



Initiating and Prioritizing TB Contact Investigations

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August 21st, 2024

TB Contact Investigation

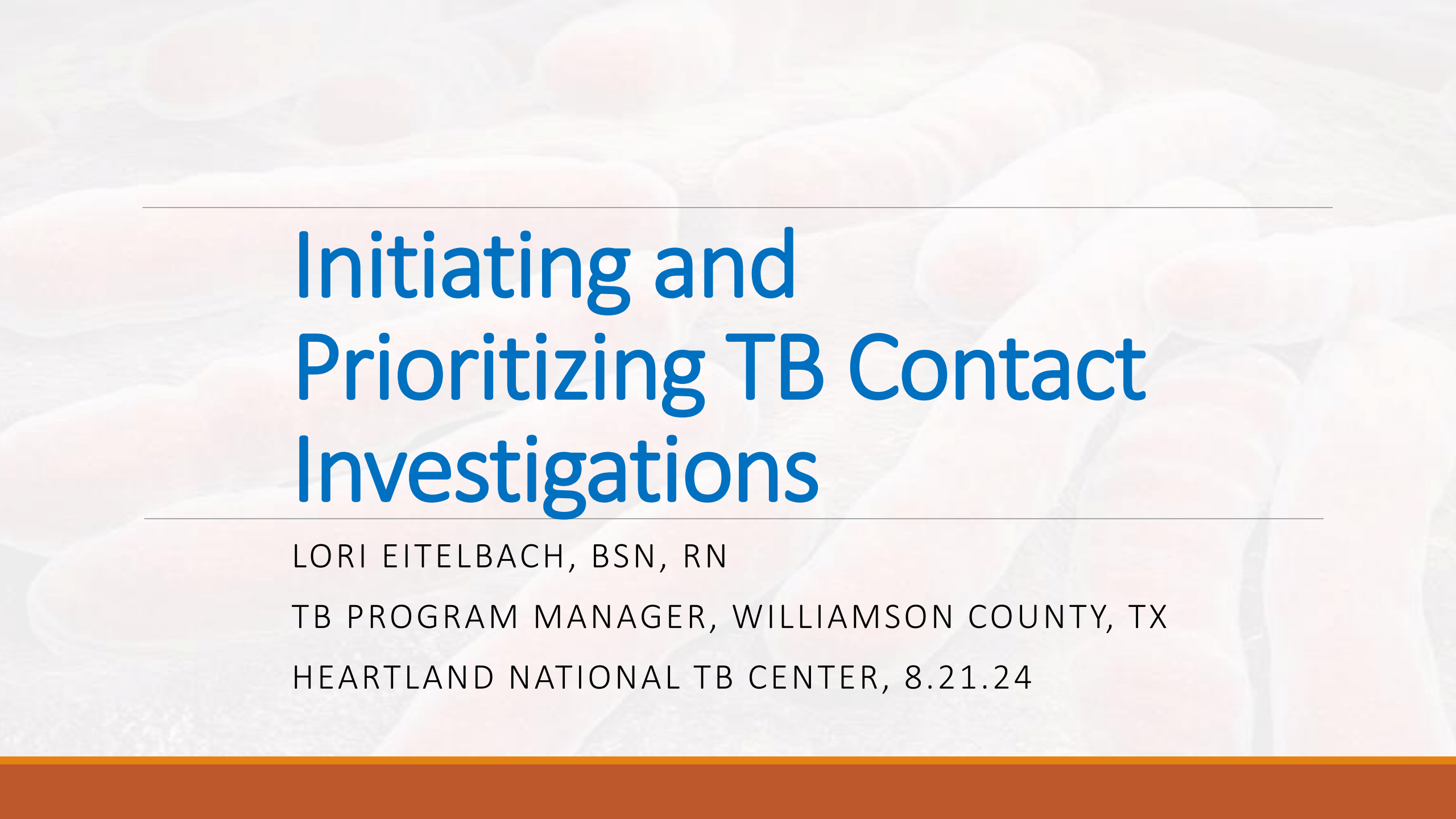
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- No conflict of interests
- No relevant financial relationships with any commercial companies pertaining to this educational activity





Initiating and Prioritizing TB Contact Investigations

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OBJECTIVES

- Determine when a TB contact investigation should be initiated.
- Prioritize among contact investigations.
- Identify your patient's infectious period.

TB Statistics 2023

- **10M** worldwide
- **9,615** in USA
- **Up to 13 million** people in the United States living with LTBI
- If not treated for LTBI, they are at risk for developing active TB disease
- An average of **10 contacts** are identified for each TB case
- Approximately **20-30%** of all TB contacts are **infected with LTBI**
- Approximately **1%** of all TB contacts have **active TB disease**

Every TB patient started as a TB contact

Systematic Approach to TB Contact Investigation

Collect and evaluate existing information about Index Case

Interview Index Case

Determine infectious period

Review information and develop plan for investigation

Prioritize contacts

Conduct and evaluate sites of transmission (field visits)

Conduct contact assessments (screening, testing)

Determine whether to expand or conclude investigation

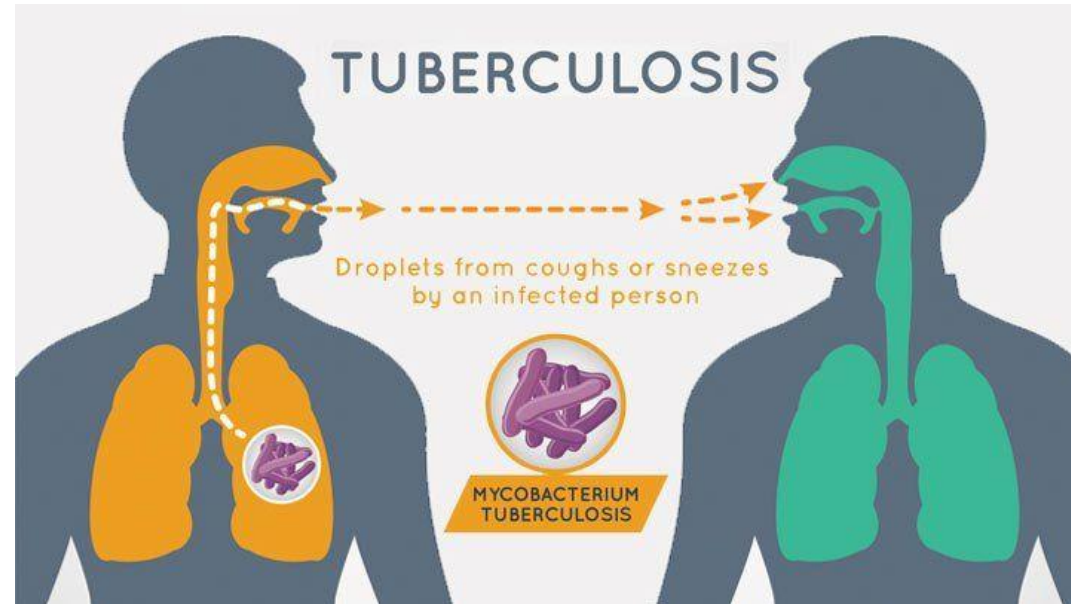
Evaluate CI activities

These steps may not always be done in sequential order

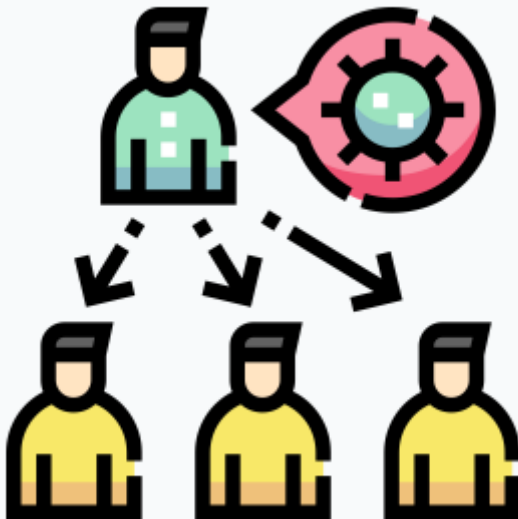
When to Initiate a TB Contact Investigation

As soon as suspected* or confirmed infectious TB case comes to public health attention (state, regional or local health department [HD]).

*Assessment of priority contacts can begin before case is confirmed. If case is eventually confirmed, continue with full CI. If person is found to NOT have infectious TB disease, stop CI process.



It is important to respond promptly because:



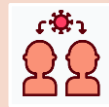
Some contacts may already have TB disease and are in need of treatment;



Some contacts could be at risk for rapid development of TB disease;



Some contacts may become more difficult to locate as time goes by, such as homeless persons;



There could be ongoing transmission of M. tuberculosis; and

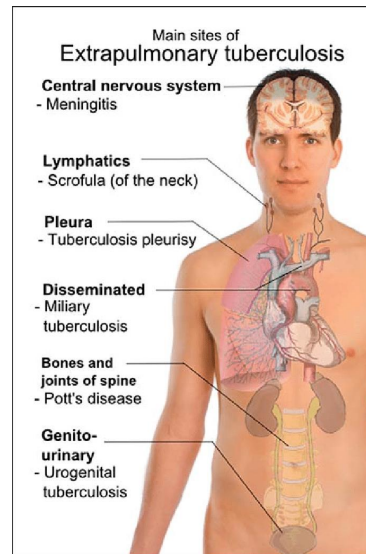


Cases may have difficulty remembering all of their contacts as time goes by.



When is a Contact Investigation Not Necessary?

- LTBI
- Positive sputum smears, negative NAAT
 - Get 2 negative NAATs – most likely Nontuberculosis Mycobacterium (NTM)
- Extrapulmonary TB
- Child under 10 years old
 - If case less than 5 years old, source case investigation should be initiated



Prioritizing Among Contact Investigations

If faced with multiple TB cases, health departments may have to decide which cases should be higher priority for conducting CI's.

Decision will be influenced by:

- Likelihood of transmission (e.g., sputum smear positive*, cavity on chest x-ray, cough, and exposure environment)
- Risk of contacts rapidly progressing to TB disease (e.g., contacts in daycare, HIV care-settings, and dialysis centers)
- Resources available (ask for help, if necessary, e.g., State TB Control or LHD epi team, immunization team, STD team)

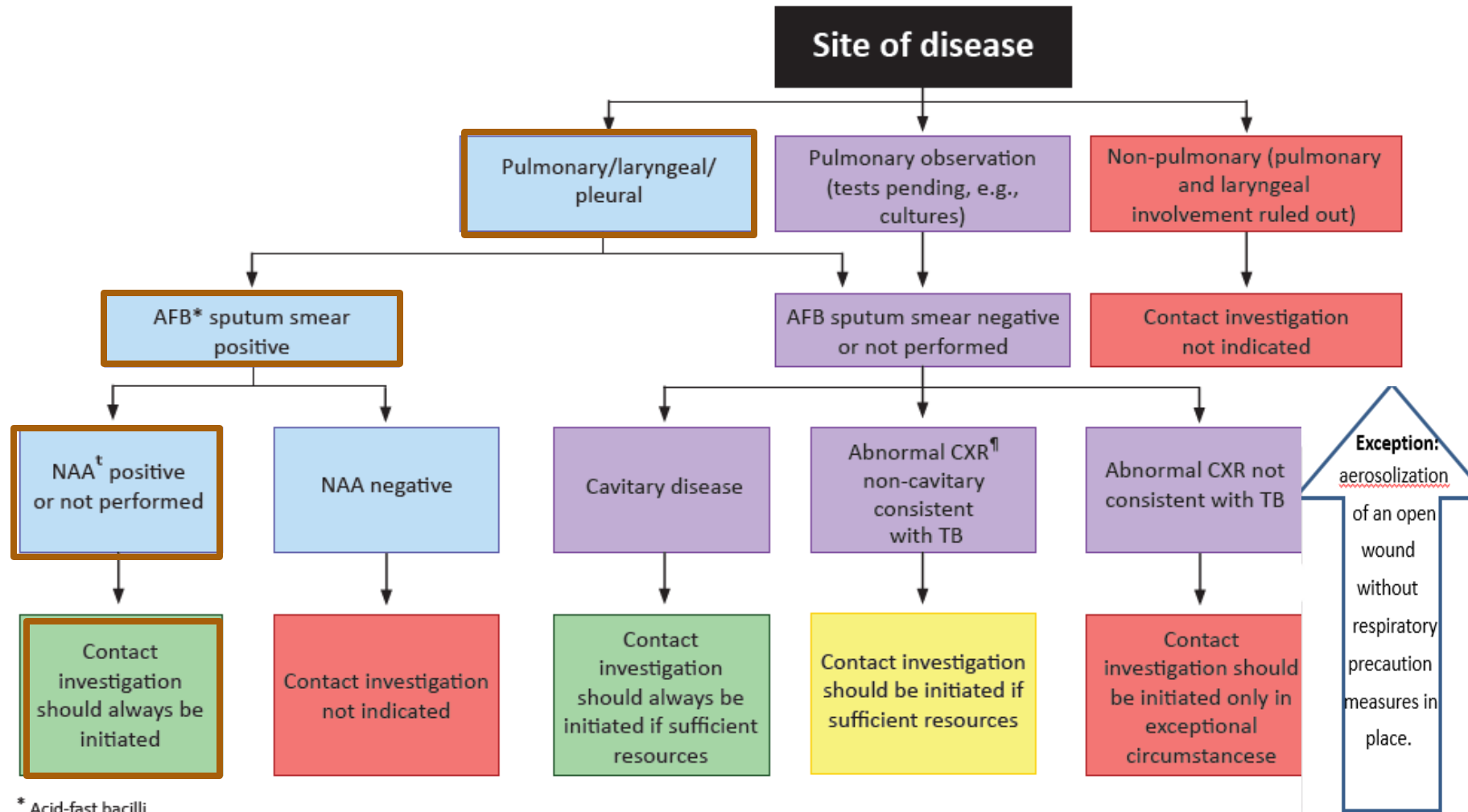
* transmission is still possible for cases with negative sputum smears

Smear Result (Number of AFB observed at 1000X magnification)	Smear Interpretation	Infectiousness of Patient
4+ (>9/field)	Strongly positive	Probably very infectious
3+ (1-9/field)	Strongly positive	Probably very infectious
2+ (1-9/10 fields)	Moderately positive	Probably infectious
1+ (1-9/100 fields)	Moderately positive	Probably infectious
+/- (1-2/300 fields)*	Weakly positive [†]	Probably infectious
No acid-fast bacilli seen	Negative	Probably not infectious**

Smear Classification Results

Higher Smear = Higher Risk

Decision to Initiate a Tuberculosis (TB) Contact Investigation



* Acid-fast bacilli.

† Nuclear acid assay.

§ According to CDC guidelines.

¶ Chest radiographic

Questions Needing Answers

First questions needing answers through medical records review and initial interview:

- Is my patient contagious?
- How do I know if my patient is contagious?
- If my patient is contagious, how contagious is he/she?
- How do I know when my patient first became contagious?
- How do I know how long my patient has been contagious?

Determining Infectiousness

Clinically

- Site of disease (typically pulmonary, pleural or laryngeal)
- Symptoms (fever, cough, hemoptysis, night sweats, weight loss)

Radiologically

- Abnormal CXR (cavities, infiltrates, ground-glass opacities, lymphadenopathy)

Microbiologically

- Positive sputum (AFB smears, NAAT/PCR, culture)

Factors Associated with Infectiousness

Factors Associated with Infectiousness	Factors Associated with Noninfectiousness
Presence of a cough	No cough
Cavity in the lung	No cavity in the lung
Acid-fast bacilli on sputum smear	No acid-fast bacilli on sputum smear
TB of the lungs, airway, or larynx	Most extrapulmonary (non-respiratory) TB
Patient not covering mouth or nose when coughing	Patient covering mouth or nose when coughing
Not receiving adequate treatment	Receiving adequate treatment for 2 weeks or longer
Undergoing cough-inducing procedures	Not undergoing cough-inducing procedures
Positive sputum cultures	Negative sputum cultures



What is the Infectious Period?

Time during which TB case is likely to transmit TB.

Why is determining infectious period so important?

- Focuses investigation on contacts most likely to be at risk of infection.
- Identifies timeframe for testing contacts (i.e., when repeat TST or IGRA is due).

Recommendations for Estimating the Start of the Infectious Period

Characteristic of Case			Recommended Minimum Beginning of the Infectious Period
Respiratory TB Symptoms	Sputum Smear Positive	Pulmonary Cavity on Chest X-ray	
Yes	No	No	3 months before symptom onset or first finding consistent with TB disease, whichever is longer
Yes	Yes	Yes	3 months before symptom onset or first finding consistent with TB disease, whichever is longer
No	No	No	1 month (4 weeks) before date of suspected diagnosis
No	Yes	Yes	3 months before finding consistent with TB disease

Estimating Start of Infectious Period

3 months before 1st respiratory symptom or 1st diagnostic finding

If smear negative, asymptomatic (non cavitary): 1 month

Infectious Period Estimate for a Smear Positive Case with TB Symptoms

The infectious period starts 3 months before symptom onset and ends the date that the case meets all of the criteria for ending the infectious period (**August 1st to December 1st**)

Effective treatment for 2 weeks or longer; diminished symptoms; and mycobacteriologic response; **end of infectious period**

3 months before symptom onset; **start of infectious period**

Symptom onset

Treatment started Nov. 15th



Infectious Period Estimate for a Smear Negative Case without TB Symptoms and No Cavities on Chest X-Ray

The infectious period starts 1 month (4 weeks) before the date TB was first suspected by a healthcare provider and, for contact investigation purposes, ends the date that the case was appropriately isolated (**August 15th to September 15th**)

1 month before the healthcare provider first suspected TB;
start of infectious period

- Healthcare provider first suspects TB
- Case isolated in healthcare facility for treatment of TB disease; **end of infectious period**



Table 2. Estimating the Beginning of the Infectious Period

A. Criteria			B. Estimated Start of Infectious Period <i>Select any of the following based on criteria met by client in Column A</i>	C. Infectious Period Start Date <i>Select <u>earliest</u> date of symptom onset listed in Table 1</i>
TB Symptoms	Acid Fast Bacilli (AFB) Sputum Smear Positive	Cavitary CXR		
Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Three (3) months before symptom onset or first positive finding consistent with TB disease (e.g. abnormal chest radiograph) whichever is longer.	
Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	No <input type="checkbox"/>		
Yes <input type="checkbox"/>	No <input type="checkbox"/>	No <input type="checkbox"/>		
No <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Three (3) months before first positive finding consistent with TB	
No <input type="checkbox"/>	No <input type="checkbox"/>	No <input type="checkbox"/>	Four (4) weeks before date of suspected diagnosis	

Source: Adapted from MMWR. 2005; 54 (No. RR-15)

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Table 3. Estimating the End of the Infectious Period (Release from Respiratory Isolation) for clients with drug susceptible TB

A. Criteria		B. Check (✓) when criteria is met	C. Infectious Period End Date <i>Type the date the selected criteria in Column A was met.</i>
When patient has POSITIVE AFB sputum smear at diagnosis	1. Three (3) consecutive negative AFB sputum smears, collected in 8 to 24 hour intervals (one should be an early morning specimen)		
	2. Symptomatic improvement		
	3. <u>Effective</u> multi-drug therapy for tuberculosis for at least the equivalent of two weeks given as directly observed therapy (DOT)		
	4. Completely adherent with DOT		
	5. Drug resistance is not suspected or confirmed		
When patient has three consecutive NEGATIVE AFB sputum smears at diagnosis and has never had a positive sputum specimen	1. Three (3) consecutive negative AFB sputum smears, collected in 8 to 24 hour intervals (one should be an early morning specimen)		
	2. Symptomatic improvement		
	3. Multi-drug therapy for tuberculosis for at least 5 days given as DOT		
	4. Completely adherent with DOT		
	5. Drug resistance is not suspected or confirmed		

Source: Adapted from MMWR. 2005; 54 (No. RR-12)

Additional Transmission Factors to Consider

SETTING

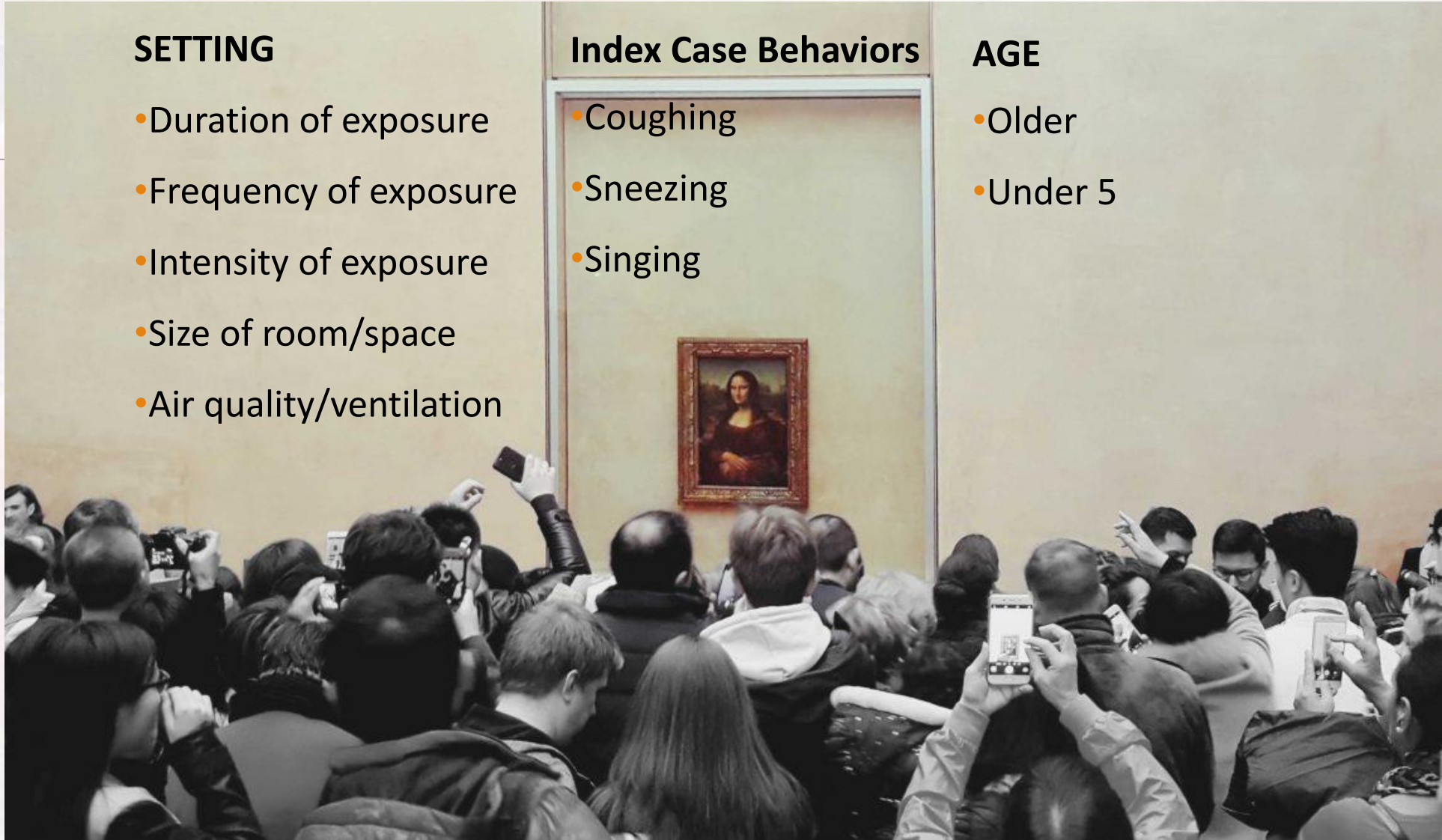
- Duration of exposure
- Frequency of exposure
- Intensity of exposure
- Size of room/space
- Air quality/ventilation

Index Case Behaviors

- Coughing
- Sneezing
- Singing

AGE

- Older
- Under 5



Environmental Factors to Disease Transmission

ENVIRONMENTAL FACTOR	LIKELIHOOD OF DISEASE TRANSMISSION	
	HIGH	LOW
Volume of shared air space	Low (small)	High (large)
Adequacy of ventilation	Poor	Good
Re-circularized air	Yes	No
Upper room ultraviolet light	Not present	Present

Reflection

- We determined when a TB contact investigation should or should not be initiated.
- We learned how to prioritize contact investigations.
- We reviewed how the infectiousness of a TB case, and the calculation of the infectious period is crucial to identifying contacts.
- A thoughtful and systematic approach is required for successful contact investigations.



Thank you!

Contact investigations are an essential
component to TB control and prevention.



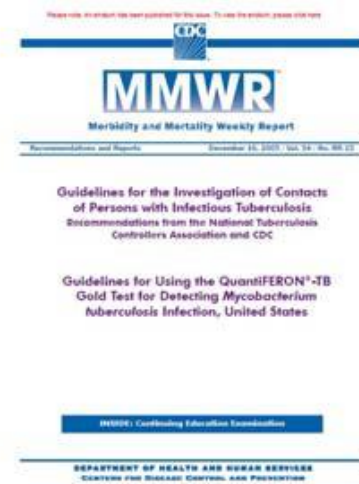
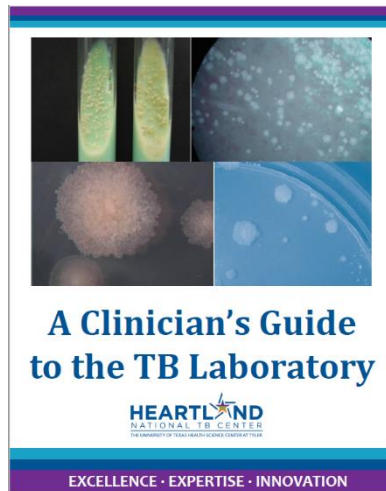
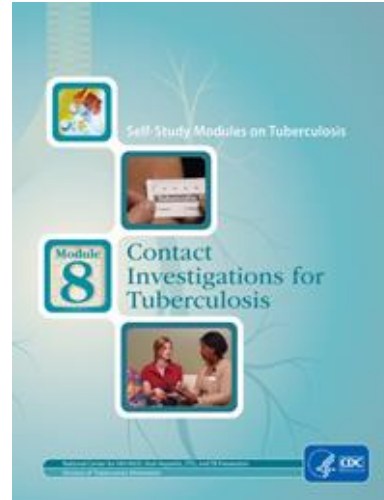
**The Spectrum of Tuberculosis
from Infection to Disease**



TB at a Glance
3rd Edition

HEARTLAND
NATIONAL TB CENTER
THE UNIVERSITY OF TEXAS HEALTH SCIENCE CENTER AT DALLAS

MAYO CLINIC



Resources

- Centers for Disease Control and Prevention. Guidelines for the investigation of contacts of persons with infectious tuberculosis: Recommendations from the National Tuberculosis Controllers Association and CDC. 2005; 54(No. RR-15):1-56. Available online at:

<http://www.cdc.gov/tb/publications/guidelines/contactinvestigations.htm>

- Centers for Disease Control and Prevention. Self-Study Modules on Tuberculosis. Available online at:

<https://www.cdc.gov/tb/education/ssmodules/default.htm>

- Heartland National TB Center Products. Available online at:

<https://www.heartlandntbc.org/products/>