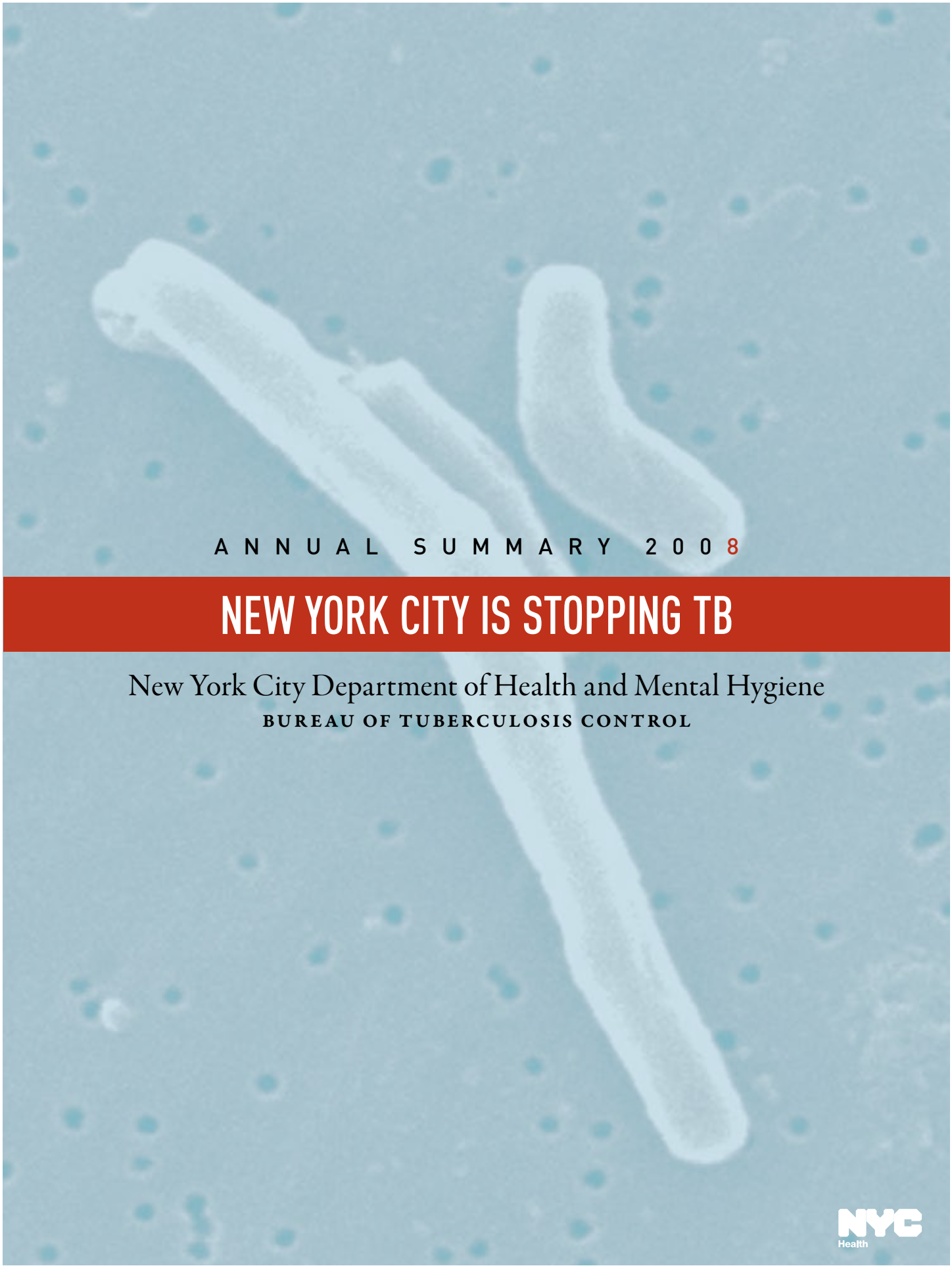

ANNUAL SUMMARY 2008

NEW YORK CITY IS STOPPING TB

New York City Department of Health and Mental Hygiene

BUREAU OF TUBERCULOSIS CONTROL

NYC Health

MISSION STATEMENT

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

GOALS:

1. **To identify all individuals with suspected TB disease and ensure their appropriate treatment, ideally on a regimen of directly observed therapy (DOT).**

2. **To ensure that individuals who are at high risk for progression from latent TB infection to active disease (e.g., contacts of active cases, immunocompromised individuals, recent immigrants from areas where TB is widespread) receive treatment for latent TB infection and do not develop disease.**

The bureau achieves its goals through direct patient care, education, surveillance and outreach.

Mandated activities include the following:

1. Ensuring that suspected and confirmed cases of TB identified in all facilities in New York City are reported to the bureau and documented in the computerized, confidential TB Registry.
2. Conducting intensive case interviews and maintaining an effective outreach program so that TB cases remain under medical supervision until completion of a full course of treatment and identified contacts receive appropriate medical care.
3. Monitoring and documenting the treatment status of all patients with active TB.
4. Setting standards and guidelines, and providing consultation on the prevention, diagnosis and treatment of latent TB infection and disease in New York City.
5. Operating clinical sites throughout New York City that provide state-of-the-art care for persons with suspected or confirmed TB disease and their close contacts, at no cost to the patient.
6. Ensuring care for persons who have or are suspected of having active TB disease, in accordance with New York State Public Health Law §2202, Article 22, Title 1, at no cost to the patient.
7. Collaborating with community-based organizations and health and social agencies in New York City and New York State to improve case-finding and the prevention and control of TB through education, outreach and targeted screening in communities at high risk for TB.

NEW YORK CITY IS STOPPING TB

BUREAU OF TUBERCULOSIS CONTROL

ANNUAL SUMMARY 2008

New York City Department of Health and Mental Hygiene

ACKNOWLEDGEMENTS

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SUGGESTED CITATION

New York City Department of Health and Mental Hygiene. Annual Summary 2008: New York City is Stopping TB. New York, NY. 2009.

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ASSISTANT COMMISSIONER'S LETTER

CHRISPIN KAMBILI, M.D. *Assistant Commissioner, Bureau of TB Control*

Dear Colleagues,

The incidence of tuberculosis (TB) in New York City continues to decline. There were 895 cases of TB and 11 cases of multidrug-resistant TB (MDR TB) in the city in 2008. The number of TB cases has declined by 70% since 1992; MDR TB has decreased by 95%. We should, however, not rest on our laurels. TB in New York City, and in the United States as whole, is being driven by the global TB epidemic. As testimony to this, over 70% of all cases of TB in NYC in 2008 were among individuals born outside the United States. **TB anywhere is TB everywhere!** HIV/TB and MDR TB continue to threaten TB control efforts globally.

To focus its message, The New York City Department of Health and Mental Hygiene Bureau of Tuberculosis Control has adopted as its slogan '*New York City is Stopping TB*'. This slogan is a message of empowerment reminding us to strengthen partnerships and for us all to do our part to stop TB:

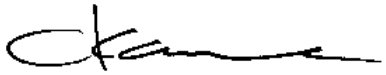
- Patients: By becoming active participants in their own health and well-being, and taking all their anti-TB drugs as prescribed
- Health care providers: By staying alert to the symptoms of the disease (Think TB!) and by providing prompt diagnosis and appropriate treatment
- Scientists: By engaging in needed research to develop new diagnostic, treatment and prevention modalities
- Communities: By sharing information to help prevent the disease and by mobilizing their members to become involved

The city's progress in controlling TB will not be sustainable without strengthened collaborations with the providers and communities that we serve. Action must be taken in order to reach those at highest risk for TB, and to identify and implement innovative strategies to improve testing and treatment among high-risk populations. The bureau is poised to work with others on these activities and will always remain a willing partner in the fight against TB.

I would like to thank all providers who report cases and manage TB patients. Without your efforts, we would not be where we are today. I look forward to ongoing communication between the bureau and all providers. It is my sincere hope that eliminating TB as a public health threat is a goal we can achieve together.

I hope you find this report informative as we mobilize to stop TB in NYC!

Sincerely,

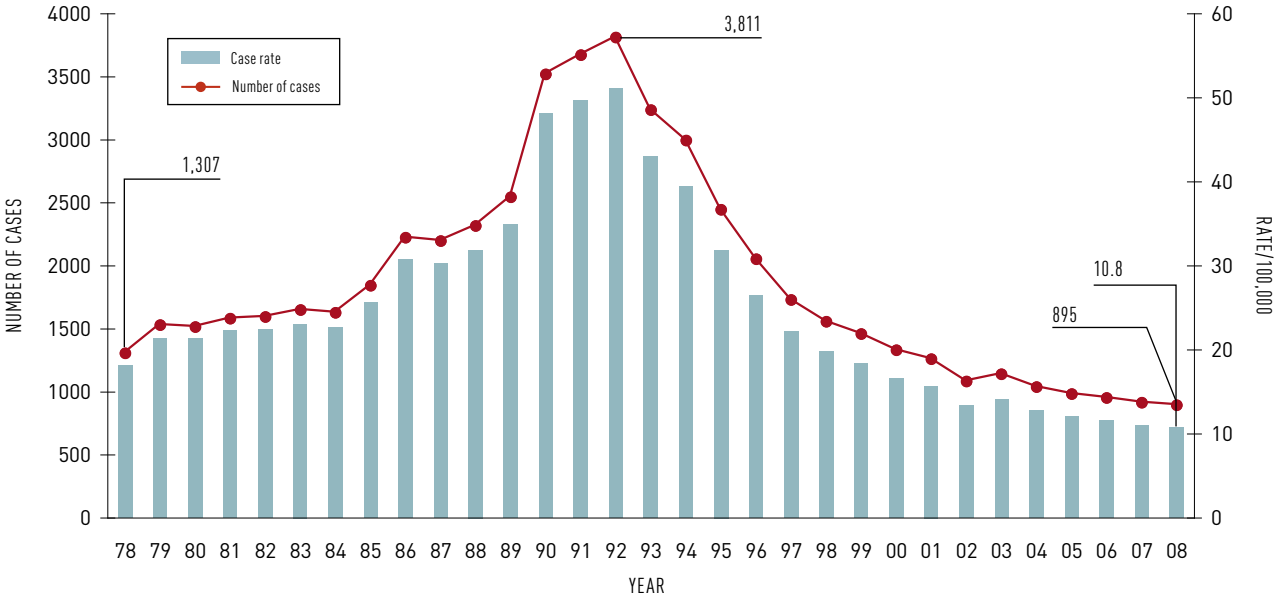


Chrispin Kambili, MD
Assistant Commissioner, Bureau of Tuberculosis Control

EXECUTIVE SUMMARY

In 2008, New York City recorded **895** confirmed cases of tuberculosis; the lowest number since the disease became reportable in 1897.

FIGURE 1. TUBERCULOSIS CASES AND RATES,[1] NEW YORK CITY, 1978-2008



[1] Rates based on official Census data and intercensal estimates prior to 2000. Rates for 2000 to 2008 are based on intercensal estimates.

For the fourth consecutive year, tuberculosis (TB) cases remained fewer than 1,000 in New York City (NYC). In 2008, there was a 2% drop from the previous year and a 77% decline since the peak of the NYC TB epidemic in 1992. Despite the decline in TB cases, there was a 12% increase in the number of confirmed cases in Queens. There were 11 multidrug resistant TB (MDR TB) cases, of which two were extensively drug-resistant TB (XDR TB). Since 1992, MDR TB cases have declined 98% (from 441 to 11).

Despite this progress, the NYC TB case rate of 10.8 per 100,000 population remains more than twice the national average of 4.2 per 100,000 population. In addition, the average annual decline in NYC's TB rate has slowed from 13% per year from 1992 through 1999 to 6% per year from 2000 through 2008.

EXECUTIVE SUMMARY

(CONT.)

In NYC, TB continues to disproportionately affect foreign-born persons and ethnic/racial minorities. In 2008, 76% of TB cases were born outside the United States, and ethnic/racial minorities accounted for over 92% of all cases. Among U.S.-born cases, the greatest disparity in TB rates was for non-Hispanic blacks, whose rates were three times that of non-Hispanic whites.

98%

Percent decrease in the number of MDR TB cases reported in NYC between1992 and 2008 (from 441 to 11)

HIV is the most important known risk factor for the progression from TB infection to disease. The number of TB cases co-infected with HIV in NYC has declined 89% since 2000, from 881 to 95.

The bureau identified 6,254 contacts to TB cases, of whom 4,488 (72%) were evaluated. Expanded contact investigations (ECI) were conducted at 32 congregate sites. The proportion of eligible TB cases on Directly Observed Therapy (DOT) has improved since 1994, rising from 57% to 76% in 2008.

In 2007, a drug-susceptible strain of TB—which had not been seen in NYC since 2001—reemerged. As of December 2008, nine NYC patients with culture-confirmed TB were identified with this same strain. This cluster of individuals belongs to the Garifuna ethnic group (an ethnic group of mixed ancestry who live along the Caribbean coast of Central America). The bureau has provided education and outreach to the Garifuna community in NYC regarding TB.

Through the use of cutting-edge laboratory tests, efforts to provide education and outreach to high risk communities and increased partnerships with NYC providers and community-based organizations, the bureau continues to meet the challenges facing TB elimination in NYC.

CORE ACTIVITIES

SURVEILLANCE

Surveillance and Reporting Accomplishments

Surveillance is an essential component of TB control in NYC. The bureau's Office of Surveillance ensures thorough and accurate reporting of TB suspects and cases by providers and laboratories, assigns patients for case management, reviews the timeliness and completeness of data, and coordinates the interjurisdictional transfer of patients into and out of NYC. The office also maintains the TB registry, monitors TB trends, prepares surveillance reports, and provides data support to the bureau. For information on TB reporting requirements in NYC, please see Appendix II.

5,115

Number of reports of patients with confirmed or suspected TB processed by the bureau in 2008

- In 2008, the Office of Surveillance received and processed new reports for 5,115 persons, of whom 895 were confirmed to have TB. The number of TB cases continued to decline, and reporting of TB suspects decreased by 3% from the previous year, which is the first decrease since 2006.
- The bureau continues to work with an outside vendor on the development of our new TB Registry. The new surveillance software system will be able to capture all patient information and receive electronic provider and laboratory reports.
- The bureau continued to make progress in its effort to encourage hospitals to implement voluntary in-house pharmacy surveillance. Pharmacy surveillance allows infection control staff to identify patients placed on anti-TB medications in instances when providers did not report them. An additional six facilities implemented a system in 2008, bringing the total using pharmacy surveillance to 36.
- Electronic reporting for laboratories was mandated in NYC in July 2006. In 2008, five additional facilities were certified to report TB test results electronically through the Electronic Clinical Laboratory Reporting System (ECLRS), bringing the total number certified to 39. The Office of Surveillance is working with the Division of Informatics and Information Technology to certify the remaining six laboratories that perform TB tests.
- The bureau continues to work with providers and laboratories to improve the timeliness and completeness of TB case and suspect reporting. In 2008, the Office of Surveillance continued to provide feedback through telephone calls and the distribution of educational materials.

CORE ACTIVITIES

CLINICAL MANAGEMENT OF TUBERCULOSIS

Chest Centers

The bureau operates nine chest centers, which are located throughout the city. Each provides TB diagnostic testing, outpatient medical and nursing care, treatment for latent and active TB, social service assistance and HIV counseling and testing at no cost to the patient. For a list of chest centers, see Appendix V.

- In 2008, the chest centers provided TB testing and treatment to 33,845 New Yorkers (a 9% increase from 30,999 in 2007) during 124,579 visits (a 2% increase from 122,481 visits in 2007). The largest increases occurred at the Fort Greene and Corona Chest Centers.
- The chest centers reported 8% of all confirmed TB cases and identified 18% of all patients suspected of having TB in 2008.
- In 2008, 47% of TB cases received care at the chest centers.

Clinical Management Innovations and Accomplishments

- Since 2006, New York State has required Nucleic Acid Amplification (NAA) testing for all initial acid-fast bacilli (AFB) smear-positive respiratory specimens. Rapid diagnostic tests are useful in determining appropriate management of potentially infectious patients, initiating contact investigations and lending support to ruling out TB diagnoses. In 2008, 74% of AFB smear-positive TB suspects and cases in NYC received NAA testing, compared to 64% in 2005.
- In 2006, the bureau began making QuantiFERON®-TB Gold (QFT-G) test available at its chest centers. This test has several advantages over the tuberculin skin test (TST), such as a lower likelihood of false-positive results and only requiring a single clinic visit. In 2008, 22,215 patients received a QFT-G test.

74% Proportion of AFB smear-positive TB suspects and cases in NYC who received NAA testing in 2008

- All bureau chest centers offer rapid testing for HIV. In 2008, 5,178 patients were tested for HIV, with 5,051 (99%) receiving rapid HIV testing.
- In 2007, the bureau started a new initiative—Partners in TB Control—in collaboration with the Department of Homeless Services and medical providers to screen and provide DOT at 20 homeless shelters. As a result, in 2008, 2,175 homeless persons were screened.

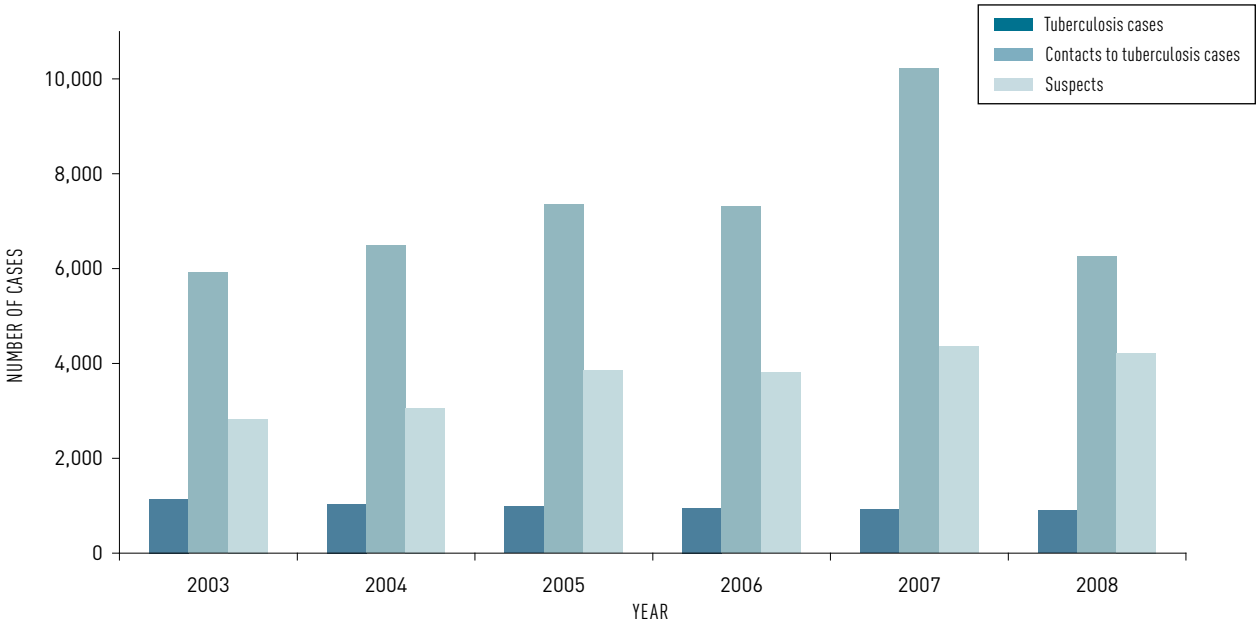
CORE ACTIVITIES

CASE MANAGEMENT AND CONTACT INVESTIGATION

The bureau provides case management for all confirmed TB cases and for many TB suspects, including those not receiving care at the bureau's chest centers. Case management includes ensuring that patients complete an appropriate course of treatment and conducting DOT. The bureau's medical consultants provide non-bureau physicians with recommendations on treatment, and perform standardized case reviews to monitor patient progress. The bureau also initiates contact investigations for all suspected and confirmed cases with respiratory TB.

- In 2008, the bureau provided case management to 295 TB cases from 2007 who were still receiving treatment in addition to the 895 cases and many patients suspected of having TB who were reported in 2008.
- Among eligible patients in 2008, 618 (76%) were treated using DOT; 917 patients, including 299 cases reported the previous year, received DOT services in 2008.
- Among the 599 cases eligible for contact investigation, 6,254 contacts were identified. Of the 4,488 (72%) contacts evaluated, 801 (18%) were found to have latent TB infection.
- In 2008, the bureau referred 600 patients (including cases, suspects and contacts) to other jurisdictions for follow-up and treatment. In addition, 482 patients were referred to the bureau from other jurisdictions.

FIGURE 2. CASES, SUSPECTS[1] AND CONTACTS IDENTIFIED BY THE BUREAU OF TB CONTROL, NEW YORK CITY, 2003-2008



[1] Includes suspects who were assigned for case management and suspects who were evaluated but not assigned for case management.

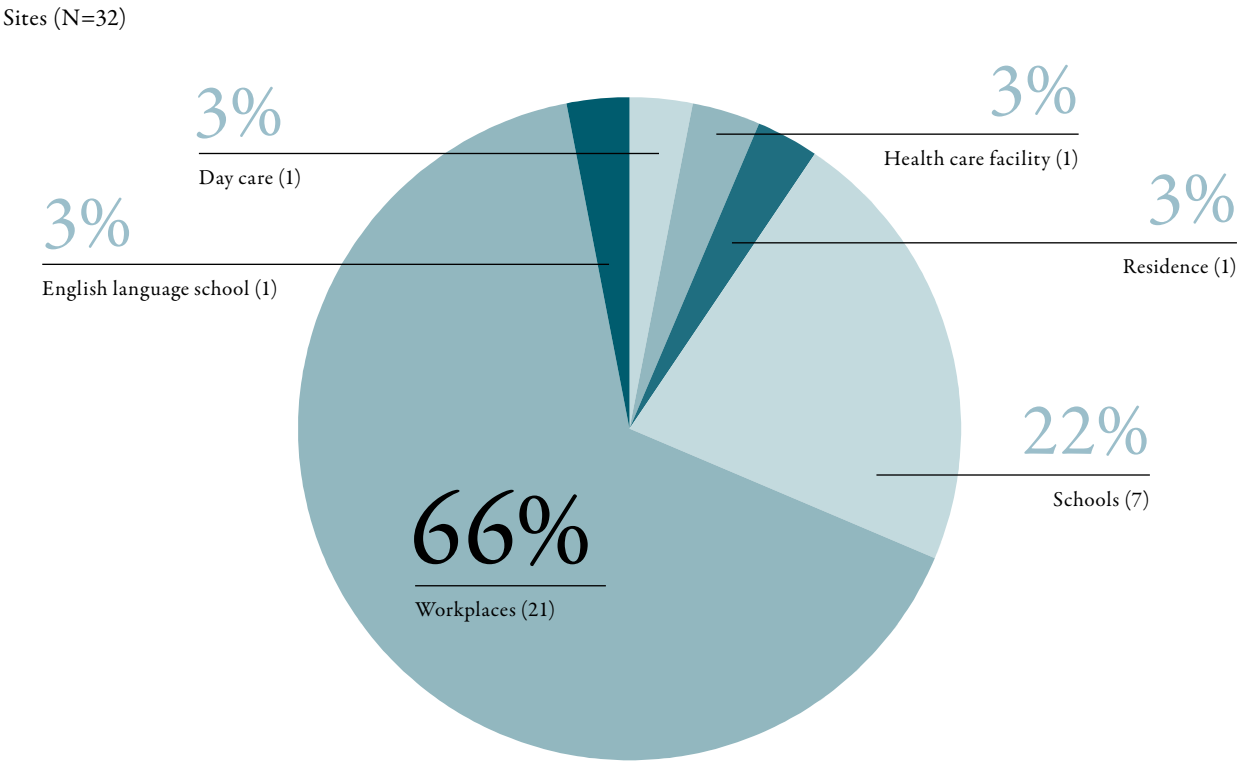
CORE ACTIVITIES

OUTBREAK DETECTION AND MANAGEMENT

Early detection of TB is crucial to preventing transmission and controlling outbreaks. When exposures occur, the bureau uses multiple methods to identify and control TB transmission. The bureau investigates all TB exposures in congregate settings to identify contacts and to determine if transmission occurred and whether further testing is warranted.

- The bureau conducted 30 epidemiologic investigations in congregate settings involving 32 sites and 1,854 contacts. (Figure 3). Among the 32 sites, 21 (66%) were work place settings, seven (22%) were schools and four (12%) were other facilities (health care, residential, day care and English language school).
- Among the 30 expanded contact investigations conducted at 32 sites in 2008, transmission was considered probable in 12 (38%), possible in six (19%), unlikely in 13 (41%) and it could not be assessed in one (3%).

FIGURE 3. EPIDEMIOLOGIC INVESTIGATIONS CONDUCTED IN CONGREGATE SETTINGS, NEW YORK CITY, 2008



CORE ACTIVITIES

OUTBREAK DETECTION AND MANAGEMENT (CONT.)

Universal Genotyping and Clustering in 2008

The bureau began universal genotyping of all culture-positive TB isolates in 2001. Genotype results identify whether TB strains are genetically related (i.e., are clustered). This information helps the bureau identify false-positive culture results, detect outbreaks and previously unknown links among patients, and detect places where TB transmission is occurring.

- Preliminary 2008 genotyping results indicate that the participation of hospital and commercial laboratories continues to be high. Isolates were submitted to NYC and New York State public health laboratories for 665 (97%) of 685 culture-confirmed cases. To date, complete genotyping results are available for 640 (96%) patients.
- In 2008, 244 (38%) of 640 cases with available genotype results were clustered to another NYC case that had been diagnosed between 2001 and 2008. The clustered cases from 2008 were in 153 different genotype clusters. Among the 244 clustered cases, 138 (57%) were clustered to at least one other 2008 case, indicating recent transmission in NYC. Among U.S.-born patients, 59% (87/148) had a clustered strain (an 11% decrease from 2007) compared to 35% (157/492) of foreign-born patients (a 3% decrease).

TRANSMISSION OF TUBERCULOSIS IN THE GARIFUNA COMMUNITY

In 2007 a drug-susceptible strain of TB which had not been seen in NYC since 2001 re-emerged. As of December 2008, nine NYC patients with culture-confirmed TB were identified with this same strain. Additionally, two patients with clinically-diagnosed TB were epidemiologically linked to patients in this cluster.

Through investigation of this cluster, bureau staff identified the following demographic characteristics among patients, which indicated that they were in a shared social network: Six (67%) resided in the Bronx and seven (78%) were born in Honduras or Belize or were a U.S.-born child with Honduran-born parents. The bureau also confirmed that six (67%) patients belonged to the Garifuna (plural: Garinagu) ethnic group, a group of mixed Caribbean and African ancestry living along the Caribbean coast of Honduras, Guatemala, Belize and Nicaragua. Although population estimates vary widely, NYC is believed to be home to the largest Garifuna population outside of Honduras.

Findings from the ongoing cluster investigation indicate that transmission of this strain is recent and occurring in NYC. In addition to a common social network among clustered patients, other links between patients have been identified. Moreover, three patients—two cluster patients and one clinically-diagnosed patient—were U.S.-born children, of whom two were exposed to infectious TB patients in NYC with the same strain.

This cluster investigation has raised awareness among bureau staff about the Garifuna population in NYC. In 2008, bureau staff met with a Garifuna community organization (http://garifunacoalition.org) to learn more about the NYC Garifuna community, educate community leaders about TB, and identify opportunities to conduct additional outreach in the Garifuna community.

CORE ACTIVITIES

OUTREACH AND STAFF DEVELOPMENT

In an effort to continue promoting the campaign *Moving Towards a Tuberculosis-Free New York City*, the bureau planned a series of events to mobilize high-risk communities, expand partnerships, reach out to medical providers serving targeted communities, and promote high-quality TB control and care. Campaign activities in 2008 included:

- On March 20, 2008, the bureau hosted its annual TB conference in commemoration of World TB Day, co-sponsored by the Northeastern Regional Training and Medical Consultation Center (RTMCC). The conference drew over 220 health care providers from around the city and the region. Presentations included such topics as NYC TB data, use of the QFT-G test, TB drugs in development, filling the gap in TB research development and challenges in TB control.
- The bureau and the Northeast RTMCC hosted the Northeast TB Controllers meeting in 2008. Approximately 170 persons attended this event, which included TB and Centers for Disease Control and Prevention staff and advocates from around the Northeast region. Attendees received TB updates and learn about advocacy efforts. The meeting also included a course on outpatient management for TB patients.

2,722

Number of TB information kits distributed by the bureau's outreach team in 2008

- The bureau outreach team conducted 38 "TB 101" sessions and in-service trainings on TB for community groups, staff and clients of various facilities and community boards. In 2008, 2,722 TB Information Kits and approximately 3,000 brochures and flyers were distributed at education sessions, partnership meetings and events including an Immigrant Health and Services Awareness Fair at the Brooklyn Public Library, a National HIV Testing Day event in Harlem, and the bureau's Annual Conference.

THE COALITION FOR A TB-FREE NEW YORK CITY

The Coalition for a TB-Free New York City, which was launched on World TB Day in 2006, continued to meet monthly throughout 2008. The Coalition's mission is to engage leaders of communities with high burdens of TB to ensure that these communities have access to services, and to advocate for funding to improve TB programs and increase TB research nationally and globally. Its core members are the Treatment Action Group, NYC Bureau of Tuberculosis Control, Center for Immigrant Health, New York State TB Control Program, NYC American Lung Association and the Charles P. Felton National Tuberculosis Center at Harlem Hospital Centers.

- The Community TB Forum is organized annually by the Coalition. The bureau hosted this event in 2008, which aimed to increase awareness about the burden of TB in NYC, share TB success stories, and develop strategies to address TB through community education, advocacy and support for increased funding for programs and research. The forum was attended by 60 community leaders, physicians, health care workers and news reporters, including 11 print, radio and T.V. media representatives.

PROFILE of TUBERCULOSIS CASES

PATIENT CHARACTERISTICS

Country of Birth

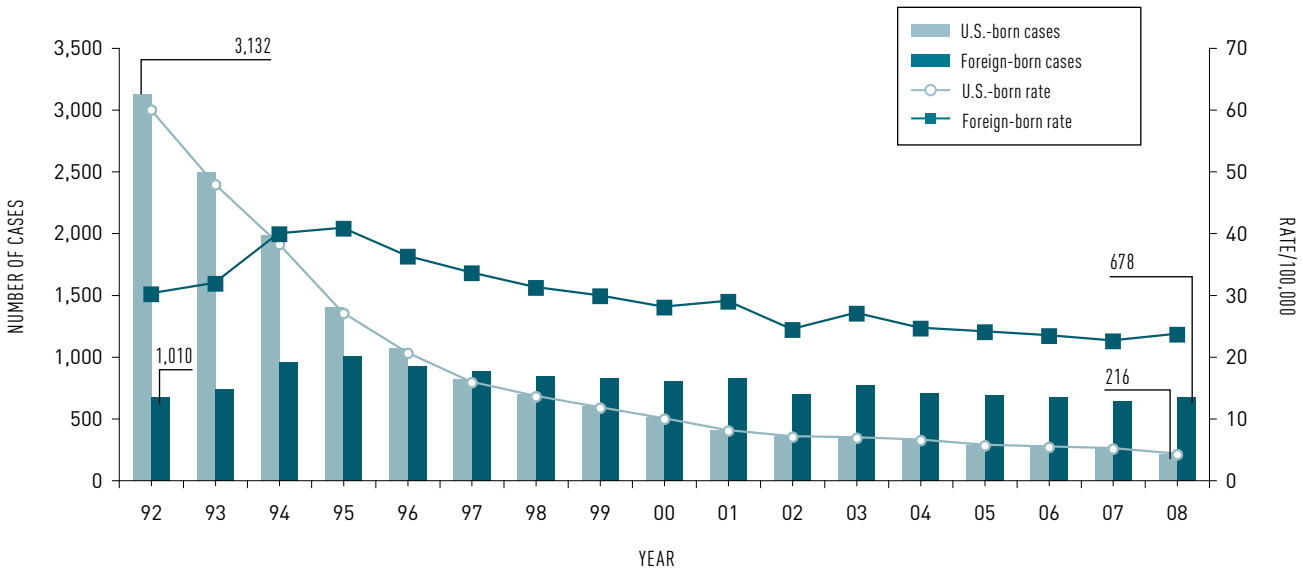
- Persons born outside the United States constituted the majority of TB patients in NYC, representing 76% (678/895) of the city's TB patients in 2008 (Figure 4). The TB rate in foreign-born persons was more than five times that of U.S.-born persons (23.6/100,000 versus 4.2/100,000).
- Countries of birth with the highest number of TB cases among foreign-born patients were China (132), Mexico (51), Ecuador (49), the Dominican Republic (46), Haiti (43), the Philippines (38), India (36) and Bangladesh (28).

76%

Proportion of TB patients in NYC in 2008 that were born outside the United States

- Overall, 61% of foreign-born TB cases in 2008 had been in the United States for more than five years at the time of TB diagnosis.

FIGURE 4. U.S.[1] AND FOREIGN-BORN TUBERCULOSIS CASES AND RATES[2], NEW YORK CITY, 1992-2008[3]



[1] U.S.-born includes people born in Puerto Rico and the U.S. Virgin Islands.
[2] Rates are based on official Census data and intercensal estimates prior to 2000. Rates since 2000 are based on 2000 Census data.
[3] There was one case with an unknown country of birth that is not included in the 2008 numbers.

PROFILE of TUBERCULOSIS CASES

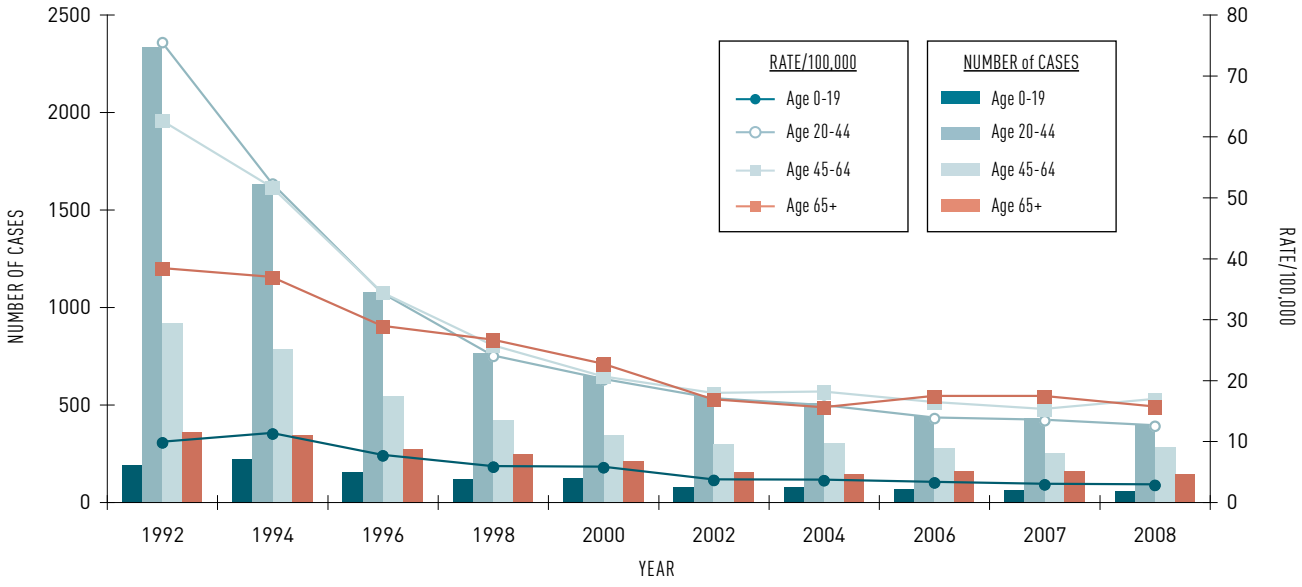
PATIENT CHARACTERISTICS (CONT.)

Age/Sex

61% Proportion of TB patients in NYC in 2008 who were males

- The majority of TB cases were among those in the 20 to 44 year old age group with 404 cases (45%) (Figure 5).
- Persons in the 45 to 64 year old age group had the highest rate of TB at 16.8/100,000.
- Among pediatric TB cases, the number of patients aged less than five years decreased from 12 in 2007 to 7 in 2008.
- 61% (546) of cases were among males and 39%(349) were among females. The highest rate for women was for those aged 25 to 34 years (12.2/100,000), while the highest rate for men was for those aged 45 to 54 years (25.5/100,000).

FIGURE 5. TUBERCULOSIS CASES AND RATES[1] BY AGE GROUP, NEW YORK CITY, 1992-2008



[1] Rates before 2000 are based on official U.S. Census data and intercensal estimates. Rates since 2000 are based on 2000 Census data.

PROFILE of TUBERCULOSIS CASES

PATIENT CHARACTERISTICS (CONT.)

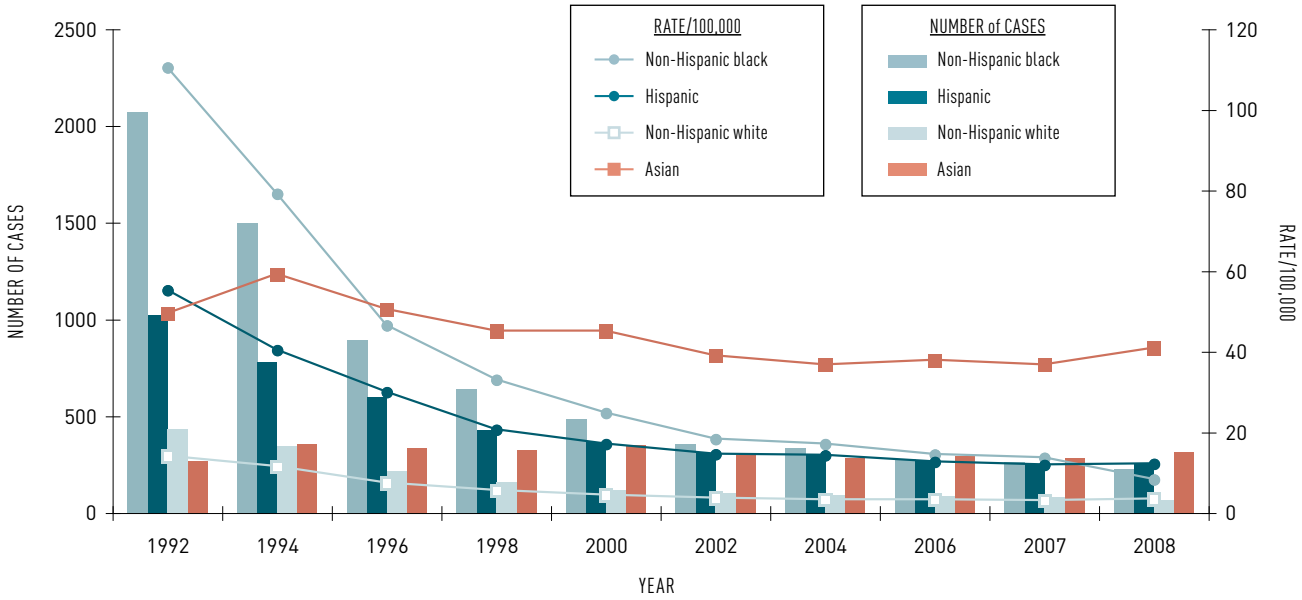
Race/Ethnicity

- Racial/ethnic minorities continue to be disproportionately affected by TB disease in NYC (Figure 6). The TB rates for all racial/ethnic groups decreased from 2007 to 2008. TB rates among Asians (40.9/100,000), Hispanics (12.2/100,000) and non-Hispanic blacks (11.8/100,000) were 4.7 to 16.4 times higher than those of non-Hispanic whites (2.5/100,000).
- All TB cases among children less than five years of age were among Hispanics (5) and non-Hispanic blacks (2).

320

Number of TB patients in NYC in 2008 that were Asian. TB rates among Asians were 16 times higher in NYC in 2008 than those of non-Hispanic whites, and 3.4 times higher than those of Hispanics, the group with the second highest rate in the city

FIGURE 6. TUBERCULOSIS CASES AND RATES[1] BY RACE/ETHNICITY, NEW YORK CITY, 1992-2007



[1] Rates before 2000 are based on official U.S. Census data and intercensal estimates. Rates since2000 are based on 2000 Census data.

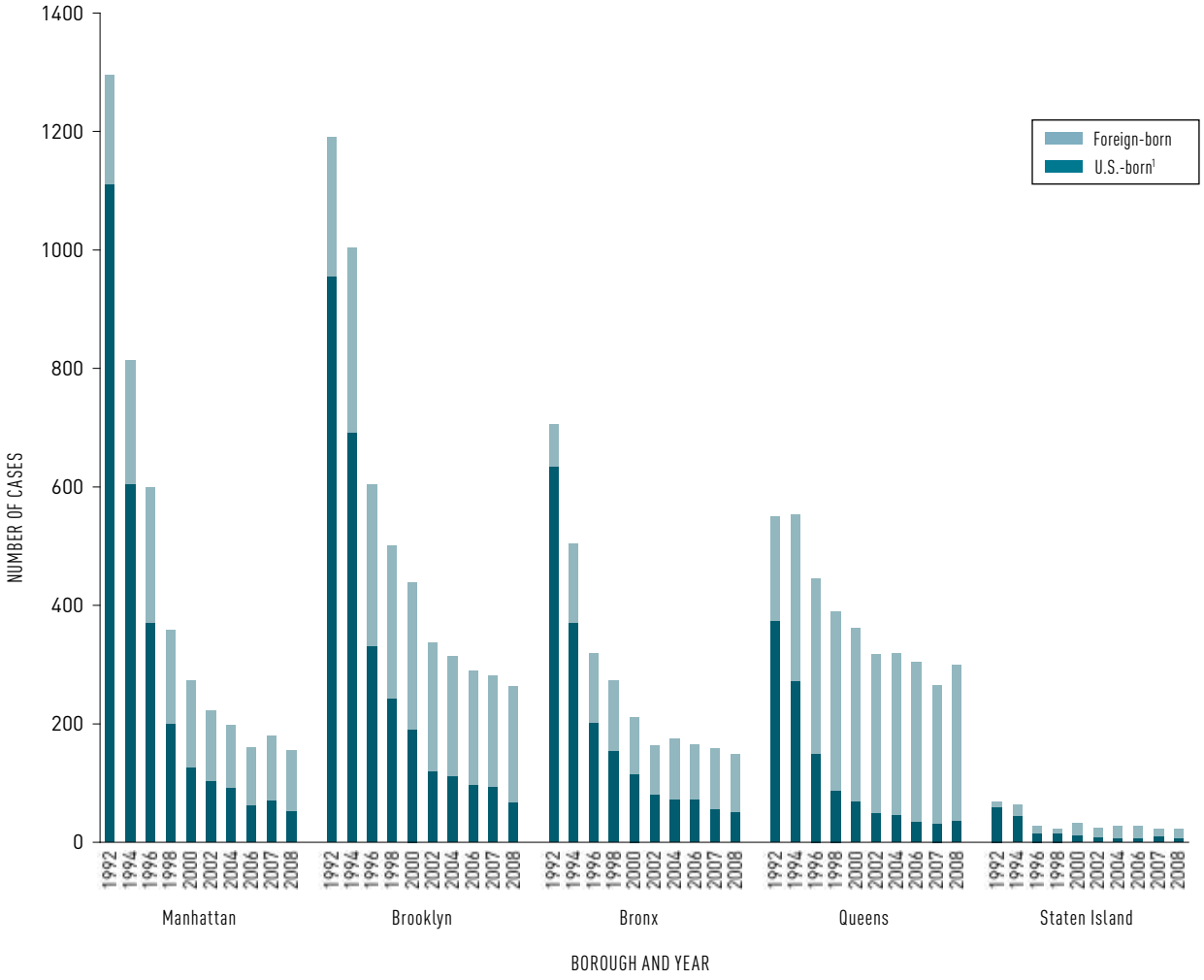
PROFILE of TUBERCULOSIS CASES

PATIENT CHARACTERISTICS (CONT.)

Neighborhoods

- Queens had the highest burden of TB with 299 (33%) cases, followed by Brooklyn with 264 (29%) cases (Figure 7).
- From 2007 to 2008, the TB rate decreased by 14% and 7% in Manhattan and Brooklyn, respectively, while the rate in Queens increased by 12%.

FIGURE 7. TUBERCULOSIS CASES BY BOROUGH AND AREA OF BIRTH, NEW YORK CITY, 1992-2008

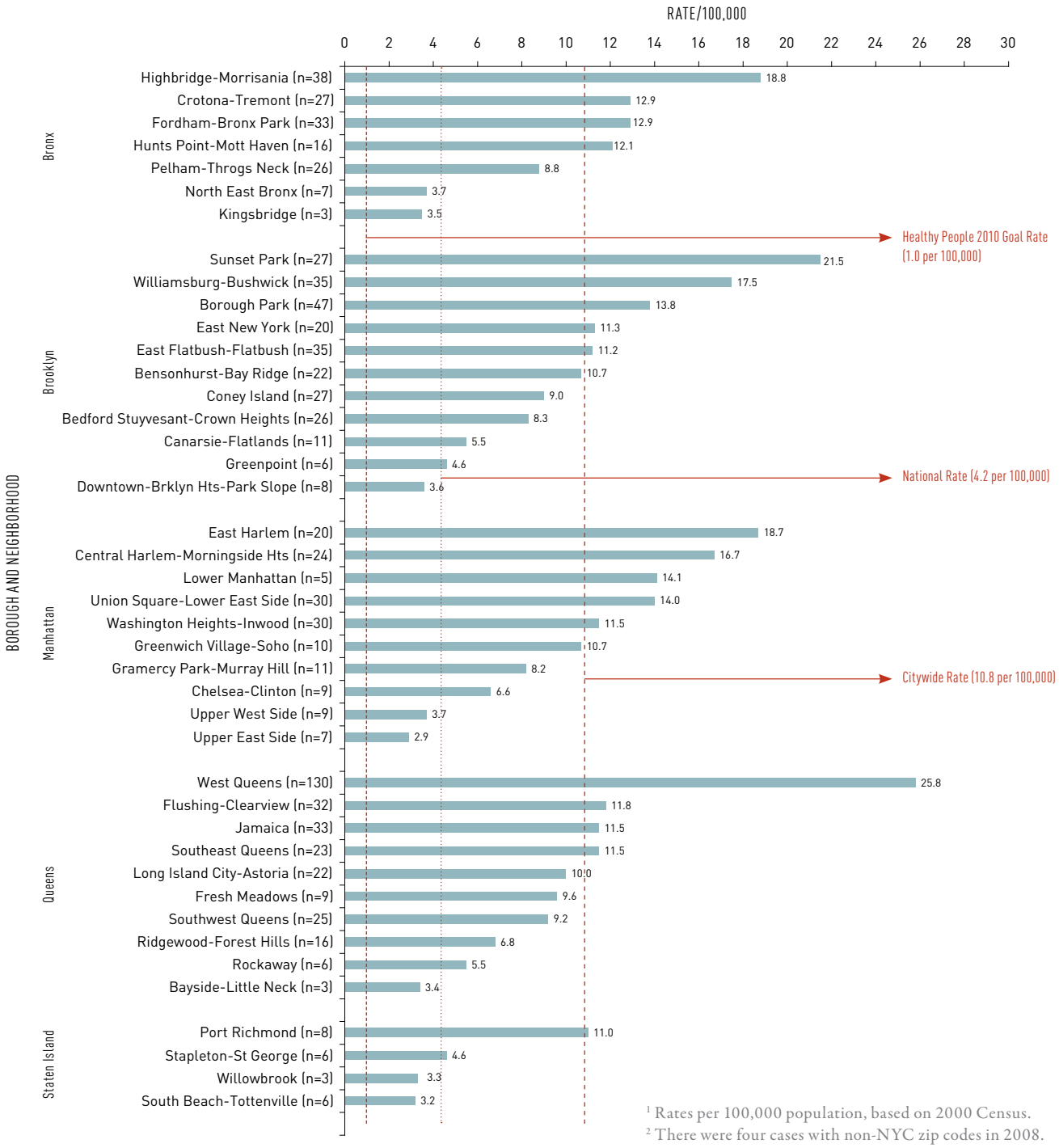


[1] Puerto Rico and U.S. Virgin Islands are included as U.S.-born.

PROFILE of TUBERCULOSIS CASES

PATIENT CHARACTERISTICS (CONT.)

FIGURE 8. RATES OF TB BY UNITED HOSPITAL FUND NEIGHBORHOOD,[1,2] NEW YORK CITY, 2008



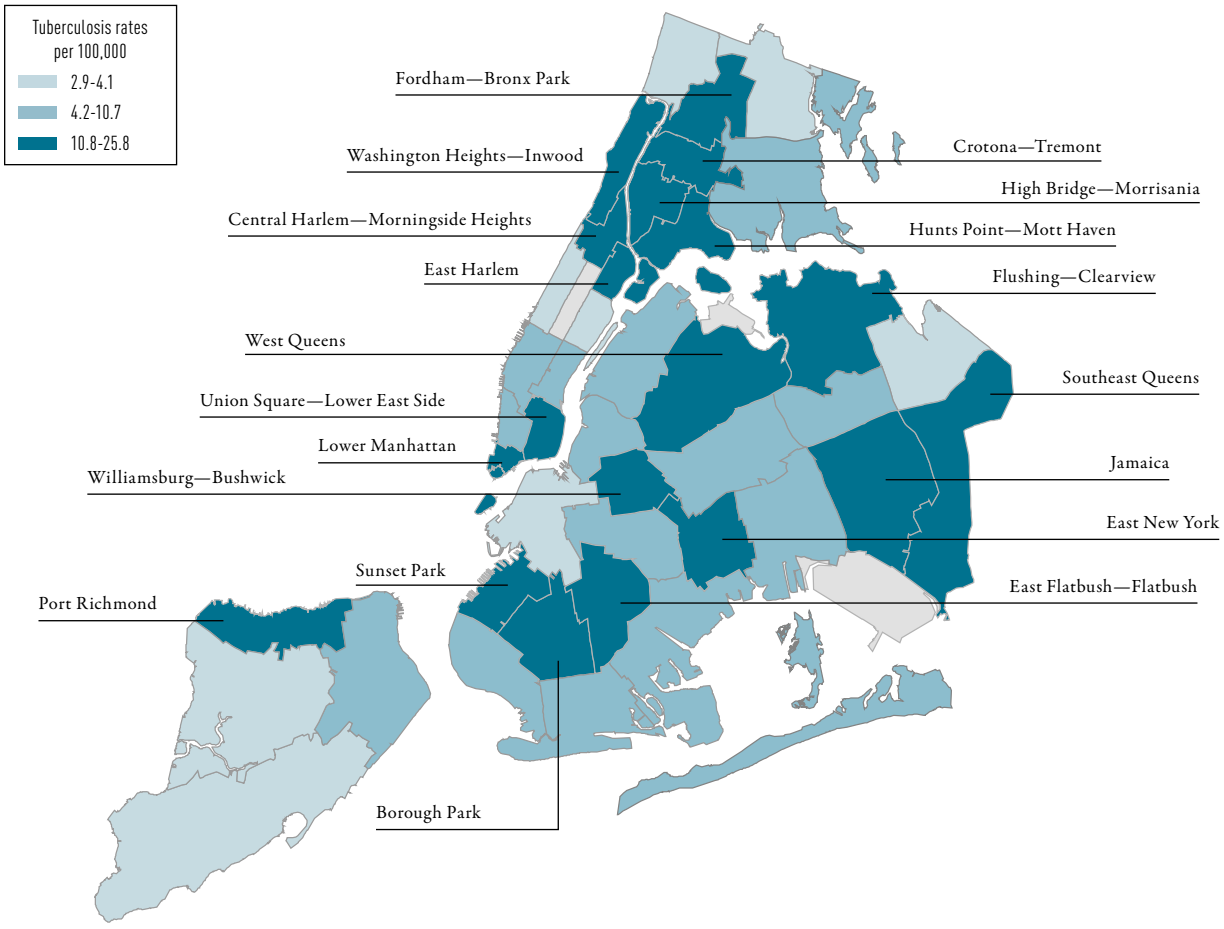
[1] Rates per 100,000 population, based on 2000 Census.
[2] There were four cases with non-NYC zip codes in 2008.

PROFILE of TUBERCULOSIS CASES

PATIENT CHARACTERISTICS (CONT.)

- TB rates decreased from 2007 to 2008 in East Harlem, Central Harlem, Gramercy Park-Murray Hill, Hunts Point-Mott Haven, Fordham-Bronx Park, Bedford Stuyvesant-Crown Heights, East Flatbush-Flatbush, Flushing and Ridgewood-Forest Hills.
- Eight NYC United Hospital Fund (UHF) neighborhoods had TB rates lower than the national average rate of 4.2/100,000.
- The TB rate in West Queens (25.8/100,000) was more than two times higher than the city average of 10.8/100,000. In West Queens, the TB rate increased from 22.6/100,000 in 2007 to 25.8/100,000 in 2008.
- Nineteen UHF neighborhoods had TB rates higher than the city average of 10.8/100,000 (Figures 8 and 9).

FIGURE 9. TUBERCULOSIS RATES BY UNITED HOSPITAL FUND NEIGHBORHOOD, NEW YORK CITY, 2008



PROFILE of TUBERCULOSIS CASES

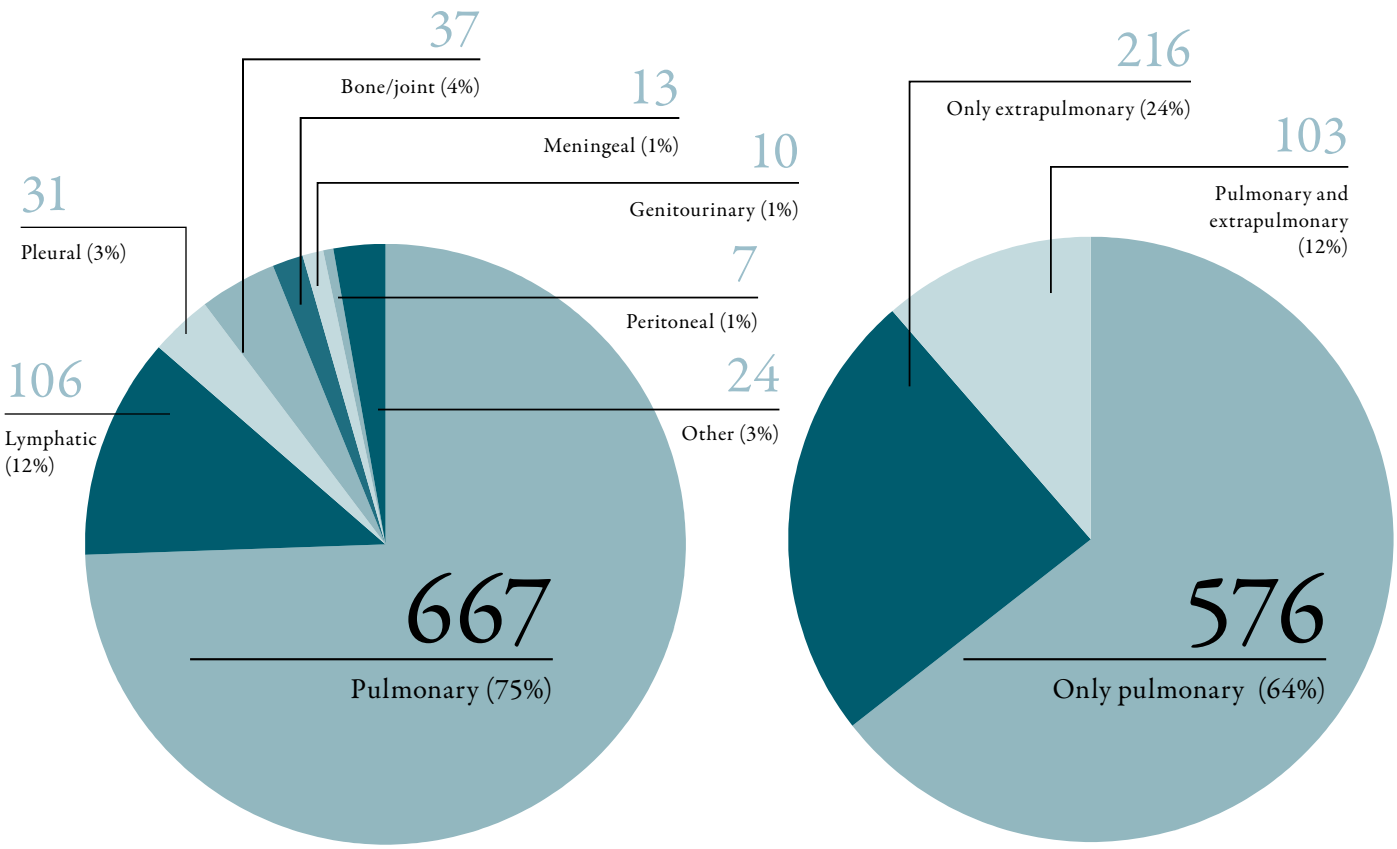
CLINICAL CHARACTERISTICS

Among the 895 TB cases in NYC in 2008, 688 (77%) were culture positive for *M. tuberculosis*. Among the 679 with some pulmonary involvement, 338 (50%) were sputum smear positive for acid-fast bacilli (AFB).

Sites of Disease

The lung was the most common primary disease site; 667 (75%) cases had pulmonary TB (Figure 10). The lymphatic system was the second most common site of TB (106 cases), followed by pleural TB (31) and TB of the bone/joint (37). Five hundred seventy six (64%) cases had pulmonary-only TB, 103 (12%) cases had both pulmonary TB and an additional site of disease and 216 (24%) had only extrapulmonary TB.

FIGURE 10. TUBERCULOSIS CASES BY SITE OF DISEASE, NEW YORK CITY, 2008



Tuberculosis Cases by Primary Disease Site

Tuberculosis Cases by All Sites of Disease

PROFILE of TUBERCULOSIS CASES

CLINICAL CHARACTERISTICS (CONT.)

Drug Resistance

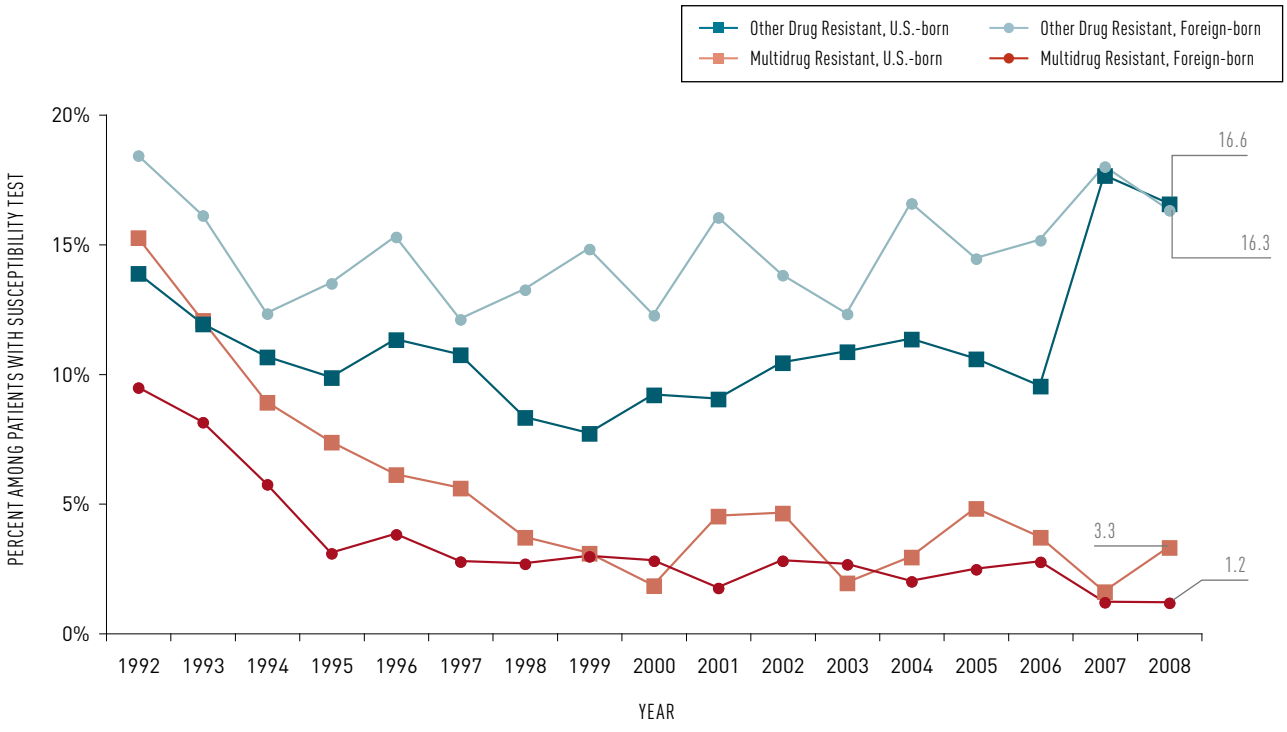
- Among culture-positive cases for whom drug susceptibility was performed (680), 120 (18%) were drug-resistant. The number of multidrug resistant (MDR TB)[1] cases increased by 22%, from nine cases in 2007 to 11 in 2008. Of these 11 MDR TB cases, two had extremely drug resistant TB (XDR TB).[2] The number of cases with other drug resistance (ODR)[3] patterns, however, decreased from 123 in 2007 to 109 in 2008.

18%

Proportion of culture-positive cases with drug-susceptibility performed that had drug resistance

- Overall drug resistance was 17% for foreign-born and 20% for U.S.-born cases. (Figure 11).

FIGURE 11. DRUG RESISTANCE[3] BY AREA OF BIRTH, NEW YORK CITY, 1992-2008



[1] MDR TB is defined as resistance to at least isoniazid and rifampin.
[2] XDR TB is defined as resistance to isoniazid and rifampin plus resistance to any flouroquinolone and to an injectable second-line anti-TB medication (i.e., amikacin, kanamycin or capreomycin).
[3] ODR is defined as isolates resistant to other anti-TB medications but which are not MDR.

PROFILE of TUBERCULOSIS CASES

CLINICAL CHARACTERISTICS (CONT.)

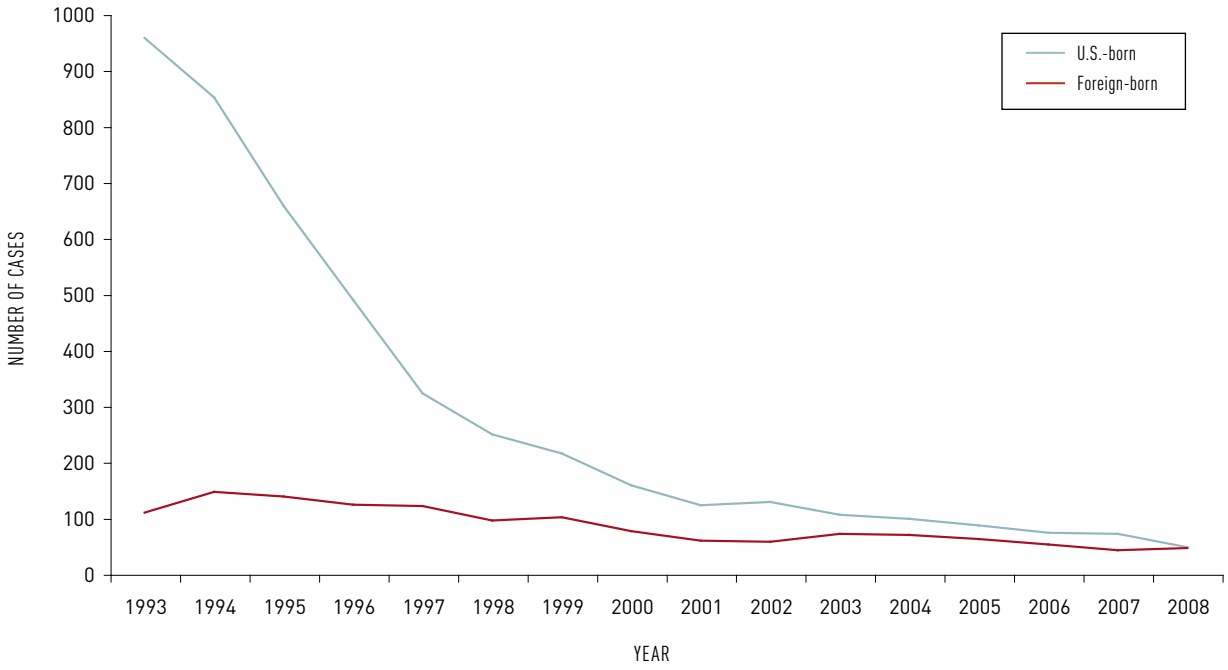
HIV Co-Infection

- 95 (11%) TB patients were infected with HIV in 2008, an 18% decrease from the previous year and a 91% decrease from 1993 (Figure 12). However, the number of cases with HIV co-infection in foreign-born persons increased by 9%, from 43 in 2007 to 47 in 2008.

18%

Percent decrease from 2007 to 2008 in the number of NYC TB patients who were infected with HIV

FIGURE 12. HIV CO-INFECTION[1] IN PERSONS WITH TUBERCULOSIS BY AREA OF BIRTH, NEW YORK CITY, 1993-2008



[1] Data for HIV status is from the bureau's TB Registry. Cross-matching of TB and AIDS registries was not conducted.

PROFILE of TUBERCULOSIS CASES

PATIENT MANAGEMENT AND OUTCOMES

Directly Observed Therapy

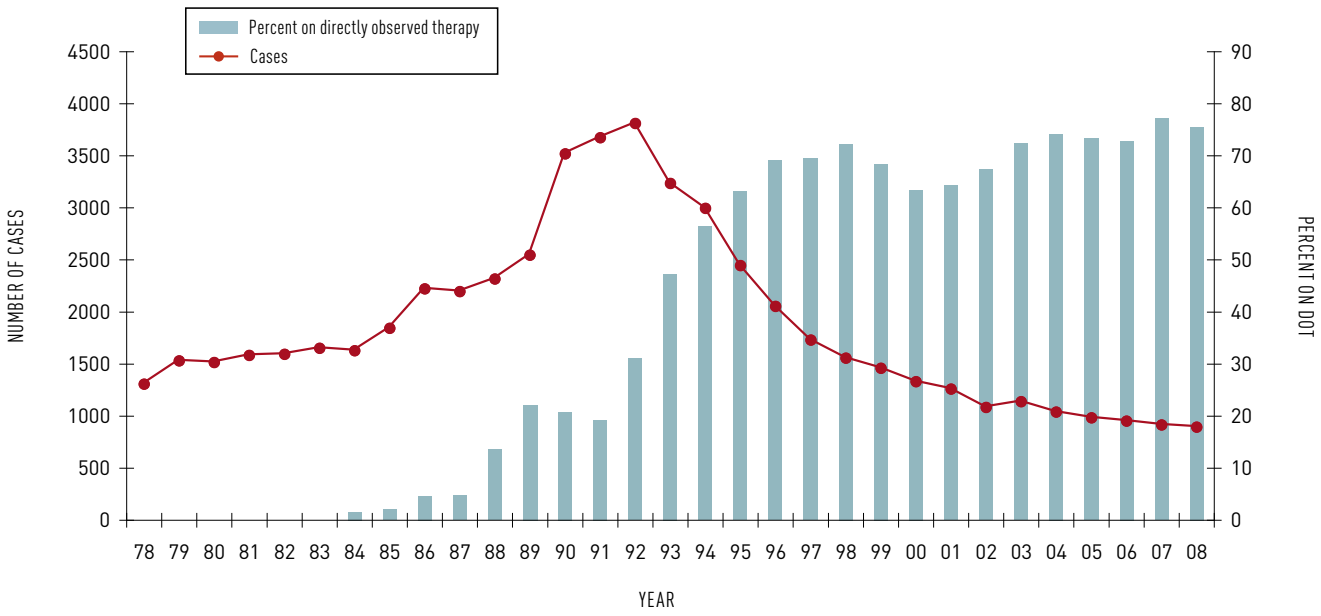
- In 2008, 76% of eligible TB patients received Directly Observed Therapy (DOT) (Figure 13).

76%

Proportion of eligible TB patients in NYC who received DOT in 2008

- DOT utilization was higher for patients who were pulmonary AFB smear-positive (87%) and patients who were treated at a bureau chest center (87%).
- DOT rates were lower among patients with extrapulmonary TB (62%) and among those treated exclusively by a private medical provider (33%) (Figure 14).

FIGURE 13. TUBERCULOSIS CASES ON DIRECTLY OBSERVED THERAPY,[1] NEW YORK CITY, 1978-2008

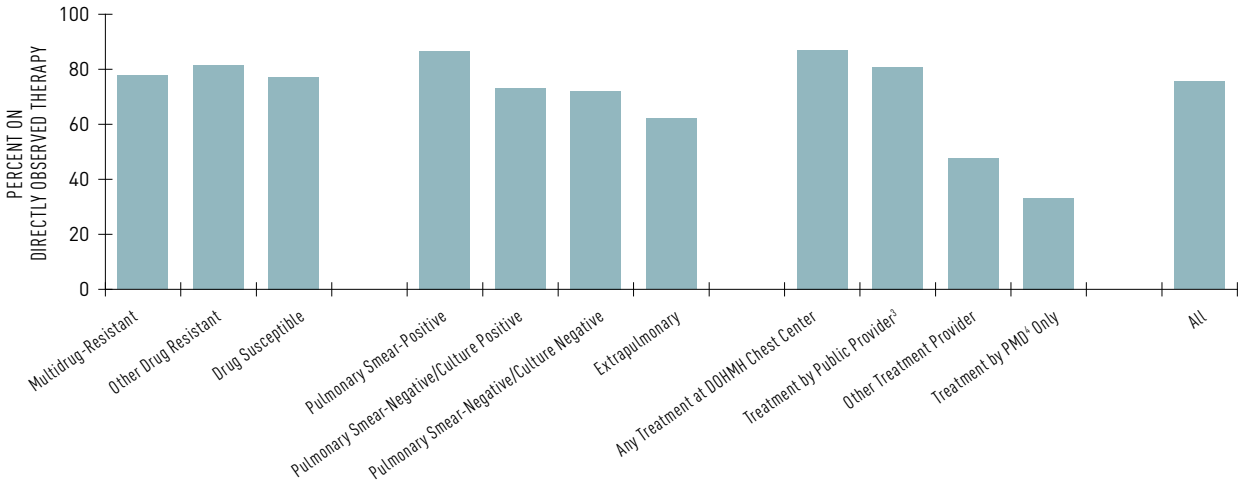


[1] Of those who were diagnosed while alive and received treatment with two or more drugs on an outpatient basis.

PROFILE of TUBERCULOSIS CASES

PATIENT MANAGEMENT AND OUTCOMES (CONT.)

FIGURE 14. PERCENTAGE OF ELIGIBLE[1] TUBERCULOSIS CASES ON DIRECTLY OBSERVED THERAPY[2] BY CLINICAL CHARACTERISTICS, NEW YORK CITY, 2008



[1] Eligible patients were those diagnosed while alive and who received treatment with two or more anti-tuberculosis drugs on an outpatient basis. [2] Ever on DOT as of March of the year after being confirmed as a case of TB. [3] Public Providers are New York City Health and Hospitals Corporation (HHC) facilities. [4] PMD=Private medical provider.

Treatment Outcomes[1]

Most (90%, 726/806) of the patients diagnosed with TB in 2007 completed treatment within one year[2]; 7% (57/820) completed treatment in more than 365 days.[3] Only seven patients (1%) refused to continue treatment and 12 (1%) were lost to follow-up. Through interstate coordination, efforts were made to ensure that the 14 patients who moved from New York City completed treatment.

90%

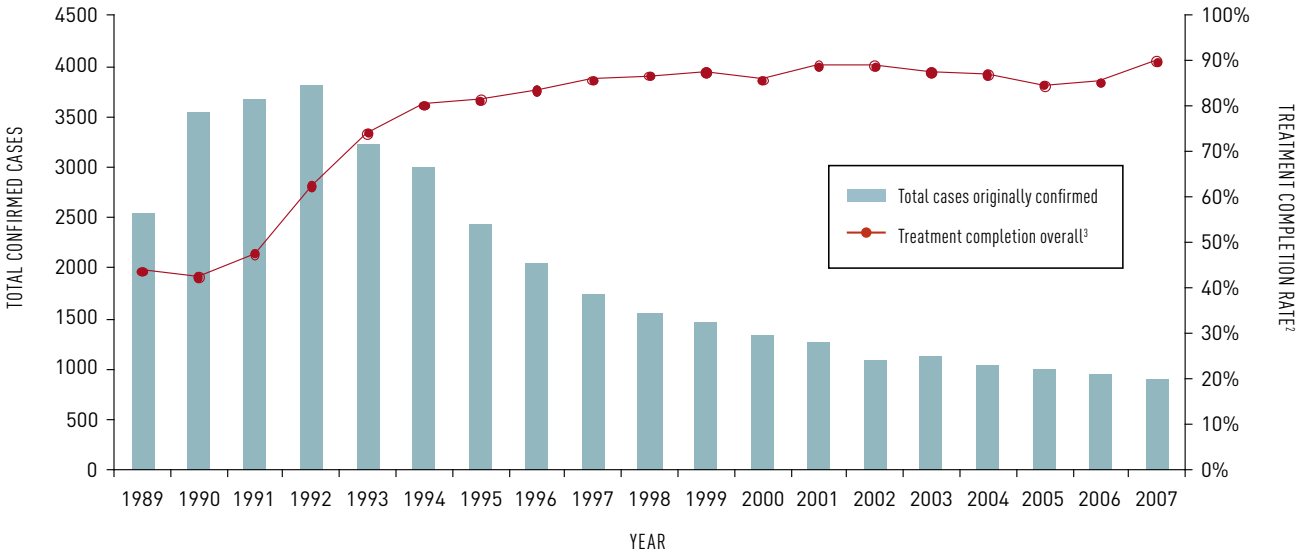
Proportion of patients diagnosed with TB in 2007 who completed treatment within one year

[1] TB treatment usually lasts six to nine months. Treatment completion is analyzed within a delay of one year to allow sufficient time for completion.
[2] Excluding patients who did not start on anti-TB medications, those who died before completion, those with Rifampin resistance and children younger than 15 years of age with bone or meningeal TB.
[3] Excluding patients who did not start on anti-TB medications and those who died before treatment completion.

PROFILE of TUBERCULOSIS CASES

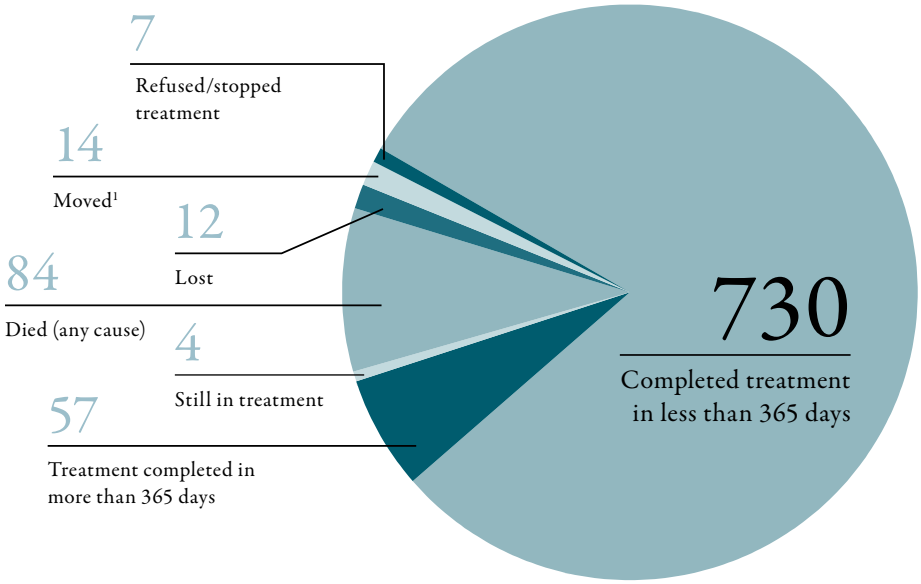
PATIENT MANAGEMENT AND OUTCOMES (CONT.)

FIGURE 15. TUBERCULOSIS TREATMENT COMPLETION, NEW YORK CITY, 1989-2007[1]



[1] Treatment completion is analyzed within a delay of one year to allow sufficient time for completion. [2] Treatment completion is calculated as per the World Health Organization (WHO) and does not exclude people who died. [3]Excluding those who never started treatment or with rifampin (RIF) resistance.

FIGURE 16. OUTCOMES FOR CONFIRMED CASES COUNTED IN 2007 (N=908), NEW YORK CITY



[1] Patients are categorized as "moved" only if their transfer to another jurisdiction is confirmed and no further follow-up information is available.

APPENDICES

APPENDIX I

TABLES

TABLE 1. TUBERCULOSIS INCIDENCE, NEW YORK CITY, 1900-2008

Year[1]	Number[2,3]	Rate per 100,000[4]	Culture + cases	Sputum smear + cases[5]	Rate per 100,000	Multidrug-resistant cases[6]	Other drug-resistant cases[7]	Deaths[8]	Death rate per 100,000
1900	11,997	348.1						9,630	279.5
1910	32,065	670.0						10,074	210.5
1920	14,035	246.9						7,915	144.1
1930	11,821	170.2						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	32.9						316	4.0
1972	2,275	29.4						335	4.3
1973	2,101	27.5						259	3.4
1974	2,022	26.7						215	2.8
1975	2,151	28.7						208	2.8
1976	2,151	29.1						187	2.5
1977	1,605	21.9						175	2.4
1978[6]	1,307	18.1						188	2.6
1979	1,530	21.4						121	1.7
1980	1,514	21.4						143	2.0
1981	1,582	22.3						155	2.2
1982	1,594	22.4						168	2.4
1983	1,651	23.1						151	2.1
1984	1,629	22.7	1,527					168	2.3
1985	1,843	25.6	1,785					155	2.2
1986	2,223	30.8	2,181					186	2.6
1987	2,197	30.3	2,157					219	3.0
1988	2,317	31.9	2,241					246	3.4
1989	2,545	34.9	2,405					236	3.2
1990	3,520	48.1	3,372					256	3.5
1991	3,673	49.7	3,484	1,772	24.0	366		245	3.3
1992	3,811	51.1	3,442	1,856	24.9[9]	441	442	200	2.7
1993	3,235	43.0	2,854	1,526	20.3	296	328	166	2.2
1994	2,995	39.4	2,479	1,265	16.7	176	245	133	1.8
1995	2,445	31.9	2,014	989	12.9	109	216	94	1.2
1996	2,053	26.5	1,721	837	10.8	84	216	67	0.9
1997	1,730	22.2	1,401	665	8.5	56	162	55	0.7
1998	1,558	19.8	1,255	558	7.1	38	135	52	0.7
1999	1,460	18.4	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	13.4	823	429	5.4	27	102	30	0.4
2003	1,140	14.1	872	427	5.3	21	103	34	0.2
2004	1,039	12.8	798	391	4.9	18	117	30	0.4
2005	984	12.1	745	373	4.7	24	98	21	0.3
2006	953	11.6	708	354	4.4	21	94	17	0.2
2007	914	11.0	709	380	4.7	9	123	19	0.2
2008	895	10.8	688	338	4.2	11	109	18	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. [7] 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 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.

TABLE 2. HIV STATUS OF TUBERCULOSIS CASES BY SEX AND AREA OF BIRTH, NEW YORK CITY, 1992-2008

Year	Females HIV (+)		Males HIV (+)		U.S.-born HIV (+)		Foreign-born HIV (+)		Total[1] HIV (+)	
	N	%	N	%	N	%	N	%	N	%
1992	297	25%	984	37%	1294[2]	43%	118	17%	1281	34%
1993	308	28%	760	36%	958	38%	110	15%	1068	33%
1994	244	24%	767	39%	852	43%	147	15%	1011	34%
1995	226	25%	575	37%	658	47%	139	14%	801	33%
1996	204	26%	429	34%	490	46%	124	13%	633	31%
1997	147	22%	301	29%	323	39%	122	14%	448	26%
1998	108	19%	238	24%	250	36%	96	11%	346	22%
1999	102	18%	219	24%	216	36%	102	12%	321	22%
2000	74	14%	167	21%	159	31%	77	10%	241	18%
2001	65	13%	119	15%	123	30%	60	7%	184	15%
2002	57	14%	136	20%	129	36%	58	8%	193	18%
2003	47	11%	131	18%	106	30%	72	9%	178	16%
2004	52	13%	117	19%	99	30%	70	10%	169	16%
2005	38	11%	113	18%	87	30%	63	9%	151	15%
2006	39	10%	88	15%	74	27%	53	8%	127	13%
2007	41	11%	75	14%	72	28%	43	7%	116	13%
2008	29	8%	66	12%	48	22%	47	7%	95	11%

[1] Total HIV-infected cases may be more than the sum of U.S. and foreign-born HIV infected cases because area of birth is unknown for some cases.
[2] Breakdown by the area of birth for 1992 is estimated, exact figures are not available.

TABLE 3. TUBERCULOSIS INCIDENCE RATES[1] BY RACE/ETHNICITY, SEX AND AGE, NEW YORK CITY, 2008

	Age (Years)										
Race/Sex	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65+	Total
Non-Hispanic White, Total	0	0	0	1	3	9	11	12	10	23	69
Non-Hispanic White, Rate	0.0	0.0	0.0	0.8	1.7	1.9	2.6	3.0	3.5	4.3	2.5
Males, Number	0	0	0	1	3	4	10	11	7	10	46
Males, Rate	0.0	0.0	0.0	1.6	3.6	1.7	4.6	5.7	5.2	4.8	3.4
Females, Number	0	0	0	0	0	5	1	1	3	13	23
Females, Rate	0.0	0.0	0.0	0.0	0.0	2.1	0.5	0.5	2.0	4.0	1.6
Non-Hispanic Black, Total	2	5	1	12	18	34	36	60	35	29	232
Non-Hispanic Black, Rate	1.4	3.0	0.6	7.9	13.1	11.6	11.4	25.2	20.9	15.7	11.8
Males, Number	0	0	1	8	9	20	22	42	22	16	140
Males, Rate	0.0	0.0	1.2	10.6	14.3	15.8	16.0	41.6	32.7	25.0	16.0
Females, Number	2	5	0	4	9	14	14	18	13	13	92
Females, Rate	2.8	6.1	0.0	5.3	12.1	8.4	7.9	13.1	13.0	10.7	8.5
Hispanic, Total	5	2	4	12	28	60	55	46	23	28	263
Hispanic, Rate	2.7	1.0	2.3	6.9	14.8	15.6	16.6	19.7	15.4	20.2	12.2
Males, Number	3	2	2	5	16	41	36	30	12	18	165
Males, Rate	3.2	2.0	2.2	5.6	16.6	21.6	22.8	28.5	18.3	35.2	15.9
Females, Number	2	0	2	7	12	19	19	16	11	10	98
Females, Rate	2.2	0.0	2.3	8.3	12.8	9.8	10.9	12.5	13.2	11.4	8.8
Asian, Total	0	2	4	10	36	55	53	58	36	66	320
Asian, Rate	0.0	4.2	8.8	20.9	57.8	34.6	36.8	54.1	60.1	112.1	41.0
Males, Number	0	0	1	6	21	26	37	35	20	43	189
Males, Rate	0.0	0.0	4.2	24.2	70.1	33.7	50.0	65.3	68.5	163.3	48.7
Females, Number	0	2	3	4	15	29	16	23	16	23	131
Females, Rate	0.0	8.7	13.9	17.4	46.4	35.5	22.8	42.8	52.0	70.7	33.4
Total,[2] Total	7	9	9	35	86	159	159	178	106	147	895
Total, Rate	1.3	1.6	1.7	6.7	14.6	11.6	12.6	17.6	15.5	15.7	11.2
Males, Number	3	2	4	20	49	92	106	120	63	87	546
Males, Rate	1.1	0.7	1.5	7.5	17.2	13.9	17.3	25.5	20.6	24.2	14.4
Females, Number	4	7	5	15	37	67	53	58	43	60	349
Females, Rate	1.5	2.5	1.9	5.9	12.2	9.5	8.1	10.7	11.4	10.4	8.3

[1] Rates are based on 2000 census data.
[2] There are 5 patients with multiple races, and 6 patients with unknown race or ethnicity. They are included in the totals.

TABLE 4: SELECTED CHARACTERISTICS OF U.S.-BORN AND FOREIGN-BORN CASES, NEW YORK CITY, 2008

Characteristics	U.S.-born		Foreign-born		Total[1]	
	N	%	N	%	N	%
Demographics						
Age Group (years)						
0-19	24	11%	36	5%	60	7%
20-44	72	33%	332	49%	404	45%
45-64	77	36%	207	31%	284	32%
65+	43	20%	103	15%	147	16%
Sex						
Female	86	40%	262	39%	349	39%
Male	130	60%	416	61%	546	61%
Race/ethnicity						
Black Non-Hispanic	110	51%	122	18%	232	26%
White Non-Hispanic	31	14%	37	5%	69	8%
Hispanic	71	33%	192	28%	263	29%
Asian	2	1%	318	47%	320	36%
Multiple	0	0%	5	1%	5	1%
Unknown ethnicity or race	2	1%	4	1%	6	1%
Borough of residence[2]						
Manhattan	53	25%	103	15%	156	17%
Bronx	51	24%	98	14%	149	17%
Brooklyn	68	31%	195	29%	264	29%
Queens	36	17%	263	39%	299	33%
Staten Island	8	4%	15	2%	23	3%
Time in the U.S.						
‹1 year	n/a	n/a	98	14%	98	14%
1-5 years	n/a	n/a	158	23%	158	23%
›5 years	n/a	n/a	411	61%	411	61%
Unknown	n/a	n/a	11	2%	11	2%
Clinical Characteristics						
Ever on DOT (of those eligible)	139	76%	469	74%	608	74%
Ever smear positive (any site)	128	59%	350	52%	479	54%
Sputum smear positive	87	40%	250	37%	338	38%
NAA positive[3]	103	62%	281	55%	385	57%
Culture positive	156	72%	531	78%	688	77%
Clinical case[4]	60	28%	147	22%	207	23%
Pulmonary-only site of disease	133	62%	442	65%	576	64%
Extrapulmonary-only site of disease	51	24%	165	24%	216	24%
Both pulmonary & extrapulmonary	32	15%	71	10%	103	12%
Cavitary chest x-ray[5]	36	22%	102	20%	138	20%
Multidrug resistance[6]	5	3%	6	1%	11	2%
Other drug resistance[7]	25	16%	83	16%	109	16%
History of prior TB	4	2%	13	2%	17	2%
HIV Status						
Positive	48	22%	47	7%	95	11%
Negative	115	53%	445	66%	560	63%
Refused	36	17%	144	21%	180	20%
Not offered/done or unknown	17	8%	42	6%	60	7%
Last medical provider type						
DOHMH chest center	92	43%	335	49%	427	48%
Health and Hospitals Corporation hospital	36	17%	181	27%	217	24%
Private hospital	47	22%	56	8%	104	12%
Private physician	17	8%	77	11%	94	11%
Other provider[8]	24	11%	29	4%	53	6%
Started on 4 first line anti-TB drugs	193	89%	621	92%	816	91%
Started on 4 or more anti-TB drugs (other)	8	4%	31	5%	39	4%
Social Characteristics						
Homeless[9]	21	10%	20	3%	41	5%
Employed[10]	68	31%	366	54%	434	48%
Health care worker	5	2%	21	3%	26	3%
Correctional employee	1	0%	0	0%	1	0%
Injection drug use[11]	14	6%	0	0%	14	2%
Non-injection drug use[11]	45	21%	8	1%	53	6%
Alcohol abuse[11]	51	24%	57	8%	108	12%
Any drug or alcohol abuse[11]	99	46%	79	12%	178	20%
Resident of correctional facility[12]	2	1%	4	1%	6	1%
Resident of long-term care facility[12]	2	1%	2	0%	4	0%
Total	**216**	**24%**	**678**	**76%**	**895**	

[1] There was 1 case with unknown country of birth that is included in the total column only; [2] Four patients had a non-New York City address but were 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 resistant is defined as resistant to at least Isoniazid and Rifampin, percent is of culture positive and susceptibility done; [7] Other drug resistance is defined as not multidrug resistant, but resistant to one or more first line drugs, percent is of culture positive and susceptibility done; [8] Other providers include correctional facilities, VA hospitals, out-of-NYC, and psychiatric providers; [9] At diagnosis or any time during treatment; [10] In past 24 months before diagnosis; [11] In past 12 months before TB diagnosis; [12] At time of diagnosis

TABLE 5. TUBERCULOSIS RATES[1] BY UNITED HOSPITAL FUND NEIGHBORHOOD, NEW YORK CITY, 1997-2008

United Hospital Fund Neighborhood	# 2008 Cases	Rate per 100,000 population[1,2]										
		2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998
BRONX[3]	**150**	**10.9**	**11.5**	**12.2**	**11.7**	**12.9**	**13.0**	**12.2**	**12.7**	**16.2**	**14.9**	**20.2**
High Bridge-Morrisania	38	18.8	14.9	19.1	17.2	17.7	21.7	15.8	17.1	21.0	20.3	31.3
Crotona-Tremont	27	12.9	9.6	14.5	15.5	15.5	13.5	17.0	12.8	23.0	17.7	22.5
Fordham-Bronx Park	33	12.9	15.6	13.4	9.4	11.3	16.7	16.0	13.4	19.9	19.0	30.3
Hunts Point-Mott Haven	16	12.1	16.6	13.0	13.8	18.4	12.2	15.5	18.2	13.8	21.2	21.2
Pelham-Throgs Neck	26	8.8	9.5	8.5	11.3	11.9	9.6	5.8	12.7	11.7	9.4	11.6
Northeast Bronx	7	3.7	5.9	7.5	5.9	8.0	6.4	8.0	5.4	7.6	7.1	11.0
Kingsbridge	3	3.5	8.2	8.2	7.0	6.9	8.1	6.9	6.8	16.9	11.2	9.0
BROOKLYN	**264**	**10.4**	**11.2**	**11.6**	**13.0**	**12.7**	**14.7**	**13.9**	**15.8**	**18.1**	**19.1**	**20.7**
Sunset Park	27	21.5	22.3	28.0	29.0	21.8	19.3	18.6	27.0	33.1	13.5	22.4
Williamsburg-Bushwick	35	17.5	16.5	23.2	23.0	19.5	24.3	21.8	25.0	22.1	26.8	25.8
Borough Park	47	13.8	10.0	12.2	12.1	13.1	13.7	10.5	10.5	10.5	18.4	21.6
East New York	20	11.3	11.3	10.7	11.9	13.7	11.3	11.3	16.5	14.9	24.9	20.4
East Flatbush-Flatbush	35	11.2	12.5	12.8	19.5	14.7	18.5	14.1	18.9	31.2	23.3	23.0
Bensonhurst-Bay Ridge	22	10.7	10.2	7.4	6.0	7.6	8.8	10.8	10.8	13.4	14.0	11.0
Coney Island	27	9.0	10.0	7.7	9.9	10.7	10.5	15.4	12.9	11.5	16.9	12.8
Bed. Stuyvesant-Crown Hts.	26	8.3	12.4	11.1	13.4	14.3	18.5	18.5	17.9	23.6	24.9	40.5
Canarsie Flatlands	11	5.5	7.0	7.6	5.6	9.6	12.7	9.1	12.1	9.1	8.7	13.0
Greenpoint	6	4.6	6.9	4.7	6.3	4.8	9.8	5.7	9.7	15.3	12.1	11.4
Downtown-Bklyn Hts.-Pk. Slope	8	3.6	7.2	7.3	8.3	9.3	12.1	14.4	15.3	15.4	17.2	13.0
MANHATTAN[3]	**155**	**9.6**	**11.3**	**10.2**	**11.5**	**12.7**	**15.4**	**14.7**	**16.6**	**17.9**	**21.5**	**23.8**
East Harlem	20	18.7	22.4	14.7	15.8	24.1	28.5	17.5	28.5	27.6	24.2	39.2
Central Harlem	24	16.7	24.3	14.4	24.0	25.4	21.7	31.7	20.6	28.4	38.6	46.7
Lower Manhattan	5	14.1	8.5	14.4	11.7	18.5	3.1	9.3	12.8	12.9	19.7	30.0
Union Square-Lower East Side	30	14.0	12.1	17.9	13.9	17.2	19.1	20.4	20.5	22.2	32.0	32.1
Washington Heights-Inwood	30	11.5	13.8	13.6	12.0	12.7	19.3	16.1	17.5	19.0	24.1	28.7
Greenwich Village-SoHo	10	10.7	8.6	6.6	10.1	15.0	9.3	8.2	16.5	19.1	21.6	12.1
Gramercy Park-Murray Hill	11	8.2	12.6	9.1	11.5	13.5	19.1	14.4	15.1	20.1	19.4	22.7
Chelsea-Clinton	9	6.6	9.5	7.4	15.8	6.2	10.3	11.2	23.3	16.3	22.7	17.8
Upper West Side	9	3.7	5.4	5.4	3.8	7.0	12.7	8.4	12.4	9.9	13.5	11.7
Upper East Side	7	2.9	2.9	2.9	4.7	2.2	4.0	6.7	5.0	8.3	4.6	6.9
QUEENS	**299**	**13.2**	**11.7**	**13.4**	**13.5**	**14.2**	**14.7**	**14.4**	**18.6**	**16.2**	**19.7**	**18.5**
West Queens	130	25.8	22.6	26.5	21.7	24.9	29.8	25.1	32.1	25.3	32.5	28.4
Flushing	32	11.8	12.9	13.8	16.6	17.1	15.4	17.0	22.1	21.8	19.3	19.5
Jamaica	33	11.5	10.1	10.8	12.2	12.6	8.0	13.6	18.9	11.9	18.0	18.9
Southeast Queens	23	11.5	7.5	7.5	8.5	7.9	8.9	6.4	13.3	10.3	15.8	11.0
Long Island City-Astoria	22	10.0	9.6	8.7	11.5	14.2	12.9	21.1	19.1	16.8	28.4	25.1
Fresh Meadows	9	9.6	6.4	12.9	7.6	17.3	13.1	10.8	10.8	17.2	17.4	8.8
Southwest Queens	25	9.2	5.9	7.7	11.9	9.3	9.7	4.8	11.5	10.0	9.8	15.4
Ridgewood-Forest Hills	16	6.8	8.5	10.7	11.1	5.9	11.6	7.6	10.1	12.9	10.5	11.8
Rockaway	6	5.5	4.6	6.5	7.5	7.6	1.0	10.5	11.3	10.3	16.0	12.3
Bayside-Little Neck	3	3.4	5.6	6.8	3.4	8.0	10.4	6.9	6.8	11.3	5.7	6.9
STATEN ISLAND	**23**	**4.8**	**4.8**	**5.9**	**3.7**	**6.0**	**6.3**	**5.5**	**6.0**	**7.2**	**7.8**	**5.8**
Port Richmond	8	11.0	5.5	7.0	4.4	8.8	7.4	7.6	17.0	11.1	17.8	11.6
Stapleton-St. George	6	4.6	6.2	7.0	6.4	9.7	16.2	8.2	9.2	15.4	12.2	9.8
Willowbrook	3	3.3	3.3	3.4	4.6	5.7	4.6	4.6	3.5	5.9	4.8	3.6
South Beath-Tottenville	6	3.2	4.2	5.8	1.1	2.7	0.0	3.3	1.1	1.1	2.8	2.3
TOTAL NEW YORK CITY	**895**	**10.8**	**11.0**	**11.6**	**12.1**	**12.8**	**14.1**	**13.4**	**15.7**	**16.6**	**18.4**	**19.8**

[1] Rates are based on intercensal estimates for 2000 to 2008. Rates for 1998 and 1999 are based on 2000 Census data. [2] There were 4 cases in 2008, 1 case in 2007, 2 cases in 2001 and 1 case in 1998 with missing zip code 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 the Bronx, but is included under the Bronx.

TABLE 6. TUBERCULOSIS CASES BY AGE AND AREA OF BIRTH, NEW YORK CITY, 2008

Area of Birth	Age (Years) 0-19		20-44		45-64		65+		Total	Rate[1]/ 100,000
Foreign-Born	N	%	N	%	N	%	N	%	N	
Caribbean & Latin America[2]	16	6%	143	54%	80	30%	27	10%	266	17.5
Asia[3]	15	5%	146	45%	98	30%	66	20%	325	47.3
Africa[4]	5	9%	30	57%	18	34%	0	0%	53	57.3
Europe[5]	0	0	9	31%	10	35%	10	35%	29	4.9
Middle East[6]	0	0	2	67%	1	33%	0	0%	3	6.2
Total Foreign-Born	**36**	**5%**	**333[7]**	**49%**	**207**	**26%**	**10[3]**	**17%**	**678**	**23.6**
U.S.[8]	24	12%	66	34%	68	35%	36	19%	194	4.0
Unknown	0	0	0	0	0	0%	1	100%	1	
Total	**60**	**7%**	**404**	**45%**	**284**	**32%**	**147**	**16%**	**895**	**11.2**

[1] Rates are based on 2000 census populations.
[2] Mexico (51), Ecuador (49), Dominican Republic (46), Haiti (43), Honduras (15), Guyana (13), Peru (10), Jamaica (8), Trinidad and Tobago (7), Colombia (6), Guatemala (5), Other (12).
[3] China (132), Philippines (38), India (36), Bangladesh (28), Nepal (22), Pakistan (16), Hong Kong (11), South Korea (11), Myanmar (10), Indonesia (4), Other (17)
[4] Ghana (8), Guinea (7), Nigeria (5), Senegal (5), Ivory Coast (4), Mali (4), Togo (4), Other (16).
[5] Russia (7), Poland (6), Other (16).
[6] Other (3).
[7] Other area of birth (2).
[8] Includes the U.S. Virgin Islands, other U.S. territories and Puerto Rico.

TABLE 7. FIRST-LINE DRUG RESISTANCE BY AREA OF BIRTH, NEW YORK CITY, 2008

	U.S.-born[1]		Foreign-born		Total[2]	
	N	%	N	%	N	%
Positive culture for *M. tuberculosis*	156		531		688	
Tested for susceptibility to first-line drugs (Percent of those with positive culture for *M. tuberculosis*.)	154	99%	525	99%	680	99%
Culture positive cases with susceptibility results (Percent of those tested for susceptibility to first-line drugs)						
Multidrug resistant (resistant to at least isoniazid & rifampin)	5	3%	6	1%	11	2%
Extensively Drug-Resistant	1	.6%	1	.2%	2	.3%
Other Drug-Resistant TB	25	16%	83	16%	109	16%
Isoniazid Resistance Only	7	5%	26	5%	33	5%
Rifampin Resistance Only	0	0	1	.2%	1	.1%
Susceptible to all first-line drugs	124	81%	436	83%	560	82%

[1] Includes Puerto Rico, the U.S. Virgin Islands and other U.S. territories.
[2] Totals include drug resistance for patients with unknown country of birth.

TABLE 8. HIV STATUS BY AREA OF BIRTH AND AGE, NEW YORK CITY, 2008

HIV Status/Area of Birth	Age Group (Years) 0-19		20-44		45-64		65+		Total	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
HIV-infected	1	2%	44	11%	48	17%	2	1%	95	11%
U.S.-born	1	4%	20	28%	25	32%	2	5%	48	22%
Foreign-born	0	0%	24	7%	23	11%	0	0%	47	7%
HIV non-infected	42	70%	309	76%	156	55%	53	36%	560	63%
U.S.-born	15	63%	48	67%	33	43%	19	44%	115	53%
Foreign-born	27	75%	261	79%	123	59%	34	33%	445	66%
Refused HIV test	9	15%	40	10%	60	21%	71	49%	180	20%
U.S.-born	4	17%	3	4%	11	14%	18	42%	36	17%
Foreign-born	5	14%	37	11%	49	24%	53	51%	144	21%
HIV test status unknown	8	13%	11	3%	20	7%	20	14%	59	7%
U.S.-born	4	17%	1	1%	8	10%	4	9%	17	8%
Foreign-born	4	11%	10	3%	12	6%	16	16%	42	6%
Total[1]	60		404		284		146		894	
U.S.-born	24	40%	72	18%	77	27%	43	29%	216	24%
Foreign-born	36	60%	332	82%	207	73%	103	71%	678	76%

[1] Total does not include one patient with unknown country of birth.

TABLE 9. EPIDEMIOLOGIC INVESTIGATIONS OF TUBERCULOSIS EXPOSURE IN CONGREGATE SETTINGS, NEW YORK CITY, 2008

Site (N=32)	Close Contacts # Identified appropriate for testing	# Tested	% Tested	# Positive	% Positive	Other-Than-Close Contacts # Identified appropriate for testing	# Tested	% Tested	# Positive	% Positive	Transmission[1]
1 Day Care	15	12	80%	0	0	0	0	0	0	0	Probable
1 Healthcare Facility	47	15	32%	3	20%	0	0	0	0	0	Possible
1 Residence	9	6	67%	1	17%	59	15	25%	1	7%	Possible
7 Schools	178	138	78%	16	12%	420	276	66%	18	7%	4 Probable 1 Possible 2 Unlikely
21 Worksites	298	224	75%	42	19%	615	308	50%	47	15%	6 Probable 3 Possible 11 Unlikely 1 Cannot asses
1 English Language School	15	12	80%	8	67%	0	0	0	0	0	Probable
Total	**562**	**407**	**72%**	**70**	**17%**	**1094**	**599**	**55%**	**66**	**11%**	

[1] Transmission is "probable" when the exposed group has a significantly higher proportion of TST-positive individuals than a comparison group; or there are documented TST conversions; or secondary cases with epidemiologic or molecular linkage to the index case. Transmission is considered "unlikely" when these conditions are not met. Transmission is considered "possible" when the conditions for probable transmission are met but the proportion of identified contacts tested is less than 75%. "Cannot assess" indicates that less than 75% of potential contacts are tested and the conditions for probable transmission have not been met.

APPENDIX II

REPORTING SUSPECTED AND CONFIRMED CASES OF TUBERCULOSIS

Medical providers and infection control practitioners are required by the New York City Health Code Article 11, in particular, Sections 11.03, 11.05 and 11.21, to report all patients suspected and confirmed with tuberculosis (TB) to the New York City Department of Health and Mental Hygiene (DOHMH) Bureau of Tuberculosis Control, 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 DOHMH within 24 hours.

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 Amplified 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 outcomes of treatment for active TB
- Any child younger than five years of age (up to the day of the fifth birthday) who has a positive tuberculin skin test or a positive U.S. Food and Drug Administration approved blood-based test for TB infection [such as QuantiFERON®- TB Gold (QFT-G)][1,2]
- In addition, Section 47.21 requires that day care staff report those with LTBI to the Bureau of Day Care

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 an 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 DOHMH, a physician must report the results of any examination of a contact.

[1] Product names are provided for identification purposes only; their use does not imply endorsement by the New York City DOHMH.

[2] To report a positive test for TB infection in a child younger than five years of age, use the Universal Reporting Form. For guidelines for interpreting skin test results, see: City Health Information: Testing and Treating for Latent TB Infection, April 2006, **www.nyc.gov/html/doh/downloads/pdf/chi/chi25-4.pdf**.

APPENDIX II

REPORTING SUSPECTED AND CONFIRMED CASES OF TB (CONT.)

The New York City Health Code also requires laboratories to report as per Articles 11 and 13, Sections 11.03, 11.05, and 13.03, all of the following within 24 hours of identification to the Bureau of TB Control:

- AFB-positive smears (regardless of anatomic site)
- Cultures positive for *M. tuberculosis* complex
- NAA test results that identify *M. tuberculosis* complex (e.g. Amplicor®, Amplified MTD®)
- Results of susceptibility tests performed on *M. tuberculosis* complex cultures
- Pathology findings consistent with TB, including the presence of AFB and granulomas
- Any culture or NAA result associated with an AFB-positive smear (even if negative for *M. tuberculosis* complex)

Laboratories are required to report using the Electronic Clinical Laboratory Reporting System (ECLRS) as of July 1, 2006. Assistance with ECLRS is available by calling (212)313-5137. In addition, within 24 hours of observing growth of *M. tuberculosis* complex in a culture from any specimen, the New York City Health Code Section 13.05(a) requires that a portion of the initial culture be sent for DNA analysis to the New York City DOHMH Public Health Laboratory (455 First Avenue, Room 236, New York, NY 10016). Laboratories outside of New York City should submit isolates directly to the Wadsworth Center Mycobacteriology Laboratory in Albany, New York for genotyping.

Reporting by Telephone and the Universal Reporting Form

Suspected and confirmed TB patients may be reported by telephone to the TB Hotline, (212)788-4162, but a completed Universal Reporting Form (URF) must follow within 48 hours. The URF should be faxed to the Bureau of TB Control at (212)788-4179 and the original mailed to the Bureau of TB Control, DOHMH, at 253 Broadway, Room 602, CN-72, New York, NY 10007. Assistance is available by calling (888)NYC-MED9 or (212)442-3384. The URF can also be completed online, by first creating an account on NYC-MED at: **www.nyc.gov/health/nycmed**.

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 DOHMH.

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

APPENDIX II

REPORTING SUSPECTED AND CONFIRMED CASES OF TB (CONT.)

Reporting Tuberculosis-Related Evaluation and Treatment of Contacts

Medical providers are required, under Section 11.21 of the New York City Health Code, 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.

PATIENT FOLLOW-UP: The treating physician should also report whether the patient completed treatment and the outcome of the patient (cured, failed, relapsed, lost, moved) or whether treatment was discontinued if the patient was found not to have TB. 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 Report of Patient Services Form (TB 65) may need to be completed.

Inquiries and Forms

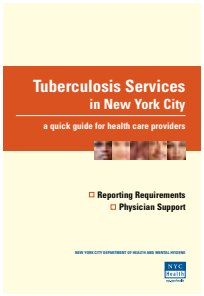
To inquire further about reporting procedures, please call the Surveillance Office at the Bureau of Tuberculosis Control at (212)788-4162. To order copies of the Report of Patients Services Form (TB 65) call (212)442-5100.

Obtain the Universal Reporting Form by calling toll free (866)NYC-DOH1 (866)392-3641 or at **www.nyc.gov/health/tb**

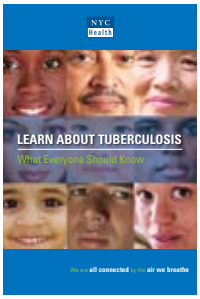
APPENDIX III

EDUCATION MATERIALS

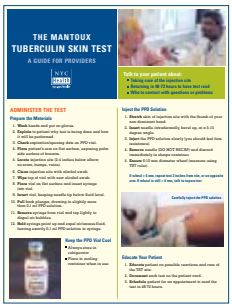
The following is a selection of culturally, technically and linguistically targeted TB education materials available to patients, the general public and health care providers. Materials are available at **www.nyc.gov/html/doh/html/tb/tb-hcp-kit.shtml** or by calling **311**. The patient brochure and TB screening form have been translated into Spanish, Chinese, Korean, French Creole, Bengali, Hindi, Urdu, Arabic and Russian.



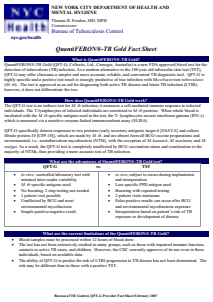
PROVIDER BROCHURE "Tuberculosis Services in New York City: a Quick Guide for Health care Providers"



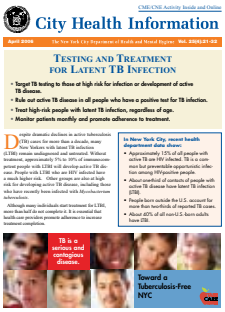
PATIENT BROCHURE "Learn About Tuberculosis: What Everyone Should Know"



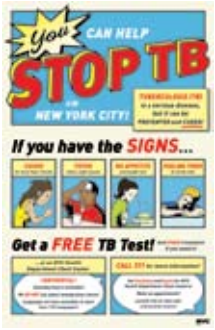
REFERENCE GUIDE for the TST test, "The Mantoux/Tuberculin Skin Test: A Guide for Providers"



FACT SHEETS on the QFT®-G TB test for patients and providers, and a fact sheet entitled "Rapid Confirmatory Tests for TB"



GUIDELINES "Testing and Treatment for Latent TB Infection" Steps for LTBI testing and treatment, recommended to improve both diagnosis and treatment of LTBI.



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. Please email tbtraining@health.nyc.gov to request files in pdf or Adobe Illustrator eps format.

REFERENCE GUIDE FOR PROVIDERS, "Anti-retroviral Drug Use with Rifampin and Rifabutin" provides updated information on the use of antiretroviral drugs with rifampin and rifabutin.

APPENDIX IV

PUBLICATIONS AND PRESENTATIONS, 2008

Publications in Peer-Review Journals

1. Burzynski JN, Brodie D, Lederer DJ, Gallardo JS, Trivedi SH, Schluger NW. Use of an interferon-gamma release assay to diagnose latent tuberculosis infection in foreign-born patients. *Chest* 2008;133:869-74.

2. Burzynski J, Schluger NW. The epidemiology of tuberculosis in the United States. *Semin Respir Crit Care Med* 2008;29:492-8.

3. Burzynski J, Feja K, McNelley E, Tran CS, et al. Management of pediatric multidrug-resistant tuberculosis and latent tuberculosis infections in New York City from 1995 to 2003. *Pediatr Infect Dis J* 2008;27:907-12.

4. Li J, Munsiff SS, Agerton TB. Prevalence of Tuberculin Skin Test Positivity in Clinical Population in New York City. *J Immigr Minor Health* 2008; http://dx.doi.org/10.1007/s10903-008-9204-9

Presentations at Scientific and Professional Meetings

1. Silin M, Harris T. *Tuberculosis in the Elderly, New York City, 2000-2006*. Presented at the IUATLD-NAR, San Diego, CA, February-March 2008.

2. Harris T. *Use of QFT-G at NYC Department of Health and Mental Hygiene Chest Clinics*. National TB Controllers Association Meeting, Atlanta, GA, June 2008.

3. Harris T. *Use of QFT-G at NYC Department of Health and Mental Hygiene Chest Clinics*. CDC IGRA Meeting, Atlanta, GA, July 2008.

4. Espinoza R. *Operationalizing Cluster Investigations*. Northeast TB Controllers Association. New York City, September 2008.

5. Harris T. *Blood-based Tests for TB Infection and Use of QFT-G in New York City*. Northeast TB Controllers Association, New York City, September 2008

6. Ahuja SD. *The Epidemiology of Tuberculosis in New York City*. Presented at the Northeast Epidemiology Annual Meeting, Farmington, CT, October 2008.

APPENDIX IV

PUBLICATIONS AND PRESENTATIONS, 2008 (CONT.)

Presentations at Scientific and Professional Meetings (cont.)

7. Hartsough K, Dworkin F, Ahuja SD. *Characteristics and Treatment Outcomes of Isoniazid-monoresistant Tuberculosis (TB) Patients in New York City (NYC), 1995-2005.* Presented at the IDSA/ICAAC Joint meeting, Washington DC, October 2008.

8. Weisenberg SA, Gibson A, Kurepina A, Huard RA, Lazzarini LC, Li J, Ahuja SD, Bang H, Kreisworth BE, Ho JL. *Characteristics and Transmission of the RDRio M. Tuberculosis Sublineage in New York City*. Presented at the IDSA/ICAAC Joint Meeting, Washington DC, October 2008.

9. Mathema B, Kurepina N, Shashkina E, Ahuja, SD, Kreiswirth BN. T*he Molecular Epidemiology of Multidrug- resistant Tuberculosis in New York City: A 6-year Population-based Study.* Presented at the Keystone Symposium, November 2008.

APPENDIX V

NYC DEPARTMENT OF HEALTH AND MENTAL HYGIENE TB CHEST CENTERS

BRONX

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

MANHATTAN

Chelsea Chest Center
303 9th Avenue, Third Floor
New York, NY 10001

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

QUEENS

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

Jamaica Chest Center
90-37 Parsons Blvd, 4th Floor
Jamaica, NY 11432

BROOKLYN

Bedford Chest Center
485 Throop Avenue, Third Floor
Brooklyn, NY 11221

Bushwick Chest Center
335 Central Avenue, Second Floor
Brooklyn, NY 11212

Fort Greene Chest Center
295 Flatbush Ave. Ext., 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.

NYC Health