Case Study #3 (Correctional Facilities)

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TB Intensive • June 10 – 12, 2025 • Dallas, Texas

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Has the following disclosures to make:

- No conflict of interests
- No relevant financial relationships with any commercial companies pertaining to this activity

TUBERCULOSIS MANAGEMENT IN CORRECTIONAL FACILITIES

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OUTLINE

- Background
- Case #1: Screening for TB in jails and prisons
- Case #2: Complex TB management
- Case #3: Transitions of care and Treatment interruptions
- Conclusions

BACKGROUND

- In 2023, 325 (3.6% of all US TB cases) persons 15 or older with TB disease were residents of a correctional facility at the time of diagnosis
- 4 states (NY, CA, FL and TX) account for half of all TB cases
- TB is more likely to spread in correctional facilities:
  - Persons may have increased risk of TB due to HIV, substance use, housing instability
  - Environment: people living in close proximity, poor air flow, overcrowding
  - Movement of people between facilities
- In 2023, 90% of TB cases occurred among persons from racial and ethnic minority groups including people who are Asian, Black and/or Hispanic

cdc.gov/tb, 2024

CASE #1

25 yo man, Spanish speaking comes into Jail

6/30/2024-Nurse intake:

- normal vitals, no chronic medical issues, takes no medications. Does not smoke, no substance use, weekly alcohol
- No known exposures to COVID, mpox
- Requesting STI testing

7/1/24 completes TB screening questionnaire– PPD placed

7/4/24 PPD 10mm

7/8/24 HIV/STI testing negative

7/6/24 CXR– DSO did not bring patient

7/7 patient is in court

7/8, 7/9, 7/12, 7/13, 7/14, 7/16, 7/19, 7/20– CXR not done because patient at work

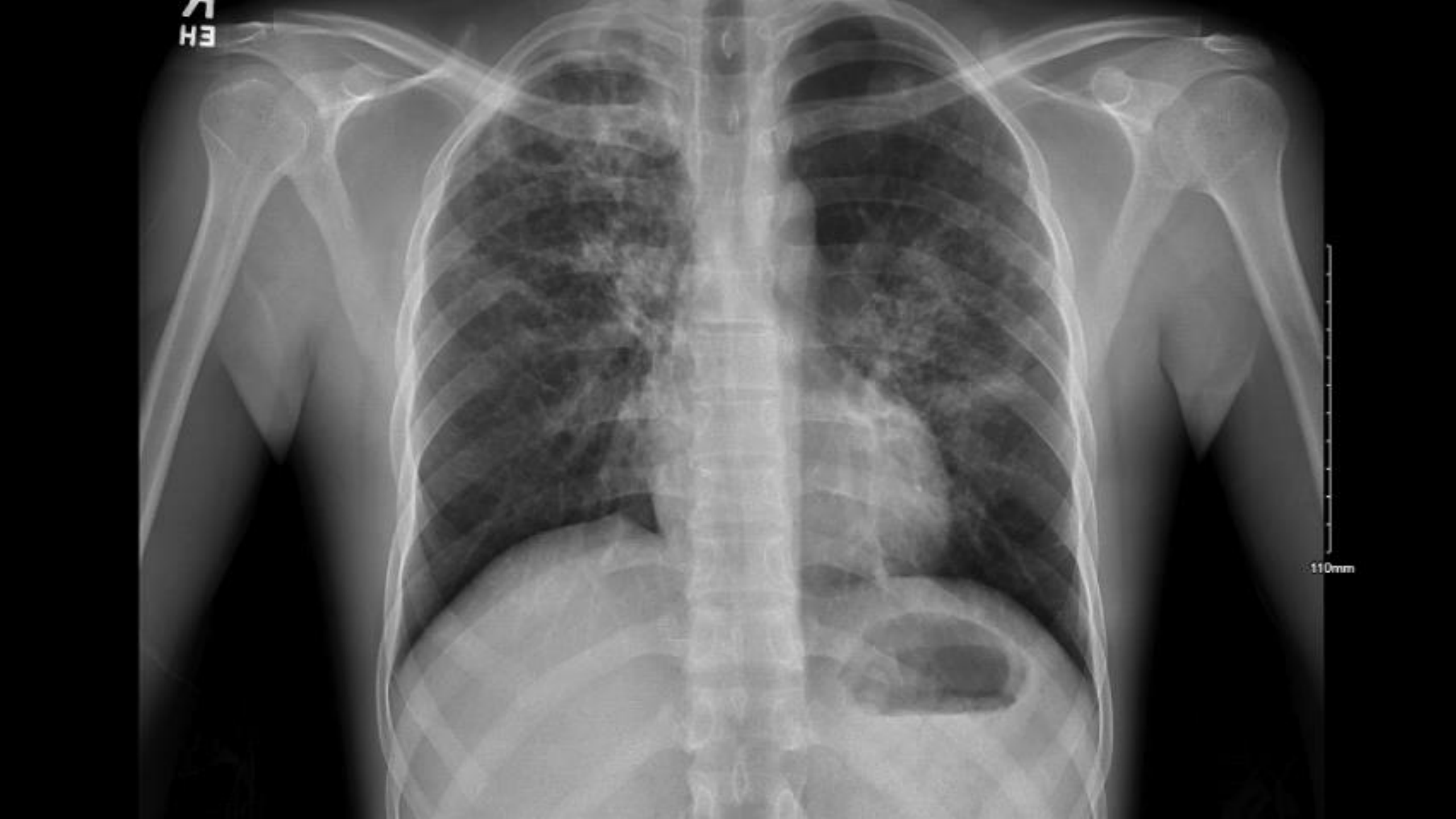
TB screening questions:

HIV?	Yes	No
Tested positive for TB in the past?	Yes	No
Have you ever been treated TB in the past?	Yes	No
Have you ever had contact with anyone with known TB?	Yes	No

When was your last CXR? Date: ____/____/____

Any signs or symptoms of Tuberculosis?

Unexplained cough longer than 3 weeks?	Yes	No
Coughing up blood?	Yes	No
Unexplained drenching night sweats?	Yes	No
Unexplained weight loss?	Yes	No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CXR READING

FINDINGS:

Patchy right upper lobe and left perihilar infiltrates are noted. There is no effusion. The heart is normal in size and appearance. Osseous structures are within normal limits.

IMPRESSION:

Bilateral infiltrates as described can not exclude TB or pneumonia at this time.

WHAT WOULD YOU DO NOW?

A. Interview patient and re-assess for symptoms
B. Treat for bacterial pneumonia
C. Isolate patient and send sputa for AFB smear, culture, MTB PCR
D. Conduct a contact investigation
E. All of the above
F. A, C, D

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F. **A, C, D**

CASE #1, CONTINUED

- Patient isolated
  - Vitals show HR 110
  - Mentions cough with blood several months ago
  - From Guatemala, had been sent medications but was uncertain what they were for
- Orders:
  - High protein diet due to BMI=20
  - Sputa sent 3+ AFB, MTB PCR positive
  - Started on RIPE
  - Sputa repeated 2 weeks later, still AFB smear + x2
- Patient released to immigration

CONTACT INVESTIGATION

- Generally involves household members, friends, coworkers, neighbors
- In a jail or prison, contacts are people who share a housing unit, which includes incarcerated patients and staff members who spend time in that unit
- Patients are frequently moved (e.g. due to an individual's charges, fights, separating gangs, work roles), the contact investigation may involve multiple housing units
- Screen for symptoms and signs of TB, repeat TST/IGRA and CXR as indicated

SCREENING FOR TB IN CORRECTIONAL FACILITIES

Required by law

Dallas County Jail processes:

- Everyone has TST (PPD) placed at the time of housing assignment
- TB staff locates each patient 2-3 days later to read and record TST
- All patients with positive TST undergo CXR
- All patients with HIV also undergo CXR regardless of TST result
- Result valid for one year (not repeated if reincarcerated within 1 year)

COST ANALYSIS OF TUBERCULIN SKIN TEST (TST) VERSUS QUANTIFERON TEST FOR TB SCREENING AT THE DALLAS COUNTY JAIL

Prospective pilot study, June-October 2014

Enrolled 529 participants, consecutive patients

- Symptom questionnaire
- TST placement, QFT-GIT testing
- Opt-out HIV testing

Cost comparison conducted with time-in-motion study

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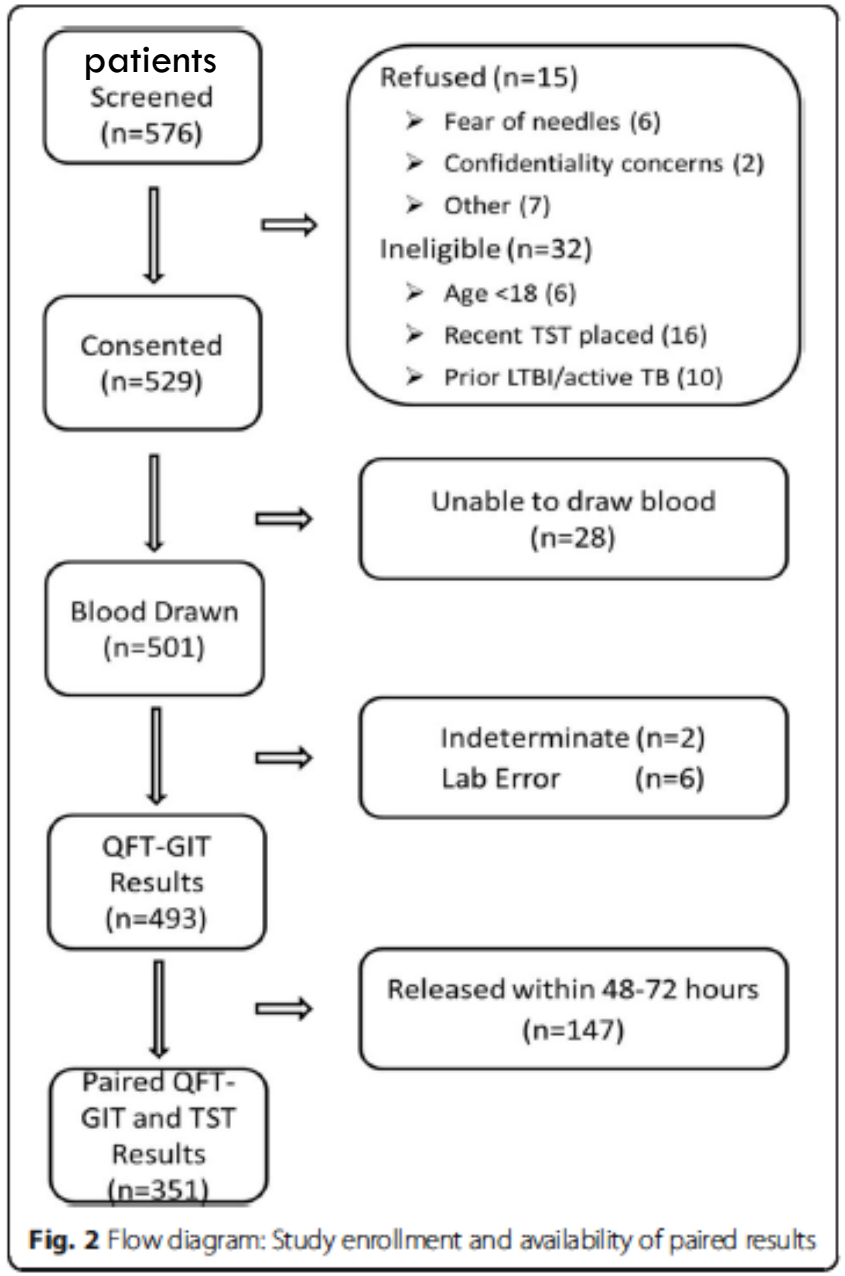

Fig. 2 Flow diagram: Study enrollment and availability of paired results

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Table 1 Baseline characteristics

Characteristic	Overall *529 (100 %)*
Gender	
Male	397 (75 %)
Age, mean (years)	33.5
18–29	242 (46 %)
30–39	137 (26 %)
40–49	91 (17 %)
>50	59 (11 %)
Ethnicity	
Hispanic	128 (24 %)
Non-Hispanic	303 (57 %)
Unknown	97 (18 %)
Race	
Black	244 (46 %)
White	151 (29 %)
Native American[a]	21 (4 %)
Asian	4 (1 %)
Pacific Islander[b]	1 (<1 %)
Other	122 (23 %)
Non US born	19 (4 %)
TB/HIV Risk Factors	
Ever stayed in a homeless shelter	75 (14 %)
First incarceration	81 (15 %)
Ever Injected Drugs	89 (17 %)
Tested for HIV in past	376 (71 %)
MSM	20 (4 %)
HIV +	13 (2 %)
Past positive TB	6 (1 %)
Ever treated for TB	6 (1 %)
Vaccinated with BCG	63 (12 %)
Ever been exposed to TB	15 (3 %)
TB symptoms	
Cough 3 weeks	2 (<1 %)
Hemoptysis	1 (<1 %)
Night sweats	4 (1 %)
Unexplained weight loss	2 (<1 %)
Any of the above	7 (1 %)

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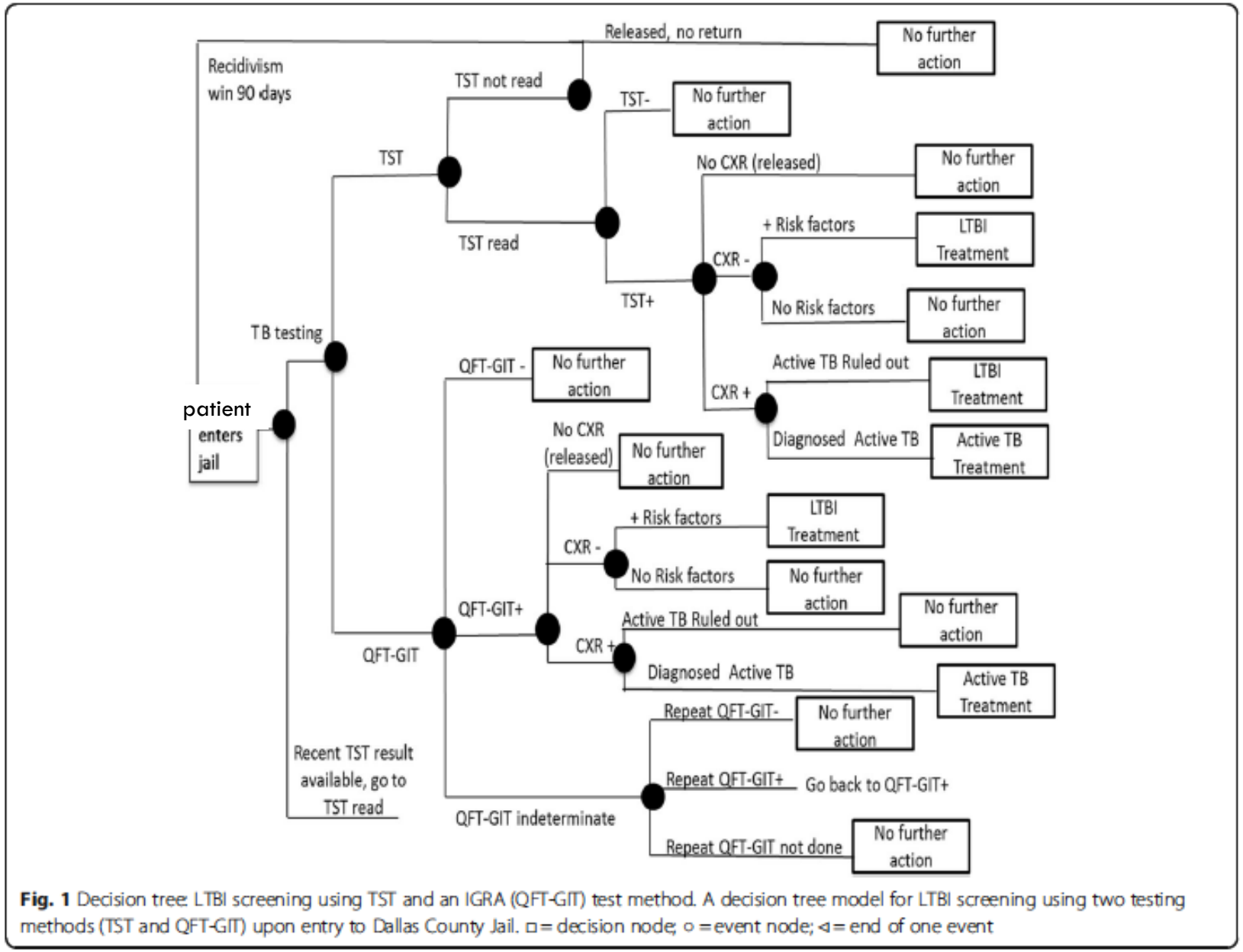

Fig. 1 Decision tree: LTBI screening using TST and an IGRA (QFT-GIT) test method. A decision tree model for LTBI screening using two testing methods (TST and QFT-GIT) upon entry to Dallas County Jail. □ = decision node; ○ = event node; ◁ = end of one event

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COST PER LTBI CASE DETECTED BASED ON ANNUAL COST ESTIMATES FOR TST AND QUANTIFERON TESTING STRATEGIES

Table 5 Cost per LTBI Case Detected based on Total Annual Cost Estimates for TST and QFT-GIT Testing Strategies

	Direct labor cost per test (health care)	Direct labor cost per test (custody)	Material cost per test	Total annual cost to facility	Total number of tests completed	Cost per per test completed	Cost per LTBI case detected
TST	$8.10	$2.76	$8	$1,010,995.77	38928	$25.97	$1246.60
QFT-GIT	$1.35	$1.38	$37[a]	$2,272,386.29	50542	$44.96	$459.87

- 9/351(2.6%) had positive TST, 47/351 (13.4%) positive QFT-GIT
- Costs $22.27 more per incarcerated person/year to screen with QFT-GIT v TST
- Cost per LTBI case detected was about 3x higher for TST than QFT-GIT

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CASE #2, HISTORY

39 yo man with HIV/AIDS (dx 2006, poor adherence to medications), Hepatitis C (untreated), anal cancer (s/p chemo/XRT), substance use (methamphetamines), presents to jail 9/8/24, last release was 12/2023

9/8/24 Intake nurse note– patient denied any symptoms, exposures, medications

9/12/24 patient refused medical assessment program visit, provider reviewed chart and restarted HIV treatment (Biktarvy), referred to HIV team

9/12/24 ppd not repeated, had refused 12/2023 and CXR on file from 12/2023

9/28/24 pt refusing visits, labs and chart reviewed by HIV provider, noted to have been admitted to Parkland 5/2024 and started on RIPE, referred to TB team

9/29/24 moved to isolation for rule out

CASE #2, CLINICAL ASSESSMENT

- Per chart review, patient was admitted to Parkland 4/6/24-4/24/24 for sepsis
  - found to have pneumonia and a pleural effusion, positive T spot
  - Sputum for AFB smear was negative x 3
  - Started on RIPE due to radiologic appearance of pleural TB
  - His sputum cultures grew MTB.
- Pt did not follow up in the health department or clinic
- States he did take his Biktarvy, but not his TB treatment
- Was living on the street, sometimes in a tent
- Pt Not convinced that he has TB, but stated "I will work with you"
- He denies cough, fevers, chills, night sweats. May have lost some weight but feels he is gaining it back since in jail. Appetite is good, no N/V/D
- Started on RIPE (with Rifabutin), changed HIV regimen

CASE #2, LAB RESULTS

10/1/24

WBC 2.3 /Hb 13.3/plt 187

AST 185/ ALT 94

CD4=86, VL 100

Smear negative x 3– cultures grew M. avium

11/6/24

AST 344/ ALT 167/alkphos 152, tbili 1.5

WHAT TO DO NOW?

A. Stop TB medications with most hepatoxicity, starting with pyrazinamide
B. Stop all TB medications
C. Stop all TB and HIV medications
D. Treat hepatitis C, continue current meds

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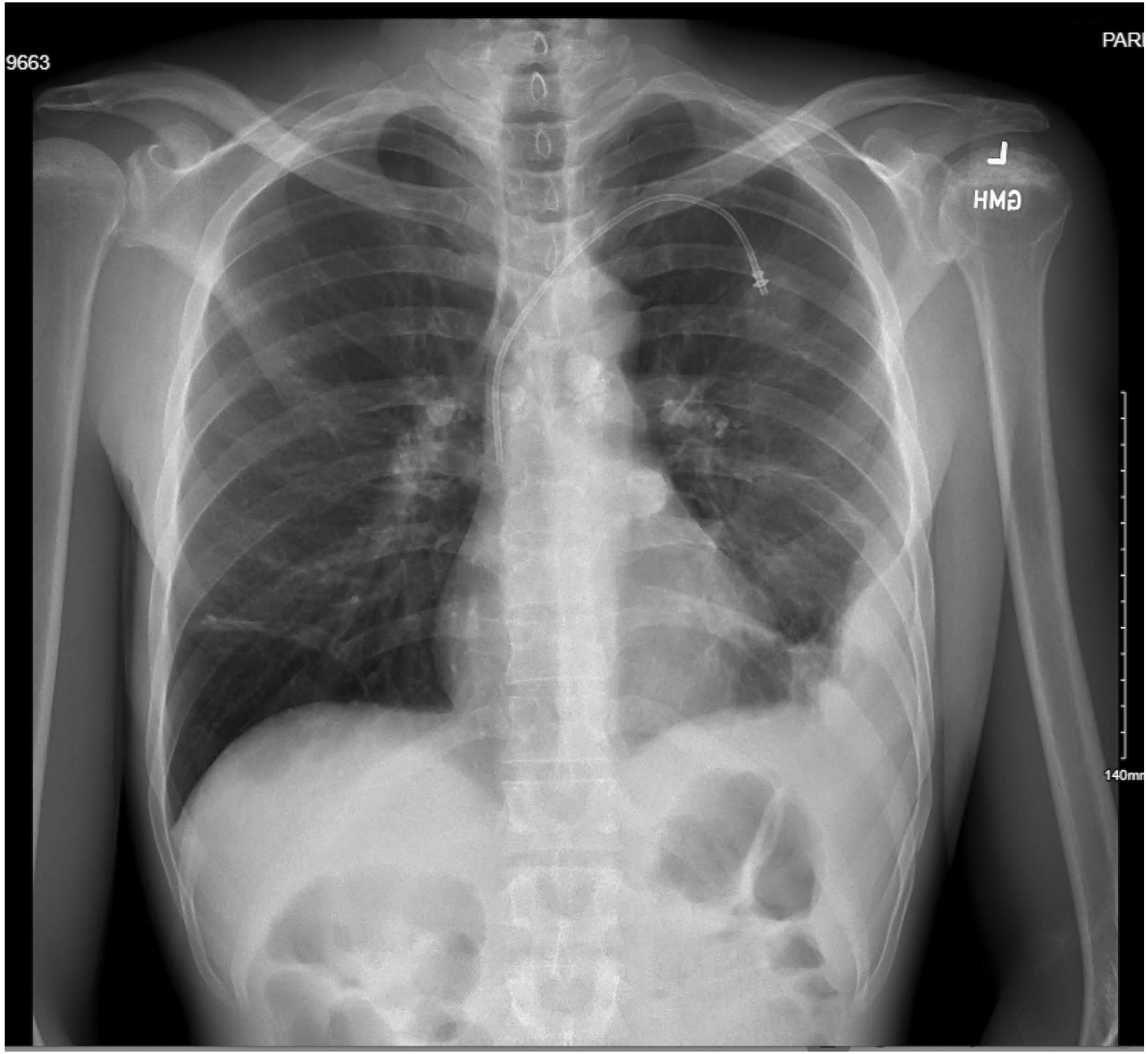


Parkland CXR 4/2024:
New left basilar consolidation/
loculated effusion

PATIENT FOLLOW-UP

Admitted to Parkland this month with acute encephalopathy

- Encephalopathy
  - positive crypto Ag, refused LP empiric treatment for cryptococcal meningitis
- Anal cell CA
  - new mesorectal LN, s/p biopsy
- TB
  - restarted on RIPE, ART on hold
- AIDS
  - CD4=40
- Acute kidney injury
  - 2/2 Bactrim
- Hepatitis C
  - AST 78/ALT 48

MANAGEMENT CONCERNS

HIV and TB

- Timing of ART and TB treatment initiation
- Drug-drug interactions

Medication Toxicity

- Elevated LFTs
- Pre-existing Hepatitis C

HIV AND TB- WHEN TO START ART

- ART is recommended for all people with HIV and TB

Clinical status	ART initiation
CD4 <50 cells/mm^3	Within first 2 weeks of TB treatment
CD4 >50 cells/mm^3	Within 2-8 weeks of TB treatment
TB meningitis, regardless of CD4	Once TB meningitis is under control, after at least 2 weeks of TB treatment (per IDSA after 8 weeks); adjunctive prednisone
Already on ART	Cont ART but modify regimen to reduce drug interactions

HIV Clinical guidelines adult and adolescent opportunistic infections, Clinicalinfo.hiv.gov

HIV AND TB- DRUG INTERACTIONS

Rifabutin[a]	• NRTIs (use TAF with caution[c]) • ETR without boosted PIs • DOR and RPV (PO) (**note**: doses need to be adjusted when used with rifabutin) • DTG, RAL • MVC without a strong CYP3A4 inhibitor • IBA, T-20, FTR	5 mg/kg (usual dose 300 mg)
	• PIs with RTV MVC with a strong CYP3A4 inhibitor	150 mg daily[e]
	• EFV	450–600 mg
	• ETR with boosted PIs • BIC, EVG/c • CAB/RPV (IM/PO) • PIs with COBI • LEN (SC/PO)	**Not recommended**

- Whenever starting TB treatment, think about drug interactions
- Rifamycins are a key component of treatment and often have drug drug interactions
- For patients with HIV, we typically use Rifabutin; a common HIV regimen with this is TDF/FTC + DOL
- If using Rifampin, DOL needs to be doses twice daily
- Bictegravir should not be used with rifamycins

HEPTOTOXICITY

INH, RIF and PZA can cause drug-induced liver injury (DILI), suspected when

- ALT >= 3 times the upper limit of normal with symptoms OR
- ALT >= 5 times the upper limit of normal without symptoms

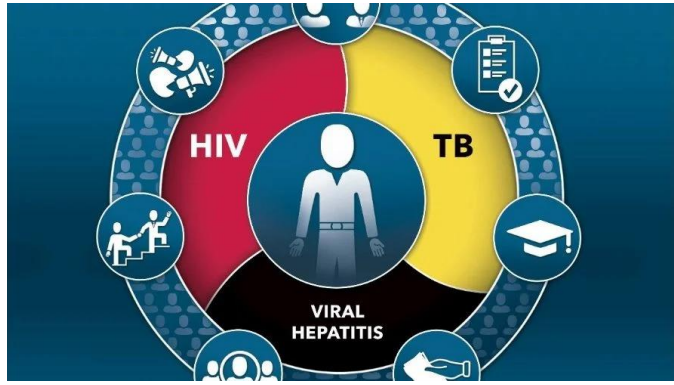
Asymptomatic increase in ALT occurs in 20% of patients treated with standard 4 drug regimen

In case of DILI, all TB medications should be stopped

Once ALT returns to <2 times upper limit of normal, individual TB medications are started – first RIF, then INH 1 week later, consider PZA 1 week thereafter if hepatotoxicity was not severe, last added drug should be stopped if ALT increases

ATS/CDC/IDSA Clinical Practice Guidelines: Treatment of Drug Susceptible TB, CID 2016

TREATING TB IN SETTING OF HEPATITIS C



Likelihood of drug-induced hepatitis is increased with prior advanced liver disease, liver transplant, or hepatitis C infection

Abnormal baseline aminotransferases alone are an independent risk factor for DILI

- Consider alternative regimen if serum ALT is >3 ULN at baseline
- Retain INH/RIF if at all possible
- Consider
  - INH/RIF/EMB x 2 months, then INH/RIF x 7 months
  - RIF/EMB, with a FQ, injectable or cycloserine for 12-18 months
  - RIF/PZA/EMB +/- FQ x 6 months
  - EMB+ FQ, cycloserine and second-line injectable x 18-24 months

ATS/CDC/IDSA Clinical Practice Guidelines: Treatment of Drug Susceptible TB, CID 2016

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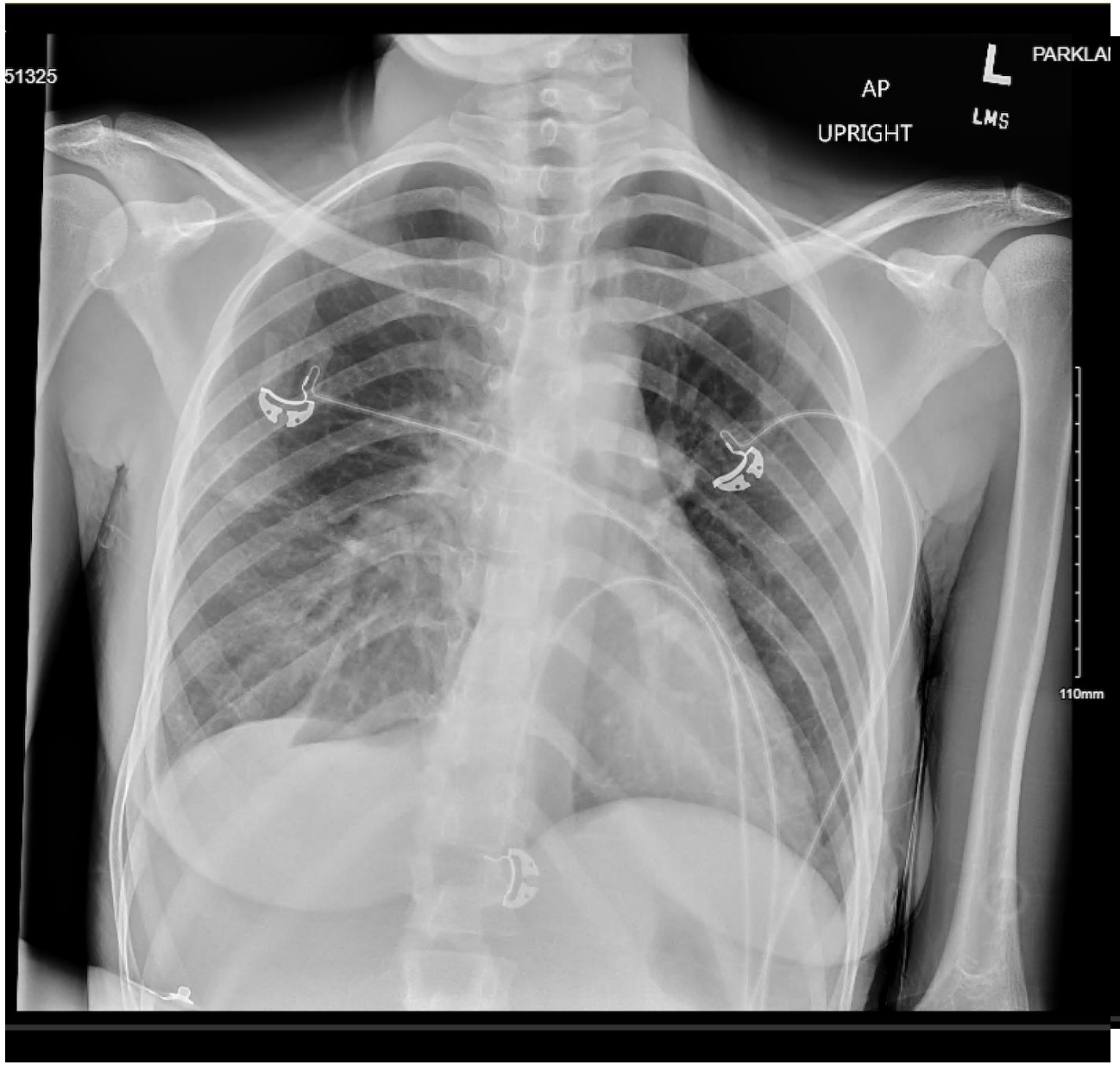
CASE #3

31 yo woman with HIV, diagnosed 2011, substance use disorder (crack cocaine), homelessness, who had been admitted to Parkland 6 months prior to incarceration for weight loss, cough, night sweats.

- Found to have a pleural effusion and positive T spot
- Started RIPE empirically, pleural fluid culture eventually grew TB
- Lost to follow up

Jail presentation:

- night sweats, weight loss, pleuritic chest pain
- BMI 17.5
- PPD 15mm
- CD4 =359, VL 169,000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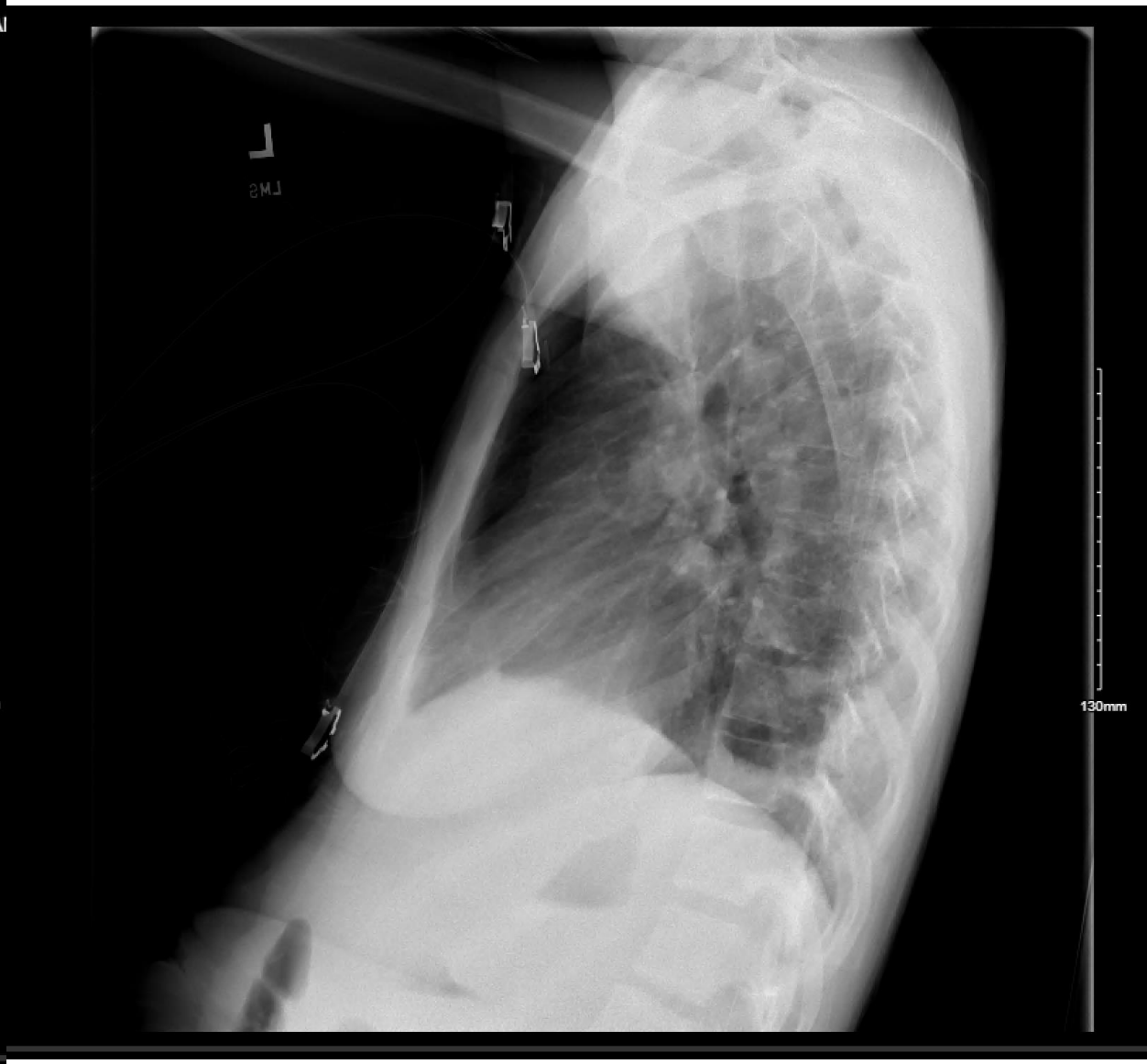
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RADIOLOGY READING

CXR, PA and Lateral (Parkland, 6 months prior):

- Right mid and lower lung hazy opacity may represent atelectasis or infection.
- Possible small right pleural effusion with fluid in the fissure.

Chest CT (Parkland, 6 months prior):

- Loculated right pleural effusion (malignant effusion including lymphoma or empyema is are considered). Interval increase in the loculated component.
- Mediastinal adenopathy; Cellular bronchiolitis with discrete nodules

CXR jail (current):

- No active disease

WHAT DO YOU DO NEXT?

A. Start the patient on RIPE and ART
B. Start the patient on RIPE, hold ART for now
C. Start the patient on continuation phase (RIF/INH/vit B6) and ART
D. Start the patient on continuation phase (RIF/INH/vit B6), hold ART
E. No treatment needed for TB since CXR is normal, start ART

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CASE #3, CONTINUED

- Ruled out for TB with three sputa (smears negative x 3)
- Started on RIPE, ART is held
- Rifabutin, Isoniazid, Pyrazinamide, Ethambutol + Vit B 6
- Treated for syphilis

1 month later:

- Weight up to 118 (from 96lb)
- Symptoms have resolved
- Started on ART– Truvada and dolutegravir
- AST 117/ALT 115

2 months later:

- Transitions to continuation phase of TB treatment
- Continues on ART
- AST 55/ALT 64
- Released 2 days later

CASE #3, CONTINUED

1 year later, patient returns to jail

- Did not go to HIV clinic or health department
- Not taking any ART or TB treatment
- Stopped using drugs and was feeling better so did not feel she had to see doctor
- Weight is stable (115)
- CD4=348, VL 14,100
- CXR at the jail is normal

WHAT DO YOU DO NEXT?

A. Start TB treatment regimen over again from the beginning, restart ART

B. Resume continuation phase of TB treatment to complete 4 months, restart ART

C. No additional treatment needed for TB, she has been off therapy for almost a year and has no symptoms and CXR is normal, so just restart ART

D. Hold all TB and HIV therapy since patient has demonstrated she is unable to be adherent to recommendations

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Table 6. Management of Treatment Interruptions[a]

Time Point of Interruption	Details of Interruption	Approach
During intensive phase	Lapse is <14 d in duration	Continue treatment to complete planned total number of doses (as long as all doses are completed within 3 mo)
	Lapse is ≥14 d in duration	Restart treatment from the beginning
During continuation phase	Received ≥80% of doses and sputum was AFB smear negative on initial testing	Further therapy may not be necessary
	Received ≥80% of doses and sputum was AFB smear positive on initial testing	Continue therapy until all doses are completed
	Received <80% of doses and accumulative lapse is <3 mo in duration	Continue therapy until all doses are completed (full course), unless consecutive lapse is >2 mo If treatment cannot be completed within recommended time frame for regimen, restart therapy from the beginning (ie, restart intensive phase, to be followed by continuation phase)[b]
	Received <80% of doses and lapse is ≥3 mo in duration	Restart therapy from the beginning, new intensive and continuation phases (ie, restart intensive phase, to be followed by continuation phase)

Abbreviation: AFB, acid-fast bacilli.

[a] According to expert opinion, patients who are lost to follow-up (on treatment) and brought back to therapy, with interim treatment interruption, should have sputum resent for AFB smear, culture, and drug susceptibility testing.

[b] The recommended time frame for regimen, in tuberculosis control programs in the United States and in several European countries, is to administer all of the specified number of doses for the intensive phase within 3 months and those for the 4-month continuation phase within 6 months, so that the 6-month regimen is completed within 9 months.

ATS/CDC/IDSA Clinical Practice Guidelines: Treatment of Drug Susceptible TB, CID 2016

CASE #3

Patient is again started on RIPE, ART

Released 2 months later (completed intensive phase)

Re-incarcerated 3 weeks later, did not take treatment in interim

WHAT TO DO NEXT?

A. This patient has had enough cumulative treatment for TB, so will not restart treatment

B. Start continuation phase of treatment (RIF+INH +Vit B6), treat for 4 more months

C. Resume continuation phase of treatment (complete what was remaining)

D. Start over from beginning with full RIPE regimen

WHAT TO DO NEXT?

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TREATMENT INTERRUPTIONS

Treatment interruption

During intensive phase

- Lapse < or > 14 days

During continuation phase

- Proportion (< or>80%) received, duration of lapse

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CONCLUSIONS

- Tuberculosis is relatively common among people in correctional facilities
- Screening for Tuberculosis upon entry to jail or prison is required by law and serves a key role in public health
  - Contact investigations may be more involved in correctional facilities given shared housing
- Treatment for Tuberculosis may be more complex in incarcerated individuals due to comorbidities such as HIV, Hepatitis C
- Transitions of care for incarcerated individuals may be chaotic and result in treatment interruptions
- Close coordination between correctional facilities and health departments is critical