Maryland Epidemiology and Genotyping Update

Wendy Cronin, PhD, Epidemiologist
Center for TB Control & Prevention
Maryland Department of Health & Mental Hygiene

TB Annual Meeting
March 22, 2016
Presentation Outline

• Global TB Epidemiology (2014)

• Maryland TB Epidemiology (2015)
  – TB case numbers and trends
  – Demographics
  – Drug resistance
  – Comorbidities
  – Genotyping

• TBESC Update
Global TB epidemiology - 2014

• No. 1 infectious disease cause of death
• No. 5 all-cause of death worldwide
• No. 3 all-cause of death in women of child-bearing age
• >9 million estimated incident “new” cases
• 80,000 TB deaths among HIV-negative children
WHO Estimates of TB incidence, 2014

56% cases in Southeast Asia, Western Pacific (35% China and India); 25% in Africa
Have germs, will travel...

Migrating populations

Source: Population Action International
Maryland TB, 2008-2015

176 cases
Rate: 2.9

Maryland TB, 2008-2015

Cases


Case Rate/100,000

0.0 1.0 2.0 3.0 4.0 5.0 6.0

Maryland
Linear (Maryland)

Cases Maryland Linear (Maryland)
TB Case Rates per 100,000, United States, 2015

(1st case increase in U.S. since 1992)  CDC, 3/24/2016
State TB Case Rates per 100,000 Population, by Jurisdiction, 2015

- Red: >2.9/100,000
- Green: <2.9/100,000
- White: No reported cases

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Baltimore City
Rate: 2.2!
(14 cases)
TB Rates among US and Foreign Born, Maryland vs. US, 2015

Case rates per 100,000

- MD US-born
- MD Foreign-born
- US US-born
- US Foreign-born
- Linear (MD Foreign-born)
6 Top Countries of Origin-MD, 2015

- Ethiopia, 11%
- India, 8%
- El Salvador, 7%
- Nigeria, 7%
- Vietnam, 6%
- Burma, 5%

Others, 55%
Foreign-born TB Case Numbers, by Time from U.S. Arrival to Diagnosis, 2013-2015

2015

2014

2013

>10 years >5-10 years 4mo-5 year <4 mo (prevalent cases)
TB Cases by Race and Origin, 2015

U.S. Born

- White 21%
- Hispanic 10%
- Black/A.A. 62%
- Asian 7%

Foreign Born

- Hispanic 26%
- Other 2%
- White 3%
- Asian 35%
- Black 34%
Cases by Age Group  Maryland, 2013-2015

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The Canary in the Coal Mine

• Children under 5 years old
  – At high risk for TB meningitis, disseminated TB
  – Disease can progress quickly
  – Can represent undiagnosed adult cases
  – Important to find source case
    • Stop further transmission
Case Rates per 100,000 in Children <5 Years of Age; Maryland vs. US, 2011-2015

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Maryland Drug Resistance, 2015

- 176 cases total
  - 128 (73%) cases: susceptibility results
  - 11 (9%) cases: any resistance
  - 1 (<1%) MDR
With Fewer Cases Why Are We Still Working So Hard?

• Risk factors
  – TB HIV co-infection
  – Co-morbidities (DM, COPD)
  – Pregnancy
  – Substance abuse

• They are more complex!
TB HIV Co-Infection Rate Trends, 2011-2015

Percent of Cases

- 2011
- 2012
- 2013
- 2014
- 2015

Percent of those tested

- 77% foreign-born in 2012
- 73% foreign-born in 2013
- 86% foreign-born in 2014
- 56% foreign-born in 2015

US Born | Foreign Born
---|---
5 | 25
4 | 15
2 | 10
1 | 5

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TB-DM project (2014-2016)
Richard Brooks, MD, MPH, EIS officer

“Quick and dirty” findings for 1.5 years of NEDSS data:

Compared to TB patients without diabetes, TB-DM were:

• Two times more likely to be sputum smear positive
• 2.4 times more likely to be cavitary
• Four times more likely to have an indeterminate IGRA
• Four times more likely to die during TB treatment
A couple of anecdotes:

1. Among TB patients/suspects: **YOU** have diagnosed previously unknown DM-TB

   HgbA1c as high as 14.4!

3. TDM among TB-DM patients: **YOU** identified low RIF absorption in some patients, and increased RIF doses to therapeutic levels
Mtb Genotype Clustering

- Local Health Department calls CTBCP
- Provider or ICP calls CTBCP
- CTBCP gets routine genotyping report from CDC (TB-GIMS) and calls LHD
- CDC (TB-GIMS) sends an “Alert”
- Laboratory calls CTBCP
<table>
<thead>
<tr>
<th></th>
<th>TB case rate (active TB)</th>
<th># cases of active TB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current U.S. (2014)</td>
<td>30 cases/million</td>
<td>9412</td>
</tr>
<tr>
<td>TB ‘pre-elimination’</td>
<td>&lt;10 cases/million</td>
<td>&lt;3200</td>
</tr>
<tr>
<td>TB ‘elimination’</td>
<td>&lt;1 case/million</td>
<td>&lt;320</td>
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</tbody>
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Why now? 
Reaching TB Pre-elimination and Elimination

- Plateau in TB case numbers
- TB transmission is limited, though persistent
- New tests (IGRAs) for diagnosing LTBI
- Shorter treatments for LTBI, with high completion rates
- Combined strategies needed to hasten time to TB elimination:
  - Reduce foreign born new arrivers with TB and untreated LTBI
  - Among individuals with LTBI, increase the proportion that are treated *(treatment as prevention)*
Pre-elimination target (<10/mill) met by ≈ 2025 IF
• Treatment rate for chronic LTBI is quadrupled starting 2008.

Approaching elimination (<1/mill) after 2030 IF
• Treatment rate for LTBI is quadrupled starting 2008.
• Assumes prevalence of chronic LTBI in FB arrivals is reduced to 25% of baseline.
TB Prevention Cascade
(“Treatment as Prevention”)

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TB Prevention Gaps in Care

% of Population

<table>
<thead>
<tr>
<th>Category</th>
<th>% of Population</th>
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<tbody>
<tr>
<td>All LTBI (known/unknown)</td>
<td>?</td>
</tr>
<tr>
<td>Engaged in care</td>
<td>?</td>
</tr>
<tr>
<td>Tested for LTBI</td>
<td>?</td>
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<tr>
<td>LTBI/no TB</td>
<td>?</td>
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<tr>
<td>Offered LTBI tx</td>
<td>?</td>
</tr>
<tr>
<td>Started LTBI tx</td>
<td>?</td>
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<tr>
<td>Completed LTBI tx</td>
<td>?</td>
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Theme for TBESC Part B!

MIND THE GAP
Challenges to TB Elimination

• We don’t know much about the ‘at risk’ populations – WHO, WHERE, HOW MANY?
• We don’t know WHICH non-health dept. providers serve ‘at-risk’ populations of interest and WHERE they are located
• We don’t know who IS and IS NOT receiving TB services outside the health department
<table>
<thead>
<tr>
<th>% of Population</th>
<th>All LTBI...</th>
<th>Engaged...</th>
<th>Tested...</th>
<th>LTBI/no...</th>
<th>Offered...</th>
<th>Started...</th>
<th>Complet...</th>
</tr>
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<table>
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<tr>
<th>LTBI services-Health Dept TB Clinics</th>
<th>X</th>
<th>X</th>
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<tr>
<td>LTBI services – Other Clinics</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>Modeling existing data (census, ACS, BRFSS, TBESC, etc.)</td>
<td>X</td>
<td>X</td>
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<td>X</td>
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Low Hanging Fruit - Collecting Data from Health Department TB Clinics

• We can do better but can’t get to TB Elimination!

• Funding cuts = fewer populations served by HD
Then there’s the old Mutt and Jeff story ...

I’m looking for my quarter.

I dropped it here.

No, I dropped it two blocks down the street.

Then why are you looking for it here?

Because the light is better here!
Potential non-HD Providers

- Other public health agencies
- Other government agencies
- FQHCs, Community Health Centers
- Other community-based organizations
- Private providers (Kaiser, universities, etc.)
Seattle – Locating High Risk Populations and Their Providers

Overlaying Cases and Clinics

2007-2014

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Questions?