



*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 health care 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.



Now what?

9 steps

2 tests

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)

IGRA = Interferon gamma release assay (Quantiferon); TNF = tumour necrosis factor; TST = tuberculin skin test

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

Symptoms of Active TB

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- 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 lymphadenopathy

Risk for Progression to Active TB

- HIV infection
- Immunosuppressant therapy
- Anti-TNF therapy
- Steroids ≥ 15 mg/day x 1 month or longer
- Chronic renal failure needing hemodialysis
- Cancer (head/neck)
- Other cancers and on chemotherapy
- Diabetes
- Abnormal CXR
- Recent TB infection
- Silicosis
- Child < 5 years old
- 3 or more TB exposures
- Cigarette smoking
- Excessive alcohol
- Malnutrition

At Risk Populations

- Persons from countries with a high TB incidence
- Persons from high TB incidence communities in northern Saskatchewan and Canada
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TB can be prevented, treated and cured!



TB Prevention and Control Saskatchewan
Population and Public Health

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See reverse for more information



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

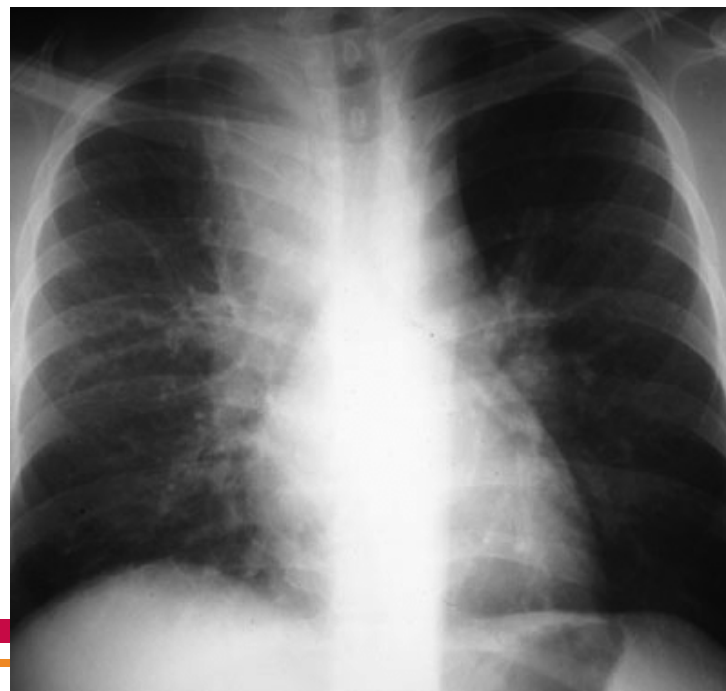
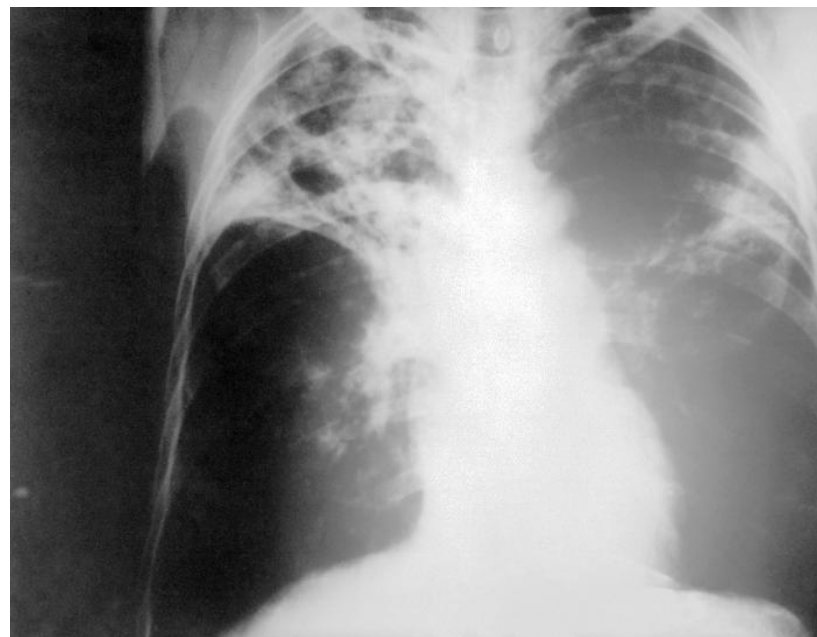
or

- 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
 - Cavitary 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

Sputum Collection for Tuberculosis

What is tuberculosis?

Tuberculosis (TB) is caused by the TB bacteria (germ). TB usually affects the lungs but it can affect any part of the body.

TB is spread through the air from person to person when someone with TB in the lungs or throat coughs, sneezes, laughs or speaks.

TB cannot be spread by touching surfaces, shaking hands or sharing objects.

What is sputum?

Sputum is mucus that is coughed up from the lungs. It is not the same as saliva (or spit) that comes from the mouth or back of the throat.

Why is sputum tested?

Testing sputum is the best way to find out if you have TB bacteria in your lungs. It also helps the TB doctor decide which medication to use if you have TB.

Sputum may also be tested after people have been taking TB medications for a while. This helps tell if the medications are working.

When do I collect sputum?

You need to collect 3 sputum samples. At least one sample must be collected as soon as you wake up in the morning (before you eat or drink). There must be at least 8 hours between each sample.


For example, if you collect your first sample in the evening then the second sample should be collected when you wake up the next morning. The third sample should then be collected either that evening or early the next morning.

Important tips:

- Do not open the container until you are ready to use it.
- Use a different container for each sputum sample.
- Try to stay away from other people when you are coughing up sputum. Go outside or open a window if possible.

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 TB Prevention and Control Saskatchewan
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TBFC SK 2016-02-01 (white)
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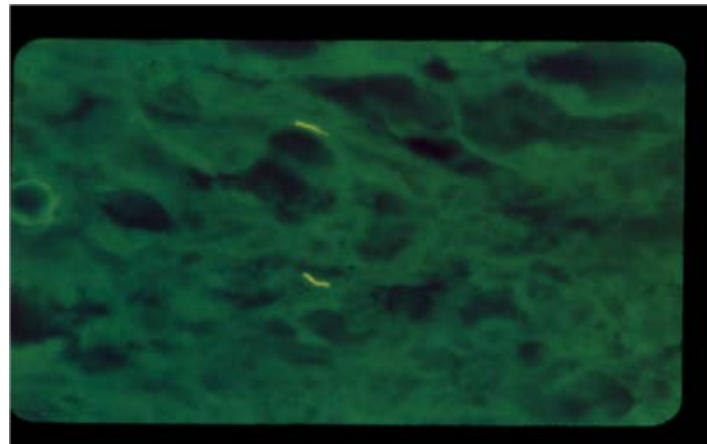
Nucleic acid amplification testing

- 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

- ❑ 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 lymphadenopathy

Step 7: Risk factor Assessment

Risk for Progression to Active TB

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Risk factor

Risk of developing active TB

LTBI with
no risk factors and
no treatment of LTBI

5% in the first 2 years following infection



10% over a lifetime



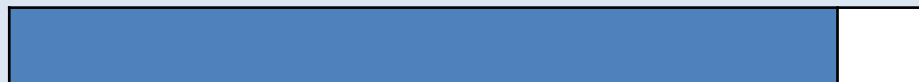
LTBI and
diabetes and
no treatment of LTBI

30% over a lifetime



LTBI and
untreated HIV infection
and no treatment of LTBI

7-10% per YEAR



Adapted from - Source: <http://www.cdc.gov/tb/education/corecurr/pdf/chapter2.pdf>

At Risk Populations

- Persons from countries with a high TB incidence
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SK Immigration, 2014

| Rank | Country of Birth | % | TB incidence rate* |
|------|--------------------------|-----------|--------------------|
| 1 | Philippines | 29 | 322 |
| 2 | <u>India</u> | 21 | 217 |
| 3 | <u>China</u> | 10 | 67 |
| 4 | Ukraine | 4 | 91 |
| 5 | <u>Pakistan</u> | 4 | 270 |
| 6 | Bangladesh | 2 | 225 |
| 7 | <u>Nigeria</u> | 2 | 322 |
| 8 | <i>Ireland</i> | 2 | 7.2 |
| 9 | Vietnam | 2 | 137 |
| 10 | <i>UK & Colonies</i> | 2 | 10** |

*High TB incidence → 3 yr avg. of ≥ 30 active cases per 100,000 population

** United Kingdom of Great Britain and Northern Ireland only

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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 |

Immigration

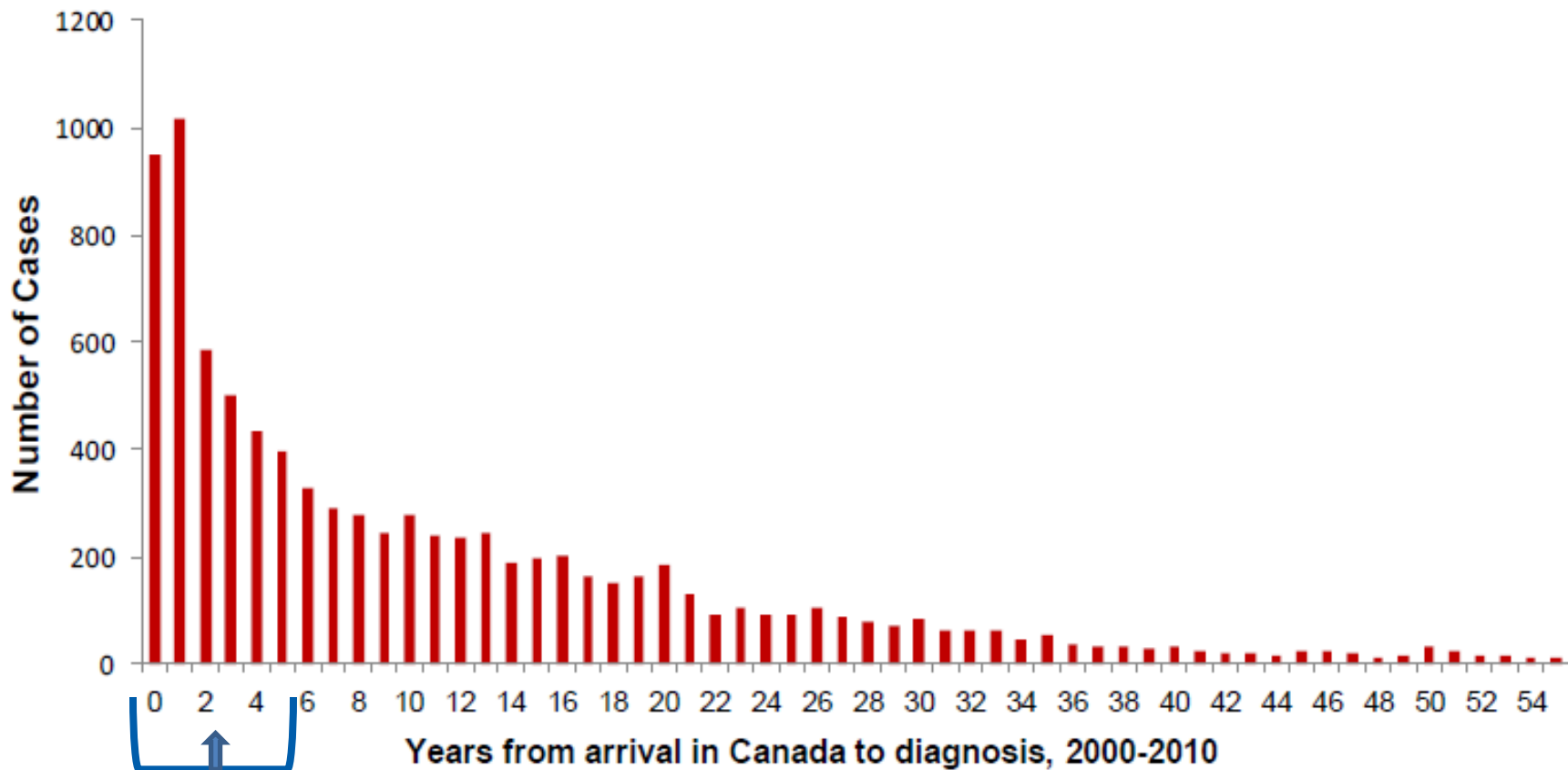


Figure 11: Reported foreign-born TB cases in Canada, 2000-2010: time from arrival in Canada to diagnosis, in years, CDN TB Standards, 7th ed.

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)

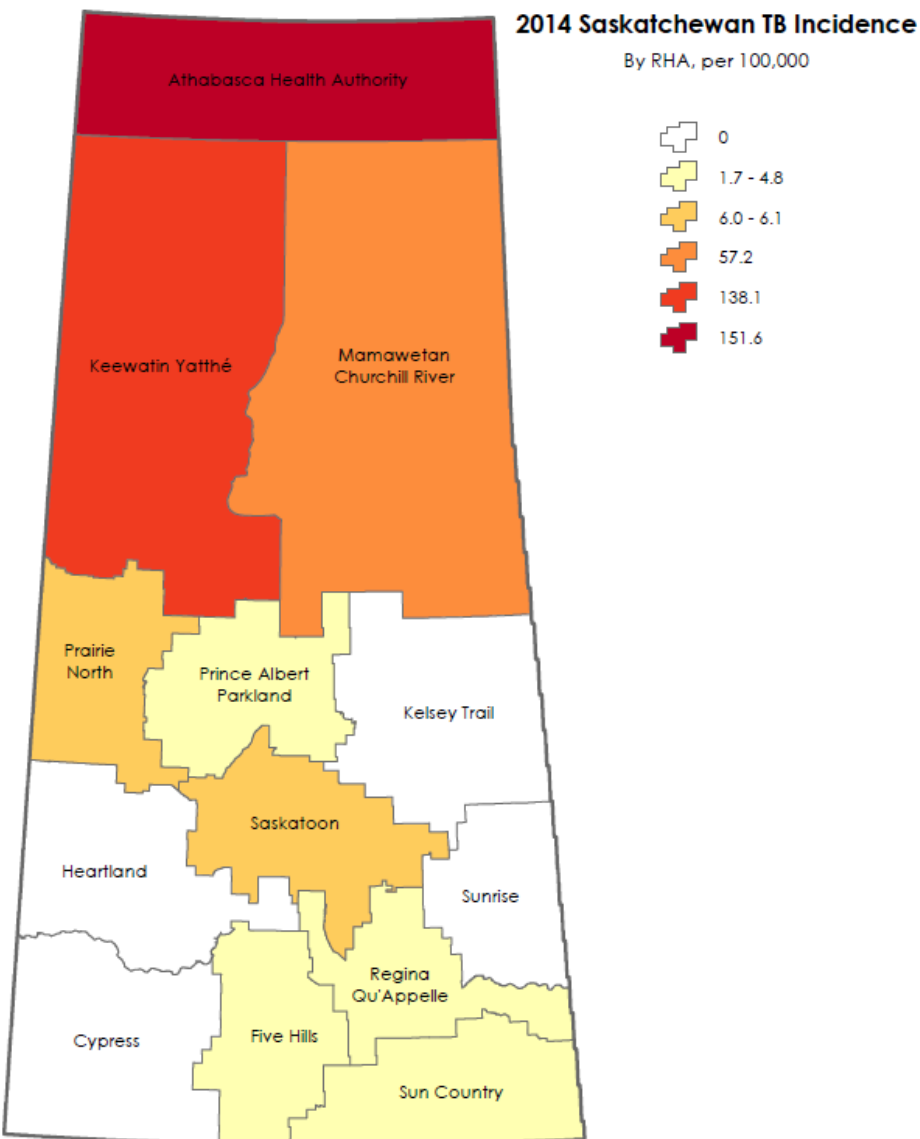
| Ethnicity | Saskatchewan (2015) | | | Canada (2014) | | |
|------------------------------|------------------------|-----|-----------|------------------|------|-----------|
| | (N) | (%) | Rate * | (N) | (%) | Rate * |
| Canadian-Born Aboriginal** | 42 | 61 | 25.3 | 318 | 20.3 | 20.4 |
| Canadian-Born Non-Aboriginal | 3 | 4 | 0.3 | 160 | 10.2 | 0.6 |
| Foreign Born | 24 | 35 | 31.1 | 1,073 | 68.4 | 13.7 |
| Unknown | | | | 1730 | 1.1 | |
| Total | 69 | 100 | 6.0 | 1568 | 100 | 4.4 |

*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

At Risk Populations

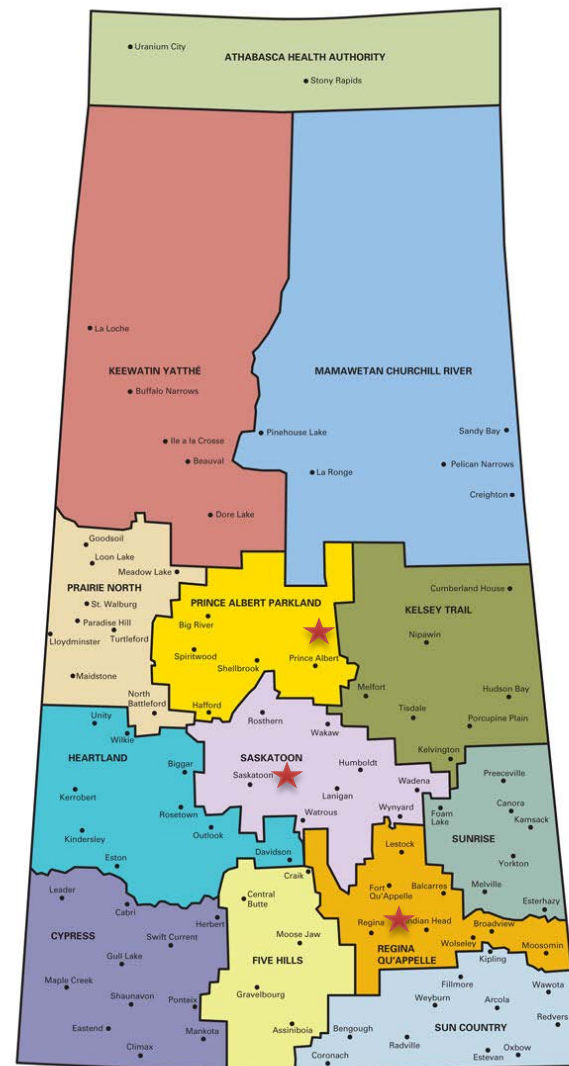
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| Network Degree | TB | | Mantoux Positive | | Mantoux Negative | | Total |
|----------------|-----|------|------------------|------|------------------|------|-------|
| | (N) | (%) | (N) | (%) | (N) | (%) | |
| All | 68 | 13.5 | 109 | 21.6 | 327 | 64.9 | 504 |
| 2 | 45 | 36.8 | 35 | 28.7 | 42 | 34.4 | 122 |
| 3 | 28 | 62.2 | 10 | 22.2 | 7 | 15.6 | 45 |
| 4 | 15 | 68.2 | 7 | 31.8 | 0 | 0 | 22 |
| 5 | 14 | 77.8 | 4 | 22.2 | 0 | 0 | 18 |
| 6 | 9 | 90 | 1 | 10 | 0 | 0 | 10 |
| 7 | 7 | 100 | 0 | 0 | 0 | 0 | 7 |
| 8 | 7 | 100 | 0 | 0 | 0 | 0 | 7 |

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)

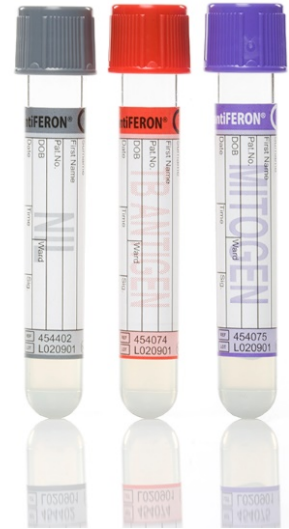
Step 9: Consult TBPC SK

- 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?

THINK YOUR PATIENT HAS TB?

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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

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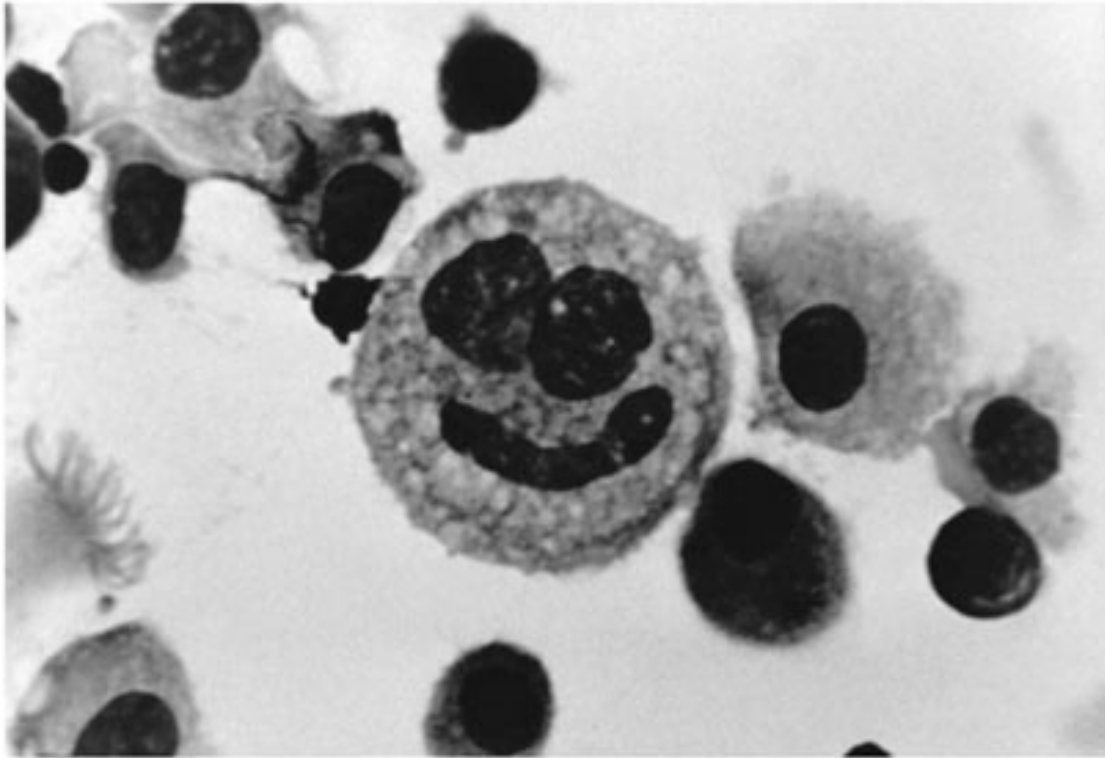
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Thank you!



“I see your feathered leukocyte and raise you a happy alveolar macrophage” (NEJM)