MAYO CLINIC

Center for Tuberculosis

Fundamentals of TB Contact Investigations

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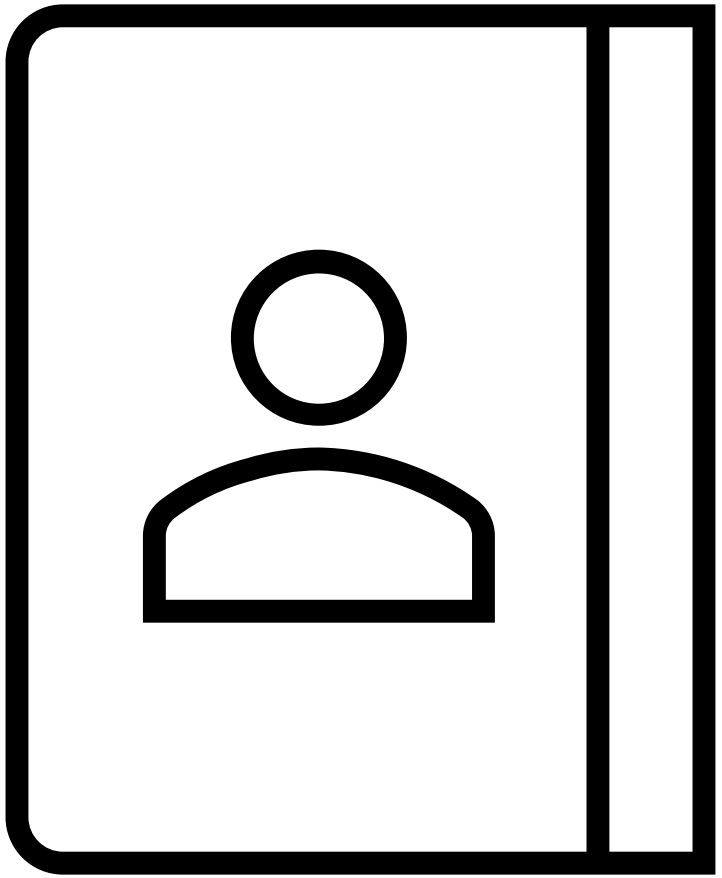
Disclosures

No relevant financial relationships

No off-label investigational uses



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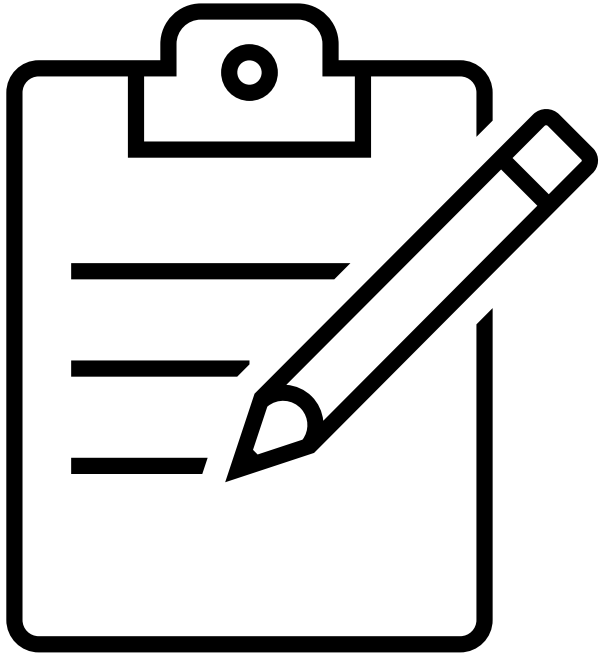
How many contact investigations have you been involved in?

1. 1 – 3
2. 4 – 6
3. 7 – 9
4. More than 10



Learning Objectives

- Identify one of the main objectives of conducting a contact investigation.
- Name the agency who is mandated by law with the responsibility for the contact investigation.
- Name the priority levels of contacts.

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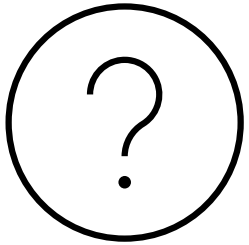

What is the main objective for conducting a contact investigation?

1. Find all friends of the person with TB disease who occasionally hang out with them.

2. Evaluate each friend who is from a foreign country.

3. Evaluate all persons who have been identified as a contact to the person diagnosed with or suspected to have TB disease.

Main Objectives

TB CONTACT INVESTIGATION

Contact Investigation

TB contact investigation is an essential component of **disease containment** and the highest priority **targeted testing** activity conducted in a TB Program.

American Thoracic Society

“Recently infected contacts of newly diagnosed cases are the most easily identified high-risk group.”

Controlling Tuberculosis in the United States: American Thoracic Society, June 2004; Centers for Disease Control and Prevention, November 2004; Infectious Disease Society of America, March 2005.

Objectives of a Contact Investigation

- Identify, examine and evaluate persons most at risk of being infected
- Find new cases and begin treatment
- Detect and treat newly infected persons
- Prevent infection in certain individuals by using window-period prophylaxis

Contact Investigation Responsibilities

- The responsibility for conducting contact investigations is **mandated by law** to public health departments in each state.
- These responsibilities are designed to "**protect the public** from communicable diseases", such as tuberculosis.

Important Definitions

- **Index Case:** First person presenting with or suspected to have TB disease

- **Suspect/Person suspected to have TB Disease:** A person for whom a diagnosis of TB disease is being considered, regardless of whether TB treatment has been started

Important Definitions

- **Source Case:** The person with diagnosed TB disease who was the original source of infection for secondary cases and contacts; can be but is not necessarily, the index case

- **TB Contacts:** Persons at high risk of acquiring TB infection because they have shared the same air space with the **Index Case** over an extended period.

Contact Prioritization

- Contacts are prioritized based on:
  - The infectiousness of the index case
  - The amount of time the contact spent with the index case
  - The environment in which the exposure occurred
  - The contact’s personal medical information and/or medical & population risk factors

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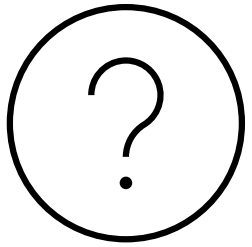


You received 3 new referrals this morning and only have time to see one new patient today. Which patient do you plan to see today?

1. 3-year-old child; 17mm TST; CXR negative; started on treatment for LTBI.

2. ✓ 27-year-old male; 26 mm TST; CXR abnormal, non-cavitary; Sputum smear 4+; NAAT +; Culture pending; Hospitalized; On treatment for TB.

3. 50-year-old female; TST 0mm; HIV +; CXR abnormal, non-cavitary; smear negative; NAAT negative; culture afb+, id pending; productive cough & weight loss; currently hospitalized.

Types of Investigations

- There are 2 types :
  - New or suspected case investigation
  - Source case or Associate investigation

Initiating a Contact Investigation

Initiate an investigation if:

- Confirmed or suspected pulmonary, laryngeal, or pleural TB.
- Sputum has AFB on the smear
- Respiratory specimen is NAAT positive
- Chest x-ray is consistent with pulmonary TB and/or
- Chest x-ray indicates presence of cavities in the lung(s)

Systematic Approach to TB Contact Investigations

10 STEPS

1 Review existing information about the index patient

2 Determine an initial estimate for the infectious period and estimate the degree of infectiousness

3 Interview the index patient

4 Review information and develop a plan for the investigation

5 Revisit the infectious period, if needed

6 Prioritize contacts

7 Conduct field visits

8 Conduct contact assessments

9 Determine whether to expand or conclude an investigation

10 Evaluate the CI activities

Medical Information Needed about the Index Case

TB skin test or **IGRA** (QFT-GIT or T-spot)

History of prior TB **disease**, TB infection or exposure

History of prior **treatment** for TB disease or TB infection

Symptoms of tuberculosis: fever, weight loss, night sweats, cough > 3 weeks (most important), fatigue

Medical Information Needed about the Index Case

- Date of onset of symptoms; How long symptomatic?
- Chest x-ray: abnormal, infiltrates, cavities, WNL?
- Sputum bacteriology: smear positive? NAAT done? Culture ordered? Result may not be available for up to 8 weeks
- Other bacteriology tests
- Results from HIV and other testing

Ensure that…

- Any person diagnosed with or suspected to have TB is started, at a minimum, on an appropriate treatment regimen.
- Sputum specimens have been collected and sent to the Lab
- Appropriate isolation measures have been instituted
- Person is interviewed

The Index Case Interview Process

Interviews should be conducted:

- In-person, face-to-face
- In the hospital, patient's home, or the TB Clinic - if an Airborne infection isolation (AII) room is available
- In a convenient location that accommodates the patient's privacy and affords appropriate respiratory protection.
- Outside is OK!

Index Case Interview

Assure patient's confidentiality

- Determine the patient's level of knowledge about the diagnosis of TB disease
- Discuss precautions to prevent transmission (masks, tissues, coughing into the crook of the arm, etc)
- Identify and record settings where transmission may have occurred
- Assess patient's willingness to share information with others about TB (at a minimum with the boss & family)

Eliciting Information

- Request permission to use the index case's name (some may agree; others will not)
- Request and compile a list of names and addresses for contacts identified in each setting
- Enlist the help of index case in notifying contacts of need for examination
- Review information with index case each visit
- Conduct follow-up interviews at each visit

Challenges

- Don’t fully understand the diagnosis nor the difference between TB infection and TB disease
- Cultural differences
- Fears & stigmas
- Quarantine
- Long term hospitalization - sanatoria
- Loss of employment

Establishing a Relationship

- You must work to establish a trusting and respectful relationship with the patient from the start - This is crucial!
- You will be working with this patient and contacts for a long time – and they all know each other.
- Open communication is vital.

Where do we start the investigation?

- **Home**, **work** and **social** environments

- For potentially infectious persons, it is very important to visit all these environments to find contacts – No telephone contact investigations or phone interviews with the boss! Go see where the case works and what they do.

For Each of the Three Environments

- Determine the approximate amount of time that others spent breathing the same air as the index case during the infectious period.
- How intense was the exposure?
- What part might the ventilation have played in transmission?
- Observe the surrounding closely. Where was the patient in this environment?

Home Setting

- If the case/suspect is still hospitalized, arrangements should be made for a home visit prior to discharge as well as post discharge.
- Be sure others present (family, friends) have been informed about the diagnosis….you may need to have privacy during the interview
- Make sure that patient is not too ill to be interviewed; if so may have to interview family member in presence of the client.
- Observe the setting. Are there people in & out, pictures on the walls, toys in the corner, etc.?

Work Setting

- Are you employed? Where? What hours do you work? Do you rotate shifts?
- What kind of work do you do?
- If an office, are several people in a room? Do you meet or greet the public? Is it a large well-ventilated area or is it “stuffy” all the time?
- Do you work alone, outside in open air?
- How do you get back and forth to work?
- Does your supervisor or co-workers know that you may have TB? Others?

Social Settings

- What do you do in your spare time? Where do you hang out? (play bridge, drink beer, shoot baskets, etc) . Do you go to church?
- Age dependent – young children go to school or day care, older youth play sports, the elderly go to senior citizen centers, young adults party, teens hang out, etc.
- Identify cultural activities.
- Go visit all these places as well.

Ventilation

- Site visits must be made to evaluate the ventilation in all the environments where the index has spent time. You don't have to be an expert in HVAC!
- Is air circulated from room to room or to outside? Are there exhaust fans? Other fans?
- Look at the patient's work site. Is it outside in the open air or a tiny cubicle in a small room with dropped ceilings?
- Are there large numbers of persons exposed in an enclosed space? (Bus, car etc.)
- Does the time of year make a difference?

Why Determine an Infectious Period?

Focuses the investigation on those contacts most likely to be at risk for infection and sets the timeframe for testing contacts.

To ensure the contacts identified are those who had exposure while the case was infectious.

No **exact** scientific procedure to determine the period of infectiousness.

Using the medical record review and the information gained in the patient interview, an ***educated decision*** is made to establish the infectious period.

Infectious Period

- The time frame during which the TB patient or suspect is capable of transmitting tubercle bacilli.
- Extrapulmonary cases/suspects do not have an infectious period and do not require a contact investigation, **IF** pulmonary disease has been ruled out.
- Children do not have an infectious period unless there are extenuating circumstances.

Beginning of Infectious Period

- Determined by going back in time approximately three months from the start of symptoms (probable onset of active TB disease). The following factors are considered:
  - Site of disease
  - Onset of signs and symptoms of disease
  - Smear results of sputum/respiratory specimens
  - Extent of infiltrates or cavitary lesions

Identifying Specific Time Frames

To identify a framework for the infectious period and identify contacts, ask the following questions.

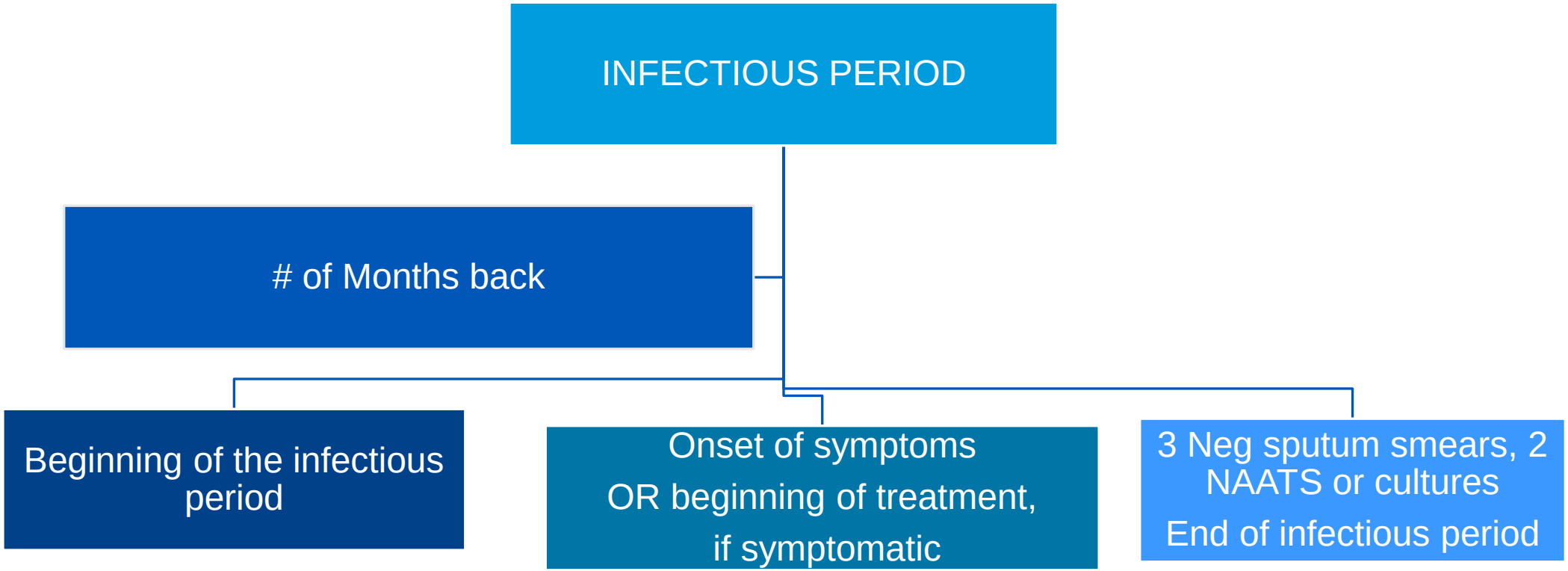
- When do you remember getting sick?
- Who visited you recently at Christmas, Easter, your birthday, etc? Were you feeling bad or coughing?
- Who lived with you in the last month, two months, six months, year?
- Who comes to your house frequently, such as children after school? Look around for ‘things”.
- Have you visited anyone in their home at any of these times?

End of Infectious Period

Occurs when the person with TB disease is most likely no longer capable of transmitting tubercle bacilli. The following factors are considered:

- Compliance with an effective treatment regimen (as demonstrated by susceptibility results)
- Mycobacteriologic response as manifested by *three (3) consecutive negative sputum smear results on three (3) separate days (at least 8 hours apart) or two (2) negative NAATs (at least 8 hours apart) or two (2) consecutive negative cultures.*
- Clinical improvement with diminished symptoms

Infectious Period Timeline



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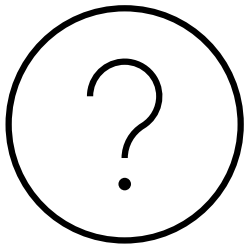


Select the correct definition to use when calculating the infectious period of a recently identified person suspected to have TB disease.

1. Beginning: Count backwards 2 months from the date the TST was done at the MD office. Ending: The day of the visit to the MD office.

2. ✓ Beginning: Count 3 months from the onset of symptoms. Ending: When it is determined that the person is no longer capable of transmitting tubercle bacilli.

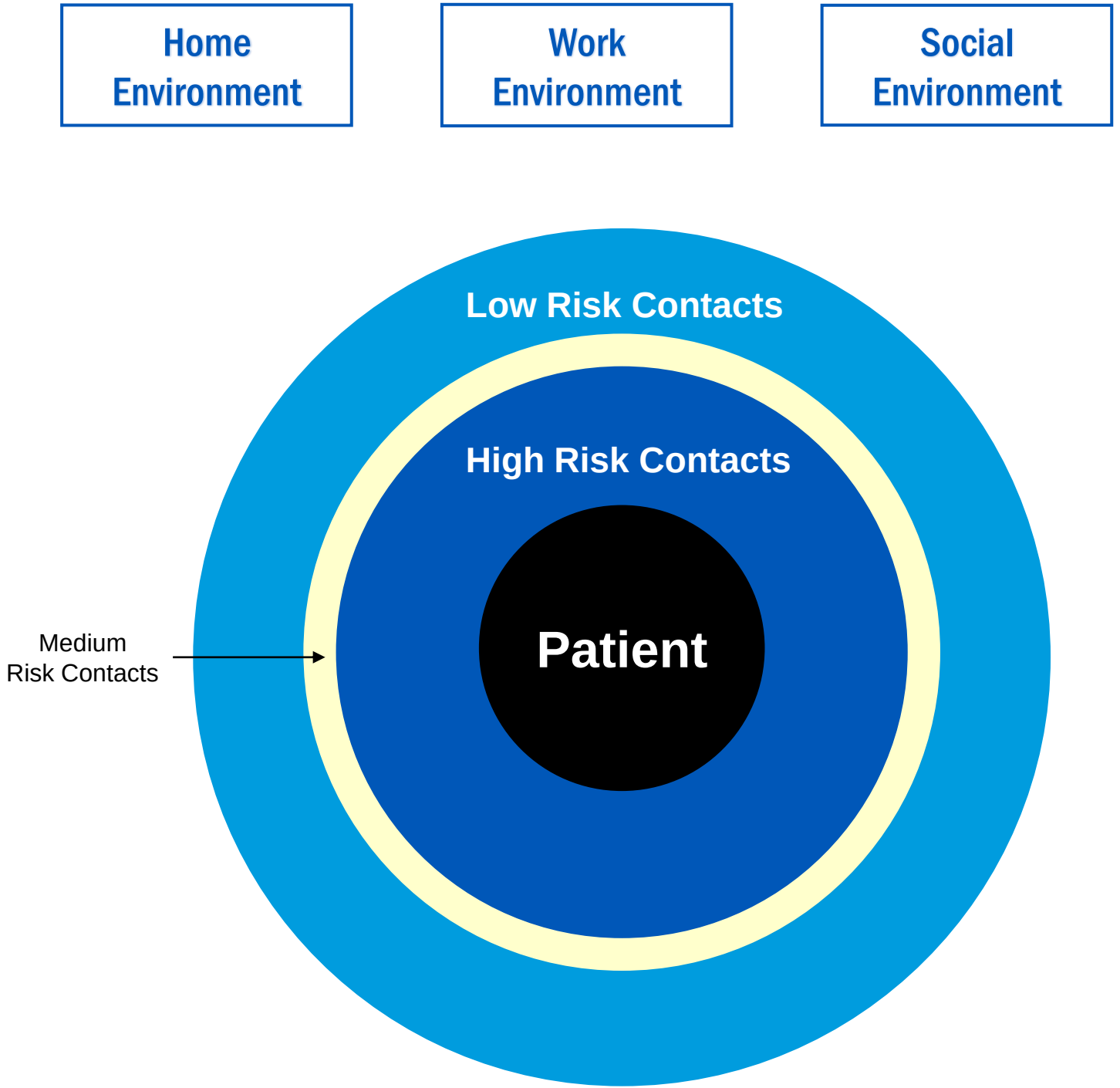
3. Beginning: Count back 2 months from the CXR showing infiltrates. Ending: The day medications were started.

Prioritizing Contacts

TB CONTACT INVESTIGATIONS

Concentric Circle Model

For identifying contacts at risk based on duration, frequency, and proximity of exposure.



What examinations are required for contacts?

- **Tuberculin skin test** - (positive if ≥ 5 mm), or **IGRA**
- **Chest X-ray** if:
    - Newly diagnosed with TB Infection
    - (+ TST or + IGRA)
    - Children < 5 years of age
    - Have an immunocompromising condition
    - Exhibiting symptoms
- **Assessment** for signs/symptoms of TB disease: Symptomatic contacts should have sputum collected
- **Repeat TST** 8-10 weeks after date of last exposure for those who are initially skin test negative

Source Case Investigations

Also known as Associate Investigations

- Conducted to identify the ***source*** *of recent infection* in a child
- Usually started before diagnosis of TB confirmed
- In the absence of cavitary disease, young children usually are not capable of transmitting TB to others.

Source Case or Associate Investigations

EXAMINATIONS

Place children < 5 years of age on window prophylaxis even if skin test is negative.

Repeat skin test in 8-10 weeks, if still negative, discontinue (window-period or primary prophylaxis).

Source case of positive TSTs in children may never be found – look anyway!

Special Circumstances

Outbreaks

An Outbreak occurs when:

- 2 or more contacts have active TB disease regardless of priority

OR

- 2 or more cases are linked outside of the contact investigation

Congregate Settings

- Prisons/Jails/Detention Centers
- Nursing Homes
- Homeless Shelters
- Schools

Interjurisdictional Investigations

- Requires the cooperation of multiple jurisdictions within the US.
- Migrant workers or persons who were traveling prior to diagnosis
- It is the responsibility of the Health Department that counts the index patient to lead the investigation and notify other health departments regarding contacts within their jurisdiction. Local HDs are to report requested information to the lead HD.

Medical Procedures

- Surgical wound debridement, aerosolization
- Bronchoscopy
- Spillage within the laboratory setting
- Autopsy – power tools

Animals

Can be Human or Bovine TB

- Wild Elk, Badgers, Deer (esp. in Michigan)
- Cattle (M.Bovis)
- Elephant (several articles)
- Zoo – Mr. Wood Duck, Bubbles

When to Expand the Contact Investigation

In the **absence of evidence** of recent transmission in the high priority contacts, a contact investigation should **not** be expanded to **low** priority contacts.

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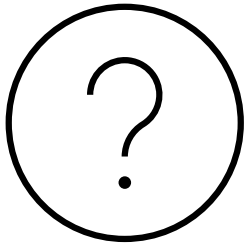

You would expand a contact investigation when you find….

1. ✓ Contacts with a 0mm reading for the first TST and a 20mm reading for the second TST.
2. 0mm TSTs in the high priority contacts.
3. A zero rate of infection in the low priority contacts.

When to Expand

- When there are:
  - Unexpectedly high rates of infection or disease in high priority contacts
  - Evidence of secondary transmission from TB patients (new cases and/or infected contacts)
  - TB disease in low priority contacts
  - TB infection and/or disease in contacts <5yrs
  - Contacts with TST conversion between the 1st and 2nd TST

Media Considerations

TB CONTACT INVESTIGATIONS

Media Advantages

- Working with the Media is an integral part of TB Control activities.
- Advantages:
  - Provides education for the public
  - Reminds the public that TB is still around
  - Alert exposed contacts, especially unidentified ones
  - Provides info to direct the community inquiries

Media Disadvantages

- Increases public anxiety if inappropriate or inaccurate information is spread
- Causes others to seek unnecessary care

Other Considerations

TB CONTACT INVESTIGATIONS

Cultural Awareness

- Culture is shaped by experiences and life events that contribute to a person's beliefs, values, attitudes and behaviors.
- Culture may also affect the way a person communicates, both verbally and nonverbally, and understands information.
- Be sensitive to and aware of the factors that shape a person's identity.
- TB affects a disproportionate number of non-US-born individuals, migrants, people who travel to and from TB-endemic countries, racial and ethnic minorities, the elderly and other distinct groups specific to your area.

Cultural Awareness

- Honor customs observed by the patient
- Understand that a patient's beliefs about TB may differ from the HCW
- Use written information
- Speak slowly and clearly
- Use nontechnical words
- Elicit assistance from the leaders in their community

Confidentiality

- HIPAA – protects individually identified health information and required an authorization of disclosure.
- Section 164.512 notes the **exemption** of communicable diseases reported to the public health authority authorized by law.
- Know your state laws regarding TB, confidentiality, and medical need to know

Questions and Answers

Thank you