

Public Health Updates for Halton Physicians:
**Screening and
Treating Tuberculosis**
March 31, 2022



The webinar will begin at 7 p.m.
If you run into technical difficulties, please email Javier.Rincon@halton.ca

Indigenous Land acknowledgement

Placeholder for video

Boozhoo, She:kon , Tanshi, Greetings!

Halton Region acknowledges the Treaty Lands of the Mississaugas of the Credit First Nation as well as the Traditional Territory of the Haudenosaunee, Huron-Wendat and Anishinabek on which we gather.

In stewardship with Mother Earth and the enduring Indigenous presence connected to these lands we acknowledge the Indigenous Nations of the past, present and future.

In the spirit of ally-ship and mutual respect, we will take the path of Truth and Reconciliation to create change, awareness and equity as we strive to elevate the collective consciousness of society.

Miigwetch, Nia:wen, Marsi, Thank you

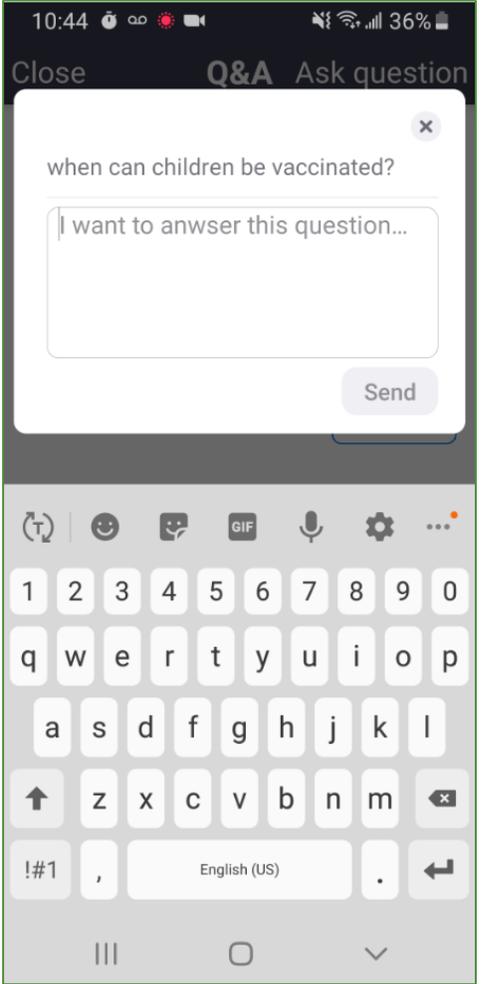
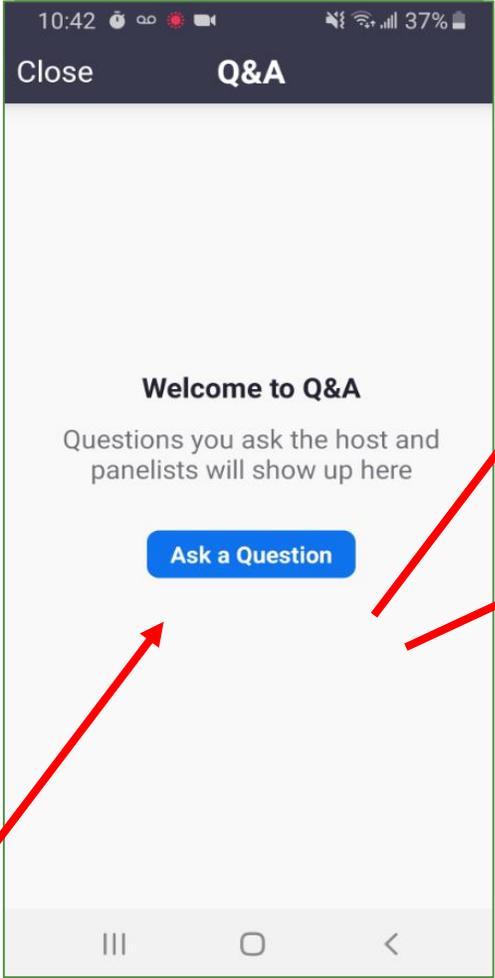
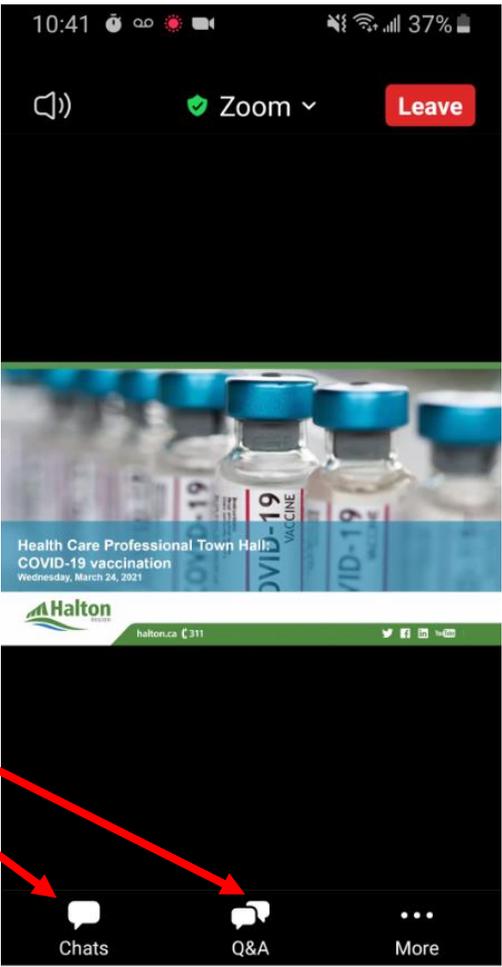


Agenda

- TB in Halton – local context
- Epidemiology, reporting, supports
– Dr. Deepika Lobo
- Screening and treating TB –
Dr. Ananda Ghosh
- Question & Answer Session



Housekeeping



Use the Q&A function to ask, vote or comment on a question

Learning Objectives

Overall series learning objective:

- By attending the Public Health Updates for Halton Physicians series, participants will be able to identify and discuss relevant and recent information about approaches to the prevention, diagnosis and management of key public health issues impacting their family medicine practice in both rural and urban settings.



- By the end of this session, participants will be able to:
- Identify risk factors for TB and re-activation of TB
 - Screen for TB using TST or IGRA
 - Differentiate between LTBI and active TB
 - Describe treatment options for LTBI, the treatment referral process for active TB and reporting requirements for TB and LTBI

Mitigating Potential Bias

All data, resources and recommendations presented are based on current scientific literature and data.

While some treatments may be referred to by their pharmaceutical name, there is no relationship between us and the pharmaceutical companies referenced in this presentation.



Disclosure of Financial Support

- This program is hosted and organized by Halton Region Public Health.
- I am a paid employee with Halton Region Public Health.
- **Potential for conflict(s) of interest:**
 - Halton Region Public Health receives funding from the Province of Ontario who also provides funding for public health research, programs and resources that may be discussed today.



We are here TB in Halton



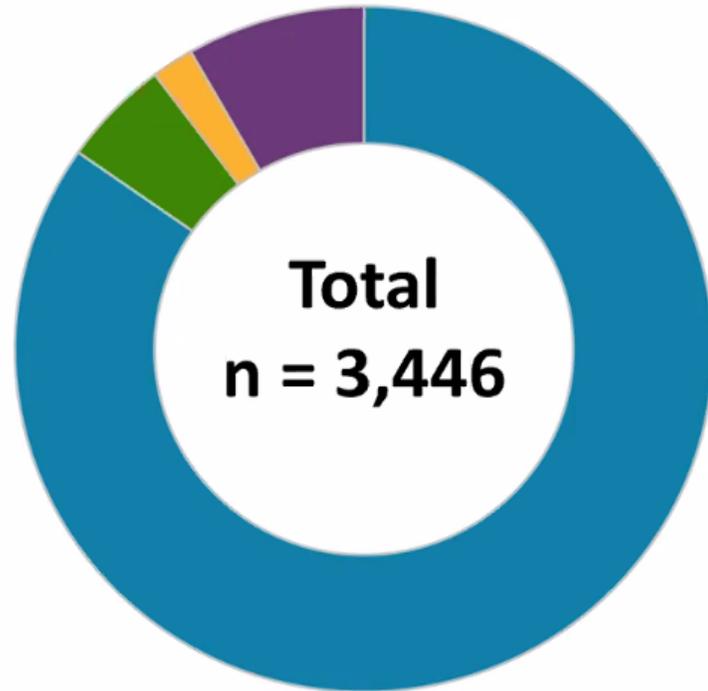
Global comparison (crude rate/ 100,000 2020)

Global Rank	Country	Rate per 100,00
1	Monaco	0
2	San Marino	0
3	United Arab Emirates	0.8
4	Israel	2.1
5	Saint Lucia	2.2
6	Antigua and Barbuda	2.3
7	Jamaica	2.4
8	United States of America	2.4
9	Barbados	2.4
10	Grenada	2.8
31	Canada	5.9
185	Papua New Guinea	441
186	Namibia	460
187	Marshall Islands	483
188	Timor-Leste	508
189	Democratic People's Republic of Korea	523
190	Gabon	527
191	Philippines	539
192	Central African Republic	540
193	South Africa	554
194	Lesotho	650

Ontario 4.5
Halton 2.7



Active TB Cases by Origin of Birth: Ontario, 2017-2021



- Born outside Canada (n=2,920; 84.7%)
- Born in Canada: non-Indigenous (n=174; 5.0%)
- Born in Canada: Indigenous (n=67; 1.9%)
- Unknown origin (n=285; 8.3%)

Of those born outside of Canada, five countries accounted for 62.9% (1,838/2,920) of all cases:

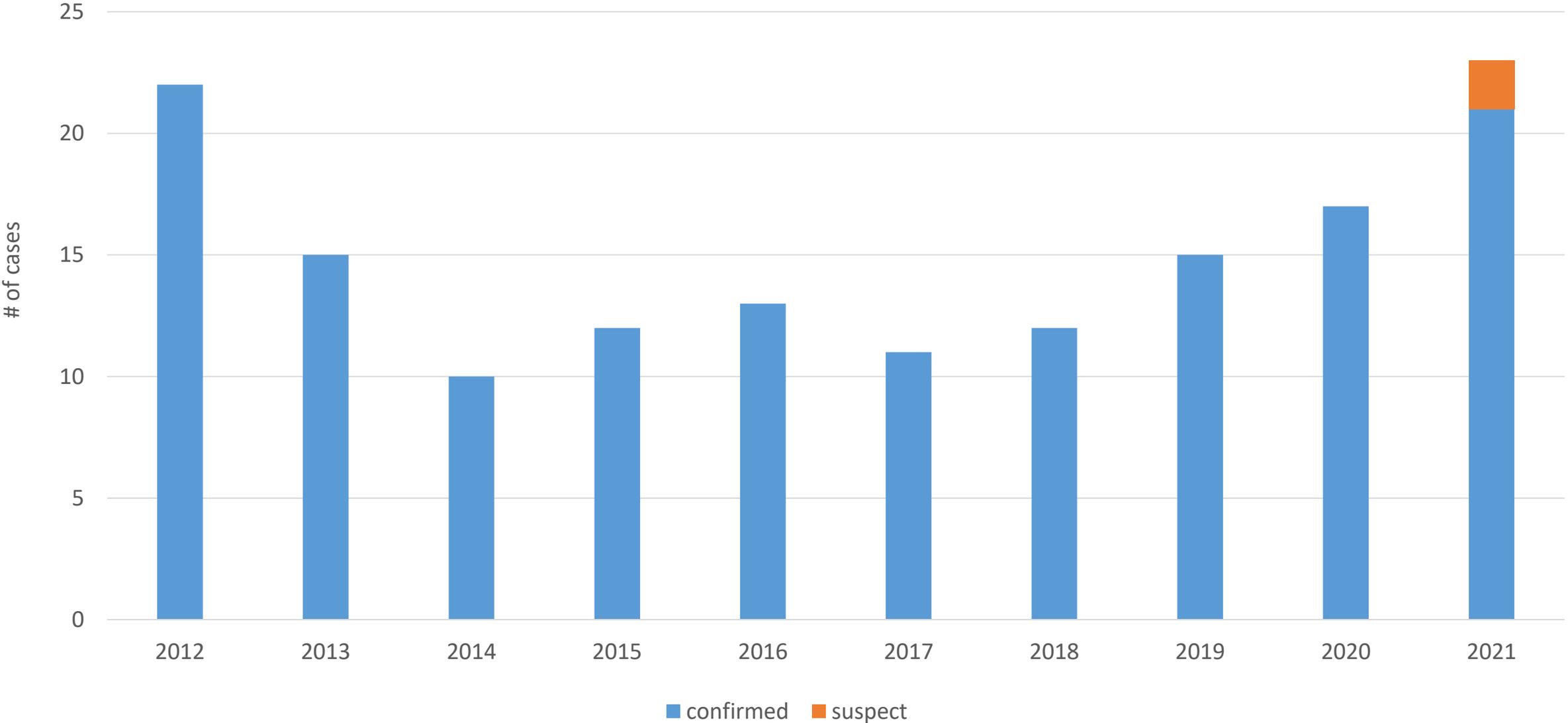
- India (n=856; 29.3%)
- Philippines (n=479; 16.4%)
- China (n=264; 9.0%)
- Vietnam (n=122; 4.2%)
- Pakistan (n=117; 4.0%)

Origin of birth varies by geography:

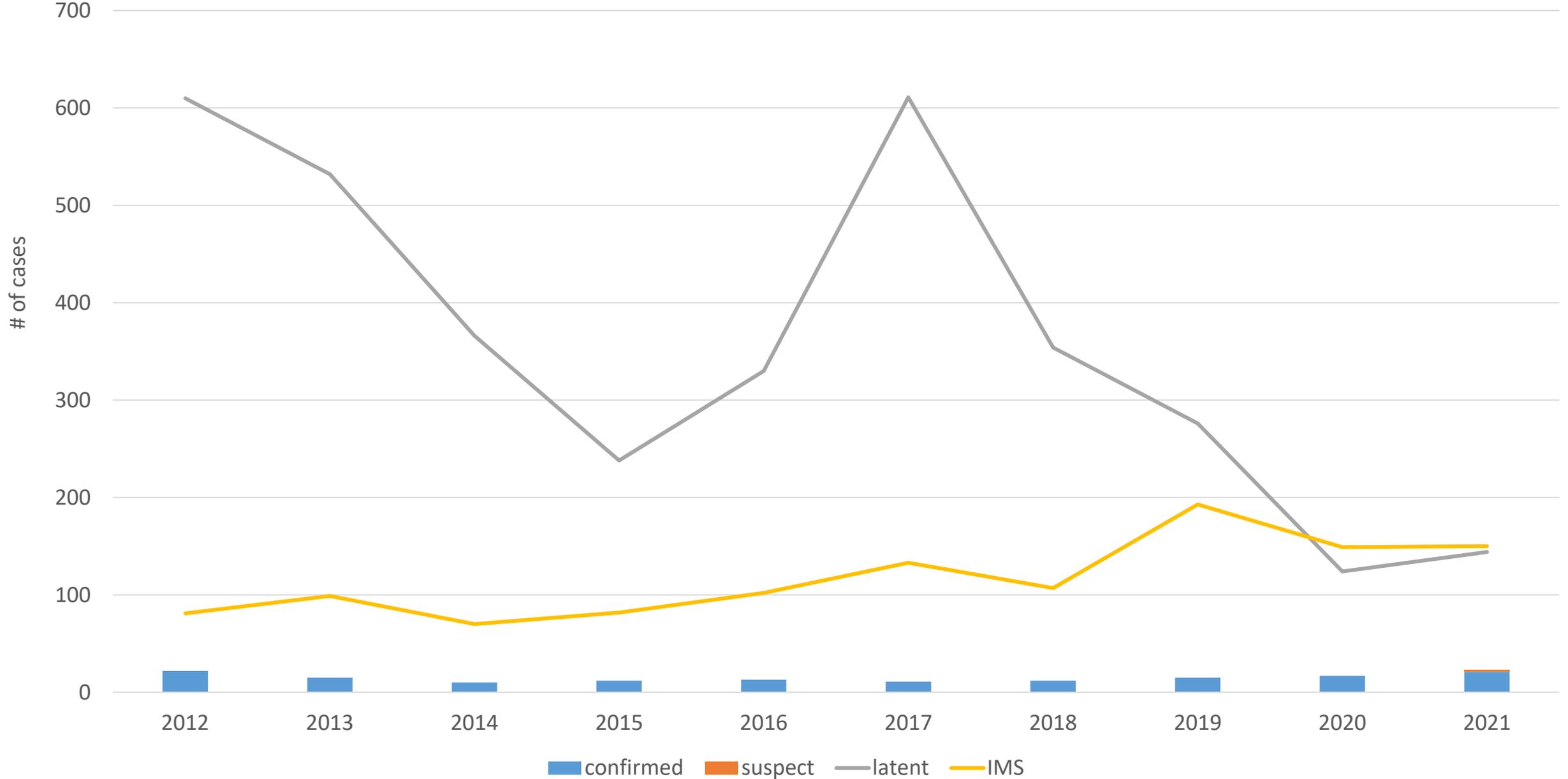
- GTA (Toronto, Peel, York):
 - 88.8% of cases born outside Canada
- Northwestern Ontario (Northwestern, Thunder Bay, Porcupine):
 - 70.3% of cases Canadian-born Indigenous

Data sources: Ontario's integrated Public Health Information System (iPHIS) [extracted March 23, 2022]; Statistics Canada population estimates

Active cases in Halton over time (# of cases)



TB trends in Halton (# of cases)



Primary care and IMS

- Public Health is notified by Immigration Refugees and Citizenship Canada (IRCC) that the individual is placed on IMS.
- Public Health provides a package to IMS clients and advises them to follow-up with a primary care provider.
 - Package includes a letter to physician, Tuberculosis Medical Surveillance Assessment Form and resources
 - Client is encouraged to bring their overseas medical report
 - The goal is to assess and rule out active TB disease (pulmonary and extra-pulmonary) and consideration for LTBI treatment

What is TB – Active vs Latent

ACTIVE

- Symptomatic
- Capable of infecting others if pulmonary/ laryngeal
- TB germs are active, multiplying and destroying tissue
- Needs medications to treat the disease

LATENT (LTBI)

- Asymptomatic
- Cannot spread to others
- May develop active TB in the future
- Needs treatment to prevent conversion to active disease

Publicly vs privately funded TST

Publicly funded

- Active TB contacts
- Deemed to be “medically necessary” by physician
- <65 age who are entering a Long-term care facility
- Students when required for school admission/continuing education
- Free TB testing solution can be ordered through the [online vaccine ordering system](#) on halton.ca/physicians

Privately funded

- For employment, volunteer placement, entry into retirement homes.
- Physician can purchase test solution and charge the patient or give a prescription to the individual



Access to TB medications

- Medications for treatment of active TB and LTBI are provided at no cost to patients, regardless of OHIP coverage, through Public Health
- In Halton, the ordering physician should:
 - fax prescription directly to Pharmex at 905-847-8271 or
 - call 905-847-8224.
- Halton Region Public Health works in collaboration with Pharmex to provide the medications to the patient
- Public Health also conducts directly observed therapy (DOT) for treatment of active pulmonary TB cases.



Reporting TB to Public Health

- Physician who reads the TST or orders the IGRA must report positive results to Public Health
- TB Physician Reporting Form (Halton)
- Fax results to 905-825-8797
- Telephone support
 - 905-825-6000 ext. 7341 live answer during business hours (Monday to Friday, 8:30 a.m.-4:30 p.m.)



Halton REGION
Tuberculosis Physician Reporting Form

Last Name: _____ First Name: _____ Date of Birth: YYYY-MM-DD _____ Gender: MALE FEMALE
 Address: _____ Phone Number: (H): _____ (C): _____ Country of birth: _____ Province: _____ Date of Arrival: YYYY-MM-DD _____

Reason for test: Employment Volunteer Work Pre-biologics Contact of Case Symptoms School Immigration Medical Surveillance (IMS) Other _____

Past TST Result: _____ Client with a documented positive TST and/or IGRA: YES NO Unknown
 Date Given: YYYY-MM-DD _____ Date Read: YYYY-MM-DD _____ Result: _____ mm Induration
 * Requires a symptom assessment, physical exam and CXR
 * Sputum x3 for AFB culture if client has TB symptoms or an abnormal CXR (see Physician Medical Assessment below)

TST Results: _____ IGRA (i.e. QFT): _____
 Step 1 - if positive do not repeat: _____ Step 2: _____
 Date Given: YYYY-MM-DD _____ Date Read: YYYY-MM-DD _____ Result: _____ mm Induration
 Date Given: YYYY-MM-DD _____ Date Read: YYYY-MM-DD _____ Result: _____ mm Induration
 Ordered: Yes No Report to be faxed to the HRHD
 HIV Testing is recommended for all positive TSTs/IGRAs: Ordered: Yes No Report to be faxed to the HRHD

Physician Medical Assessment: Asymptomatic Symptomatic Cough Fever Night Sweats Fatigue Other: _____
 *** If your client is symptomatic or has an abnormal chest x-ray indicating TB disease, call the Halton Region Health Department (HRHD) immediately at 905.825.6000 x7341 and instruct client to isolate at home.

Behavioural/Social Risk Factors: Injection drug user Close contact of a case Alcohol abuse Smoker Homeless/Under housed None identified Mental Health Condition Lived in endemic country Prolonged travel to a TB endemic country Other: _____
 Medical Risk Factors: Organ transplant Past treatment for TB HIV/AIDS Cancer Silicosis None identified Renal Disease Diabetes Immunosuppressed - Biologics Immunosuppressed - Disease Other: _____

Counselling/Intervention (check all that apply): Signs and symptoms of TB discussed When to seek medical attention discussed Reviewed TB fact sheet (available on Halton website) Prophylaxis discussed Prophylaxis not recommended Prophylaxis refused by client Prophylaxis prescribed - refer to LTBI treatment section Client referred to ID Specialist /Respirologist
 Dr. _____ Apt. date: _____

LTBI Treatment Section: Order through Pharmex Direct Inc. Tel: 905.847.8224 or Fax: 905.847.8271

Medication (Weight based)	Prescription (Standard regime)	Prescription (leave blank if ordering standard)	Duration (in months)
Isoniazid (INH)	<input type="checkbox"/> Standard: 300 mg Oral Daily	_____ mg Oral _____	6 9 12
Pyridoxine (B6)	<input type="checkbox"/> Standard: 25 mg Oral Daily	_____ mg Oral _____	6 9 12
Rifampin (RIF)	<input type="checkbox"/> Standard: 600 mg Oral Daily	_____ mg Oral _____	4 6

Physician name (print): _____ Date: _____
 Signature: _____ Address: _____ Tel: _____ Fax: _____

Legend: TST - tuberculin skin test
 HRHD - the Halton Region Health Department
 LTBI - Latent tuberculosis infection

Please FAX COMPLETED form to: The Halton Region Health Department at 905-825-8797
 Halton Region • 1151 Bronte Rd. Oakville, Ontario L6M 3L1 • 905-825-6000 • Toll free: 1-866-4HALTON • TTY: 905-827-9833 • www.halton.ca

January 2019

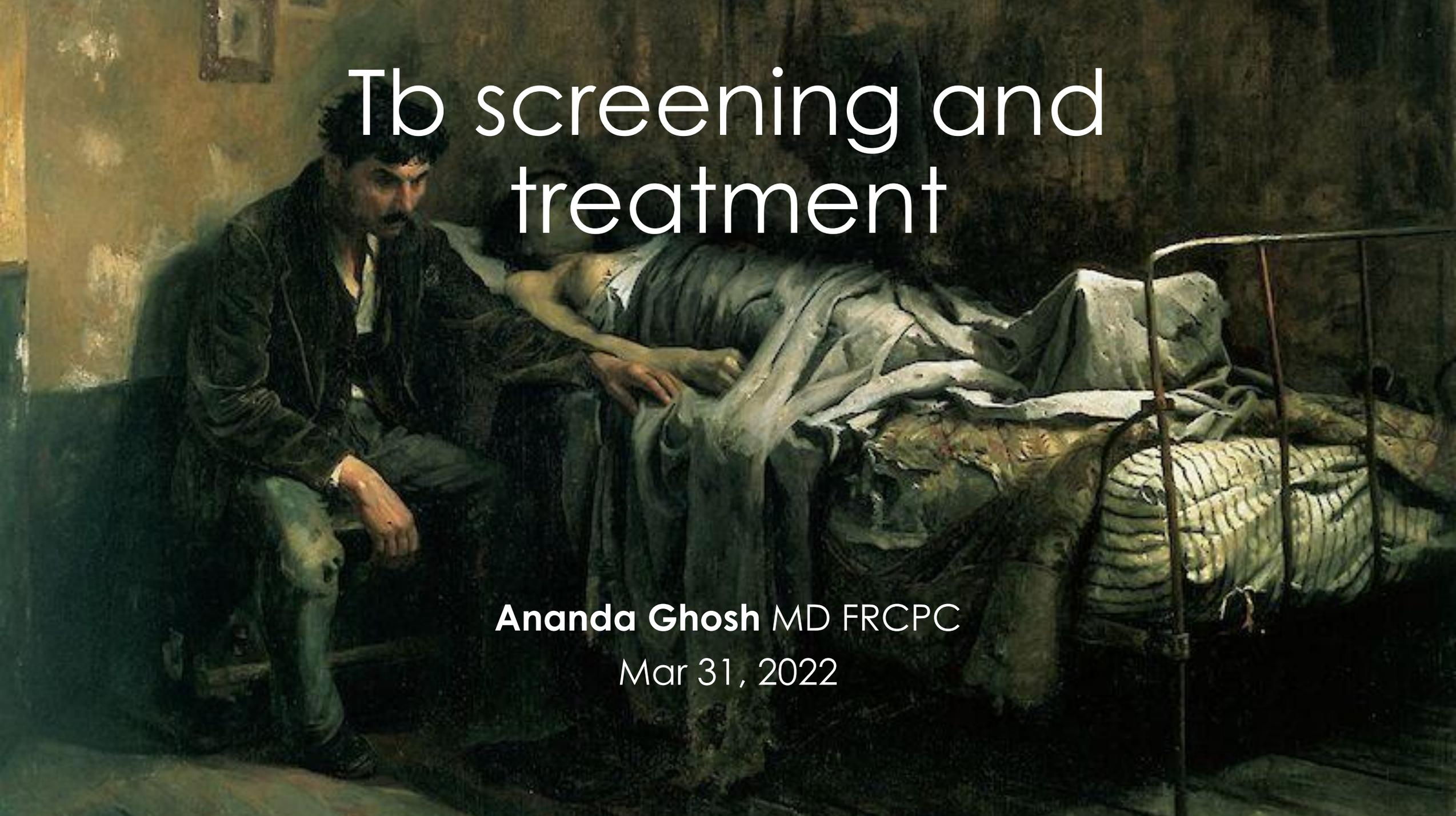


Dr. Ananda Ghosh, MD FRCP

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Physician Lead, Quality and Patient Safety
Medical Lead, COVID-19 Assessment Centres and
Vaccination Clinic
Halton Healthcare

Adjunct Assistant Clinical Professor
Department of Medicine
McMaster University



A painting depicting a doctor in a dark coat sitting on a bench, examining a patient lying in a hospital bed. The patient is covered with a white sheet, and the scene is set in a dimly lit, rustic room. The doctor's hand is resting on the patient's arm, and the overall atmosphere is somber and focused.

Tb screening and treatment

Ananda Ghosh MD FRCPC

Mar 31, 2022

Disclosures

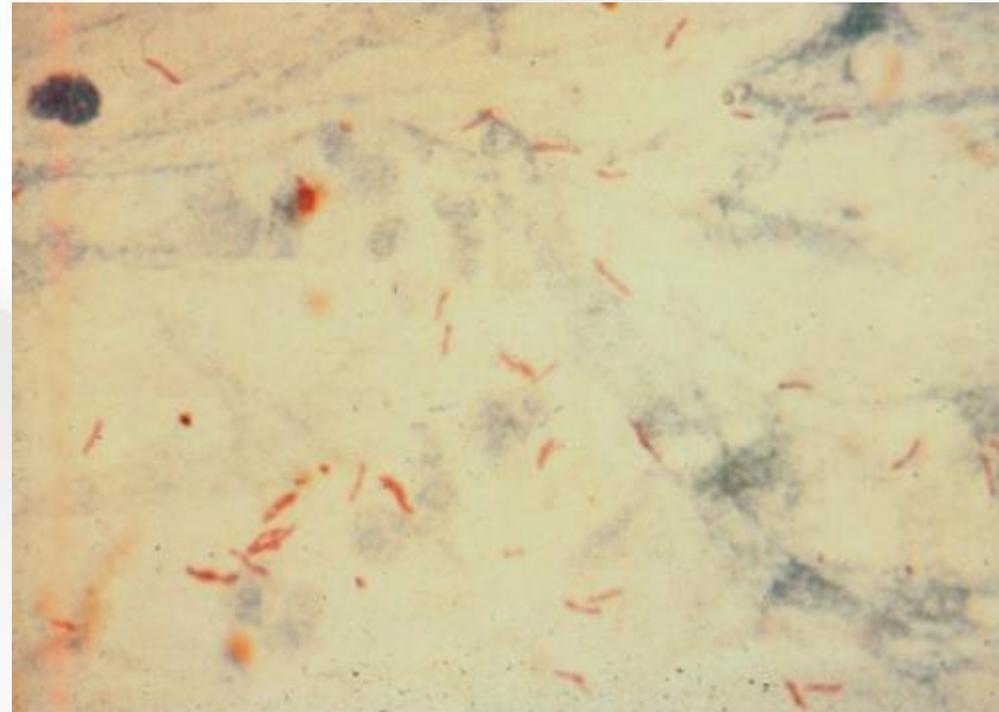
- No grants/research support
- Funded by Halton Healthcare Services (Quality & Patient Safety, Infection Prevention & Control)
- Participant in Gilead Sciences and ViiV Healthcare HIV therapies advisory boards (not related to TB treatment)

Outline

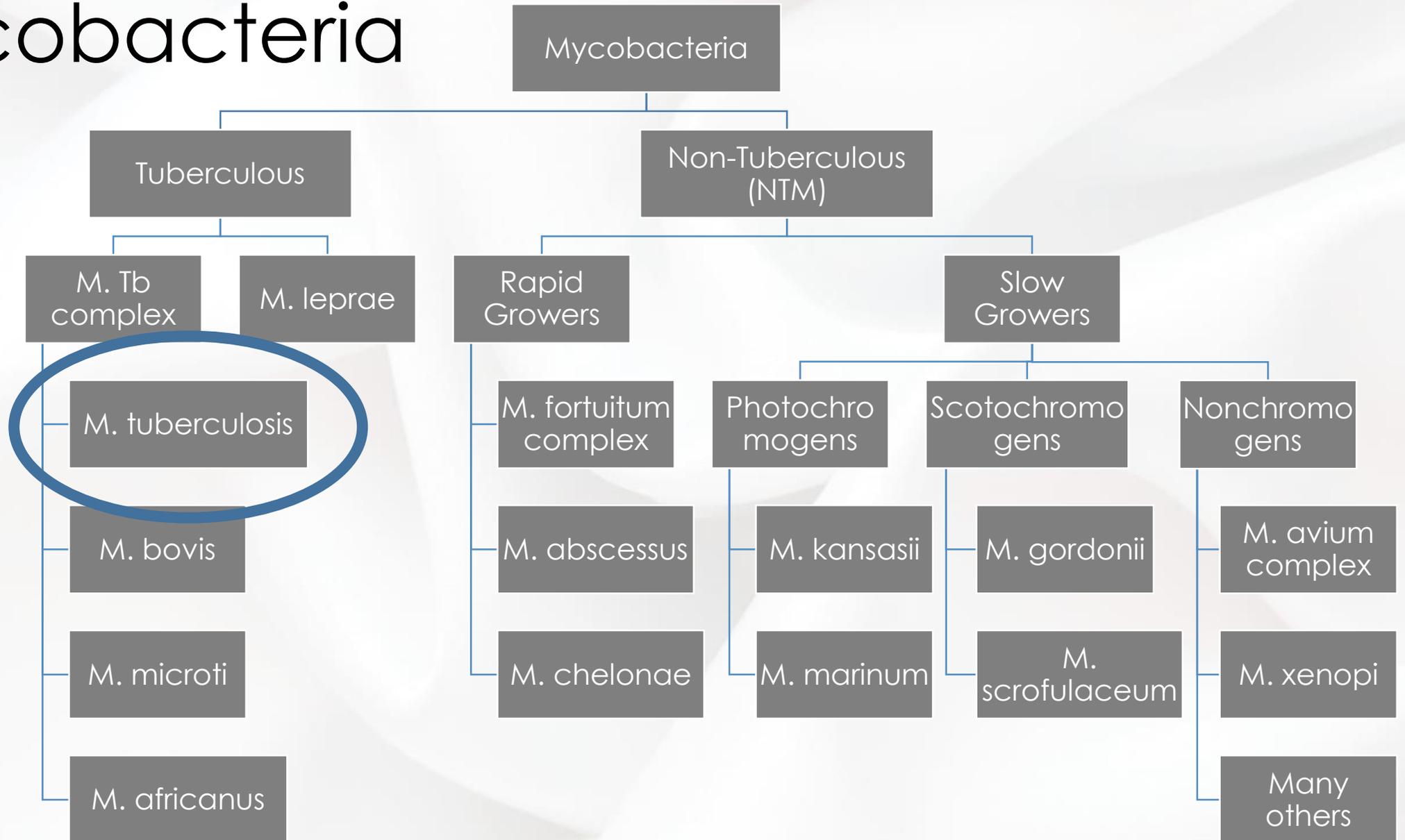
- Tuberculosis (Tb) – what is it?
 - Natural history and pathogenesis of Tb
- Latent Tb (Infection)
 - Diagnosis
 - Treatment
- Active Tb (Disease)
 - Diagnosis
 - Treatment

What is tuberculosis?

- Bacterial infection caused by *Mycobacterium tuberculosis*
 - Enveloped (acid-fast)
 - Aerobic
 - Gram-positive
 - Bacillus
 - Slow growing



Mycobacteria



Natural History

Inhalation of aerosol droplets containing *M. tb*:

- Immediate clearance (**no infection**)
- Immune response to establish granuloma(ta) and contain (**latent tuberculosis infection**)
 - May later have immune escape leading to active disease (**reactivation disease**)
- Limited or inadequate immune response allowing immediate progression to active disease(**primary disease**)

Diagnosing Latent Tb

Diagnosing tuberculosis infection

Diagnosing latent Tb infection

- Looking for immune response, not Tb bacilli
- T-cell mediated response (Gell and Coombs type IV)
- Mantoux tuberculin skin test (TST)
- Interferon-Gamma release assay (IGRA)

Mantoux tuberculin skin test (TST)

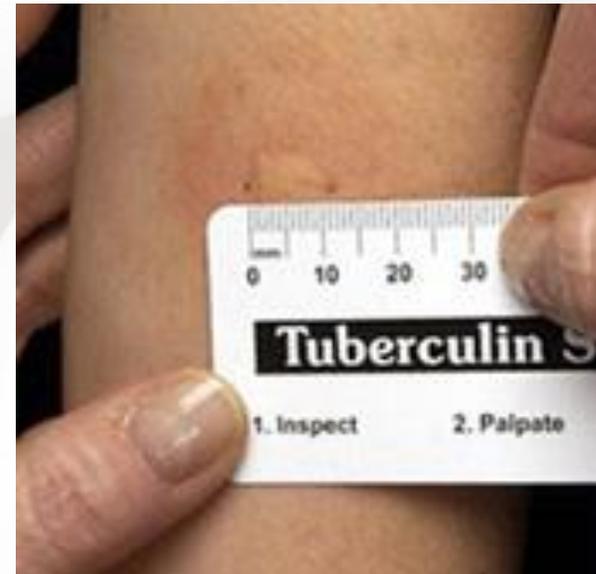
Placing TST

- Inject 0.1 mL Tb purified protein derivative (PPD)
- Intradermal administration
 - Needle at 10-15° from skin
 - Bevel of needle up
 - Create small wheal



Reading TST

- 48 to 72 hours later
- Measure millimeters of **induration** (not erythema)



Mantoux tuberculin skin test (TST)

TST Result	Situation in which reaction is considered positive
<5 mm	In general, this is considered negative
≥5 mm	People living with HIV Known recent (<2 years) contact with a patient with infectious TB disease Fibronodular disease on chest x-ray (evidence of healed, untreated TB) Prior to organ transplantation and receipt of immunosuppressive therapy Prior to receipt of biologic drugs, such as tumor necrosis factor alpha inhibitors, or disease-modifying antirheumatic drugs Prior to receipt of other immunosuppressive drugs, such as corticosteroids (equivalent of ≥15 mg per day of prednisone for at least one month) Stage 4 or 5 chronic kidney disease (with or without dialysis)
≥10 mm	Recent (<2 years) conversion of TST from negative to positive Diabetes (controlled or uncontrolled) Malnutrition (<90% of ideal body weight) Current tobacco smoker (any amount) Daily consumption of >3 alcoholic drinks Silicosis Hematologic malignancies (lymphomas and leukemia) and certain carcinomas (such as cancers of head, neck, lung and/or gastrointestinal tract) Any population considered at low risk of disease.

- Report measurement of induration in addition to interpretation

IGRA

- Laboratory-based method to assess T-cell mediated immune response to Tb antigens
- Blood exposed to (more specific than PPD) *M. tb* antigens
- Release of IFN- γ in response is detected/measured
- Low probability of cross reacting from BCG vaccine or NTM infection
- Not covered by OHIP (cost ~\$100)

BCG vaccine

- Live attenuated vaccine (strain of *M. bovis*)
 - Developed by Calmette and Guérin
- Limited efficacy at preventing latent Tb (infection)
- Modest (unclear) efficacy at preventing active Tb (disease)

- Likelihood of causing false positive TST depends on:
 - Age of administration (<12 months vs >12 months)
 - Time since administration

Choosing TST vs IGRA

- Patient preference and access
- IGRA preferred if:
 - Child <10 years old with history of BCG vaccine
 - Any age with BCG vaccine dose after 12 months old
 - Unlikely/unable to present for reading of TST
- TST preferred for:
 - Planned serial testing (i.e. on-going exposure risk)

Treating Latent Tb

Tuberculosis preventative treatment

Decision to treat

- Weigh risk of reactivation/progression to active disease against
- Risk of toxicity or intolerance of therapy and
- Patient values and preference

- Practical considerations may influence decision (e.g. employment, barrier to potential future therapeutics)

Risk of progression to active disease

Risk factor	Annual risk of TB disease for the first 2-3 years after testing positive (%) ^a	Reference
VERY HIGH RISK		
People living with HIV	1.7 to 2.7	2,56
Child or adolescent (<18y) tuberculosis contact	2.9 to 14.6	56,57
Adult (≥18y) tuberculosis contact	0.8 to 3.7	2,56
Silicosis	3.7	2
HIGH RISK		
Stage 4 or 5 chronic kidney disease with or without dialysis	0.3 to 1.2	2
Transplant recipients (solid organ or hematopoietic)	0.1 to 0.7	2
Fibronodular disease	0.2 to 0.6	Extrapolated from: 75–77
Receiving immunosuppressing drugs (eg, tumor necrosis factor α inhibitors or steroids) ^b	0.5	2
Cancer (lung, sarcoma, leukemia, lymphoma or gastrointestinal)	0.1 to 0.4	Extrapolated from: 70
MODERATE RISK		
Granuloma on chest x-ray	0.1	Extrapolated from: 77,78
Diabetes	0.1 to 0.2	Extrapolated from: 83
Heavy alcohol use (at least 3 drinks/day)	0.1 to 0.2	Extrapolated from: 79
Heavy tobacco cigarette smoker (at least 1 pack/day)	0.1	Extrapolated from: 80–82
LOW RISK		
General (adult) population with no known risk factor	0.03	2
Persons with a positive two-step TST booster and no known risk factor	0.02	Extrapolated from: 84,85

Before starting latent Tb treatment

- **Essential to rule out active disease**

Minimum:

- Thorough history for symptoms
- Chest X-ray within previous six months and after last exposure
- Physical exam and further investigations based on above

Tb preventative therapy regimens

Rifampin daily for 4 months

- Dosed 10mg/kg up to 600mg once daily
- Counsel regarding:
 - Nausea/vomiting/diarrhea (typically mild, improves)
 - Change in colour of urine, sweat, tears
 - Mild rash can usually be treated through
 - Any severe rash (involving palms, soles, mucous membranes)
STOP THERAPY IMMEDIATELY (SJS is rare but known risk)
- Review regular medications for interactions
 - Rifampin is a potent CYP450 inducer

Tb preventative therapy regimens

Isoniazid daily for 9 months

- Dosed 5mg/kg up to 300mg once daily
- Only used when rifampin not an option due to longer duration and higher risks of adverse events
- Counsel regarding:
 - Hepatotoxicity (monitoring bloodwork if age >40)
 - Peripheral neuropathy (co-administer 25mg pyridoxine daily)
 - Avoid Et-OH consumption while on therapy

Follow up

- Typically 2-4 weeks after initiating therapy to ensure
 - Receipt of therapy
 - Adherence
 - Tolerance
- At completion of therapy to ensure
 - Completion of recommended course
 - Counsel:
 - No need for further TST
 - No 'test of cure'
 - Provide documentation of successful completion

Diagnosing Active Tb

Diagnosing tuberculosis disease

Diagnosing active Tb

- Looking for the Tb bacilli, not the immune response
- Limited (?no) role for TST/IGRA in diagnosis of active Tb
 - Positive test does not confirm latent vs active
 - Negative test does not rule out active Tb

Go fishing where the fish are

Sample site of suspicion

- **Pulmonary**
 - Pleural
- Lymphadenitis
- Urogenital
- Bone and joint
- Bone marrow
- Skin
- Meningitis



Establishing a microbiological Dx

- Order “AFB stain and mycobacterial culture”
- For pulmonary Tb, sputum samples to start (3 samples, at least an hour apart)
 - High suspicion may required induced sputum or BAL
- For other sites, **tissue biopsy** for culture higher yield than body fluids (sample not in formalin, for micro studies)
- Important not only to confirm diagnosis of Tb disease
- Drug susceptibility results guide therapy

Treating Active Tb

Therapy for tuberculosis disease

Principles of treating active Tb

- ALWAYS have at least two confirmed active agents
- Intensive or induction phase
 - 3 active agents (pyrazinamide is preferred 3rd agent)
 - 2 months
- Continuation phase
 - 2 active agents (ideally one is rifampin)
 - 4 months minimum
 - Longer continuation phase if not using rifampin or high burden of disease and cultures not cleared by end of intensive phase

Nuances of treating active Tb

- Counselling and monitoring for adverse drug events
- Managing adverse drug events
 - Which can be treated through
 - Which necessitate interruption of therapy
 - Re-introduction of therapy after adverse drug events
- Expected (or unexpected) clinical course – paradoxical reactions
- Collaboration with PH for DOT to support adherence

Regimens for susceptible active Tb

Table 2. Recommended treatment regimens for known or suspected drug-susceptible pulmonary TB.

	Initial phase (first two months)	Continuation phase
Suspected drug susceptible^a		
Preferred regimen	INH ^b RMP PZA EMB ^c daily ^d	INH RMP EMB daily for 4 months
Alternative regimen ^a	INH RMP EMB daily	INH RMP EMB daily for 7 months
Alternative regimen ^f	INH RMP PZA EMB daily	INH RMP EMB 3x per week ^g for 4 months
Alternative regimen ^f	INH RMP EMB daily	INH RMP EMB 3x per week ^g for 7 months
Known drug susceptible		
Preferred regimen	INH RMP PZA daily ^d	INH RMP daily for 4 months
Alternative regimen ^a	INH RMP EMB daily	INH RMP daily for 7 months
Alternative regimen ^f	INH RMP PZA daily	INH RMP 3x per week ^g for 4 months
Alternative regimen ^{a,f}	INH RMP EMB daily	INH RMP 3x per week ^g for 7 months

Abbreviations: TB, tuberculosis; INH, Isoniazid; RMP, rifampin; PZA, pyrazinamide; EMB, ethambutol; DOT, directly observed therapy.

^aINH: Isoniazid, RMP: rifampin, PZA: pyrazinamide, EMB: ethambutol.

Key messages

- Spectrum of clinical disease with interplay between pathogen factors and host immune response
- Classical paradigm of Latent Tb and Active Tb still a useful and practical approach
- Diagnosis of Latent Tb = detection of host immune response (TST or IGRA)
- Diagnosis of Active Tb = detection of mycobacteria (microbiologic diagnosis)

(more) Key messages

- Must rule out Active Tb before treating Latent Tb
- 4 months rifampin is preferred Latent Tb regimen
- Management of Active Tb should be referred for specialist care



Thank you

back to Heather...

TB resources for primary care

- TB resources for primary health care sheet will be emailed to attendees
- halton.ca/physicians > Communicable diseases > Tuberculosis
- [TST skin test video](#), Ottawa Public Health
- Call 311
- TB Public Health Nurse
 - 905-825-6000, ext. 7341

Tuberculosis (TB) resources for primary health care – March 2022

- **Screening, testing and treatment Resources**
 - [Canadian Tuberculosis Standards \(8th Edition, March 2022\)](#) – includes information on diagnosis, treatment, prevention and control of tuberculosis
 - [Tuberculosis information for Halton physicians](#) – Halton Region Public Health information on TB screening; diagnosing, treating and reporting active and latent TB infection; TB diagnostic and treatment for uninsured people (TB-UP) and Immigration Medical Surveillance (IMS)
 - [Quick Reference Guide: Assessment and Treatment of Latent Tuberculosis Infection](#)
 - [How to administer a Tuberculin Skin Test Video](#), Ottawa Public Health
 - [Order free TB testing solution – BID \(Mantoux\) Tuberculin Purified Protein Derivative](#)
 - [Public Health Ontario test requisition forms, specimen containers and supplies](#)
 - [The Online TST/IGRA Interpreter](#) – tool to estimate the risk of active TB for individuals with a TST reaction of ≥5mm based of his/her clinical profile
 - [The BCG World Atlas](#) – interactive map providing detailed information on current and past BCG vaccination policies and practices for more than 200 countries
 - [Tuberculosis screening: admission to long-term care homes in Ontario](#), Public Health Ontario
 - [Tuberculosis Diagnostic and Treatment Services for Uninsured Persons \(TB-UP\)](#) – Call Halton Region Public Health at 905-825-6000, ext. 7341 **before providing services** to register
- **Ordering free TB medication**
 - [Pharmex Direct Inc.](#) – Fax prescription to 905-847-8271 or phone 905-847-8224. TB medications are funded through Halton Region Public Health regardless of OHIP status.
 - [Halton Region Public Health](#) – If you have questions about TB medication, call 905-825-6000, ext. 7341 (Monday-Friday, 8:30 a.m. – 4:30 p.m.) to speak directly with a public health nurse
- **Billing**
 - [Tuberculosis \(TB\) skin test INFOBulletin #4692, January 30, 2017](#) – information re. OHIP-insured TB skin testing
 - [Physician's Guide to Uninsured Services \(2022\)](#), Ontario Medical Association
 - [Billing for uninsured services](#), Ontario Medical Association
- **Additional TB resources**
 - [Tuberculosis \(TB\) information for Halton Region residents](#) – patient information about TB, public health supports, Immigration Medical Surveillance (IMS), prevention and FAQs
 - [Halton Region Child Care Health Resource: Immunization, Health Protection](#)
 - [TST Ruler](#) – Call Halton Region Public Health at 905-825-6000, ext. 7341 to receive a free TST ruler mailed to you

Tuberculosis Information for Physicians

Home / For Business / Information for Physicians / Communicable Diseases Information for Physicians / Tuberculosis Information for Physicians

Need help?



Special Order Vaccine Online Request form
Order Tuberculin Purified Protein Derivative –

Questions?

Email doctors@halton.ca

Call 311 or

905-825-6000, ext. 7341



Thank you!

doctors@halton.ca

halton.ca/physicians

