

Sep 21st, 10:45 AM - 11:30 AM

HIV and TB in the Rural Southeast

Beth Gadkowski

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TB and HIV in the Rural Southeast

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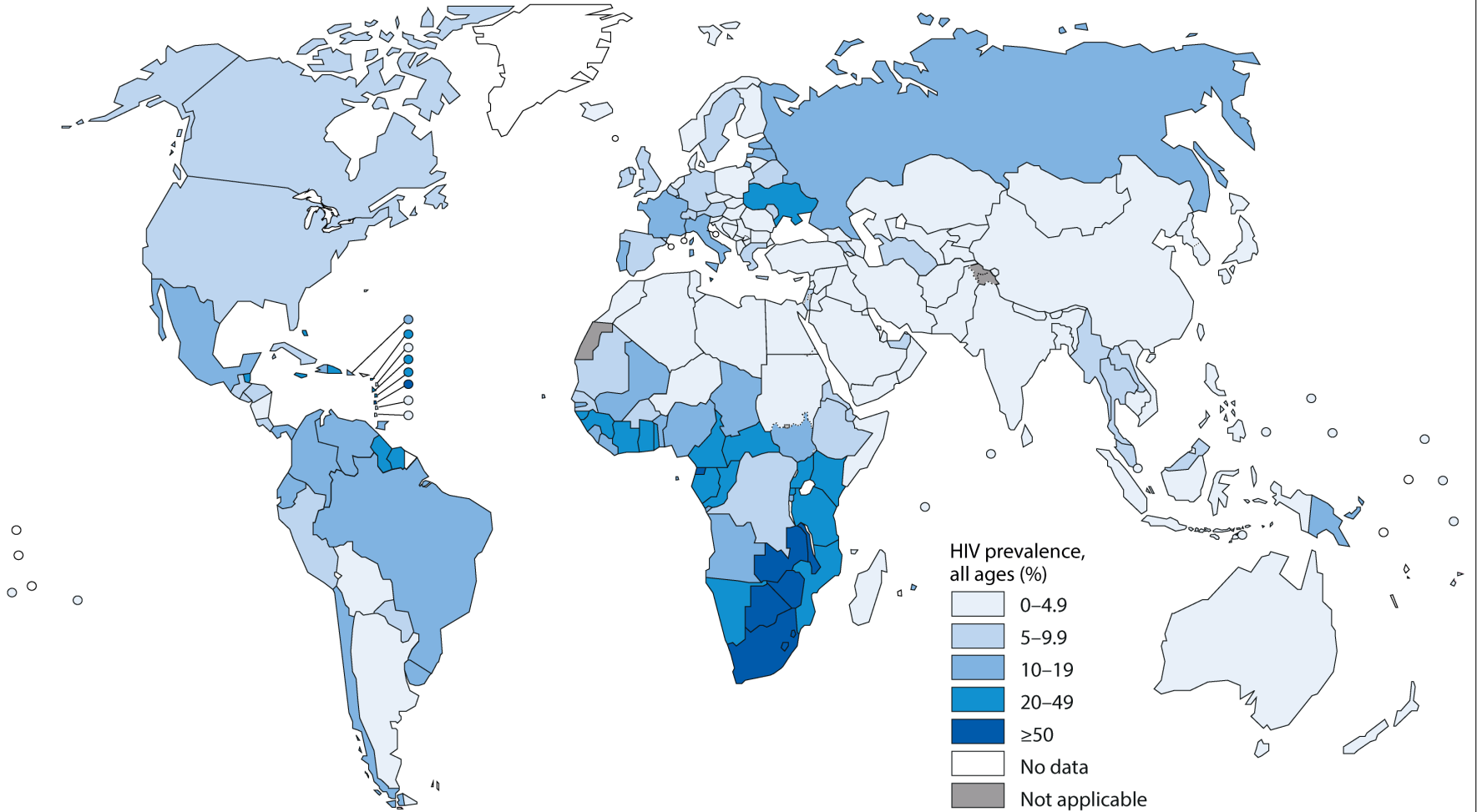
Disclosure Information

I **do not** have any conflicts of interest to disclose and I **do not** intend to discuss off label use of any drug or treatment during this discussion.

Objectives

- Describe the global and local epidemiology of TB/HIV coinfection
- Utilize TSTs and IGRAs appropriately in the diagnosis of LTBI in people living with HIV (PLWH)
- Identify the signs and symptoms of active TB in PLWH
- Develop a treatment plan for an TB/HIV coinfecting patient

Estimated HIV prevalence in new and relapse TB cases, 2016



The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

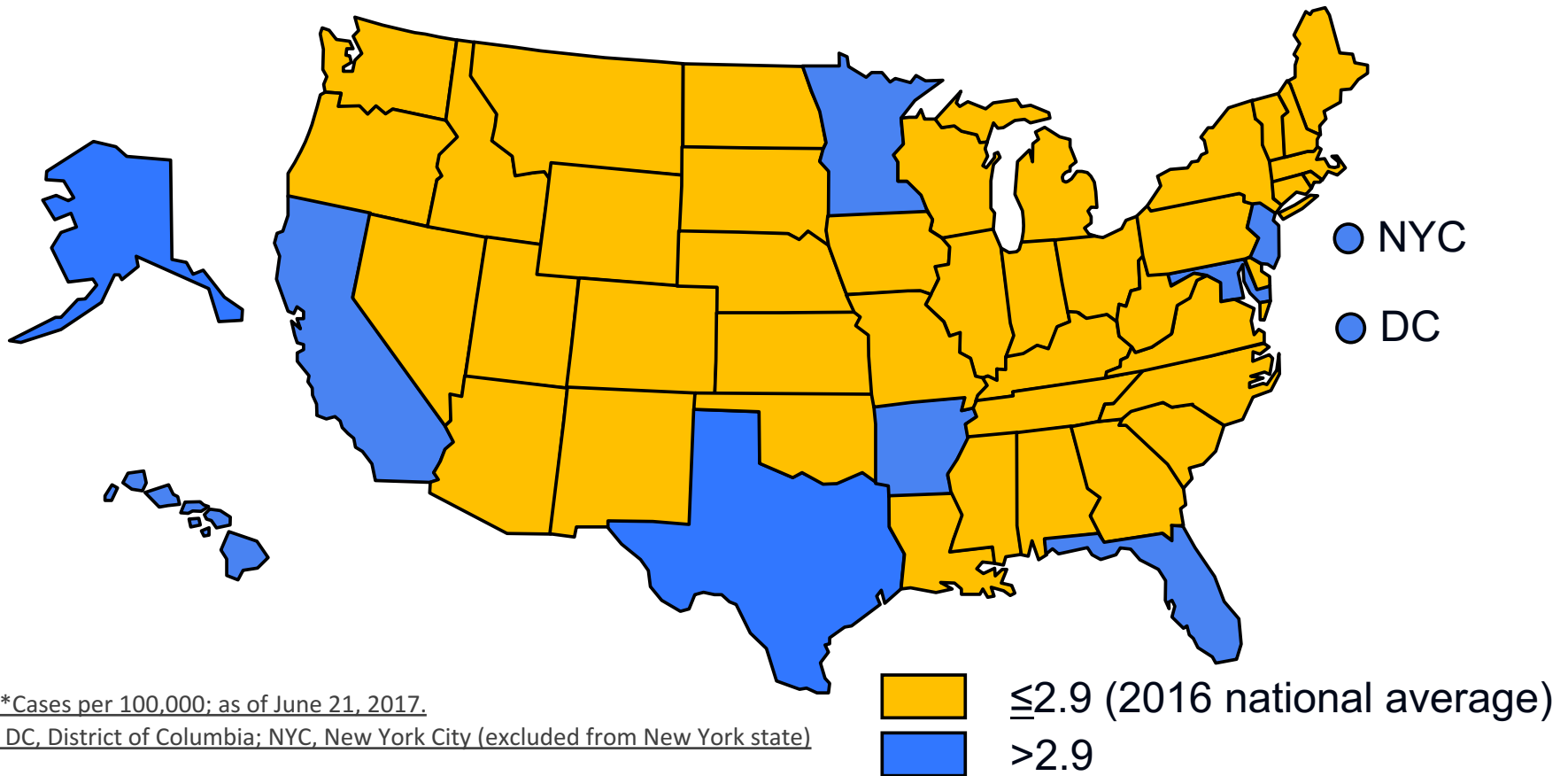
Data Source: *Global Tuberculosis Report 2017*. WHO, 2017.

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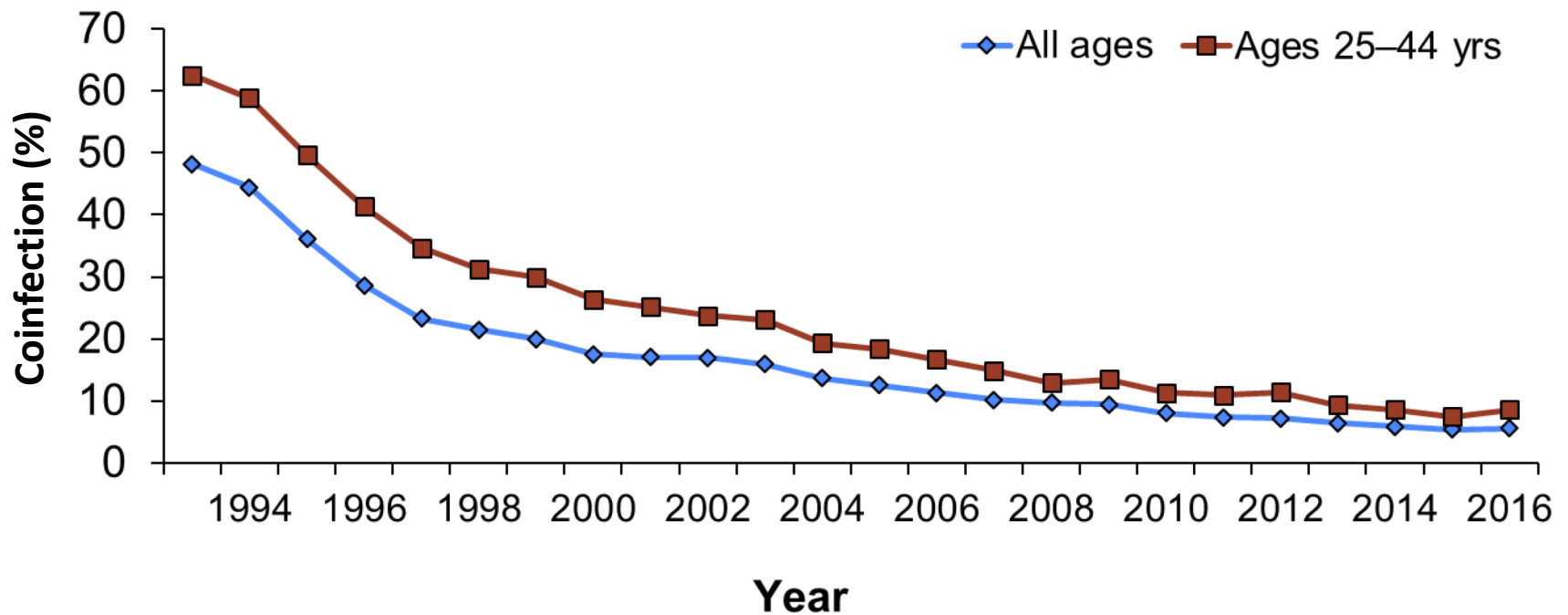
World Health Organization

TB Case Rates,* United States, 2016



<https://www.cdc.gov/tb/statistics/surv/surv2016/default.htm>

Estimated HIV Coinfection Among Persons Reported with TB, United States, 1993–2016*



* As of June 21, 2017.

Note: Minimum estimates are based on reported HIV-positive status among all TB patients in the age group.

<https://www.cdc.gov/tb/statistics/surv/surv2016/default.htm>

TB/HIV in Georgia, 2016

- 301 new TB cases (2.9 cases per 100000)
- 48% foreign-born persons
- 11% HIV positive
 - 80% non-Hispanic, Black
 - 73% male
 - 50% age 45-64

Figure 12. HIV Status of TB Cases, Georgia, 1996-2016

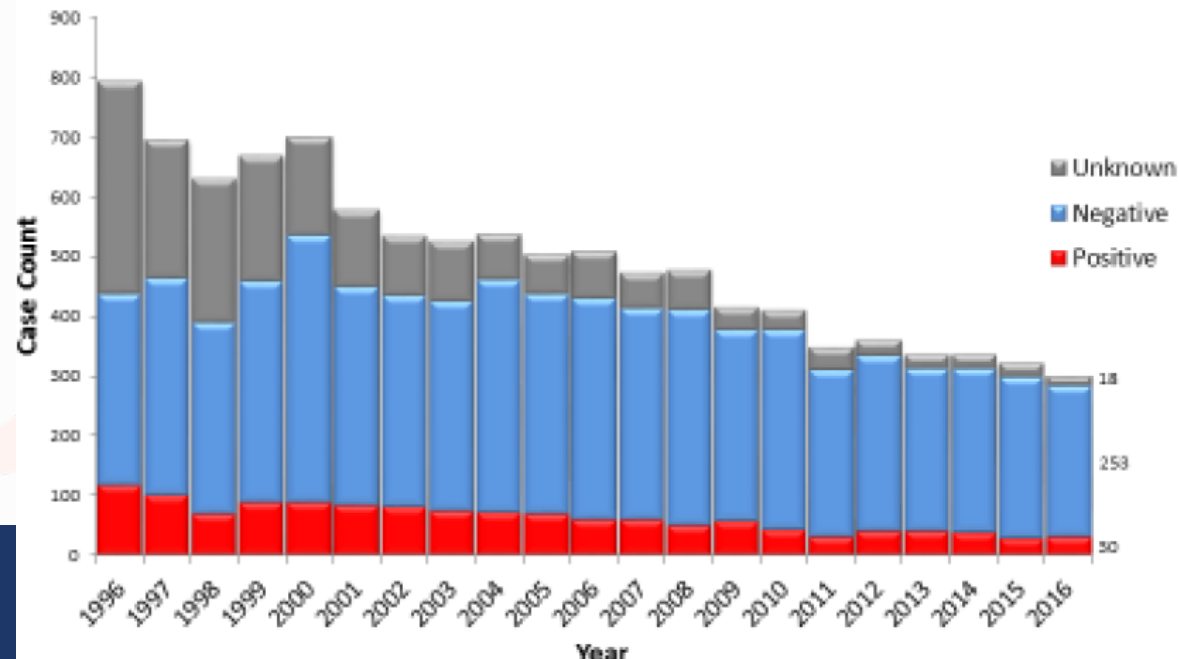
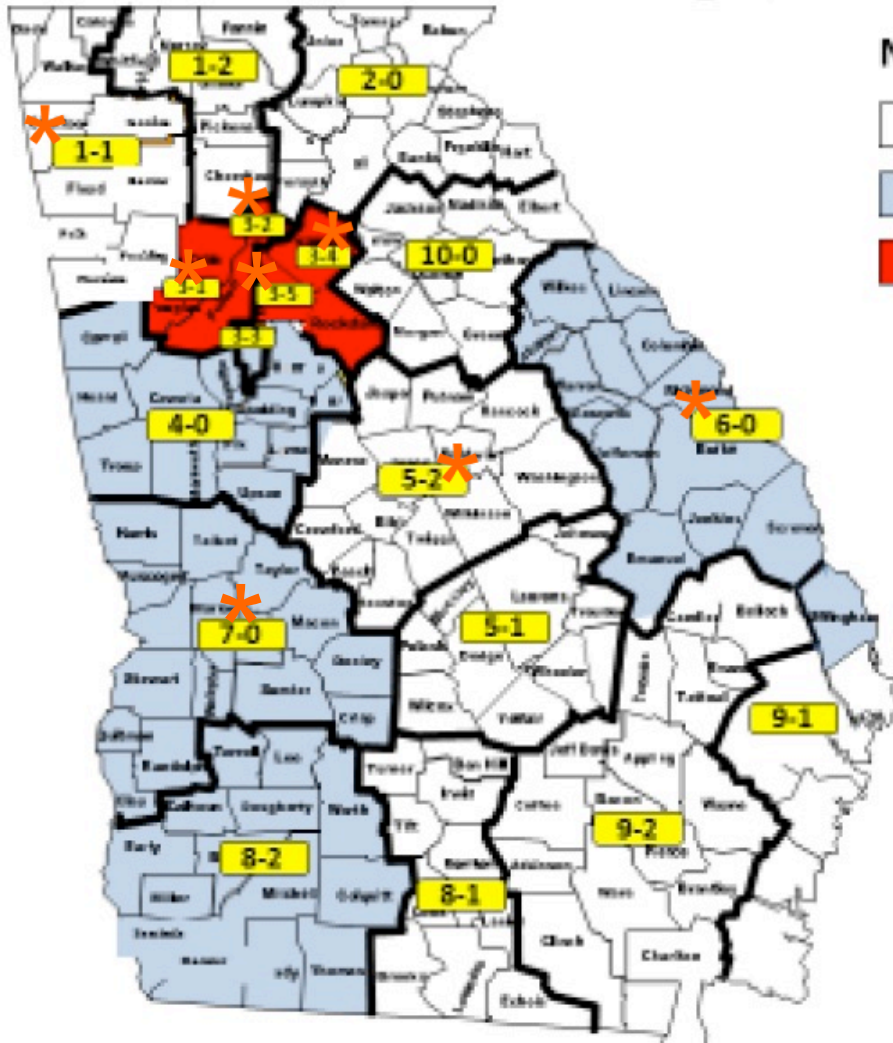


Figure 3. Number of TB Cases by Health Districts, Georgia, 2016



Number of TB Cases:

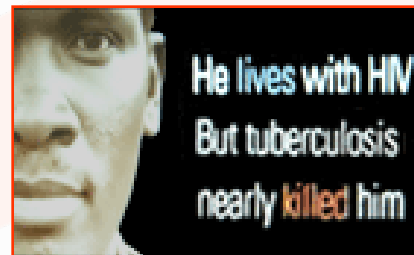
- Low incidence: 1-10
- Medium incidence: 11-18
- High incidence: >18 (29-58)

*** HIV-positive by Health District:**

- 1.1 Rome: 20% (5)
- 3.1 Cobb: 7% (29)
- 3.2 Fulton: 30% (44)
- 3.4 Lawrenceville: 11% (37)
- 3.5 DeKalb: 9% (58)
- 5.2 Macon: 11% (9)
- 6.0 Augusta: 17% (18)
- 7.0 Columbus: 6% (17)

HIV and Tuberculosis

- HIV increases the risk of TB reactivation enormously.
- TST+, HIV- \Rightarrow lifetime risk \sim 10%
- TST+, HIV+ \Rightarrow YEARLY risk \sim 10%
- A deadly duo



TB Risk Factors in HIV

Sociodemographic:

- Black, Asian or Hispanic ethnicity
- Birth or long-term residence in a country with high TB incidence
- HIV acquisition through IDU/ active IDU use
- Homelessness
- Proximity to active TB case

Clinical:

- Low CD4 count
- High viral load
- Failure of (or late) initiation of ART

Winter et al. IJTLDD (7):713-722 · July 2018

In addition to HIV...

- TB disproportionately affects vulnerable populations: recent immigrants, homeless, incarcerated or have problems with substance abuse
- These populations are “hard to reach” and are linked by poverty, social deprivation and difficulty in accessing health care

Barriers to Care

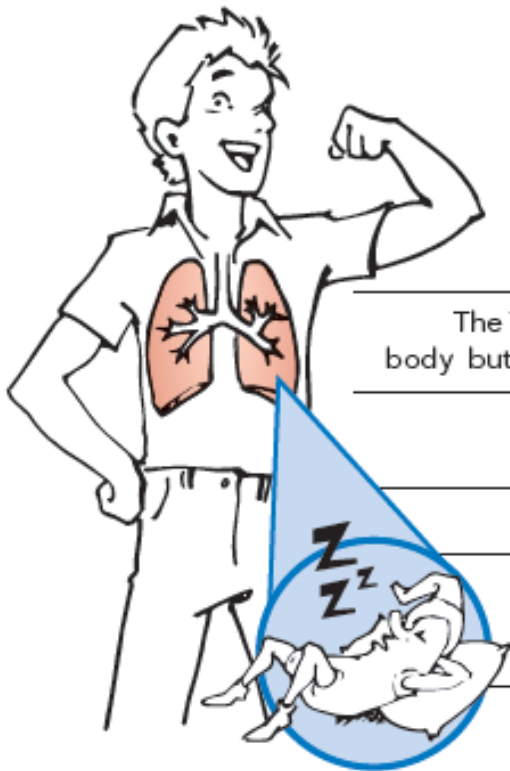
- **Stigma:** may prevent patients from accepting supervised treatment in their homes, where visits from health care workers would be immediately noticed by the community; fear of being laid off or fired if TB is discovered; loss of community due to isolation; reluctance to disclose contacts can lead to outbreaks
- **Lack of access to health care:** lack of insurance, lack of providers, distance to facility, no transportation, having to choose between work and care
- **Distrust of medical community**
- Delays in correct TB diagnosis and initiation of effective TB treatment increases TB morbidity/mortality, risk of transmission and development of drug-resistant TB

TB Prevention

- Early HIV diagnosis with early initiation of ART
- ART results in a prompt and marked decrease in the incidence of TB disease
- HIV-related TB incidence has declined more rapidly than the rate of active TB in the general population, in part due to the widespread use of ART
- Even with the beneficial effects of ART, the risk of TB disease among persons with HIV infection remains greater than that of the general population

TB Prevention--LTBI

- Treatment of latent TB infection (LBTI) (as defined by a positive tuberculin skin test [TST]) decreases the risk of TB disease by 62% and the risk of death by 26% among persons with HIV infection
- Prevention of TB disease by screening and appropriate treatment for LTBI are key components of HIV care



Latent TB Infection

I am healthy.

The TB germs are "sleeping" in my body but could "wake up" in the future.

I have no symptoms.

My chest x-ray is normal.

I am not contagious.

I have a positive result on a TB skin test or blood test.

Active TB Disease

I have a serious illness that could kill me if left untreated.

The TB germs have "woken up".

I may have symptoms – cough, fever, weight loss, night sweats.

My chest x-ray may be abnormal.

I may be contagious and could infect other people when TB germs are spread through the air when I cough, laugh or speak.

I may have a positive result on tests of my phlegm.



Can my **Latent TB Infection** (sleeping germs) wake up and make me sick with **Active TB Disease**?

Yes, and certain factors increase my risk!

- I arrived recently from another country where TB is common.
- I have HIV.
- I was in close contact with someone with active TB disease.
- I have diabetes, kidney failure, or cancer.
- I had surgery to remove part of my stomach.
- I live or work in a hospital, jail, drug rehab center or shelter.
- I use injection drugs.
- I have received an organ transplant.
- I take certain medications that affect my immune system, like prednisone (steroids) or other pills or injections to treat certain types of skin, joint and gastrointestinal conditions.

If I have **Latent TB Infection**, can I reduce my chances of getting sick with **Active TB Disease**?

Yes, I can prevent tuberculosis!

I can take safe, effective medicines.



When to Test for LTBI

- Test for LTBI at initiation of HIV care
- Repeat LTBI testing:
 - If initial test negative and subsequent CD4 cell count rises to >200 cells/mm³ after the initiation of antiretroviral therapy

Guidelines for Prevention and Treatment of Opportunistic Infections in HIV-Infected Adults and Adolescents
<https://aidsinfo.nih.gov/guidelines>

Repeat LTBI testing (if baseline test negative) annually if there is ongoing high risk for TB exposure:

- Current or history of incarceration
- Live in congregate settings
- Active drug abuse (IVDA, crack cocaine)
- Marginal housing or homelessness
- Travel to TB-endemic locations

Tuberculin Skin Testing

- Inject 0.1 ml of standardized mix of TB proteins (purified protein derivative)
- Given intradermally on volar forearm
- Measure **induration** 48-72 hrs after placement
- Measure in millimeters, not “positive” or “negative”
- Should be interpreted by well-trained health care professional



Picture from: www.info.gov.hk/dh/diseases/CD/TB.htm

Interpreting a Tuberculin Skin Test (TST)

Classification of the Tuberculin Skin Test Reaction

An induration of 5 or more millimeters is considered positive in

- HIV-infected persons
- A recent contact of a person with TB disease
- Persons with fibrotic changes on chest radiograph consistent with prior TB
- Patients with organ transplants
- Persons who are immunosuppressed for other reasons (e.g., taking the equivalent of >15 mg/day of prednisone for 1 month or longer, taking TNF-alpha antagonists)

An induration of 10 or more millimeters is considered positive in

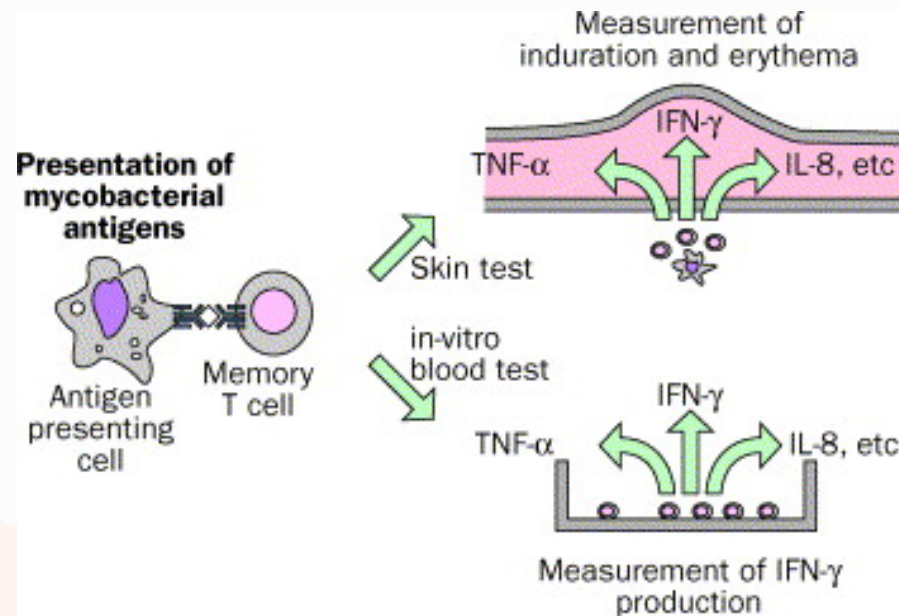
- Recent immigrants (< 5 years) from high-prevalence countries
- Injection drug users
- Residents and employees of high-risk congregate settings
- Mycobacteriology laboratory personnel
- Persons with clinical conditions that place them at high risk
- Children < 4 years of age
- Infants, children, and adolescents exposed to adults in high-risk categories

An induration of 15 or more millimeters is considered positive in any person, including persons with no known risk factors for TB. However, targeted skin testing programs should only be conducted among high-risk groups.

<http://www.cdc.gov/tb/publications/factsheets/testing/skintesting.htm>

Blood Tests for TB Infection

- Interferon Gamma Release Assays (IGRA)
- Developed in 2001
- Measures the interferon gamma (IFN- γ) released in response to *M.tuberculosis* antigens



Lancet 356: 1099 2000

IGRAs:

PROS:

- Requires single patient visit
“One and done”
- Results can be available within 24 hours
- Does not boost responses measured by subsequent tests
- Prior BCG vaccination does not cause a false-positive result
- Largely unaffected by most environmental nontuberculous mycobacteria (NTM)
- Data suggest not affected by intravesicular BCG

CONS:

- Expensive
- Blood samples must be processed 8-30 hours after collection
- Errors in collecting or transporting blood specimens or in running and interpreting the assay can decrease accuracy
- Inconsistent test reproducibility
- Limited data on effect of IGRA-guided therapy on prevention of TB disease
- False positive can occur in individuals infected with: *M. marinum*, *M. kansasii*
- May be boosted by TST (>3 days to 3 months)

FDA-Approved IGRAs: T-Spot, Quantiferon-TB Gold, Quantiferon-TB Gold Plus

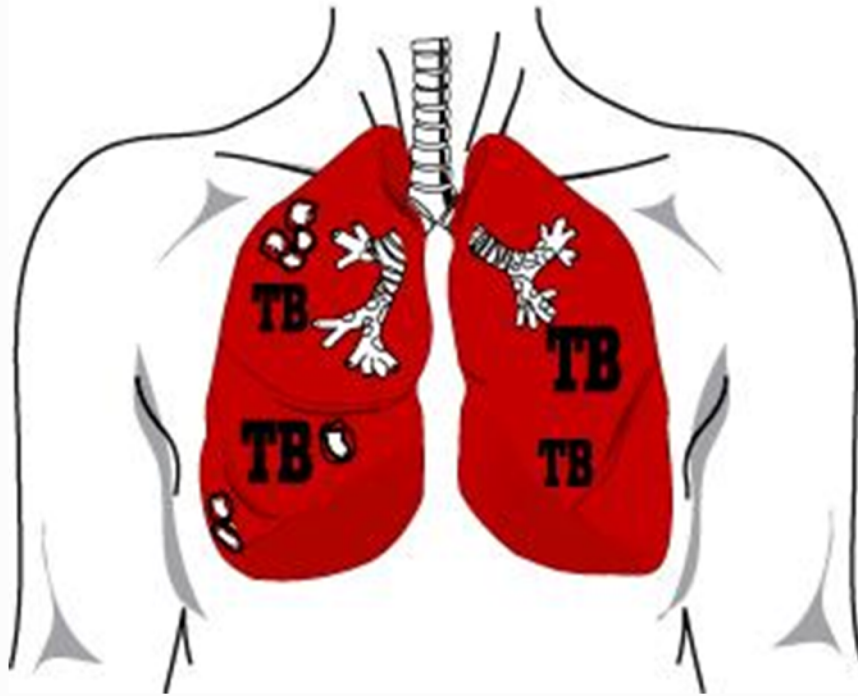
IGRA Performance in Diagnosing LTBI in HIV+ Patients

- IGRAs (particularly TSPOT) may be more sensitive than TST in HIV-affected individuals and less affected by advanced immunosuppression
- IGRAs perform similarly to the TST in identifying HIV+ individuals who could benefit from LTBI therapy
- Low TB screening completion rates with TST may be improved by using IGRA

Cattamanchi et al. J Acquir Immune Defic Syndr 2011;56:230-238

IGRA vs. TST in HIV

- No definitive comparisons of tests for LTBI screening in persons with HIV in low-burden TB settings
- Use one or the other, not both

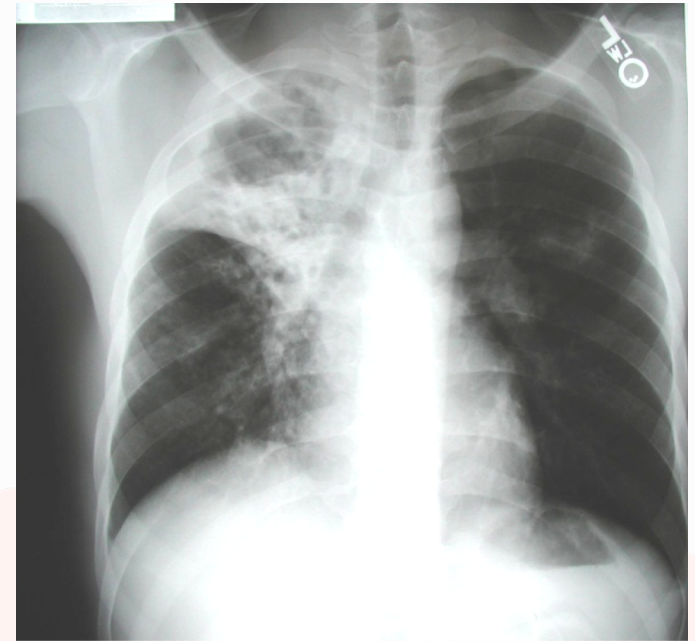


**NIP
TB
IN
THE
BUD!**

LTBI testing of **ANY** kind is preferable to **NO TESTING**

Evaluation of LTBI in HIV

- Assess for symptoms: fever, night sweats, weight loss, cough of *any* duration, lymphadenopathy
- CXR
- Assess for extrapulmonary TB:
 - more common in HIV
 - more common when $CD4 < 200$



Who to treat?

- A positive diagnostic test for LTBI and no prior history of treatment for active or latent TB
- A negative diagnostic test for LTBI but close contacts of persons with infectious pulmonary TB

Treating LTBI (to prevent TB disease)

Indications:

- (+) screening test^a for LTBI, no evidence of active TB, and no prior history of treatment for active or latent TB **(AI)**;
- Close contact with a person with infectious TB, regardless of screening test result **(AII)**

Preferred Therapy (Duration of Therapy = 9 Months):

- INH 300 mg PO daily + pyridoxine 25-50 mg PO daily **(AII)** *or*
- INH 900 mg PO twice weekly (by DOT) + pyridoxine 25-50 mg PO daily **(BII)**

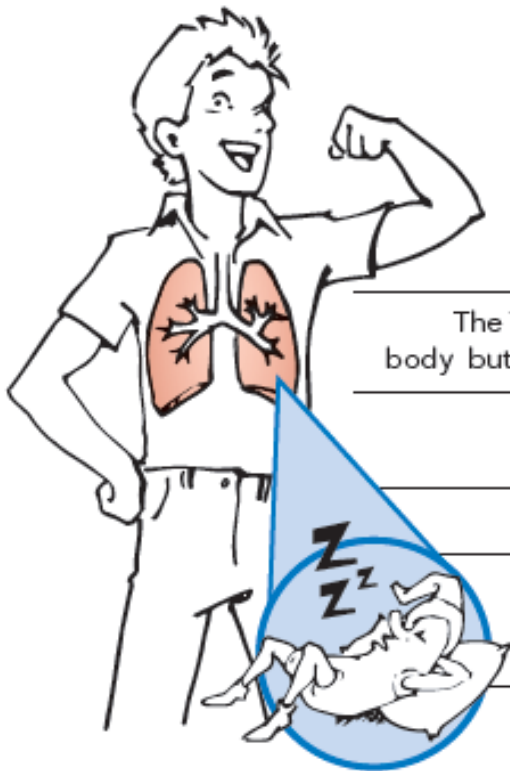
Alternative Therapies:

- RIF 600 mg PO daily x 4 months **(BIII)** *or*
- RFB (dose adjusted based on concomitant ART) x 4 months **(BIII)** *or*
- RPT (weight-based, 900 mg max) PO weekly + INH 15 mg/kg weekly (900 mg max) + pyridoxine 50 mg weekly x 12 weeks – in patients receiving an EFV- or RAL-based ART regimen **(BIII)**
 - 32.1–49.9 kg 750 mg
 - ≥50.0 kg 900 mg
- For persons exposed to drug-resistant TB, select anti-TB drugs after consultation with experts or with public health authorities **(AII)**

*Treatment of LTBI decreases the risk of TB disease in HIV-positive individuals by 62%, risk of death by 26%

*Protective effect of LTBI treatment is durable

<https://aidsinfo.nih.gov/guidelines>



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- I have diabetes, kidney failure, or cancer.
- I had surgery to remove part of my stomach.
- I live or work in a hospital, jail, drug rehab center or shelter.
- I use injection drugs.
- I have received an organ transplant.
- I take certain medications that affect my immune system, like prednisone (steroids) or other pills or injections to treat certain types of skin, joint and gastrointestinal conditions.

If I have **Latent TB Infection**, can I reduce my chances of getting sick with **Active TB Disease**?

Yes, I can prevent tuberculosis!

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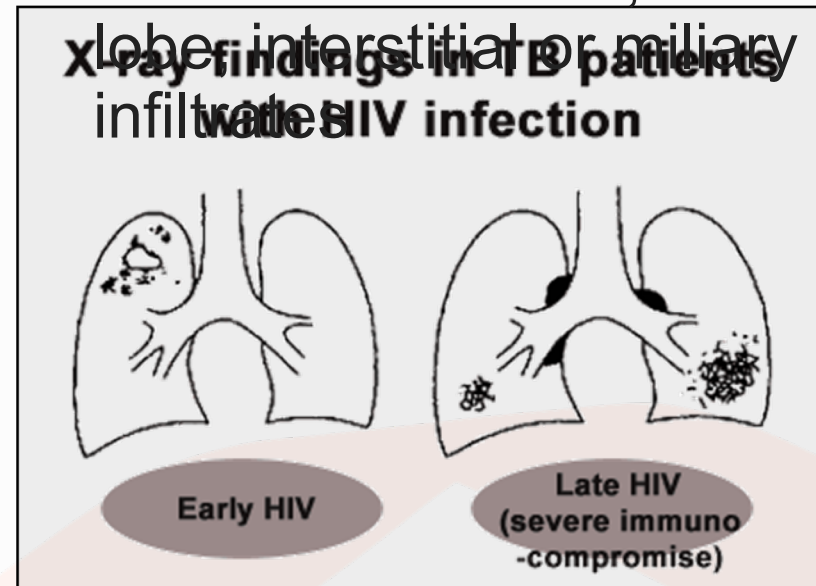
Diagnosis of Active TB in HIV

- Presentation of disease influenced by degree of immunodeficiency
- In HIV+ without pronounced immunodeficiency (CD4>350), TB clinically resembles disease seen in HIV-negative→pulmonary disease with typical x-ray
- Lower CD4 counts→atypical presentation of disease
- Extrapulmonary TB is also more common in HIV regardless of CD4 count:
 - disseminated/miliary disease
 - meningitis
 - lymphadenitis
- High level of suspicion necessary

Diagnosis of Pulmonary TB in HIV

- Most HIV-infected patients with pulmonary TB have symptoms:
 - fever, cough, weight loss, night sweats
- Duration of symptoms is shorter in HIV-infected patients
- 25 % of HIV+ individuals with pulmonary TB will have negative TST or IGRA
- CXR atypical or even normal with CD4 <200

- “Atypical” CXR findings include: lower lobe, middle lobe, interstitial or miliary infiltrate



Diagnosis of Pulmonary TB in HIV

- Obtain CXR
- AFB sputum smear x 3
- Nucleic-acid amplification testing: GeneXpert MTB/RIF, GeneXpert MTB/RIF Ultra
- Sputum for AFB culture and drug susceptibility

Treating Active TB Disease

- After collecting specimen for culture and molecular diagnostic tests, empiric treatment should be initiated in HIV-infected persons with clinical and radiographic presentation suggestive of HIV-related TB **(AIII)**.
- DOT is recommended for all patients requiring treatment for HIV-related TB **(AII)**.
- Please refer to the table below for TB drug dosing recommendations and to the [Adult and Adolescent ARV Guidelines](#) for dosing recommendations of ARV drugs when used with RIF or RFB.

For Drug-Sensitive TB

Intensive Phase (2 Months)

- INH + (RIF or RFB) + PZA + EMB **(AI)**; if drug susceptibility report shows sensitivity to INH & RIF, then EMB may be discontinued.

Continuation Phase (For Drug-Susceptible TB)

- INH + (RIF or RFB) daily (5–7 days per week) **(AII)**

Total Duration of Therapy:

- Pulmonary, drug-susceptible TB—6 months **(BII)**
- Pulmonary TB & positive culture at 2 months of TB treatment—9 months **(BII)**
- Extrapulmonary TB w/CNS involvement—9 to 12 months **(BII)**
- Extrapulmonary TB w/bone or joint involvement—6 to 9 months **(BII)**
- Extrapulmonary TB in other sites—6 months **(BII)**

For Drug-Resistant TB

Empiric Therapy for Suspected Resistance to Rifamycin +/- Resistance to Other Drugs:

- INH + (RIF or RFB) + PZA + EMB + (moxifloxacin or levofloxacin) + (an aminoglycoside or capreomycin)
- Therapy should be modified based on drug susceptibility results
- A TB expert should be consulted

Resistant to INH

- (RIF or RFB) + EMB + PZA + (moxifloxacin or levofloxacin) for 2 months **(BIII)**; followed by (RIF or RFB) + EMB + (moxifloxacin or levofloxacin) for 7 months **(BII)**

Resistant to Rifamycins +/- Other Antimycobacterial Agents:

- Therapy and duration of treatment should be individualized based on drug susceptibility, clinical and microbiological responses, and with close consultation with experienced specialists **(AIII)**.

Daily Therapy

- TB regimens that included twice- or thrice-weekly dosing during the initial intensive phase of therapy have been associated with an increased risk of treatment failure or relapse with acquired rifampin resistance
- Daily therapy is recommended over the entire course of therapy via directly-observed therapy (DOT)

Video Directly Observed Therapy

- The use of remote video by a healthcare provider to observe a patient ingesting medications
- North Carolina: in person DOT for at least first two weeks, uses Facetime, Skype
- Georgia: in person DOT for first 8 weeks, uses Skype

Georgia Tuberculosis Policy and Procedure Manual 2016 <https://dph.georgia.gov/sites/dph.georgia.gov/files>
N.C. Tuberculosis Policy Manual <https://epi.publichealth.nc.gov/cd/lhds/manuals/tb/6>

Timing of ART in TB/HIV Disease

- Concurrent therapy is challenging due to:
 - High pill burden
 - increased potential drug toxicity
 - increased risk of drug interactions
 - risk of TB-associated IRIS
- Delaying HAART until after completion of TB therapy increases AIDS-associated morbidity and mortality

Timing of ART in TB/HIV Disease

- CD4 < 50: start ART within two weeks of starting TB therapy
- CD4 ≥ 50: ART should be started within 8 weeks of starting TB therapy
- When TB occurs in patients already on ART, start TB medications immediately and choose rifamycin that does not lead to drug interactions with ART

**early ART not necessarily beneficial in TB meningitis

Table 5. Drug-drug Interactions with Rifamycins and ART

For additional details see the drug-drug interactions tables in the Adult/Adolescent ARV guidelines at <https://aidsinfo.nih.gov/guidelines/html/1/adult-and-adolescent-arv/367/overview> and www.hiv-druginteractions.org

Rifampin (RIF)¹⁷-based Regimen with ART

NUCLEOSIDE REVERSE TRANSCRIPTASE INHIBITORS (NRTIs)

Do not use RIF with tenofovir alafenamide (TAF) containing regimens (i.e. Biktarvy[®], Descovy[®], Genvoya[®], Odefsey[®])

NON-NUCLEOSIDE REVERSE TRANSCRIPTASE INHIBITORS (NNRTIs)

Efavirenz (EFV) 600 mg po every night (standard). Consider TDM.

Do not use RIF with etravirine (ETR), nevirapine (NVP), or rilpivirine (RPV).

PROTEASE INHIBITORS (PIs)

Do not use RIF with any PI (boosted or unboosted) containing regimen.

INTEGRASE STRAND TRANSFER INHIBITORS (INSTIs)

Increase dolutegravir (DTG) to 50 mg po bid. Use alternative to RIF if INSTI-experienced with certain INSTI-associated resistance substitutions or clinically suspected INSTI resistance.

Increase raltegravir (RAL) to 800 mg po bid. Do not use once daily RAL with rifampin.

Do not combine RIF with bictegravir/emtricitabine/TAF (Biktarvy[®])

Do not use RIF with elvitegravir (EVG) containing regimens (i.e. Genvoya[®] or Stribild[®])

CCR5 INHIBITOR

Use MVC 600 mg bid with RIF, or 300 mg bid if used with RIF and a strong CYP3A inhibitor

Rifabutin (RFB)-based Regimen with ART	
NRTIs	
Do not use RFB with TAF containing regimens (i.e. Biktarvy [®] , Descovy [®] , Genvoya [®] , Odefsey [®])	
NNRTIs	
NNRTI	Rifabutin (RFB)
EFV (standard dose)	RFB 450–600 mg/day; or RFB 600 mg 3 times/week if EFV is not coadministered with a PI
ETR (standard dose)	RFB 300 mg po once daily (standard dose). Do not combine ETR with RFB if used with a RTV-boosted PI.
NVP (standard dose)	RFB 300 mg po once daily (standard dose)
RPV	Increase RPV to 50 mg po once daily.
PIs	
Ritonavir (/r) or Cobicistat (/c)-boosted PIs ¹⁸	
Atazanavir (ATV)/r or ATV/c	RFB 150 mg po once daily Monitor for antimycobacterial efficacy, adverse effects, and consider TDM
Darunavir (DRV)/r or DRV/c	
Lopinavir/r	
Tipranavir/r	
Unboosted PIs	
ATV	RFB 150 mg po once daily
INSTIs	
No dosage adjustments for DTG or RFB ¹⁹	
No dosage adjustments for RAL or RFB ¹⁹	
Do not combine RFB with bictegravir/emtricitabine/TAF (Biktarvy [®])	
Do not combine RFB with elvitegravir/cobicistat/emtricitabine/tenofovir (Stribild [®] or Genvoya [®]).	
CCR5 INHIBITOR	
MVC 150 mg po bid (with potent CYP3A inhibitor); MVC 300 mg po bid (without potent CYP3A inhibitor or inducer); Dose RFB based on other drugs in regimen (consider TDM)	

Adverse Drug Reactions in TB Patients on ART

- TB medications and antiretrovirals share similar adverse drug reactions:
 - drug-induced liver injury
 - rash
- Due to multiple medications, it may be difficult to determine cause

TB-IRIS

- Relatively common in patients starting ART while on TB treatment (8%-43%)
- Risk factors: CD4<100, extrapulmonary or disseminated TB, short interval between starting TB meds and ART, high viral load
- Symptoms typically occur 1-4 weeks after ART initiated

ATS/CDC/IDSA Clinical Practice Guidelines for Drug-Susceptible TB. CID 2016:63 (1 October)

TB-IRIS

- Patients usually improve on TB therapy, then develop new or recurrent symptoms within the first few weeks of ART
- Common manifestations:
 - fevers
 - new or worsening lymphadenopathy
 - new or worsening respiratory symptoms
 - new or worsening radiographic findings
- Diagnosis based on: clinical presentation with typical timeline, demonstration of response to ART (\uparrow CD4, \downarrow VL), r/o alternative causes for deterioration like: treatment failure from drug resistant TB, other OIs

ATS/CDC/IDSA Clinical Practice Guidelines for Drug-Susceptible TB. CID 2016;63 (1 October)

TB-IRIS

- Treatment:
 - symptomatic; treat with anti-inflammatories
 - most cases self-limiting
 - steroids used in cases with significant symptoms:
prednisone 1.25 mg/kg/day for 2-4 weeks with tapering
over a period of 6-12 weeks or longer

ATS/CDC/IDSA Clinical Practice Guidelines for Drug-Susceptible TB. CID 2016:63 (1 October)

TB/HIV Pearls

- Early diagnosis and treatment of HIV will help reduce TB risk
- Early assessment for latent TB infection and treatment (if indicated)
- Educate patients and providers on signs and symptoms of TB

TB/HIV Pearls

- When treating active TB, work closely with TB Control nurses, case managers, outreach workers
- Give TB/HIV medications together when able
- After completion of TB therapy, ensure continuation of HIV care and maintained virologic suppression

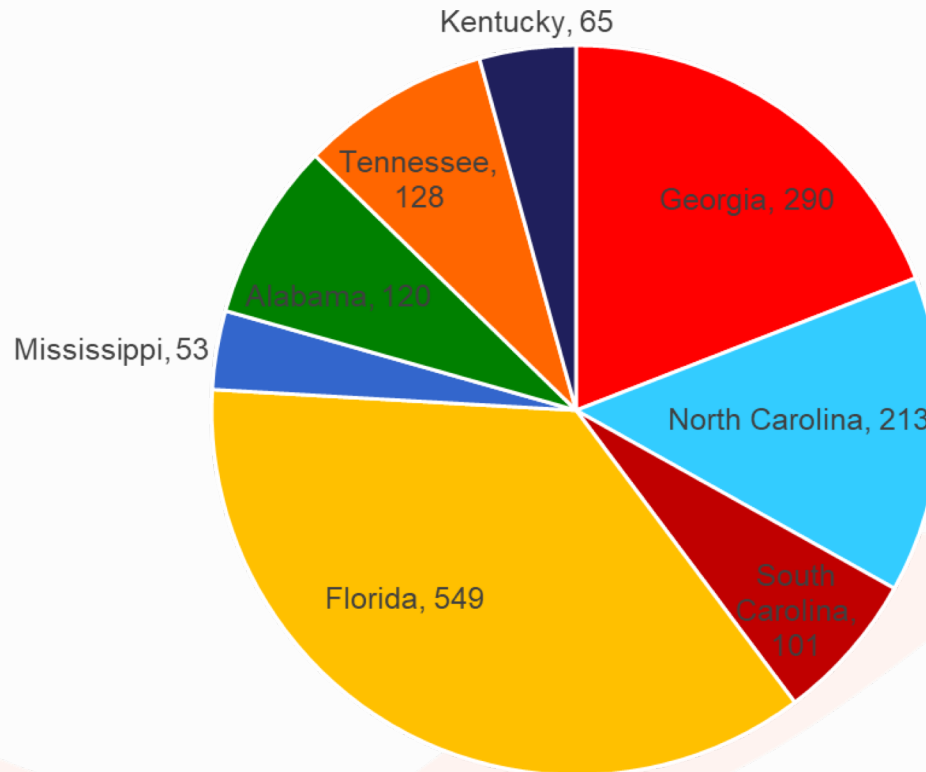
■ Thank you!

Table 3. Monitoring Treatment for Active TB Disease in Patients with HIV

X=recommended in all pts, O=optional or recommended in certain situations (see footnotes)

Activity	Baseline	Month of Treatment Completed								End of Treatment	
		1	2	3	4	5	6	7	8		
Microbiology											
Sputum smears and culture ⁶	X	X	X	O	O						O
Drug susceptibility testing ⁷	X			O							
Imaging											
CXR or other imaging ⁸	X		O								O
Clinical Assessment											
Weight ⁹	X	X	X	X	X	X	X	X	X	X	
Symptom and adherence review ¹⁰	X	X	X	X	X	X	X	X	X	X	
Vision assessment ¹¹	X	X	X	O	O	O	O	O	O	O	
Laboratory Testing											
AST, ALT, bilirubin, alkaline phosphatase ¹²	X	X	X	X	X	X	X	X	X	X	
Platelet count ¹³	X	O	O	O	O	O	O	O	O	O	
Creatinine ¹³	X	O	O	O	O	O	O	O	O	O	
HIV testing ¹⁴	X										
Hepatitis B and C screen ¹⁵	X										
Diabetes Screen ¹⁶	O										

US TB Cases, 2017: 9093



The Online TST/IGRA Interpreter

Version 3.0



The following tool estimates the risk of active tuberculosis for an individual with a tuberculin skin test reaction of ≥ 5 mm, based on his/her clinical profile. It is intended for adults tested with standard tuberculin (5 TU PPDS, or 2 TU RT-23) and/or a commercial Interferon Gamma release assay (IGRA). For more details about the algorithm used, go to the [About](#) page. The current version of the algorithm contains modifications of the original version, which was detailed in a paper by [Menzies, et al. \(2008\)](#). For further information see [references](#), or contact dick.menzies@mcqill.ca

Results

Once you have completed the form, click on "Submit" and your results will show up in this space.

For inquiries, and suggestions please contact dick.menzies@mcqill.ca.

Please select the best response for each field:

TST Size:

IGRA Result:

Age:

Age at immigration (if person immigrated to a low TB incidence country):

Country of birth:

BCG status:

For more info, visit: [BCG World Atlas](#).

Recent contact with active TB:

Please select all the conditions that currently apply to the patient:

(If none of these conditions apply, please leave boxes unchecked)

- | | |
|---|--|
| <input type="checkbox"/> AIDS | <input type="checkbox"/> Abnormal chest x-ray: granuloma |
| <input type="checkbox"/> Abnormal chest x-ray: fibronodular disease | <input type="checkbox"/> Carcinoma of head and neck |
| <input type="checkbox"/> Chronic renal failure requiring hemodialysis | <input type="checkbox"/> Cigarette smoker(>1 pack/day) |
| <input type="checkbox"/> Diabetes Mellitus (all types) | <input type="checkbox"/> HIV infection |

Risk of Infection ↑	Groups with Increased Likelihood of Infection with Mtb	Benefit of Therapy	LTBI Testing Strategy		
			Likely to be Infected Low to Intermediate Risk of Progression (TST ≥ 10mM)	Likely to be Infected High Risk of Progression (TST ≥ 5mM)	
	Household contact or recent exposure of an active case	Yes	Likely to be Infected Low to Intermediate Risk of Progression (TST ≥ 10mM)	Likely to be Infected High Risk of Progression (TST ≥ 5mM)	
	Mycobacteriology laboratory personnel	Not demonstrated			
	Immigrants from high burden countries (>20 / 100,000)	Not demonstrated			
	Residents and employees of high risk congregate settings	Yes			
	None	Not demonstrated	Unlikely to be Infected (TST > 15mM)		
			Risk of Developing Tuberculosis if Infected →		
			Low	Intermediate (RR 1.3 -3)	High (RR 3-10)
			No risk factors	Clinical predisposition Diabetes Chronic renal failure Intravenous drug use	Children age less than 5 HIV infection Immunosuppressive therapy Abnormal CXR consistent with prior TB Silicosis
			Benefit of Therapy		
			Not demonstrated		Yes

In developing a diagnostic approach for the evaluation of those with suspected LTBI, we recommend the clinician weigh the likelihood of infection, the likelihood of progression to TB if infected, and the benefit of therapy (Horsburgh, C.R., Jr., and E.J. Rubin. 2011. Clinical practice. Latent tuberculosis infection in the United States. The New England journal of medicine 364:1441-1448). Recommendations were formulated for each of the three groups illustrated above. These groups are concordant with current recommendations for the interpretation of the TST (2000. Targeted tuberculin testing and treatment of latent tuberculosis infection. American Thoracic Society. MMWR. Respiratory Diseases Branch 49:1-51)



Questions / Answers





Thank You

