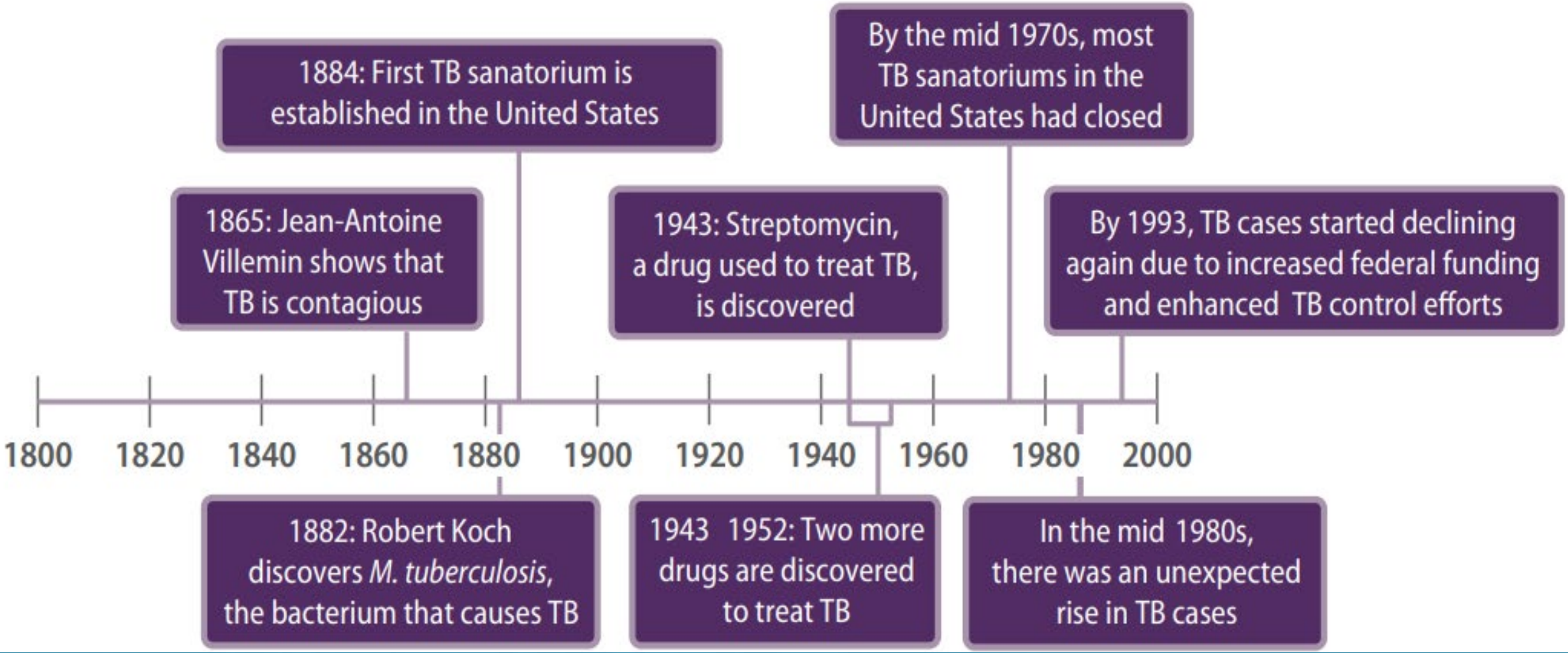
BACK TO BASICS

STRENGTHENING TB OUTREACH WORKER SKILLS AND CONNECTIONS

APRIL 22-23, 2026 · RICHMOND, VA

TB 101

A Quick TB History

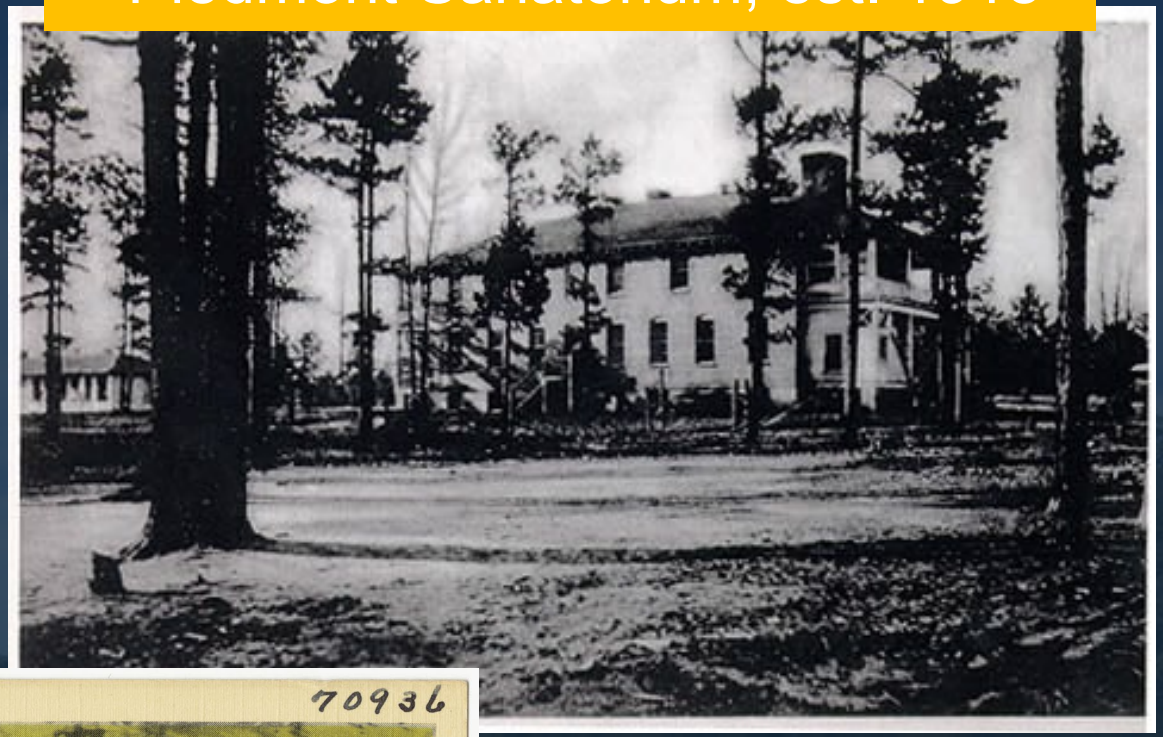


Source: CDC Self-Study Modules on Tuberculosis 1: Transmission and Pathogenesis of TB

Catawba Sanatorium, est. 1908

Weigh Day

- Piedmont Sanatorium, est. 1918



History - PGH | DBHDS

Blue Ridge Sanatorium, est. 1920

Blue Ridge Sanatorium – Wikipedia

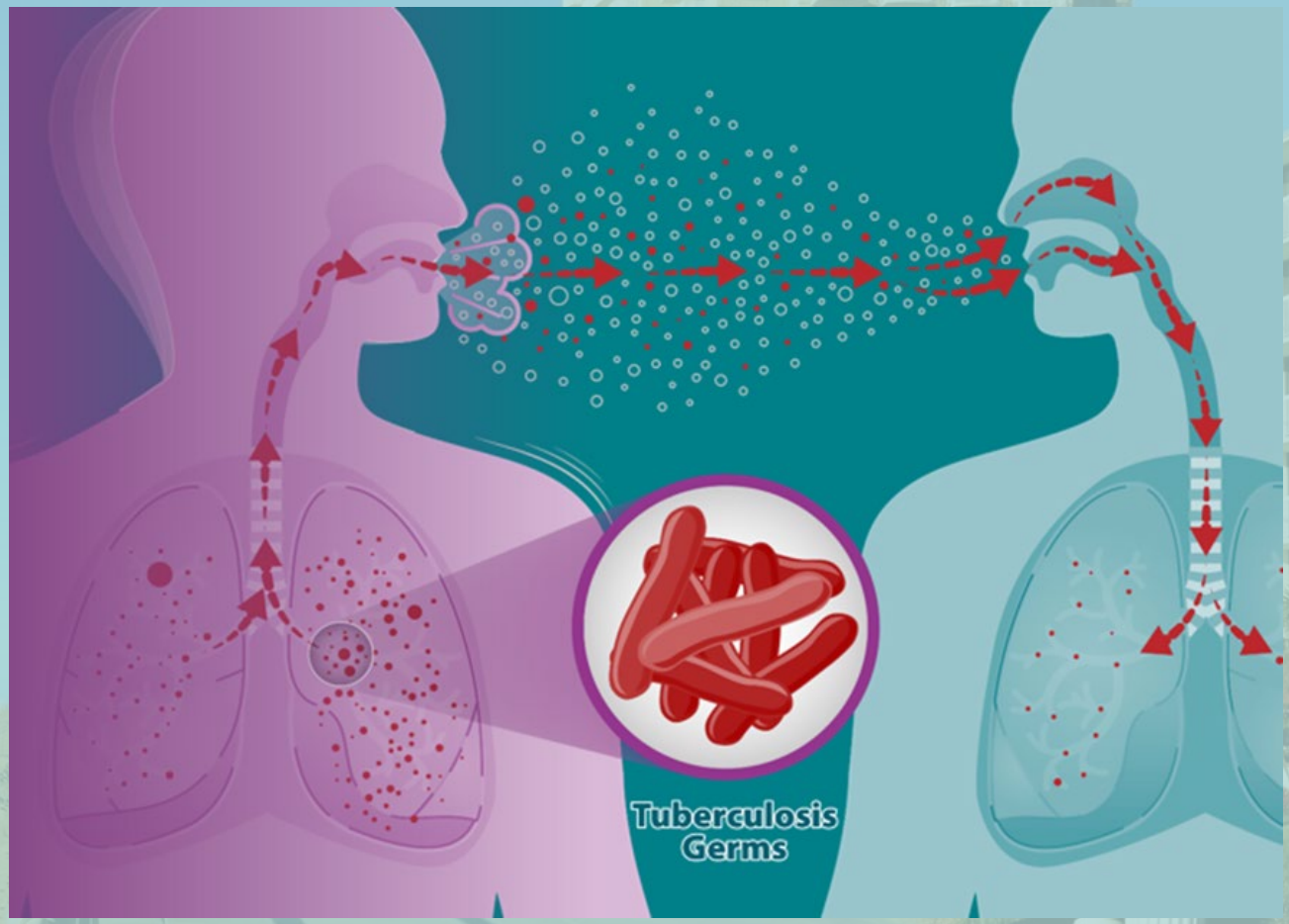
TB Pathology

Tuberculosis (TB)

- TB is a disease caused by bacteria called *mycobacterium tuberculosis*. The bacteria, or TB germs, usually attack the lungs. However, TB germs can attack any part of the body such as the kidney, spine, or brain.
  - Pulmonary TB is TB in the lungs.
  - Extrapulmonary TB is TB in places other than the lungs, such as the kidney, spine, or brain.
- TB is spread from person to person through the air.
- Not everyone infected with TB germs becomes sick.

Transmission of TB

- TB spreads through the air from person to person when someone with contagious TB coughs, speaks, or sings



Source: CDC Core Curriculum on Tuberculosis: What the Clinician Should Know

Which, if any, of these routes could transmit TB?

Sharing toothbrushes

Saliva from kissing

Shaking someone's hand

Touching bed linens or toilets

Sharing food, drink, or utensils

TB is NOT spread by

Sharing toothbrushes

Saliva from kissing

Shaking someone's hand

Touching bed linens or toilets

Sharing food, drink, or utensils

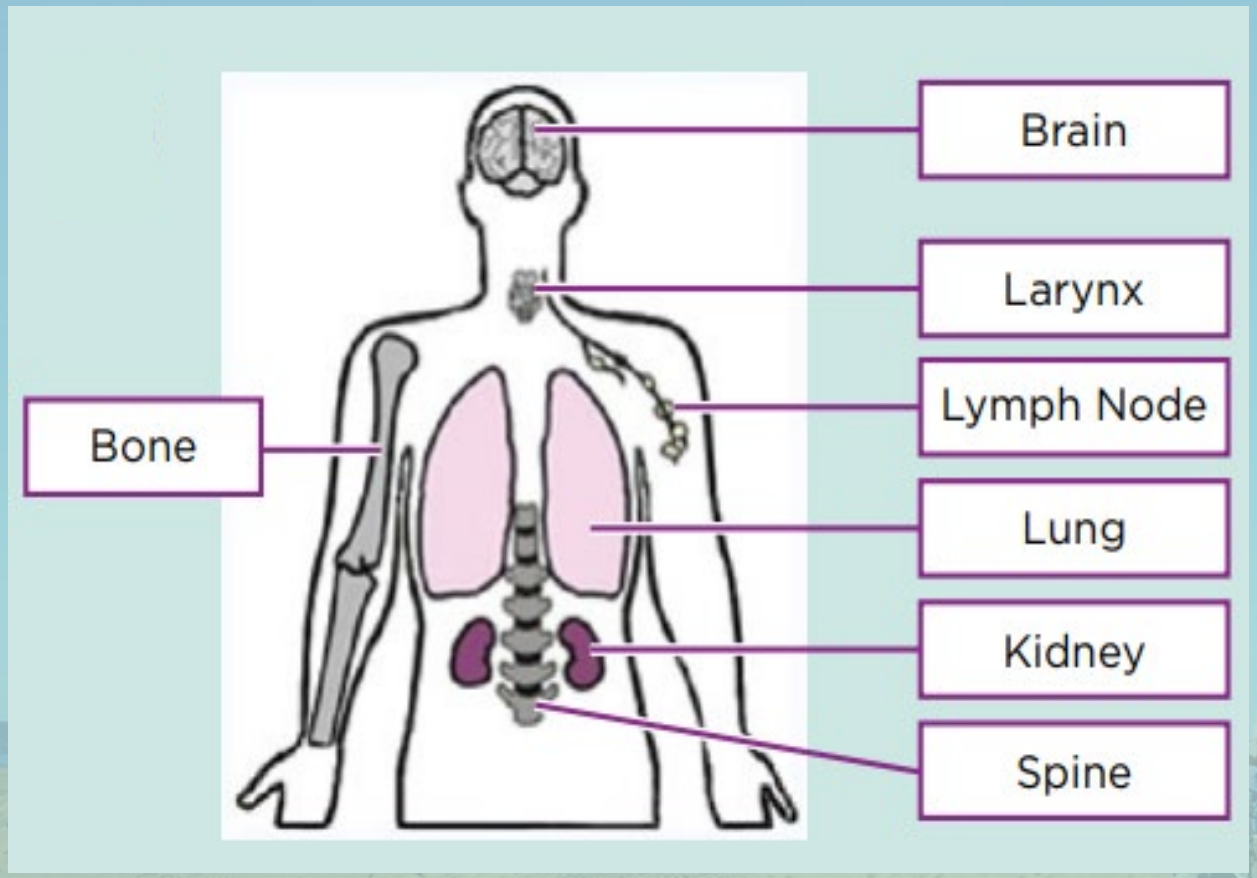
Transmission of TB

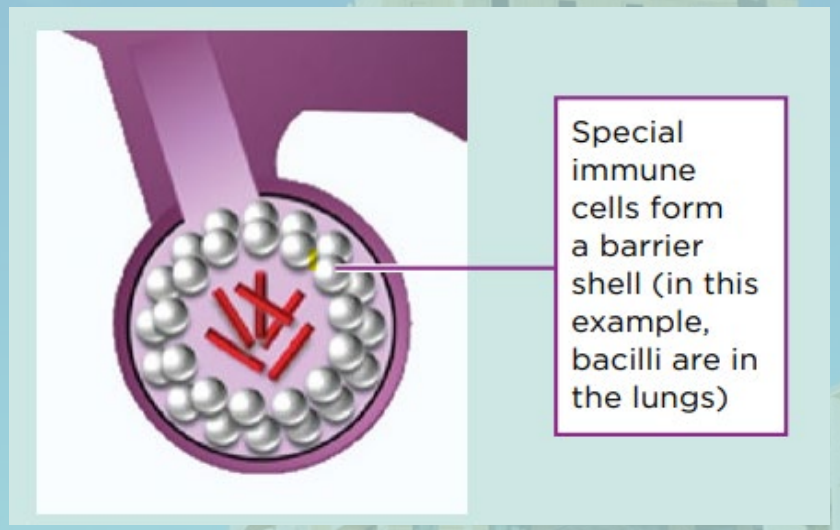
Factor	Description
Susceptibility	• Susceptibility (immune status) of the exposed individual
Infectiousness	• Infectiousness of the person with TB disease (respiratory site, cough, cavitation, aerosol-generating procedures)
Environment	• Concentration of infectious particles • Space • Ventilation • Air circulation • Specimen handling • Negative pressure
Exposure	• Proximity • Frequency • Duration of exposure

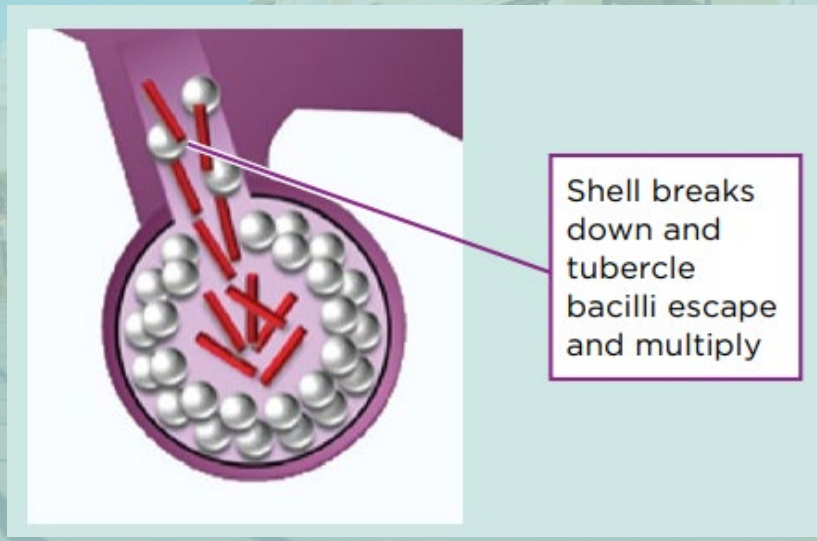
Transmission of TB

- Extrapulmonary TB without pulmonary, pleural, or laryngeal involvement usually is **not** infectious
- Exceptions:
  - An open abscess or lesion, especially with drainage
  - Aerosolizing procedure of an extrapulmonary site of disease (i.e., use of a bone saw)

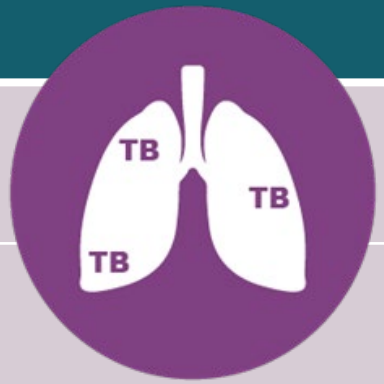
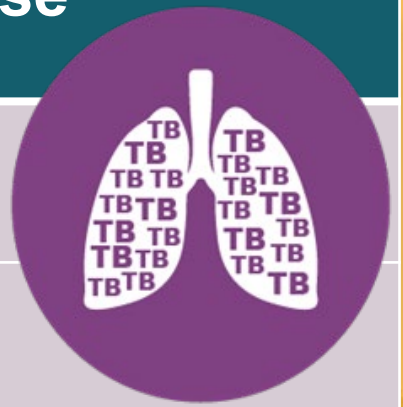
Pathogenesis







LTBI vs. Active Disease

LTBI	Active TB Disease
 Tubercle bacilli in the body	
Tuberculin skin test or IGRA usually positive	
No symptoms	Symptoms
Chest x-ray (CXR) normal or abnormal but not consistent with TB	Chest x-ray usually abnormal
Not infectious	Often infectious
Should consider preventative treatment	Needs treatment

Risk of Developing TB Disease over a Lifetime

Risk Factor	Risk of Developing TB Disease	Description
TB infection and no risk factors	About 10% over a lifetime 	For people with TB infection, **no risk factors**, and no treatment, the risk is about 5% in the first 2 years after infection and about 10% over a lifetime.
TB infection and diabetes	About 30% over a lifetime 	For people with TB infection, **diabetes**, and no LTBI treatment, the risk is about 30% over a lifetime (3 times as high as those with no risk factors).
TB infection and HIV infection	About 7% to 10% PER YEAR 	For people with TB infection, **untreated HIV infection** and with no LTBI treatment, the risk is about 7% to 10% PER YEAR, a very high risk over a lifetime.

Source: CDC Core Curriculum on Tuberculosis: What the Clinician Should Know

Risk factors for Progression

- Living with HIV
- Children <5 years of age
- Recent infection (<2 years)
- Receiving immunosuppressive therapy (TNF antagonists, system corticosteroids, immunosuppressive drug therapy following organ transplant
- Diabetes mellitus
- Silicosis
- Chronic renal failure
- Cancer of the head, beck, or lung
- Gastrectomy
- Malnourishment/low body weight

Diagnosis

Testing for Infection

- Tuberculin Skin Test (TST)
  - Intradermal placement of purified protein derivative
  - Stimulates a delayed-type hypersensitivity response mediated by T lymphocytes
  - In patients with prior mycobacterial exposure, causes induration at the injection site within 48 to 72 hours
- Interferon-Gamma Release Assays (IGRA)
  - Blood test
  - Measure T cell release of interferon-gamma following stimulation by antigens more specific to Mycobacterium tuberculosis
  - 2 Brands of tests:
    - QuantiFERON-TB Gold
    - T-SPOT

Diagnosis

- Latent TB
  - Positive test for infection
  - Normal chest x-ray
  - No symptoms

Diagnosis

- Active TB
  - Positive PCR or culture
  - Most will have symptoms, but not all
  - Abnormal chest radiography- if pulmonary TB
  - Positive test for infection
- Clinical Case
  - Negative smears and cultures
  - May have symptoms, but not all
  - Abnormal chest radiography- if pulmonary TB
  - Positive test for infection
- Every patient and situation is different

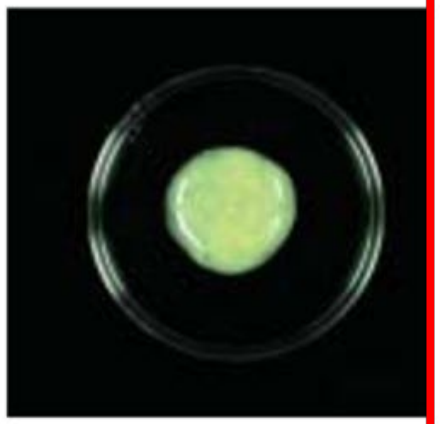
Diagnosis

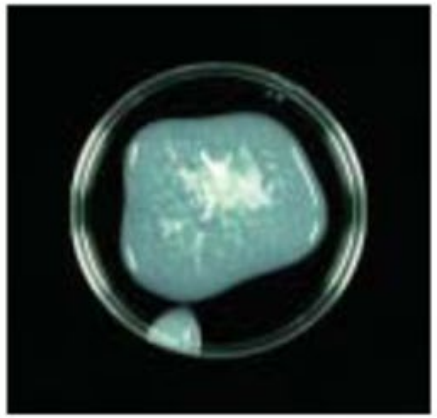
- Look at the whole picture
  - Risk factors
  - Symptoms
  - Physical exam
  - Chest radiography
  - Known exposure
  - Positive test for infection
  - Sputum smears, PCR, cultures
  - Immunodeficiency

Laboratory Testing Overview

Sputum

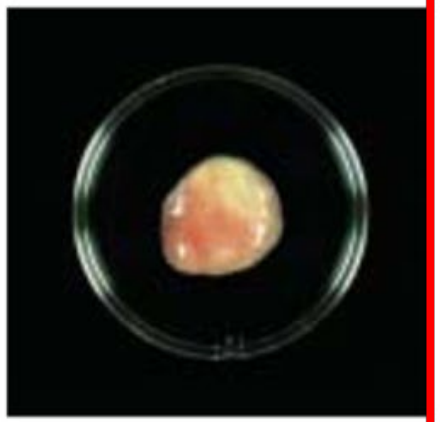
Thick, Mucopurulent

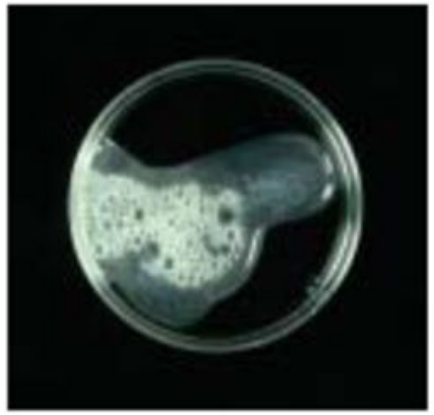




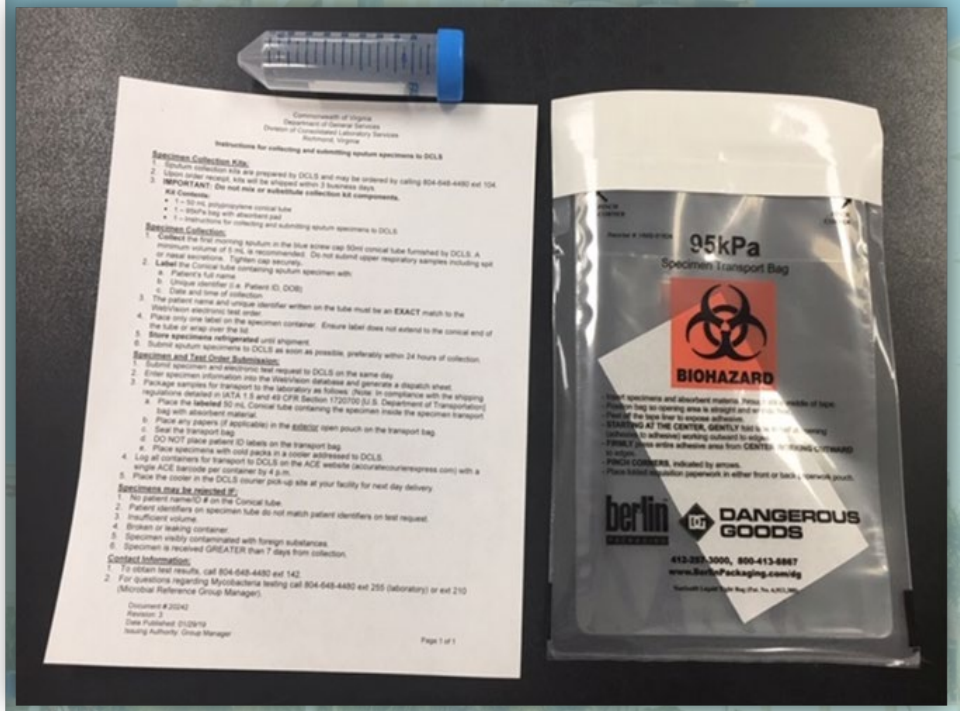
Watery (acceptable if induced)

Hemoptysis (Bloody Sputum)





Salivary



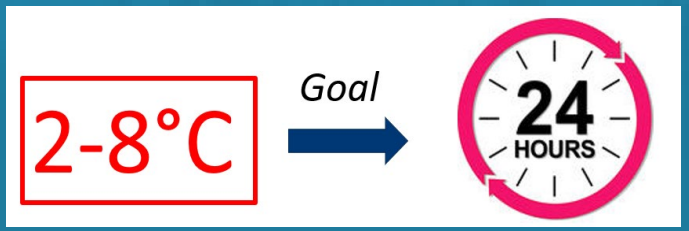
Sputum

- Establish an initial diagnosis
- Indicator of initial infectiousness
- Monitor response to treatment

How many sputa specimens are collected at initial evaluation?

Sputum

- 3 specimens
- 8 hours apart
- Early morning preferred
- Observation is preferred for at least one
- Induction if needed
- Specimen should be refrigerated and sent to the lab within 24 hours of collection – don't wait and batch



Sputum

How to Collect and Process Sputum in Webvision

Entering your TB sputum samples into Webvision is a 3-4 part process. Please follow the instructions below to correctly process the sample. It's important to remember to process the samples and send to DCLS as soon as possible. Samples must be placed in a cooler with ice packs for transport. Please do not "batch" your specimens and send all at once. This delays the testing process and may compromise the integrity of the sample.

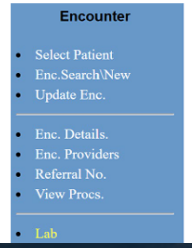
This process will cause Webvision to open other windows to ask further questions about your sample. Before doing this, be sure that "pop-ups" are not blocked.

Please keep in mind that local health districts have different processes when it comes to how many copies they keep, where they keep the records, etc. This document may need to be modified for your district or office to reflect your policies and procedures.

Please note that DCLS does not have access to Webvision and will not be able to answer any questions about sputum processing. Webvision test requests are electronically sent to DCLS each night (midnight) and will not be visible to the laboratory until the next morning.

Entering the test into Webvision

1. Once the encounter is created, click on "Lab" located in the menu box on the left.



Sputum Collection Tips for Healthcare Workers

Before collection:

- Healthcare workers should wear appropriate respiratory protection if present for collection
- Ensure use of a safe place for sputum collection, such as negative pressure room, outside, or in a well-ventilated room in the client's home
- Educate the client on collection steps
- Plan to observe the first specimen collection. The second and third specimens should be collected at least 8 hours apart
- Plan to collect a morning sputum. Secretions pool overnight, so a morning sputum is a better specimen
- Instruct the client to rinse their mouth with filtered or bottled water to limit the presence of nontuberculous mycobacteria (NTM) and food
  - A lot of tap water contains NTM - handout on VDH TB website
  - If you do not have filtered or bottled water, boiled tap water can be used

During collection:

- Observe at least the first sputum collection:
  - Ensure the sample is thick, not watery with spit or nasal secretions
  - Obtain at least 5mL
  - Instruct the client not to put their mouth on the tube, if possible
- Encourage the client to sit and lean forward. This is the best position for producing a strong cough
- Try these strategies if the client cannot produce sputum:
  - Have the client breathe in steam from a hot shower or a boiling pot of water
  - Apply percussion to the client's back to help loosen secretions
  - Help the client use a nebulizer with hypertonic saline to induce sputum. Inhaling the saline for about 10 minutes should help produce a cough
- Tightly seal the collection tube

After collection:

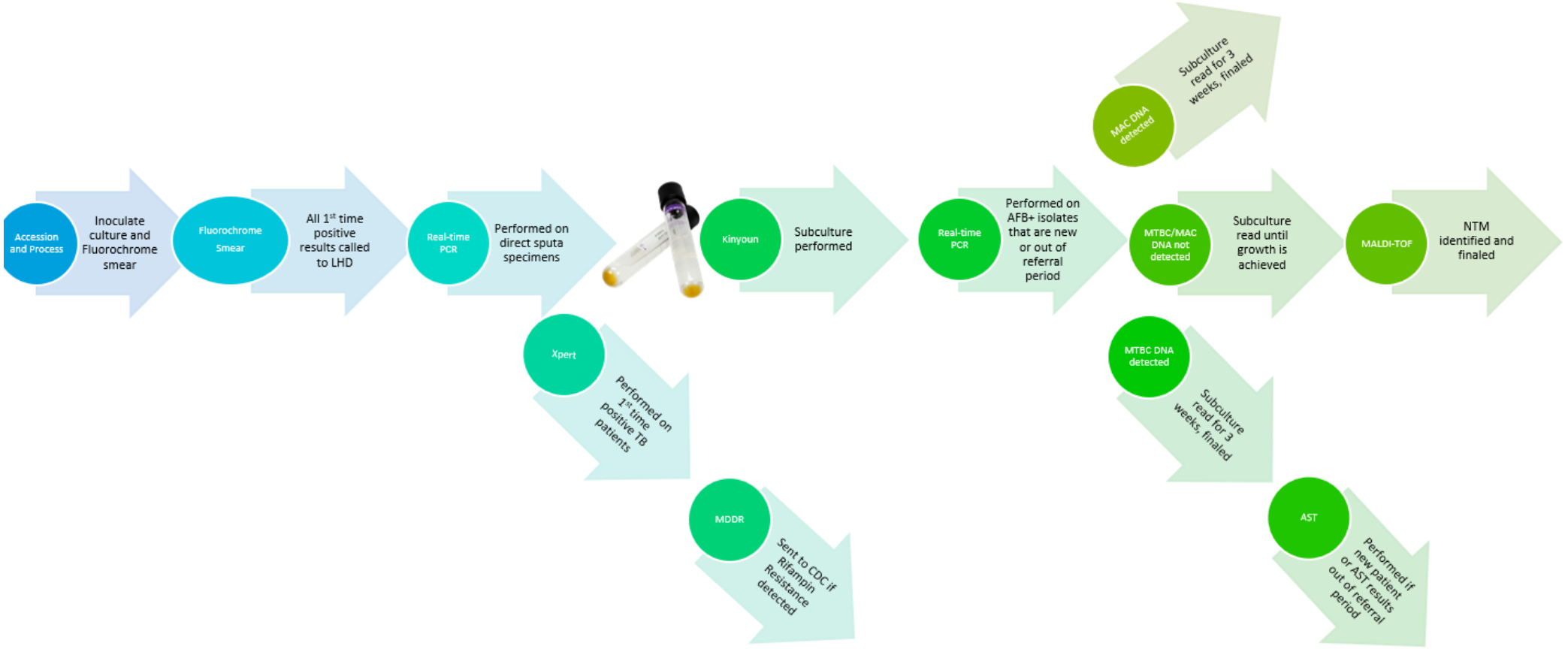
- Label the tube with:
  - Client's full name
  - Unique identifier (i.e., client ID, DOB)
  - Date and time of collection
- Place only one conical tube per biohazard bag
- Store specimens refrigerated at 4°C (do not freeze)
- Enter specimen order into Web VISION and dispatch order
- Ship on a cold pack within 24 hours of collection
- Do not batch (hold onto) specimens to submit to DCLS together - the fresher the better!

Sputum Collection Guide

Recommended Sputum Sample Collection Schedule – Virginia Department of Health Tuberculosis Program

Location of Patient	Purpose	Monitoring	Frequency	Number of Specimens	Comments
All Patients	-Determine initial infectiousness and confirmation of TB disease **OR** -Rule out of pulmonary involvement for an extrapulmonary case **OR** -Rule out of active TB for someone with a B1 classification	Initial contact with client	Collect 3 consecutive specimens	Minimum of 3 samples, with one collected in the early morning	At least one specimen collection should be observed/coached by HD staff. At minimum, samples should be at least 8 hours apart. Guidance for high quality sputum collection. Submit specimens to the lab as soon as possible. Do not hold and submit specimens in a batch.
	Establish client with VDH when TB diagnosis is from an outside facility (e.g., hospital, another state)	Initial contact with client	Collect 2 consecutive sputum samples	2 samples, with one collected in the early morning	At least one specimen collection should be observed/coached by HD staff. At minimum, samples should be at least 8 hours apart.
	Monitor for response to treatment **and** Determine need for extension of treatment	Culture conversion	Collect one sample every 14* days, until 2 consecutive cultures are negative with no positive culture result thereafter. **Continue monthly collection until treatment completion for:** Rifamycin resistance; MDR/XDR-TB; HIV+	Until 2 consecutive sputum cultures are negative with no positive culture results thereafter.	Single specimens should be observed by HD staff when feasible. If unable to produce sputa spontaneously, several 20-minute induction attempts on different days, including early AM, should be undertaken before deciding that a client can no longer produce sputum. Collecting a specimen 55 – 60 days after treatment initiation provides valuable information about treatment response

DCLS TB Lab Testing Algorithm



Treatment

Treatment of LTBI

- Adults:
  - 3HP
  - 4R
  - 3HR
  - 6H/9H
- Pediatrics
  - 3HP (2yr +)
  - 4R
  - 3HR
  - 9H

Latent Tuberculosis Infection Treatment Regimens

Treatment regimens for latent TB infection (LTBI) use isoniazid (INH), rifapentine (RPT), or rifampin (RIF). **CDC and the National Tuberculosis Controllers Association preferentially recommend short-course, rifamycin-based, 3- or 4-month latent TB infection treatment regimens over 6- or 9-month isoniazid monotherapy.**

Clinicians should choose the appropriate treatment regimen based on drug susceptibility results of the presumed source case (if known), coexisting medical conditions (e.g., HIV*), and potential for drug–drug interactions.

https://www.cdc.gov/mmwr/volumes/69/rr/rr6901a1.htm?s_cid=rr6901a1_w

	DRUG	DURATION	FREQUENCY	TOTAL DOSES	DOSE AND AGE GROUP
Preferred	ISONIAZID† AND RIFAPENTINE†† (3HP)	3 months	Once weekly	12	**Adults and children aged ≥12 yrs** INH: 15 mg/kg rounded up to the nearest 50 or 100 mg; 900 mg maximum RPT: 10–14.0 kg; 300 mg 14.1–25.0 kg; 450 mg 25.1–32.0 kg; 600 mg 32.1–49.9 kg; 750 mg ≥50.0 kg; 900 mg maximum
					Children aged 2–11 yrs INH†: 25 mg/kg; 900 mg maximum RPT††: See above
	RIFAMPIN§ (4R)	4 months	Daily	120	**Adults:** 10 mg/kg; 600 mg maximum
					Children: 15–20 mg/kg; 600 mg maximum
	ISONIAZID† AND RIFAMPIN§ (3HR)	3 months	Daily	90	**Adults** INH†: 5 mg/kg; 300 mg maximum RIF§: 10 mg/kg; 600 mg maximum
					Children INH†: 10-20 mg/kg#; 300 mg maximum RIF§: 15-20 mg/kg; 600 mg maximum
Alternative	ISONIAZID† (6H/9H)	6 months	Daily	180	**Adults** Daily: 5 mg/kg; 300 mg maximum Twice weekly: 15 mg/kg; 900 mg maximum
			Twice weekly¶	52	
		9 months	Daily	270	**Children** Daily: 10-20 mg/kg#; 300 mg maximum Twice weekly: 20–40 mg/kg#; 900 mg maximum
			Twice weekly¶	76	

*For persons with HIV/AIDS, see Guidelines for the Use of Antiretroviral Agents in Adults and Adolescents Living with HIV available at: https://aidsinfo.nih.gov/guidelines/html/1/adult-and-adolescent-arv/367/overview.
†Isoniazid is formulated as 100-mg and 300-mg tablets.
††Rifapentine is formulated as 150-mg tablets in blister packs that should be kept sealed until use.
¶Intermittent regimens must be provided via directly observed therapy (i.e., a health care worker observes the ingestion of medication).
§Rifampin (rifampicin) is formulated as 150-mg and 300-mg capsules.
||The American Academy of Pediatrics acknowledges that some experts use rifampin at 20–30 mg/kg for the daily regimen when prescribing for infants and toddlers (**Source**: American Academy of Pediatrics. Tuberculosis. In: Kimberlin DW, Brady MT, Jackson MA, Long SS, eds. Red Book: 2018 Report of the Committee on Infectious Diseases. 31st ed. Itasca, IL: American Academy of Pediatrics; 2018:829–53).
#The American Academy of Pediatrics recommends an INH dosage of 10–15 mg/kg for the daily regimen and 20–30 mg/kg for the twice weekly regimen.

CDC | LTBI Treatment Guidelines

Latent Tuberculosis Treatment Regimens

Treatment of Active TB

- RIPE
  - Rifampin
  - Isoniazid
  - Pyrazinamide
  - Ethambutol
- Clinical Case
  - 4-6 months
- Confirmed Case
  - 6-9 months
  - Could be longer

Ethnomed.org

Thank you!

Questions?

Please fill out the evaluation