Practical Aspects of TB Infection Control

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Disclosure / Disclaimer

• No financial conflicts of interest
• Mention of off-label use of FDA-approved medications

• This presentation is that of the author and does not necessarily represent the official position of the U.S. Centers for Disease Control and Prevention
Early disease prevention
Modern cough etiquette

PREVENT DISEASE

CARELESS SPITTING, COUGHING, SNEEZING, SPREAD INFLUENZA and TUBERCULOSIS

Don't Bug Me!

Be a bug stopper at school and at home.

- Cover your mouth and nose when you cough or sneeze.
  Use a tissue and throw it away.
- Wash your hands a lot - with soap.
  Wash long enough to sing “Happy Birthday” twice.

Stop the bug and stop the flu!

Sponsored by Hillcrest HealthCare System and the Tulsa Health Department.
When I think of personal infection control...
(Almost) everything you need to know about TB infection control in the health-care setting

Morbidity and Mortality Weekly Report

Recommendations and Reports December 30, 2005
Vol. 54 / No. RR-17

Guidelines for Preventing the Transmission of *Mycobacterium tuberculosis* in Health-Care Settings, 2005

www.cdc.gov/tb
Really important levels of control

Administrative
Without, TB control fails

Environmental
Personal respiratory protection
NOT the 1st level of control, training is critical
What has NOT changed in guidelines

Most important risk for transmission of *M. tb* in health-care settings:

*Unrecognized contagious TB patients*
Collaboration with Public Health

• Reporting cases
• Coordinating discharge planning
• Facilitate continuity of care
• Review of policies and procedures
• Home evaluation
• Community investigations
What’s New in Guidelines?

• Broadens the scope of health-care settings
• Redefines TB risk assessment
• Changes TB testing frequency for HCWs
• Defines “airborne infection isolation” (All)
• Summarizes respiratory fit testing
• Expands information on engineering controls
TB is an Airborne Contagion
Risk is Variable

- Prevalence of TB in the community
- Patient population served
- Type of health-care facility
- HCW occupational group
- Area in the hospital
- Effectiveness of TB infection control interventions
Conduct a Baseline Risk Assessment

- Develop/Revise
- TB Infection Control Plan
- Evaluate
- Implement
Changes in Risk Classifications and Frequency of TB Screening
Current Risk Classifications

- Low
- Medium
- Potential ongoing transmission
# Risk Classifications for Hospitals

<table>
<thead>
<tr>
<th>Inpatient settings</th>
<th>Low</th>
<th>Medium</th>
<th>Potential Ongoing Transmission</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;200 beds</td>
<td>&lt;3 TB patients/yr</td>
<td>≥3 TB patients/yr</td>
<td>Evidence of ongoing transmission, regardless of setting</td>
</tr>
<tr>
<td>≥200 beds</td>
<td>&lt;6 TB patients/yr</td>
<td>≥6 TB patients/yr</td>
<td></td>
</tr>
</tbody>
</table>
# Risk Classifications for Outpatient Settings

<table>
<thead>
<tr>
<th>Outpatient settings</th>
<th>Low</th>
<th>Medium</th>
<th>Potential Ongoing Transmission</th>
</tr>
</thead>
<tbody>
<tr>
<td>medical offices, ambulatory care settings, TB treatment facilities</td>
<td>&lt;3 TB patients/yr</td>
<td>≥3 TB patients/yr</td>
<td>Evidence of ongoing transmission, regardless of setting</td>
</tr>
</tbody>
</table>
### Risk Classifications for Other Health-Care Settings

<table>
<thead>
<tr>
<th>Nontraditional facility-based settings</th>
<th>Low</th>
<th>Medium</th>
<th>Potential Ongoing Transmission</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMS, LTCFs, medical settings in correctional facilities, outreach care</td>
<td>Only LTBI; system for detection of persons with TB symptoms</td>
<td>Settings where persons with TB disease are treated</td>
<td>Evidence of ongoing transmission, regardless of setting</td>
</tr>
</tbody>
</table>
Example of Risk Classification (1)

- A 100 bed hospital in a small city
- Two TB patients admitted in the previous year – one directly to AI, one after 2 days on a medical ward
- Contact investigation in exposed employees found no evidence of transmission

*Risk Classification:*

Low
Example of Risk Classification (2)

- Big city hospital admits 30 TB patients/year
- TB test conversion rate of 1.0%; 3/20 (15%) respiratory therapists (RTs) converted
- Problem evaluation:
  - The three who converted spent time where induced sputum specimens collected
  - Ventilation in this area inadequate

*Risk Classification:*

1. Potential ongoing transmission for RTs
2. Rest of facility: medium
Example of Risk Classification (3)

- A home healthcare agency that serves a clientele with TB rates higher than community
- No patients with TB in past year
- 125 workers; 1/3 are foreign-born
  - provide nursing, PT, basic home care
  - at baseline two-step testing, 4 TST+; 2 TST+ on second-step; no cases

Risk Classification:
Low
<table>
<thead>
<tr>
<th>Risk Classification</th>
<th>Baseline; then further screening not necessary unless exposure occurs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Baseline; then annually</td>
</tr>
<tr>
<td>Potential ongoing transmission</td>
<td>Baseline; then every 8–10 weeks until transmission interrupted</td>
</tr>
</tbody>
</table>
### Who needs two-step testing?

<table>
<thead>
<tr>
<th>Situation</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>New employee</strong></td>
<td></td>
</tr>
<tr>
<td>No previous TST</td>
<td>Two-step test</td>
</tr>
<tr>
<td>Neg TST &gt;12 months ago</td>
<td>Two-step test</td>
</tr>
<tr>
<td>Neg TST &lt;12 months ago</td>
<td>1 additional test</td>
</tr>
<tr>
<td>Previous documented + TST</td>
<td>No TST needed</td>
</tr>
<tr>
<td>Previous undocumented + TST</td>
<td>Two-step test</td>
</tr>
<tr>
<td>Previous BCG</td>
<td>Two-step test</td>
</tr>
<tr>
<td><strong>Current employee with negative TST &gt;12 months ago</strong></td>
<td></td>
</tr>
<tr>
<td>Single TST</td>
<td></td>
</tr>
</tbody>
</table>
Criteria for Initiating AII Precautions

• Patient has signs or symptoms of infectious TB disease
  or
• Whenever patient has documented culture-positive pulmonary TB disease and is still infectious
Frequency of Sputum Collection for Patients with Suspected TB Disease

- Three negative sputum smears
- At least 8 hours apart
- At least one collected during early AM
Criteria for Discontinuing AII

When infectious TB is unlikely and either

1) Another diagnosis is made that explains the clinical syndrome
   or
2) Patient has three consecutive negative AFB sputum smear results
When can All room be used for the next patient?

• Use normal cleaning procedures
• Keep posted the warning sign
• Wear respiratory protection until 99.9% of air is removed
• Time depends on ACH
  – 6 ACH = 69 minutes
  – 12 ACH = 35 minutes
Case Studies
Case 1: In the Hospital

- 32 y/o male from China seen for possible TB
- Placed in airborne infection isolation room
- TB evaluation
  - Mild dry cough x 3 weeks
  - TST placed, at 48 hours = 0 mm
  - CXR done same day
Case 1

- Two negative AFB sputum smears
- The patient improved within 48 hours of starting levofloxacin for CAP…
- Patient released from isolation
- After release, a specimen grew *M. tb*
TST, smears and contagiousness

• 20% of patients with TB who have no immunosuppression will have a negative TST
• ~50% of patients with non-cavitary TB are sputum smear negative
• 5-10% of patients with cavitary TB are smear negative
• TB with positive smears is more contagious than is smear negative TB, but…BOTH are contagious
TB is a laboratory diagnosis

TB treatment is a clinical decision
Case 2: Stepping Out

- 22 y/o student from Russia
- Seen by private MD for chest pain, fatigue
- History of prior treatment for TB
- Sputum smear is positive for AFB
- Started on 6 drugs
Can she attend class with a N95 mask?

1. Yes
2. No
3. After proper fit testing
Protect the innocent

Young children
Immunocompromised
Uninfected
Non exposed
## TB precautions in the home

<table>
<thead>
<tr>
<th>Setting</th>
<th>Administrative controls</th>
<th>Environmental controls</th>
<th>Respiratory protection</th>
</tr>
</thead>
</table>
| **Home health care** | • Train patients about meds, cough etiquette  
                         • Screen visitors  
                         • Postpone travel until noninfectious | • Ventilate the home            | • When transporting patients in an enclosed vehicle |
Case 3: Long-term care

- 82 year old female with some dementia
  - cough x 2 weeks
  - 10 lb. weight loss
- No insurance
Chest radiograph
When can this patient return to the facility?
When can this patient be discharged?

1. Minimal TB symptoms
2. 3 negative smears
3. Tolerating TB medications
4. All of the above
Case 4: Non-adherence with therapy

- 41 y/o with HIV infection presents with fever, chills and productive cough
- Hospitalized 2 weeks for smear-positive pulmonary TB
- Not cooperative with DOT in hospital
- Lives with HIV-infected partner
Chest radiograph on admission
How would you proceed with this patient?

1. Send home
2. Admit to a hospice
3. Keep in the hospital
Discharge

- What do you need to know?
  - About the patient
  - About the home setting
  - About visitors
Home Infection Control

• Discharge from the hospital should not take place until a plan that includes DOT has been approved.
• Patients can be at home while infectious if there is no risk of exposing uninfected persons who are at high risk for progressing to TB disease (e.g., young children, HIV-infected persons).
• Until the patient is deemed noninfectious, he or she should not have uninfected visitors.

Connecticut Advisory Committee for the Elimination of Tuberculosis, 2008
Summary
Keys to good infection control

- Think TB!
- Isolate
- Start 4 drugs
- Patient education
- Directly Observed Therapy
- Discharge planning
- Respiratory protection
What are the three levels of infection control?

A. Administrative
B. Environmental
C. Personal Respiratory
D. All of the above
What is the most important risk factor for transmission of TB in health care facilities?

A. Staff not wearing an N95 respirator
B. Unrecognized contagious TB patients
C. Patients being released from isolation too quickly
D. Patients being treated with inadequate TB regimens

25%  25%  25%  25%
What are the criteria for initiating airborne isolation precautions?

A. Patient has signs or symptoms of infectious TB disease
B. Whenever patient has documented culture-positive pulmonary TB disease and is still infectious
C. a & b