The State of Tuberculosis in New York City: The 2017 Data

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ABOUT THE ANNUAL REPORT, 2017

- Summarize preliminary data for 2017 (reflect the most complete information available as of January 22, 2018)
- Includes summary of key bureau activities and highlights from the year
- Report is used:
  - To share data with key internal and external stakeholders
  - For provider outreach
  - For program planning

NYC BUREAU OF TUBERCULOSIS CONTROL KEY ACTIVITIES OVERVIEW

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

GOALS

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

2 Ensure that individuals at high risk for progression from latent TB infection to TB disease complete treatment and do not develop disease

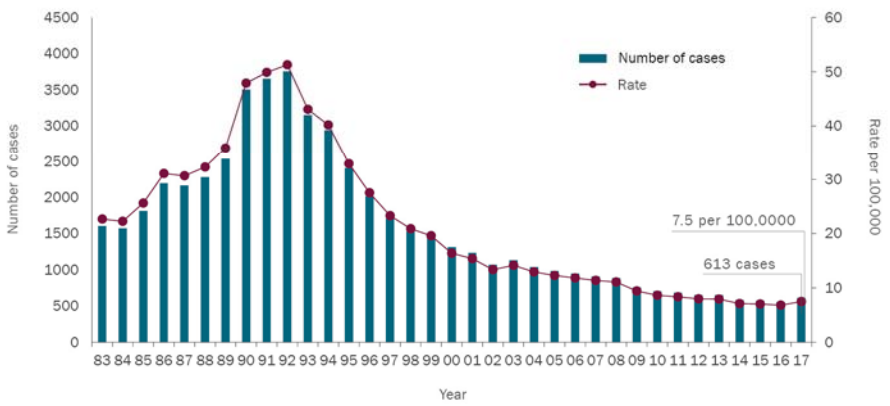
ACTIVITIES

- Maintain a surveillance system for all TB cases and their contacts, all people suspected of having TB disease and children younger than 5 years of age with latent TB infection
- Ensure that providers and laboratories report suspected and confirmed TB cases to the New York City Health Department
- Conduct intensive case management to ensure that TB patients remain under medical supervision until treatment completion, with DOT as the standard of care
- Conduct contact investigations to identify individuals with TB disease or latent TB infection and ensure appropriate treatment
- Detect and respond to outbreaks to prevent the spread of TB
- Set standards and guidelines and consult on all aspects of TB control, including prevention, diagnosis and treatment of TB disease and latent TB infection
- Provide medical consultation and perform timely reviews of discharge plans submitted by hospitals and providers
- Operate state-of-the-art chest clinics for TB screening, diagnosis and treatment at no cost to the patient
- Ensure that all positive cultures for Mycobacterium tuberculosis are sent to the NYC Public Health Laboratory for drug susceptibility testing and genotyping analysis
- Use data to monitor trends, inform programmatic decision-making and conduct research and evaluation
- Align funding allocations with program priorities
- Collaborate with community-based organizations and health care providers to improve TB prevention and management
- Support advocacy to maintain and improve the TB public health infrastructure
- Ensure data confidentiality

- Surveillance
- Clinical care
- Case management
- Contact investigation
- Genotyping
- Drug susceptibility testing
- Cluster investigation and outbreak detection/response
- Data analysis and research
- Outreach
- Support advocacy

YEAR AT-A-GLANCE: TUBERCULOSIS IN NEW YORK CITY, 2017

TUBERCULOSIS CASES AND RATES,[1] NEW YORK CITY, 1983-2017



1. Rates are based on decennial census data

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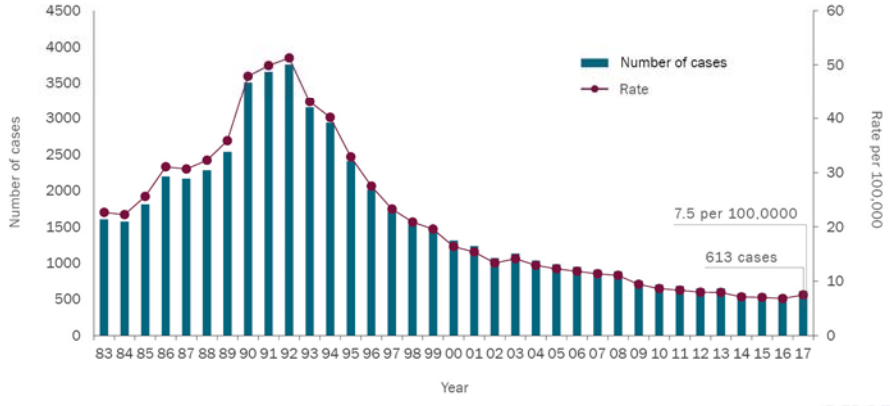
TUBERCULOSIS CASES AND RATES,[1] NEW YORK CITY, 1983-2017

1983-1992:
Overall increase: **134%**
Average annual increase: **11%**

1992-2003:
Overall decrease: **70%**
Average annual decrease, 1992-2002: **10%**
One-year increase, 2002-2003: **6%**

2003-2017:
Overall decrease: **46%**
Average annual decrease, 2004-2016: **5%**
One-year increase, 2016-2017: **10%**



1. Rates are based on decennial census data

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REPORTED 6% INCREASE FROM 2002-2003

I. Executive Summary

New York City (NYC) has made enormous strides in tuberculosis control: the number of tuberculosis cases has declined by 70% since 1992. However, in 2003, the number of tuberculosis cases increased slightly for the first time in over 10 years, with 1,140 tuberculosis cases and a rate of 14.2 per 100,000. Despite the overall 10-year decreasing trend in tuberculosis in New York City, the rate of tuberculosis is 2.8 times higher than the national rate of 5.1 per 100,000 and 14 times higher than the Healthy People 2010 Objective of 1.0 per 100,000.

The increase in tuberculosis cases represents an excess of 56 cases over the number in 2002. This increase is partially the result of a change in case counting methods that occurred at the end of 2002, immigration from countries with high prevalence of tuberculosis and increased transmission of tuberculosis, in residences for homeless individuals.

Profile of Tuberculosis Cases

- Most tuberculosis patients were aged 20 to 64 years,

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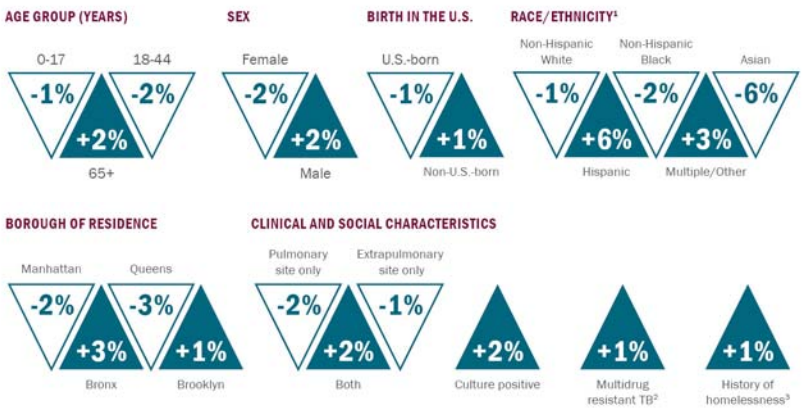
PERCENT CHANGE IN PROPORTION FOR SELECT CHARACTERISTICS AMONG TUBERCULOSIS CASES, 2016 TO 2017



NO CHANGE among patients 45-64 years of age, patients living in Staten Island at time of TB diagnosis or patients with HIV infection. Change in clustering proportion could not be assessed due to a change in genotyping and clustering ethods.

1. Race/ethnicity is among patients born in the U.S. 2. MDR TB is defined as resistance to at least isoniazid and rifampin.
3. In the 12 months before TB diagnosis.

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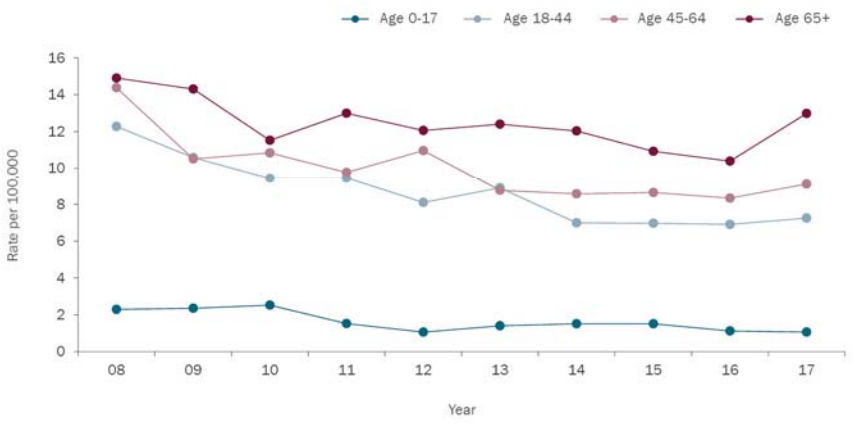
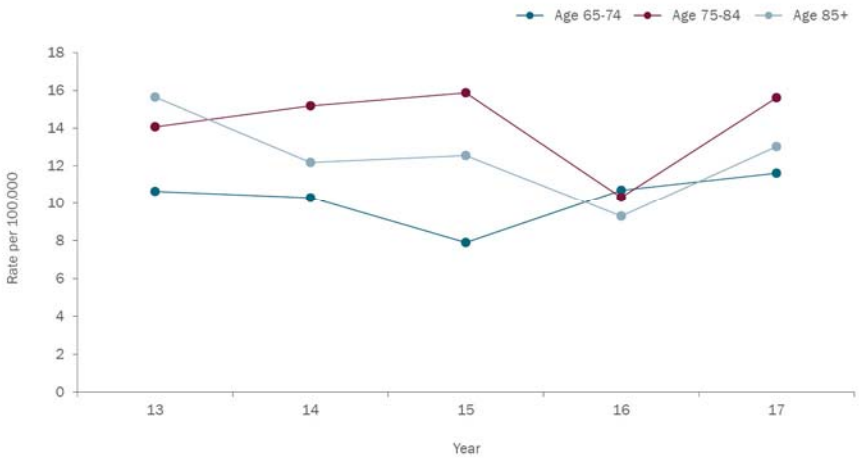
TUBERCULOSIS RATES[1] BY AGE GROUP IN YEARS, NEW YORK CITY, 2008-2017



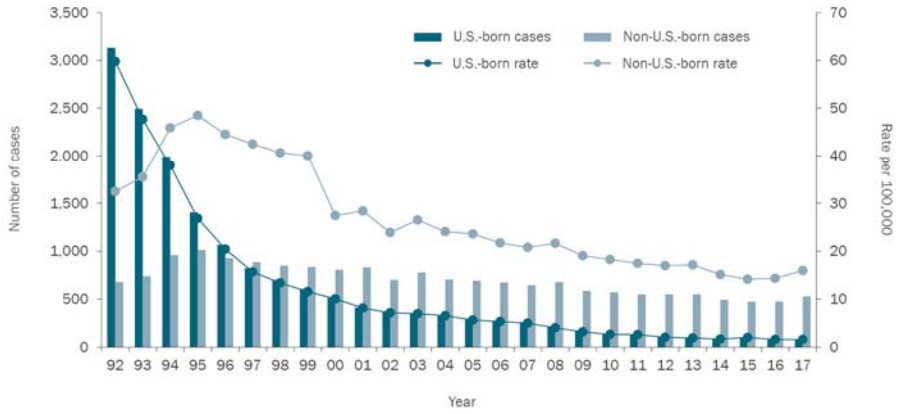
1. Rates are based on New York City Health Department population estimates, modified from U.S. Census Bureau interpolated intercensal population estimates, 2000-2016. Updated September 2017.

TUBERCULOSIS RATES[1] AMONG ADULTS OLDER THAN 65 BY AGE GROUP IN YEARS, NEW YORK CITY, 2013-2017



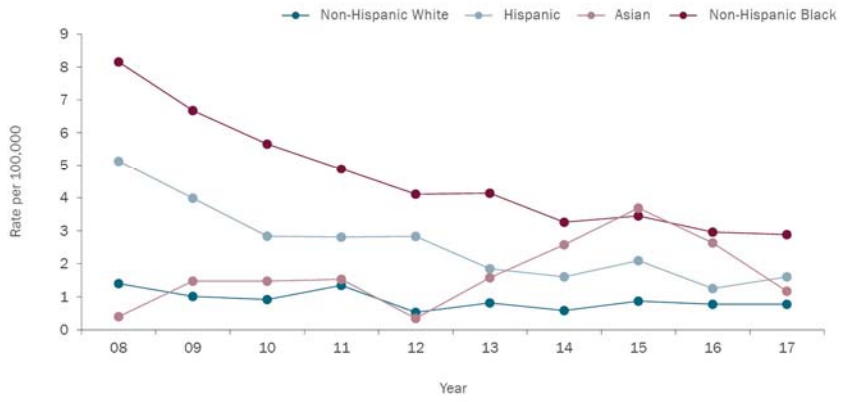
1. Rates are based on New York City Health Department population estimates, modified from U.S. Census Bureau interpolated intercensal population estimates, 2000-2016. Updated September 2017.

TUBERCULOSIS CASES AND RATES[1] BY BIRTH IN THE UNITED STATES (U.S.),[2] NEW YORK CITY, 1992-2017



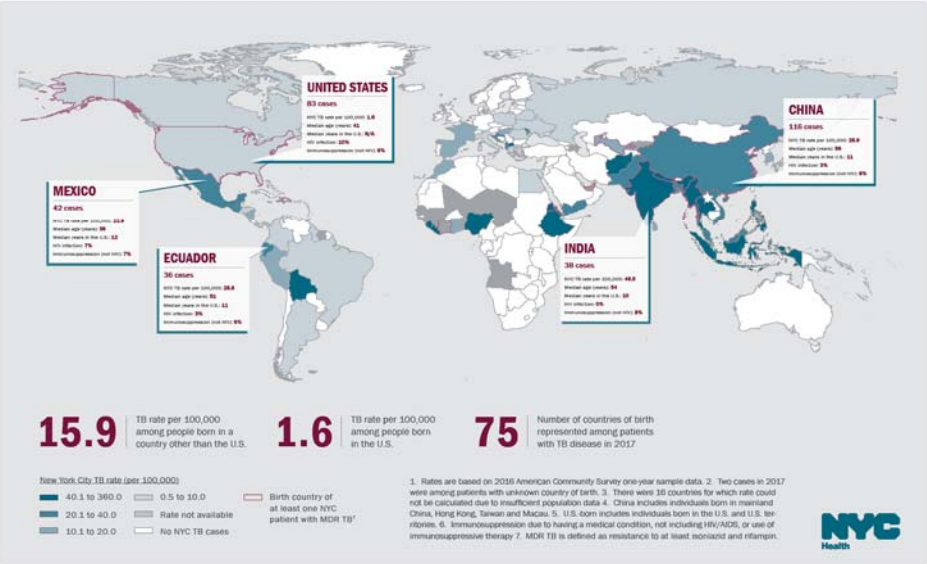
1. Rates prior to 2000 are based on 1990 U.S. Census data. Rates for 2000-2005 are based on 2000 U.S. Census data. Rates after 2005 are based on one-year American Community Survey data for the given year or the most recent available data. 2. U.S.-born includes individuals born in the U.S. and U.S. territories. 3. Excludes cases with unknown country of birth.

TUBERCULOSIS RATES[1] AMONG PEOPLE BORN IN THE UNITED STATES (U.S.)[2] BY RACE/ETHNICITY, NEW YORK CITY, 2008-2017



1. Rates are based on one-year American Community Survey Public Use Microdata Sample data for the given year or the most recent available data. 2. Data shown does not include patients with multiple, other, or unknown race/ethnicity. 3. U.S.-born includes individuals born in the U.S. and U.S. territories. 4. Excludes cases with unknown country of birth.

TUBERCULOSIS CASES, RATES[1] AND SELECT CHARACTERISTICS BY PATIENT COUNTRY OF BIRTH, NEW YORK CITY, 2017



TOP TEN COUNTRIES OF BIRTH BY TUBERCULOSIS BURDEN AND INCIDENCE IN NEW YORK CITY,[1,2,3] 2017

COUNTRY OF BIRTH	# OF NYC TB CASES
China[4]	116
United States[5]	83
Mexico	42
India	38
Ecuador	36
Dominican Republic	31
Bangladesh	27
Philippines	25
Hait	19
Nigeria	15

COUNTRY OF BIRTH	NYC TB RATE (PER 100,000)[1]
Eritrea	360
Sierra Leone	225
Bloivia	130
Burma	118
Indonesia	112
Ethiopia	93
Nepal	86
Liberia	78
Afghanistan	66
Nigeria	57

1. Rates are based on 2016 American Community Survey one-year sample data. 2. Two cases in 2017 were among patients with unknown country of birth. 3. There were 16 countries for which rate could not be calculated due to insufficient population data. 4. China includes individuals born in mainland China, Hong Kong, Taiwan and Macau. 5. U.S.-born includes individuals born in the U.S. and U.S. territories.

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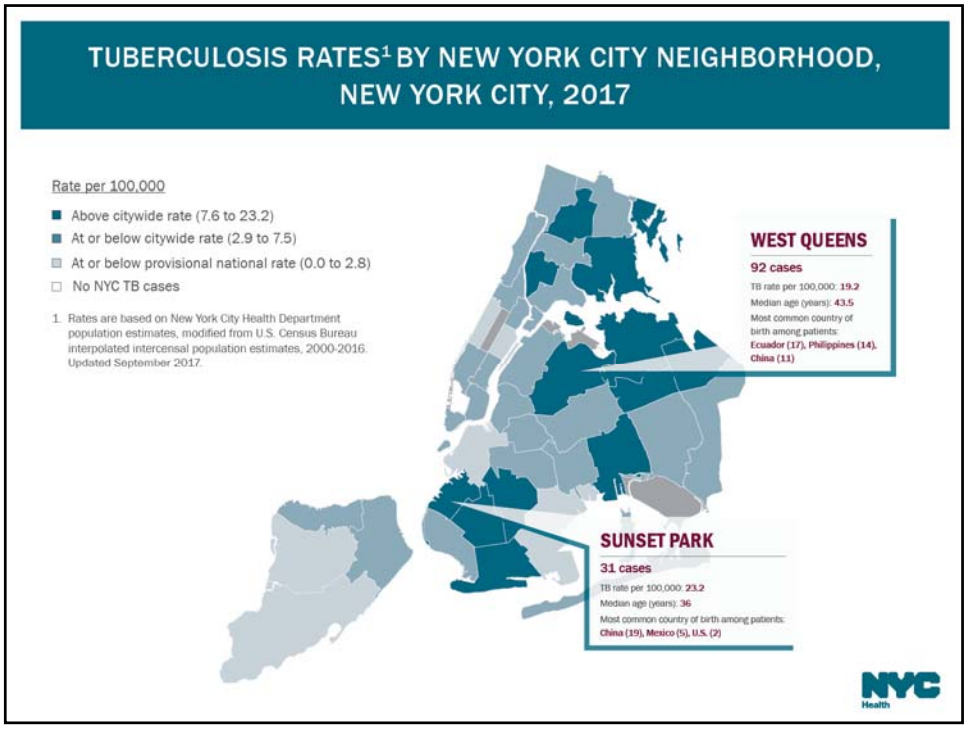
TUBERCULOSIS RATES[1] BY NEW YORK CITY NEIGHBORHOOD, NEW YORK CITY, 2017
Rate per 100,000
Above citywide rate (7.6 to 23.2)
At or below citywide rate (2.9 to 7.5)
At or below provisional national rate (0.0 to 2.8)
No NYC TB cases
1. Rates are based on New York City Health Department population estimates, modified from U.S. Census Bureau interpolated intercensal population estimates, 2000-2016. Updated September 2017.
WEST QUEENS
92 cases
TB rate per 100,000: 19.2
Median age (years): 43.5
Most common country of birth among patients: Ecuador (17), Philippines (14), China (11)
SUNSET PARK
31 cases
TB rate per 100,000: 23.2
Median age (years): 36
Most common country of birth among patients: China (19), Mexico (5), U.S. (2)
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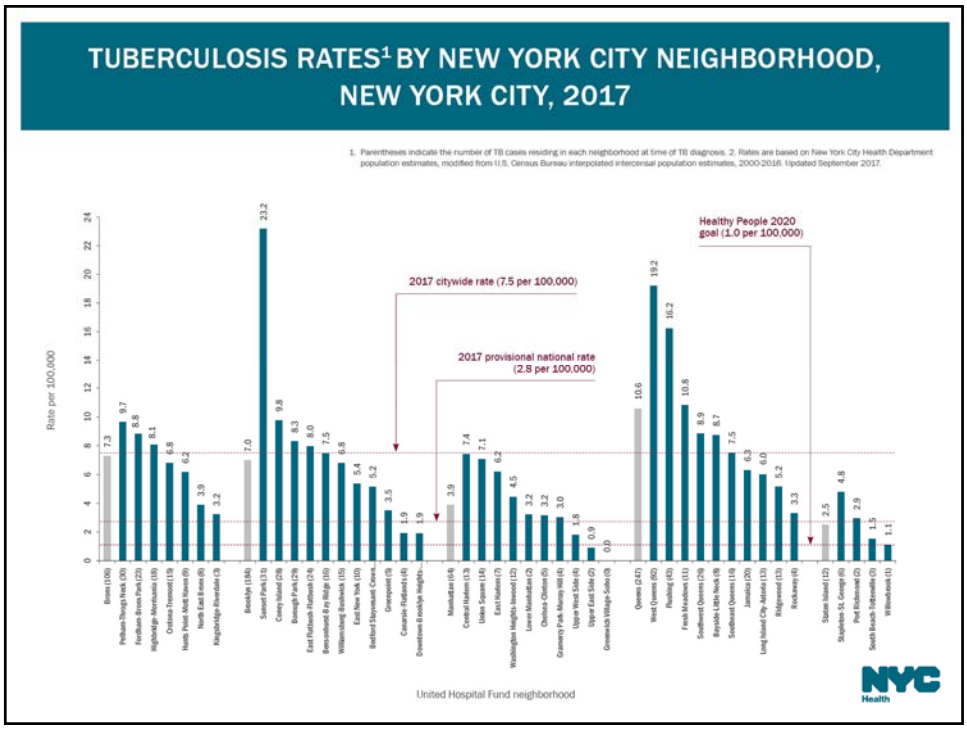
TUBERCULOSIS RATES[1] BY NEW YORK CITY NEIGHBORHOOD, NEW YORK CITY, 2017
1. Parentheses indicate the number of TB cases residing in each neighborhood at time of TB diagnosis. 2. Rates are based on New York City Health Department population estimates, modified from U.S. Census Bureau interpolated intercensal population estimates, 2000-2016. Updated September 2017.
Rate per 100,000
Healthy People 2020 goal (1.0 per 100,000)
2017 citywide rate (7.5 per 100,000)
2017 provisional national rate (2.8 per 100,000)
United Hospital Fund neighborhood
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TUBERCULOSIS CASES BY DISEASE SITE, NEW YORK CITY, 2017 (N=613)

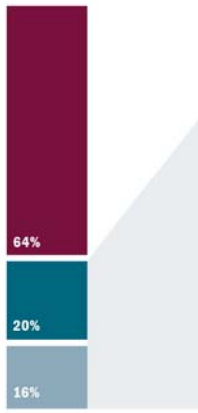

TABLE: Disease site among tuberculosis cases with extrapulmonary disease,[1] New York City, 2017 (n=224)

Disease site	Number of cases	Percent
Any extrapulmonary site	224	
Lymphatic	88	39
Pleural	58	26
Bone/Joint	25	11
Meningeal	15	7
Genitourinary	11	5
Peritoneal	17	8
Laryngeal	2	1
Other	45	20

1. Categories are not mutually exclusive.

Pulmonary disease only | Extrapulmonary disease only | Both pulmonary and extrapulmonary disease sites

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HIV INFECTION AMONG TUBERCULOSIS CASES BY BIRTH IN THE UNITED STATES (U.S.), NEW YORK CITY, 2008-2017

1. Excludes cases with unknown country of birth. 2. U.S.-born includes individuals born in the U.S. and U.S. territories. 3. 110 patients in 2017 had an unknown HIV status.

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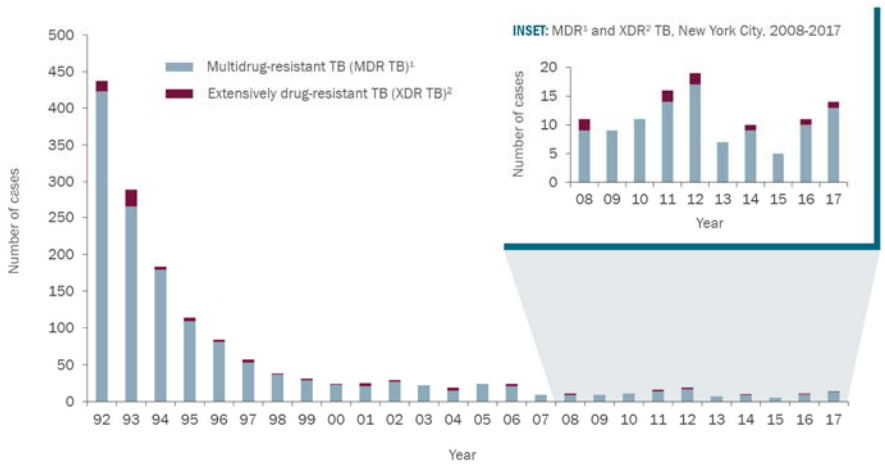
HIV INFECTION AMONG TUBERCULOSIS CASES BY BIRTH IN THE UNITED STATES (U.S.), NEW YORK CITY, 1992-2017

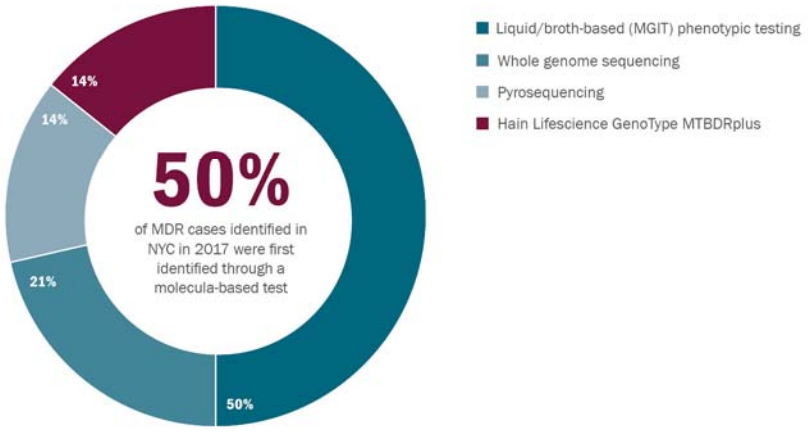
You'll need to request this data from the Data Team

MULTIDRUG RESISTANCE[1] AMONG TUBERCULOSIS CASES, NEW YORK CITY, 1992-2017



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

LABORATORY METHOD USED TO FIRST IDENTIFY RESISTANCE TO BOTH ISONIAZID AND RIFAMPIN AMONG CASES WITH A MULTIDRUG-RESISTANT TUBERCULOSIS STRAIN, NEW YORK CITY, 2017 (N=14)



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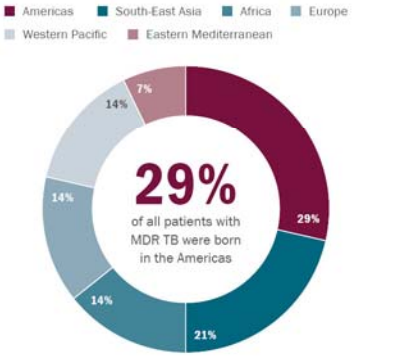
SELECT CHARACTERISTICS AMONG PATIENTS DIAGNOSED WITH MULTIDRUG-RESISTANT[1] TUBERCULOSIS, NEW YORK CITY, 2017 (N=14)

Characteristics	
Median age (range)	41 (19-80)
Number born outside of the United States (U.S.) (%)	12 (86%)
Years in the U.S. among non-U.S.-born patients (%)	
< 5 years	5 (42%)
5-10 years	4 (33%)
> 10 years	3 (25%)
Pulmonary site of disease (%)	12 (86%)
Median number of drugs to which there was known resistance among MDR TB cases[2] (range)	7 (3-12)
Median number of contacts identified around patients with MDR TB (range)	3 (0-155)

1. MDR TB is defined as resistance to at least isoniazid and rifampin.
2. Resistance to any fluoroquinolone was counted once

FIGURE: Region of birth[1] among patients diagnosed with multidrug-resistant tuberculosis, New York City, 2017 (n=14)



1. Based on World Health Organization regional defintions

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CONTACT INVESTIGATIONS IN NON-HOUSEHOLD SETTINGS[1] BY SITE TYPE, NEW YORK CITY, 2017 (N=69)

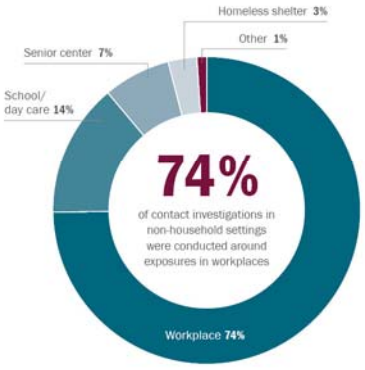

TABLE: Contact investigation outcomes in non-household settings[1] by number of exposed contacts, New York City, 2017 (n=69)

	≥ 15 exposed contacts	< 15 exposed contacts	Total
	n (%)	n (%)	n (%)
Number of sites	28	41	69
Likely transmission[2]	8 (31%)	7 (19%)	15 (24%)
Transmisison could not be assessed	2 (7%)	5 (12%)	7 (10%)
Total number of contacts	849	249	1,098
Median contacts per site (range)	25 (15-89)	6 (1-14)	10 (1-89)
Contacts eligible for testing[3]	810 (95%)	233 (94%)	1,043 (95%)
Contacts tested	709 (88%)	207 (89%)	916 (88%)
Contacts with a positive TB test result	75 (11%)	28 (14%)	103 (11%)

1. Excludes health care-associated investigations (n=153)
2. Proportion calculated among investigations where transmission could be assessed
3. Contacts eligible for testing are defined as contacts without a known history of TB disease or documented positive test for TB infection who were alive subsequent to the diagnosis of the infectious TB case to whom they were exposed

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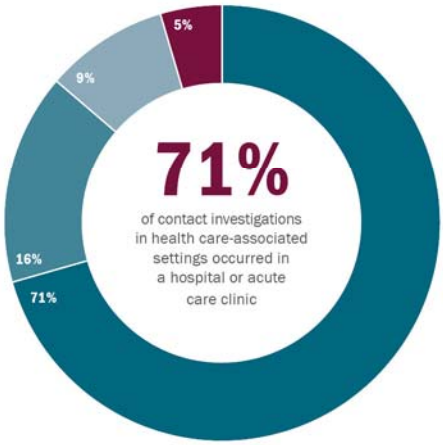
CONTACT INVESTIGATIONS IN HEALTHCARE-ASSOCIATED SETTINGS BY SITE TYPE, NEW YORK CITY, 2017 (N=153)



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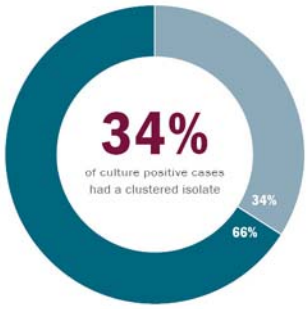
PROPORTION CLUSTERED[1] AMONG TUBERCULOSIS CASES WITH A COMPLETE GENOTYPE[2] BY SELECT PATIENT CHARACTERISTICS, NEW YORK CITY, 2017 (N=440)



AGE GROUP:

0-17 years	70%	30%
18-44 years	34%	66%
45-64 years	32%	68%
65 and older	34%	66%

BIRTH IN THE UNITED STATES (U.S.):[3]

U.S.-born	51%	49%
Non-U.S.-born	31%	69%

RACE/ETHNICITY:[4,5]

Non-Hispanic Black	57%	43%
Non-Hispanic White	20%	80%
Hispanic	63%	37%
Asian	25%	75%

TIME IN THE U.S.:[6,7]

< 1 year	29%	71%
1-5 years	20%	80%
> 5 years	37%	63%

OTHER:

Any pulmonary disease	35%	65%
Extrapulmonary disease only	27%	73%
History of homelessness[8]	47%	53%
Drug or excessive alcohol use[8]	44%	56%

47% Proportion of cases among patients younger than 18 with no obtainable genotype

92% Proportion of culture positive cases with WGS results available

1. Defined as a case with an isolate that has exact-matching 24-loci mycobacterial interspersed repetitive unit–variable number tandem repeat (MIRU) results and spacer oligonucleotide typing (spoligotyping) results to another NYC case verified since January 1, 2009. 2. Having both spoligotype and MIRU results; 440 (87%) cases verified in 2017 had a complete genotype as of January 22, 2018. 3. U.S.-born includes individuals born in the U.S. and U.S. territories; two cases had unknown country of birth. 4. Among patients born in the U.S. 5. Excludes four patients with unknown or multiple race/ethnicity. 6. Among patients born outside the U.S. 7. Time in the U.S. is not available for all patients. 8. In the 12 months before TB diagnosis.

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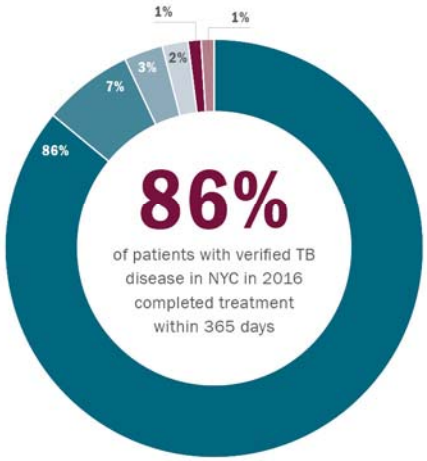
TREATMENT OUTCOMES FOR TUBERCULOSIS CASES COUNTED IN 2016[1] WHO WERE ELIGIBLE TO COMPLETE TREATMENT WITHIN 365 DAYS, NEW YORK CITY (N=556)



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

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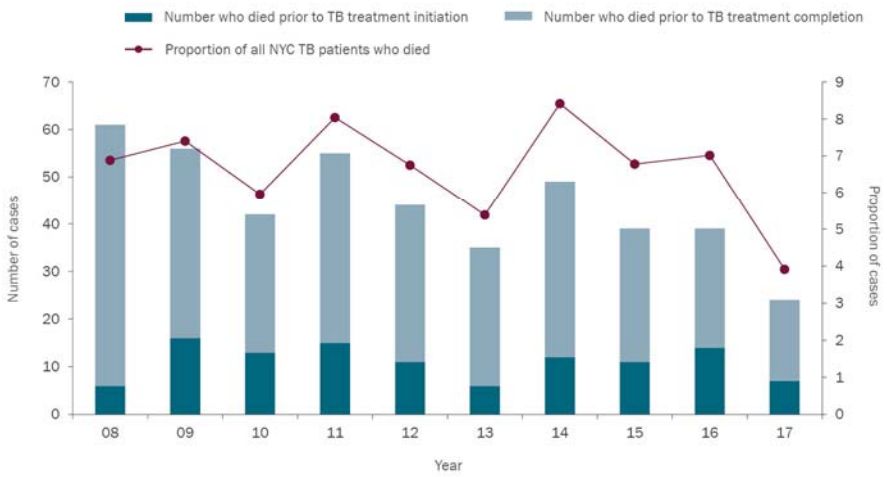
NUMBER AND PROPORTION OF PATIENTS WITH TUBERCULOSIS WHO DIED BEFORE OR DURING TREATMENT, NEW YORK CITY, 2008-2017



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

BTBC STAFF PUBLICATIONS IN PEER-REVIEWED JOURNALS, 2017

- Burzynski J. The Use of Modeling to Compare Tuberculosis Dynamics in Four U.S. States. **Am J Respir Crit Care Med**. 2017 Oct 15;196(8):953-954.
- Fojo AT, Stennis N, Azman A, Kendall EA, Shrestha S, Ahuja SD, Dowdy DW. Current and future trends of tuberculosis in New York City: a dynamic model. **Lancet Public Health**. 2017 Jul 2: e323–30
- Fox GJ, Benedetti A, Cox H, Koh WJ, Viiklepp P, Ahuja S, Pasvol G, Menzies D; Collaborative Group for Meta-Analysis of Individual Patient Data in MDR-TB. Group 5 drugs for multidrug-resistant tuberculosis: individual patient data meta-analysis. **Eur Respir J**. 2017 Jan 3;49(1)
- Levanon Seligson A, Parvez FM, Lim SW, Singh T, Mavinkurve M, Harris TG, Kerker B. Public Health and Vulnerable Populations: Morbidity and mortality among people ever-incarcerated in NYC jails, 2001–2005. **J Correct Health Care**. 2017 Oct;23(4):421-436.
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- Smith SE, Pratt R, Trieu L, Barry PM, Thai DT, Ahuja SD, Shah S. Epidemiology of Pediatric Multidrug-Resistant Tuberculosis in the United States, 1993-2014. **Clin Infect Dis**. 2017 Oct 16;65(9):1437-1443..
- Stennis NL, Sullivan Meissner J, Bhavnani D, Kreiswirth B, Ahuja SD, Tuberculosis disease among Mexico-born individuals living in New York City, 2001-2014. **Int J Tuberc Lung Dis** 21(6):657–663.

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