Tuberculosis

1. DISEASE REPORTING

A. Purpose of Reporting and Surveillance
   1. To identify and treat persons with tuberculosis (TB) disease.
   2. To identify and evaluate the contacts to TB cases. To treat infected contacts for latent TB infection (LTBI).
   3. To prevent transmission of TB from cases to contacts.

B. Laboratory and Physician Reporting Requirements

1. Health Care Providers and Health Care Facilities
   a. Report all confirmed and suspected cases to the local health department (LHD) within one working day of making a presumptive TB diagnosis. (OAR 333-018-0000)
   b. Cooperate with local public health authorities in the investigation and implementation of appropriate TB control measures. (OAR 333-019-0002)

2. Laboratories
   a. Report all test results suggestive of TB to the LHD within one working day (OAR 333-018-0015). This includes positive acid fast smears, positive cultures identified as Mycobacterium tuberculosis or M. tuberculosis complex, or positive nucleic acid amplification test results for M. tuberculosis.
   b. Forward primary M. tuberculosis complex isolates to the Oregon State Public Health Laboratory (OSPHL). (OAR 333-018-0018)

C. Local Health Department Reporting and Follow-up Responsibilities

1. Reporting
   Report all confirmed and suspected cases to TB Control, Oregon Health Authority, (TBOHA) within one week of initial notification of the suspect or confirmed case. (OAR 333-018-0020). Forms at: https://public.health.oregon.gov/DISEASESCONDITIONS/COMMUNICABILEDISEASE/TU BERCULOSIS/Page s/reporting.aspx .

2. Follow-up
   The LHD is responsible for investigating reportable diseases (including TB), carrying out control measures, and following procedures outlined in these Investigative Guidelines (ORS 433.006, OAR 333-019-0000). Basic requirements include:
   - Assigning a TB Nurse Case Manager (TB-NCM) for each suspect or confirmed case
   - Using directly observed therapy (DOT) for the majority of TB cases/suspects
   - Monitoring therapy and treatment response for all cases
   - Initiating a contact investigation within 72 hours of verifying the case/suspect (as appropriate)
   - Evaluating contacts and initiating therapy (as appropriate)
2. THE DISEASE

A. Pathogenesis

TB is caused by Mycobacterium tuberculosis complex. This complex includes M. tuberculosis, M. africanum, M. bovis, M. microti, and M. canettii. Infection with TB occurs when a person inhales aerosolized TB bacilli from someone with pulmonary TB disease. TB bacilli that reach the pulmonary alveoli (small structures in the lungs) are ingested by macrophage cells, where the bacilli are either destroyed or effectively multiply.

In 90-95% of people infected, the immune system clears or contains the TB bacilli, either at this stage or earlier, by walling off the bacilli. In 5-10% of newly infected patients, the immune system fails to control bacillary growth or spread. These patients develop signs and symptoms of TB disease, often within the first two years following infection.

In patients with an effective immune response and successful control of infection, TB bacilli can survive intracellularly for many years in a latent state (“latent TB infection”, or LTBI). A small percentage of such persons will suffer activation of their LTBI later in life, when bacilli replicate and cause disease. The risk of LTBI progression to active disease is increased by immunosuppression, and can be decreased by preventive therapy for LTBI.

While most patients are infected with TB via an inhalational route, infection can also occur by the ingestion of raw milk products containing M. bovis or M. tuberculosis.

B. TB Disease Signs and Symptoms

Although most patients with TB present with pulmonary disease, TB disease can develop in any body part including bone, meninges, body organs and skin. TB disease outside of the lungs is called “extrapulmonary”. The symptoms of pulmonary TB typically include cough, chest pain, and hemoptysis. The symptoms of extrapulmonary TB depend on the site of disease. Systemic symptoms consistent with TB include fever, chills, night sweats, appetite loss, weight loss, and fatigue.

C. TB Transmission

TB is spread from person to person through the air. When a person with pulmonary or laryngeal TB coughs, sneezes, speaks, or sings, droplet nuclei containing M. tuberculosis become airborne. Depending on the environment, these tiny particles (1–5 microns in diameter) can remain suspended for hours. If another person inhales air containing droplet nuclei, transmission may occur. The probability TB will be transmitted depends on the infectiousness of the person with TB (the number of organisms expelled into the air), the immune competency of the person exposed, the environment in which exposure occurred, the duration of exposure, and the virulence of the organism.

Persons at highest risk for becoming infected with M. tuberculosis are those who had prolonged, frequent, or intense contact. These close contacts may be family members, roommates, friends, coworkers, or others.

Extrapulmonary TB is rarely contagious (except for laryngeal TB); however, transmission from extrapulmonary sites can occur during aerosol-producing procedures, such as autopsies and tissue irrigation.

D. Need for Respiratory Isolation of Patients with Pulmonary, Pleural or Laryngeal TB Disease
1. **Latent TB Infection (LTBI)**
   Persons with LTBI are not infectious.

2. **TB Disease**
   Any patient with pulmonary TB is potentially capable of infecting others. However, studies have shown that this risk is higher when the patient has AFB positive sputum smears. See section 5, “Controlling Further Spread of Disease”, for details on isolation decisions.

3. **Extrapulmonary TB**
   Extrapulmonary TB is not considered communicable except laryngeal TB.

E. **Overview of Treatment**

1. **LTBI**
   See [http://www.cdc.gov/mmwr/preview/mmwrhtml/rr4906a1.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/rr4906a1.htm) for detailed treatment information.

   a. **There are 3 main regimens used for treating LTBI.**

   - **Isoniazid (INH)**
     9 months daily INH is the most common regimen
     6 months daily INH is adequate to treat LTBI for immunocompetent adults

   - **INH and rifapentine (RPT)**
     Taken once a week for 12 weeks by DOT

   - **Rifampin (RIF)**
     4 months daily RIF is an alternate for contacts to INH resistant cases, patients unable to tolerate INH due to side effects and high risk patients unlikely to complete INH treatment due to the prolonged regimen
     The two month regimens of RIF and pyrazinamide (PZA) should not be used due to risk of liver injury.

   b. **Patients at risk for peripheral neuropathy on INH** may need supplementation with B6 (Pyridoxine) (i.e. diabetics, pregnant or nursing mothers, symptoms of peripheral neuropathy). Standard dosing is 25-50 mg daily.

   c. **Some patients may require baseline and ongoing liver function tests (LFTs).** Seek consultation or see [http://www.cdc.gov/mmwr/preview/mmwrhtml/rr4906a1.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/rr4906a1.htm) for details.

   d. **All patients should be monitored monthly during treatment for side effects and compliance with treatment.**

   e. **Patients should be educated about the signs and symptoms of hepatotoxicity.** Any symptomatic patient should stop medication pending further clinical evaluation.

2. **TB Disease**
See: [http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5211a1.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5211a1.htm) for detailed treatment information.

a. DOT is the standard of care for all TB cases in Oregon. In rare cases, self-administered therapy with close supervision may be acceptable. See Program Element #03-Tuberculosis Services located at: [http://public.health.oregon.gov/ProviderPartnerResources/LocalHealthDepartmentResources/Pages/program-elements.aspx](http://public.health.oregon.gov/ProviderPartnerResources/LocalHealthDepartmentResources/Pages/program-elements.aspx)

b. LFT, CBC, creatinine & glucose tests are required when starting treatment for TB disease. If the patient is on ethambutol (EMB), baseline vision testing (Snellen and Ishihara) is needed. See: [http://public.health.oregon.gov/DiseasesConditions/CommunicableDisease/Tuberculosis/Documents/tools/txchart.pdf](http://public.health.oregon.gov/DiseasesConditions/CommunicableDisease/Tuberculosis/Documents/tools/txchart.pdf)

c. Most TB cases will start on 4 drugs: isoniazid (INH), rifampin (RIF), pyrazinamide (PZA), and ethambutol (EMB), pending susceptibility results.

d. Drug dosing is based upon the patient’s weight.

e. Patients with drug resistance, treatment failure, hepatic disease, HIV, pregnancy, renal insufficiency or end stage renal disease may require alternate regimens. Expert consultation is strongly advised in those situations.

f. If the patient’s isolate is susceptible to INH, RIF and PZA:
   - EMB may be discontinued when susceptibility is known.
   - PZA may be discontinued at the end of the initial phase. The initial phase is complete after the first two months of treatment (40 doses).

g. Most patients require 6 months total treatment.

h. Some patients will require longer treatment (e.g. pulmonary cavity TB and culture conversion after 2 months).

i. For details on dosing and alternate drug regimens see, “Treatment of Tuberculosis” Table 2: Drug Regimens for Culture Positive Pulmonary Tuberculosis Caused by Drug-Susceptible Organisms at [http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5211a1.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5211a1.htm).

### 3. DIAGNOSIS AND LABORATORY SERVICES

#### A. Case Definitions

1. **Laboratory Confirmed Case**
   - Case has NAAT (PCR, Xpert MTB/RIF assay) or culture positive specimen identified as *M. tuberculosis*

2. **Clinical Case**
   - Culture negative cases meeting the below criteria:
     a. Positive tuberculin skin test (TST) or positive Interferon Gamma Release Assay (IGRA) result. IGRA’s are Quantiferon Gold-In Tube® (QFT-IT) and T SPOT.
     b. Signs and symptoms of TB.
     c. A complete evaluation for TB disease, including collection of appropriate specimen(s) sent for AFB smear and culture.
d. Started on four drug therapy for TB disease and have clinical improvement in response to treatment.

B. Diagnosis

1. Follow the appropriate CDC guidelines on diagnosis available at:
   http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5211a1.htm

C. Laboratory Services

OSPHL performs tests and provides results for mycobacterial smear, NAAT, culture, and susceptibilities. For more information on shipping and tests, refer to OSPHL’s Submitting Samples Menu at: http://public.health.oregon.gov/LaboratoryServices/CommunicableDiseaseTesting/Pages/index.aspx.

1. AFB smear
   Staining and microscopic examination of sputum or other specimens. All species of mycobacteria appear essentially the same on smear.

2. Nucleic acid amplification test (NAAT)
   Identifies genetic material unique to TB. OSPHL uses the GenProbe MTD test. The first sputum or other respiratory specimen sent to OSPHL is tested. Another type of NAAT is the Xpert MTB/RIF assay which detects M. tuberculosis and genetic mutations associated with resistance to rifampin. Xpert MTB/RIF assay is not available at OSPHL.

3. AFB culture
   The specimen is inoculated into both rapid test (liquid) media and standard culture media for growth, isolation, and identification. OSPHL identifies only M. tuberculosis complex and M. avium complex from specimens with AFB growth. Therefore a culture may be reported as AFB positive, but negative for M. tuberculosis complex.

4. Drug susceptibility
   Determine the TB isolate’s susceptibility or resistance to TB drugs.

5. Pyrosequencing
   Available upon request. It is used to identify M. tuberculosis complex and to rapidly screen for drug resistance. This test can be used on AFB smear positive sputum specimens or AFB isolates from culture.

6. Genotyping
   The analysis of TB genetic components to determine strain type.
   OSPHL sends an isolate from every culture positive TB patient to a CDC contracted laboratory for testing. Genotyping can assist in determining the relatedness between TB cases, which is useful for contact and outbreak investigations.

4. ROUTINE INVESTIGATION

A. Contact Investigation
   Conducting a TB contact investigation (CI) includes identifying individuals who had contact with the case during the infectious period, determining whether or not the individual contact is high or low risk and deciding which contacts need evaluation based upon case characteristics, the type of exposure and contact characteristics. See: http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5415a1.htm and http://public.health.oregon.gov/DiseasesConditions/CommunicableDisease/Tuberculosis/Documents/formdoc/contactforminstructions.pdf
1. **Timeline for completion**  
Begin CIs within 72 hours of reported pulmonary (including pleural) or laryngeal TB. Consult with TB Control, OHA for CI in congregate settings or when the exposure occurred on an airplane or other public transportation. Evaluate high risk contacts by history and screening test (TST or IGRA) when applicable within 7 days of their identification. Assure appropriate medical evaluation and treatment initiation of contacts within 7 days of positive screening test results.

All contacts who test negative on their initial test must be re-tested with the same screening test 8-10 weeks after their last exposure to the case.

2. **Period of Infectiousness of the Case**  
Determining precisely when a TB case became infectious is not possible. Usually the infectious period is estimated to begin three months prior to the onset of symptoms. If the patient was asymptomatic, the infectious period is estimated to begin 3 months prior to the first clinical indication that the patient had TB (e.g. first abnormal chest x-ray (CXR) or first smear positive sputum).

3. **Risk of Transmission**  
The TB nurse case manager (TB-NCM) must identify household, work, and other contacts, and estimate the proximity and duration of exposure between the case and potential contacts within each setting. Risk factors for disease progression in contacts (e.g. age less than 5 years, HIV+ and other immunosuppression) must be considered. The presumed infectiousness of the case also influences the number of contacts needing evaluation. Guidelines describing how to conduct CIs are at:  
[http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5415a1.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5415a1.htm).

4. **Evaluation of Contacts**  
a. **Assess each contact for symptoms of TB disease and TB risk factors.**  
Symptomatic contacts, children less than 5 years old and/or those who are otherwise highly immunocompromised (e.g. HIV) should be noted as recommendations for follow-up differ for these groups. Symptomatic contacts need a CXR and possibly sputum collection.

b. **Screen contacts with either a TST or IGRA.**  
   - Do not use an IGRA for children less than 5 years old.
   - Before utilizing QFT-IT in any large contact investigation, coordination with OSPHL must occur.
   - If the contact has a documented past positive TST or IGRA, repeat testing is not needed. In this situation, a CXR may be needed if the TB exposure was intense or the contact is immunocompromised.

If the contact is symptomatic for TB and/or has an abnormal CXR indicative of TB, TB disease must be ruled out by obtaining sputum or other appropriate respiratory, tissue, or fluid specimens for lab testing. Do not start LTBI treatment until culture results are known to be negative.
c. Contacts who have a negative test should be tested again 8-10 weeks after their last exposure.

d. Contacts under 5 years old, HIV+, and others who are highly immunocompromised require different follow-up. CXR and window prophylaxis may be needed regardless of screening results. Consultation with a TB expert is advised.

e. For contacts who have LTBI or need window prophylaxis see: http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5415a1.htm and http://www.cdc.gov/mmwr/preview/mmwrhtml/rr4906a1.htm

5. Ongoing CI Follow-up
Re-interview cases for additional contact information and expanded the investigation to low risk contacts if evidence of transmission exists as per CDC guidelines.

6. CI for Extrapulmonary TB
A CI is not necessary unless there is evidence of pulmonary, pleural or laryngeal TB.

B. Source Case Finding (for cases less than 5 years old)
Source case finding is an investigation to determine the source of TB disease in an index case. This process is a “reverse” contact investigation. Source case finding should be undertaken for children age less than 5 years diagnosed with TB disease.

C. Environmental Evaluation
Take into account the environment where the exposures took place when classifying contacts as high or low risk. Generally, closed poorly ventilated spaces increase the chances of transmission. Guidance regarding exposure limits can be found at: https://public.health.oregon.gov/DiseasesConditions/CommunicableDisease/Tuberculosis/Documents/formdoc/contactforminstructions.pdf

5. CONTROLLING FURTHER DISEASE SPREAD

A. Isolation Measures
Infectious cases should be in respiratory isolation at home or in a hospital until no longer considered infectious. Educate the patient about the need for respiratory isolation. Complete a home isolation agreement when the case is isolated at home or in another non health-care setting (e.g. motel). The home isolation agreement is available at: https://public.health.oregon.gov/DiseasesConditions/CommunicableDisease/Tuberculosis/Documents/formdoc/isolationagreement.pdf
**INITIATION** of respiratory isolation for pulmonary, pleural or laryngeal TB suspect

<table>
<thead>
<tr>
<th>Clinical information</th>
<th>Action</th>
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<tbody>
<tr>
<td>• AFB smear positive</td>
<td>Initiate respiratory isolation</td>
</tr>
<tr>
<td>• MTD/NAAT positive</td>
<td></td>
</tr>
<tr>
<td>• AFB smear positive</td>
<td>Likely is nontuberculosis mycobacterium. Discontinue isolation unless 4 drug TB treatment started.</td>
</tr>
<tr>
<td>• MTD/NAAT negative or not done</td>
<td></td>
</tr>
<tr>
<td>• AFB smear negative x 3 consecutive sputums</td>
<td>Initiate respiratory isolation</td>
</tr>
<tr>
<td>• MTD/NAAT positive</td>
<td></td>
</tr>
<tr>
<td>• AFB smear negative x 3 consecutive sputums and/or</td>
<td>Respiratory isolation not required unless 4 drug TB treatment started.</td>
</tr>
<tr>
<td>• MTD/NAAT negative x 3</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** Xpert MTB/RIF Assay is a NAAT. If MTB/RIF assay is positive for the detection of Rifampin resistance, contact TBOHA. Isolation may need to be extended if patient has confirmed MDR TB.

**DISCONTINUATION** of respiratory isolation for TB suspect on TB medication

If patient works in high risk setting or lives with persons at high risk for TB (children under age 5, HIV+, other immunocompromised) consult a TB expert.

<table>
<thead>
<tr>
<th>Initial Sputum Results</th>
<th>Criteria for Ending Respiratory Isolation</th>
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<tbody>
<tr>
<td>• AFB smear positive</td>
<td>3 negative consecutive AFB smears OR one negative MTB culture AND</td>
</tr>
<tr>
<td>• MTD/PCR positive or MTB culture positive</td>
<td>• Minimum of 2 weeks treatment with 4-drug regimen</td>
</tr>
<tr>
<td>• AFB smear negative x 3 consecutive sputums</td>
<td>• Symptoms (if any) are improving</td>
</tr>
<tr>
<td>• MTD/PCR positive or MTB culture positive</td>
<td>Minimum 5 business days of treatment with 4-drug regimen. Lengthen time if works or lives in high risk setting.</td>
</tr>
<tr>
<td>• AFB smear negative x 3 consecutive sputums</td>
<td>Minimum 5 business days of treatment with 4-drug regimen. Lengthen time if works or lives in high risk setting.</td>
</tr>
<tr>
<td>• MTD/PCR negative or not done and MTB culture pending</td>
<td>Minimum 5 business days of treatment with 4-drug regimen. Lengthen time if works or lives in high risk setting.</td>
</tr>
</tbody>
</table>

**B. TB Case Management**

A least one nurse must be designated as the TB nurse case manager (TB-NCM). The responsibility of the TB-NCM is to assure TB suspects/cases and their contacts are managed according to current guidelines. Staff newly assigned as TB-NCM should complete, at minimum, the CDC TB Self Study Modules 1-9 or attend the TB Case Management and TB Contact Investigation classes given by TB Control, OHA.

The CDC Self Study Modules can be found at: [http://www.cdc.gov/TB/education/ssmodules/default.htm](http://www.cdc.gov/TB/education/ssmodules/default.htm).

Responsibilities and activities for the TB-NCM are outlined in Program Element #03 found at: [http://public.health.oregon.gov/ProviderPartnerResources/LocalHealthDepartmentResources/Pages/index.aspx](http://public.health.oregon.gov/ProviderPartnerResources/LocalHealthDepartmentResources/Pages/index.aspx)
6. MANAGING SPECIAL SITUATIONS

A. Medical Situations
The following medical situations are specifically addressed in the CDC treatment guidelines:
common adverse side effects, culture negative TB (clinical case), drug resistance, diabetes, hepatic
disease, HIV, pregnancy and breastfeeding, renal insufficiency and end stage renal disease, treatment
failure and relapse, and treatment interruptions. See:
http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5211a1.htm.
In these situations, expert consultation is advised. Obtain consultation by contacting TB Control,
OHA at 971-673-0174 or Curry International TB Center warmline 877-390-6682.

B. Legal Issues in TB Control
Document all efforts to gain voluntary cooperation of TB cases and suspect cases before pursing legal
action (i.e., Public Health Measure). Document patient education, treatment plans, episodes of non-
compliance, and attempts to resolve compliance problems. Written agreements and orders are
necessary to establish clear expectations and provide evidence when pursuing legal action. Taking a
progressive approach to legal interventions is recommended as found in:
tblegal.pdf
Oregon Revised Statutes about Isolation and Quarantine can be found at:
http://public.health.oregon.gov/diseasesconditions/communicabledisease/reportingcommunicabledis-
ease/documents/benchbook.pdf. Obtaining local legal counsel is strongly advised.

C. Inter-jurisdictional Coordination and Transfers
   1. Coordination of Contact Investigations
   When a TB case lives in one jurisdiction and works or has contacts in another jurisdiction,
   the TB-NCM needs to coordinate follow-up with the other jurisdiction. If needed, contact
   TB Control, OHA for assistance. To facilitate this process, use the “Transfer Notification”
   form, at
   http://public.health.oregon.gov/DiseasesConditions/CommunicableDisease/Tuberculosis/
   Pages/reporting.aspx .
   Fill out the form and fax it to the appropriate jurisdiction. Contact the jurisdiction for
   follow-up information if it is not sent back as requested. For contact investigations of
   worksites or schools, in addition to the form, call the jurisdiction to alert them of the
   referral and discuss significant factors relating to the case.

   2. Transfer of TB Case Care
   Occasionally TB cases move before treatment is completed. When this happens, obtain
   the case’s new locating information and fill out a "TB Suspect/Case Inter-jurisdictional
   Transfer Notification" form found at:
   http://public.health.oregon.gov/DiseasesConditions/CommunicableDisease/Tuberculosis/
   Pages/reporting.aspx.
   Fax the form to the new jurisdiction and submit a copy to TB Control, OHA.
   a. If it is known that the patient is moving, contact the new jurisdiction to alert them of
   the pending transfer and to facilitate a smooth transition.
   b. If the case leaves without prior notice, attempt to obtain locating information from
   the case’s friends, family, work, etc.
c. Contacting the receiving jurisdiction
   i. United States: the NTCA maintains a list of State TB Control Offices and the appropriate inter-jurisdictional contact for each state. This can be found at: http://www.tbcontrollers.org/community/statecityterritory/#.U1W11OJqA0.
   ii. International
      - TBNet facilitates transfer and follow-up of TB contacts/cases internationally. More information is at: http://www.migrantclinician.org/services/tbnet.html.
      - The CDC has a transfer form and contact information available for all countries. More information is available at: http://www.cdc.gov/tb/programs/international/default.htm.

TB Control, OHA can assist with international transfers as needed.
REFERENCES AND RESOURCES

A. References

1. TB Diagnosis
   - CDC. Updated Guidelines for the Use of Nucleic Acid Amplification Tests in the Diagnosis of Tuberculosis MMWR January 16, 2009; 58(01). http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5801a3.htm?s_cid=mm580

2. TB Treatment

3. LTBI Diagnosis and Treatment
   - CDC. Recommendations for use of INH-Rifapentine Regimen with Direct Observation to Treat Latent Mycobacterium tuberculosis Infection. MMWR 2011; 60(48); 1650-1653. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6048a3.htm
   - CDC. Updated Guidelines for Using Interferon Gamma Release Assays to Detect Mycobacterium tuberculosis Infection, United States, 2010. MMWR 2010; 59 (RR05); 1-25. http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5905a1.htm?s_cid=rr5905a1_e

4. Contact Investigation

5. Health Care Facilities
6. **Long Term Care Facilities**

   - CDC. Prevention and Control of Tuberculosis in Facilities Providing Long-Term Care to the Elderly. MMWR 1990; 39 (No. RR-10).
     http://www.cdc.gov/mmwr/preview/mmwrhtml/00001711.htm

   - OAR 333-019-041
     http://arcweb.sos.state.or.us/pages/rules/oars_300/oar_333/333_019.html#019-0041

B. **TB Resources**

1. **CDC:** http://www.cdc.gov/tb/
   - Self-Study Modules on TB
     http://www.cdc.gov/tb/education/ssmodules/default.htm
   - State TB Control Offices
   - International Notification of TB Cases
   - TST training materials

2. **TB Control, OHA:**
   - Forms
   - Case management tools
   - Patient education materials in 13 languages
   - Data
   - Rules and statues

3. **Curry International Tuberculosis Center:** http://www.currytbcenter.ucsf.edu/
   Email: CurryTBcenter@ucsf.edu
ABBREVIATIONS

AFB  acid fast bacilli  
CBC  complete blood count  
CI接触  investigation  
CXR  chest x-ray  
DOT  directly observed therapy  
EMB  ethambutol  
INH  isoniazid  
LFTs  liver function tests  
LHD  local health department  
LTBI  latent TB infection  
MTD  GenProbe MTD test, type of NAAT used by OSPHL  
NAAT  nucleic acid amplification test  
TB Control, OHA  TB Control, Oregon Health Authority  
OSPHL  Oregon State Public Health Laboratory  
PLWH  person living with HIV  
PZA  pyrazinamide  
QFT-IT  QuantiFERON®-TB Gold In-Tube  
RIF  rifampin  
TB  Tuberculosis, TB disease  
TB-NCM  TB Nurse Case Manager  
TST  TB skin test