STOPPING TB TOGETHER

NEW YORK CITY DEPARTMENT OF HEALTH AND MENTAL HYGIENE

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:

- **To identify all individuals with suspected and confirmed TB disease and ensure their appropriate treatment, ideally on directly observed therapy (DOT)**
- **To ensure that individuals at high risk for progression from TB infection to TB disease complete treatment for TB infection 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 less than 5 years of age with TB infection
- Ensure that providers and laboratories report suspected and confirmed TB cases to the BTBC
- Monitor and document the treatment status of all patients with TB disease
- 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 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 infection and disease
- 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 TB cultures are sent to the 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 2014 and provides robust surveillance data, summaries of core program activities, and highlights. The data reflect the most complete information available as of February 2, 2015. For additional details on the use of denominators and changes in this report, please see Technical Notes (page 34).

A PDF of this and past TB reports and slides for select figures and tables will be available at nyc.gov, search **TB REPORT**.

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TABLE OF CONTENTS

ASSISTANT COMMISSIONER'S LETTER

March 24, 2015

Dear Colleagues,

Last year, Bureau of Tuberculosis Control (BTBC) staff members played key roles in helping New York City (NYC) confront Ebola virus disease. In response to these unprecedented events, the City employed the same core activities that the BTBC uses every day to control TB in NYC: rapid identification, isolation and treatment of infectious cases and contact identification and testing.

As a result of these effective, patient-centered strategies, the number of TB cases in NYC reached a new historic low of 585 in 2014. TB incidence decreased 10% to a rate of 7.2 per 100,000. In addition, NYC exceeded the national goal of 93% treatment completion among TB patients in 2014, and the percentage of patients infected with human immunodeficiency virus (HIV) remained low at 7%.

These accomplishments also reflect the invaluable contributions of our many partners. Collaboration among the BTBC, community health care providers, hospitals and laboratories has resulted in an 84% reduction in TB cases since the epidemic's 1992 peak and is essential for the continued success of TB control in NYC.

We are proud of our progress but recognize that challenges remain. Foreign-born New Yorkers still disproportionately bear the burden of TB. In 2014, 85% of NYC TB cases were among patients born outside the United States. We are committed to working with key stakeholders and affected communities to address these inequities.

In 2014, the BTBC adopted several novel initiatives to better meet patient needs. We have greatly increased the availability of video-based directly observed therapy, a more convenient alternative for our patients. The latest generation of the blood-based QuantiFERON®-TB Gold test is now the BTBC's standard test for TB infection in all settings, and the new shortened treatment regimen for TB infection, known as "3HP," is now available at all of our chest centers.

Achieving our mission of eliminating TB requires the active engagement of all parts of the health system and of the communities that we serve. I congratulate BTBC staff and our many partners on the important successes we have already achieved and look forward to our continued collaboration as we work to stop TB together.

Sincerely,

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

In 2014, the number of confirmed tuberculosis cases in New York City dropped to 585, a 10% decrease from 2013 and the lowest number since the disease became reportable in 1897.

FIGURE 1: Tuberculosis cases and rates,[1] New York City, 1982-2014

1. Rates are based on decennial Census data.

EXECUTIVE SUMMARY

- The number of tuberculosis (TB) cases and the rate of TB in New York City (NYC) decreased by 10% between 2013 and 2014, from 650 cases and a rate of 8.0 per 100,000 to 585 cases and a rate of 7.2 per 100,000. NYC's rate of TB remains more than twice the national rate of 3.0 per 100,000 (provisional).
- Compared to other age groups, the greatest decline in cases from 2013-2014 occurred among people 18 to 44 years of age (21%). However, the majority of TB cases (42%) still occurred among this age group. People 65 years of age and older continued to have the highest rate of TB in 2014 (12.5 per 100,000). The lowest rate of TB, 1.5 per 100,000, was among children younger than 18 years of age.
- The rate of TB among males in NYC, 9.3 per 100,000, was almost twice the rate of TB among females, 4.8 per 100,000.
- TB still disproportionately affects foreign-born people in NYC. In 2014, 85% of TB patients were foreign-born. After remaining stable from 2011 to 2013, the rate of TB among foreign-born people decreased by 10% between 2013 and 2014, from 17.2 to 15.5 per 100,000.
- More than half (64%) of foreign-born TB patients resided in the United States (U.S.) for more than five years at the time of diagnosis.
- China was the most common country of birth for TB patients in 2014, exceeding the number of patients born in the U.S. (131 vs. 86, respectively). The number of TB patients born in the U.S. fell below 100 for the first time since TB became a reportable disease in 1897.
- Close to half of U.S.-born TB patients were non-Hispanic Blacks and the rate of TB for this group (3.3 per 100,000) was more than six times the rate among U.S.-born non-Hispanic Whites (0.5 per 100,000). U.S.-born Asians were the only U.S.-born group for which the number of cases increased in 2014 (from five to eight cases).
- Queens continued to have the greatest number of TB cases in 2014 with 212 cases (36% of all NYC cases), and a rate of 9.2 per 100,000. The United Hospital Fund (UHF) neighborhood with the highest rate of TB was Sunset Park in Brooklyn with a rate of 23.1 per 100,000, which is more than three times the citywide rate. Thirteen UHF neighborhoods (31%) had TB rates that exceeded the overall NYC rate, and 26 (62%) exceeded the national rate.
- In 2014, there were 10 patients with a multidrug-resistant (MDR) TB strain, an increase from seven in 2013. None of these patients had extensively drug-resistant TB strains. The majority (90%) occurred among foreign-born patients.
- There were 39 TB patients with human immunodeficiency virus (HIV) infection in 2014; more than half (69%) were foreign-born.
- In 2014, BTBC adopted several new initiatives aimed at improving patient care and outcomes. The latest generation QuantiFERON®-TB Gold (QFT) blood-based test for TB infection was adopted by the BTBC as the standard test for TB infection in all settings. Following two pilot projects, the BTBC now offers a three-month treatment regimen of isoniazid and rifapentine for TB infection, known as 3HP, at all chest centers and provides directly observed therapy (DOT) through secure video conferencing (VDOT) for eligible patients with suspected or confirmed TB disease.
- In June 2014, the NYC Health Code was revised to require the reporting of subsequent negative TB diagnostic laboratory results for patients with a previous positive laboratory result. Under the new law, negative laboratory results from specimens collected within one year of the most recent positive result must be reported.
- Since June 2013, 15 cases have been linked to an outbreak of TB among young adults born in China and residing or spending time in the same Brooklyn neighborhood. Frequent use of internet cafes and work in out-of-state restaurants is common among these patients.

CORE ACTIVITES

SURVEILLANCE

The BTBC maintains a state-of-the-art registry and case management system (Maven) for patients with confirmed and suspected TB disease, contacts to TB patients and children younger than 5 years old who are reported with TB infection in NYC. Maven includes all the data needed to assist BTBC staff with case management for TB patients and their contacts, 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.

The BTBC reviews all reports submitted by providers and laboratories for timeliness and accuracy, determines whether patients are eligible for case management and ensures that TB patients residing outside of NYC are reported to the appropriate jurisdiction.

ELECTRONIC REPORTING: Health care providers in NYC are encouraged to report individuals electronically via the NYC Health Department's NYCMED portal. Laboratories are required to report individuals with reportable conditions through New York State's Electronic Clinical Laboratory Reporting System (ECLRS). Electronic reporting enables more efficient processing and reduces the time to case management initiation.

For more information on TB reporting requirements in NYC see page 28-30.

CHEST CENTERS

The BTBC is one of the leading providers of TB care in NYC. The BTBC operates four chest centers in NYC, in the Bronx, Brooklyn, Manhattan and Queens. To assist in rapidly identifying patients with TB, all chest centers provide an array of TB diagnostic services including tuberculin skin tests (TST) and latest generation QuantiFERON®-TB Gold (QFT) tests for TB infection, sputum induction and chest radiographs. The chest centers also offer treatment for TB infection and disease, as well as Directly Observed Therapy (DOT) services. Anyone with symptoms of TB or a positive test for TB infection is eligible for medical evaluation and treatment at no cost at these chest centers.

Additional services provided at each chest center include:

- Outpatient medical and nursing care
- Social services referrals
- Human immunodeficiency virus (HIV) counseling and testing
- TB evaluation for newly arrived immigrants and refugees referred by the Centers for Disease Control and Prevention (CDC)

For a list of BTBC chest center locations, see page 33.

SURVEILLANCE IN 2014:

- 585 TB cases, 2,797 persons suspected of having TB disease, 4,399 contacts (those exposed to a TB case), and 105 children younger than 5 years of age with TB infection were newly identified in NYC.
- 293 individuals (cases, suspects, and contacts) were referred by the BTBC to other jurisdictions for follow-up evaluation and treatment; 138 were referred to the BTBC by other jurisdictions.
- BTBC certified one laboratory for reporting via ECLRS, bringing the total number of certified laboratories to 33 (92% of all eligible).

CHEST CENTERS IN 2014:

- Of 585 TB cases in 2014, 332 (57%) received some or all of their TB care at a BTBC chest center.
- 64% of NYC TB patients with an AFB-positive respiratory smear received care at a BTBC chest center.
- BTBC chest centers provided TB-related services during 37,654 patient visits.
- BTBC chest center staff performed 3,572 tests for TB infection; 15% of tests were positive.
- 1,014 patients started treatment for TB infection at BTBC chest centers.
- 199 immigrants and refugees were reported to the BTBC by CDC. 89% were seen by a BTBC physician or other NYC provider within 30 days of being reported to the BTBC; 96% completed evaluation for TB disease or infection.
- The BTBC performed 3,187 tests for HIV, of which 0.3% were positive.

CORE ACTIVITES

EVALUATION OF NEWLY ARRIVED IMMIGRANTS AND REFUGEES: The BTBC conducts domestic follow-up evaluations for newly arrived immigrants with an overseas TB screening classification to rule out TB disease and infection and offer treatment as indicated.

HIV TESTING AND COUNSELING: The BTBC provides rapid HIV testing and 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.

For information about recent updates to HIV testing laws see page 29.

FIELD SERVICES

The BTBC provides case management for all confirmed TB cases in NYC, people who may have been exposed to TB, and for many people who are suspected of having TB. Case management occurs for hospitalized patients and those who receive care from outpatient clinics and private medical providers. Activities include patient education on TB pathogenesis and transmission, comprehensive patient interviews, contact identification and evaluation, DOT, monthly monitoring for adherence to medical appointments and treatment and patient support.

The BTBC also locates non-adherent patients and returns them to medical supervision, participates in the transfer of patient care between NYC and other jurisdictions, and collaborates with non-BTBC health care providers.

DIRECTLY OBSERVED THERAPY

DOT is NYC's standard of care for patients with suspected or confirmed TB disease. During DOT, a patient is observed by a health care worker while taking anti-TB medications. DOT is arranged to be flexible and convenient for patients. Although DOT is not legally enforceable for all patients, the law allows court-ordered DOT for patients who are both unwilling to adhere to recommendations for treatment and who may pose a public health threat.

In NYC, DOT is conducted by trained BTBC staff as well as staff at three NYC Health and Hospitals Corporation (HHC) facilities. All four BTBC chest centers provide DOT services onsite, and BTBC field staff provide DOT in homes, worksites and other locations, both during and outside of traditional business hours.

FIELD SERVICES AND DOT IN 2014:

- BTBC field staff initiated or continued case management for 1,091 confirmed TB cases and for 1,116 patients newly suspected of having TB.
- 4,399 contacts were identified around 504 TB cases eligible for contact investigation; 3,245 have been evaluated to date and 517 had a positive TB test result.
- BTBC field staff conducted 5,573 facility visits to conduct medical record reviews, interview patients and meet with treating physicians, infection control practitioners and discharge planners.
- BTBC field staff made 2,606 home visits and 12,600 telephone calls to patients to promote treatment adherence; return non-adherent patients to service; and conduct patient interviews, contact investigations and home assessments.
- 429 confirmed TB cases were enrolled in DOT through the BTBC or another health care provider. Of these, 126 were enrolled in a video-based DOT (VDOT) program.
- BTBC field staff made approximately 16,900 home and field visits to perform field-based DOT for 342 patients with suspected or confirmed TB disease.
- BTBC chest center and field staff provided approximately 39,670 DOT observations for 1,005 TB patients with suspected or confirmed TB disease and patients with TB infection.

CORE ACTIVITES

MEDICAL TREATMENT AND CONSULTATION

BTBC physicians provide medical evaluation and treatment for patients with suspected or confirmed TB disease and for contacts with TB infection. They also conduct standardized reviews of patients with suspected or confirmed TB disease and consult with non-Health Department 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 NYC hospital patients. In addition, BTBC physicians review all cases of drug-resistant TB monthly to ensure appropriate therapy and complete follow-up and management of contacts.

The BTBC works with the NYC Public Health Laboratory (PHL) to ensure timely and appropriate reporting of laboratory results and completion of susceptibility testing for specimens received. The BTBC and PHL are currently working together to offer new modalities for TB diagnosis and drug resistance testing for BTBC clinics and non-Health Department providers.

The BTBC collaborates with the CDC-sponsored Northeast Regional Training and Medical Consultation Consortium (RTMCC) at the New Jersey Medical School Global TB Institute (GTBI). Additionally, BTBC staff members serve on the Northeast RTMCC Medical Advisory Board and the Board of the National TB Controllers Association. BTBC physicians also participate in the TB Expert Network Conference, a joint project among the CDC, all RTMCCs and the National Jewish Medical Research Center.

BTBC physicians also give medical grand rounds on TB topics at hospitals and outpatient facilities throughout the city and coordinate with hospitals on citywide TB Rounds. The BTBC also hosts a TB Rounds meeting every year.

To request a medical lecture, grand rounds presentation, or TST training, please email: ***tb@health.nyc.gov***

To obtain expert medical consultation regarding TB, receive additional information about available TB services, report TB cases and suspects, obtain forms, or refer patients for TB testing or treatment at a BTBC chest center, call ***311***

EDUCATION AND TRAINING

The BTBC works to ensure that all TB patients receive the highest quality of care in line with current TB guidelines. The BTBC offers professional development and educational resources for health care providers and organizations that serve high-risk populations. A dedicated training team also ensures that BTBC staff members are well-qualified to meet the day-to-day demands of their work. In 2014, BTBC staff were trained in motivational interviewing techniques to improve contact elicitation and encourage at-risk contacts to initiate treatment for TB infection.

EDUCATION & TRAINING IN 2014:

- The BTBC hosted TB control colleagues from several countries, including England and India.
- The 2014 Annual World TB Day Conference gave 170 health care providers from NYC and other jurisdictions the opportunity to learn about updated TB care guidelines and recommendations. The conference also emphasized TB advocacy and addressed barriers to TB care. The conference was jointly sponsored by the NYC Health Department, GTBI, and the Center for Continuing and Outreach Education at Rutgers Biomedical and Health Sciences.
- The Second Annual NYC TB Walk and Rally was held on March 22, 2014. It was organized by RESULTS in partnership with the NYC Health Department, other state and city agencies, nonprofit organizations and volunteers. The event's goals were to raise TB awareness, inspire action and reinvigorate community stakeholders. TB survivors shared their experiences and challenges, and several local experts and policymakers participated. Over 80% of surveyed participants said they would take action to raise TB awareness in their community or contact an elected official after participating in the walk. The walk attracted national and international attention, inspiring the planning of TB walks in other cities.

Follow the 2015 NYC TB Walk on Facebook: ***facebook.com/nyctbwalkandrally*** *and Twitter:* ***@tbwalknyc #TBwalknyc***

CORE ACTIVITES

COMMUNITY AND PROVIDER OUTREACH

In 2014, BTBC created a new Office of Outreach. The Office of Outreach will help facilitate the detection, treatment, and prevention of TB through several community and provider based efforts. Specifically, the office will:

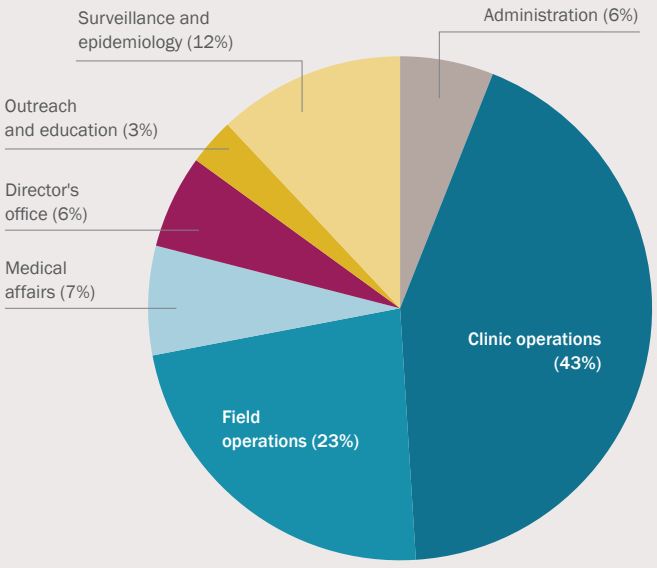
- Prioritize populations of focus
- Engage community stakeholders in educational efforts
- Assess barriers to care-seeking and treatment adherence
- Develop community-based efforts aimed at increasing knowledge of TB risk and encouraging care-seeking
- Educate providers about TB risk and treatment
- Evaluate outreach efforts

The Office of Outreach will also work closely with the Health Department's Office of Communications to develop TB educational materials that are culturally relevant and linguistically appropriate. Through this partnership, the BTBC will utilize various media outlets to more broadly raise awareness about TB within the community, with a specific focus on higher risk neighborhoods and populations.

FUNDING AND BTBC ADMINISTRATION

The BTBC receives city, state and federal funding, and has non-financial agreements with two organizations that support laboratory services and DOT. Funds support all BTBC activities, from hiring staff to operating the TB chest centers.

FIGURE 2: Bureau of Tuberculosis Control staff by work function, 2014 (n=208)



FUNDING AND ADMINISTRATION IN 2014:

- The BTBC had an operational budget of approximately $15.5 million: 36% from the federal government, 12% from New York State, and 52% from NYC.
- The BTBC had 181 full-time employees and 27 part-time/ volunteer staff.

POLICY AND EVALUATION

The BTBC's policies and practices are intended to meet national and local objectives for public health and patient care. Performance targets are developed in coordination with partners at the NYC Health Department, the New York State Department of Health, and the CDC. Core performance measures are divided into three major categories: treatment and case management, laboratory reporting, and contact investigation. The BTBC routinely monitors and evaluates performance measures to ensure that they result in high-quality patient services and effective TB control.

TABLE 1: Select performance measures, national targets, and New York City performance outcomes, 2012-2013[1,2]

Performance measure[2]	Target	2012	2013
Treatment and case management of persons with TB disease			
Initiate TB treatment within 7 days of specimen collection[3]	95%	89%	86%
Started on recommended initial 4-drug TB regimen[4]	93%	96%	96%
Sputum culture conversion within 60 days of treatment initiation[5]	62%	76%	73%
Contact Investigation			
Cases with contacts elicited[6]	100%	95%	96%
Contacts evaluated[7]	93%	83%	84%
Contacts who initiated treatment for TB infection[8]	88%	80%	80%
Contacts who completed treatment for TB infection[9]	79%	72%	68%

(See notes at right.)

As part of routine monitoring and evaluation, the BTBC regularly revises its policies based on available evidence or need. In 2014, the NYC Health Code was revised to require the reporting of negative TB diagnostic laboratory results. *For more information on the new regulations, see page 28.*

One of the BTBC's key evaluation activities is the quarterly cohort review process. During cohort review meetings, the BTBC Assistant Commissioner reviews the case management and treatment outcomes for all patients with TB disease and their contacts four to six months after TB diagnosis. Successes and challenges in patient care and case management are used to inform policy development and identify training needs. Cohort review also provides an opportunity to assess data completeness and quality. In 2014, the BTBC reviewed 612 cases during these quarterly meetings.

If you are interested in learning more about the BTBC's policies and evaluation activities or in attending one of our cohort review meetings, please contact Dr. Michelle Macaraig at ***mmacarai@health.nyc.gov***

PERFORMANCE MEASURE DEFINITIONS:

1. Definitions for performance measures and national indicators are established by the CDC. 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 having reported taking an initial drug regimen and alive at diagnosis. Initial drug regimen is the first regimen taken for at least two weeks of treatment. Recommended four-drug regimen includes isoniazid, rifampin, pyrazinamide, and ethambutol.
5. 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.
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.

CORE ACTIVITES

FIELD EPIDEMIOLOGY

The BTBC uses multiple methods to identify and control TB transmission, including contact investigations at congregate settings (e.g., worksites, schools and healthcare-associated settings). The BTBC 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 BTBC 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's Division of Global Migration and Quarantine.

MOLECULAR EPIDEMIOLOGY

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. Genotype results identify whether TB strains are genetically related (i.e. clustered), which helps the BTBC identify false-positive culture results, detect outbreaks, and determine where TB transmission may be occurring.

The BTBC reviews all clustered cases and uses an algorithm to prioritize and assign cases for further epidemiologic investigation. The BTBC also promptly investigates potential false-positive cultures to ensure that patients are not placed on anti-TB medications unnecessarily. False-positive culture investigations are initiated through BTBC review of patients with a single positive culture, prospective matching of genotype results, and requests from BTBC staff, physicians, laboratories, and other health departments.

The BTBC hosts an annual conference on genotyping and molecular epidemiology for academic and laboratory partners and public health colleagues from other jurisdictions. Conference topics in 2014 included updates on NYC genotyping data and related investigations, the New York State laboratory's methodology for spoligotyping, CDC updates on national TB genotyping data and large outbreak surveillance, whole genome sequencing methods and application, and a summary of genotyping-related research projects from 2013 and 2014. The 2015 conference is scheduled for October 2015.

For more information about the upcoming genotyping meeting, please contact Jeanne Sullivan Meissner at ***jsulliv2@health.nyc.gov***

FIELD EPIDEMIOLOGY AND GENOTYPING IN 2014:

- BTBC field epidemiology staff reviewed 413 potential TB exposures in congregate settings. Of these, 153 (37%) were in healthcare facilities, and 37 (9%) were in schools.
- The BTBC completed 17 large epidemiologic investigations (defined as investigations with greater than or equal to 15 exposed people) and 48 small investigations in community-based congregate settings. A total of 896 contacts at these sites were tested for TB infection.
- Isolates were submitted to NYC and New York State public health laboratories for 447 culture-confirmed TB cases; complete genotype results were available for 414 (93%) cases.
- Among TB patients with complete genotype results, 172 (42%) were clustered to another NYC TB patient counted since 2001; clustered cases were in 121 different clusters; cluster investigation was initiated for 78 patients.
- BTBC initiated 26 false-positive culture investigations. Of these, 4 false-positive cultures were confirmed, 1 investigation had an inconclusive result, 12 investigations had an unlikely result, and 9 investigations are pending.

RESEARCH

The BTBC participates in research and evaluation on all aspects of TB control. This includes observational studies on the epidemiology of TB in NYC and participation in clinical research through the CDC TB Trials Consortium (TBTC), which conducts national and international studies to develop new treatment regimens for TB infection and disease. In 2014, BTBC staff published eight articles in peer-reviewed literature (see below). NYC TB data were also presented at the following meetings and conferences:

The American Thoracic Society Annual Conference; Council for State and Territorial Epidemiologists Annual Conference; International Union for Tuberculosis and Lung Disease–North American Regional Meeting; National Tuberculosis Conference; NYC Annual Genotyping Update; NYC Annual World TB Day Conference; NYC Epidemiology Forum; The Union World Conference on Lung Health

BTBC STAFF PUBLICATIONS IN PEER-REVIEWED JOURNALS, 2014:

Bhavnani D, Lancki N, Winter I, Macaraig M. Treatment outcomes of patients with tuberculosis in New York City. *J Public Health Manag Pract.* 2014 Dec 30.

Bushnell G, Drobnik AM, Stennis NL, Proops DC, Ahuja SD, Bornschlegel K, Fuld J. Characteristics and TB treatment outcomes among TB patients with viral hepatitis, New York City 2000-2010. *Epidemiol Infect.* 2014 Nov 12:1-10.

Klein PW, Harris TG, Leone PA, Pettifor AE. HIV testing of tuberculosis patients by public and private providers in New York City. *J Community Health.* 2014 Jun;39(3):494-502.

Macaraig M, Burzynski J, Varma, JK. Tuberculosis control in New York City — a changing landscape. *N Engl J Med* 2014; 370:2362-2365

Sanderson JM, Meissner JS, Ahuja SD. Re: "Estimated rate of reactivation of latent tuberculosis infection in the United States, overall and by population subgroup". *Am J Epidemiol.* 2014 Sep 1;180(5):556-7.

Schluger NW, Burzynski J. Variability in Interferon Gamma Release Assay results and screening for tuberculosis - A Way Forward? *Ann Am Thorac Soc* 2014 Oct; 11(8):1256–1257.

Stennis NL, Trieu L, Ahuja SD, Harris T. Estimated prevalence of tuberculosis infection among a New York City clinic populationusing Interferon-gamma Release Assays. *Open Forum Infectious Diseases.* September 1, 2014. 1 (2).

Stennis N, Trieu L, Perri B, Mushtaq M, Ahuja S. Disparities in tuberculosis burden among South Asians living in New York City, 2001-2010. *Am J Public Health*. 2014 Nov 13:e1-e8.

NYC TB RESEARCH CONSORTIUM

In 2014, the BTBC hosted three meetings of the NYC TB Research Consortium, which brings together health department, academic, laboratory and other researchers to move toward eliminating TB as a public health problem in NYC.

The group's activities include the following: pursuing studies that will guide TB control policies and practices, collaborating on epidemiologic, genotyping and clinical research projects to advance TB research, jointly pursuing funding opportunities and mentoring new researchers and students to develop research skills for future public health careers.

In 2014, NYC TB Research Consortium participants included: Albert Einstein College of Medicine, Bellevue Medical Center, Columbia University, Drexel University, Johns Hopkins University, NYC Health Department, Rensselaer Polytechnic Institute, Public Health Research Institute, and Treatment Action Group (TAG)

For more information or to join the Consortium, please email Dr. Shama Ahuja at ***sahuja@health.nyc.gov.***

BTBC INITIATIVES TO IMPROVE PATIENT CARE, 2014

In 2014, the BTBC adopted several new initiatives aimed at improving patient care and outcomes. By incorporating advances in technology and treatment options into routine activities, the BTBC aims to better meet patient needs and increase the efficiency of our operations.

QUANTIFERON®-TB GOLD TEST FOR TB INFECTION

In 2014, the latest generation QuantiFERON®-TB Gold (QFT) blood-based test for TB infection was piloted by BTBC in household settings. BTBC plans to use QFT as the standard test for TB infection in all settings in 2015. More than 1,100 QFT tests were conducted by BTBC staff at a DOHMH chest center or in a field-based setting in 2014.

QFT has several advantages over the TST: QFT does not yield false-positive results due to prior Bacillus Calmette-Guérin (BCG) vaccination; does not cross react with most non-tuberculous mycobacteria; requires only a single medical visit; and produces instrument-derived quantitative results, which are not subject to reader bias. QFT is the preferred test for foreign-born patients.

VIDEO-BASED DOT

In 2014, the BTBC piloted the use of VDOT, in which BTBC staff use a smartphone and computer to observe remotely as patients with suspected or confirmed TB disease take their anti-TB medications. With VDOT, BTBC staff use a smartphone and computer to observe remotely as patients take their anti-TB medication. The BTBC now offers VDOT as a DOT option to all eligible patients, including those receiving TB care from a non-Health Department provider. To date, 7,907 DOT observations have been conducted via VDOT. Preliminary findings from the pilot suggest that VDOT is a promising alternative to in-person DOT. Compared to traditional DOT, VDOT allows greater flexibility and convenience for the patient and may be more efficient for TB control programs.

*To refer a patient for VDOT, submit a request through a patient's case manager or call **311**.*

SHORTENED TREATMENT FOR TB INFECTION

In December 2014, the U.S. Food and Drug Administration approved use of the drug rifapentine as treatment for TB infection in patients two years of age and older when used in combination with isoniazid. This combination regimen, administered once-weekly and known as 3HP, consists of 12 doses of rifapentine and isoniazid. CDC recommends that 3HP be administered under DOT.

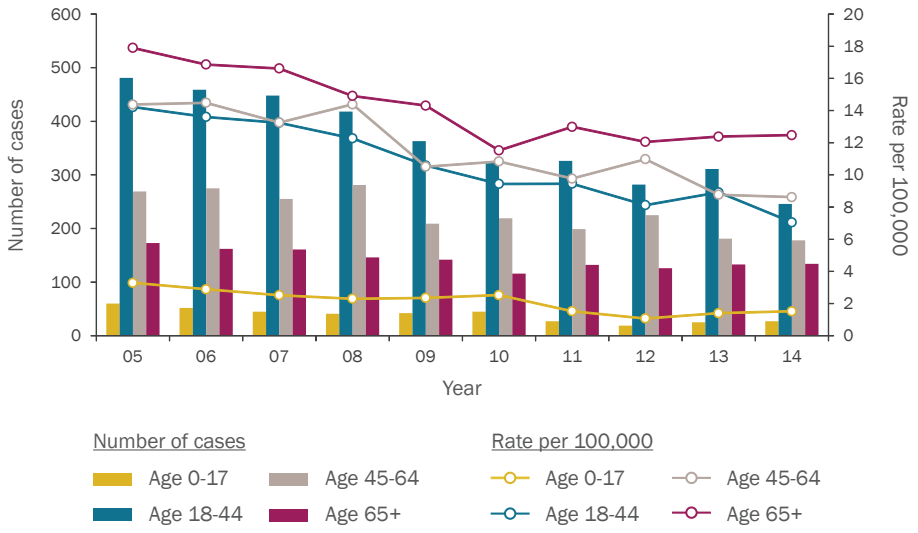
In 2014, the BTBC completed a pilot implementation of 3HP and is now routinely offering 3HP under clinic-based DOT to eligible patients at all four BTBC chest centers. To date, approximately 400 patients have initiated treatment with 3HP. The greatest barrier to acceptance of 3HP during the pilot was the clinic-based DOT requirement. In 2015, the BTBC will offer 3HP in combination with VDOT to increase the acceptability and convenience of 3HP for patients.

If you would like to know more about treating TB infection with 3HP, please go to:
***http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6048a3.htm** or call **311** and ask to speak to a TB Bureau staff.*

PROFILE OF TB CASES

AGE

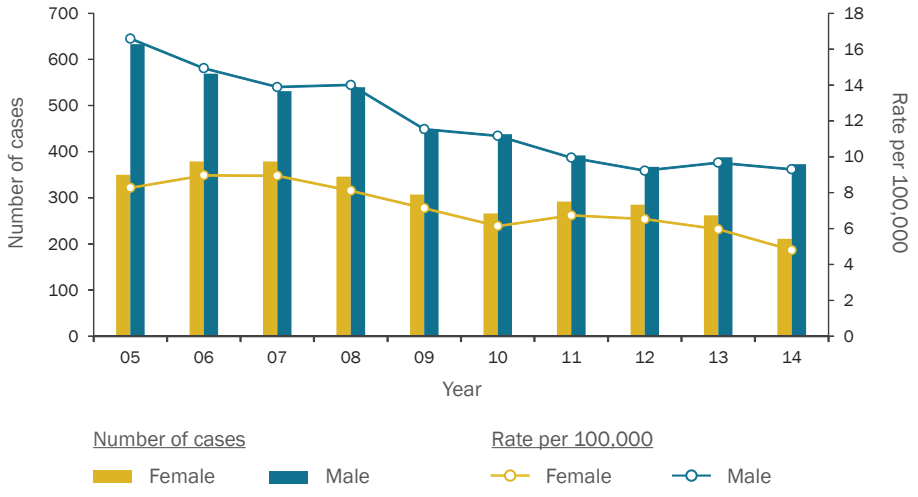
FIGURE 3: Tuberculosis cases and rates[1] by age in years, New York City, 2005-2014



1. Rates are based on NYC DOHMH population estimates, modified from U.S. Census Bureau interpolated intercensal population estimates, 2000-2013. Updated August 2014.

SEX

FIGURE 4: Tuberculosis cases and rates[1] by sex, New York City, 2005-2014



1. Rates are based on NYC DOHMH population estimates, modified from U.S. Census Bureau interpolated intercensal population estimates, 2000-2013. Updated August 2014.

IN 2014:

- The majority of NYC TB cases (42%) occurred among patients 18 to 44 years of age.

21% Decline in the rate of TB among New Yorkers 18 to 44 years of age from 2013 to 2014

- People 65 years of age and older continued to have the highest rate of TB in 2014 (12.5 per 100,000).
- The lowest rate of TB, 1.5 per 100,000, was among children less than 18 years of age.

4 Number of NYC TB cases among children younger than 5 years of age; three were infants under the age of 1

- The rate of TB among males in NYC, 9.3 per 100,000, was almost twice the rate of TB among females, 4.8 per 100,000.

PROFILE OF TB CASES

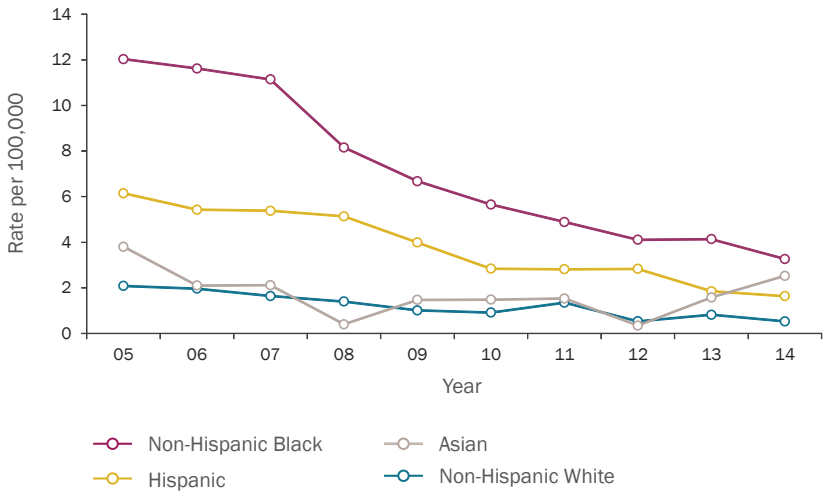
BIRTH IN THE UNITED STATES

FIGURE 5: Tuberculosis cases and rates[1] by birth in the United States (U.S.),[2] New York City, 1992-2014

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 3-year American Community Survey data centered on the given year or the most recent available data.
2. U.S.-born includes individuals born in the U.S. and U.S. territories. Two cases had unknown country of birth.

RACE/ETHNICITY

FIGURE 6: Tuberculosis rates[1] among persons born in the United States (U.S.)[2] by race/ethnicity, New York City, 2005-2014



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 invididuals born in the U.S. and U.S. territories.

IN 2014:

- 85% of patients with TB disease were foreign-born.

86 Number of NYC TB cases in 2014 among patients born in the U.S.

- This is the first year since TB became a reportable disease that the number of cases among the U.S.-born in NYC has fallen below 100.
- After remaining stable from 2011 to 2013, the rate of TB among foreign-born people decreased by 10% between 2013 and 2014, from 17.2 to 15.5 per 100,000.

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

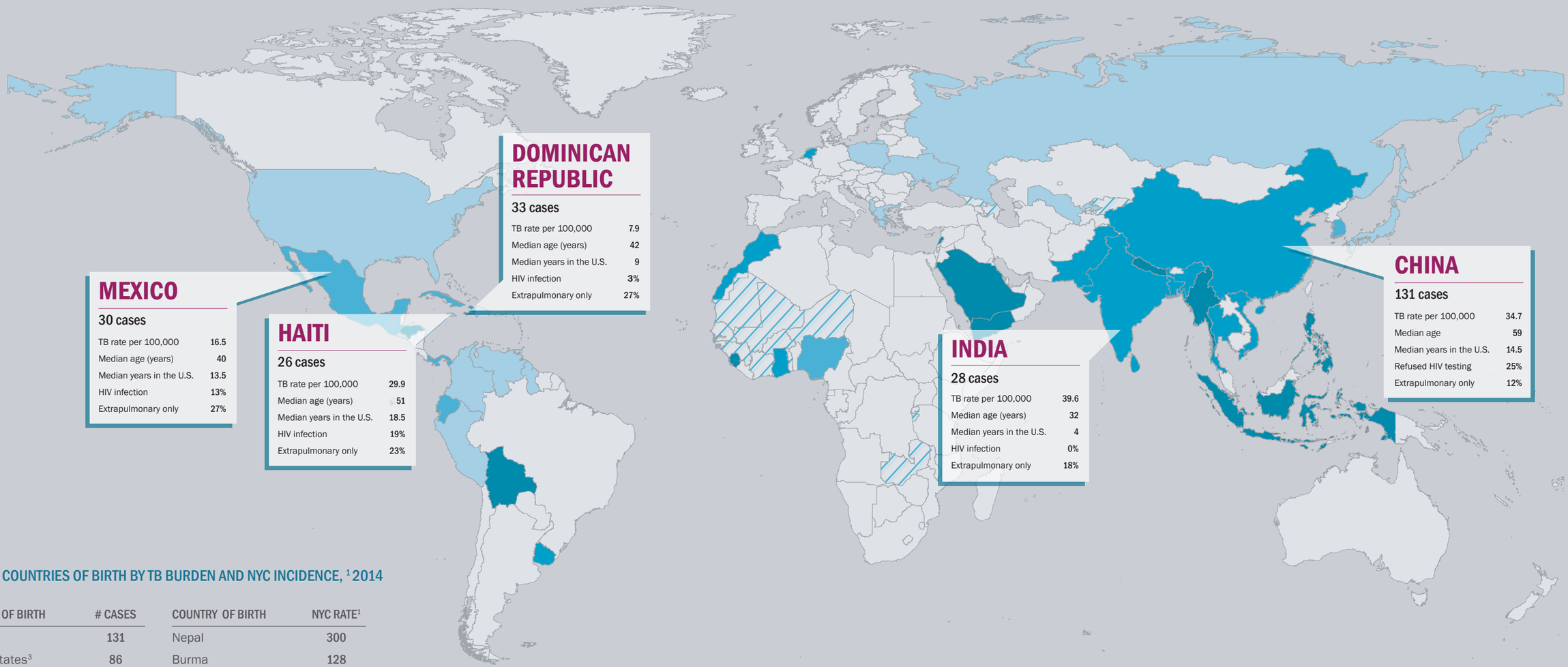
- The TB rate among patients born in the U.S was.1.7 per 100,000.
- Close to half of U.S.-born TB cases occurred among non-Hispanic Blacks, and the rate of TB for this group (3.3 per 100,000) was more than six times the rate among U.S.-born non-Hispanic Whites (0.5 per 100,000).

60% Increase in NYC's TB rate among U.S.-born Asians from 2013 to 2014

- U.S.-born Asians were the only U.S.-born group for which the number of cases increased in 2014 (from five to eight cases).

PROFILE OF TB CASES

FIGURE 7: Tuberculosis cases and rates[1] by country of birth,[2,3] New York City, 2014



TOP TEN COUNTRIES OF BIRTH BY TB BURDEN AND NYC INCIDENCE, [1] 2014

COUNTRY OF BIRTH	# CASES	COUNTRY OF BIRTH	NYC RATE[1]
China[2]	131	Nepal	300
United States[3]	86	Burma	128
Dominican Republic	33	Sierra Leone	100
Mexico	30	Saudi Arabia	77
India	28	Bolivia	64
Haiti	26	Philippines	49
Philippines	25	Indonesia	45
Ecuador	24	Yemen	45
Bangladesh	16	Lebanon	45
Pakistan	15	Honduras	40

New York City TB rate (per 100,000)

- 1.7 to 10.0
- 10.1 to 20.0
- 20.1 to 40.0
- 40.1 to 300.0
- Rate not available
- No NYC TB cases

1. Rates are based on 2013 American Community Survey Public Use Microdata Sample data. 2. China includes individuals born in Hong Kong, Taiwan and Macau.
3. U.S.-born includes individuals born in the U.S. and U.S. territories. Two cases had unknown country of birth.

TB AMONG THE FOREIGN-BORN IN NYC

In 2014, 85% of NYC TB cases were among patients born outside of the U.S., and the rate of TB among the foreign-born was nine times the U.S.-born rate (15.5 and 1.7 per 100,000 respectively). Among the foreign-born, TB incidence, 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 interventions in partnership with the NYC communities most affected by TB.

62 Total countries of birth represented among NYC TB patients in 2014

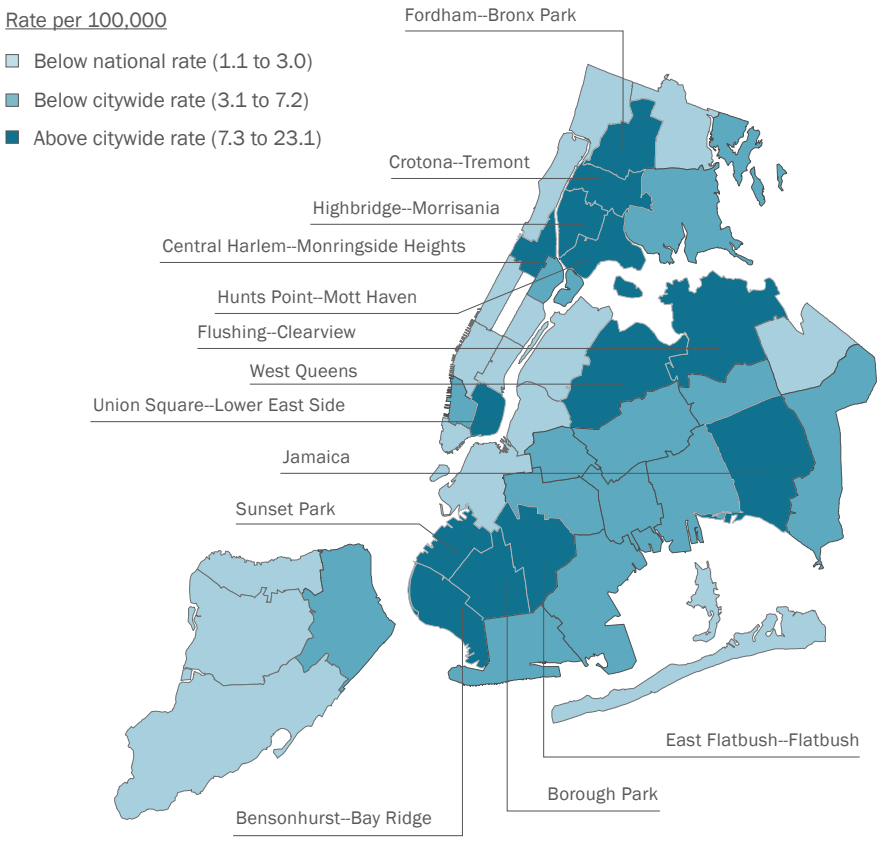
10 Median number of years that foreign-born NYC TB patients had lived in the U.S. at diagnosis

15.5 TB rate per 100,000 among foreign-born New Yorkers in 2014

PROFILE OF TB CASES

GEOGRAPHY AND AREA-BASED POVERTY

FIGURE 8: Tuberculosis rates[1] by United Hospital Fund (UHF) neighborhood, New York City, 2014



1. Rates are based on NYC DOHMH population estimates, modified from U.S. Census Bureau interpolated intercensal population estimates, 2000-2013. Updated August 2014.

TABLE 2: Tuberculosis rates[1] by area-based poverty level[2,3] and birth in the United States (U.S.),[4] New York City (NYC), 2014

Area-based poverty level[2]	Number of U.S.-born cases	U.S.-born rate	Number of foreign-born cases	Foreign-born rate	Total number of cases	Total NYC rate
Less than 10%	10	0.9	37	7.8	48	2.9
10 to <20%	21	1.3	195	15.8	217	7.5
20 to <30%	28	2.3	172	19.7	200	9.6
30 to 100%	27	2.6	92	17.4	120	7.7

1. Rates are based on 2008-2012 American Community Survey data.
2. Area-based poverty level is based on 2008-2012 American Community Survey data on the proportion of ZIP code residents living below the Federal poverty limit.
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. Two cases had unknown country of birth.

IN 2014:

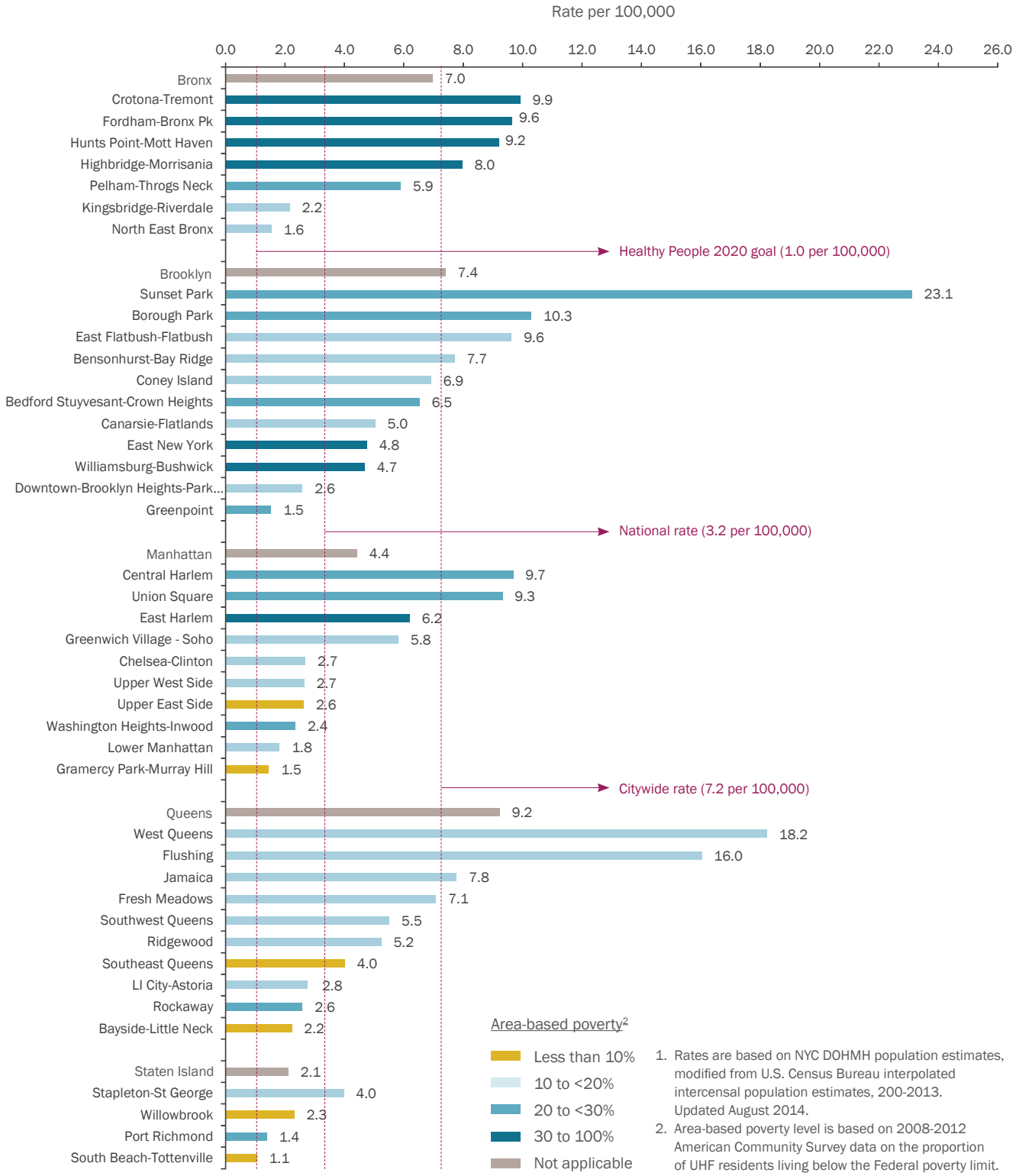
- Queens continued to have the greatest burden of TB in 2014, with 212 cases (36% of all NYC cases) and a rate of 9.2 per 100,000.
- The United Hospital Fund (UHF) neighborhood with the highest rate of TB was Sunset Park in Brooklyn, with a rate of 23.1 per 100,000, which is more than three times the citywide rate.

13 Number of UHF neighborhoods with TB rates higher than the 2014 citywide rate

- 26 (62%) UHF neighborhoods had TB rates that exceeded the exceeded the national rate.

21% Proportion of NYC TB patients who lived in a neighborhood with at least 30% of residents living below the federal poverty level

FIGURE 9: Tuberculosis rates[1] by borough, United Hospital Fund (UHF) neighborhood, and area-based poverty level,[2] New York City, 2014



1. Rates are based on NYC DOHMH population estimates, modified from U.S. Census Bureau interpolated intercensal population estimates, 200-2013. Updated August 2014.
2. Area-based poverty level is based on 2008-2012 American Community Survey data on the proportion of UHF residents living below the Federal poverty limit.

PROFILE OF TB CASES

SITE OF DISEASE

FIGURE 10: Tuberculosis cases by disease site, New York City, 2014 (n=585)

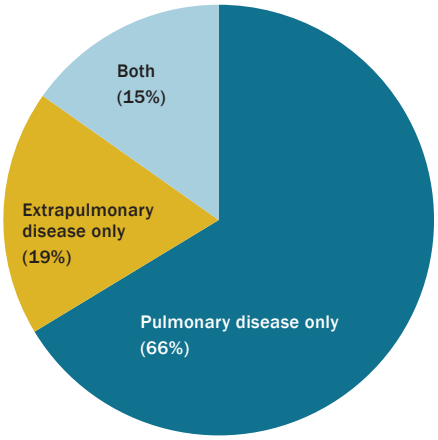


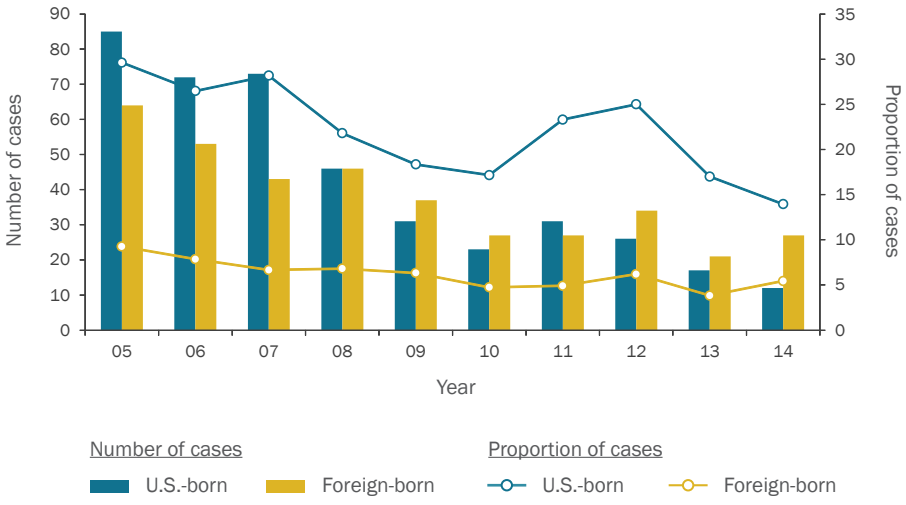
TABLE 3: Disease site[1] among tuberculosis cases with any extrapulmonary disease, New York City, 2014 (n=198)

Disease site:	n	%
Lymphatic	83	42%
Pleural	55	28%
Bone/joint	16	8%
Meningeal	15	8%
Genitourinary	9	5%
Peritoneal	11	6%
Laryngeal	1	1%
Other	30	15%

1. Categories are not mutually exclusive.

HIV INFECTION

FIGURE 11: Human immunodeficiency virus (HIV) infection among tuberculosis cases by birth in the United States (U.S.),[1] New York City, 2005-2014



1. U.S.-born includes individuals born in the U.S. and U.S. territories. Two cases had unknown country of birth.

IN 2014:

- 83% of the 198 NYC TB cases with an extrapulmonary site of disease were foreign-born
- here were 39 TB patients with human immunodeficiency virus (HIV) infection in 2014; more than half (69%) were foreign-born.
- 20% of NYC TB cases had an unknown HIV infection status; of these, 76% refused HIV testing.

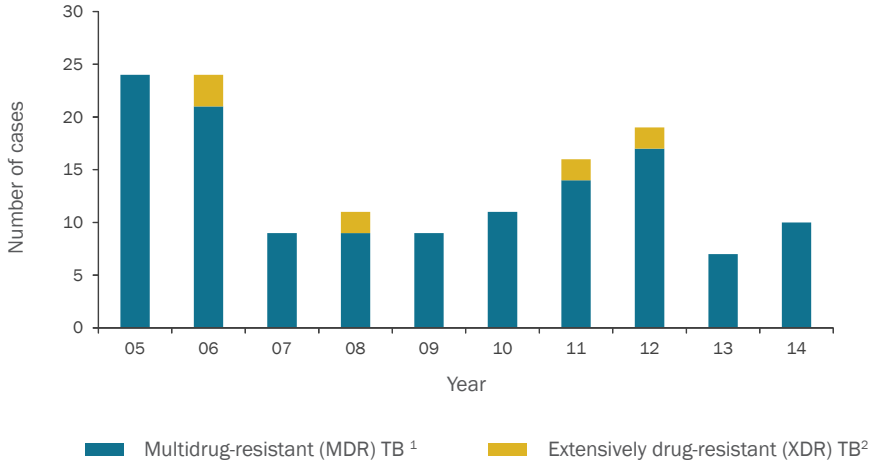
PROFILE OF TB CASES

CULTURE-CONFIRMED TB

FIGURE 12: Number and proportion of culture-confirmed tuberculosis cases among all tuberculosis cases, New York City, 2005-2014

DRUG RESISTANCE

FIGURE 13: Multidrug resistance among tuberculosis cases, New York City, 2005-2014



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.

IN 2014:

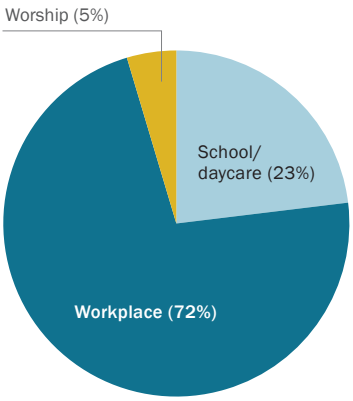
22% Proportion of NYC TB cases without a positive culture for *M. tuberculosis*

- There were 10 cases of multidrug-resistant (MDR) TB, an increase from seven in 2013.
- There were no cases of extensively drug-resistant TB in NYC.
- The majority (90%) of cases with a multidrug-resistant strain occurred among patients who were foreign-born.
- 60% of MDR patients received care at a BTBC chest center.

PROFILE OF TB CASES

CONTACT INVESTIGATIONS IN CONGREGATE SETTINGS

FIGURE 14: Epidemiologic investigations in congregate settings[1] by site type, number of exposed contacts, and transmission assessment, New York City, 2014 (n=65)



	≥15 exposed contacts	<15 exposed contacts	Total
Number of sites	17	48	65
Transmission likely[2]	5 (36%)	11 (30%)	16 (31%)
Number of contacts	878	267	1145
Eligible for testing	833 (95%)	247 (93%)	1080 (94%)
Tested	667 (80%)	229 (93%)	896 (83%)
Positive	51 (8%)	58 (25%)	109 (12%)

1. Excludes healthcare-associated investigations (n=160).
2. Proportion calculated among investigations where transmission could be assessed.

GENOTYPE CLUSTERING

FIGURE 15: Number of culture-positive tuberculosis cases with complete genotype[1] and proportion clustered[2] by birth in the United states (U.S.),[3] New York City, 2005-2014

1. Complete genotype is defined as a valid spatial ogligonucleotide typing (spoligotype) and *IS6110* restriction 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. Excludes cases with unknown country of birth.

IN 2014:

- Contact investigations were initiated in six homeless shelters, seven elementary and secondary schools, and four correctional facilities. Eight airline exposures were also referred for further investigation.

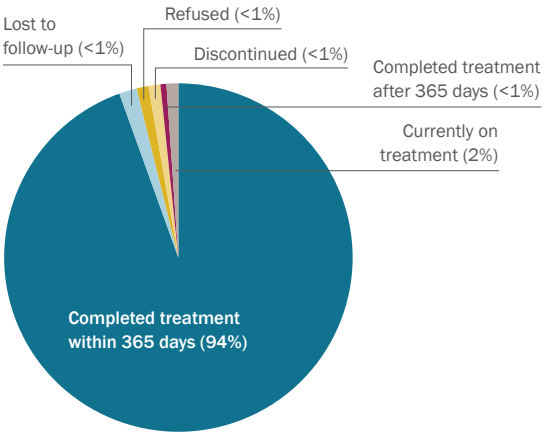
43% Proportion of NYC TB patients who were employed at the time of diagnosis

160 Number of healthcare-associated epidemiologic investigations initiated by the BTBC

PROFILE OF TB CASES

TREAMENT OUTCOMES

FIGURE 16: Treatment outcomes for tuberculosis cases counted in 2013[1] who were eligible to complete treatment within 365 days[2], New York City (n=545)

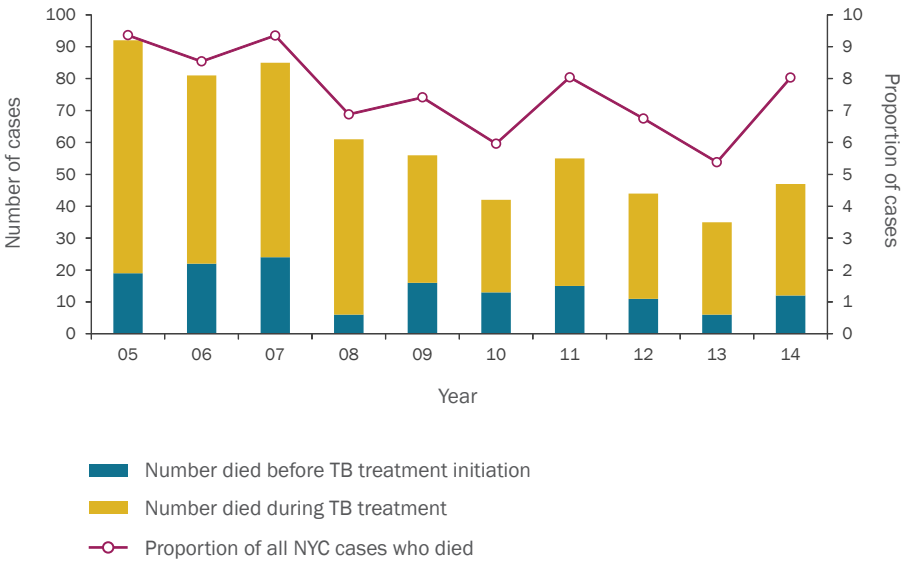


Treatment outcome	n
Completed treatment within 365 days	515
Currently on treatment	9
Completed treatment after 365 days	6
Lost to follow-up	6
Refused	3
Discontinued due to adverse event	6

1. Treatment outcomes are not reported for the current year to allow sufficient time for follow-up.
2. Excludes patients who never started on anti-TB medications, those who died or moved outside of the U.S. within 365 days of treatment initiation, those with any rifampin resistance, those with meningeal TB, and children 14 years of age or younger with disseminated TB.

MORTALITY

FIGURE 17: Number and proportion of tuberculosis cases who died[1] before or during treatment, New York City, 2005-2014



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

TUBERCULOSIS OUTBREAK IN NEW YORK CITY, 2014:

In 2014, BTBC initiated an outbreak investigation in response to the rapid growth of a genotype cluster, first identified in NYC in 2012, with strong evidence of recent local transmission.

Fifteen outbreak-associated TB cases were identified between June 1, 2013 and February 1, 2015; seven of these were identified between September 2014 and February 2015.

All patients have drug-susceptible, pulmonary tuberculosis. All were born in China and have links to the same Brooklyn neighborhood. Patients range in age from 19 to 28, with a mean age of 24; 13 are male.

Patients had been in the U.S. for a median of nine years at time of diagnosis (range: 2-23 years). Other common characteristics among patients include frequent use of internet cafes and work in out-of-state restaurants. Median time from TB symptom onset to TB treatment initiation was 28 days (range 11-281 days).

In response, the BTBC has been working collaboratively with local healthcare providers, community organizations and others to quickly identify new outbreak cases, interrupt ongoing transmission, encourage prompt TB diagnosis and reporting, screen for TB in individuals at high risk, and increase awareness of TB and TB-related services among community members.

TABLES

TABLE 4: Tuberculosis cases and rates[1] by select characteristics, New York City, 1900-2014

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	3756	51.3	3402	1856	25.3	437	200	2.7
1993	3153	43.1	2786	1531	20.9	289	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	1233	15.4	939	455	5.7	25	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	30	0.4
2005	983	12.3	745	378	4.7	24	21	0.3
2006	948	11.8	706	355	4.4	24	17	0.2
2007	909	11.4	707	379	4.7	9	19	0.2
2008	886	11.1	685	339	4.2	11	18	0.2
2009	756	9.4	538	280	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	17	0.2
2013	650	8.0	473	258	3.2	7	17	0.2
2014	585	7.2	456	243	3.0	10	30	0.4

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 Office of Vital Statistics. Deaths recorded in a given year may include cases diagnosed in a previous year.

TABLES

TABLE 5: Select characteristics of tuberculosis cases by birth in the United States (U.S.),[1] New York City, 2013-2014

CHARACTERISTICS	2013						2014					
	U.S.-born[1]		Foreign-born		Total[2]		U.S.-born[1]		Foreign-born		Total[2]	
	n	%	n	%	n	%	n	%	n	%	n	%
DEMOGRAPHICS												
Age Group												
0-17	13	13%	12	2%	25	4%	11	13%	16	3%	27	5%
18-44	30	30%	281	51%	311	48%	24	28%	222	45%	246	42%
45-64	40	40%	140	26%	181	28%	31	36%	146	29%	178	30%
65+	17	17%	116	21%	133	20%	20	23%	113	23%	134	23%
Sex												
Female	49	49%	214	39%	263	40%	32	37%	179	36%	211	36%
Male	51	51%	335	61%	387	60%	54	63%	318	64%	374	64%
Race/ethnicity												
White Non-Hispanic	17	17%	26	5%	43	7%	11	13%	25	5%	37	6%
Black Non-Hispanic	52	52%	80	15%	132	20%	41	48%	86	17%	127	22%
Hispanic	26	26%	137	25%	164	25%	23	27%	123	25%	147	25%
Asian	5	5%	296	54%	301	46%	8	9%	234	47%	242	41%
Multiple/Other	0	0%	10	2%	10	2%	2	2%	30	6%	32	5%
Borough of residence[3]												
Manhattan	21	21%	72	13%	93	14%	22	26%	50	10%	72	12%
Bronx	19	19%	70	13%	89	14%	18	21%	80	16%	99	17%
Brooklyn	45	45%	150	27%	196	30%	30	35%	162	33%	192	33%
Queens	14	14%	229	42%	243	37%	13	15%	199	40%	212	36%
Staten Island	1	1%	24	4%	25	4%	3	3%	6	1%	10	2%
Time in the U.S.												
<1 year	n/a	n/a	81	15%	81	15%	n/a	n/a	70	14%	70	14%
1-5 years	n/a	n/a	120	22%	120	22%	n/a	n/a	108	22%	108	22%
> 5 years	n/a	n/a	348	63%	348	63%	n/a	n/a	319	64%	319	64%
Unknown	n/a	n/a	0	0%	0	0%	n/a	n/a	0	0%	0	0%
CLINICAL CHARACTERISTICS												
Ever respiratory AFB smear positive	41	41%	232	42%	273	42%	26	30%	226	45%	252	43%
Sputum AFB smear positive	35	85%	223	96%	258	95%	24	92%	219	97%	243	96%
NAA positive[4]	0	0%	5	14%	5	12%	3	33%	8	35%	11	34%
Culture positive	66	66%	406	74%	473	73%	57	66%	397	80%	456	78%
Pulmonary only site of disease	65	65%	334	61%	400	62%	54	63%	333	67%	387	66%
Extra-pulmonary only site of disease	24	24%	126	23%	150	23%	18	21%	89	18%	109	19%
Both pulmonary & extra-pulmonary	11	11%	89	16%	100	15%	14	16%	75	15%	89	15%
Cavitary chest x-ray ever[5]	18	24%	117	28%	135	27%	18	26%	74	18%	92	19%
Multidrug resistance[6]	0	0%	7	2%	7	2%	1	2%	8	2%	9	2%
Extensive drug resistance[7]	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Non-MDR INH resistance[6]	7	11%	35	9%	42	9%	5	9%	36	9%	41	9%
Non-MDR RIF resistance[6]	0	0%	1	0%	1	0%	0	0%	0	0%	0	0%
History of TB disease	4	4%	35	6%	39	6%	5	6%	32	6%	37	6%
HIV Status												
Infected	17	17%	21	4%	38	6%	12	14%	27	5%	39	7%
Not Infected	61	61%	439	80%	500	77%	53	62%	374	75%	428	73%
Refused	20	20%	75	14%	95	15%	17	20%	75	15%	92	16%
Not offered/done or unknown	2	2%	14	3%	17	3%	4	5%	21	4%	26	4%
SOCIAL CHARACTERISTICS[8]												
Homeless	7	7%	8	1%	16	2%	6	7%	10	2%	16	3%
Employed[9]	26	30%	246	46%	272	44%	21	28%	221	46%	242	43%
Health care worker[9]	3	12%	32	13%	35	13%	4	19%	20	9%	24	10%
Drug use	13	13%	13	2%	26	4%	13	15%	9	2%	22	4%
Excessive alcohol use	4	4%	5	1%	9	1%	2	2%	10	2%	13	2%
TOTAL	100	15%	549	84%	650		86	15%	497	85%	585	

1. U.S.-born includes individuals born in the U.S. and U.S. territories. 2. One case in 2013 and two cases in 2014 had unknown country of birth. As such, totals may not equal the sum of U.S.-born and Foreign-born. 3. There were two cases in 2013 with addresses that could not be geocoded and two cases with non-NYC addresses. As such, totals may not equal the sum of U.S.-born and foreign-born. 4. Among patients with negative culture and NAA performed. 5. Percent is among patients with a pulmonary site of disease. 6. Multidrug-resistant (MDR) TB is defined as resistance to at least isoniazid and rifampin. Percent is among patients with a positive culture and susceptibility testing for isoniazid and rifampin performed; one case with MDR TB in 2014 did not have a positive culture. 7. Extensively drug-resistant TB is defined as resistance to at least isoniazid and rifampin plus a fluoroquinolone and a second-line injectable anti-TB medication. Percent is among patients with a positive culture and susceptibility testing for isoniazid, rifampin, any fluoroquinolone, and any second-line injectable anti-TB medication performed. 8. In the 12 months before TB diagnosis. 9. Among patients 18 years of age and older.

REPORTING REQUIREMENTS

REPORTING SUSPECTED AND CONFIRMED TUBERCULOSIS CASES

Medical, dental, osteopathic and other health care providers, 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 BTBC 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 NYC 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®) 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 five 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 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 a NYCMED account. Alternatively, providers may fax a completed Universal Reporting Form

REPORTING IN 2014:

30% Proportion of 2014 NYC TB cases initially reported by public hospitals

14 Number of facilities responsible for reporting 51% of NYC TB cases

NYC HEALTH CODE CHANGE TO REPORTING OF NEGATIVE TB LABORATORY RESULTS:

In 2014, the BTBC proposed a revision to the NYC Health Code requiring the reporting of subsequent negative TB diagnostic laboratory results for patients with a positive laboratory result. These revisions were adopted on June 9, 2014. Under the new law, negative laboratory results from specimens collected within one year of the most recent positive result must be reported. Negative test results (e.g., negative acid-fast bacilli smear results) are used by providers to evaluate treatment efficacy and the infectiousness of patients with pulmonary TB. Mandatory reporting of negative test results will expedite receipt of these results and improve patient care.

REPORTING REQUIREMENTS

(URF) to the BTBC at **212-788-4179**. 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 (home or cell), 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 NYC 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 DOHMH Public Health Laboratory (455 First Avenue, Room 236; NY, NY 10016) within 24 hours of observing growth of *M. tuberculosis* complex in a culture from any specimen (a specimen submitted to DOHMH for drug susceptibility testing meets this requirement unless DOHMH 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,

AMENDMENT TO NEW YORK STATE HIV TESTING LAWS, 2014:

All patients with confirmed or suspected TB disease and all contacts of infectious TB patients should be tested for HIV infection. In 2014, New York State's Public Health Law was amended as follows:

- Providers are no longer required to obtain written consent prior to ordering an HIV test; documented oral consent is acceptable. The only exception is for people tested in correctional facilities.
- HIV information in the HIV Registry can now be shared between local and state health departments and with healthcare providers currently treating the patient, when used for purposes of patient linkage and retention in care.

These changes have been incorporated into the law which already requires that:

- HIV testing must be offered to all persons between the ages of 13 and 64 (or younger or older if indicated) receiving hospital or primary care services, with limited exceptions.
- With a few very limited exceptions, providers must inform the patient or the patient's healthcare proxy prior to conducting an HIV test, make information regarding testing available, and the patient must have an opportunity to decline testing. Providers must document testing notification and all HIV tests in the patient record.

For additional information about the recent updates to New York State HIV testing laws, please visit ***http://www.health.ny.gov/diseases/aids/providers/testing/***

REPORTING REQUIREMENTS

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 DOHMH 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. Healthcare providers must provide access to necessary paper and electronic medical records to authorized DOHMH staff as requested. [Health Code § 11.03(e)]

In addition, per Health Code § 11.21(a)(2), treating physicians or persons in charge of facilities must submit monthly clinical status reports for patients with TB disease, which must include at least:

- The 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 DOHMH 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 TB-RELATED EVALUATION AND TREATMENT OF CONTACTS

Per Health Code §11.21(b), when requested by the BTBC, medical providers are required to report to the Health Department 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 TB TREATMENT PLAN REPORTING REQUIREMENTS:

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

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

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

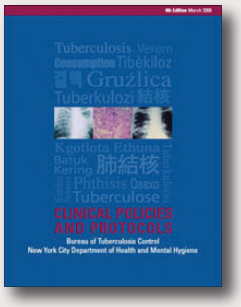
INQUIRIES AND FORMS:

- 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.com and search **TB 65**

ADDITIONAL RESOURCES

EDUCATIONAL RESOURCES FOR HEALTHCARE PROVIDERS AND THE PUBLIC

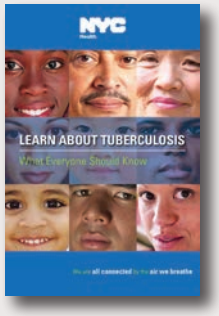
The Health Department has a selection of culturally, technically and linguistically appropriate TB education materials that are available to patients, the general public and health care providers. Materials are available at nyc.gov or by calling 311.



CLINICAL POLICIES AND PROTOCOLS

4th Edition.

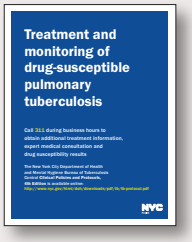
Describes policies, protocols and recommendations for the prevention, treatment and control of TB



PATIENT BROCHURE

Learn About Tuberculosis: What Everyone Should Know

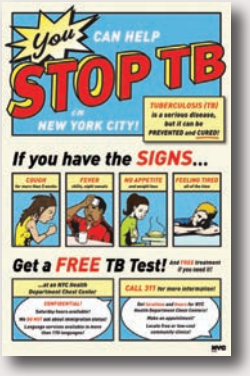
General information in easy-to-read format for all audiences. Available in English, Spanish, Chinese, Korean, French and Haitian Creole



POCKET-SIZED REFERENCE GUIDE FOR PROVIDERS

Treatment and monitoring of drug-susceptible pulmonary tuberculosis

Provides concise information about treatment and monitoring for pulmonary TB



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, please email *tbtraining@health.nyc.gov*

NYC INTERACTIVE HEALTH DATA IS NOW AVAILABLE ONLINE:

Data on TB cases reported to the BTBC from 2001 to 2012 are now available on TB EpiQuery.

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 the epidemiology of TB are also available, including country of birth and HIV infection.

To access TB EpiQuery, go to:
http://nyc.gov/health/epiquery

NYC HEALTH EPI DATA BRIEFS:

Epi Data Briefs are short publications that highlight data findings from varying Health Department programs and projects.

For more information and to access recently-published reports, go to:
http://www.nyc.gov/html/doh/html/data/epidata.shtml

TECHNICAL NOTES

1 Data for 2014 are preliminary and reflect the most complete information available as of February 2, 2015.

2 Data prior to 2014 have been updated since the release of the 2013 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 limit. 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.

BTBC CHEST CENTERS:

Eligible patients can be referred to one of four Health Department Chest Centers located throughout New York City (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.

To refer a patient, call the individual chest center and indicate which services are needed.

BRONX

Morrisania Chest Center
1309 Fulton Avenue, First Floor
Bronx, NY 10456
718.579.4157

MANHATTAN

Washington Heights Chest Center
600 West 168th Street, Third Floor
New York, NY 10032
212.368.4500 or 212.690.1348

QUEENS

Corona Chest Center
34-33 Junction Boulevard, Second Floor
Queens, NY 11372
718.476.7635 or 718.476.7636

BROOKLYN

Fort Greene Chest Center
295 Flatbush Avenue Extension, Fourth Floor
Brooklyn, NY 11201
718.643.8357 or 718.643.6551 or 718.643.4808

For hours of operation, call 311

NYC Health