THE STATE OF TUBERCULOSIS
IN NEW YORK CITY: THE 2017 DATA

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New York City Department of Health and Mental Hygiene

ABOUT THE ANNUAL TB SUMMARY, 2017

• Summarizes TB surveillance data for 2017
  • Reflects 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 internal and external stakeholders
  • For provider and community outreach
  • For program planning
NYC BUREAU OF TUBERCULOSIS CONTROL
KEY ACTIVITIES OVERVIEW

- Surveillance
- Clinical care
- Case management and medical consultation
- Contact investigation
- Genotyping and drug susceptibility testing
- Cluster investigation and outbreak detection/response
- Data analysis, program evaluation and research
- Outreach
- Support advocacy

PRELIMINARY 2017 DATA
TUBERCULOSIS CASES AND RATES,¹ NEW YORK CITY, 1983-2017

1. Rates are based on decennial Census data

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

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

1. Rates are based on decennial Census data
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TUBERCULOSIS CASES AND RATES,¹ NEW YORK CITY, 1983-2017

2003-2016
Overall decrease: 51%
Average annual decrease, 2003-2016: 5%

2003-2017
Overall decrease: 46%
Average annual decrease, 2003-2016: 5%

1. Rates are based on decennial Census data
A CLOSER LOOK AT THE INCREASE

REPORTED 6% INCREASE FROM 2002-2003

1. 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 30 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 in 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 50 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, immigrants 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 44 years.
### PERCENT CHANGE IN PROPORTION FOR SELECT CHARACTERISTICS AMONG TUBERCULOSIS CASES, 2016 TO 2017

<table>
<thead>
<tr>
<th>AGE GROUP (YEARS)</th>
<th>SEX</th>
<th>BIRTH IN THE U.S.</th>
<th>RACE/ETHNICITY*</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-17</td>
<td>Male</td>
<td>U.S.-born</td>
<td>Non-Hispanic</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>White</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Non-Hispanic</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Black</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Asian</td>
</tr>
<tr>
<td>18-44</td>
<td>Female</td>
<td>U.S.-born</td>
<td>Non-Hispanic</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>White</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Non-Hispanic</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Black</td>
</tr>
<tr>
<td>65+</td>
<td>Male</td>
<td>U.S.-born</td>
<td>Non-Hispanic</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>White</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Non-Hispanic</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Black</td>
</tr>
</tbody>
</table>

**BOROUGH OF RESIDENCE**

<table>
<thead>
<tr>
<th>Borough</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manhattan</td>
<td>-2%</td>
</tr>
<tr>
<td>Queens</td>
<td>-3%</td>
</tr>
<tr>
<td>Bronx</td>
<td>+3%</td>
</tr>
<tr>
<td>Brooklyn</td>
<td>+1%</td>
</tr>
<tr>
<td>Staten Island</td>
<td>+2%</td>
</tr>
</tbody>
</table>

**CLINICAL AND SOCIAL CHARACTERISTICS**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary culture only</td>
<td>+2%</td>
</tr>
<tr>
<td>Extrapulmonary culture only</td>
<td>-1%</td>
</tr>
<tr>
<td>Culture positive</td>
<td>+2%</td>
</tr>
<tr>
<td>Multidrug-resistant TB</td>
<td>+1%</td>
</tr>
<tr>
<td>History of homelessness</td>
<td>+1%</td>
</tr>
</tbody>
</table>

**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 methods.

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.
TUBERCULOSIS RATES\(^1\) BY AGE GROUP IN YEARS, NEW YORK CITY, 2008-2017

![Graph showing tuberculosis rates by age group in years for New York City, 2008-2017.](image)

1. Rates are based on New York City Health Department population estimates, adjusted from U.S. Census Bureau interpolated intercensal population estimates, 2000-2015. Updated September 2017.

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TUBERCULOSIS RATES\(^3\) AMONG ADULTS OLDER THAN 65 BY AGE GROUP IN YEARS, NEW YORK CITY, 2013-2017

![Graph showing tuberculosis rates for adults older than 65 by age group in years for New York City, 2013-2017.](image)

1. Rates are based on New York City Health Department population estimates, adjusted from U.S. Census Bureau interpolated intercensal population estimates, 2000-2015. Updated September 2017.
COUNTRY OF BIRTH

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. Includes cases with unknown country of birth.
TUBERCULOSIS RATES AMONG PEOPLE BORN IN THE UNITED STATES (U.S.) 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 two-year 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 severity of illness.

NEW YORK CITY NEIGHBORHOODS

STOP TB
TUBERCULOSIS RATES^1 BY NEW YORK CITY NEIGHBORHOOD, NEW YORK CITY, 2017

1. Rates are based on New York City Health Department population estimates, calculated from U.S. Census Bureau data.

2. Rates are based on New York City Health Department population estimates, calculated from U.S. Census Bureau data.

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, calculated from U.S. Census Bureau data.

2. Rates are based on New York City Health Department population estimates, calculated from U.S. Census Bureau data.
TUBERCULOSIS RATES\textsuperscript{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, occurring from U.S. Census Bureau estimates and counts of case notifications, 2001-2003. Updated September 2017.

WEST QUEENS
92 cases
- TB rate per 100,000: 31.2
- Median age (years): 30
- Most common setting: Group living
- Race: White (0), Black (90), Other (0)

SUNSET PARK
32 cases
- TB rate per 100,000: 26.0
- Median age (years): 30
- Most common setting: Group living
- Race: White (0), Black (30), Other (2)

CLINICAL CHARACTERISTICS
**TB Case Distribution by Disease Site, New York City, 2017 (N=613)**

**Table:** Disease site among tuberculosis cases with extrapulmonary disease, New York City, 2017 (n=224)

<table>
<thead>
<tr>
<th>Disease site</th>
<th>Number of cases</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any extrapulmonary site</td>
<td>224</td>
<td></td>
</tr>
<tr>
<td>Lymphohistio</td>
<td>68</td>
<td>30</td>
</tr>
<tr>
<td>Pleural</td>
<td>58</td>
<td>26</td>
</tr>
<tr>
<td>Bone/Joint</td>
<td>25</td>
<td>11</td>
</tr>
<tr>
<td>Meningeal</td>
<td>15</td>
<td>7</td>
</tr>
<tr>
<td>Genitourinary</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>Peritoneal</td>
<td>17</td>
<td>8</td>
</tr>
<tr>
<td>Laryngeal</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>45</td>
<td>20</td>
</tr>
</tbody>
</table>

**HIV Infection Among Tuberculosis Cases by Birth in the United States (U.S.), New York City, 1993-2017**

1. Excludes cases with unknown country of birth.
3. 310 patients in 2017 had an unknown HIV status.
MULTIDRUG RESISTANCE

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

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>41 (19-80)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median age (range)</td>
<td></td>
</tr>
<tr>
<td>Number born outside of the United States (0.5% (19%)</td>
<td>12 (85%)</td>
</tr>
<tr>
<td>Years in the U.S. among non-U.S.-born patients (%)</td>
<td></td>
</tr>
<tr>
<td>&lt; 5 years</td>
<td>5 (42%)</td>
</tr>
<tr>
<td>5-19 years</td>
<td>4 (33%)</td>
</tr>
<tr>
<td>&gt; 20 years</td>
<td>3 (25%)</td>
</tr>
<tr>
<td>Pulmonary site of disease (%)</td>
<td>12 (85%)</td>
</tr>
<tr>
<td>Median number of drugs to which there was known resistance among MDR TB cases (%) (range)</td>
<td>7 (3-12)</td>
</tr>
<tr>
<td>Median number of contacts identified around patients with MDR TB (%) (range)</td>
<td>3 (0-10%)</td>
</tr>
</tbody>
</table>

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

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

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)

- Liquid/broth-based (MGIT) phenotypic testing (21%)
- Whole genome sequencing (50%)
- Pyrosequencing (50%)
- Hain Lifescience GenoType MTBDRplus (50%)

50% of MDR cases identified in NYC in 2017 were first identified through a molecular-based test.
TREATMENT OUTCOMES

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

86% of patients with verified TB disease in NYC in 2016 completed treatment within 365 days.

1. Treatment outcomes are not reported for the current year to allow sufficient time for follow-up.
NUMBER AND PROPORTION OF PATIENTS WITH TUBERCULOSIS WHO DIED BEFORE OR DURING TREATMENT, NEW YORK CITY, 2008-2017

EPIDEMIOLOGIC INVESTIGATIONS AND GENOTYPING
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)

<table>
<thead>
<tr>
<th>Number of Exposed Contacts</th>
<th>n (%)</th>
<th>&lt; 15 Exposed Contacts</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>Number of cases</td>
<td>28</td>
<td>41</td>
<td>69</td>
</tr>
<tr>
<td>Likely transmission(^2)</td>
<td>9 (31%)</td>
<td>7 (10%)</td>
<td>16 (24%)</td>
</tr>
<tr>
<td>Transmission could not be assessed</td>
<td>2 (7%)</td>
<td>5 (12%)</td>
<td>7 (10%)</td>
</tr>
<tr>
<td>Total number of contacts</td>
<td>409</td>
<td>249</td>
<td>1,048</td>
</tr>
<tr>
<td>Median contacts per site (range)</td>
<td>25 (15-40)</td>
<td>6 (1-14)</td>
<td>10 (1-40)</td>
</tr>
<tr>
<td>Contacts eligible for testing(^3)</td>
<td>810 (99%)</td>
<td>223 (94%)</td>
<td>1,043 (99%)</td>
</tr>
<tr>
<td>Contacts tested</td>
<td>700 (88%)</td>
<td>207 (89%)</td>
<td>907 (88%)</td>
</tr>
<tr>
<td>Contacts with a positive TB test result</td>
<td>75 (11%)</td>
<td>38 (16%)</td>
<td>303 (11%)</td>
</tr>
</tbody>
</table>

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

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

- Acute care facilities
- Home health care service agencies
- Nursing homes/long-term care facilities
- Other outpatient health care facilities

71% of contact investigations in healthcare-associated settings occurred in a hospital or acute care clinic
PROPORTION CLUSTERED² AMONG TUBERCULOSIS CASES WITH A COMPLETE GENOTYPE² BY SELECT PATIENT CHARACTERISTICS, NEW YORK CITY, 2017 (N=440)

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 cases with an isolate that has exact matching 24-locus MspI or RFLP genotyping reports with variable numbers to the index patient (MAC). 2. Excludes cases identified in 2017 and a single genotype as of January 1, 2016. 3. Among both MspI and RFLP results, 440 reported cases verified in 2017 had a signature genotype as of January 1, 2016. 4. U.S. born includes individuals born in the U.S. and U.S. territories. Two cases were noted to have open category of birth. 5. Among patients born in the U.S. 6. Excludes five patients with miliary or multiple airs/pleurisy. 7. Among patients born outside the U.S. 8. Data on the U.S. is not available for all patients. 9. In the 12 months before TB diagnosis.

CHARACTERISTICS OF SELECT HIGH-PRIORITY² TUBERCULOSIS (TB) CLUSTERS,² NEW YORK CITY, 2017

<table>
<thead>
<tr>
<th>Cluster A</th>
<th>Cluster B</th>
<th>Cluster C</th>
<th>Cluster D</th>
<th>Cluster E</th>
<th>Cluster F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of cases identified from January 1, 2015 to December 31, 2015</td>
<td>11</td>
<td>6</td>
<td>7</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Proportion of cases among males²</td>
<td>64%</td>
<td>73%</td>
<td>72%</td>
<td>63%</td>
<td>63%</td>
</tr>
<tr>
<td>Proportion of patients born in the United States (U.S.)²</td>
<td>27%</td>
<td>88%</td>
<td>14%</td>
<td>17%</td>
<td>100%</td>
</tr>
<tr>
<td>Median patient age in years (range)²</td>
<td>30 (20-70)</td>
<td>31 (16-99)</td>
<td>27 (17-40)</td>
<td>29 (19-70)</td>
<td>36 (24-65)</td>
</tr>
<tr>
<td>AHF admission diagnosis for patients in clusters of TB diagnosis²</td>
<td>Pneumonia (30%)</td>
<td>Multibacillary (42%)</td>
<td>Bacterium (36%)</td>
<td>Bacterium (100%)</td>
<td>Bacterium (100%)</td>
</tr>
<tr>
<td>Proportion of patients reporting history of homelessness²</td>
<td>9%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Proportion of patients reporting history of drug use or excessive alcohol use²</td>
<td>28%</td>
<td>50%</td>
<td>14%</td>
<td>17%</td>
<td>63%</td>
</tr>
<tr>
<td>Proportion of patients with pulmonary disease²</td>
<td>52%</td>
<td>88%</td>
<td>100%</td>
<td>63%</td>
<td>100%</td>
</tr>
<tr>
<td>Clusters in which patients reported history of transfused blood²</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Clusters in which social network links were identified among patients²</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Clusters in which patients were linked to the same geographically-concentrated area²</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

1. Includes clusters with two or more cases identified in three years and evidence of recent local transmission. 2. Clusters defined as cases whose cases have exact matches to a similar signature MspI or RFLP genotyping reports with variable numbers to the index patient (MAC). 3. Includes patients born outside of the U.S. and multibacillary smear results and microscopy results other than DNA probe. 4. Among patients born in the U.S. 5. Data on the U.S. is not available for all patients. 6. In the 12 months before TB diagnosis.
### CHARACTERISTICS OF SELECT HIGH-PRIORITY\(^1\) TUBERCULOSIS (TB) CLUSTERS,\(^2\) NEW YORK CITY, 2017

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Cluster B</th>
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<th>Cluster E</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Number of cases identified from January 1, 2015 to December 31, 2017</td>
<td>11</td>
<td>8</td>
<td>7</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Proportion of cases among males(^3)</td>
<td>64%</td>
<td>75%</td>
<td>72%</td>
<td>63%</td>
<td>63%</td>
</tr>
<tr>
<td>Proportion of patients born in the United States (US)(^3)</td>
<td>27%</td>
<td>69%</td>
<td>14%</td>
<td>17%</td>
<td>100%</td>
</tr>
<tr>
<td>Median patient age in years (range)(^4)</td>
<td>30 (20-70)</td>
<td>31 (16-96)</td>
<td>27 (17-40)</td>
<td>29 (19-39)</td>
<td>36 (24-45)</td>
</tr>
<tr>
<td>Mean maximum serum creatinine at time of TB diagnosis (mg/dL)</td>
<td>QUANTILE</td>
<td>QUANTILE</td>
<td>QUANTILE</td>
<td>QUANTILE</td>
<td>QUANTILE</td>
</tr>
<tr>
<td>Proportion of patients reporting history of homelessness(^5)</td>
<td>9%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Proportion of patients reporting history of drug use or excessive alcohol use(^6)</td>
<td>18%</td>
<td>50%</td>
<td>14%</td>
<td>17%</td>
<td>63%</td>
</tr>
<tr>
<td>Proportion of patients with pulmonary disease(^7)</td>
<td>62%</td>
<td>80%</td>
<td>100%</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>Clusters in which patients reported history of transient work(^8)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Clusters in which clusters were identified among patients(^9)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Clusters in which patients were linked to the same geographically-concentrated area(^10)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

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1. Includes clusters with two or more cases identified in the same year and evidence of recent local TB transmission. 2. Includes clusters with two or more cases linked to another cluster also meeting these criteria. 3. Includes cases confirmed by culture or smear examination of sputum or other respiratory specimen. 4. Includes case confirmed by culture or smear examination of sputum or other respiratory specimen. 5. Includes case confirmed by culture or smear examination of sputum or other respiratory specimen. 6. Includes case confirmed by culture or smear examination of sputum or other respiratory specimen. 7. Includes case confirmed by culture or smear examination of sputum or other respiratory specimen. 8. Includes case confirmed by culture or smear examination of sputum or other respiratory specimen. 9. Includes case confirmed by culture or smear examination of sputum or other respiratory specimen.
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<td>75%</td>
<td>72%</td>
<td>63%</td>
<td>63%</td>
</tr>
<tr>
<td>Proportion of patients born in the United States (95)%</td>
<td>27%</td>
<td>88%</td>
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<td>106%</td>
</tr>
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<td>Median patient age in years (range)</td>
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<td>35 (24-65)</td>
</tr>
<tr>
<td>Proportion of patients reporting history of homelessness</td>
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<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Clusters in which patients reported history of unemployment</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Clusters in which social network links were identified</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Clusters in which patients were linked to the same geographically-concentrated area</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

1. Includes clusters with 1 or more cases identified in those years and evidence of recent local TB transmission. 2. Clusters include cases where patients have visited medical or other public places where tuberculosis patients were identified. 3. Includes one case confirmed outside of NYC with matching genotypes and epidemiologic links in other clusters. 4. Includes patients born in S. Korea or China in 2015. 5. All cases were identified between January 1, 2015 and December 31, 2017. 6. U.S. born includes internationals born in China and India. 7. In the 2 clusters in which diagnosis F is noted, a shared outlier was detected.

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### CHARACTERISTICS OF SELECT HIGH-PRIORITY TUBERCULOSIS (TB) CLUSTERS, NEW YORK CITY, 2017

<table>
<thead>
<tr>
<th>Cluster A</th>
<th>Cluster B</th>
<th>Cluster C</th>
<th>Cluster D</th>
<th>Cluster E</th>
<th>Cluster F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of cases identified from January 1, 2015 to December 31, 2017</td>
<td>11</td>
<td>8</td>
<td>7</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Proportion of cases among males</td>
<td>64%</td>
<td>75%</td>
<td>72%</td>
<td>63%</td>
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</tr>
<tr>
<td>Proportion of patients born in the United States (95)%</td>
<td>27%</td>
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# Characteristics of Select High-Priority Tuberculosis (TB) Clusters, New York City, 2017

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<tr>
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<td>7</td>
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<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Proportion of cases among males*</td>
<td>64%</td>
<td>75%</td>
<td>72%</td>
<td>93%</td>
<td>83%</td>
<td>96%</td>
</tr>
<tr>
<td>Proportion of patients born in the United States (45.5)%</td>
<td>27%</td>
<td>48%</td>
<td>14%</td>
<td>17%</td>
<td>106%</td>
<td>66%</td>
</tr>
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<td>Median patient age in years (range)$</td>
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<td>39 (19-38)</td>
<td>35 (24-60)</td>
<td>40 (18-91)</td>
</tr>
<tr>
<td>Week maximum temperature at residence or week of TB diagnosis (%)</td>
<td>Manhattan (50%)</td>
<td>Manhattan (52%)</td>
<td>Manhattan (96%)</td>
<td>Manhattan (100%)</td>
<td>Seattle (100%)</td>
<td>Manhattan (100%)</td>
</tr>
<tr>
<td>Proportion of patients reporting history of homelessness**</td>
<td>9%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>20%</td>
</tr>
<tr>
<td>Proportion of patients reporting history of drug use or excessive alcohol use**</td>
<td>16%</td>
<td>50%</td>
<td>14%</td>
<td>17%</td>
<td>63%</td>
<td>20%</td>
</tr>
<tr>
<td>Proportion of patients with pneumoconiosis**</td>
<td>52%</td>
<td>48%</td>
<td>100%</td>
<td>83%</td>
<td>100%</td>
<td>0%</td>
</tr>
</tbody>
</table>

* Indicate clusters with two or more cases identified in the same year and evidence of recent local TB transmission.
** Indicates clusters with cases whose primary languages were Spanish, Chinese, or French and had recent contact with a patient of the same language background.

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### Publications

- STOP TB

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BTBC STAFF PUBLICATIONS IN PEER-REVIEWED JOURNALS, 2017


• Fox GI, Benedetti A, Cox H, Koh WJ, Viiklepp S, 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)


• Burzynski J. The Use of Modeling to Compare Tuberculosis Dynamics in Four U.S. States. Am J Respir Crit Care Med. 2017 Oct;196(8):953-954


• Fox GI, Benedetti A, Cox H, Koh WJ, Vikelepp 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)


INFOGRAPHICS, MAPS, AND HARD COPIES OF THE ANNUAL TB SUMMARY ARE AVAILABLE

Online:
www.nyc.gov/health/tb

Hard copies:
Email tb-epi@health.nyc.gov
ACKNOWLEDGEMENTS

THE ANNUAL REPORT TEAM
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- All of the BTBC staff that contribute to this report by working with our patients and collecting the data included in the report

WORKING TOGETHER TO BEND THE CURVE: A CALL TO ACTION

Joseph N. Burzynski, MD, MPH
Director, Bureau of Tuberculosis Control
New York City Department of Health and Mental Hygiene
Essential Core TB Control Components Work

In 2017, largest increase in TB rates since 1992

613 TB cases reported in NYC in 2017

7.5 NYC citywide TB rate in 2017 per 100,000 people

1. Rates are based on denominator census data
Since 2015, MDR-TB is on the Rise in NYC

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of MDR-TB Cases in NYC</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>0</td>
</tr>
<tr>
<td>2013</td>
<td>0</td>
</tr>
<tr>
<td>2014</td>
<td>0</td>
</tr>
<tr>
<td>2015</td>
<td>0</td>
</tr>
<tr>
<td>2016</td>
<td>0</td>
</tr>
<tr>
<td>2017</td>
<td>5</td>
</tr>
</tbody>
</table>

MDR: multidrug-resistant
XDR: extensively drug-resistant

13 MDR-TB Cases in 2017
1 XDR-TB Case in 2017
Bureau of TB Control Budget and Number of NYC TB cases, 2007-2017

Year

TB Budget in Millions*

TB Cases

TB Budget

*Not adjusted for inflation

U - Shaped Curve of Concern

Bend it like Frieden

Active TB Disease

Latent TB Infection

Prevalence estimates in NYC are between 670,000 - 1.7 million*

*LTBI prevalence estimates based on clinic data and NHANES
**Approach to Bending the Curve**

- Test
- Treat
- Innovate
- Collaborate
TEST - TB Disease

“Think TB”

• Know TB signs and symptoms

• Know local epidemiology
  − 86% among non-U.S.-born persons
  − Nearly ¼ among persons 65 years and older
  − Majority >5 years after entry to the U.S.

TEST - TB Disease

Use newer tests for diagnosing TB

• Nucleic acid amplification (NAA)
  − Genotype MTBDRplus (Hain Lifesciences)
  − Xpert MTB/RIF (Cepheid)

• Pyrosequencing

• Whole Genome Sequencing

= Shorter time to diagnosis
= Determine drug resistance quicker to inform treatment
TEST - TB Infection

- Conduct TB risk assessment
  - Contacts to active TB patients
  - Born in, resided in, or travelled (>1 month) to countries with high incidence of TB
  - Have HIV or other immunosuppression due to conditions (e.g. cancers) or medications (e.g. TNF-α antagonists)

- Screen all persons who are pregnant

TEST - TB Infection

- Now more insurance coverage for testing
  - U.S. Preventive Service Task Force (USPSTF) recommendation

U.S. Preventive Services Task Force

Screening for Latent Tuberculosis Infection in Adults

<table>
<thead>
<tr>
<th>Population</th>
<th>USPSTF recommendation grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>asymptomatique adults 5 years and older at increased risk for tuberculosis infection</td>
<td>B</td>
</tr>
</tbody>
</table>

Recommended


TEST - TB Infection

Health Code Change for children <5 years of age [NEW!]

- Report all children <5 years of age with a positive test for TB infection within 24 hours
  - Qualitative and quantitative interferon gamma release assay (IGRA) or tuberculin skin test (TST) results
- Report subsequent evaluation to rule out TB disease
  - All radiographic/diagnostic imaging (e.g., chest x-rays, CT scans, and MRI)
  - TB infection treatment regimen and start date

TEST - TB Infection

Use IGRA\(s\)

- Preferred test
- Can be used for persons ≥ 2 years of age
  - New 2018 AAP Red Book recommendations
- Eliminates Bacille-Calmette Guérin (BCG) vaccination as confounder
- IGRA\(s\) available:
  - T-SPOT.TB
  - QuantiFERON\textsuperscript{R}-TB Gold In-Tube / QuantiFERON\textsuperscript{R}-TB Gold Plus [NEW]
Approach to Bending the Curve

TREAT - TB Disease

- Utilize infection control practices
  - Prevent nosocomial, community, or household transmission
  - Discharge patient as quickly as clinically appropriate
  - Determine patient infectiousness
    * Dr. Nardell to speak on this later

- Develop patient discharge plan in collaboration with DOHMH
  - Medical consultant and field staff
TREAT - TB Disease

- Partner to manage patients with drug-resistant TB
  - DOHMH offers expert consultation in MDR-TB treatment
  - DOHMH can help access newer MDR-TB drugs (e.g., delaminid, bedaquiline)
  - New shorter, treatment regimens for MDR-TB
    - Dr. Daly to speak on this later

TREAT - TB Disease

Increase treatment adherence and completion

- Enroll patients in Directly Observed Therapy (DOT)
  - In-Person DOT is offered in clinical and field settings
  - Video DOT (VDOT)
    - Live (synchronous)
    - Recorded (asynchronous)
TREAT - TB Infection

- Treat individuals with TB infection
- Use shorter treatment regimens
  - Isoniazid and rifapentine (3HP)
    - Once weekly (x12 weeks)
    - VDOT / self-administered [new!]
  - Rifampin (4R)
    - Daily (x4 months)
    - Self-administered

Completing LTBI treatment can reduce the chance of developing TB disease by 90%

Approach to Bending the Curve

Test  Treat  INNOVATE  Collaborate
INNOVATE

Embrace new tools and technology

• Rapid diagnostics
  – Whole Genome Sequencing
    • Faster turnaround time (~1 week)
    • More comprehensive results
    • Cost-effective
  • Use Regional Health Information Organizations to enhance case management

INNOVATE

• Research/Clinical trials
  – VDOT study (TB disease)
  – Trials Consortium
  – Academic collaborations
  – TB Drug Pipeline (Dr. Li to speak more on this later)
Approach to Bending the Curve

Test  Treat  Innovate  COLLABORATE

COLLABORATE

Promote TB Awareness, Advocacy, and Action

- TB patient advocates (Ms. O’Brien and Mr. Rana to share their personal stories later)
- Health care providers
- Global and community-based groups
  - African Services Committee
  - Federation of Protestant Welfare Agencies
  - Hispanic Federation
  - Housing Works
  - Latino Commission on AIDS, Hispanic Health Network
  - Mayor’s Office of Immigrant Affairs
  - National Tuberculosis Controllers Association
  - New York Immigration Coalition
  - New York State Department of Health
  - RESULTS
  - TB Alliance
  - The International Union of Tuberculosis and Lung Disease
  - Treatment Action Group
- Many dedicated individuals...
COLLABORATE

- Engage high TB burden communities
  - Partner with elected officials and community leaders
  - Targeted testing (e.g., mobile vans, health fairs) and linkage to care

- TB Summit - June 2018

- BTBC Program Manual [Coming soon!]

DOHMH Resources

1. TB Hotline
   Medical consultation

2. CLINIC
   Four clinics – free, do not ask about immigration status

3. Multilingual educational materials

4. DOT
   Case Management

5. TB presentations
   (e.g., medical grand rounds)
THANK YOU!