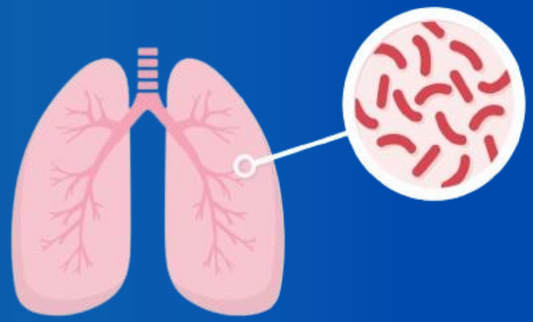
County of Los Angeles Public Health



SOUTHERN CALIFORNIA REGIONAL

COMMUNITY OF PRACTICE TO END TB

Tuesday, June 17, 2025

12:00PM - 1:30PM PDT

Agenda

UCLA Perspectives: TB Infection in Pregnancy and the Path to TB Elimination

12:00 – 12:05	Welcome and introductions	**Melissa Zhang** TB Control Program Analyst Los Angeles County Department of Public Health	**Parveen Kaur, MD** Clinical Lead Southern CA CoP to End TB
12:05 – 12:25	Overview of the LTBI cascade	**Katya Salcedo, MPH** Epidemiologist TB Free CA, California Department of Public Health	
12:25 – 12:55	Screening for and managing TB infection in pregnancy: it CAN be done!	**Neil Silverman, MD** Professor of Clinical Obstetrics and Gynecology Director, MFM Fellowship Program Director, Infections in Pregnancy Program David Geffen School of Medicine at UCLA	
12:55 – 1:10	Snapshot of the UCLA provider experience		
1:10 – 1:30	Discussion session and meeting closure	**Melissa Zhang** TB Control Program Analyst Los Angeles County Department of Public Health	**Parveen Kaur, MD** Clinical Lead Southern CA CoP to End TB

SOUTHERN CALIFORNIA REGIONAL

COMMUNITY OF PRACTICE TO END TB

County of Los Angeles Public Health

Updates

- Community of Practice website under construction

- UPDATED: Los Angeles County TB Infection Provider Toolkit
  - Resources on California TB Screening Law AB 2132
  - LAC Adult TB Risk Assessment and User Guide
  - TB Infection Testing Information
  - TB Infection Treatment Information

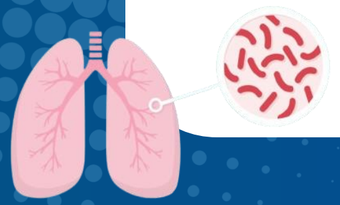
- IN PROGRESS: School entry testing guidelines

Isoniazid and Rifapentine (3HP)

Rifampin (4R)

Isoniazid (INH)

Isoniazid and Rifampin (3HR)



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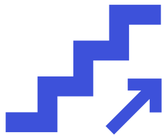
California Department of Public Health

Measuring the LTBI Care Cascade

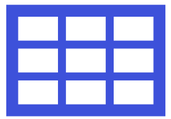
Southern California Regional Community of Practice #2
Katya Salcedo, MPH
Tuberculosis Control Branch, TB Free California
California Department of Public Health
June 17, 2025

Learning Objectives



- **Walk through the 7 steps of the LTBI Care Cascade**

- **Provide examples of ways to measure each step**



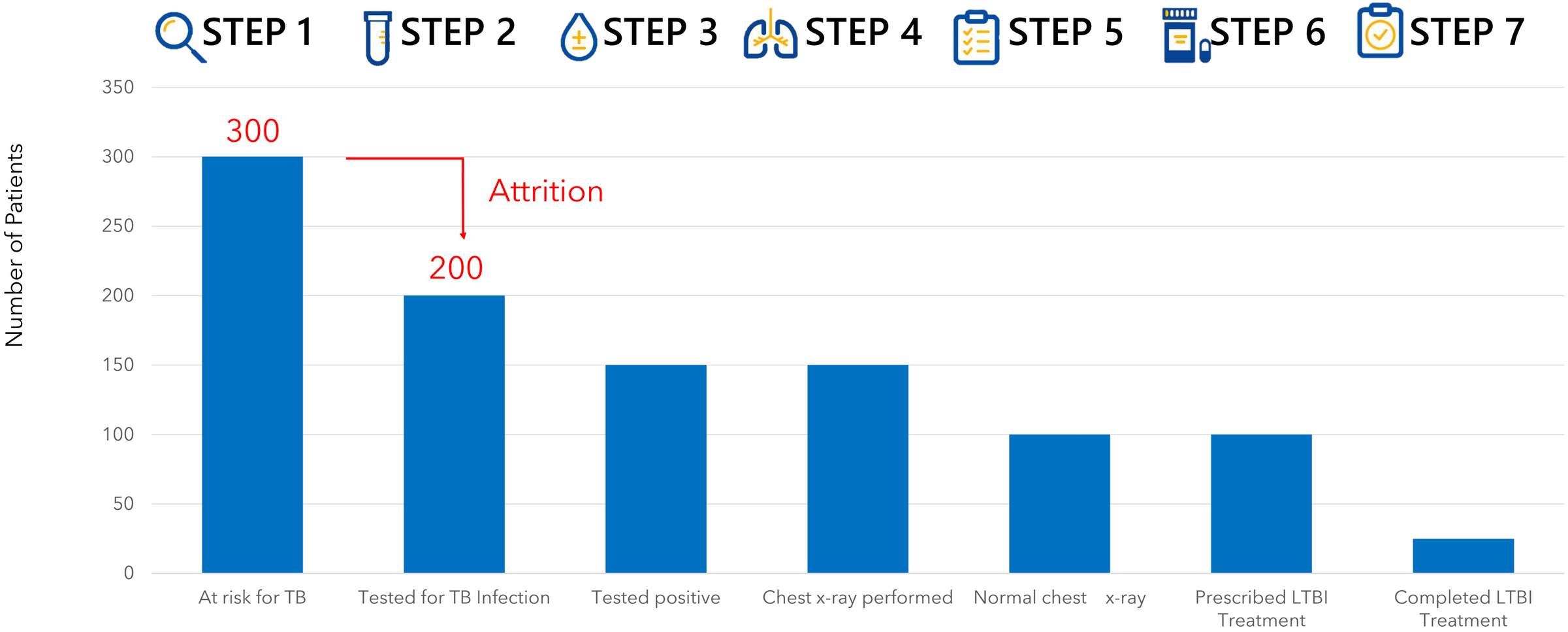
- **Introduce LTBI Care Cascade template**

LTBI Care Cascade Steps Overview

Risk	LTBI Diagnosis				Treatment	
STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6	STEP 7

Assess patient risk for TB infection	Test for TB infection, IGRA preferred	Document positive tests for TB infection	Evaluate patient for TB disease, including chest x-ray	Complete chest x-ray and document normal result	Prescribe LTBI treatment	Retain patient in care and document treatment completion

Hypothetical LTBI Care Cascade



Step 1: Assess patient risk for TB infection

TB risk Assessment

Birth, travel or residence (>1 month) in a country with an elevated TB rate

Planned or current immunosuppression

Close contact to someone with infectious TB disease during lifetime

Current or prior homelessness or incarceration

Step 1 measurement: Number of patients with at least one risk factor

- Use birth country from “registration” section in EMR
- Find immunosuppression status in “medications” section in the EMR (i.e. HIV, transplant, steroids)
- Find contact to a infectious TB case in the “chronic problem” list

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https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/TB-Risk-Assessment.aspx

Step 2: Test for TB infection

Preferred: Interferon-gamma release assay (IGRA) QuantiFERON® TB Gold (QFT) or T-SPOT

TB skin test (TST), also known as PPD

Step 2 measurement: Number of patients tested

- If IGRA, look for lab order in the “orders”, “laboratory” or “results” section in EMR
- If TST, look for documentation in the EMR’s “Immunization” or “notes” section

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Step 3: Document positive test result

IGRA interpretation

Measure release of interferon-gamma following stimulation by TB antigens

- QFT
  - Results: positive, negative, or indeterminate
- T-SPOT
  - Results: positive, negative, or borderline

TST Interpretation

- Measure induration (not erythema) at 48-72 hours after Tuberculin injection
  - Results: positive or negative
  - Units: millimeters
- Positive test:
  - ≥ 5mm for immunosuppressed including HIV, recent contacts
  - ≥ 10mm for all others with TB risk

Step 3 measurement: Number of patients with positive test

- For IGRA results look for lab report in “laboratory” or “results” in EMR
- For TST results look in EMR “immunization” or “notes” section in EMR

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Step 4: Evaluate patient for TB disease

- Neither IGRA nor TST testing can distinguish LTBI from active TB disease
- If the IGRA or TST test is positive, symptom screening and chest x-ray are necessary to rule out the possibility that the patient has TB disease

Symptom Screening

Chest X-ray

Step 4 measurement: Number of patients who were ordered a chest x-ray

- For chest x-ray order, look in "orders" section in EMR
- Look at visit notes for symptom review

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Step 5: Complete chest x-ray and document normal result

[Select]
Normal
Abnormal, consistent w/ TB
Abnormal, not consistent w/ TB

Step 5 measurement: Number of patients with documented <u>normal</u> chest-x ray result

- Chest x-ray results are usually available in the “Imaging”, “Results” or “Radiology” sections of EMR
- Look for LTBI diagnosis in “chronic problem” list in EMR

Step 6: Prescribe LTBI treatment

Step 6 measurement: Number of patients who were prescribed LTBI treatment

- To see if a prescription was issued look for LTBI medication and regimen in “Orders” or “Medications” sections in EMR

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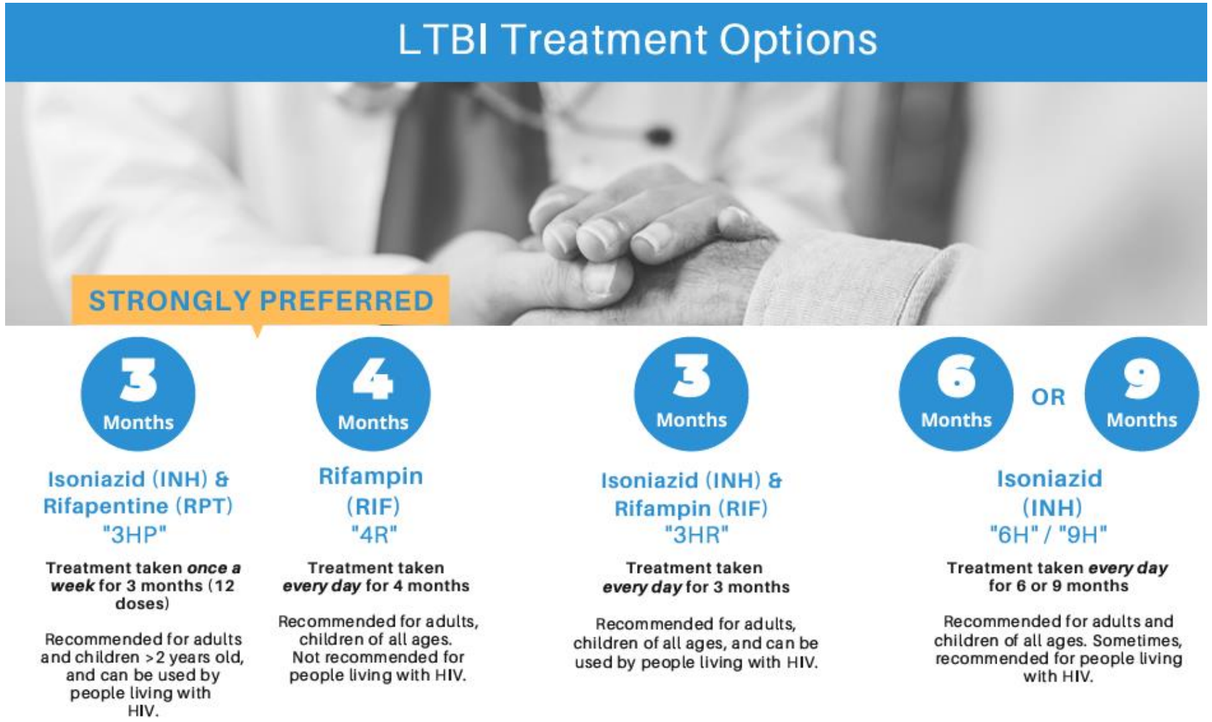
Step 7: Document LTBI treatment completion



Medication	Reason stopped	Date
RIFAMPIN	Completed	8/9/2021

Step 7 measurement: Number of patients who complete LTBI treatment

- Use pharmacy records or "progress notes"

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Two core LTBI care indicators to monitor

% at risk population that receive a TB test

Measurements needed:
- # tested (step 2)
- # at risk for TB (step 1)

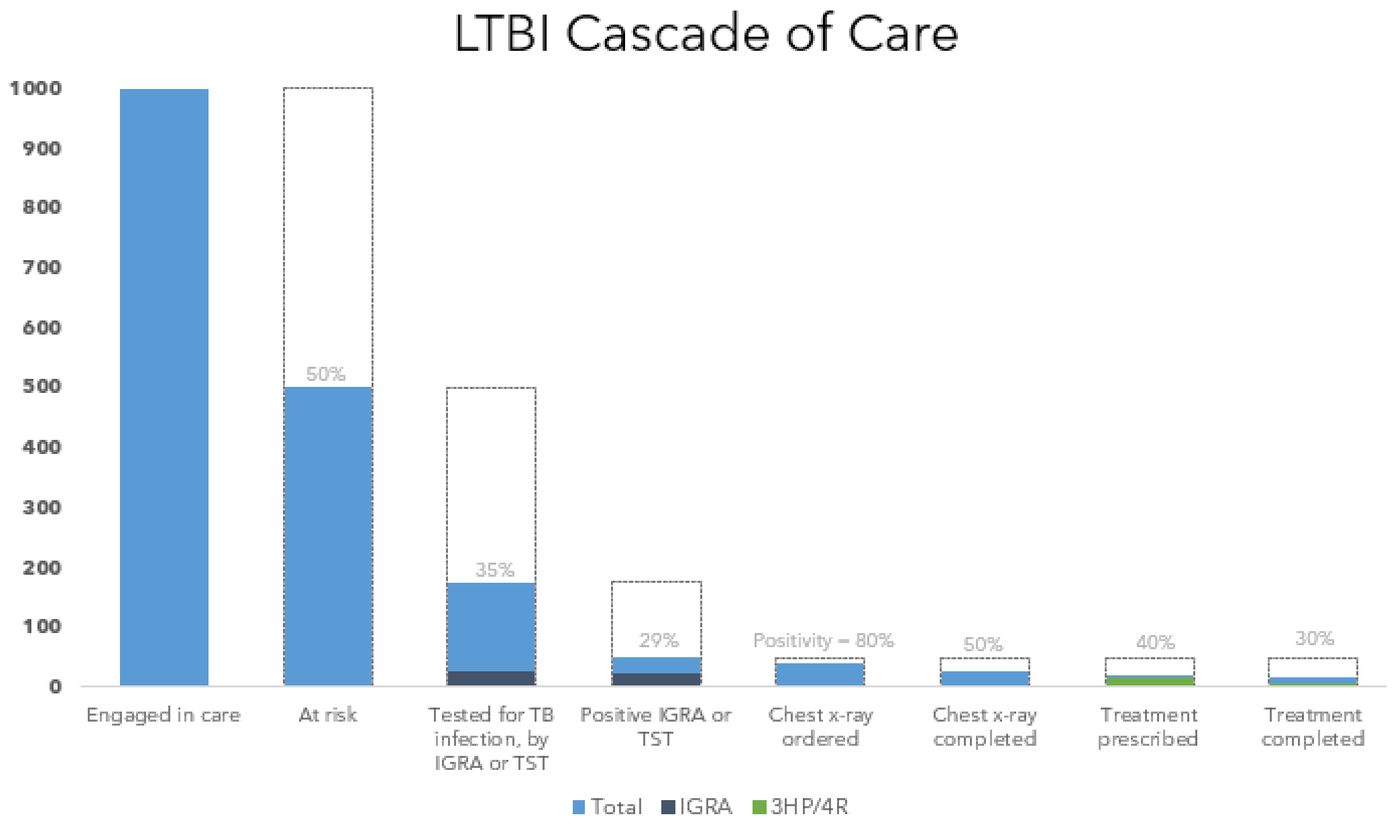
% with a positive test that complete LTBI treatment

Measurements needed:
- # who complete LTBI treatment (step 7)
- # with positive TB test (step 3)

LTBI Care Cascade Template

- A simple tool where users can input numbers to visualize an LTBI care cascade.
- Email tbfreecatraining@cdph.ca.gov for the LTBI Care Cascade Template

LTBI Care Cascade	Numerator		Denominator		%	Variable Definition	Sample definitions
	Total	IGRA 3HP/4F	Target	Max Outline			
Engaged in care	1000						All, by default
At risk	500		1000	1000	50%		Positive risk factor on risk assessment, within past 2 y
Tested for TB infection, by IGRA or TST	175	25	500	500	35%		TST or IGRA result available, ever
Positive IGRA or TST	50	20	175	175	29%		Positive interpretation, lab result or other discrete field
Chest x-ray ordered	40		50	50	80%		Chest x-ray order present, date>=TST or IGRA date
Chest x-ray completed	25		50	50	50%		Chest x-ray result documented
Treatment prescribed	20	15	50	50	40%		Isoniazid (only) or Isoniazid + rifapentine or Rifampin (
Treatment completed	15	5	50	50	30%		Treatment completed, discrete field or date



Summary

- Measurement of the LTBI care cascade is possible
- You can start small by monitoring 1-2 metrics
- LTBI care cascade steps in the guidebook provide a standardized approach for measuring testing and treatment practices
- Care cascades help identify areas to prioritize improvement within

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California Department of Public Health

Thank you!

tbfreecalifornia.org

Tuberculosis Screening and Management in Pregnancy: How to Make it Happen

Neil S. Silverman, MD
Professor of Clinical Obstetrics and Gynecology
Director, MFM Fellowship Program
Director, Infections in Pregnancy Program
David Geffen School Of Medicine at UCLA

Tuberculosis Screening and Management in Pregnancy

1. Tuberculosis 101
2. Screening
3. Management

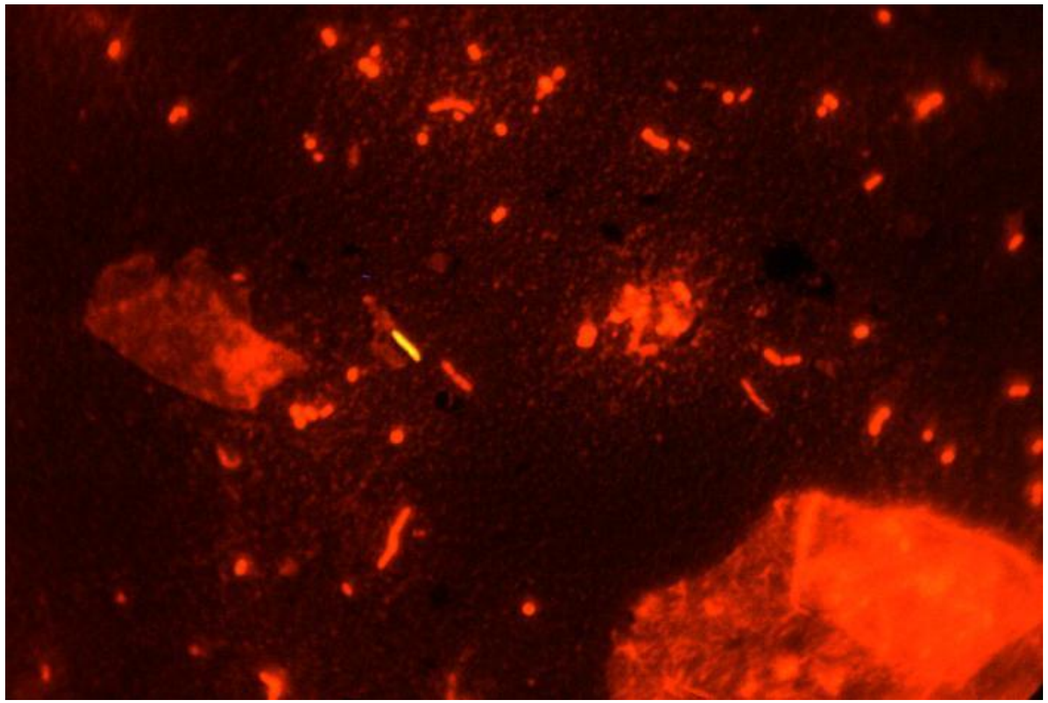
1

Tuberculosis 101:

What does an OB/GYN need to know?

Tuberculosis (TB) Pathophysiology

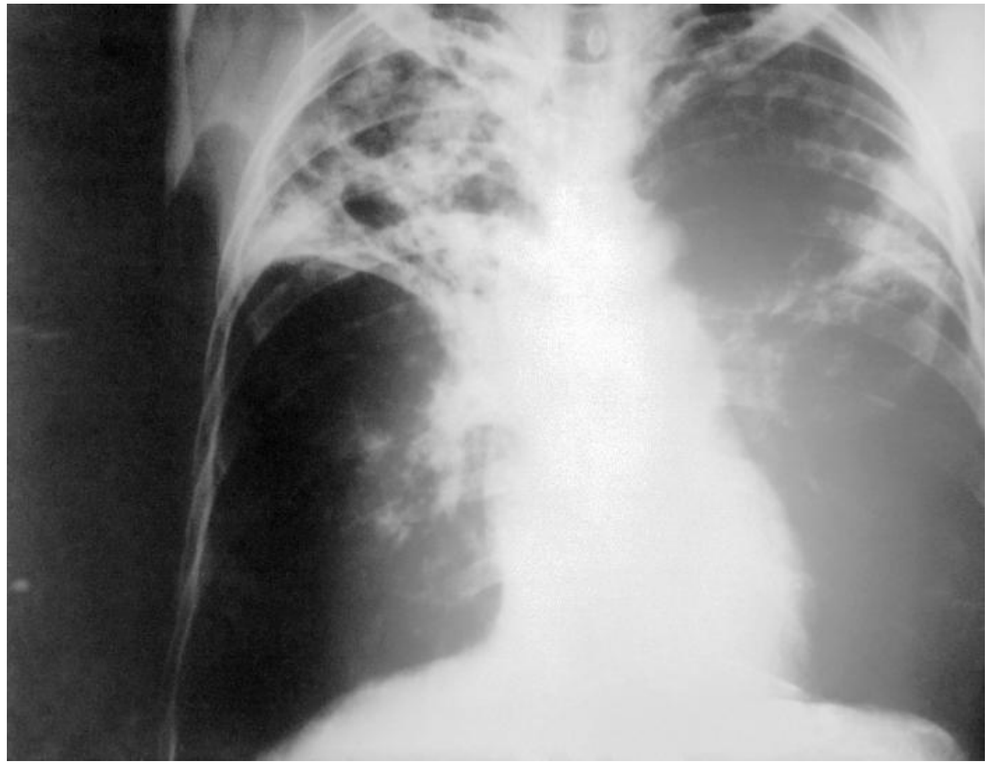
- *Mycobacterium tuberculosis*
- Usually attacks the lungs
- Airborne
- Latent TB infection vs TB disease



Latent TBI

- The majority of pulmonary tuberculosis infections are clinically and radiographically unapparent,
  - A positive TST or IGRA result, most commonly, is the only indication that infection with *Mtb* has taken place
- In the absence of treatment, approximately 4%–6% of individuals who acquire LTBI will develop active TB disease during their lifetime.
- The greatest risk of progression is during the first 2 years following exposure
- Individuals who have a prior latent infection with *Mtb* (not treated) and then acquire HIV infection will develop TB disease at an approximate rate of 5%–10% per year (in the absence of effective HIV treatment)

TB Disease (aka Active TB)



- Bacteria are multiplying
- Symptoms may include:
  - Cough (3+ weeks)
  - Chest pain
  - Cough with sputum with/without blood
  - Fatigue
  - Weight loss and poor appetite
  - Fevers/chills and night sweats
- Contagious -- airborne spread
- Often abnormal chest x-ray and positive sputum studies

BOX 2. Risk factors for progression of infection to active tuberculosis

Persons at increased risk* for progression of infection to active tuberculosis include

- persons with human immunodeficiency virus (HIV) infection;†
- infants and children aged <5 years;†
- persons who are receiving immunosuppressive therapy such as tumor necrosis factor–alpha (TNF-α) antagonists, systemic corticosteroids equivalent to ≥15 mg of prednisone per day, or immune suppressive drug therapy following organ transplantation;†
- persons who were recently infected with *M. tuberculosis* (within the past 2 years);
- persons with a history of untreated or inadequately treated active tuberculosis, including persons with fibrotic changes on chest radiograph consistent with prior active tuberculosis;
- persons with silicosis, diabetes mellitus, chronic renal failure, leukemia, lymphoma, or cancer of the head, neck, or lung;
- persons who have had a gastrectomy or jejunoileal bypass;
- persons who weigh <90% of their ideal body weight;
- cigarette smokers and persons who abuse drugs or alcohol; and
- populations defined locally as having an increased incidence of active tuberculosis, possibly including medically underserved or low-income populations

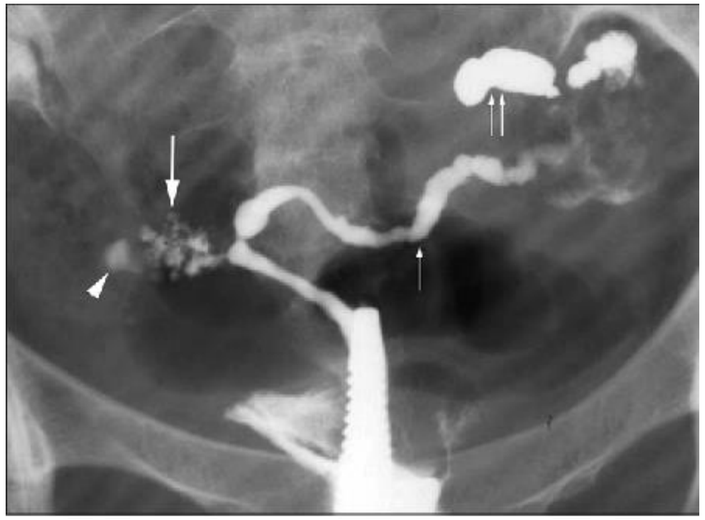
Source: Based on CDC. Targeted tuberculin testing and treatment of latent tuberculosis infection. MMWR 2000;49(No. RR-6).

* Persons with these characteristics have an increased risk for progression of infection to active tuberculosis compared with persons without these characteristics.

† Indicates persons at increased risk for a poor outcome (e.g., meningitis, disseminated disease, or death) if active tuberculosis occurs.

CDC, MMWR 2010

Urogenital TB



- Third most common extrapulmonary TB
- Female genital tract:
  - Usually affects fallopian tubes, endometrium, and ovaries
  - Associated with **0.2 – 21% of infertility depending on setting**
  - Presents with infertility, **pelvic pain, pelvic mass, or menstrual disorders**
  - Hysterosalpingogram with tubal occlusion or cavity deformity
  - Endometrial biopsy with histology, staining, and culture

TB Vaccine

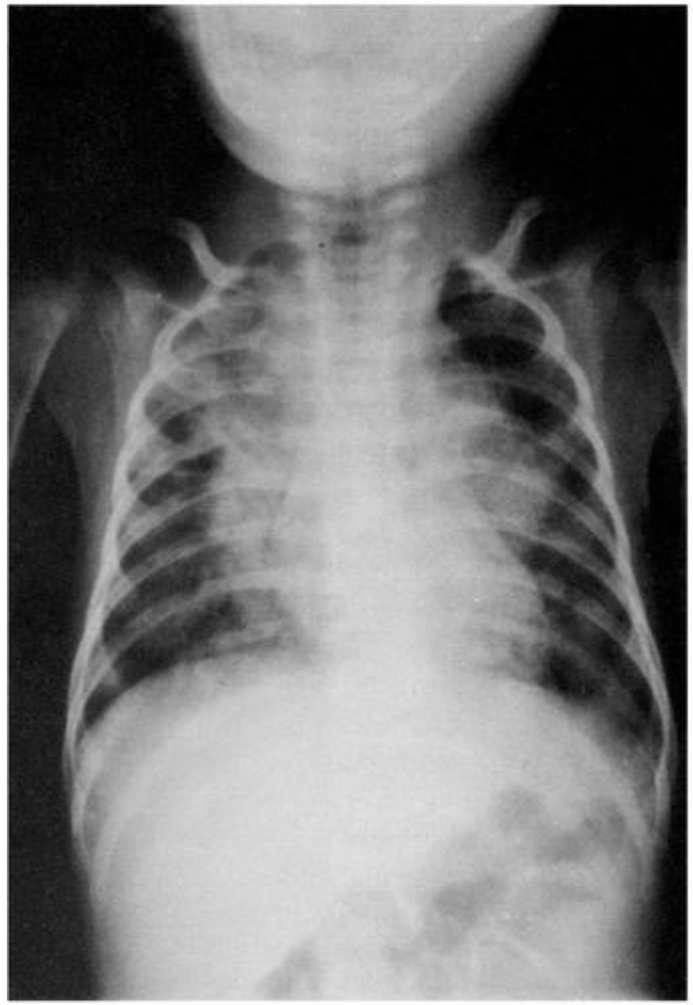
- Bacille Calmette-Guerin (BCG) vaccine
- **Limited efficacy in preventing adult TB disease**
- Rare in the US
- May cause positive TST
- IGRAs (TB blood tests) not affected

TB Disease and Pregnancy

- Pregnancy morbidity and mortality
  - Antenatal admission, anemia, cesarean birth (3x increase)
  - Miscarriage (9x increase)
  - Preterm birth and low birthweight (2x increase)
- **Pregnancy does not appear to increase susceptibility to TB infection or progression to TB disease**
- Pregnancy can make diagnosis of TB more difficult
- Report of higher incidence of TB disease postpartum

Congenital and Neonatal TB

- **Mortality rate of about 50%**
- Congenital TB
  - Respiratory distress
  - Fever
  - Hepatosplenomegaly
  - Poor feeding
  - Low birth weight
- Neonatal TB



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Screening:

Who do we need to be thinking about?

https://www.cdc.gov/tb/topic/testing/healthcareworkers.htm

Questions

- **Where have you lived and worked?**
  - Latin America, the Caribbean, Africa, Asia, Eastern Europe, Russia
  - Correctional facilities, long-term care facilities, homeless shelters
- **Has anyone you lived with or spent time with been sick?**
  - Do they have TB disease?
- **Have you been diagnosed with TB in the past?**
  - Not adequately treated, infection within past two years
- **Do you have HIV, diabetes, immunocompromise, or inject drugs?**

Los Angeles County Adult Tuberculosis Risk Assessment

- Use this tool to identify asymptomatic **adults** for TB infection testing
- Re-testing should only be done in persons who previously tested negative, and have **new** risk factors since the last assessment
- For TB symptoms or abnormal chest x-ray consistent with active TB disease → Evaluate for active TB disease

Complete evaluation for active TB disease includes: symptom screen, chest x-ray, and if indicated, sputum AFB smears, cultures, and nucleic acid amplification testing. A negative tuberculin skin test or interferon gamma release assay does not rule out active TB disease.

Check appropriate risk factor boxes below.

TB infection testing is recommended if any of the 4 boxes below are checked.

If TB infection test result is positive and active TB disease is ruled out, TB infection treatment is recommended.

☐ **Birth, travel, or residence** for at least 1 month or frequent border crossing in a country with an elevated TB rate

- Includes countries other than the United States, Canada, Australia, New Zealand, or Western and Northern European countries
- If resources require prioritization within this group, **prioritize** patients with at least one medical risk for progression (see Fact Sheet for list)
- Interferon Gamma Release Assay is preferred over Tuberculin Skin Test f or non-U.S.-born persons ≥ 2 years old

☐ **Immunosuppression**, current or planned

- HIV infection, organ transplant recipient, treated with TNF-alpha antagonist (e.g., infliximab, etanercept, others), steroids equivalent of prednisone ≥15 mg/day for ≥1 month) or other immunosuppressive medication

☐ **Close contact** to someone with infectious TB disease at any time

- The Centers for Disease Control and Prevention indicates that the evaluation of contacts and treatment of infected contacts is an important component of the U.S. strategy for TB elimination

☐ **History of homelessness or incarceration**, current or past

- The U.S. Preventive Service Task Force (USPSTF) recommends screening populations at increased risk for TB infection based on increased risk of exposure including persons who have lived in high-risk congregate settings (e.g. homeless shelters and correctional facilities)

☐ None; no TB testing is indicated at this time.

Provider: _____

Assessment Date: _____

Patient Name: _____

Date of Birth: _____

(Place sticker here if applicable)

See the **Los Angeles County Adult Tuberculosis Risk Assessment User Guide** for more information about using this tool.

Adapted for LAC use from the California Tuberculosis Risk Assessment available on the PROVIDERS page at www.ctca.org
To ensure you have the most recent version visit http://publichealth.lacounty.gov/tb/providertoolkit.htm

CTCA California Tuberculosis Controllers Association · CDPH California Department of Public Health · Curry International Tuberculosis Center · County of Los Angeles Public Health

February 2025

http://publichealth.lacounty.gov/tb/providertoolkit.htm

TB cases and rates

Table 1. TB cases and rates, by jurisdiction — United States, 2023 and 2024

In 2024, 10,347 TB cases were provisionally reported with a corresponding rate of 3.0 cases per 100,000 population. The percentage increase in both case counts (8%) and rates (6%) from 2023 to 2024 were less than the increases from 2022 to 2023 (15% in case counts and 15% in rates) (Figure). Thirty-four states and the District of Columbia reported increases in TB case counts and rates from 2023 to 2024.

Jurisdiction	No. of cases*			TB rate†		
	2023	2024	% change 2023 to 2024	2023	2024	% change 2023 to 2024§
All	**9,622**	**10,347**	**8**	**2.9**	**3.0**	**6**
Alabama	92	90	-2	1.8	1.7	-3
Alaska	77	94	22	10.5	12.7	21
Arizona	202	210	4	2.7	2.8	2
Arkansas	82	119	45	2.7	3.9	44
California	2,108	2,100	0	5.4	5.3	-1

https://www.cdc.gov/tb-data/2024-provisional/index.html

TB cases in US and origin of birth

- **Origin of birth is a prominent risk factor for TB disease in the United States. Most TB cases (7299, 75.8%) in 2023 occurred among non-U.S.–born persons.**
- **In 2023, among non-U.S.–born persons with TB disease:**

	1 yr after arrival	2 yrs after arrival	3 yrs after arrival	4 yrs after arrival	5 yrs after arrival
# cases	1632	1098	827	1062	2227
% cases	22.4	15.0	11.3	14.6	30.5

Compared with 2022, the incidence rate in 2023 for those non-U.S.–born increased from 13.1-15.0 cases per 100,000 persons (14%), while the rate for U.S.-born persons increased by 7.5% to 0.8%

TB disease rates and place of origin

In 2023, the five most common countries of birth among non-U.S.–born persons with TB disease were the same as in previous years. These countries of birth accounted for almost half (47.6%) of U.S. TB disease cases among non-U.S.–born persons:

- Mexico (17.3%)
- Philippines (11.5%)
- India (7.9%)
- Vietnam (6.2%)
- China (4.7%)

3

Management:

What are we going to do about it?

When to Treat TB in Pregnancy

- **TB disease**
- **LTBI** treatment can usually be delayed until 3 months post-partum UNLESS high risk of progression to TB disease
  - Recent infection
  - HIV infected

* Baseline LFTs and HIV/HBV/HCV

Medications for TB Disease in Pregnancy

1. Isoniazid (INH), rifampin (RIF), and ethambutol (EMB) daily for 2 months **THEN**
2. INH and RIF daily OR twice weekly for 7 months

* Outside the US, PZA increasingly used, as well as in US – commonly used if HIV-infected or severe TB disease

* 9 months of treatment when not giving PZA

* Supplementary pyridoxine 25-50 mg/day while taking INH

TB Medications Not Used in Pregnancy

- Streptomycin
- Kanamycin
- Amikacin
- Capreomycin
- Fluoroquinolones****

*****Quinolones not absolutely contraindicated based on individualized factors (drug-resistance, rx-intolerance)*

Medications for LTBI in Pregnancy

- **RIF daily for 4 months**
- **INH and RIF daily for 3 months**
- INH daily for 6 months
- INH daily for 9 months
- **Rifapentine/INH weekly for 3 months (12 doses)

- Supplementary pyridoxine 25-50 mg/day while taking any INH-containing regimen
- ***** This course of LTBI therapy is not currently 1st line in pregnancy (stay tuned for upcoming slides)***

Medications: Side effects

- Overall, these drugs are well-tolerated, and INH and rifampin have established safety profiles in pregnancy
- INH
  - GI (nausea, in up to 15%) : < 5% discontinue, usually transient
  - LFT elevations: up to 60% with mild elevations, typically resolve
  - < 1-2% develop grade 3-4 transaminitis
- Rifampin
  - Dose-dependent discoloration of body fluids
  - GI: constipation, LFT elevations
- Rifapentine
  - GI side effects
  - Rifapentine, like other rifamycins, may produce an orange-red discoloration of body fluids (urine, tears, sputum, feces, and cerebrospinal fluid).

ORIGINAL ARTICLE

Three Months of Rifapentine and Isoniazid for Latent Tuberculosis Infection

Timothy R. Sterling, M.D., M. Elsa Villarino, M.D., M.P.H., Andrey S. Borisov, M.D., M.P.H., Nong Shang, Ph.D., Fred Gordin, M.D., Erin Bliven-Sizemore, M.P.H., Judith Hackman, R.N., Carol Dukes Hamilton, M.D., Dick Menzies, M.D., Amy Kerrigan, R.N., M.S.N., Stephen E. Weis, D.O., Marc Weiner, M.D., et al., for the TB Trials Consortium PREVENT TB Study Team*

December 8, 2011
N Engl J Med 2011; 365:2155-2166
DOI: 10.1056/NEJMoa1104875

38 References 607 Citing Articles Letters

CDC FACT SHEET

PREVENT TB Study

Tuberculosis (TB) is one of the world's leading infectious killers, and has not yet been eliminated in the U.S. Despite the significant burden of the disease, major medical advances in preventing, diagnosing, and treating TB have been rare. The current standard treatment for latent TB infection is effective when completed, but it is decades-old, lengthy, and complicated — which contributes to poor adherence.

The Centers for Disease Control and Prevention has been at the forefront of research into new, simpler ways to treat latent TB infection in order to prevent the spread of TB disease. The recently completed PREVENT TB study, sponsored by CDC, was one of the largest U.S. government clinical trials conducted to date on latent TB treatment. The results, described below, represent one of the most significant advances in TB research in decades.

Study Overview

Background

- The PREVENT TB trial tested the effectiveness of a new preventive TB treatment regimen among individuals with latent TB infection who are at high risk of progressing to TB disease (see box, this page).

Methodology

- Study enrolled more than 8,000 participants (n=8,053). Most were in the U.S. and Canada, though some lived in Brazil and Spain.
- Participants were randomly assigned to receive one of two regimens:
  - *Current standard treatment regimen:* A self-administered daily dose of isoniazid taken for 9 months
  - *Study treatment regimen:* A once-weekly dose of rifapentine and isoniazid taken for 3 months, and given with supervision (called directly observed therapy)
- Trial lasted approximately 10 years.

Latent TB Infection vs. TB Disease

Individuals with latent TB infection have TB bacteria in their bodies, but do not feel sick, do not have any symptoms, and cannot spread TB to others. The only sign of latent TB infection is a positive reaction to a special skin test or TB blood tests. More than 11 million people in the U.S. have latent TB (about 4 percent of the total population).

While not everyone with latent TB infection will develop TB disease, about 5 to 10 percent of infected persons will if not treated. Some of those people will develop TB disease soon after infection (within the first two years), while others will develop TB disease later — particularly if their immune systems become weak, such as those who are also infected with HIV. Persons with TB disease may spread TB bacteria to others, although this typically requires prolonged exposure. In 2010, there were more than 11,000 reported cases of TB disease in the U.S.

Key Findings

- The new regimen is safe and as effective in preventing new cases of TB disease as the current standard regimen. There were very few cases of TB disease in either arm: 7 cases among those taking the study regimen and 15 cases among those taking the current standard regimen.
- In addition, there was higher adherence to the new regimen, with 82 percent of participants completing the 3-month course of medication, compared to 69 percent who completed the 9-month course.

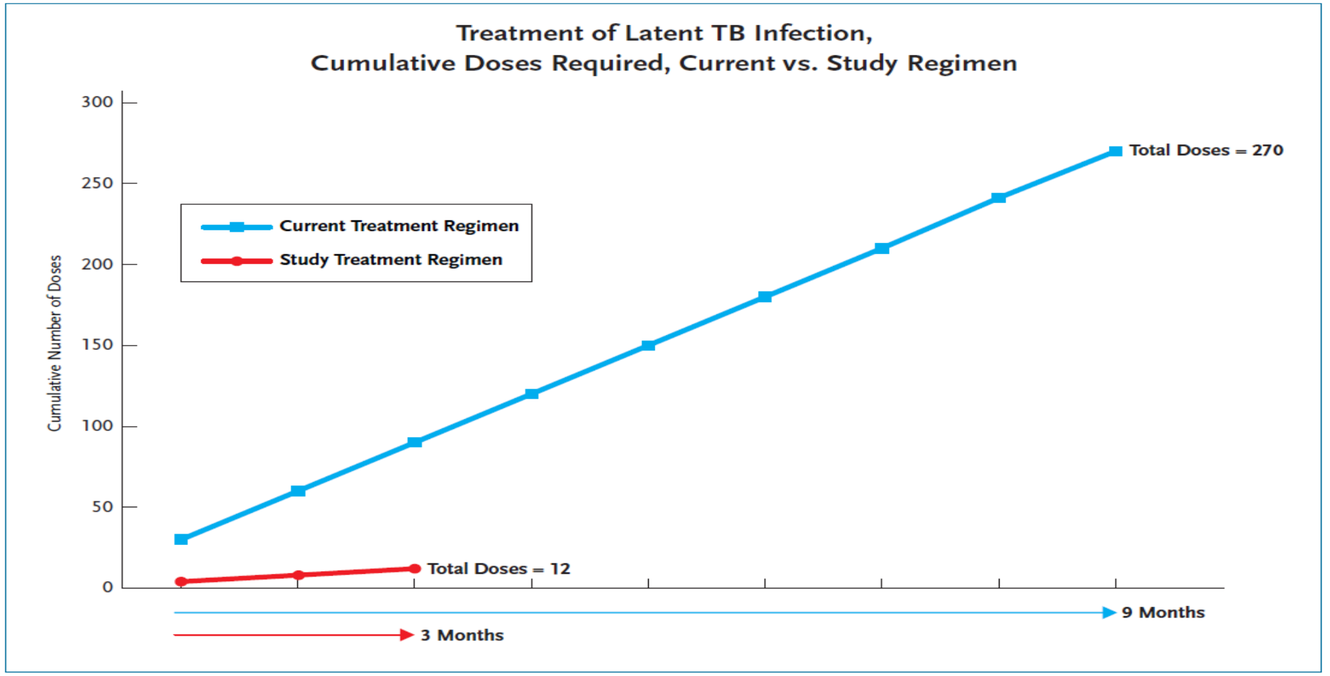
CDC FACT SHEET

Study Implications

The outcome of the PREVENT TB trial represents a major advance in TB treatment:

- The new regimen is simpler — reducing the required treatment from 270 daily doses over 9 months to 12 once-weekly doses over 3 months.
- The study results suggest that we may soon be able to treat latent TB infection more easily, which would prevent more cases and slow the spread of TB disease.
- The trial results are applicable only to countries with low-to-medium TB incidence. Additional research will likely be needed before the new regimen can be recommended in countries with a high incidence of TB.

CDC recently convened an expert consultation to review the data and begin working on new treatment guidelines for the use of the new regimen in the U.S. These guidelines are expected later this year.



LTBI Treatment in Pregnancy Research

ORIGINAL RESEARCH

Exposure to Latent Tuberculosis Treatment during Pregnancy

The PREVENT TB and the iAdhere Trials

Ruth N. Moro[1,2], Nigel A. Scott[1,2], Andrew Vernon[1], Naomi K. Tepper[1], Stefan V. Goldberg[1], Kevin Schwartzman[3], Chi-Chiu Leung[4], Neil W. Schluger[5], Robert W. Belknap[6], Richard E. Chaisson[7], Masahiro Narita[8,9], Elizabeth S. Machado[10], Marta Lopez[11], Jorge Sanchez[12,13], Margarita E. Villarino[1], and Timothy R. Sterling[14]

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Moro, R. N., Scott, N. A., Vernon, A., Tepper, N. K., Goldberg, S. V., Schwartzman, K., ... & Sterling, T. R. (2018). Exposure to latent tuberculosis treatment during pregnancy. The PREVENT TB and the iAdhere Trials. *Annals of the American Thoracic Society*, *15*(5), 570-580.

Pregnancy and Infant Outcomes About the Same

Table 3. Pregnancy outcomes of those considered exposed to study drugs versus all reported pregnancies

Outcome	Pregnancies Exposed to Study Drugs			All Reported Pregnancies		
	3HP (*n* = 31)	9H (*n* = 56)	Total (*n* = *87*)	3HP (*n* = 54)	9H (*n* = 72)	Total (*n* = *126*)
Pregnancy outcomes						
Live birth, *n* (%)	20 (65)	41 (73)	61 (70)	37 (69)	56 (78)	93 (74)
Elective abortion, *n* (%)	7 (23)	7 (13)	14 (16)	9 (17)	7 (10)	16 (13)
Fetal loss (all are spontaneous abortion <20 wk), *n* (%)	4 (13)*	8 (14)*	12 (14)†	8 (15)‡	9 (13)‡	17 (13)§
Fetal loss, *n* (%) 95% CI of individual proportion	4/31 (13) (4–30)	8/56 (14) (6–26)	12/87 (14) (7–23)	8/54 (15) (7–27)	9/72 (13) (6–22)	17/126 (13) (8–21)
Infant outcomes						
Congenital anomalies, *n* (%)‖	0¶	2 (5)¶	2 (3)**	1 (3)††	2 (4)††	3 (3)‡‡
Congenital anomalies, *n* (%) 95% CI of individual proportion	0/20 (0) (0–17)	2/41 (5) (1–17)	2/61 (3) (0–11)	1/37 (3) (0–14)	2/56 (4) (0–12)	3/93 (3) (1–9)

Reassurance about Treatment from Small Studies

Pregnancy Outcomes	PREVENT TB and iAdhere Trials	U.S. General Pregnant Population
Fetal Loss	13 – 14%	17% [1]
Congenital Anomalies	3%	3% [2]

[1]Reported in 2008 by 45 states among 6.5 million pregnancies in women through age 44 years

[2] U.S. point estimate of congenital anomalies was also 3% according to a 2008 CDC publication “Update on overall prevalence of major birth defects”

Prevention of TB in Pregnancy

Clinical Infectious Diseases

MAJOR ARTICLE

Pharmacokinetics and Safety of 3 Months of Weekly Rifapentine and Isoniazid for Tuberculosis Prevention in Pregnant Women

Jyoti S. Mathad,[1] Rada Savic,[2] Paula Britto,[3,a] Priya Jayachandran,[2,a] Lubbe Wiesner,[4] Grace Montepiedra,[3] Jennifer Norman,[4] Nan Zhang,[2] Ellen Townley,[5] Nahida Chakhtoura,[6] Sarah Bradford,[7] Sandesh Patil,[8] Stephanie Popson,[9] Tsungai Chipato,[10] Vanessa Rouzier,[1,11] Deborah Langat,[12] Amphan Chalermchockcharoentkit,[13] Portia Kamthunzi,[14] Amita Gupta,[8,15] and Kelly E. Dooley[15]; on behalf of the IMPAACT 2001 Study Team

Mathad, J. S., Savic, R., Britto, P., Jayachandran, P., Wiesner, L., Montepiedra, G., ... & Dooley, K. E. (2022). Pharmacokinetics and Safety of 3 Months of Weekly Rifapentine and Isoniazid for Tuberculosis Prevention in Pregnant Women. *Clinical Infectious Diseases*, *74*(9), 1604-1613.

IMPAACT
International Maternal Pediatric Adolescent AIDS Clinical Trials Network

[1]Zenner AJRCCM 2011; [2]WHO LTBI 2018; [3]Gupta, NEJM 2019; [4]Sterling NEJM 2011 &[5]AIDS 2016; [6]Villarino JAMA 2015

TB and the Neonate

- LTBI -- does not warrant separation

- TB disease -- shared decision-making around separation
  - A mother can infect her newborn baby if she is infectious; usually this is only if she has a cough and is not on treatment.
  - Bein on treatment for TB is not a reason for separation from the newborn
  - Normally after 2 weeks of treatment the mother is usually not infectious.

TB and Breastfeeding

- LTBI: breastfeeding OK immediately
- **TB disease: breastfeeding OK after being on 2 weeks of treatment**
- INH, RIF, EMB, PZA all with concentrations in breast milk too small to produce toxicity in the infant or child
  - Congenital infection and TB in breast milk unlikely UNLESS mother has extrapulmonary or disseminated TB disease
- If taking INH, **all** must also take pyridoxine supplementation
- Warn patients about **RIF-induced orange discoloration** of body fluids, including breast milk

Available Resources

- **TB Centers of Excellence for immediate answers**
  https://www.cdc.gov/tb/education/tb_coe
- LTBI Guide for Primary Health Care Providers
  https://www.cdc.gov/tb/publications/ltbi/default.htm

References

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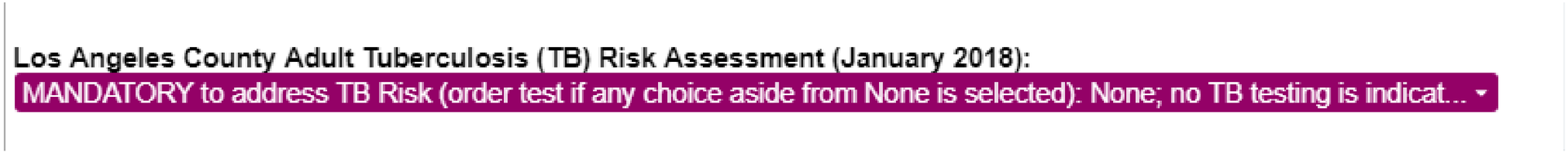
Questions

Snapshot of the UCLA Provider Experience

TB Risk Assessment

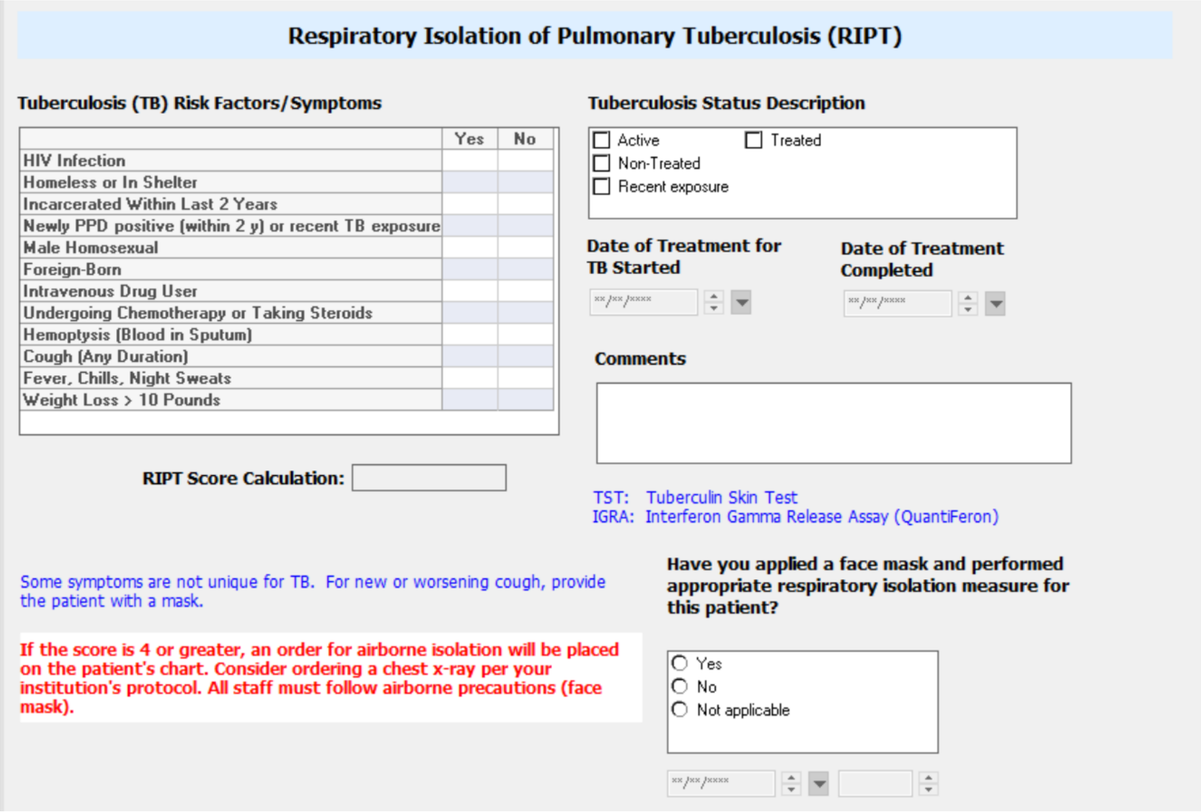
- No standard risk assessment
  - Dot phrase in Epic that has LAC adult TB risk assessment: TBRISKASSESSMENTADULTJAN2018



Los Angeles County Adult Tuberculosis (TB) Risk Assessment (January 2018): Birth, travel, or residence in a country with an elevated TB rate for at least 1 month
Los Angeles County Adult Tuberculosis (TB) Risk Assessment (January 2018): Immunosuppression, current or planned
Los Angeles County Adult Tuberculosis (TB) Risk Assessment (January 2018): Close contact to someone with infectious TB disease at any time
Los Angeles County Adult Tuberculosis (TB) Risk Assessment (January 2018): History of homelessness or incarceration
Los Angeles County Adult Tuberculosis (TB) Risk Assessment (January 2018): None; no TB testing is indicated at this time

Symptom Review

- No standardized TB symptom review dot phrase in Epic



Respiratory Isolation of Pulmonary Tuberculosis (RIPT)

Tuberculosis (TB) Risk Factors/Symptoms

	Yes	No
HIV Infection		
Homeless or In Shelter		
Incarcerated Within Last 2 Years		
Newly PPD positive (within 2 y) or recent TB exposure		
Male Homosexual		
Foreign-Born		
Intravenous Drug User		
Undergoing Chemotherapy or Taking Steroids		
Hemoptysis (Blood in Sputum)		
Cough (Any Duration)		
Fever, Chills, Night Sweats		
Weight Loss > 10 Pounds		

Tuberculosis Status Description

☐ Active ☐ Treated
☐ Non-Treated
☐ Recent exposure

Date of Treatment for TB Started mm/dd/yyyy

Date of Treatment Completed mm/dd/yyyy

Comments

RIPT Score Calculation:

TST: Tuberculin Skin Test
IGRA: Interferon Gamma Release Assay (QuantiFeron)

Some symptoms are not unique for TB. For new or worsening cough, provide the patient with a mask.

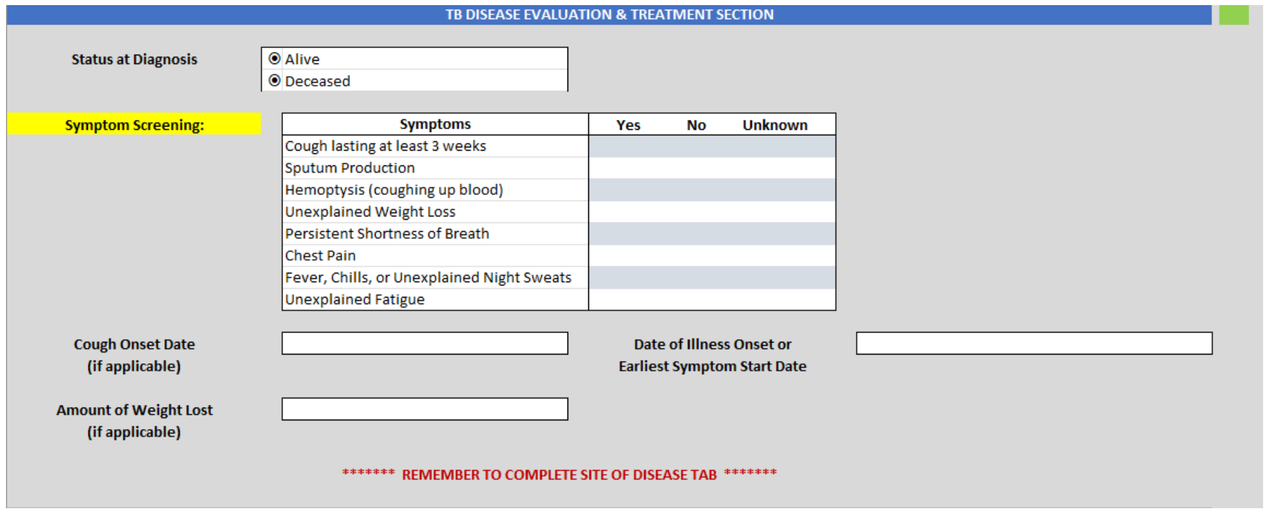
If the score is 4 or greater, an order for airborne isolation will be placed on the patient's chart. Consider ordering a chest x-ray per your institution's protocol. All staff must follow airborne precautions (face mask).

Have you applied a face mask and performed appropriate respiratory isolation measure for this patient?

○ Yes
○ No
○ Not applicable

mm/dd/yyyy

Current symptom review example (HUCLA)



TB DISEASE EVALUATION & TREATMENT SECTION

Status at Diagnosis

◉ Alive
◉ Deceased

Symptom Screening:

Symptoms	Yes	No	Unknown
Cough lasting at least 3 weeks			
Sputum Production			
Hemoptysis (coughing up blood)			
Unexplained Weight Loss			
Persistent Shortness of Breath			
Chest Pain			
Fever, Chills, or Unexplained Night Sweats			
Unexplained Fatigue			

Cough Onset Date (if applicable)

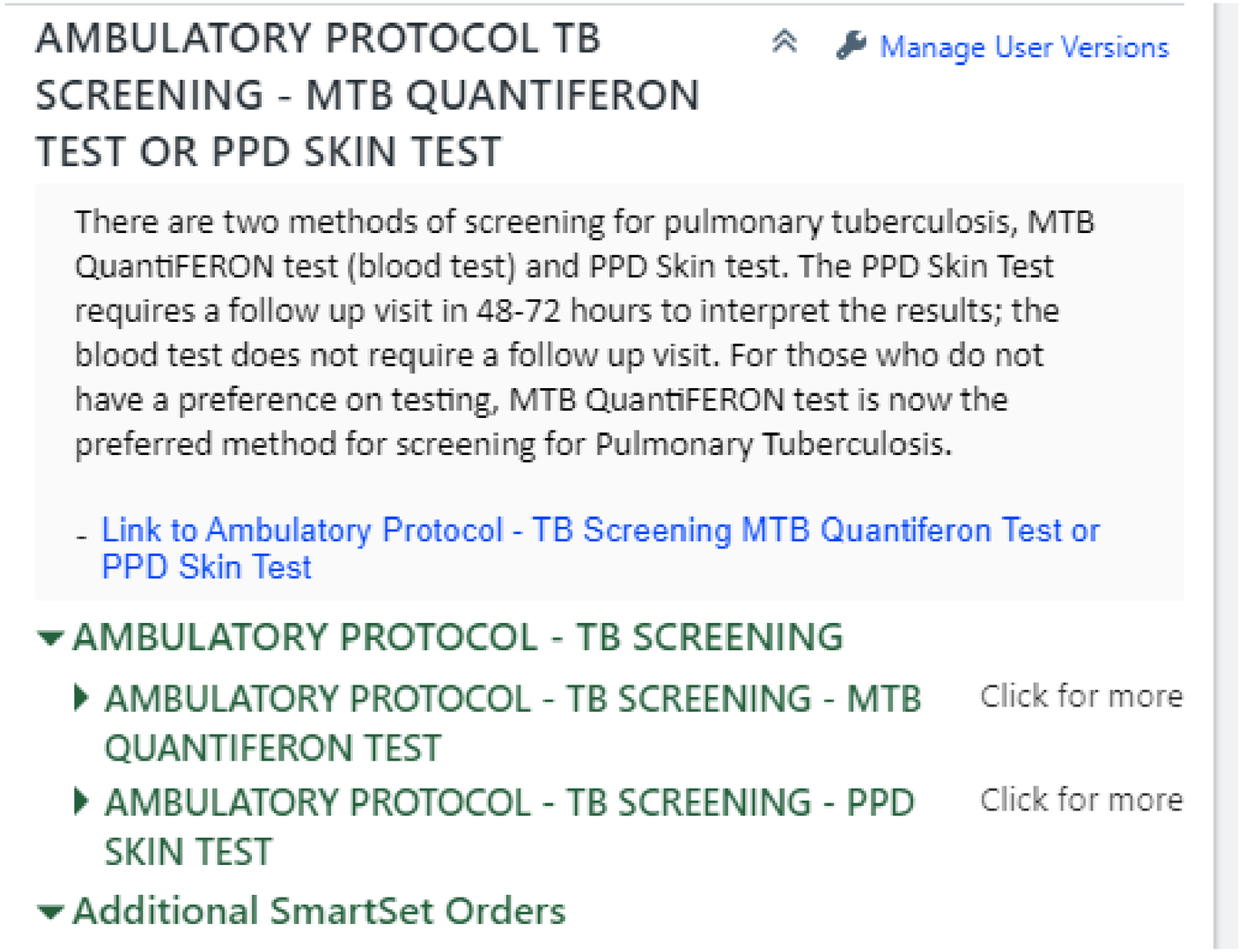
Date of Illness Onset or Earliest Symptom Start Date

Amount of Weight Lost (if applicable)

******* REMEMBER TO COMPLETE SITE OF DISEASE TAB *******

Proposed symptom review

TB Screening Order Set



TB Screening Order Set

- Set includes a preference for IGRA
- IGRAs preferred for adult patients and UCLA healthcare personnel
- IGRAs preferred for pediatric patients
  - No age cut-off although <2 y/o likely seen by peds ID

AMBULATORY PROTOCOL - TB SCREENING - MTB QUANTIFERON TEST

MA, LVN and RN Initiation Only
For New, Consultation and Established UCLA Patients

Use "**Per Protocol: Cosign Required"** order mode when initiating this protocol.

CRITERIA:

- Patients 18 years and older, who are requesting MTB QuantiFERON test via MyChart, telephone, walk-in (no MD appointment)
- Patient has had an MTB QuantiFERON test within the past 1 year
  - If Negative, provide patient with a copy of the result.
  - If patient requests additional testing or needs to discuss, then Make an appointment with MD
  - If Positive, Make an appointment with MD
- Patient has not had an MTB QuantiFERON test within the past 1 year
- According to this patient's chart, the result of the MTB QuantiFERON test done >1 year ago was negative.
  - If unknown or positive, make an appointment with the MD

Selecting this protocol confirms that you have reviewed the protocol criteria and are approved to initiate this protocol for this patient.

☐ MTB-Quantiferon-Gold Plus ELISA (Ambulatory Protocol - TB Screening - MTB Quantiferon Test)

MA, LVN and RN Initiation Only For New, Consultation and Established UCLA Patients Use "Per Protocol: Cosign Required" order mode when initiating this protocol. CRITERIA: Patients 18 years and older, who are requesting MTB QuantiFERON test via MyChart, telephone, walk-in (no MD appointment) Patient has had an MTB QuantiFERON test within the past 1 year If Negative, provide patient with a copy of the result. If patient requests additional testing or needs to discuss, then Make an appointment with MD If Positive, Make an appointment with MD Patient has not had an MTB QuantiFERON test within

AMBULATORY PROTOCOL - TB SCREENING - PPD SKIN TEST

MA, LVN and RN Initiation Only

Use "**Per Protocol: Cosign Required"** order mode when initiating this protocol.

STAFF INSTRUCTIONS:

- Instruct the patient that they must return to have it read within 48 to 72 hours or the test will not be valid for interpretation
- Only licensed staff may interpret the results of a PPD Skin test. Medical Assistants are not permitted to interpret a PPD Skin test; they may measure the amount of induration but may not interpret this as "positive" or "negative."
- Upon Return (within 48 – 72 hours of PPD placement):

IF SEEN BY LVN or RN:

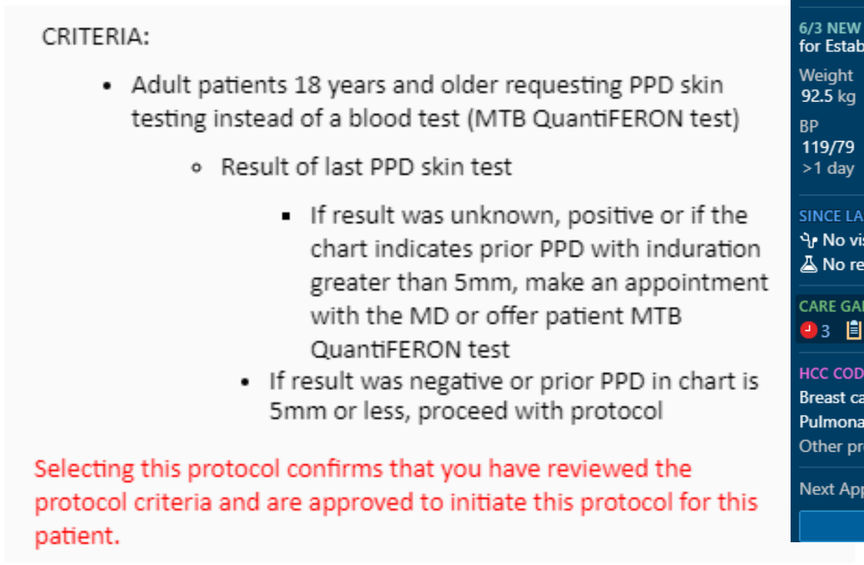
- STEP 1: LVN or RN shall measure amount of induration and enter this result into CareConnect.
- STEP 2: If induration is less than 10 mm, LVN or RN shall indicate that this is "negative" on any required forms. If induration is greater than 15 mm, LVN or RN shall indicate that this is positive" on any required form and patient shall be instructed to follow up with provider. If induration is greater than 10 mm and less than 15 mm, LVN or RN shall consult with provider.

IF SEEN BY MA (MEDICAL ASSISTANT):

- STEP 1: MA shall measure amount of induration and enter this measurement into CareConnect.
- STEP 2: MA shall inform provider of the amount of induration so that Provider may interpret the result as negative or positive and sign any required forms.

TB Screening Order Set Feedback

- No reference to California TB Screening Law AB 2132 in EHR
- TB screening order set needs to be searched and is not available as a suggested option when the Care Gaps Menu opens
  - In light of AB2132, can the TB risk assessment be included in the Care Gap activities?



CRITERIA:

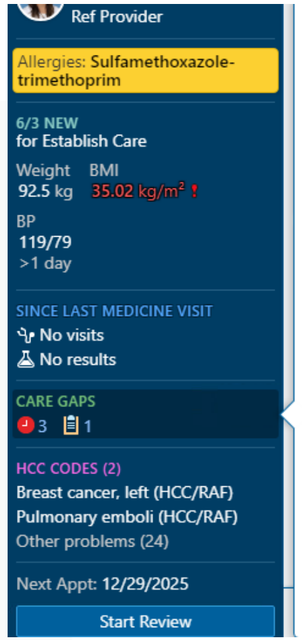
- Adult patients 18 years and older requesting PPD skin testing instead of a blood test (MTB QuantiFERON test)
  - Result of last PPD skin test
    - If result was unknown, positive or if the chart indicates prior PPD with induration greater than 5mm, make an appointment with the MD or offer patient MTB QuantiFERON test
  - If result was negative or prior PPD in chart is 5mm or less, proceed with protocol

Selecting this protocol confirms that you have reviewed the protocol criteria and are approved to initiate this protocol for this patient.

☐ TB Skin Test - (Ambulatory Protocol - TB Screening - MTB Quantiferon Test)

MA, LVN and RN Initiation Only Use "Per Protocol: Cosign Required" order mode when initiating this protocol. STAFF INSTRUCTIONS: Instruct the patient that they must return to have it read within 48 to 72 hours or the test will not be valid for interpretation CRITERIA: Adult patients 18 years and older requesting PPD skin testing instead of a blood test (MTB QuantiFERON test) Result of last PPD skin test If result was unknown or positive, make an appointment with the MD or offer patient MTB QuantiFERON test If result was negative, proceed with protocol Selecting this protocol confirms that you have reviewed the protocol criteria and are approved to initiate this protocol for this patient.

☐ Screening-pulmonary TB [Z11.1]



Ref Provider

Allergies: Sulfamethoxazole-trimethoprim

6/3 NEW
for Establish Care

Weight 92.5 kg
BMI 35.02 kg/m²

BP 119/79
>1 day

SINCE LAST MEDICINE VISIT
No visits
No results

CARE GAPS
3 1

HCC CODES (2)
Breast cancer, left (HCC/RAF)
Pulmonary emboli (HCC/RAF)
Other problems (24)

Next Appt: 12/29/2025

Start Review

Care Gaps — Close care gaps

Overdue

APR 15 2019 — Advance Directive (Every 5 Years)
Last completed: Apr 15, 2014

NOV 25 2019 — Shingles (Shingrix) Vaccine (2 of 2)
Last completed: Sep 30, 2019

Never done — Statin prescribed for ASCVD Prevention or Treatment (Once)

Ordered This Encounter

JUN 3 2025 — Breast Cancer Screening: Mammogram (Every 2 Years)
Order Details

Upcoming

SEP 1 2025 — Influenza Vaccine (Season Ended)
Last completed: Aug 24, 2023

JUN 3 2026 — Preventive Wellness Visit (Yearly)
Last completed: Jun 3, 2025

MAY 6 2031 — Colorectal Cancer Screening (Colonoscopy) (Every 10 Years)
Last completed: May 6, 2021

JUL 25 2033 — Tdap/Td Vaccine (3 - Td or Tdap)
Last completed: Jul 25, 2023

Chest X-rays

- Chest x-rays are not part of the initial screening order set
- No order set for CXR for IGRA (+) patients
- Primary care is following-up on their own
  - However, one of our UCLA partners report ordering CXR is not difficult

Treatment

- The medications for treatment (rifampin, isoniazid, rifapentine) are on formulary but this does not clarify in the EHR whether these are covered by insurance or not
- Vast majority of PCPs refer to ID specialty clinic for LTBI treatment
- Pediatric ID uses rifamycin based regimens

Assessment

- LTBI diagnosis and treatment is referred to adult ID/peds ID
- Epic currently not set up to support new California TB Screening Law AB 2132

Challenges

Risk	LTBI Diagnosis				Treatment	
STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6	STEP 7

Assess patient risk for TB infection **No standard risk assessment** **DOT phrase not widely available**	Test for TB infection, IGRA preferred **None of LTBI cascade found in Care Gap Activities**	Document positive tests for TB infection	Evaluate patient for TB disease, including chest x-ray **No order set for CXR for positive IGRAs**	Complete chest x-ray and document normal result	Prescribe LTBI treatment **No order set for LTBI treatment**	Retain patient in care and document treatment completion **No standardized location**

Recommendations and Considerations

- How can TB risk assessment be made standardized and more accessible in EHR?
  - In light of AB 2132, include TB risk assessment requirement in the Care Gap activities
  - Implement EHR-based method to document TB risk assessment
- In TB test ordering order set, include CXR order for positive TB tests
- Create an LTBI treatment order set
- Create a place in EHR to document LTBI treatment completion (to avoid repeatedly dealing with a positive TB test)
- Establishing protocol to prevent repeating TB test for those with positive TB test

Questions

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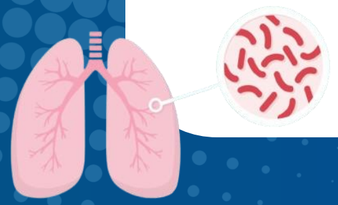
Discussion

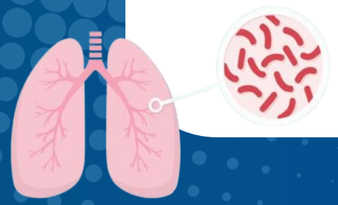
1. Are there aspects of LTBI care where you feel very confident?
2. At what stage of the LTBI care cascade does your clinic or program experience the greatest patient attrition or challenge?
3. What strategies or approaches have you found effective — or would you like to explore — to improve retention or reduce attrition at that stage?
4. What tools, templates, or approaches has your clinic developed that could help others in this group?
5. How does your clinic approach LTBI management for pregnant individuals?

Risk	LTBI Diagnosis				Treatment	
STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6	STEP 7
Assess patient risk for TB infection	Test for TB infection, IGRA preferred	Document positive tests for TB infection	Evaluate patient for TB disease, including chest x-ray	Complete chest x-ray and document normal result	Prescribe LTBI treatment	Retain patient in care and document treatment completion



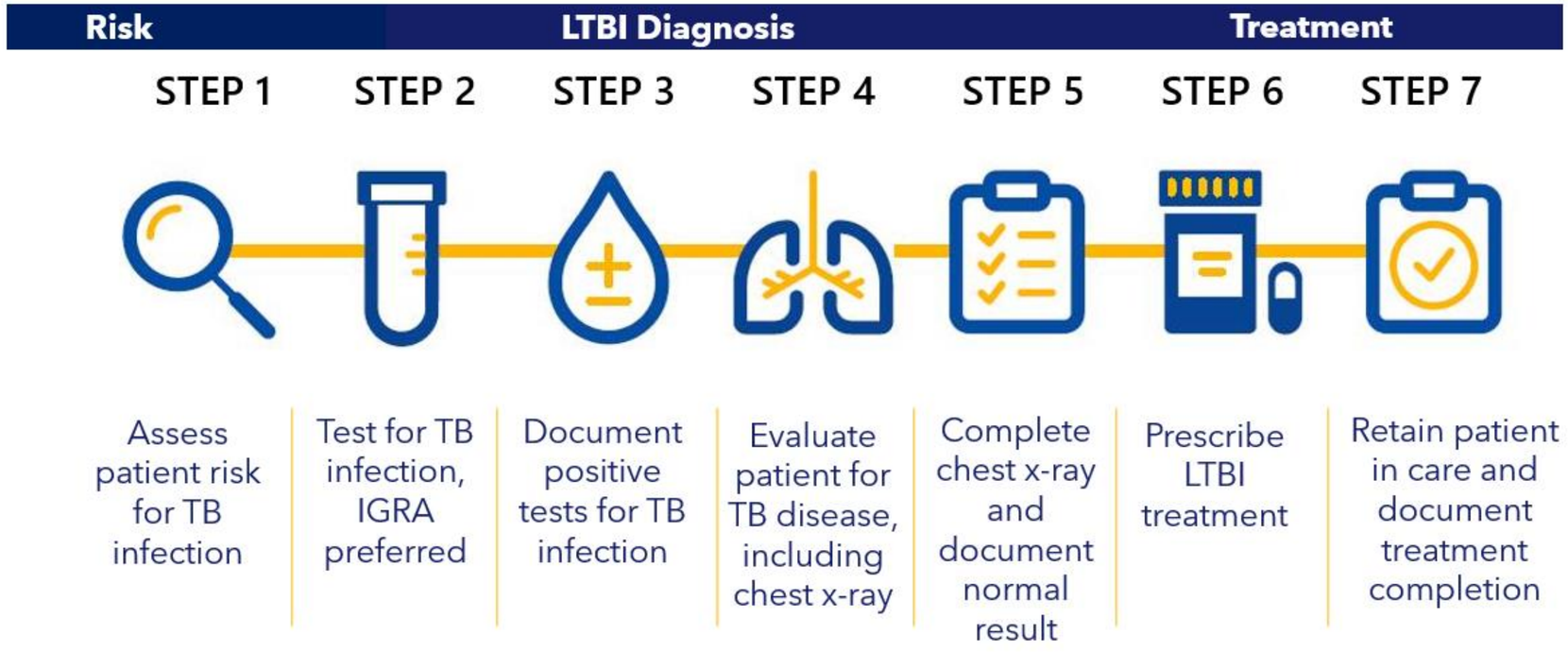
Poll Question

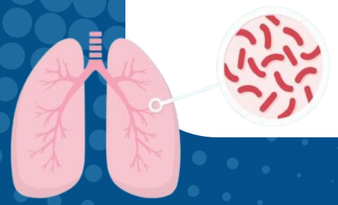
Are there aspects of LTBI care where you feel very confident?



Discussion

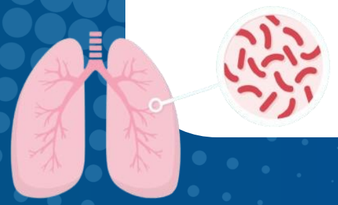
At what stage of the LTBI care cascade does your clinic or program experience the greatest patient attrition or challenge?





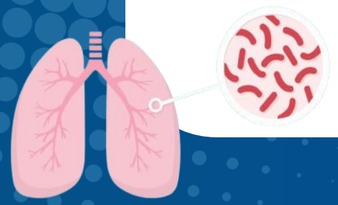
Discussion

What strategies or approaches have you found effective — or would you like to explore — to improve retention or reduce attrition at that stage?



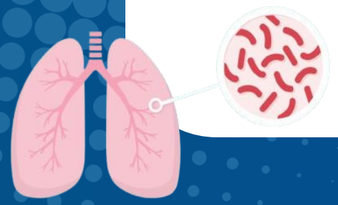
Discussion

How does your clinic approach LTBI management for pregnant individuals? What protocols or considerations do you apply when balancing the risks and benefits of treatment initiation or deferral during pregnancy?



Discussion

Many of you have developed creative workarounds to deal with system-level challenges — whether it's EHR documentation, pharmacy issues, insurance, or language access. What tools, templates, or approaches has your clinic developed that could help others in this group?



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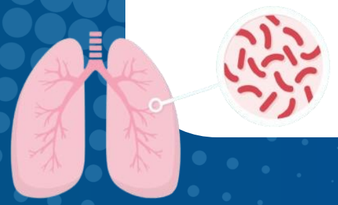
Future meetings

August (date TBD)	**TBD**
October (date TBD)	Partner presentation: Clinical pharmacy-led LTBI clinic model

Topics and presenters subject to change



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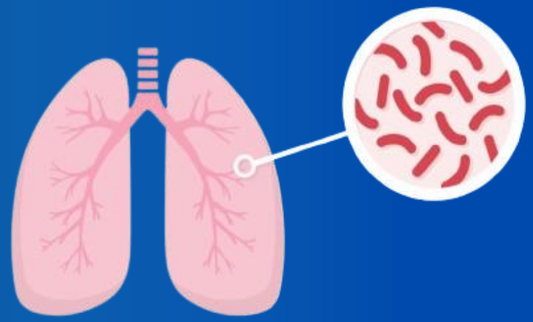

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Thank you!