Think TB: 
A one-page guide for healthcare providers

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TB Prevention and Control Saskatchewan
September 15, 2017
Active TB vs. Latent TB

**Latent TB infection (LTBI):** Presence of latent (sleeping) infection with *Mycobacterium tuberculosis*. No evidence of clinically active disease – asymptomatic, negative microbiologic tests, no change on radiologic tests, non-infectious.

**Active TB:** Active clinical disease that is usually symptomatic and for which microbiologic tests are usually positive and radiologic tests are usually abnormal.
Definitions

**Respiratory TB**: pulmonary TB, TB pleurisy, intrathoracic & mediastinal lymph nodes, nasopharynx, nose or sinuses

**Nonrespiratory TB**: used interchangeably with extrapulmonary TB but slightly different (sites not part of respiratory tract)

**Pulmonary TB**: TB of the lungs and conducting airways (includes tracheal, bronchial and laryngeal TB)

**Extrapulmonary TB**: Everything but pulmonary TB (lungs and conducting airways)
Early detection is key!

“The most effective way to reduce transmission is to diagnose and treat patients with active TB disease as soon as possible.”

(Canadian TB Standards, 7th edition)
Healthcare associated transmission

- The most important contributors to healthcare associated transmission of *M. tuberculosis* are patients with unrecognized, respiratory TB disease.

- Delayed diagnosis occurs in almost half of all hospitalized patients in whom respiratory TB disease is subsequently detected.
THINK YOUR PATIENT HAS TB?
A Guide for Healthcare Providers

WHAT NEXT?
☐ Airborne precautions and isolation
☐ Chest x-ray
☐ Sputum for TB x 3
☐ Other specimens as needed
☐ History and physical assessment
☐ Symptom assessment
☐ Risk factor assessment
☐ Think TB...test for HIV. Think HIV...test for TB
☐ Consult TB Prevention and Control ASAP
(24 hour physician on-call service 306.655.1000)
☐ TST or IGRA to diagnose latent TB infection
(negative TST or IGRA does not rule out active TB)

Symptoms of Active TB
- Cough 2 weeks or longer
- Unexplained fever
- Pneumonia that does not improve with antibiotics
- Fatigue, lethargy
- Unexplained weight loss, anorexia, failure to thrive
- Night sweats
- Hemoptysis
- Chest pain, dyspnea
- Extrapulmonary signs such as symphysis pubis

Risk for Progression to Active TB
- HIV infection
- Immunosuppressant therapy
- Anti-TNF therapy
- Steroids ≥ 15 mg/day
- 1 month or longer
- Chronic renal failure
- Needing hemodialysis
- Cancer (head/neck)
- Other cancers
- On chemotherapy

At Risk Populations
- Persons from countries with a high TB incidence
- Persons from high incidence communities in northern Saskatchewan and Canada
- Immunocompromised
- Prior exposure to someone with infectious TB

TB can be prevented, treated and cured!

For more information, contact
TB Prevention and Control Saskatchewan
1-866-780-6482
Saskatoon (306) 655-1740
Prince Albert (306) 765-4260
Regina (306) 766-4311

Now what?
9 steps
2 tests
Step 1: Airborne precautions and isolation

- **Suspected or confirmed respiratory TB** → required

- **Pediatrics**
  - ≤10 years old usually non-infectious and precautions not required unless adult-type pulmonary TB
  - Accompanying adult/adolescent may be infectious source

- **Extrapulmonary TB**
  - Usually non-infectious and precautions not required
  - Required if concurrent pulmonary TB (10-50%)
  - Required if draining abscess/infected tissue is irrigated/manipulated
Airborne Precautions

**TB suspected**

Discontinue upon TB physician, MRP or designate order IF:

- PCR (Xpert® MTB/RIF assay) negative
- or
- 3 consecutive AFB-negative smears, if PCR not available.
Airborne Precautions

Confirmed AFB Smear-Negative, Culture-Positive Respiratory TB

Discontinue upon TB physician order IF:

• 5 consecutive doses drug therapy taken and tolerated and
• Clinical improvement
Airborne Precautions

Confirmed AFB Smear-Positive Respiratory TB

Discontinue upon TB physician order IF:

• 2 weeks (14 doses) drug therapy and
• Clinical improvement and
• 3 consecutive smear-negative sputum

or

• 3 weeks (21 doses) drug therapy and
• Clinical improvement
Step 2: Chest x-ray

- **Immunocompetent:**
  - UL infiltrates
  - UL volume loss
  - Cavitation (late sign)

- **Immunocompromised:**
  - Hilar & mediastinal lymphadenopathy
  - Cavitory infiltrates
  - LL involvement
Step 3: Sputum Specimens

- Sputum for AFB x 3
- At least 8 hours apart
- 1 early morning specimen
- 5-10 mLs per specimen
- Keep in fridge if delay in sending to lab

Info sheet available

https://www.saskatoonhealthregion.ca/locations_services/Services/TB-Prevention
Nucleic acid amplification testing

- Xpert® MTB/RIF assay → PCR
- Fully automated rapid TB test
- Results within 2-3 hours
- Available at RUH, RGH
- ER/inpatients – completed on 1 sputum spec or CSF
  – On request for outpatients
- Reported as: PCR positive/negative for Mycobacterium tuberculosis
Smear microscopy

- Processed at SDCL
- Detects AFB
- Does not identify bacilli as MTBC
- Reported as: Direct Fluorescent Stain...
  - 1 to 4+ acid-fast bacilli seen OR
  - Negative for acid-fast bacilli
Culture

- Processed at SDCL
- Isolates and identifies MTBC
- Negative results reported after 49 days
- Positive culture reported as:
  - Culture: Mycobacterium...Acid-fast bacilli isolated. Organism identified as Mycobacterium tuberculosis complex OR Positive for Mycobacterium tuberculosis complex
Step 4: Other specimens as needed

• Bronchial washing

• Gastric aspirate
  – Pediatrics

• Biopsy
  – No formaldehyde
  – Necrotizing granuloma → Think TB!
Step 5: History & Physical Assessment

“The most common physical finding in pulmonary TB is a totally normal examination, even in relatively advanced cases.”

Canadian TB Standards, 6th edition, 2007 p. 73
Step 6: Symptom Assessment

**Symptoms of Active TB**

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- Unexplained weight loss, anorexia, failure to thrive
- Night sweats
- Hemoptysis
- Chest pain, dyspnea
- Extrapulmonary signs such as lymphadenopathy
Step 7: Risk factor Assessment

<table>
<thead>
<tr>
<th>Risk for Progression to Active TB</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV infection</td>
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<tr>
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<tr>
<td>Silicosis</td>
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<tr>
<td>Child &lt; 5 years old</td>
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<tr>
<td>3 or more TB exposures</td>
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<tr>
<td>Cigarette smoking</td>
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<tr>
<td>Excessive alcohol</td>
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<tr>
<td>Malnutrition</td>
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<tr>
<td>Risk factor</td>
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<tr>
<td>-------------</td>
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<tr>
<td>LTBI with no risk factors and no treatment of LTBI</td>
</tr>
<tr>
<td>LTBI and diabetes and no treatment of LTBI</td>
</tr>
<tr>
<td>LTBI and untreated HIV infection and no treatment of LTBI</td>
</tr>
</tbody>
</table>

Adapted from - Source: http://www.cdc.gov/tb/education/corecurr/pdf/chapter2.pdf
At Risk Populations

- Persons from countries with a high TB incidence
- Persons from high TB incidence communities in northern Saskatchewan and Canada
- Immunocompromised
- Prior exposure to someone with infectious TB
SK Immigration, 2014

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country of Birth</th>
<th>%</th>
<th>TB incidence rate*</th>
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<tbody>
<tr>
<td>1</td>
<td>Philippines</td>
<td>29</td>
<td>322</td>
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<tr>
<td>2</td>
<td>India</td>
<td>21</td>
<td>217</td>
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<tr>
<td>3</td>
<td>China</td>
<td>10</td>
<td>67</td>
</tr>
<tr>
<td>4</td>
<td>Ukraine</td>
<td>4</td>
<td>91</td>
</tr>
<tr>
<td>5</td>
<td>Pakistan</td>
<td>4</td>
<td>270</td>
</tr>
<tr>
<td>6</td>
<td>Bangladesh</td>
<td>2</td>
<td>225</td>
</tr>
<tr>
<td>7</td>
<td>Nigeria</td>
<td>2</td>
<td>322</td>
</tr>
<tr>
<td>8</td>
<td>Ireland</td>
<td>2</td>
<td>7.2</td>
</tr>
<tr>
<td>9</td>
<td>Vietnam</td>
<td>2</td>
<td>137</td>
</tr>
<tr>
<td>10</td>
<td>UK &amp; Colonies</td>
<td>2</td>
<td>10**</td>
</tr>
</tbody>
</table>

*High TB incidence → 3 yr avg. of ≥ 30 active cases per 100,000 population
** United Kingdom of Great Britain and Northern Ireland only

11,826 immigrants
4.2% of Canada’s immigrants

Top 5 community destinations:
- Saskatoon 4,369
- Regina 3,736
- Lloydminster 421
- Prince Albert 324
- Estevan 289

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Immigration

Figure 11: Reported foreign-born TB cases in Canada, 2000-2010: time from arrival in Canada to diagnosis, in years, CDN TB Standards, 7th ed.
TB cases and rate in SK (2015) & Canada (2014) by ethnicity

Table 1: TB cases and rates by ethnicity in Saskatchewan (2015) and Canada (2014)

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>(N)</td>
<td>(%)</td>
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<tr>
<td>Canadian-Born Aboriginal**</td>
<td>42</td>
<td>61</td>
</tr>
<tr>
<td>Canadian-Born Non-Aboriginal</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Foreign Born</td>
<td>24</td>
<td>35</td>
</tr>
<tr>
<td>Unknown</td>
<td></td>
<td></td>
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<tr>
<td>Total</td>
<td>69</td>
<td>100</td>
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</tbody>
</table>

*Rate per 100,000 population

**Canadian-Born Aboriginal includes First Nations and Métis cases

Source: TB Prevention and Control SK 2015 Annual Report, Dr. A. Al-Azem
Distribution of TB in SK

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Multiple TB exposures/contacts

Table 8: Core collapse sequence (to degree 8) of community 1 TB network, with Mantoux positivity at each stage of collapse. (Dr. A. Al-Azem, 2006)

<table>
<thead>
<tr>
<th>Network Degree</th>
<th>TB (N)</th>
<th>(%</th>
<th>Mantoux Positive (N)</th>
<th>(%)</th>
<th>Mantoux Negative (N)</th>
<th>(%)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>68</td>
<td>13.5</td>
<td>109</td>
<td>21.6</td>
<td>327</td>
<td>64.9</td>
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<tr>
<td>2</td>
<td>45</td>
<td>36.8</td>
<td>35</td>
<td>28.7</td>
<td>42</td>
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<tr>
<td>3</td>
<td>28</td>
<td>62.2</td>
<td>10</td>
<td>22.2</td>
<td>7</td>
<td>15.6</td>
<td>45</td>
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<tr>
<td>4</td>
<td>15</td>
<td>68.2</td>
<td>7</td>
<td>31.8</td>
<td>0</td>
<td>0</td>
<td>22</td>
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<tr>
<td>5</td>
<td>14</td>
<td>77.8</td>
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<td>0</td>
<td>0</td>
<td>18</td>
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<td>90</td>
<td>1</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>7</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7</td>
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Step 9: Consult TBPC SK

- Provincial program
- 3 offices
- Physician on-call 24/7
- Nursing and Pharmacy M→F
- Only TB physicians prescribe treatment for TB
- TB Pharmacy dispenses meds
- TB Health Records at Ellis Hall
Think Latent TB?

- 2 tests to identify LTBI:
  - Tuberculin skin test
  - Interferon gamma release assay (IGRA)
- TST and IGRA are acceptable but imperfect
- Neither detects active TB
- IGRA:
  - Measures immune response to TB proteins
  - Processed at RUH
  - Blood collection sites limited
Case

- 54 year old CDN-born Aboriginal male
- Referred by ortho to RUH ER with query spinal TB
- From high-incidence northern community

- Airborne precautions needed?
- Additional tests?
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IGRA = interferon gamma release assay (QuantiFERON); TST = tuberculin skin test

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TB can be prevented, treated and cured!
The goal...

- Outline essential steps to:
  - Increase early detection
  - Decrease/stop transmission
  - Prevent delayed diagnosis

- ICPs are critical in promoting the message and highlighting the steps
“I see your feathered leukocyte and raise you a happy alveolar macrophage” (NEJM)