INTERNAL MEDICINE RESIDENCY CONFERENCE · 10/20/2026

# TB for the Internist

## Mentimeter

Suspecting it, isolating it, treating it: disease and infection




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BEFORE WE START

# Disclosures

## A conflict of interest

I’m the hospital epidemiologist. Every patient with TB who isn’t isolated becomes *my* contact investigation.

So I have a deeply personal stake in you masking, isolating and calling us early.

Financial disclosures: [none]

## Use of AI

- Claude (Anthropic) drafted the slide design, first-draft text, speaker notes and literature search
- I chose the content and cases, rewrote and reorganized the slides, and reviewed every citation
- No patient identifiers were shared with the AI

WHY IT MATTERS

# Rare here, and that is why it gets missed

WORLDWIDE · 2024

**10.7M**

people fell ill with TB and 1.2 million died. Still the leading infectious killer. [1]

UNITED STATES · 2025

**10,260**

provisional cases (3.0 per 100,000). 77% in people born outside the US. [2]

WEST VIRGINIA · 2025

**9**

cases (0.5 per 100,000). When you rarely see it, you rarely think of it. [2]

THE BASICS

# Infection and disease are different states

## Exposure

Shared air with someone who has infectious pulmonary TB

## TB infection

- Formerly “latent TB”
- Positive IGRA or skin test
- No symptoms, normal CXR
- Not contagious

## TB disease

- Symptoms, imaging findings, or both
- Pulmonary disease can spread

5–10% of untreated infections over a lifetime; about half within 2 years

### HIGHER RISK OF PROGRESSION

Big ones: HIV · TNF-α inhibitors and other immunosuppression · transplant
Don't forget: dialysis · diabetes · silicosis · fibrotic scars on CXR · low body weight · smoking

CASE 1 · ADMISSION

# A 74-year-old man coughing up blood

**Presentation:**

1. A month of worsening cough
2. A week of weight loss, fevers and night sweats
3. New large-volume hemoptysis yesterday

**History:**

- Diabetes (A1c 9.4)
- 2 packs a day since age 12
- Former heavy alcohol use
- Doesn't "doctor" much

**Exposures:** lives in rural Ohio; no travel or known TB contacts; lots of time outdoors.

**What do you do in the first hour?**

CASE 1 · RECOGNIZE

# When to think TB [3]

## Symptoms

- Cough for 2–3 weeks or more
- Fever and night sweats
- Weight loss
- Hemoptysis

## Epidemiology

- Use my .TBRISKFACTORS smartphrase
- High-incidence country of birth or residence
- Known TB contact
- Congregate settings; HIV or other immunosuppression

## Imaging

- Upper-lobe or superior-segment disease (TB likes oxygen)
- Cavitation
- Miliary nodules
- Advanced HIV: lower zones, nodes, effusion, or a normal film

⚠ **Laryngeal TB:** hoarseness, painful swallowing, or a lesion that looks like cancer on scope. Rare, usually alongside pulmonary TB, and highly contagious. [4]

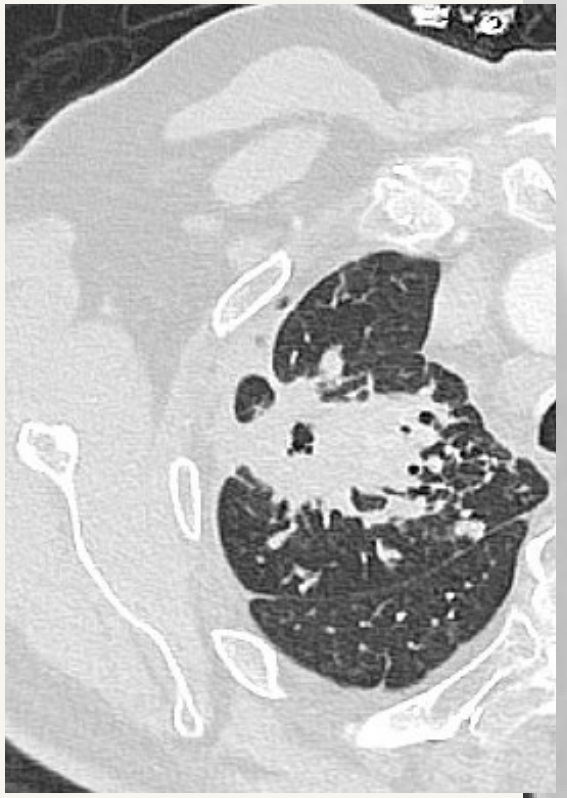
CASE 1 · RECOGNIZE

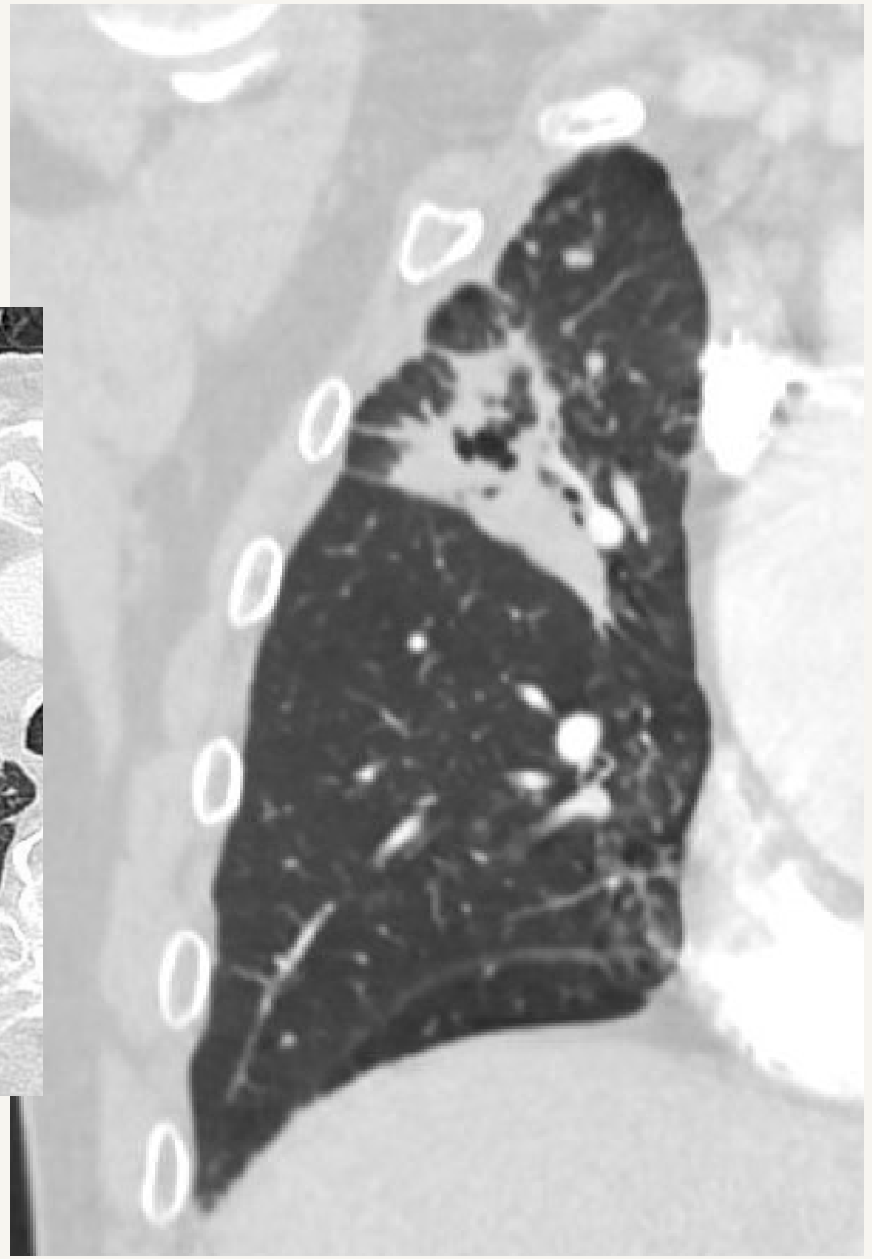
# Case 1: CT chest

## Radiology report

Indication: “c/o shortness of breath and hemoptysis since yesterday, smoker 2ppd”

- Worsening multifocal infectious or inflammatory process, most likely, with a **chronic** thick-walled right upper lobe cavity
- Numerous nodules in both lungs
- **New** nodular opacification in the left lower lobe





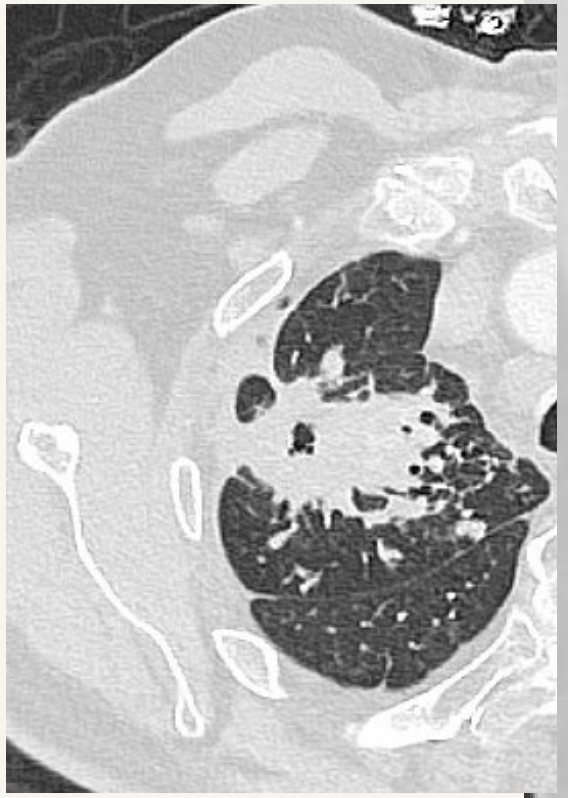
CASE 1 · RULE OUT

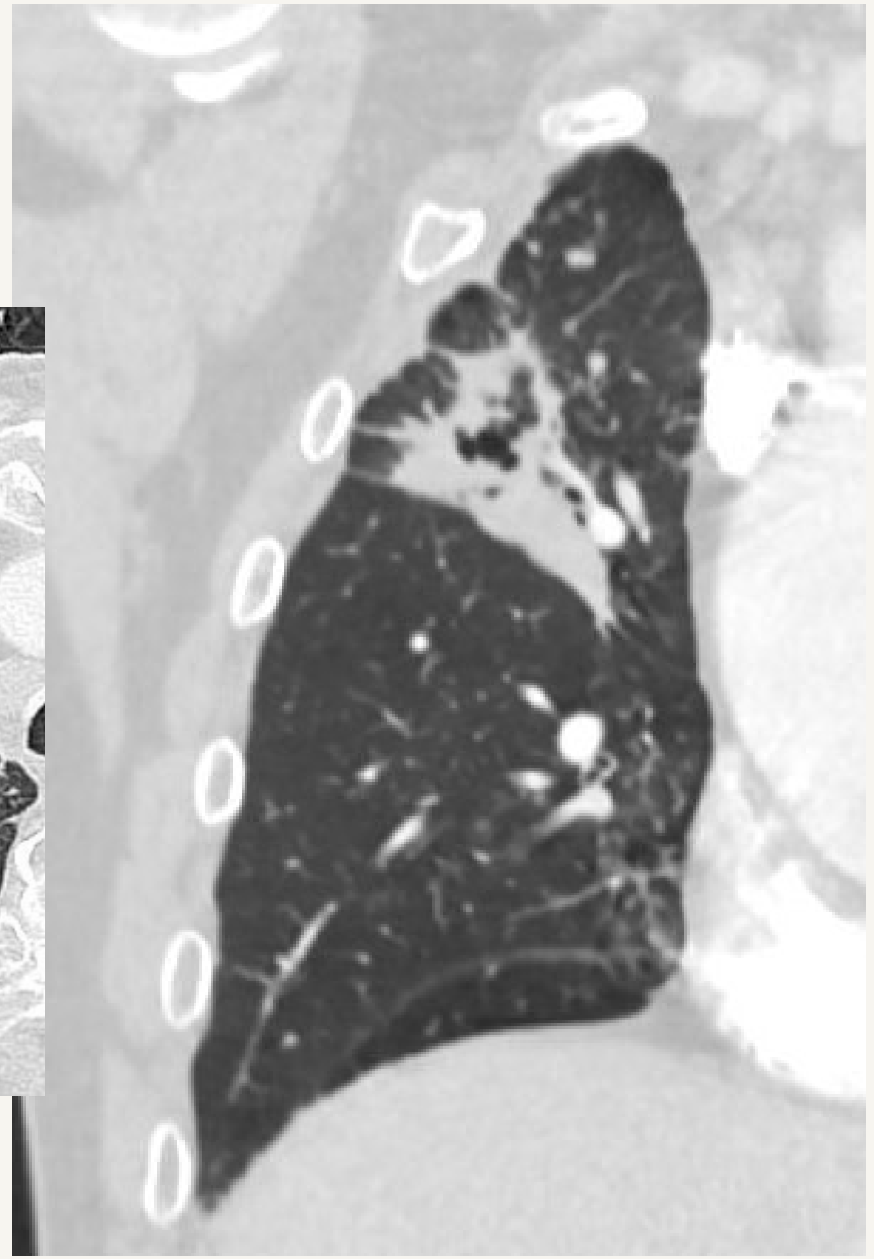
# Case 1: How do you rule out TB?

## Poll: select all that apply

Which of these meaningfully lowers the chance that this is TB?

- 3 negative sputum AFB smears
- Negative sputum TB PCR
- Negative BAL TB PCR
- No TB risk factors
- Negative QuantiFERON
- Recent diagnosis of lung cancer





CASE 1 · RULE OUT

# QuantiFERON can’t rule out TB disease [5]

## Why it fails

- Misses about 1 in 5 cases of active TB (sensitivity about 80%)
- Roughly the same as TTE for endocarditis
- Much worse with HIV, immunosuppression and severe illness: **the patients you worry about most**

## What the result does to your estimate

| Before | QFT negative | QFT positive |
|---|---|---|
| 20% | 6% | 49% |
| 30% | 10% | 62% |
| 70% | 37% | 90% |

Assumes sensitivity 80%, specificity 79% in people evaluated for TB

Worried enough to order a QuantiFERON? Then you’re worried enough to isolate and send sputum.

CASE 1 · ISOLATE

# The first hour: isolate on suspicion [4]

## Do now

- Surgical mask on the patient
- Airborne isolation room (negative pressure)
- Contact infection prevention (“Ruby Infection Prevention” on Epic chat) or myself
- Use CAPR or fit-tested N95 to enter the room
- Report to the health department on suspicion, not confirmation (once IP is involved, we do this for you)

## Coming off isolation

### SUSPECTED TB

Infection prevention and I decide, based on:

- Pretest probability, or an alternative diagnosis
- Sputum PCR: 1–2 negative Xpert results are FDA-cleared for this [6]
- AFB smears (older standard: 3 negative)

### CONFIRMED TB

Effective therapy, clinical improvement and 3 consecutive negative smears. Discharge plans go through the health department.

CASE 1 · TEST

# Three sputa and a NAAT, then culture [3]

## Specimens

- Sputum ×3 for AFB smear and culture: 8–24 h apart, at least one early-morning
- NAAT on the early AM specimen: results in hours, more sensitive than smear (higher NPV), flags rifampin resistance
- Can’t produce sputum? Induce before bronchoscopy
- If concern for TB, need to also test for HIV

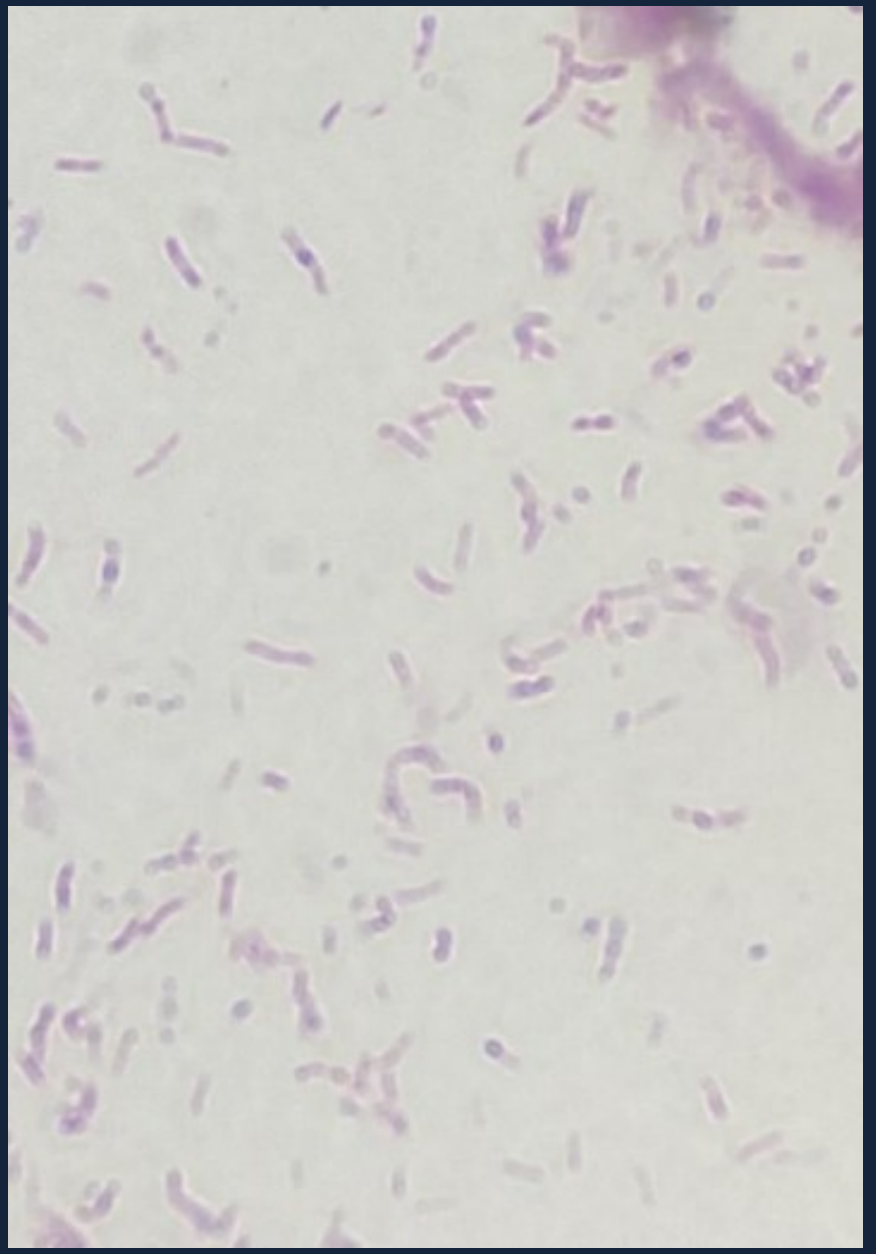
## Reading the first results

| | NAAT + | NAAT – |
|---|---|---|
| Smear + | TB: treat, isolate, report | Think NTM (or a false-negative NAAT) |
| Smear – | Presumptive TB: treat while culture is pending | Less likely, not excluded: clinical judgment |

CASE 1 · RESULTS

# Back to our patient

1. **Smear:** AFB smear positive
2. **PCR:** MTB PCR positive; no rifampin-resistance mutation detected
3. **Clinical worsening:** intubated on hospital day 3 for massive hemoptysis



CASE 1 · TREAT

# How would you treat?

Smear and PCR positive, no rifampin resistance detected, prior interrupted treatment, now intubated.

1. RIPE for 6 months
2. RIPE, planning for 9 months
3. 4-month rifapentine-moxifloxacin regimen (HPMZ)
4. Hold treatment until culture and susceptibilities return

Loading...

ACTIVE TB · KNOW YOUR DRUGS

# RIPE: side effects and interactions

## Side effects [7]

| Drug | Watch for |
|---|---|
| Isoniazid | Major hepatitis risk, neuropathy (give B6) |
| Rifampin | Hepatitis (alkP), orange fluids, DDI |
| Pyrazinamide | Hepatitis, gout |
| Ethambutol | Optic neuritis |

## Rifampin lowers levels [8, 9]

- Anticoagulants: DOACs, warfarin
- Contraceptives: pill, patch, ring
- HIV: PIs, bictegravir, dolutegravir
- Transplant: tacrolimus, cyclosporine
- Methadone and other opioids
- Azoles: voriconazole, itraconazole
- Steroids, antiseizure drugs, statins

⚠ **Liver injury** (ALT >3× ULN with symptoms, >5× without): hold INH, RIF and PZA; call ID.

ACTIVE TB · TREAT

# Treating drug-susceptible TB

## Standard · 6 months [8]

RIPE · 2 mo | RI · 4 mo

- Rifampin, isoniazid, pyrazinamide, ethambutol
- Stop ethambutol once the isolate is pan-susceptible
- Cavity plus positive 2-month culture: 9 months total
- Pyridoxine with isoniazid; DOT via the health department

## New option (2025) · 4 months [10, 11]

HPMZ · 8 wk | HPM · 9 wk

- Rifapentine, moxifloxacin, isoniazid (INH), pyrazinamide
- Age ≥12, weight ≥40 kg, pulmonary, presumed susceptible
- Not for pregnancy, most extrapulmonary TB, CD4 under 100

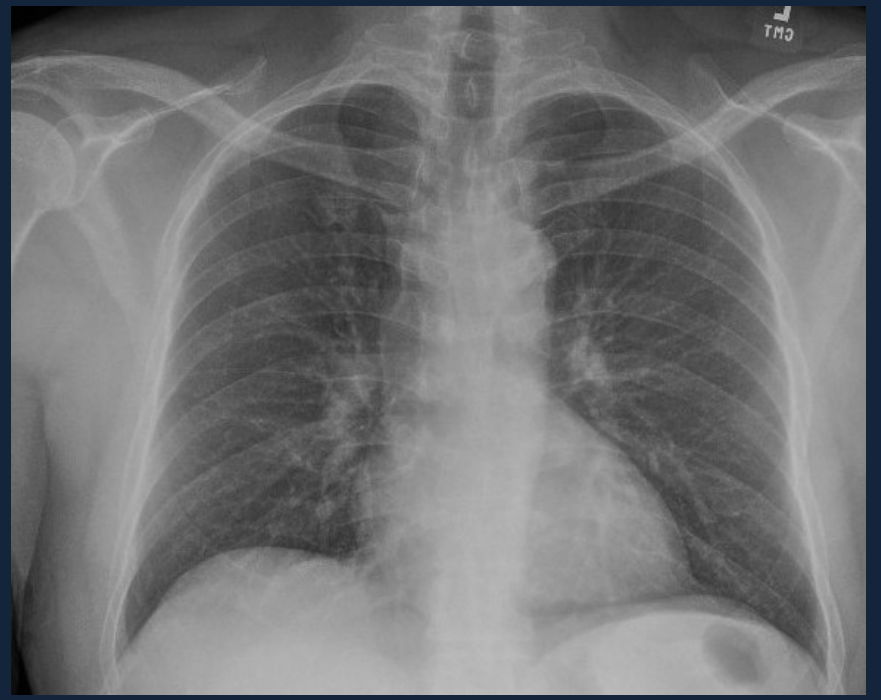
CASE 2 · CLINIC

# A positive IGRA before a JAK inhibitor

A man in his 50s with seropositive RA recently started tofacitinib, with a dramatic response.

Born in India; in the US since 2020. Rheumatology's screening QuantiFERON is positive, so they hold tofacitinib and refer him to ID.

No symptoms. He says he has never been treated for TB.



**Poll: what next?**

Repeat the IGRA · Start 4R · CT chest · Clear him for tofacitinib · Get more history

TB INFECTION · WHO

# Test the people you would treat [3, 12]

## More likely infected

- Born or lived in a high-incidence country
- Close contact of infectious TB
- Incarceration, homeless shelters, other congregate settings
- Health care workers, at baseline

## More likely to progress

- HIV
- Before TNF-α inhibitors, other biologics, JAK inhibitors, chemotherapy, transplant
- Prednisone ≥15 mg/day for a month or more
- Dialysis, silicosis, diabetes

Low pretest probability means low positive predictive value: in a low-risk person, a positive IGRA is often a false positive.

TB INFECTION · WHICH TEST

# IGRA or skin test? [3]

| | IGRA | Tuberculin skin test |
|---|---|---|
| BCG cross-reaction | No | Yes |
| Preferred for | Most adults, especially after BCG or if unlikely to return | When IGRA isn't available; needs a read at 48–72 h |
| Positive means | Above the cutoff; near-cutoff results often revert | ≥5, ≥10 or ≥15 mm, by risk group |
| Pitfalls | Indeterminate with lymphopenia or immunosuppression | Reader variability, boosting, NTM cross-reaction |

⚠ Neither test separates infection from disease or rules out active TB, and both usually stay positive after treatment.

TB INFECTION · TREAT

# Rule out disease, then treat short [13]

⚠ **First:** symptom review and chest X-ray, with sputum if anything is abnormal. One or two drugs for unrecognized active TB breeds resistance.

| Regimen | Schedule | Notes |
|---|---|---|
| 3HP · isoniazid + rifapentine | Weekly × 12 doses | Often used by health dept; often with directly observed therapy |
| 4R · rifampin | Daily × 4 months | Most commonly used; limited by DDI |
| 3HR · isoniazid + rifampin | Daily × 3 months | Same rifampin interactions |
| 6H or 9H · isoniazid | Daily × 6–9 months | Only if rifamycins can't be used; more liver injury, lower completion |

CASE 2 · ANSWERS

# Back to our patient

1. **Chart review:** positive IGRAs since 2021, across several health systems.
2. **Already treated:** a prior rheumatologist gave him 4R in 2024, and the pharmacy confirmed the fill.
3. **IGRAs stay positive after treatment.** Don’t repeat them; document “TB infection, treated (4R, 2024).”
4. **No disease, no new exposure: no retreatment.** He can resume tofacitinib, with a low threshold to evaluate symptoms.

TAKE HOME

# Five take aways

1. Isolate and report on suspicion, TB is rare, but rare cases come to Ruby
2. Three sputa for smear and culture, TB PCR on one of them
3. Rule out disease ("active"), then treat infection ("latent") with a short rifamycin regimen
4. Rifampin interacts with nearly everything: pharmacy reviews the list first
5. QuantiFERON testing has advantages to PPD, but is still a very imperfect test

FURTHER READING

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