (spoligotype) and IS*6110* restriction fragment length polymorphism analysis (RFLP) result.2. Cases were defined as clustered if they had similar or exact-matching RFLP and spoligotype results to at least one other TB case counted in NYC since January 1, 2001. 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. China includes individuals born in mainland China, Hong Kong, Taiwan and Macau. 5. Excludes cases with unknown country of birth.

COMMUNITY-BASED COLLABORATION AND OUTBREAK RESPONSE

Partnering with community organizations is a critical part of achieving a shared vision of healthy communities. These collaborative efforts capitalize on the expertise and resources of all partners to collectively improve TB elimination efforts. In 2015, the Health Department partnered with community groups, health care providers and political organizations to plan coordinated TB outbreak response in two NYC neighborhoods. These partnerships laid the foundation for community-based efforts aimed at TB elimination.

OUTBREAK RESPONSE, SUNSET PARK BROOKLYN:

In response to an outbreak of TB among young adults born in China and residing in or with epidemiologic links to Sunset Park, Brooklyn, the Health Department worked closely with community health care providers, elected officials, community-based organizations and local media outlets to encourage prompt TB diagnosis, identify and interrupt TB transmission and increase awareness of TB and TB-related services in the affected neighborhood.

181 people were tested for TB at four community health events, where free hepatitis testing, influenza vaccination, dental exams and other health services were also available.

168 people were evaluated during six weeks of TB testing via a mobile van in Sunset Park. Testing was co-sponsored by community organizations and local politicians, and conducted by Health Department staff and community volunteers.

The Health Department developed educational materials to encourage high-risk individuals to get tested and treated for TB. Messaging was disseminated through local media outlets, geo-targeted web ads, social media platforms, the Health Department website and posters and flyers distributed in the affected neighborhood.

OUTBREAK INVESTIGATION AT AN NYC ELEMENTARY SCHOOL:

In 2015, the Health Department identified a cluster of TB cases among patients with epidemiologic links to an elementary school in the Bronx.

Outbreak investigation and response activities were initiated in October 2015 in conjunction with the NYS Department of Health and NYC Department of Education and included TB information sessions at the school; onsite TB testing using blood-based tests; and follow-up with students, families, staff and community health care providers to ensure appropriate evaluation and treatment for exposed individuals.

587 individuals have been evaluated in conjunction with this investigation to date.

TB ACTION NEWS, BTBC's ONLINE NEWSLETTER:

In 2015, the Health Department launched a quarterly online newsletter, "TB Action News." This newsletter includes information about recent Health Department research, upcoming TB-related events, clinical information related to the diagnosis and treatment of TB and links to resources.

600 Number of health care providers, public health personnel and community advocates who received the newsletter in 2015

RESOURCES FOR COMMUNITIES AND THE PUBLIC:

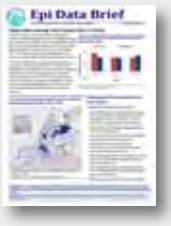
NYC INTERACTIVE HEALTH DATA ONLINE:

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**

"YOU CAN STOP TB" EDUCATIONAL POSTER:

Provides basic TB information and includes illustrations with captions; available in English, Spanish, French, Haitian Creole, Hindu, Urdu, Bengali, Tibetan, Tagalog and Chinese. To request information or posters in hard copy or digital formats, **call 311**

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/html/doh/html/data/epidata.shtml**

REPORTING SUSPECTED AND CONFIRMED TUBERCULOSIS CASES

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 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 or by express or overnight mail, fax, or telephone.

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

- Smear (from any anatomic site) positive for acid-fast bacilli (AFB)
- 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
- Any child younger than 5 years old (up to the day of the fifth birthday) who has a positive tuberculin skin test (TST) or a positive blood-based test for latent TB infection regardless of whether the child has received BCG vaccination

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 are encouraged to report electronically through an NYCMED account. Alternatively, providers may fax a completed URF to the 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 NYC Health Department:

- Information needed to identify and locate the individual (e.g., name, telephone, address, date of birth, e-mail)
- Provider information (e.g., physician's name, reporting facility)
- 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 results, 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 Health Department 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 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 in patient follow-up. 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, per Health Code § 11.21(a)(1), 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 the submission of mandatory monthly patient status reports, the Health Department has created the "Report of Patient Services" form (TB 65). This form, or other 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.

HOSPITAL DISCHARGE PLAN AND TUBERCULOSIS TREATMENT PLAN REPORTING REQUIREMENTS:

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.

The Hospital Discharge Approval Request Form (TB354) can be found online at: **nyc.gov/html/doh/downloads/pdf/tb/tb-discharge-checklist.pdf**

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

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)]. The **TB Treatment Plan** is available online at: **nyc.gov/html/doh/downloads/pdf/tb/tb-treatment-plan-inst.pdf**

›› INQUIRIES AND FORMS:

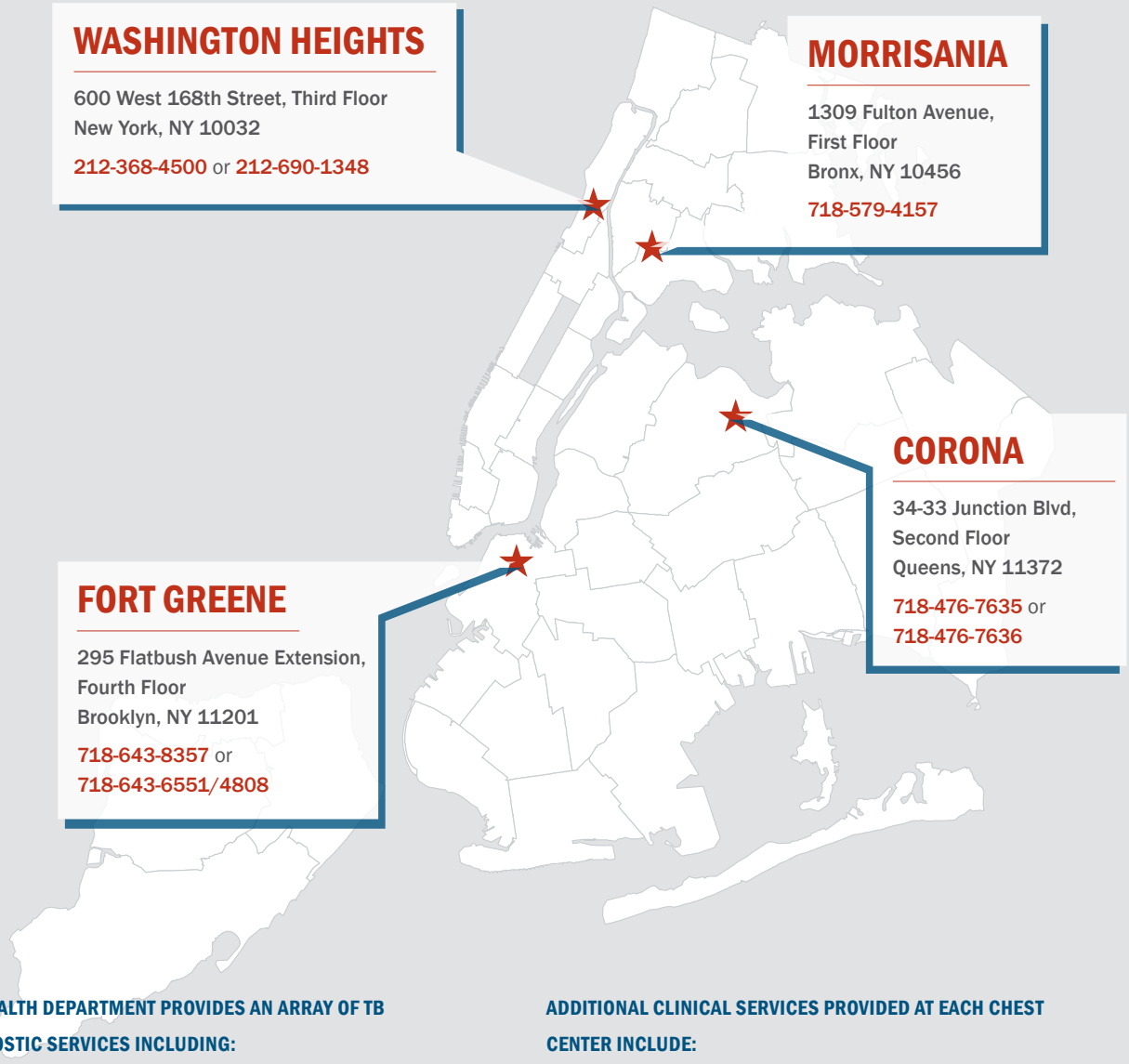
- To inquire further about reporting procedures, **call 311** and ask for the BTBC Surveillance Unit, or go to nyc.gov and search **TB REPORTING REQUIREMENTS**
- To obtain a URF, go to nyc.gov and search **URF**
- To create a NYCMED account, go to nyc.gov and search **NYC MED** or go to: **https://a816-healthpsi.nyc.gov/NYCMED/Account/Login**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

TECHNICAL NOTES

1. Data for 2015 are preliminary and reflect the most complete information available as of February 1, 2016.
2. Data prior to 2015 have been updated since the release of the 2014 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 to 1940, only cases of pulmonary TB were reportable. Beginning in 1978, the TB case definition was amended to consider people who had verified 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. 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.
6. The NYC 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.
7. 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.
8. 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, 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.
9. 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.
10. Data presented on HIV status reflect information as collected by the Bureau of Tuberculosis Control. 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.
11. 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.
12. Product names are provided for identification purposes only; their use does not imply the NYC Health Department's endorsement.

HEALTH DEPARTMENT CHEST CENTERS

Eligible patients can be referred to one of four Health Department chest centers located throughout New York City 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.



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
- Directly Observed Therapy (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
- Human immunodeficiency virus (HIV) education and testing regardless of person's need for TB care
- TB evaluation for newly arrived immigrants and refugees referred by the Centers for Disease Control and Prevention

TO MAKE AN APPOINTMENT OR REFER A PATIENT, CALL THE INDIVIDUAL CHEST CENTER OR CALL 311

NYC Health