2012

TOWARDS ZERO TB

NEW YORK CITY DEPARTMENT OF HEALTH AND MENTAL HYGIENE

Bureau of Tuberculosis Control Annual Summary, 2012

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 a regimen with directly observed therapy
- To ensure that individuals who are at high risk for progression from TB infection to active disease (e.g., contacts of active cases, immunocompromised individuals, individuals who have recently entered the United States from areas where TB is endemic) complete treatment for TB infection and do not develop disease

ACTIVITIES INCLUDE THE FOLLOWING:

- Maintain a surveillance system of all TB suspects, TB cases and contacts to TB cases
- Ensure that providers and laboratories report suspected and confirmed TB cases to the BTBC
- Operate state-of-the-art chest centers to screen, diagnose and treat TB at no cost to the patient
- Monitor and document the treatment status of all patients with active TB
- Conduct intensive case management to ensure that TB patients remain under medical supervision until treatment completion, with directly observed therapy as the standard of care
- Conduct contact investigation to identify individuals with TB infection or TB disease and ensure placement on appropriate treatment
- Conduct outbreak detection and management to prevent the spread of TB
- Set standards and guidelines, and provide consultation on all aspects of TB control, including prevention, diagnosis and treatment of TB disease and TB infection
- Perform timely reviews of discharge and treatment plans submitted by hospitals and providers
- Ensure that positive TB cultures are sent to the Public Health Laboratory for genotyping analysis
- Ensure that funding allocations are aligned with program priorities
- Collaborate with providers, community-based organizations and other agencies to improve prevention and control of TB
- Ensure confidentiality of data

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ABOUT THIS REPORT:

This report covers calendar year 2012 and provides robust surveillance data, concise summaries of core program activities and highlights for the reporting period.

Data for 2012 are preliminary and reflect the most complete information available as of February 8, 2013, unless otherwise noted. Data for 2011 have been updated since March 2012 and reflect the most complete information available. Data for years prior to 2011 reflect the official numbers released in those years.

Where applicable, rates were calculated using interpolated intercensal population estimates updated in December 2012 and will differ from previously reported rates based on Census counts or previous versions of population estimates.

Product names are provided for identification purposes only; their use does not imply endorsement by the New York City Department of Health and Mental Hygiene.

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

March 22, 2013

Dear Colleagues,

This year's World TB Day theme, "Towards Zero TB," is a call for global action against tuberculosis (TB). In New York City (NYC), thanks to the collaborative efforts of the Health Department, private providers and hospitals, we have seen an 83% reduction in TB cases since 1992, decreased the proportion of cases co-infected with human immunodeficiency virus (HIV) by 95%, and reduced the number of cases with a multidrug-resistant strain (MDR TB) by 96% during the same time period. These successes bring us closer to our goal of zero new TB infections, zero TB cases, zero TB stigma, zero TB suffering, and zero TB deaths.

However, to reach zero TB, many challenges lie ahead. Despite the decline in the overall number of TB cases, we have seen a 100% increase in MDR TB in NYC over the past five years, from nine cases in 2007 to 18 cases in 2012. In addition, the TB burden remains high among many foreign-born persons living in NYC. If we are to achieve zero TB, we must continue our efforts to rapidly identify and treat persons with active TB, as well as advocate for prompt identification and treatment of those infected with TB who are at high risk for progression to active disease.

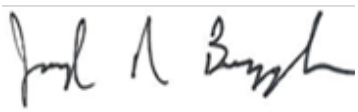
For the first time in many years, a new drug, bedaquiline, has been approved by the Food and Drug Administration for the treatment of MDR TB, and other drugs may soon follow. These new drugs offer promising alternative treatment options for patients. A new combination of two TB drugs for the treatment of TB infection, rifapentine and isoniazid, shortens the course of treatment from nine months to three months. We have begun to offer this drug regimen as a pilot program in our Fort Greene TB chest center in Brooklyn. We hope to expand this option to the remaining chest centers by the end of 2013.

In 2012, NYC Bureau of TB Control (BTBC) staff and other health care providers throughout the city rose to the many challenges that occurred when Hurricane Sandy struck NYC. Despite interruptions in electricity, water, and communication services across much of the city, our TB chest centers remained open for business, BTBC staff and community providers worked to ensure that patients' treatment was uninterrupted, and NYC's Public Health Laboratory, which is located in a hard-hit area, quickly resumed operations and processed TB specimens with little interruption. Many BTBC staff members were engaged in hurricane response efforts, while close collaboration between the BTBC and city hospitals enabled the seamless relocation of hospitalized and infectious TB patients who were evacuated from a downtown Manhattan hospital.

The future of TB control will be challenged by decreases in funding and increases in the proportion of patients with difficult-to-treat TB strains. The treatment of patients with co-morbidities including diabetes, cancer, HIV infection and hepatitis can be difficult and lead to worse outcomes. However, with determination and collaboration, we can continue to meet these challenges and work towards zero new TB infections, zero TB cases, zero TB stigma, zero TB suffering and zero TB deaths.

I would like to extend my gratitude to the staff at the BTBC and to the many health care providers in NYC who work tirelessly in the fight ''towards zero TB.''

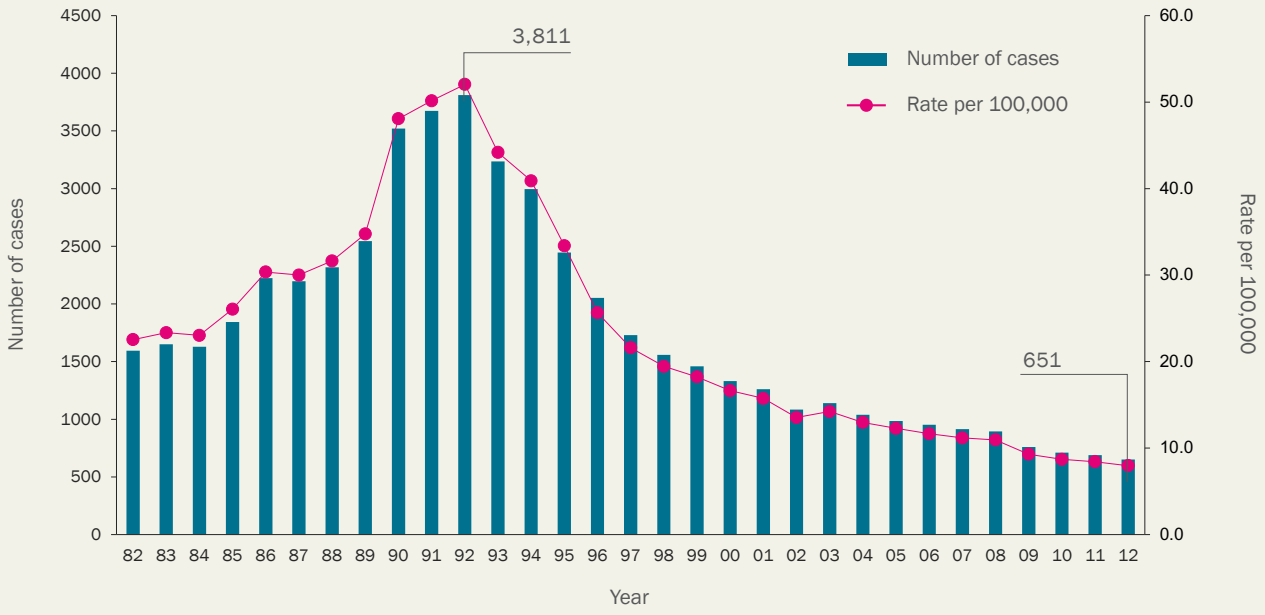
Sincerely,



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

In 2012, the number of confirmed tuberculosis cases in New York City dropped to 651, the lowest number since the disease became reportable in 1897.

FIGURE 1: Tuberculosis cases and rates,[1] New York City, 1982-2012



1. Rates are based on official Census data.

- The number of tuberculosis (TB) cases in New York City (NYC) decreased by 6% between 2011 and 2012, from 689 to 651 cases. The NYC case rate declined during the same period, from 8.4 to 8.0 per 100,000, but remains more than twice the 2012 national rate of 3.2 per 100,000 *(provisional)*.

- Persons in the 65-and-older age group had the highest rate of TB in 2012 at 12.6 per 100,000, while the highest number of TB cases (265) occurred among persons in the 20-44 age group. The rate of TB among children younger than five has declined 83% since 2000, from 5.7 per 100,000 to 1.0 per 100,000 persons in 2012.

- TB continues to disproportionately affect foreign-born persons in NYC. In 2012, the proportion of TB cases among the foreign-born was 84%, up from 80% in 2011. China was the most common country of birth among foreign-born cases in 2012, with only three fewer cases (101) than occurred among persons born in the United States (U.S.) (104). The number of cases among persons born in Mexico decreased 31% between 2011 and 2012 (from 49 cases to 34 cases), while the number of cases among persons born in the Philippines more than doubled, from 16 cases in 2011 to 36 cases in 2012.

- The number of TB cases among persons born in the U.S. decreased 24% between 2011 and 2012. However, the rate among U.S.-born non-Hispanic blacks (9.9 per 100,000) was almost 20 times higher than the rate among U.S.-born non-Hispanic whites (0.5 per 100,000) and more than 20 times the rate of U.S.-born Asians (0.4 per 100,000). The rate among U.S.-born Hispanics (2.8 per 100,000) was almost six times higher than that of U.S.-born non-Hispanic whites and seven times higher than that of U.S.-born Asians.

- The borough of Queens continued to have the highest burden of TB in 2012, with 37% of all NYC cases and an incidence rate of 10.9 per 100,000 persons.

- There were 16 (38%) United Hospital Fund (UHF) neighborhoods with a TB rate that exceeded the overall NYC rate in 2012, and 34 (81%) with a rate that exceeded the national rate. Among all UHF neighborhoods, Sunset Park in Brooklyn had the highest rate in the city (22.7 per 100,000), followed closely by West Queens (22.1 per 100,000).

- While the proportion of cases with a multidrug-resistant (MDR TB) strain remains low in NYC (3% in 2012), the number of MDR TB cases increased from nine in 2007 to 18 in 2012. Of the 18 MDR TB cases counted in 2012, 16 occurred among foreign-born persons, and two had extensively drug-resistant (XDR TB) strains.

- There were 60 TB cases with human immunodeficiency virus (HIV) co-infection in 2012, a 3% increase from 2011. One quarter of U.S.-born cases in 2012 had HIV co-infection compared to 6% of foreign-born cases.

- The BTBC continues to make progress toward meeting national targets for performance measures established by the Centers for Disease Control and Prevention (CDC). Among cases counted in NYC in 2011, 91% of eligible patients initiated treatment within seven days of specimen collection, 92% of eligible patients completed treatment for TB disease within 365 days, and contacts were elicited for 96% of acid-fast bacilli sputum smear-positive TB cases.

- The BTBC actively monitors the epidemiology of TB in sentinel populations, including health care workers and persons with a history of homelessness. In 2012, 6% of TB cases occurred among health care workers, the highest proportion seen in the past decade. One quarter of all U.S.-born cases in 2012 reported ever being homeless, an increase from 16% in 2011. Thirteen percent of U.S.-born cases reported history of homelessness in the 12 months prior to TB diagnosis, the highest proportion seen since 2006.

- In 2012, the NYC Health Code was changed to eliminate the TB testing requirement for secondary school age children (grades 6 to 12) entering the NYC school system for the first time.

SURVEILLANCE

Surveillance is a core TB control activity. The BTBC maintains a state-of-the-art registry and case management system (Maven) for all confirmed NYC TB cases, TB suspects, contacts, and children younger than five years old who are reported with TB infection. Maven is used to help the BTBC manage TB patients and their contacts, monitor TB trends, prepare surveillance reports, report data to national and state health authorities, provide data support to BTBC staff and identify data 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 state or local health department.

ELECTRONIC REPORTING: Health care providers are encouraged to report individuals electronically via the NYC Department of Health and Mental Hygiene's NYCMED portal. Laboratories are required to electronically 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. In 2012, the BTBC certified two laboratories for reporting via ECLRS, bringing the total number of certified laboratories to 34 (92% of all eligible). *For more information on TB reporting requirements in NYC, see pages 28-29.*

IN 2012:

- **651** TB cases, **3,111** TB suspects and **3,464** contacts were newly identified in NYC
- **113** individuals (cases, suspects and contacts) were referred by the BTBC to other jurisdictions for follow-up evaluation and treatment
- **435** individuals (cases, suspects and contacts) were referred to the BTBC from other jurisdictions

CHEST CENTERS

The BTBC operates five chest centers in NYC, one in each borough. Each chest center provides TB diagnostic testing, outpatient medical and nursing care, treatment for active TB disease and TB infection, social service referrals, human immunodeficiency virus (HIV) counseling and testing and directly observed therapy (DOT) at no cost to the patient. TB diagnostic testing includes sputum induction, chest radiographs and QuantiFERON®-TB Gold In-Tube (QFT) tests. BTBC chest centers also provide phlebotomy services for QFT tests and tests related to TB treatment, including baseline chemistry and liver function tests.

Testing for TB infection at BTBC chest centers is currently available to anyone exposed to an individual with infectious TB disease. Anyone who has a positive tuberculin skin test (TST) or QFT or who presents to a BTBC chest center with signs and symptoms of TB is eligible for evaluation.

For a list of BTBC chest center locations, see page 31.

NYC HEALTH CODE CHANGE: In June 2012, the Board of Health approved an amendment to Article 49 of the NYC Health Code to eliminate the TB testing requirement for secondary school age children (grades 6 to 12) entering the NYC school system for the first time.

Over the past several years, the BTBC has eliminated a series of mandatory TB testing requirements in NYC schools. Following this change to the Health Code, NYC no longer requires TB testing for school entry or school employment purposes.

These changes are consistent with CDC guidelines, which discourage targeted TB testing for low risk populations.

EVALUATION OF NEWLY-ARRIVED IMMIGRANTS: The BTBC conducts domestic follow-up evaluations for newly arrived immigrants with an overseas TB screening classification to rule out TB disease and TB infection and offer treatment as indicated. On average, more than 80% of individuals are evaluated within 90 days.

HIV TESTING AND COUNSELING: The BTBC provides rapid HIV testing and HIV counseling services in its chest centers and in the field. In 2012, all HIV tests performed by the BTBC were done in its chest centers. The BTBC works to ensure that patients with HIV infection are referred to health care providers who specialize in treatment for HIV. Anonymous HIV testing and counseling are available at BTBC chest centers regardless of need for TB services.

IN 2012:

- BTBC chest centers provided TB-related services during **50,956** patient visits
- BTBC chest center staff performed **5,373** tests for TB infection; **761** patients tested positive
- **1,733** patients were started on treatment for TB infection at BTBC chest centers (includes persons who were tested elsewhere and referred to a BTBC chest center)
- **1,183** immigrants and refugees with an overseas TB screening classification were reported to the BTBC
- The BTBC performed **4,170** tests for HIV; the proportion of HIV-positive results among those tested in BTBC chest centers was **0.2%**

FIELD SERVICES

BTBC provides case management for all confirmed TB cases and many persons with suspected TB disease. Case management of TB patients includes patient education on TB pathogenesis and transmission, comprehensive patient interview, identification and evaluation of contacts (including TB testing in the field), DOT, patient support to maintain or improve adherence to treatment, locating non-adherent patients and returning them to medical supervision, physician case review, transfer of clinical care between NYC and other jurisdictions and collaboration with non-BTBC health care providers.

The BTBC provides DOT and case management in all five boroughs of NYC. These activities are provided to hospitalized patients, to those who receive care from outpatient clinics and private medical providers, to patients incarcerated at Rikers Island (the largest correctional facility in NYC) and to difficult-to-treat TB patients (who failed all other interventions) detained at the Bellevue Hospital Center.

IN 2012:

- **1,871** individuals (including 1,220 TB suspects) were assigned for case management
- **284** (44%) patients with TB disease received treatment exclusively from a non-DOHMH health care provider; **367** (56%) patients with TB disease received all or part of their TB care at a BTBC chest center
- **3,464** contacts were identified for 436 TB cases eligible for contact investigation; **2,535** (73%) have been evaluated; **557** had a positive TB test result

DIRECTLY OBSERVED THERAPY

DOT is the standard of care for patients who are treated for suspected or confirmed TB disease in NYC. DOT is provided by a health care worker through face-to-face observation of patients ingesting anti-TB medications. DOT is arranged so that it is flexible and convenient for patients. Although DOT is not legally enforceable for all patients, the law allows court-ordered DOT for patients who are unwilling to adhere to recommendations for treatment and may pose a public health threat.

In NYC, DOT is conducted by trained BTBC staff as well as staff at three non-BTBC health care facilities. All five BTBC chest centers and four BTBC field offices provide DOT services onsite or in the community. In some instances, DOT is provided before the start of and after traditional working hours.

IN 2012:

- **430** (66%) confirmed TB cases were enrolled in DOT through BTBC or a non-BTBC health care provider
- BTBC staff made approximately **19,023** home/field visits to perform DOT; jointly, BTBC chest center and field unit staff provided approximately **28,914** DOT observations

MEDICAL TREATMENT AND CONSULTATION

BTBC physicians provide medical evaluation and treatment for TB cases, TB suspects and contacts with TB infection. In addition, they conduct standardized reviews of TB cases and suspects and provide non-BTBC providers with consultation on TB treatment and patient management, including consultation for cases with drug-resistant TB. BTBC physicians also give medical grand rounds on TB-related topics at hospitals and outpatient facilities throughout the city and work with hospitals to coordinate presentation of TB cases at Citywide TB Rounds. *To request a medical lecture, grand rounds, or TST training, please email tb@health.nyc.gov.*

PROVIDER TB HOTLINE: 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 the Provider TB Hotline: **347-396-7400**.

Throughout 2012, the BTBC continued to work with hospitals and other health care providers to improve understanding of new NYC Health Code requirements that call for submitting treatment plans for newly diagnosed TB patients to the BTBC for review and obtaining BTBC approval at least 72 hours before discharging infectious patients from inpatient care. *For more information related to hospital discharge requirements, see page 29.*

During 2012, the BTBC continued its ongoing collaboration with the CDC-sponsored Northeast Regional Training and Medical Consultation Consortium (RTMCC) at the New Jersey Medical School Global TB Institute (GTBI). In 2012, BTBC staff served as trainers, lecturers and coordinators at courses on genotyping, cluster investigation, cultural competency and medical management of TB. BTBC staff also serve on the Northeast RTMCC medical advisory board and the board of the National TB Controllers Association. Additionally, BTBC physicians participate in the TB Expert Network Conference, a joint project between the CDC, all RTMCCs and the National Jewish Medical Research Center.

IN 2012:

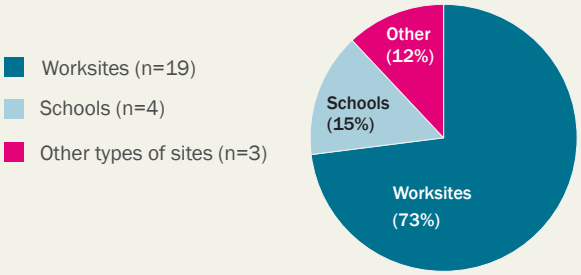
- BTBC physicians presented on core TB concepts, reporting requirements and discharge planning at **10** local residency programs, reaching about **350** medical residents
- BTBC physicians provided **23** medical lectures and grand rounds presentations at NYC hospitals
- BTBC staff provided training in TST administration to **56** registered nurses
- The BTBC hosted colleagues from TB control programs based in Vietnam, London, and South Korea

OUTBREAK DETECTION AND MANAGEMENT

Early detection of TB is crucial to preventing transmission and controlling outbreaks. When exposures occur, the BTBC uses multiple methods to identify and control TB transmission.

The BTBC investigates TB exposures in congregate settings to identify and evaluate contacts, to determine if transmission has occurred, and to determine whether further testing is warranted. In 2012, the BTBC conducted 26 epidemiologic investigations in congregate settings (Figure 2) and tested 784 contacts (31% of all NYC contacts tested in 2012).

FIGURE 2: Epidemiologic investigations in congregate settings by site type and transmission assessment, New York City, 2012 (n=26)



Transmission Assessment:	n	%
Probable transmission	12	46%
Possible transmission	4	15%
Unlikely transmission	10	38%

UNIVERSAL GENOTYPING

In 2001, the BTBC began universal genotyping of TB isolates using spacer oligonucleotide typing (spoligotyping) and IS*6110* restriction fragment length polymorphism (RFLP) analysis. 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., are clustered), which helps the BTBC identify false-positive culture results, detect outbreaks and detect places where TB transmission may be occurring. The BTBC routinely investigates clustered TB cases to identify epidemiologic links between patients and performs prompt investigations of potential false-positive cultures to make sure 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 respiratory culture, prospective matching of genotype results, and requests from BTBC staff, non-BTBC physicians, laboratories, and other health departments.

The BTBC hosts a genotyping conference attended by academic and laboratory partners and public health colleagues from other jurisdictions. Conference topics in 2011 included the application of genotyping techniques for outbreak detection and response, an update on the CDC's national genotyping system, a review of recent false-positive culture investigations in NYC and pyrazinamide resistance. The 2013 Annual

Tuberculosis Genotyping Update is scheduled for May 2013.

IN 2012:

- Isolates were submitted to NYC and New York State public health laboratories for **484** (98%) culture-confirmed TB cases; of these, complete genotype results were available for **423** (87%) cases
- Among TB cases with complete genotype results, **140** (33%) were clustered to another NYC TB case counted since 2001; clustered cases were in **104** different clusters; cluster investigation was initiated for **74** cases
- **37** false-positive culture investigations were initiated; of these, two (5%) false-positive cultures were confirmed, seven (19%) investigations had an inconclusive result and five (14%) investigations are pending; the median number of days to confirm false-positive culture was **62**

EDUCATION, TRAINING, AND OUTREACH

The BTBC works to ensure that all TB patients are given 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 serving high-risk populations and works with communities to increase TB knowledge and facilitate links to TB services. A dedicated training staff ensures that BTBC staff are well-qualified to meet the day-to-day demands of case management, contact investigation, and other facets of TB control.

For information about TB educational materials for health care providers and the public, see page 30.

In 2012, the BTBC continued to collaborate with communities and health care providers in conjunction with a BTBC initiative, launched in 2011, to reduce the TB burden among foreign-born populations in NYC. As part of the health needs assessment phase of this project, 54 interviews with patients, health care providers and community representatives were completed in Summer 2012. While data analysis is ongoing, the BTBC has begun to share preliminary findings with community members and others, and to use these findings to inform the development of tailored interventions to improve health care access, increase TB awareness, and reduce TB in NYC.

TB CONTROL DURING HURRICANE SANDY:

On October 29, 2012, Hurricane Sandy struck NYC, causing widespread flooding and power outages which significantly damaged property and city infrastructure.

In anticipation of the storm, the BTBC contacted chest center patients to reschedule follow-up visits, provided medication to patients receiving treatment through DOT in case they were unable to come to the chest center, and gave instructions to patients receiving DOT at home on how to take their medication if staff could not reach them following the storm.

During the storm, BTBC chest centers remained open, case management continued, and TB surveillance activities remained uninterrupted. Because of flooding and power outage, Bellevue Hospital had to evacuate patients, including TB patients detained for treatment. BTBC staff worked with city hospitals to transfer six patients to other hospital facilities and redirect 27 patients receiving DOT from Bellevue's outpatient clinic to BTBC chest centers for follow-up evaluation. Continuity of DOT services was provided by BTBC chest centers and Bellevue and BTBC field staff. BTBC field staff also located patients receiving TB care at two additional hospital facilities affected by the storm and ensured continuity of care.

The Public Health Laboratory (PHL), located in a hard-hit area, lost power and was operating for several days on back-up generator power. Though transportation systems were inoperable for several days and many hospital and reference laboratories were non-functional due to complications from the storm, the PHL continued to process TB specimens with little interruption.

Several days after the storm hit, BTBC chest centers were in full operation; monitoring of treatment resumed for patients receiving DOT outside of the chest centers, BTBC staff were in hospitals conducting chart reviews and interviewing TB patients, and contact investigations in the community resumed.

During the storm and for weeks after, BTBC staff worked to maintain the core activities of the BTBC, while other BTBC personnel volunteered and/or were reassigned to assist in the city's evacuation and recovery efforts.

The 2012 Annual World TB Day Conference was held on March 23 and reached 169 health care providers from NYC and surrounding areas. The conference was sponsored by the BTBC, GTBI and the University of Medicine and Dentistry of New Jersey Center for Continuing and Outreach Education. With a theme of "Stopping TB in My Lifetime," conference topics included new modalities in treatment for TB infection, laboratory testing, TB among the foreign-born in NYC, management of TB and co-morbidities and working with prison populations. The BTBC is planning a medical conference and a community-focused TB Walk for March 2013.

POLICY AND EVALUATION

The BTBC conducts ongoing evaluation of its policies and practices to ensure the highest quality of patient services and efficient and effective TB control activities. The BTBC measures progress towards meeting its goals through indicators and targets developed by the CDC. To ensure BTBC accountability for activities measured by these indicators, case management and treatment outcomes for every TB case and their contacts are reviewed by the BTBC Assistant Commissioner in a series of 16 multidisciplinary meetings during the year, known as the cohort review process. Successes and challenges related to patient care and case management are identified through these meetings, which inform policy development and help the BTBC identify training needs.

RESEARCH

The BTBC conducts research on all aspects of TB control, including participation in clinical research through the CDC TB Trials Consortium (TBTC), which conducts national and international research studies to develop new treatment regimens for TB infection and disease. In 2012, numerous presentations and abstracts showcasing NYC TB data were presented at the following national and international meetings and conferences: American Thoracic Society Annual Conference • Annual Tuberculosis Workshop • CDC Seminar: The Ethics of Resource Allocation in Public Health; TB as a Case Study • CDC Division of TB Elimination Brown Bag Seminar • Council for State and Territorial Epidemiologists Annual Conference • International Union for Tuberculosis and Lung Disease–North American Regional Meeting • NYC Annual Genotyping Update • NYC Annual World TB Day Conference • Public Health Prevention Service Annual Conference • TB Program Evaluation Network Meeting • TB Education and Training Network Annual Conference • The Union World Conference

PUBLICATIONS IN PEER-REVIEWED JOURNALS, 2012:

- Ahuja SD, Ashkin D, Avendano M, Banerjee R, Bauer M, et al. (2012) Multidrug Resistant Pulmonary Tuberculosis Treatment Regimens and Patient Outcomes: An Individual Patient Data Meta-analysis of 9,153 Patients. *PLoS Med* 9(8): e1001300. Epub 2012 Aug 28.
- Anger HA, Proops D, Harris TG, Li J, Kreiswirth BN, Shashkina E, Ahuja SD. Active case finding and prevention of tuberculosis among a cohort of contacts exposed to infectious tuberculosis cases in New York City. *Clin Infect Dis.* 2012 May;54(9):1287-95. Epub 2012 Mar 12.
- Harris TG, Sullivan Meissner J, Proops D. Delay in diagnosis leading to nosocomial transmission of tuberculosis at a New York City health care facility. *Am J Infect Control.* 2012 Jun 30. [Epub ahead of print]
- Mathema B, Kurepina N, Yang G, Shashkina E, Manca C, Mehaffy C, Bielefeldt-Ohmann H, Ahuja S, Fallows DA, Izzo A, Bifani P, Dobos K, Kaplan G, Kreiswirth BN. Epidemiologic consequences of microvariation in Mycobacterium tuberculosis. *J Infect Dis.* 2012 Mar;205(6):964-74.
- Parrinello CM, Crossa A, Harris TG. Seasonality of tuberculosis in New York City, 1990-2007. *Int J Tuberc Lung Dis.* 2012 Jan;16(1):32-7.
- Sotgiu G, Centis R, D'Ambrosio L, Alffenaar J, Anger H, Caminero J, Castiglia P, De Lorenzo S, Ferrara G, Koh W, Schecter G, Shim T, Singla R, Skrahina A, Spanevello A, Udwadia Z, Villar M, Zampogna E, Zellweger J, Zumla A, Migliori GB. Efficacy, safety and tolerability of linezolid containing regimens in treating MDR TB and XDR-TB: systematic review and meta-analysis. *Eur Respir J.* 2012 Apr 10.

NYC TUBERCULOSIS RESEARCH CONSORTIUM:

In September 2012, the BTBC hosted the first meeting of the NYC TB Research Consortium, which brings together health department, academic, laboratory and other researchers to:

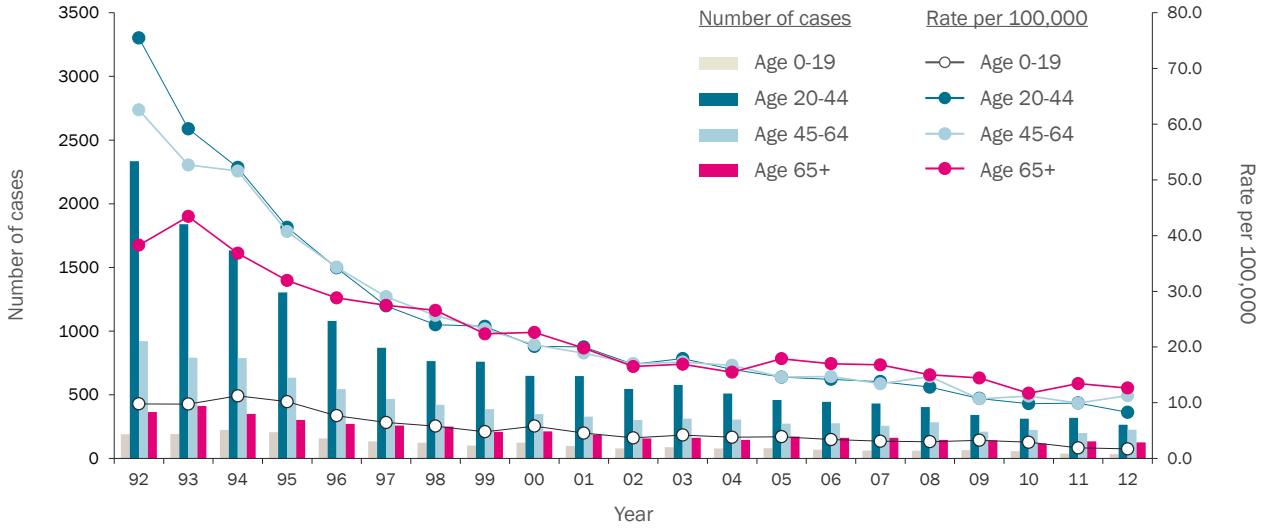
- Move toward eliminating TB as a public health problem in NYC by pursuing studies that will guide TB control policies and practices
- Collaborate on epidemiologic, genotypic and clinical research projects to move the TB control research agenda forward
- Jointly pursue funding opportunities
- Mentor new researchers and students to develop research skills for future public health careers

For more information, please contact Dr. Shama Ahuja at: sahuja@health.nyc.gov.

AGE

The number of TB cases in NYC in 2012 was highest among persons in the 20-44 year-old age group (265), though the proportion of cases in this age group fell from 46% to 41% between 2011 and 2012. The number of TB cases in the 45-64 year-old age group increased 14% during the same time period, from 199 cases in 2011 to 226 cases in 2012. Persons in the 65-and-older age group had the highest TB rate in 2012 (12.6 per 100,000) (Figure 3).

FIGURE 3: Tuberculosis cases and rates[1] by age in years,[2] New York City, 1992-2012

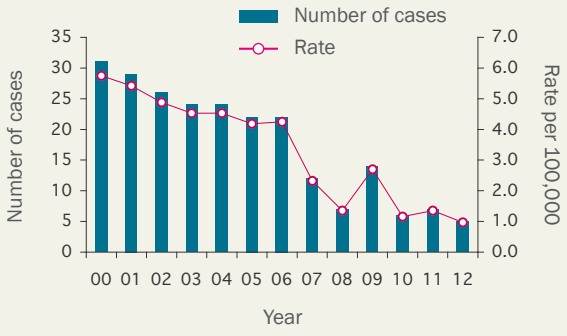


1. Rates are based on official intercensal estimates prior to 2000. Rates for 2000-2012 are based on NYC DOHMH population estimates, modified from US Census Bureau interpolated intercensal population estimates. Updated December 2012.

TB IN THE VERY YOUNG: The number and rate of TB cases in the pediatric population in NYC continued to decline in 2012. This decrease is seen particularly among the youngest children. The TB rate among children under age five has declined 83% since 2000 (from 5.7 per 100,000 to 1.0 per 100,000). In 2012, there were five TB cases younger than age five (Figure 4).

Although TB is most often diagnosed in young children based on clinical suspicion, two cases (40%) in 2012 had culture-positive TB, one of whom was diagnosed with MDR TB. Additionally, in 2012, four infants under one year old were reported with TB infection with no known contact to a TB case.

FIGURE 4: Tuberculosis cases and rates[1] among children younger than five, New York City, 2000-2012



1. Rates are based on interpolated intercensal population estimates.

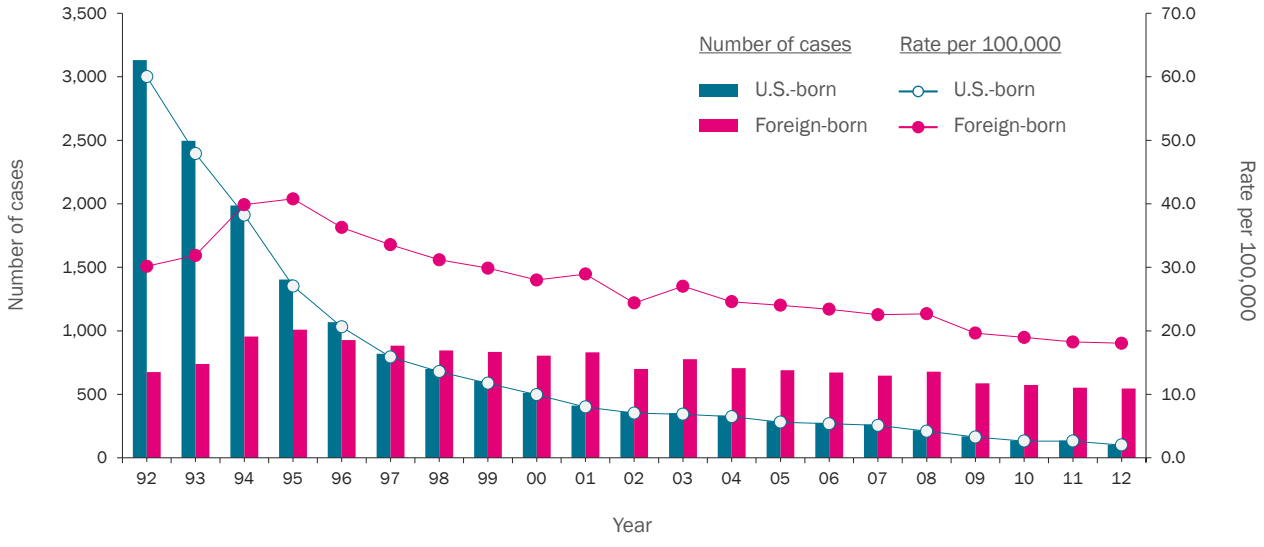
COUNTRY OF BIRTH AND RACE/ETHNICITY

TB rates continue to decline among both U.S.-born and foreign-born persons in NYC. However, the rate among the foreign-born in 2012 was 18.0 per 100,000, nine times greater than the rate of 2.0 per 100,000 among the U.S.-born. Eighty-four percent of TB cases in NYC occurred among foreign-born persons in 2012, a slight increase from 80% in 2011 and a dramatic increase from 18% in 1992 (Figure 5).

Though 74 countries of birth were represented by at least one NYC TB case in 2012, the 10 most common countries of birth (excluding the U.S.) comprised 65% of all foreign-born cases. China was the most common country of birth among foreign-born TB cases in 2012, with only three fewer cases (101) than occurred among persons born in the U.S. (104). The number of TB cases among persons born in Mexico decreased 31% between 2011 and 2012 (from 49 cases to 34), while the number of cases among persons born in the Philippines more than doubled, from 16 in 2011 to 36 in 2012 (Figure 6).

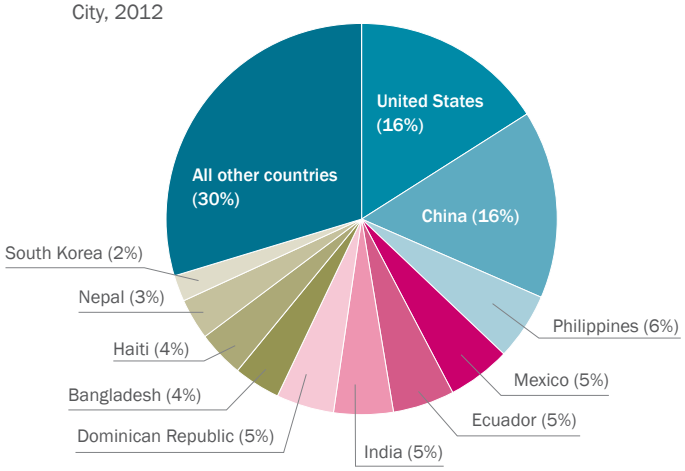
Although TB rates have declined among U.S.-born persons in all groups over the past decade, racial/ethnic minorities continue to be disproportionately affected by TB. In 2012, the TB rate among U.S.-born non-Hispanic blacks (9.9 per 100,000) was almost 20 times higher than the rate among U.S.-born non-Hispanic whites (0.5 per 100,000) and more than 20 times higher than the rate among U.S.-born Asians (0.4 per 100,000). The rate among U.S.-born Hispanics has remained stable at 2.8 per 100,000 for the past three years, but was almost six times higher than the rate among U.S.-born non-Hispanic whites in 2012 and seven times higher than the rate among U.S.-born Asians (Figure 7).

FIGURE 5: Tuberculosis cases and rates[1] by birth in the United States (U.S.),[2] New York City, 1992-2012



1. Rates prior to 2000 are based on official census data. Rates from 2000-2012 are based on official census data and intercensal estimates.
2. U.S. includes Puerto Rico and the U.S. Virgin Islands.

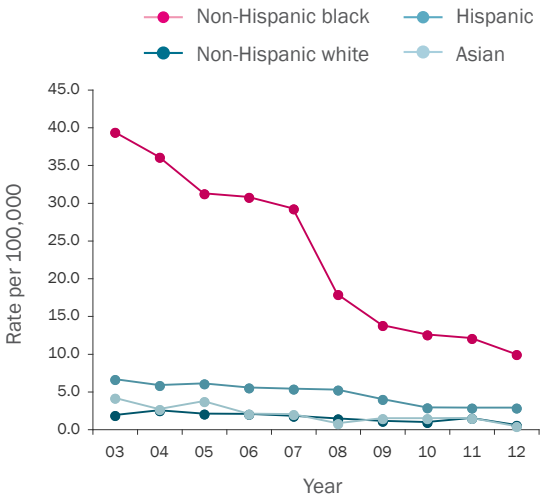
FIGURE 6: Tuberculosis cases by country of birth,[1] New York City, 2012



Country of birth (number of cases):

- United States[2] (104)
- China[3] (101)
- Philippines (36)
- Mexico (34)
- Ecuador (33)
- India (32)
- Dominican Republic (31)
- Bangladesh (25)
- Haiti (25)
- Nepal (22)
- South Korea (14)
- All other countries (193)

FIGURE 7: Tuberculosis rates[1] among persons born in the United States[2] by race/ethnicity, New York City, 2003-2012



1. Rates are based on American Community Survey one-year estimates.
2. United States (U.S.) includes Puerto Rico and the U.S. Virgin Islands.

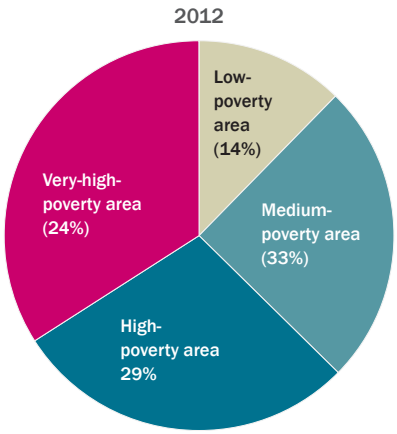
Figure 6:
1. There was one case in 2012 for whom country of birth was unknown.
2. United States (U.S.) includes Puerto Rico and the U.S. Virgin Islands.
3. China does not include Hong Kong (8 cases).

AREA-BASED SOCIOECONOMIC STATUS

In 2012, more than half of NYC TB cases lived in high-poverty or very-high-poverty areas (defined below) at time of TB diagnosis. Almost one-quarter of patients lived in census tract areas where at least 30% of households had incomes below the federal poverty level, while 53% of cases lived in a census tract area where at least 20% of households had an income below the federal poverty level. This proportion has decreased since 2000, when 63% of TB cases lived in a high- or very-high-poverty area at time of diagnosis (Figure 8).

FIGURE 8: Tuberculosis cases by area-based socioeconomic status,[1,2] New York City, 2000 and 2012

Area-based poverty level:	2000	2012
	n (%)	n (%)
Low-poverty area: 0 to <10% of households below federal poverty level	164 (12%)	91 (14%)
Medium-poverty area: 10 to <20% of households below federal poverty level	333 (25%)	213 (33%)
High-poverty area: 20 to <30% of households below federal poverty level	380 (29%)	186 (29%)
Very-high-poverty area: 30% or more of households below federal poverty level	453 (34%)	153 (24%)



1. Eight cases in 2012 and two cases in 2000 were excluded due to insufficient address information.
2. Area-based poverty level is based on data from the American Community Survey 5-year estimates for 2007-2012.

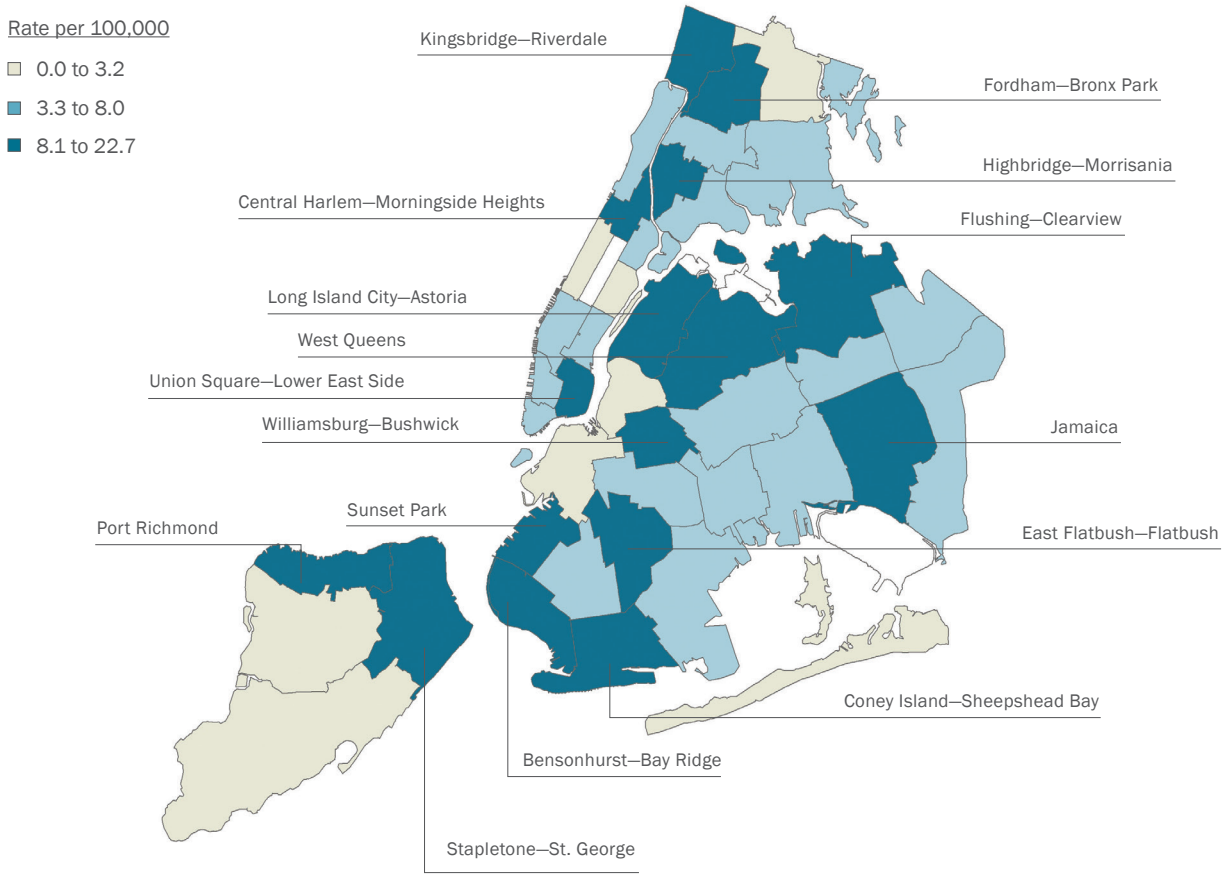
GEOGRAPHIC DISTRIBUTION

The borough of Queens continued to have the highest burden of TB in 2012, with 37% of all NYC cases and an incidence rate of 10.9 per 100,000. The TB rate decreased in Queens, Manhattan and Brooklyn between 2011 and 2012, but remained unchanged in the Bronx (7.3 per 100,000) and increased in Staten Island, from 3.0 to 5.1 per 100,000.

Among 42 United Hospital Fund (UHF) neighborhoods, there were 16 (38%) with a TB rate that exceeded the overall NYC TB rate of 8.0 per 100,000 in 2012; 34 (81%) UHF neighborhoods exceeded the national rate of 3.2 per 100,000. The UHF neighborhood of Sunset Park in Brooklyn had the highest TB rate in 2012 at 22.7 per 100,000, a 17% increase over the previous year. The rate in West Queens (22.1 per 100,000) declined slightly between 2011 and 2012, but remained almost three times as high as the overall citywide rate (Figures 9 and 10).

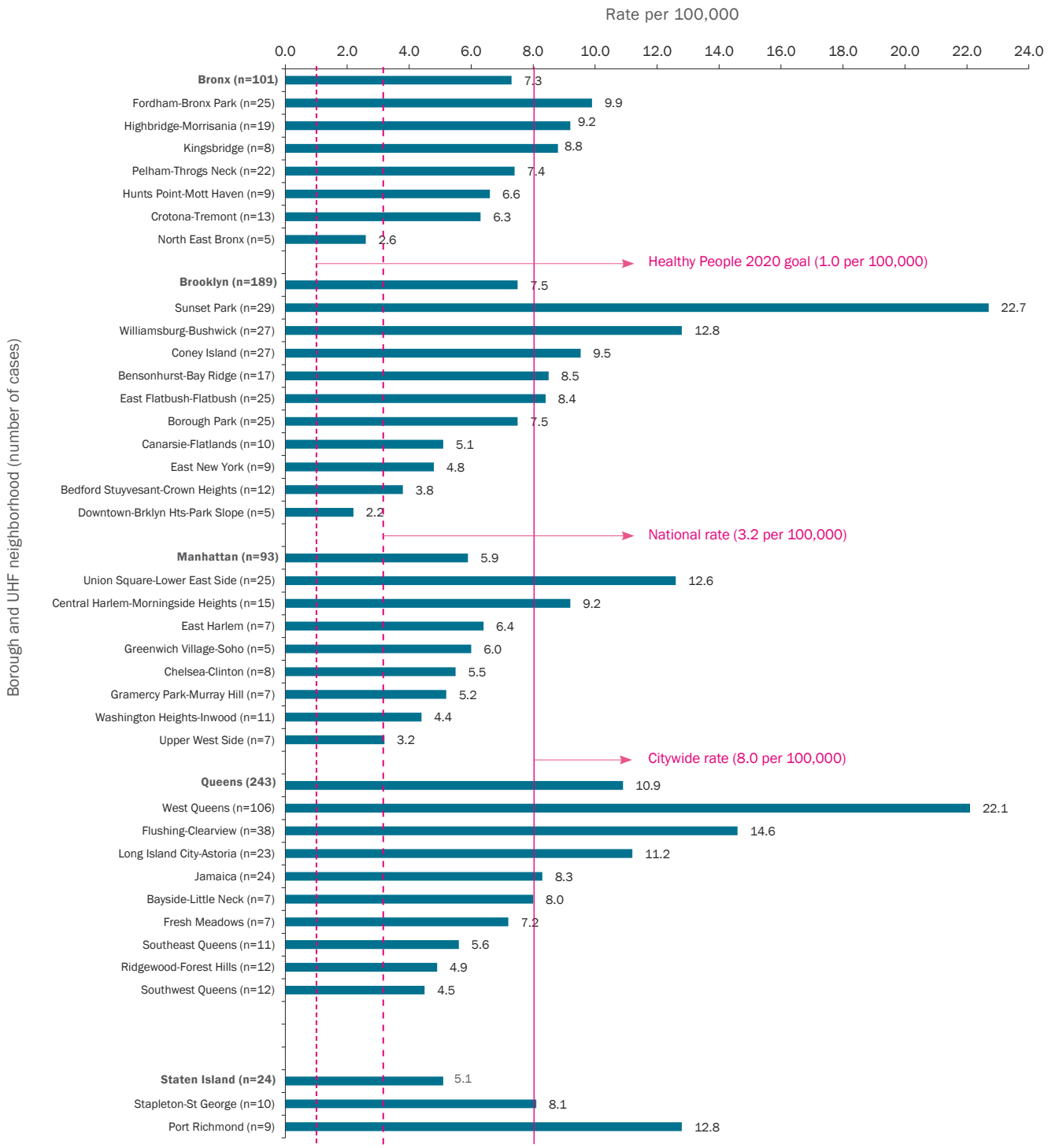
NYC INTERACTIVE HEALTH DATA ONLINE: EpiQuery is a web-based, user-friendly system designed to provide users with NYC health data from a variety of sources. TB data will be available on the EpiQuery site in Summer 2013: **a816-healthpsi.nyc.gov/EpiQuery**

FIGURE 9: Tuberculosis rates[1] by United Hospital Fund neighborhood of residence at time of diagnosis,[2] New York City, 2012



1. Rates are based on 2010 Census data. Caution should be used in interpreting case rates for neighborhoods with a small number of cases.
2. There were three cases with missing address information and one case with a non-NYC address.

FIGURE 10: Tuberculosis rates[1] by borough and United Hospital Fund (UHF) neighborhood of residence at time of diagnosis,[2,3] New York City, 2012



1. Rates are based on 2010 Census data. Caution should be used in interpreting case rates for neighborhoods with a small number of cases.
2. There were three cases with missing address information and one case with a non-NYC address. 3. UHF neighborhoods with fewer than five cases in 2012 are not shown.

CLINICAL CHARACTERISTICS

CULTURE AND SMEAR RESULTS: Among 651 TB cases in NYC in 2012, 495 (76%) were culture-positive for *mycobacterium tuberculosis* complex. Of 499 cases with a respiratory disease site, 240 (48%) were sputum smear positive for acid-fast bacilli.

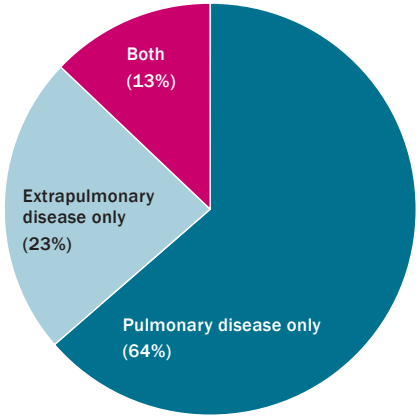
SITE OF DISEASE: The proportion of TB cases with a pulmonary disease site only was 64% in 2012, while the proportion with an extrapulmonary disease site only was 23%. Thirteen percent of cases had both pulmonary and extrapulmonary sites of disease. Among cases with an extrapulmonary disease site, the lymphatic system was the most common site of disease, accounting for 39% of cases (Figure 11). Among cases with only extrapulmonary disease, 61% had a lymphatic disease site.

DRUG RESISTANCE: Drug susceptibility testing for first-line drugs was performed for 99% of culture-positive TB cases in 2012. Of these, 84 (17%) cases had a strain with some form of drug resistance: 18 cases had a multidrug-resistant TB strain (MDR TB, defined as resistance to at least isoniazid and rifampin), and 66 had a strain with other drug resistance (ODR TB, defined as not multidrug-resistant but resistant to one or more first-line drugs). Two MDR TB cases had extensively drug resistant strains (XDR TB, defined as resistance to at least isoniazid and rifampin plus a fluoroquinolone and a second-line injectable anti-TB medication) in 2012 (Figure 12).

The number of MDR TB cases has declined dramatically since 1992, when 441 (12%) TB cases had an MDR TB strain. However, the number of MDR TB cases has doubled over the past five years, from nine cases in 2007 to 18 cases in 2012. Among MDR TB cases diagnosed in NYC since 2007, the majority have been foreign-born from Asia and the Former Soviet Republic (Figure 13), regions reporting increasing MDR TB incidence. Since 1992, there have been a total of 1,492 MDR TB cases in NYC; 77 of these were extensively drug-resistant.

HIV CO-INFECTION: In 2012, the number of TB cases with HIV co-infection increased to 60, a 3% rise from 2011. Despite this recent increase, the proportion of TB patients with HIV co-infection has declined over time, from 33% in 1993 to 9% in 2012 (Figure 14). Among U.S.-born TB cases in 2012, 25% were co-infected with HIV compared to 6% of foreign-born cases with HIV co-infection.

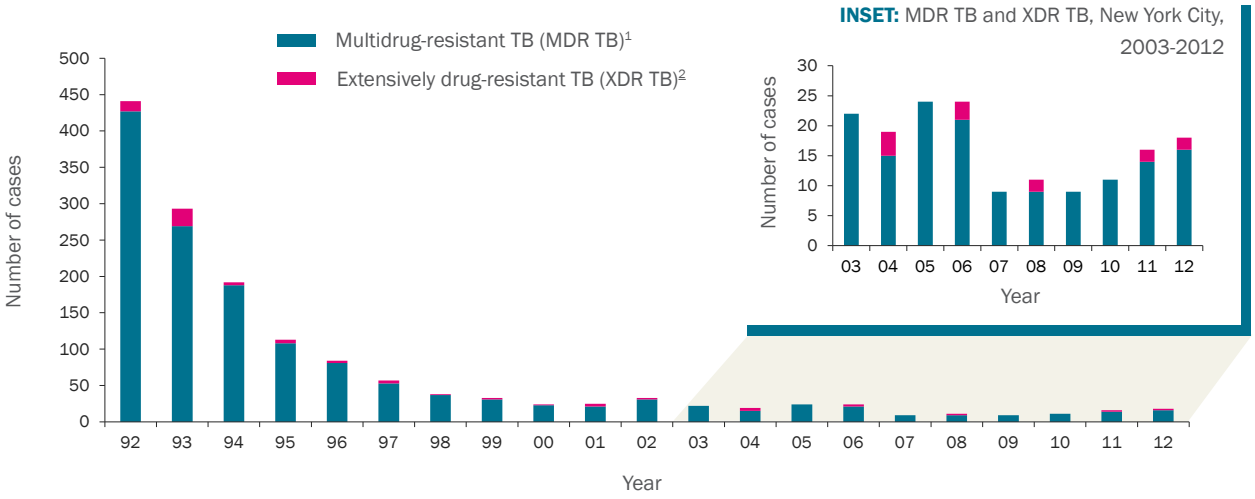
FIGURE 11: Tuberculosis cases by disease site,[1] New York City, 2012 (n=651)



Disease site among tuberculosis cases with extrapulmonary disease,[2] New York City, 2012 (n=236)

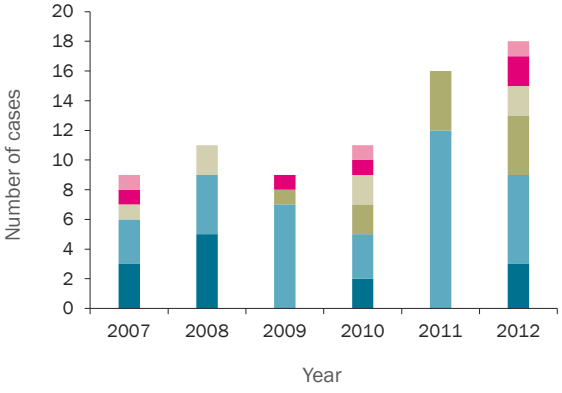
Disease site:	n	(%)
Lymphatic	93	(39%)
Pleural	51	(22%)
Bone/joint	26	(11%)
Meningeal	13	(6%)
Genitourinary	12	(5%)
Peritoneal	10	(4%)
Laryngeal	1	(<1%)
Other	30	(13%)

FIGURE 12: Multidrug resistance among tuberculosis cases, New York City, 1992-2012



1. Multidrug-resistant TB is defined as a strain that is resistant to at least isoniazid and rifampin.
2. Extensively drug-resistant TB is defined as a strain resistant to at least isoniazid and rifampin plus a fluoroquinolone and a second-line injectable anti-TB medication.

FIGURE 13: Multidrug resistance (MDR TB)[1] among tuberculosis cases by region of birth, New York City, 2007-2012

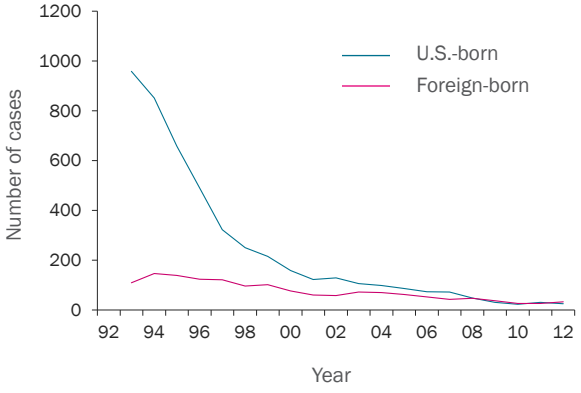


Region of birth (number of MDR TB cases, 2007-2012)

- United States[2] (13)
- Asia (35)
- Former Soviet Republic (11)
- South America (7)
- Central America/ Caribbean (5)
- Africa (3)

1. Multidrug-resistant TB is defined as a strain that is resistant to at least isoniazid and rifampin (Includes extensively drug resistant TB).
2. United States (U.S.) includes Puerto Rico and the U.S. Virgin Islands.

FIGURE 14: Tuberculosis and human immunodeficiency virus (HIV)[1] co-infection by birth in the United States (U.S.),[2] New York City, 1992-2012

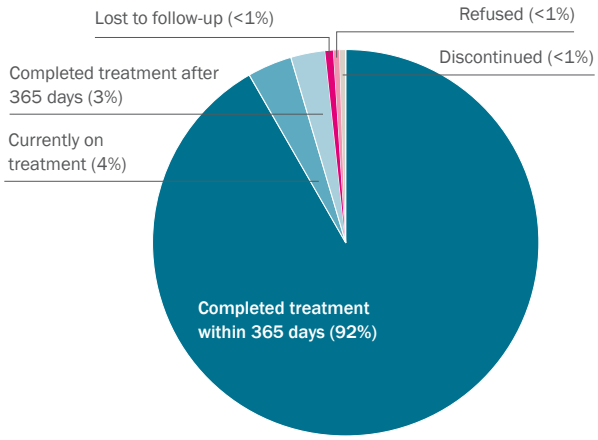


1. Data for HIV status is from the BTBC TB case registry only.
2. U.S. includes Puerto Rico and the U.S. Virgin Islands.

TREATMENT COMPLETION AND NATIONAL PERFORMANCE MEASURES

The BTBC continues to make progress towards meeting national targets. Overall treatment completion for eligible patients counted in NYC in 2011 was 95% (Figure 15). For the past three years, the proportion of eligible patients with sputum culture conversion within 60 days of treatment initiation met or exceeded 62%, while treatment initiation within seven days of specimen collection among eligible patients has remained higher than 90%. The proportion of AFB sputum smear positive patients with contacts elicited has been above 90% since 2007, and the proportion of contacts evaluated has been more than 80% annually (Table 1). The BTBC also monitors drug susceptibility testing results, HIV status, laboratory and provider reporting and evaluation and treatment of newly-arrived immigrants and refugees with abnormal chest x-rays read overseas.

FIGURE 15: Treatment outcomes for tuberculosis cases counted in 2011 who were eligible to complete treatment within 365 days[1], New York City (n=590)



Treatment outcome:	n
Completed treatment within 365 days	541
Currently on treatment	22
Completed treatment after 365 days	17
Lost to follow-up	4
Refused	3
Discontinued due to adverse event	3

1. Excludes patients who never started on anti-TB medications, those who died before treatment completion, those with any rifampin resistance, those with meningeal TB, those who moved outside of the U.S. during treatment, those who were not alive at time of diagnosis, and children aged 14 or younger with disseminated TB.

TABLE 1: Select performance measures, national targets,[1] and New York City performance outcomes, 2007-2011

Performance measure*	Target	2007	2008	2009	2010	2011
Treatment completion within 12 months among eligible TB cases[2] (%)	93	91	89	93	92	92
Treatment initiation within 7 days of specimen collection[3](%)	increase	--	--	96	92	91
Sputum culture conversion within 60 days of treatment initiation[4] (%)	62	59	--	62	76	71
Proportion of TB cases started on recommended initial four-drug TB regimen[5]	93	87	84	83	83	86
Proportion of AFB sputum smear positive TB cases with contacts elicited	100	96	94	96	96	96
Proportion of contacts evaluated[6]	93	83	81	86	81	82
Proportion of contacts who initiated treatment for TB infection[7]	88	80	74	79	79	75
Proportion of eligible contacts who completed treatment for TB infection[8]	79	68	65	67	68	--

*All performance measures listed are reported as percentages. 1. As defined by the U.S. Centers for Disease Control and Prevention. Performance measures are analyzed within one or two years to allow sufficient time for follow-up. For additional information, see: cdc.gov/tb/programs/evaluation/indicators/default.htm 2. Excludes patients who never started on anti-TB medications, those who died before treatment completion, those with any rifampin resistance, those with meningeal TB, those who were not alive at time of diagnosis, and children aged 14 or younger with disseminated TB. For 2009 and later, patients who moved out of the U.S during treatment are also excluded. 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. Of TB patients having reported taken 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. 6. Of contacts to AFB sputum smear-positive TB cases counted in the year of interest. 7. Of contacts to sputum AFB smear-positive TB cases who have newly-diagnosed TB infection. 8. Of contacts to sputum AFB smear-positive TB cases with newly diagnosed TB infection who started treatment.

TB IN SENTINEL POPULATIONS: During the NYC TB epidemic in the early 1990s, there were multiple outbreaks of MDR TB, many in health care settings, and a high proportion of homelessness and HIV-infection among TB cases. Despite decreasing resources for TB control programs, it is critical to monitor TB in certain sentinel populations, as they may serve as an early indicator of concerning epidemiologic trends. The BTBC actively monitors TB epidemiology in many such populations, including children, persons who are HIV-infected and persons with MDR TB (data presented elsewhere in this report), as well as persons with history of homelessness and those who work in occupations with increased exposure risk (e.g., health care workers).

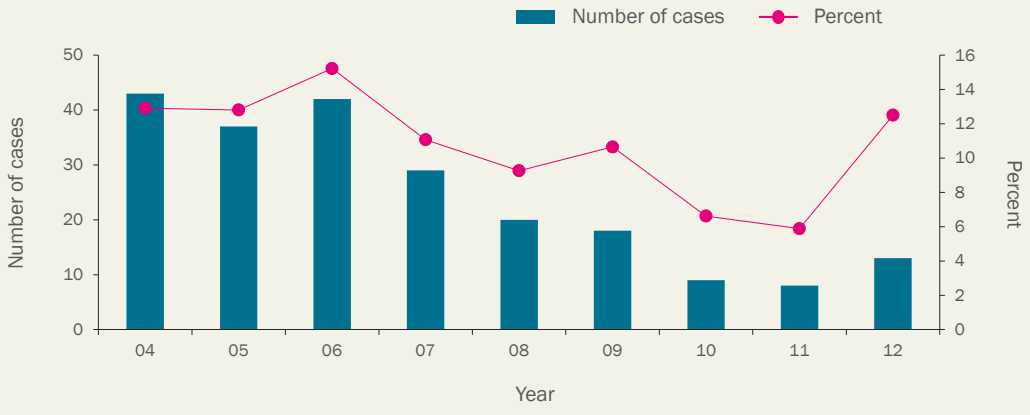
HEALTH CARE WORKERS AND HEALTH CARE-ASSOCIATED TB EXPOSURES: Identifying, interrupting and preventing TB exposure in health care settings is a vital component of effective TB control efforts. The BTBC actively monitors potential health care-related transmission and works with infection control staff in health care settings to quickly respond to confirmed health care exposures.

In 2012, 6% (39) of all TB cases in NYC occurred among health care workers (HCW), which represents the highest proportion of HCWs among TB cases in the past decade. Although this increase may be due to enhanced surveillance, the BTBC confirmed occupational TB transmission around one HCW in 2012 and established possible occupational transmission for another.

The BTBC routinely coordinates expanded contact investigations surrounding known health care-associated exposures. In 2012, transmission was documented in four of the 11 investigated health care facility TB exposures due to an AFB sputum smear positive case. No transmission was documented in any of the five TB exposures investigated due to an AFB sputum smear negative case.

TB AMONG PERSONS WITH HISTORY OF HOMELESSNESS: The BTBC collects information about history of homelessness from all patients. Recently, the BTBC has seen an increase in the proportion of U.S.-born patients reporting ever being homeless, as well as an increase in the proportion of those with a history of homelessness in the 12 months prior to TB diagnosis. In 2012, 25% of U.S.-born TB cases in NYC reported ever being homeless, an increase from 16% in 2011. Thirteen percent of U.S.-born TB cases in 2012 reported a history of homelessness within the 12 months prior to TB diagnosis, the highest proportion seen since 2006 (Figure 16). These increases have not been observed among foreign-born TB cases in NYC.

FIGURE 16: History of homelessness within 12 months prior to tuberculosis diagnosis[1] among persons born in the United States,[2] New York City, 2004-2012



1. History of homelessness is based on self-report. 2. United States (U.S.) includes Puerto Rico and the U.S. Virgin Islands.

TABLE 2: Tuberculosis numbers and rates by select characteristics, New York City, 1900-2012

Year[1]	Number of TB cases[2,3]	Rate per 100,000[4]	Culture + cases	Sputum-smear + cases[5]	Sputum smear + rate per 100,000	Multidrug-resistant cases[6]	Other drug-resistant cases[7]	Deaths attributable to TB[8]	Death rate per 100,000
1900	11,997	349.0						9,630	279.5
1910	32,065	672.7						10,074	210.5
1920	14,035	249.7						7,915	144.1
1930	11,821	170.6						4,574	68.2
1940	9,005	120.8						3,680	50.0
1950	7,717	97.8						2,173	27.4
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	4.3
1973	2,101	26.6						259	3.4
1974	2,022	25.6						215	2.8
1975	2,151	27.2						208	2.8
1976	2,151	30.4						187	2.5
1977	1,605	22.7						175	2.4
1978	1,307	18.5						188	2.6
1979	1,530	21.6						121	1.7
1980	1,514	21.4						143	2.0
1981	1,582	22.4						155	2.2
1982	1,594	22.5						168	2.4
1983	1,651	23.3						151	2.1
1984	1,629	23.0	1,527					168	2.3
1985	1,843	26.1	1,785					155	2.2
1986	2,223	30.4	2,181					186	2.6
1987	2,197	30.0	2,157					219	3.0
1988	2,317	31.6	2,241					246	3.4
1989	2,545	34.8	2,405					236	3.2
1990	3,520	48.1	3,372					256	3.5
1991	3,673	50.2	3,484	1,772	24.0	366		245	3.3
1992	3,811	52.0	3,442	1,856	24.99	441	442	200	2.7
1993	3,235	44.2	2,854	1,526	20.3	296	328	166	2.2
1994	2,995	40.9	2,479	1,265	16.7	176	245	133	1.8
1995	2,445	33.4	2,014	989	12.9	109	216	94	1.2
1996	2,053	25.6	1,721	837	10.8	84	216	67	0.9
1997	1,730	21.6	1,401	665	8.5	56	162	55	0.7
1998	1,558	19.5	1,255	558	7.1	38	135	52	0.7
1999	1,460	18.2	1,143	515	6.5	34	131	49	0.6
2000	1,332	16.6	1,066	467	5.8	25	114	44	0.5
2001	1,261	15.7	964	453	5.7	24	129	33	0.4
2002	1,084	13.5	823	429	5.4	27	102	30	0.4
2003	1,140	14.2	872	427	5.3	21	103	34	0.2
2004	1,039	13.0	798	391	4.9	18	117	30	0.4
2005	984	12.3	745	373	4.7	24	98	21	0.3
2006	953	11.7	708	354	4.4	21	94	17	0.2
2007	914	11.2	709	380	4.7	9	123	19	0.2
2008	895	10.9	688	338	4.2	11	109	18	0.2
2009	760	9.3	539	278	3.4	9	82	25	0.3
2010	711	8.7	512	241	3.0	11	85	26	0.3
2011	689	8.4	501	231	2.8	16	72	32	0.4
2012	651	8.0	495	240	2.9	18	67	17	0.2

1. TB became reportable on January 19, 1897. 2. For "phthisis," or pulmonary cases, 1920-1940; thereafter, all forms of tuberculosis. 3. Case definition revised in 1978 to include persons who had verified disease in the past and were discharged or lost to supervision for more than 12 months and had verified disease again." 4. Rates before 2000 are based on official Census population data. Rates since 2000 are based on population estimates. 5. Patients with a sputum smear positive for acid-fast bacilli regardless of culture result. 6. Resistant to at least isoniazid and rifampin. Mandatory drug susceptibility reporting became effective during 1991; number from that year is not complete. Numbers for years prior to 2011 reflect the official number reported in that year. 7. The definition for 'other drug-resistant cases' changed in 2004 to include all non-MDR cases with a resistant result reported for a first-line drug, regardless of drug susceptibility testing method. All historical data has been updated to reflect this definition. 8. TB deaths are obtained from vital statistics records and may include cases diagnosed in previous years. 9. This information was estimated for 1992, exact figures are not available.

Contents

TABLE 3: Tuberculosis cases with human immunodeficiency virus (HIV) co-infection by age in years, New York City, 2000-2012

Year	Age 0-19		Age 20-44		Age 45-64		Age 65+		Total	
	n	%	n	%	n	%	n	%	n	%
2000	2	2	147	23	86	25	6	3	241	18
2001	0	0	121	19	59	18	4	2	184	15
2002	2	3	109	20	78	26	4	3	193	18
2003	1	1	112	19	64	20	1	<1	178	16
2004	1	1	94	18	72	24	2	1	169	16
2005	3	4	83	18	61	22	4	2	151	15
2006	1	1	64	14	59	21	3	<1	127	13
2007	0	0	58	13	55	21	3	2	116	13
2008	1	2	44	11	48	17	2	1	95	11
2009	1	2	39	11	25	12	3	2	68	9
2010	0	0	27	9	25	10	1	<1	50	7
2011	0	0	23	7	30	15	5	4	58	8
2012	1	3	30	11	27	12	2	2	60	9

TABLE 4: Tuberculosis cases and rates by age in years and region of birth, New York City, 2011-2012

Year and area of birth	Age 0-19		Age 20-44		Age 45-64		Age 65+		Total	Rate/100,000[1]
	n	%	n	%	n	%	n	%		
2011										
Foreign-born	24	4	275	60	147	26	106	21	552	18.2
Caribbean and Latin America[2]	13	6	111	60	57	27	33	15	214	13.6
Asia[3]	9	3	131	48	75	27	59	22	274	33.0
Africa[4]	2	6	20	61	9	27	2	6	33	27.1
Europe[5]	0	0	13	42	6	19	12	39	31	6.5
United States (U.S.)[6]	14	10	43	32	52	38	27	20	136	2.6
Unknown	0	0	0	0	0	0	1	100	1	–
Total	38	6	318	46	199	29	134	19	689	8.4
2012										
Foreign-born	25	5	237	61	178	26	106	21	546	18.0
Caribbean and Latin America[7]	9	5	93	48	66	34	25	13	193	12.3
Asia[8]	10	4	113	40	92	33	68	24	283	34.1
Africa[9]	6	14	24	57	10	24	2	5	42	34.5
Europe[10]	0	0	7	25	10	36	11	39	28	5.9
United States (U.S.)[6]	9	9	27	26	48	46	20	19	104	2.0
Unknown	0	0	1	100	0	0	0	0	1	
Total	34	5	265	41	226	35	126	19	651	8.0

1. Rates are based on 2009-2011 American Community Survey (ACS).
2. Mexico (49), Dominican Republic (31), Ecuador (30), Haiti (30), Guyana (12), Colombia (9), Honduras (9), Jamaica (9), Guatemala (7), Peru (7), Trinidad and Tobago (7), Panama (5), Other (9).
3. China (104), Bangladesh (33), India (30), Nepal (19), Philippines (16), Burma (11), South Korea (11), Pakistan (10), Hong Kong (7).
4. Gambia (7), Senegal (5), Other (21).
5. Ukraine (10), Other (21).
6. Includes the US Virgin Islands, other US territories and Puerto Rico.
7. Mexico (34), Ecuador (33), Dominican Republic (31), Haiti (25), Guatemala (9), Guyana (9), Peru (8), Colombia (7), Trinidad and Tobago (7), Honduras (5), Jamaica (5), Other (20).
8. China (101), Philippines (36), India (32), Bangladesh (25), Nepal (22), South Korea (14), Pakistan (12), Burma (8), Hong Kong (8), and Other.
9. Nigeria (8), Senegal (5), Other (29).
10. Poland (6), Ukraine (6), Other (16).

TABLE 5: Tuberculosis rates by United Hospital Fund (UHF) neighborhood, New York City, 2000-2012

United Hospital Fund Neighborhood	Rate per 100,000 population[1,2]												
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
BRONX	**16.3**	**12.7**	**12.4**	**13.3**	**13.3**	**11.9**	**11.9**	**11.4**	**10.9**	**9.9**	**8.3**	**7.3**	**7.3**
FORDHAM-BRONX PARK	20.0	13.6	16.3	17.2	11.6	9.6	13.5	15.8	13.1	9.9	11.9	6.7	9.9
HIGH BRIDGE-MORRISANIA	21.1	17.4	6.7	22.7	18.4	17.9	18.3	14.4	18.3	15.4	9.6	12.5	9.2
KINGSBRIDGE	16.9	6.7	17.5	7.9	6.7	6.7	7.7	7.7	3.3	7.7	4.4	4.4	8.8
PELHAM-THROGS NECK	11.7	12.8	16.3	9.7	12.1	11.4	8.4	9.4	8.7	8.4	7.4	7.7	7.4
HUNTS POINT-MOTT HAVEN	13.8	18.7	5.9	13.0	19.5	14.6	12.4	16.1	11.7	11.0	8.8	10.2	6.6
CROTONA-TREMONT	23.1	13.0	8.1	14.0	16.0	16.0	14.6	9.7	13.1	12.1	9.7	6.8	6.3
NORTH EAST BRONX	7.5	5.4	16.4	6.5	8.1	5.9	7.3	5.8	3.7	4.2	3.7	1.6	2.6
BROOKLYN	**18.1**	**15.8**	**14.0**	**14.8**	**12.7**	**13.1**	**11.6**	**11.3**	**10.5**	**8.2**	**9.3**	**8.8**	**7.5**
SUNSET PARK	33.2	27.4	14.4	19.9	22.4	29.9	27.4	21.9	21.1	14.9	22.7	18.8	22.7
WILLIAMSBURG-BUSHWICK	22.1	25.2	5.6	24.7	19.6	23.2	21.9	15.7	16.6	8.1	11.4	9.5	12.8
CONEY ISLAND	11.5	12.9	9.1	10.5	10.8	10.1	8.1	10.5	9.5	5.6	6.3	9.8	9.5
BENSONHURST-BAY RIDGE	13.4	10.8	10.5	8.7	7.7	6.2	7.5	10.5	11.0	7.5	11.5	7.0	8.5
EAST FLATBUSH-FLATBUSH	31.3	18.9	11.5	18.6	14.5	19.3	13.5	13.1	11.8	12.5	9.4	11.1	8.4
BOROUGH PARK	10.5	10.5	14.2	13.6	13.3	12.3	12.4	10.2	14.2	11.7	13.3	10.5	7.5
CANARSIE-FLATLANDS	9.1	12.1	10.8	12.6	9.6	5.6	7.7	7.2	5.6	5.1	6.7	7.7	5.1
EAST NEW YORK	15.0	16.7	15.3	11.5	13.8	12.1	10.1	10.6	10.6	7.5	8.5	6.9	4.8
BEDFORD STUYVESANT-CROWN HEIGHTS	23.6	18.0	18.6	18.6	14.2	13.2	11.0	12.2	8.2	7.8	9.1	8.5	3.8
GREENPOINT	15.3	9.6	22.1	9.6	4.8	6.4	4.7	6.9	4.7	4.7	1.6	0.8	2.4
DOWNTOWN-BKLYN HEIGHTS-PARK SLOPE	15.4	15.4	19.1	12.1	9.3	8.4	7.1	7.1	3.6	3.1	2.7	3.1	2.2
MANHATTAN[3]	**17.9**	**16.7**	**14.8**	**15.6**	**12.9**	**11.9**	**10.2**	**11.5**	**9.8**	**7.6**	**5.7**	**6.7**	**5.9**
UNION SQUARE-LOWER EAST SIDE	22.3	20.8	8.4	19.8	17.8	14.7	14.6	13.1	15.1	7.5	8.0	10.6	12.6
CENTRAL HARLEM	28.5	20.5	20.8	21.2	24.5	23.2	12.9	21.5	14.8	9.2	8.0	11.1	9.2
EAST HARLEM	27.8	28.7	17.6	28.7	24.1	15.7	14.5	21.8	18.2	10.0	8.2	10.9	6.4
GREENWICH VILLAGE-SOHO	19.1	16.7	8.6	9.6	15.5	10.8	7.2	9.6	11.9	3.6	6.0	7.2	6.0
LOWER MANHATTAN	12.9	12.9	6.9	3.2	19.4	12.9	9.4	5.6	9.4	7.5	5.6	5.6	5.5
CHELSEA-CLINTON	16.3	23.6	11.4	10.6	6.5	17.1	6.9	9.0	6.2	9.7	4.1	4.1	5.5
GRAMERCY PARK-MURRAY HILL	20.1	15.3	9.7	19.3	13.7	12.1	8.9	12.6	8.2	10.4	5.9	5.9	5.2
WASHINGTON HEIGHTS-INWOOD	19.2	17.7	31.1	19.6	12.6	11.8	14.5	14.5	12.1	9.7	7.2	7.2	4.4
UPPER WEST SIDE	9.9	12.6	16.3	13.1	7.2	4.1	5.9	5.9	4.1	4.5	3.2	2.3	3.2
UPPER EAST SIDE	8.3	5.0	14.5	4.1	2.3	5.0	5.9	3.2	3.2	4.5	2.3	4.5	1.8
QUEENS[3]	**16.2**	**18.6**	**14.4**	**14.7**	**14.2**	**13.6**	**13.6**	**11.9**	**13.3**	**12.3**	**11.6**	**11.2**	**10.9**
WEST QUEENS	25.3	32.5	20.8	30.6	26.8	22.4	27.5	23.7	27.1	22.9	20.2	21.4	22.1
FLUSHING	21.9	22.3	17.2	15.7	17.6	17.2	14.2	13.5	12.3	17.3	14.6	15.4	14.6
LONG ISLAND CITY-ASTORIA	16.7	19.0	25.5	12.7	14.0	11.3	9.3	10.3	10.7	12.7	11.7	11.7	11.2
JAMAICA	11.9	18.9	6.8	8.1	12.6	12.3	10.7	10.0	11.4	9.0	7.9	8.6	8.3
BAYSIDE-LITTLE NECK	11.3	6.8	13.7	10.2	7.9	3.4	6.8	5.7	3.4	10.2	4.5	10.2	8.0
FRESH MEADOWS	17.2	10.7	10.3	12.9	17.2	7.5	12.4	6.2	9.3	6.2	12.4	7.2	7.2
SOUTHEAST QUEENS	10.3	13.3	6.4	8.8	4.4	8.3	7.7	7.7	11.8	4.6	7.2	8.2	5.6
RIDGEWOOD/FOREST HILLS	12.9	10.0	10.7	11.2	5.8	10.8	10.2	8.1	6.5	9.8	8.5	3.7	4.9
SOUTHWEST QUEENS	10.0	11.5	7.5	9.6	9.3	11.9	7.9	6.0	9.4	7.9	7.5	4.1	4.5
ROCKAWAY	10.3	11.2	4.8	0.9	7.5	7.5	6.1	4.3	5.2	0.0	4.3	3.5	2.6
STATEN ISLAND	**7.2**	**6.1**	**5.6**	**6.5**	**6.3**	**3.8**	**6.0**	**4.9**	**4.9**	**3.8**	**2.8**	**3.0**	**5.1**
PORT RICHMOND	11.1	17.5	8.6	8.0	9.6	4.8	7.1	5.7	11.4	7.1	7.1	2.8	12.8
STAPLETON-ST GEORGE	15.5	9.2	8.0	17.2	10.3	6.9	7.3	6.5	4.9	7.3	4.9	3.2	8.1
WILLOWBROOK	5.9	3.5	4.7	4.7	5.9	4.7	3.5	3.5	3.5	0.0	2.3	1.2	2.3
SOUTH BEACH-TOTTENVILLE	1.1	1.1	3.3	0.0	2.8	1.1	5.8	4.2	3.2	2.1	0.0	3.7	1.6
TOTAL NEW YORK CITY	**16.6**	**15.7**	**13.5**	**14.2**	**13.0**	**12.3**	**11.7**	**11.2**	**10.9**	**9.3**	**8.7**	**8.4**	**8.0**

1 Rates are based on official census data.
2 There were 2 cases in 2012, with missing zipcode or information that are not included in the borough totals but included in the NYC total.
3 One patient had a ZIP code which covers Manhattan and Queens but is included under Queens.

TABLE 6: Select characteristics of tuberculosis cases by birth in the United States (U.S.), New York City, 2011-2012

Characteristics	2011						2012					
	U.S.-born		Foreign-born		Total[1]		U.S.-born		Foreign-born		Total[1]	
	n	%	n	%	n	%	n	%	n	%	n	%
DEMOGRAPHICS												
Age Group (years)												
0-19	14	10	24	4	38	6	9	9	25	5	34	5
20-44	43	32	275	50	318	46	27	26	237	43	265	41
45-64	52	38	147	27	199	29	48	46	178	33	226	35
65+	27	20	106	19	134	19	20	19	106	19	126	19
Sex												
Female	65	48	227	41	293	43	44	42	241	44	285	44
Male	71	52	325	59	396	57	60	58	305	56	366	56
Race/ethnicity												
Black Non-Hispanic	62	46	89	16	151	22	51	49	86	16	137	21
White Non-Hispanic	30	22	42	8	72	10	11	11	33	6	44	7
Hispanic	39	29	150	27	190	28	39	38	138	25	178	27
Asian	4	3	257	47	261	38	1	1	270	49	271	42
Multiple	1	1	6	1	7	1	1	1	11	2	12	2
Other	0	0	8	1	8	1	0	0	8	2	8	1
Unknown ethnicity or race	0	0	0	0	0	0	1	1	0	0	1	<1
Borough of residence[2]												
Manhattan	38	28	69	13	107	16	25	24	68	12	93	14
Bronx	28	21	73	13	101	15	33	32	67	12	101	16
Brooklyn	47	35	169	31	217	31	30	29	159	29	189	29
Queens	19	14	230	42	249	36	11	11	231	42	242	37
Staten Island	3	2	11	2	14	2	5	5	19	3	24	4
Time in the U.S.												
Less than1 year	n/a	n/a	72	13	72	13	n/a	n/a	71	13	71	13
1-5 years	n/a	n/a	150	27	150	27	n/a	n/a	133	24	133	24
Greater than 5 years	n/a	n/a	324	59	324	59	n/a	n/a	340	62	340	62
Unknown	n/a	n/a	6	1	6	1	n/a	n/a	2	<1	2	<1
CLINICAL CHARACTERISTICS												
Ever respiratory smear positive	54	40	200	37	254	37	38	37	227	42	265	41
Sputum smear positive	45	83	185	93	230	91	30	79	210	93	240	91
NAA positive[3]	42	78	152	76	194	77	29	49	180	96	209	79
Culture positive	92	68	408	75	501	73	70	67	424	78	495	76
Clinical case[4]	44	32	144	26	188	27	34	33	122	22	156	24
Pulmonary-only site of disease	89	65	358	66	447	65	66	63	349	64	415	64
Extrapulmonary-only site of disease	26	19	127	23	154	22	25	24	127	23	152	23
Both pulmonary and extrapulmonary	21	15	67	12	88	13	13	13	71	13	84	13
Cavitary chest x-ray[5]	20	18	83	20	103	19	13	17	65	15	78	16
Multidrug resistance[6]	0	0	14	3	14	3	3	4	15	4	18	4
Extensive drug resistance[7]	0	0	2	<1	2	<1	0	0	2	<1	2	<1
Other drug resistance[8]	12	13	59	15	71	14	7	10	58	14	66	14
History of prior TB	8	6	26	5	34	5	9	9	32	6	41	6
HIV Status												
Infected	31	23	27	5	58	8	26	25	34	6	60	9
Not infected	78	57	410	75	488	71	52	50	396	73	449	69
Refused	18	13	100	18	118	17	23	22	90	16	113	17
Not offered/done or unknown	9	7	15	3	27	4	3	3	26	5	27	4
SOCIAL CHARACTERISTICS												
Homeless[9]	5	4	13	2	18	3	9	9	8	1	17	3
Resident of correctional facility[9]	4	3	3	1	7	1	4	4	4	1	8	1
Employed[10]	106	78	457	83	563	82	33	32	313	57	347	53
Health care worker[11]	4	4	17	4	21	4	5	15	34	11	39	11
Injection drug use[10]	8	6	1	<1	9	1	7	7	0	0	7	1
Non-injection drug use[10]	22	16	17	3	39	6	25	24	14	3	34	6
Excessive alcohol use[10]	4	3	8	1	12	2	6	6	11	2	17	3
Any drug or excessive alcohol use[10]	27	26	25	5	52	8	31	30	22	4	53	8
TOTAL	136	20	552	80	689	-	104	16	546	84	651	-

1. There was one case in 2012 with unknown country of birth (included in the total column only); 2. Two cases in 2012 had non-New York City addresses but confirmed as NYC cases; 3. Of patients with any pulmonary disease site and positive respiratory acid-fast bacilli (AFB) smears; 4. As per CDC clinical case definition; 5. Percent of cases with pulmonary disease; 6. Multidrug resistance is defined as resistant to at least isoniazid and rifampin. Percent is among those with positive culture and susceptibility done; 7. Extensive drug resistance TB is defined as a strain resistant to at least isoniazid and rifampin plus a fluoroquinolone and a second-line injectable anti-TB medication. Percent is among those with positive culture and susceptibility done; 8. Other drug resistance is defined as not multidrug-resistant, but resistant to one or more first-line drugs. Percent is among those with positive culture and susceptibility done; 9. At time of diagnosis; 10. In past 12 months before TB diagnosis. 11. Percent is among all employed.

APPENDIX II: REPORTING REQUIREMENTS

REPORTING SUSPECTED AND CONFIRMED TB CASES

Medical, dental and osteopathic and other health care providers and infection control practitioners and administrators of hospitals or other institutions providing care and treatment, are required by the NYC Health Code §§11.03, 11.05 and 11.21 to report all patients 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 received by the BTBC within 24 hours, whether by express or overnight mail, fax, telephone or electronically.

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

- Smear (from any anatomic site) positive for acid-fast bacilli (AFB)
- Nucleic acid amplification (NAA) test (e.g., Roche's AMPLICOR®, Genprobe's MTD™) 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*
- Biopsy, pathology, or autopsy findings consistent with active TB, including but not limited to caseating and necrotizing granulomas in biopsy of lung, lymph nodes or other specimens
- Treatment with two or more anti-TB medications for suspected or confirmed active TB
- 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
- Continuation, discontinuation, completion or other treatment outcomes for active TB
- 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 U.S. Food and Drug Administration (FDA) approved blood-based test for TB infection [such as QuantiFERON®-TB Gold In-Tube]

When an individual has an AFB-positive smear or has started treatment for TB, reporting should never be delayed pending identification of *M. tuberculosis* with a NAA test. Patients should be reported whenever TB is suspected, even if bacteriologic evidence of disease is lacking or treatment has not been initiated. Additionally, when requested by the BTBC, a physician shall report the results of any examination of a contact to a TB case.

MICROBIOLOGY AND PATHOLOGY LABORATORIES

Laboratories are required to report via the New York State's Electronic Clinical Laboratory Reporting System (ECLRS) as of July 1, 2006. Reportable tuberculosis results, as per the NYC Health Code §§13.03 and 13.05, should be reported to the BTBC as follows within 24 hours of identification:

- AFB-positive smears (regardless of anatomic site)
- Cultures positive for *M. tuberculosis* complex
- NAA test results that identify *M. tuberculosis* complex (e.g. AMPLICOR®, MTD™)
- Results of susceptibility tests performed on *M. tuberculosis* complex cultures
- Biopsy, pathology, or autopsy findings consistent with active TB, 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)

Health Code §13.05 (a) mandates that a portion of the initial culture be sent for DNA analysis to the NYC 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.

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 DOHMH in its efforts to evaluate persons suspected of having TB and in patient follow-up. Case managers will be in contact with the treating physicians to request updates and ensure that appropriate treatment and monitoring is being conducted. A completed Report of Patient Services Form (TB 65) may be requested. To find the Report of Patient Services Form, go to: nyc.gov, search **TB65**.

REPORTING TB-RELATED EVALUATION AND TREATMENT OF CONTACTS

Medical providers are required, per Health Code §11. 21(b), to report to the DOHMH, when requested, all information on the evaluation, testing, and treatment of individuals who have been in contact with a person with active TB disease.

PROVIDER REPORTING

Per Health Code §11.21(a)(1), health care providers are required to report TB suspects or cases to the BTBC. Health care providers are encouraged to report electronically through a NYCMED account. To create a NYCMED account, go to: nyc.gov, search **NYCMED**, or call 1-888-692-6339. Alternatively, providers may fax a completed Universal Reporting Form (URF) to the BTBC at 212-788-4179. To obtain a URF, go to: nyc.gov, and search **URF**. Information reported on the URF should be as complete as possible. The following essential information must be included when the report is submitted:

- Information needed to identify and locate the individual (e.g., name, telephone, address, date of birth)
- Provider information (e.g., physician's name and telephone number, reporting facility)
- Results of smear for AFB (including date specimen obtained and accession number, if available)
- Results of chest radiographs
- Any treatment information

** Product names are provided for identification purposes only, their use does not imply endorsement by the NYC Department of Health and Mental Hygiene.

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. For further details, and to find these forms or documents, go to: nyc.gov, search **TB354**. To facilitate discharge planning, refer to the Hospital Discharge Planning Checklist at: nyc.gov, search **TB hospital discharge checklist.**

Providers must also submit to the BTBC a proposed treatment plan within one month of treatment initiation for all persons newly diagnosed with active TB [Health Code §11. 21(a)(2)]. The BTBC will provide the form to the treating physician of record.

INQUIRIES AND FORMS

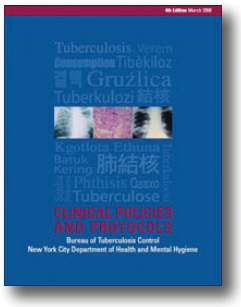
To inquire further about reporting procedures, call 311 and ask for the BTBC Surveillance Unit.

PROVIDER REPORTING RESOURCES ARE AVAILABLE ONLINE AT NYC.GOV:

- Patient Services Form (TB 65): Search **TB65**
- To create a NYCMED account: Search **NYCMED**
- To obtain a URF: Search **URF**
- For hospital discharge planning checklist: Search **TB hospital discharge checklist**

APPENDIX III: EDUCATIONAL MATERIALS

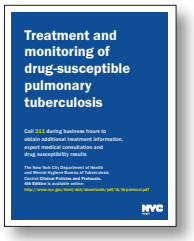
The following is a selection of culturally, technically and linguistically appropriate TB education materials available to patients, the general public and health care providers. Materials are available at nyc.gov, search "tb-hcp kit", or by calling 311.



CLINICAL POLICIES AND PROTOCOLS

4th Edition.

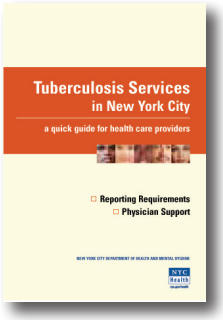
Describes policies, protocols and recommendations for the prevention, treatment and control of tuberculosis



POCKET-SIZED REFERENCE GUIDE FOR PROVIDERS

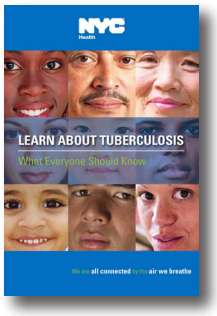
Treatment and monitoring of drug-susceptible pulmonary tuberculosis

Provides concise information about treatment and monitoring for pulmonary TB



PROVIDER BROCHURE

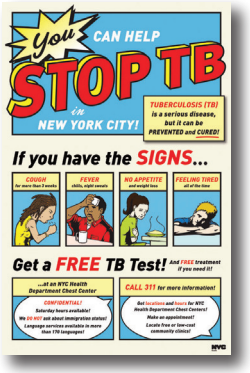
Tuberculosis Services in New York City: a Quick Guide for Health care Providers



PATIENT BROCHURE

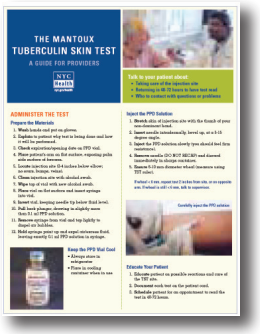
Learn About Tuberculosis: What Everyone Should Know

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



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, please email tbtraining@health.nyc.gov*



REFERENCE GUIDE

The Mantoux Tuberculin Skin Test: A Guide for Providers

Step-by-step guide to administering and reading TST

BTBC CHEST CENTER LOCATIONS:

BRONX

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

MANHATTAN

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

QUEENS

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

BROOKLYN

Fort Greene Chest Center
295 Flatbush Avenue Extension, Fourth Floor
Brooklyn, NY 11201

STATEN ISLAND

Richmond Chest Center
51 Stuyvesant Place, Fourth Floor
Staten Island, NY 10301

For hours of operation, call 311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