Taking Aim on TB Elimination: How Are We Doing?

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Medical Director, TB Elimination Program
Objectives

1. Define the goal of TB elimination and describe progress toward achieving that goal in the United States and in Tennessee.

2. Discuss epidemiological and clinical challenges to the achievement of TB elimination.
Context – ACET Strategic Plan (1989)

- **1984** – Dr. James O. Mason, then Director of CDC, challenged public health community to develop a strategy to eliminate TB from the United States

- **1989** – CDC/DHHS Advisory Committee for Elimination of Tuberculosis (ACET) released a strategic plan*

- “The committee urges the nation to establish the goal of tuberculosis elimination (a case rate of less than one per million population”

- “…describing actions necessary to achieve the goal by the year 2010, with an interim target of a case rate of 3.5 per 100,000 population by the year 2000.”

“Three factors make this a realistic goal:

1) tuberculosis is retreating into geographically and demographically defined pockets;

2) biotechnology now has the potential for generating better diagnostic, treatment, and prevention modalities; and

3) computer, telecommunications, and other technologies can enhance technology transfer.”*

How Are We Doing?

Fight Tuberculosis
with modern methods

Metropolitan Life Insurance Company

HUBER THE TUBER
A Story of Tuberculosis

Huber the Tuber

Department of Health

5
Reported TB Cases
United States, 1982–2014*

*Updated as of June 5, 2015.
Number of TB Cases in U.S.-born vs. Foreign-born Persons, United States, 1993–2014*

*Updated as of June 5, 2015.
TB Cases by Year - Tennessee, 1930-2015

5,945 cases (1948)

131 cases (2015)
Comparison of TB Case Rates - U.S. and TN
1970-2015

Year
Case Rate

TN Case Rate
U.S. Avg. Case Rate
TB Cases - Tennessee, 2011-2015

Lowest annual TB case count on record in Tennessee

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Counted Cases</th>
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<tbody>
<tr>
<td>2010</td>
<td>193</td>
</tr>
<tr>
<td>2011</td>
<td>156</td>
</tr>
<tr>
<td>2012</td>
<td>163</td>
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<td>2013</td>
<td>143</td>
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<td>2014</td>
<td>151</td>
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<tr>
<td>2015</td>
<td>131</td>
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TB Cases by U.S.-born Status
Tennessee, 1993-2015

Year

Cases


TN US-Born
TN Foreign-Born

2015 – 45.0% Foreign-born
What Has Changed – Overview

• Epidemiology of TB in Tennessee
• Diagnostic and therapeutic technologies
  – Imaging: CT, MRI, PET
  – Bronchoscopy
  – Nucleic acid amplification tests (NAAT)
  – Interferon-gama release assays (QFT, T-Spot.TB)
  – Liquid culture
  – Drug sensitivity testing
  – Molecular detection of drug resistance
  – Genotyping and whole genome sequencing
  – Therapeutic drug monitoring (TDM)
• Public health infrastructure and organization
• Directly observed therapy for TB (“DOT”)
• Public and medical awareness of TB
What Has Changed – TB Program

- 2002 – Targeted Testing Initiative (Dr. Connie Haley)
- 2004 – 1st comprehensive “TB Program Guidelines”
- 2004 – Universal genotyping
- 2012 – Use of TDM for selected pts at risk for malabsorption
- 2012 – GeneXpert implemented at TDH Laboratory Services
- 2012 – Collaboration with CDC path. lab and MDDR lab
- 2013 – QFT-GIT with “HIV opt-out” testing implemented
- 2014 – TB cluster analysis
- 2015 – Implementation of 3HP regimen for tx of TB infection
What Has Changed - PH Technology
What Has Changed - PH Infrastructure

THEN

NOW
Public Health Nursing - *Still* the Core of PH Practice
What Has (mostly) NOT Changed

- 1st-line anti-TB drugs: INH, RIF, PZA, ETH (“HRZE”)
- Long treatment course (6 - 24 months)
- PH reliance upon case reporting from physicians, hospitals and laboratories
- TB contact investigation
- Public health commitment to eliminate TB in the TN
- “The Cycle of Neglect” – as TB incidence decreases, PH program resources jeopardized until TB incidence rises again
- Other???
Challenges and Opportunities

- Less toxic, more effective, simpler and shorter anti-TB regimens
- Diagnostic tools to predict which patients at highest risk for progression to active TB disease
- Diagnostic dilemmas: TB? Histo? Sarcoid? Other?
- Raising public and clinician awareness of continued public health threat of TB
  - Community education for high-risk populations
  - Community health centers / screening, testing & treating TBI
  - Clinician education
- Collaborative research (e.g., VTC, CDC, TDH)
- An effective TB vaccine
# The END TB Strategy

**World Health Organization**

Global strategy and targets for tuberculosis prevention, care and control after 2015

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| VISION | A world free of tuberculosis  
zero deaths, disease and suffering due to tuberculosis |
<table>
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<tbody>
<tr>
<td>GOAL</td>
<td>End the global tuberculosis epidemic</td>
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</table>
| INDICATORS | MILESTONES  
SDG 2030  
END TB 2035 |
| Reduction in number of TB deaths compared with 2015 (%) | 35%  
75%  
90%  
95% |
| Reduction in TB incidence rate compared with 2015 (%) | 20%  
20%  
80%  
(<85/100 000)  
(<55/100 000)  
(<20/100 000)  
(<10/100 000) |
| TB-affected families facing catastrophic costs due to TB (%) | Zero  
Zero  
Zero  
Zero |
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