Transmission of TB

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TB Updates for the Community: Partnering to Eliminate TB
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Objectives

- Explain Transmission and Pathogenesis of Tuberculosis
- Probability of Transmission and Likelihood of Infection
- Differentiate Between
  - Latent TB Infection (LTBI)
  - TB Disease
- Risk Factor for Progression to TB Disease

Tuberculosis

- Caused by Mycobacterium tuberculosis complex
  - M. tuberculosis
  - M.bovis
  - M. africanum
  - M. Microti
- Atypical mycobacterium
  - NTM, MOTT
  - Mycobacterium Kansasi, M.avium

Positive AFB Smear
You can get TB infection if you spend a lot of time indoors with this person.

how TB is transmitted from one person to another

• Brief contact
• Sharing dishes and utensils
• Using towels and linens
• Handling food
Probability of Transmission and Likelihood of Infection

What is the Probability TB Will Be Transmitted?

- Infectiousness of person with TB
- Susceptibility of contact
- Duration of exposure

Ventilation and Size of Space Determines Probability of Transmission

- Concentration of droplet nuclei in air (Environment)
- Majority of contacts do not become infected
Latent TB Infection (LTBI)

Criteria for LTBI Diagnosis

- Positive TST
- Asymptomatic
- Normal CXR and physical examination
- NOT infectious

How is LTBI Diagnosed?

- Using TST
  - TST will become positive
    - Within 2–10 weeks
**Active Tuberculosis Disease**

- Primary lesion
- T cell
- Empty giant cell
- Histologic examination
- Fibrinopurulent case extending to blood without bacilli
- Predominant Inhibitors in human blood

**Diagnostic Criteria for TB Disease**

- Symptoms
  - Cough
  - Night sweats
  - Loss of appetite
  - Fever/chills
  - Fatigue
  - Weight loss

- Abnormal CXR and/or physical examination
- Positive AFB smears and/or cultures
- **MAY BE INFECTIOUS** until adequately treated
- TST may be positive or negative

**Potential Sites of TB Disease**
**TB Transmission**

Source case

Exposure to Contacts

Contacts

- No infection (50%)
- Infection (25-50%)
- Disease (10%)

No infection (90%)

No disease (90%)

Disease (10%)

“Early” Progressive (5%)

“Late” Recrudescent (5%)

**Progression to TB Disease**

Exposure (LTBI)

- 5% First Year
- 2-3% Second Year
- ~0.1% per year thereafter

Disease

- Skin test positive
- CXR normal
- No signs or symptoms
- NOT infectious

No Disease (90%)

**Comparison of Latent TB Infection and TB Disease**

<table>
<thead>
<tr>
<th>LTBI</th>
<th>Active</th>
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</thead>
<tbody>
<tr>
<td>- Skin test positive</td>
<td>- Skin test positive or negative</td>
</tr>
<tr>
<td>- CXR normal</td>
<td>- CXR abnormal</td>
</tr>
<tr>
<td>- No signs or symptoms</td>
<td>- Positive smears/cultures</td>
</tr>
<tr>
<td>- NOT infectious</td>
<td>- Signs/symptoms</td>
</tr>
<tr>
<td></td>
<td>- Infectious</td>
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Risk Factors: Who gets TB?

Anyone is susceptible

Risk Factors for TB

- HIV-infected
- Substance abusers (IVDU)
- Homeless
- Inmates in jail and prisons
- Other immune-compromised persons

Other Risk Factors for TB

- Children < 5 years of age
- Health Care Workers
- Elderly, especially in nursing homes
- Immigrants from high-prevalence countries
Summary

- Transmission and Pathogenesis of Tuberculosis
  - Airborne disease
  - Majority of contacts do not become infected

- Probability of Transmission dependent on:
  - Infectiousness
  - Susceptibility of the contact
  - Duration of exposure
  - Environment

Differentiate Between

- Latent TB Infection (LTBI)
  - Not contagious
  - No symptoms
- TB Disease
  - Contagious
  - Symptomatic

Highest Risk Factors for Progression to TB Disease
- HIV and immune-compromise patients
- Drug users
- Immigrants
- Homeless
- Children (< 5 years of age)
- Health Care Workers
- Living in congregate Settings

Questions?