Tuberculosis Epidemiology, Prevention and Control in RI

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Reported TB cases
United States, 1982–2007

- Loss of public health infrastructure
- HIV co-epidemic
- Outbreaks in congregate settings
- Increasing immigration from areas of high endemicity

No. of Cases

-7.8% per year

Year

-3.8% per year
Local TB Transmission Cycle and points at which TB control measures could be implemented

- Pre-Immigration TB screening
- Contact Investigations
- Treatment of LTBI
- Screening for LTBI
- Treatment of LTBI
- Improve Completion rates
- Early diagnosis & treatment
- Infection control
- Ensure completion of therapy (DOT)

Global Pool of LTBI
Migrants into USA with LTBI
Reactivation of LTBI
Active TB Infection
Susceptible Host
Primary TB Infection
Airborne Transmission
Latent TB Infection (LTBI)
CDC funds Priority TB Prevention & Control Programs

• **#1**- Finding all patients with active TB and ensuring completion of therapy.

• **#2**- Finding and evaluating contacts of infectious TB patients and ensuring completion of appropriate treatment.

• **#3**- Targeted testing of high-risk groups and ensuring completion of treatment for LTBI.
Rhode Island TB Program Logic Model

Inputs/Resources
- Capacity & Infrastructure
  - Adequate funding (State/Federal)
  - Well-trained and well-staffed public health programs
  - Functional data systems, including case management data system (TMS, NEDSS)
  - Adequate physical, diagnostic, and treatment resources (State lab, RISE Clinic)
  - Policies, procedures, and guidelines
  - Clinical, epidemiological, and operational evaluations

Activities
- Provide TB education and training to community providers and public
- Find and treat active TB
  - Identify early
  - Use effective drugs
  - Reduce treatment barriers
- Investigate Contacts
  - Identify contacts quickly
  - Locate and evaluate in a timely manner
  - Guide institutional responses
- Detect and Control Outbreaks
  - Rapid response capacity tied to Departmental emergency operations plan
- Prevent TB in high-risk populations
  - Engage community partners (leverage through advisory process)
  - Detect LTBI & TB in hard-to-reach populations
- Monitoring & evaluation
  - Data-driven interventions to improve program activities defined and disseminated

RI Strategies
- Maintain comprehensive and current webpage
- Disseminate training information to key providers
- Sustain TB surveillance, and lab capacity
- Sustain TB specialty clinic services
- Ensure universal DOT program
- Patient on appropriate treatment
- Patient adheres to treatment
- Timely completion of appropriate treatment
- Actively prioritize contacts
- Ensure 2-step screening evaluation
- Explore QuantiFERON as a tool
- Participate in regional genotyping project
- Conduct epidemiologic investigation
- Seek expert multidisciplinary consultation for outbreak response
- Sustain pediatric TB clinic services
- Supply PPD to high-risk populations
- Supply INH to high-risk populations

Outcomes
- Reduced TB transmission
- Reduced LTBI prevalence
- Reduced TB incidence
- Reduced TB morbidity and mortality

Enhanced accountability

Data and programs undergo continuous improvement with ongoing monitoring and evaluation feedback
RI TB Program

• **What do we do:** Surveillance for active and selected high risk LTBI, Laboratory Services, Clinical Services, DOT program. Provider and public education.

• **How well do we do it? 2008:**
  
  - Initiate Rx in smear pos pts in 7 days- 9/11 = 80%;
  - Sputum conversion in 60 days- 8/9 = 89%;
  - Rx completion in 12 mo- 93%, DOT success rate- 98%.
  
- Contacts identified 90%, evaluated 73%, Rx started 97%, Rx completed 77%

- Refugee eval metrics, HIV co-infection metrics
- Metrics for lab services, drug susceptibility testing and genotyping metrics
- Data management and Q/A metrics
Outbreaks/Large Contact Investigations

- **Central Falls High School Outbreak**: 1199 contacts (102 LTBI, 1 active case)
- **Pediatric Health Care Provider**: 269 contacts (3 LTBI, 0 cases)
- **NE Knitting Factory**: 147 contacts (45 LTBI, no cases)
- **Olive Garden**: 160 contacts (35 LTBI, 1 case)
- **Stericycle**: 8 conversions (environmental transmission)
- **NTM---Pediatric Long Term Care Facility** (3)
RI Program Highlights

- Excellent implementation of DOT for actives and highest risk LTBI (95%)
- Excellent adherence and completion rates for actives on DOT (95%)
- Contribution to TB from HIV, homelessness, corrections, MDR TB low.

- **Contribution from foreign born high.**
- Surveillance data indicate that we are a low incidence State for actives, ready to pursue elimination.
TB in Rhode Island, 2008-2009

- 60 Cases
- TB Rate = 2.9 cases/100,000 (23rd in nation in 2008)
- 83% Minority, 23 Asian, 15 Hispanic
- 78% Foreign Born
- 58% Unemployed (includes retired)
- 0 Cases Incarcerated, 0 Cases Homeless, 0 Cases IDU, 0 drug resistance
- 4/21 HIV+ among persons 25-44 years old
# TB Morbidity

**United States, 2002–2009**

<table>
<thead>
<tr>
<th>Year</th>
<th>No.</th>
<th>US Rate</th>
<th>RI Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>15,056</td>
<td>5.2</td>
<td>4.7</td>
</tr>
<tr>
<td>2003</td>
<td>14,836</td>
<td>5.1</td>
<td>4.3</td>
</tr>
<tr>
<td>2004</td>
<td>14,500</td>
<td>5.0</td>
<td>4.9</td>
</tr>
<tr>
<td>2005</td>
<td>14,067</td>
<td>4.8</td>
<td>4.5</td>
</tr>
<tr>
<td>2006</td>
<td>13,727</td>
<td>4.6</td>
<td>3.4</td>
</tr>
<tr>
<td>2007</td>
<td>13,288</td>
<td>4.4</td>
<td>4.3</td>
</tr>
<tr>
<td>2008</td>
<td>12,904</td>
<td>4.2</td>
<td>3.4</td>
</tr>
<tr>
<td>2009</td>
<td>‘11675’</td>
<td>‘3.8’</td>
<td>2.3</td>
</tr>
</tbody>
</table>
• Interim **Year 2000 Objective**: 3.5 per 100,000
• Asian/PI  15.0
• Black       10.0
• Hispanic    5.0

**Interim Year 2010/2020 Objective**: 1.0 per 100,000

• Rate of 1.0 for all of above risk groups—**ELIMINATION GOAL for RI:10 cases/yr**
Reported Cases of Tuberculosis, Rhode Island, 2000-2009

<table>
<thead>
<tr>
<th>Year</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>49</td>
</tr>
<tr>
<td>2001</td>
<td>60</td>
</tr>
<tr>
<td>2002</td>
<td>49</td>
</tr>
<tr>
<td>2003</td>
<td>46</td>
</tr>
<tr>
<td>2004</td>
<td>51</td>
</tr>
<tr>
<td>2005</td>
<td>47</td>
</tr>
<tr>
<td>2006</td>
<td>26</td>
</tr>
<tr>
<td>2007</td>
<td>45</td>
</tr>
<tr>
<td>2008</td>
<td>36</td>
</tr>
<tr>
<td>2009</td>
<td>24</td>
</tr>
</tbody>
</table>

Prepared by the Center for Epidemiology, HEALTH, March 2010
Tuberculosis Case Rates* by Year, Rhode Island, 2000-2009

*Rates are based on the 2000-2009 Rhode Island Population estimated as calculated by the U.S. Bureau of Census.

Prepared by the Center for Epidemiology, HEALTH, March 2010
Reported Cases of Tuberculosis by Sex, Rhode Island, 2000-2009

Prepared by the Center of Epidemiology, HEALTH, March 2010
Tuberculosis Rates* by Race/Ethnicity, Rhode Island, 2005-2009

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Hispanic White</td>
<td>2.0</td>
<td>0.4</td>
<td>1.6</td>
<td>0.5</td>
<td>0.7</td>
</tr>
<tr>
<td>Non-Hispanic Black</td>
<td>9.6</td>
<td>9.5</td>
<td>22.7</td>
<td>17.0</td>
<td>3.8</td>
</tr>
<tr>
<td>Hispanic</td>
<td>14.2</td>
<td>11.2</td>
<td>12.6</td>
<td>7.4</td>
<td>4.9</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>32.5</td>
<td>18.0</td>
<td>18.0</td>
<td>46.1</td>
<td>35.5</td>
</tr>
<tr>
<td>Rhode Island Incidence Rate</td>
<td>4.4</td>
<td>2.5</td>
<td>4.3</td>
<td>3.4</td>
<td>2.3</td>
</tr>
</tbody>
</table>

*Rates are expressed as cases/100,000. Rates are based on 2005-2008 Rhode Island population estimates as calculated by the US Census Bureau. The Rhode Island population estimate.

Prepared by the Center for Epidemiology, HEALTH, March 2010
Tuberculosis Rates* by Age, Rhode Island, 2008-2009

<table>
<thead>
<tr>
<th>Age</th>
<th>2008 Rate</th>
<th>2009 Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4</td>
<td>1.6</td>
<td>1.6</td>
</tr>
<tr>
<td>5-14</td>
<td>2.4</td>
<td>0</td>
</tr>
<tr>
<td>15-24</td>
<td>1.3</td>
<td>0</td>
</tr>
<tr>
<td>25-44</td>
<td>4.3</td>
<td>3.2</td>
</tr>
<tr>
<td>45-64</td>
<td>3.5</td>
<td>1.4</td>
</tr>
<tr>
<td>65+</td>
<td>5.4</td>
<td>6.8</td>
</tr>
</tbody>
</table>

*Rates are expressed as cases/100,000. Rates are based on 2008 Rhode Island population estimates as calculated by the US Census Bureau. The rate for 2009 is based on the 2008 Rhode Island population estimate.

Prepared by the Center for Epidemiology, HEALTH, March 2010

Prepared by the Center for Epidemiology, HEALTH, March 2010

Prepared by the Center for Epidemiology, HEALTH, March 2010
Reported Cases of Tuberculosis by Race/Ethnicity, Rhode Island, 2009

Asian/Pacific Islander 42%
Non-Hispanic White 25%
Non-Hispanic Black 8%
Hispanic 25%

Prepared by the Center for Epidemiology, HEALTH, March 2010
Tuberculosis by Region of Origin for Foreign Born Cases, Rhode Island, 2009

<table>
<thead>
<tr>
<th>Region</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central/South America</td>
<td>21%</td>
</tr>
<tr>
<td>Africa</td>
<td>11%</td>
</tr>
<tr>
<td>Caribbean</td>
<td>5%</td>
</tr>
<tr>
<td>Europe</td>
<td>11%</td>
</tr>
<tr>
<td>Asia</td>
<td>52%</td>
</tr>
</tbody>
</table>

Countries of Significance
- Cambodia  15%
- Philippines 15%

Prepared by the Center for Epidemiology, HEALTH, March 2010
Reported Tuberculosis Cases by County, Rhode Island, 2009

<table>
<thead>
<tr>
<th>County</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bristol</td>
<td>0</td>
</tr>
<tr>
<td>Kent</td>
<td>1</td>
</tr>
<tr>
<td>Newport</td>
<td>1</td>
</tr>
<tr>
<td>Providence</td>
<td>21</td>
</tr>
<tr>
<td>Washington</td>
<td>1</td>
</tr>
</tbody>
</table>

Prepared by the Center for Epidemiology, HEALTH, March 2010
Reported Cases of Tuberculosis by Site of Infection, Rhode Island, 2009

50% Pulmonary
50% Extra-Pulmonary

Prepared by the Center for Epidemiology, HEALTH, March 2010
Reported Cases of Tuberculosis by Site of Infection, Rhode Island, 2009

- Lungs: 12 cases
- Genitourinary: 3 cases
- Lymphatic/Cervical: 3 cases
- Lymphatic/Other: 2 cases
- Lymphatic/Intrathoracic: 2 cases
- Bone and/or Joint: 2 cases
- Spleen: 1 case
- Pleural: 1 case
- Blood: 1 case

A few cases in 2008 had multiple sites of infection. Each site was counted separately.

Prepared by the Center for Epidemiology, HEALTH, March 2010
The Total Number of Pulmonary Cases with Culture Confirmation, Rhode Island, 2001-2009

Prepared by the Center for Epidemiology, HEALTH, March 2010

Culture (+) are the pulmonary TB cases who had a positive culture consistent with pulmonary TB. Specimen types include sputum, broncial washing, gastric aspirate, lung tissue and pleura.

Prepared by the Center for Epidemiology, HEALTH, March 2010
LTBI Prevalence

Estimate:
30,000 cases in RI (of 1 million population)

Central falls Outbreak: 18% foreign born PPD pos, 2% US born PPD pos.
Total Number of Referrals that Started and Completed LTBI Treatment, by Year, RISE Clinic, 2000-2007

<table>
<thead>
<tr>
<th>Year</th>
<th>Number Started</th>
<th>Number Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>1051</td>
<td>555</td>
</tr>
<tr>
<td>2001</td>
<td>979</td>
<td>511</td>
</tr>
<tr>
<td>2002</td>
<td>1082</td>
<td>683</td>
</tr>
<tr>
<td>2003</td>
<td>1247</td>
<td>742</td>
</tr>
<tr>
<td>2004</td>
<td>1028</td>
<td>638</td>
</tr>
<tr>
<td>2005</td>
<td>1062</td>
<td>669</td>
</tr>
<tr>
<td>2006</td>
<td>1227</td>
<td>798</td>
</tr>
<tr>
<td>2007</td>
<td>530</td>
<td>362</td>
</tr>
</tbody>
</table>
# Results of Class B Activities, Rhode Island, 2007-2009

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2009*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Traditional B1 and B2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Located (% Located)</td>
<td>11 (92%)</td>
<td>13 (93%)</td>
<td>18 (67%)</td>
</tr>
<tr>
<td>Fully Evaluated</td>
<td>11</td>
<td>13</td>
<td>18</td>
</tr>
<tr>
<td>Treatment Prescribed</td>
<td>4</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Completed</td>
<td>3</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Lost</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Pending</td>
<td>0</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Never Located</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Still Trying to Locate</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td><strong>B2 (LTBI)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Located (% Located)</td>
<td></td>
<td></td>
<td>14 (56%)</td>
</tr>
<tr>
<td>Fully Evaluated</td>
<td></td>
<td></td>
<td>11</td>
</tr>
<tr>
<td>Treatment Prescribed</td>
<td></td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Completed</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Lost</td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Pending</td>
<td></td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Never Located</td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Still Trying to Locate</td>
<td></td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

* Data is preliminary and subject to change.
New England TB Consortium

• TB cases (2007)
  - 408 cases
  - 3.0 / 100,000 (range 0.5–4.3)

• Regional cases equivalent to state with 8th highest TB burden

Five key strategies:
• Team building
• Education
• Capacity expansion
• Universal genotyping
• Medical and outbreak consultation
The six New England TB Programs promote a regional approach to TB elimination. This website represents a step toward building collaboration, exchanging experiences and practices, and enhancing program capacity.

Using Regional Approaches to Reach the Goal of TB Elimination

Regional collaborations provide a framework for strengthening TB programs by establishing common goals and objectives. Our regional TB plan presents five strategic components (effective communication, consultation, training and education, enhanced case-finding and program evaluation) and five key operations (collaboration, policy development, surveillance using molecular genotyping, cohort reviews and research) that guide our common activities.

Click here for more information and resources on regional collaboration.

Want automatic emails when this site is updated? Click on “Request Access” in the upper right-hand corner of this page and we’ll send you instructions!
Tuberculosis Program

LTBI Treatment Web Resources for Clinicians

PRIMARY RESOURCES

Guide for Primary Health Care Providers: Targeted Tuberculin Testing and Treatment of Latent Tuberculosis Infection
This booklet provides recommendations on targeted tuberculin testing, treatment of LTBI, and clinical monitoring. It serves as a reference resource that highlights the main points and recent updates to the "Targeted Tuberculin Testing and Treatment of Latent Tuberculosis Infection" guidelines published in 2000. (CDC)

ADDITIONAL RESOURCES

The Difference Between Latent TB Infection and Active TB Disease
Challenges to elimination:

- Importation of TB from outside US
- HIV epidemic – national and global
- Poverty: racial-ethnic disparities, homelessness
- Drug resistance
- Sustaining expert resources to assure adequate surveillance, patient management, LTBI diagnosis and treatment

Not feasible to eliminate TB without:

- better tools to diagnose latent TB infection
- better drugs to treat LTBI
- effective vaccine

Next Upsurge: Decreased funding, loss of TB expertise, high in migration, lag in implementing newer diagnostics and drugs.