

# TB in the GTA: What do children and adolescents have to do with it?

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- ▶ No conflicts of interest
- ▶ Patient details modified to protect privacy

Childhood TB  
Pediatric TB

<15 years.  
0-17 years



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## TB Infection and TB Disease

**TB Disease:** Clinically /radiologically /microbiologically detectable organ involvement by *Mycobacterium tuberculosis*

**TB Infection-** Positive IGRA or TST

- ▶ No evidence of disease due to TB clinically or radiologically
- ▶ 5-10% overall risk of developing disease over a lifetime.

**≥10% of patients with TB disease will have negative TSTs OR IGRAs**



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## Objectives To discuss

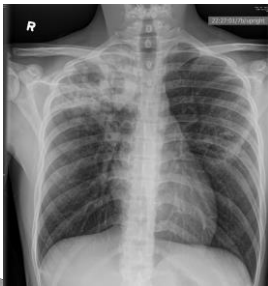
- ▶ Epidemiology: World  
Canada
- ▶ Clinical features Adolescents  
Children

Diagnostic tests



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## Patient X

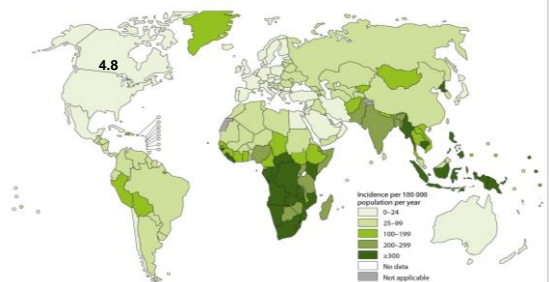


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Cough 4-5 weeks  
Weight loss  
3 physician visits  
Amoxicillin x 7 days  
No effect  
Moxifloxacin x 7 days – felt better.

Expectorated sputum smear positive, Grew TB

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## Estimated TB rates 2017

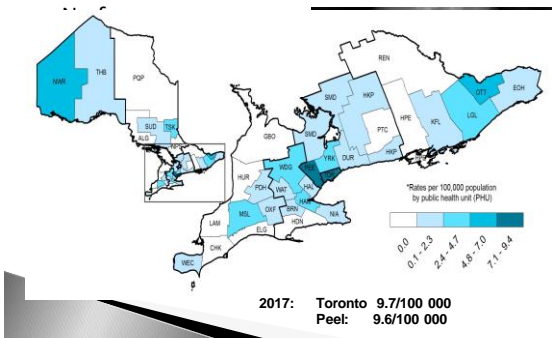


Global 132/100 000

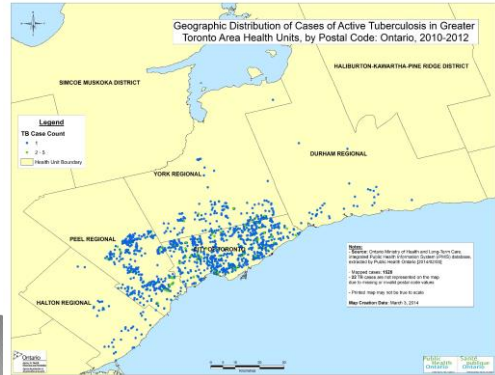
10 million incident cases  
1.6 million deaths

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## TB Ontario 2014 ≈ 2017



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## PEDIATRIC TB DISEASE

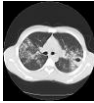
- ▶ CANADA: Indigenous Canadians – especially Inuit, but also First nations FOR GTA
- ▶ Foreign born

OR

- ▶ Child of a foreign born parent Acquisition **Within family in Canada Or Travel.**

Baymunt, Pediatric Infect Dis J. 2016 Jan;35(1):138-404

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
### Adult and Adolescent “Typical” TB Disease

Typical symptoms: Fever, Cough  
Nightsweats Weight Loss  
Often Pulmonary

**MULTIBACILLARY**  
Sputum easy to obtain  
Often culture positive  
Often smear- positive  
**INFECTIOUS**

**SMEARS AND CULTURES CONVERT TO NEGATIVE: Endpoints for success**



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## Case 2

- ▶ 3 ED visits and 1 physician visit
- ▶ Cough
- ▶ Then hemoptysis-
- ▶ Sputum smear positive when sent.



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## Pulmonary disease-



Can be lower lobe- Send sputum for TB culture and smear.

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Cough—nonproductive  
Fever and chills  
Biopsy and culture of fluid important—75%+ yield on biopsy  
Lymphocytic predominance a clue

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### Pulmonary TB in adolescents- late diagnosis

- Those with infectious TB who make ER visits without isolation
- Range 2-10 visits
- 30% Obese
- Most upper lobe disease
- Most chronic symptoms. (>2 WEEKS) Fever, cough
- All Had Epidemiology
- Failure to send sputum delayed diagnosis



AlDubisi IUATLD-NAR 2017

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### PULMONARY DISEASE IN THE OLDER CHILD AND ADOLESCENT

- May present as
  - Unresolving pneumonia
  - Pleural effusion with small parenchymal infiltrate
  - **Upper lobe airway disease**
  - Lower lobe- any lobe- airway disease
  - Cavitory and non cavitory disease
  - SPUTUM SMEAR AND CULTURE STILL CRITICAL
  - Induced sputum is better

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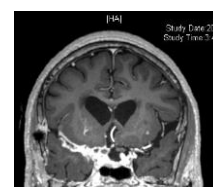
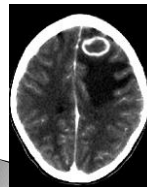
### TB in Adolescents



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### TB in adolescents

Abdominal pain, weight loss, fever thickened terminal ileum



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### TB in adolescents



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### TB in adolescents

- › Late diagnosis– lack of clinical suspicion
- › Median 5.5 months—multiple physician visits
- › Protean with extrapulmonary disease (56%)
- › Recent immigrants <5 years from arrival.

Kam et al PIDJ 2007  
 de Pontual PIDJ 2006  
 Pongsamart PIDJ 2009

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### Missed opportunities for early diagnosis of paediatric TB in Canada

- › Failure to consider epidemiologic history
- Foreign born or children of foreign born parents**
- › Failure to obtain sputum for TB culture
- › Failure to send biopsy specimens for TB culture.
- › Not considering TB because the TST is negative.
- › Expecting pulmonary disease

Kitai et al CMAJ 2017

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### Missed opportunities for early diagnosis of paediatric TB in Canada

#### Failure to consider TB in the following circumstances:

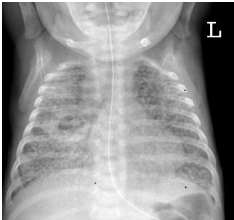
- › Poorly responding pneumonia
- › Pleural effusion with or without parenchymal change
- › Hydrocephalus and meningitis with negative bacterial cultures.
- › Prolonged fever in the returning traveller

Kitai et al CMAJ 2017

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### The very young: Recipients of TB

- › 3 month old
- › Hx pertussis like cough
- › Fever
- › Canadian Born
- › Unwell
- › HLH
- › ICU admission



Crockett M, Clin Infect Dis 2004; 3

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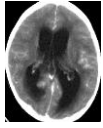
### TB in very young



- › After 1 years therapy
- › Immune competent
- › Major risk factor for disseminated and severe disease–
- › YOUNG AGE


Crockett Clin Infect Dis 2004

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**CHILDHOOD TB: "A CONCEALED MAJOR CAUSE OF CHILDHOOD MORTALITY"**  
(Starke)

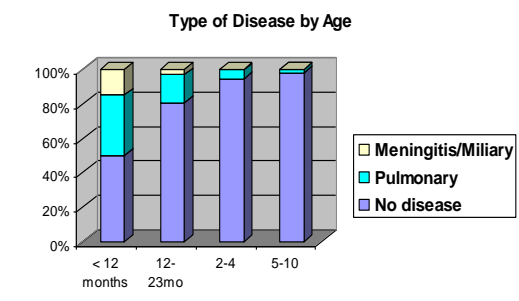
2012- 8 000 000 cases	500 000 children
2017 10 000 000 cases	1 000 000 children



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**Clinical Presentation in Children following infection.**

**Type of Disease by Age**



Age Group	No disease (%)	Pulmonary (%)	Meningitis/Miliary (%)
< 12 months	~50	~30	~20
12-23 mo	~80	~15	~5
2-4	~90	~5	~5
5-10	~95	~5	~0

Marais BJ, et al. The natural history of childhood intra-thoracic tuberculosis: a critical review of literature from the pre-chemotherapy era. *Int J Tuberc Lung Dis* 2004;8(4):392-400

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**TB in the very young**

- ▶ Rapid progression to TB disease
- ▶ Often disseminated
- ▶ May be miliary, TB meningitis

**TB EXPOSURES:**

- ▶ The younger child the more urgent the need for evaluation and "window prophylaxis."



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**TB: Management of Contacts**

X ray and TST - all children

**PPD negative: clinically well**

**Preventive Rx to all < 5, the younger the more important**

**Rpt test after 8-10 weeks**

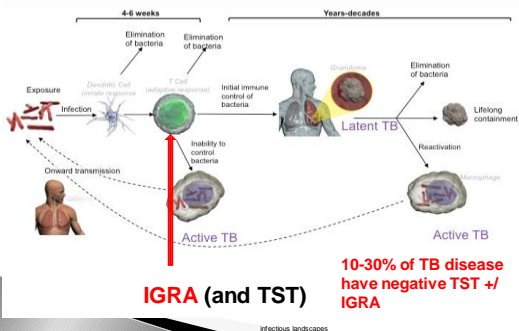
D/c Rx if repeat -ve.

If positive (>5mm)- reevaluate and RX for LTBI or disease



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**Natural history of TB infection**



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**Inteferon-Gamma Release Assays IGRAs for TB**



The QuantIFERON- TB Gold In-Tube Assay

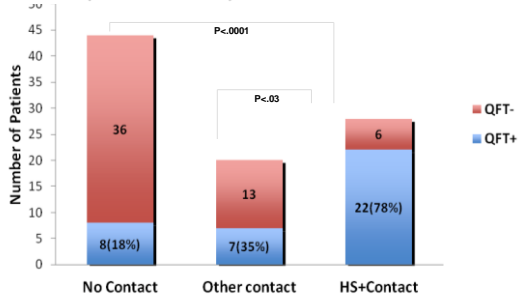
- Antigens not found in BCG.
- Promise of greater specificity
- Standardised.
- No need to return for reading



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### QuantIFERON GOLD IT -SickKids

Referred patients already known TST+ve



Rose W. J Pediatric Infect Dis Soc. 2015

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Childhood TB Canada	Rate per 100,000
Indigenous (Overall)	<b>8.61</b>
First Nations (Overall)	<b>9.10</b>
First Nations, On-Reserve	<b>20.2</b>
Métis	<b>0.76</b>
Inuit	<b>54.28</b>
Non-Indigenous/No Spec	<b>0.52</b>
Overall Canadian rate <15 yrs old:	<b>1.16</b>

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