ALGORITHM FOR ACTIVE PULMONARY MYCOBACTERIA TUBERCULOSIS (TB) INFECTION EVALUATION

(ADULT PATIENTS AGE ≥ 18 YEARS ONLY*)

Key Points:

- Obtain sputum samples for AFB smear and culture that are spaced at least 8 hours apart.
- Most patients will need 3 sputum samples ordered: 2 for both AFB smear/culture and TB PCR and one additional specimen for just AFB smear/culture. See the table below for exceptions.
- See below for guidance on:
  - Whether two or three sputum specimens are needed.
  - The number of TB PCRs to request.
  - Criteria for discontinuation of Airborne Isolation. Contact Infection Control before discontinuing isolation.
    - Non-business hours—contact Nursing Supervisor (ML: x38036; MB: x20728).
- Ensure that the SFDPH TB Control Unit (415-206-8524) is aware of confirmed TB cases and all patients with suspected TB who are being empirically treated with multidrug TB therapy.

*Limited to adult patients ≥18 years of age because of insufficient data regarding the sensitivity and positive/negative predictive value of TB PCR for pediatric patients.
I. Flow diagram for TB evaluation steps

Place patient on Airborne Isolation
Order sputums #1 and #2 for TB PCR and AFB smear/culture spaced apart by at least 8 hrs

- **TB PCR neg AND Smear neg x 2** OR Smear neg x 3
  - **NO** High clinical suspicion for TB?
    - **TB unlikely** D/C isolation
      - If 2 sputums are smear- and TB PCR-negative, a 3rd sputum is not needed
    - **YES** Continue isolation
      - If, regardless of TB PCR and AFB smear results, clinical suspicion for active TB remains high, send 3rd sputum for AFB smear/culture and consider ID consultation

- **TB PCR pos x 1 or 2** Smear results can be pos or neg
  - **NO** High clinical suspicion for TB?
    - **TB very likely** Continue isolation
      - 3rd sputum still required for smear/culture
    - **YES** Non-TB mycobacteria (NTM) likely
      - D/C isolation
      - Send 3rd sputum for AFB smear/culture (to identify non-TB mycobacterial species)
  - **YES** If, regardless of TB PCR and AFB smear results, clinical suspicion for active TB remains high, send 3rd sputum for AFB smear/culture and consider ID consultation
II. Detailed TB evaluation grid

If clinical suspicion for active pulmonary or laryngeal TB is **high**\(^1\) (including patients receiving empiric active TB treatment), continue Airborne Isolation regardless of AFB smear or TB PCR results until appropriate isolation discontinuation criteria are met\(^2\).

If clinical suspicion for active pulmonary or laryngeal TB is **low to moderate**\(^3\), use the following criteria:

<table>
<thead>
<tr>
<th>Sputum Sample #1</th>
<th>Sputum Sample #2</th>
<th>Can Airborne Isolation be discontinued?</th>
<th>Sputum Sample #3, if needed (see details below)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AFB smear</strong></td>
<td><strong>TB PCR</strong></td>
<td><strong>AFB smear</strong></td>
<td><strong>TB PCR</strong></td>
<td><strong>Comments</strong></td>
</tr>
<tr>
<td>Negative</td>
<td>Negative</td>
<td>Negative</td>
<td>Not needed</td>
<td>TB infection is very likely</td>
</tr>
<tr>
<td>Negative</td>
<td>Positive</td>
<td>Yes—OK to d/c isolation</td>
<td><strong>Send for AFB smear/culture</strong></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>Negative</td>
<td>Yes—OK to d/c isolation</td>
<td><strong>Send for AFB smear/culture</strong></td>
<td>Nontuberculous mycobacterial infection likely</td>
</tr>
<tr>
<td>Positive</td>
<td>Positive</td>
<td><strong>No--continue isolation</strong></td>
<td><strong>Send for AFB smear/culture</strong></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>Positive</td>
<td><strong>No--continue isolation</strong></td>
<td><strong>Send for AFB smear/culture</strong></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td><strong>Positive or Negative</strong></td>
<td>Not needed</td>
<td><strong>Send for AFB smear/culture</strong></td>
<td></td>
</tr>
<tr>
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<td>Yes—OK to d/c isolation</td>
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<td></td>
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<tr>
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<td><strong>No--continue isolation</strong></td>
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<td><strong>Send for AFB smear/culture</strong></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>Positive</td>
<td><strong>No--continue isolation</strong></td>
<td><strong>Send for AFB smear/culture</strong></td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) Including patients receiving empiric active TB treatment.

\(^2\) TB infection is very likely)

\(^3\) Nontuberculous mycobacterial infection likely
1 The degree of clinical suspicion for active pulmonary TB should be based on the likelihood of prior exposure to TB (e.g., lived in an area of the world with relatively high TB rates, close contact with someone with active TB, known prior positive TB skin test or Quantiferon/T spot result), risk factors for TB reactivation (e.g., medical conditions associated with weakened immune systems such as cancer, HIV, diabetes, severe renal disease, organ or stem cell transplantation; receipt of immunosuppressive medications such as steroids, chemotherapy), and clinical signs and symptoms suggestive of active pulmonary TB.

2 See Isolation Precautions Table https://infectioncontrol.ucsfmedicalcenter.org/isolation-table for guidance regarding duration of airborne isolation.

3 Send a total of at least 3 sputum samples for AFB smear and culture—this is important for mycobacterial species identification and for anti-TB drug susceptibility testing.