Colorado Department of Public Health and Environment

2007 Guidelines for Tuberculosis Screening of College and University Students

Introduction

Foreign-born students account for 4-6% of all tuberculosis (TB) cases reported among foreign-born persons in the United States (U.S.) and 18-37% of cases among persons on non-immigrant visas (Weis 2001, Cronin 2007). Each year an average of two active cases of TB are identified in students attending Colorado colleges and universities. The students diagnosed with TB have been found not only in the foreign-born population but also in U.S. born students who have risk factors, such as living in a high-risk country. TB is not only a severe, disabling, infectious disease, but the outcome may be fatal. Within the past five years, two Colorado university students have died due to tuberculosis, a preventable disease. These guidelines have been developed to provide a standard for effective policies and procedures designed to prevent death and disability due to TB among university students and the community.

Tuberculosis is a communicable disease caused by the bacteria *Mycobacterium tuberculosis*. TB is spread from person to person through the air when someone with infectious TB coughs, sneezes, yells, or otherwise expels bacteria-laden droplets. If another person inhales air containing droplet nuclei, transmission may occur. A person, who becomes infected with *M. tuberculosis* but does not have active TB disease, is considered to have latent TB infection (LTBI). A person with LTBI cannot spread the infection to others but the infection carries a life-time risk of developing active TB in the future.

There are 9 million new cases of active TB worldwide each year, most of which occur in Asia, Africa and Latin America. There are almost two million deaths due to TB each year, making TB one of the leading causes of death worldwide. In some high-burden countries up to 1% of the population has active TB, often without symptoms. Thirty percent of the global population is infected with *M. tuberculosis*. For these reasons, TB is a significant health problem for U.S. residents and visitors who were born or have lived in Asia, African, Latin America or Eastern Europe, where TB remains endemic. Over half of the newly reported TB cases in the U.S. occur among individuals born abroad. Some individuals have active TB upon arrival in the U.S., but most develop active TB after arrival due to latent TB infection that they acquired abroad.

Targeted testing is a strategic component of TB control that identifies persons at high risk for developing TB and who would benefit with treatment for LTBI. A targeted testing program should be conducted only among groups at high risk and discouraged in those at low risk for infection. Infected persons who are considered to be at high risk for developing active TB disease should be offered treatment for LTBI, irrespective of age.[i]

Persons who were born in or have lived in countries with a high incidence of TB are at high risk of developing TB. An estimated 850,000 to 1.9 million workers, students and other visitors and their families might reside in the U.S. for multiple years.[ii] These persons are not required to have TB screening upon arrival into the U.S. TB among foreign-born persons is of increasing importance. During 1992–2006, the percentage of TB cases in the United States that occurred among foreign-born persons increased from 27% in 1992 to 55% in 2006. In 2006, the TB rate among foreign-born persons in the United States was 9.5 times that of U.S.-born persons.[iii] In Colorado, the rate in the foreign-born is 19 times higher than the U.S. rate (18.0 per 100,000 among foreign-born compared to 0.9 per 100,000 among U.S. born). Since 2000, 50 percent of the active TB cases in Colorado have been in the foreign-born population.

For the first several years after arrival in the United States, persons who have emigrated from areas of the world with high rates of TB have incidence rates that approach those of their countries of origin. This high rate likely results from both the detection of active TB that was present upon arrival and the progression from latent TB infection to active TB after arrival in the United States. The risk for developing active TB is also increased in adolescents and young adults.[iv]

Purpose

These guidelines provide a basis to standardize TB screening in colleges and universities within Colorado.

Goals

1. Provide a risk assessment for TB of all students entering a college or university in the State of Colorado.
2. Conduct targeted testing of those students identified with risk factors for TB.
3. Identify students with LTBI or active TB disease and provide appropriate evaluation and treatment.
4. Protect students attending colleges and universities from the spread of TB.

Background

The American Thoracic Society and the Centers for Disease Control provided guidelines in July 1999, which the Infectious Diseases Society of America endorsed for targeted testing of high-risk individuals who would benefit from treatment of LTBI. These guidelines are entitled, “Targeted Tuberculin Testing and Treatment of Latent Tuberculosis Infection” and provide direction for identifying, testing and treating high-risk populations.[v]

The American College Health Association (ACHA) guidelines, “Tuberculosis Screening of College and University Students”, November 2000, recommend screening for TB to identify persons with LTBI and TB disease. The ACHA guidelines indicate screening

of high-risk students should take place within 3-6 months prior to or after college entrance.[vi]

The Colorado Department of Public Health and Environment State Board of Health Rules and Regulations 6 CCR 1009-1, Regulation 4. K. state the chief medical health officer of a local health agency, with prior approval of the local board of health may require screening for a particular group or population that has been identified as high risk based on recent local, state, national, or international epidemiologic data concerning the incidence of and risk factors for tuberculosis. The State Board of Health must approve the proposed program. The targeted testing program should be designed so that the initial step in screening is the determination of whether a person has recognized risk factors for TB and if yes, then said person should undergo a TB skin test or blood test such as the QuantiFERON®-TB Gold (QFT-G) and a clinical evaluation.[vii]

Protocol

1. All incoming students should complete a risk assessment questionnaire that will identify those who have been at increased risk for exposure to TB. The risk assessment questionnaire will identify the following risk factors of TB:

    -Persons with signs or symptoms of TB
    -Persons with medical conditions known to increase the risk for disease if infection occurs such as HIV infection, cancer of the head and neck, hematologic and reticuloendothelial diseases (e.g., leukemia and Hodgkins' disease), end stage renal disease, diabetes mellitus, other immunosuppressive therapy (e.g. TNF α antagonists, prolonged corticosteroid therapy), intestinal bypass or gastrectomy, chronic malabsorption syndromes, and low body weight.
    -Close contacts of persons known or suspected to have active TB
    -Injection drug users
    -Persons who have resided, worked or volunteered in a prison, homeless shelter, hospital, nursing home or other long term treatment facility.
    -Persons who have lived or traveled in a country other than those listed below. (This includes international students as well as U.S. citizens who have lived in these countries for more than 2 months)

Students who have one or more identified risk factors for exposure to TB should have a tuberculin skin test (TST) or blood test such as QFT-G. (See attachment A for sample questionnaire.)

The World Health Organization identifies countries of high risk for TB. However, it is easier to identify countries that are at low risk. The ACHA identifies the following countries as <u>low</u> risk:

American Region:

Canada
Jamaica
Saint Kitts and Nevis
Saint Lucia
USA
Virgin Islands (USA)

European Region:

Belgium
Denmark
Finland
France
Germany
Greece
Iceland
Ireland
Italy
Liechtenstein
Luxembourg
Malta
Monaco
Netherlands
Norway
San Marino
Sweden
Switzerland
United Kingdom

Western Pacific Region:

American Samoa
Australia
New Zealand

Note: A student with written documentation of a previous positive TST or blood test such as QFT-G does not need a repeat test. A chest radiograph should be obtained in these students. A student with a history of documented treatment for active TB disease does not need to be tested.

2. To place a TST intradermally, inject 0.1 cc of intermediate strength purified protein derivative containing 5 tuberculin units in the volar or hairless area of the forearm about 4 inches below the elbow, creating a wheal 6-10mm in size. Repeat the TST on the opposite arm or three (3) inches from original test site if the wheal created is not of adequate size.

   The TST is read between 48-72 hours by a qualified health care worker. Measure the area of INDURATION, a hard, dense, raised formation (erythema or redness does not indicate a positive reaction). The number of millimeters of INDURATION is recorded.

   If there is <5 mm of induration or no reaction at all, the test is considered negative. Always record the test results in millimeters (mm) and not as "negative".

   A reaction of ≥5 mm is a POSITIVE reaction for high risk students who are:

   • Persons with HIV infection
   • Persons who have had close contact with an infectious TB case in the past year
   • Persons who have chest radiographs with fibrotic lesions likely to represent healed TB

• Persons with organ transplants and other immunosuppressed patients (e.g. receiving the equivalent of >15mg/day prednisone for >1 month)
• Persons receiving treatment with tumor necrosis factor-alpha (TNF-α) antagonists

A reaction of ≥10 mm is classified as a POSITIVE reaction in all other high-risk students who do not meet the above criteria.

A reaction of ≥15 mm is a positive reaction in those who do not have risk factors for TB.

Many students from countries with high rates of TB have been previously vaccinated with bacillus Calmette-Guerin (**BCG**). BCG is used in many countries with a high prevalence of TB to prevent childhood tuberculous meningitis and miliary disease. BCG does not prevent infection with *M. tuberculosis*.

Despite the potential for BCG to interfere with test results, the TST or a blood test such as the QFT-G are not contraindicated for persons who have been vaccinated with BCG. The presence or size of a TST reaction in these persons does not predict whether BCG will provide any protection against TB disease. Furthermore, the size of a TST reaction in a BCG vaccinated person is not a factor in determining whether the reaction is caused by LTBI or the prior BCG vaccination.[viii]

Anergy testing among HIV-positive persons is no longer routinely recommended. The results of currently available anergy testing methods in U.S. populations have not been demonstrated to make a useful contribution to most decisions about treatment of LTBI.

3. Students with a positive test should have a chest radiograph and clinical evaluation to rule out active TB disease. Students with symptoms of TB or an abnormal chest radiograph should be referred to the local public health agency for further testing and follow-up.

4. Once active TB disease has been ruled out, treatment for LTBI may be considered. Regimens for treatment of LTBI include:

   A. **(*Preferred* regimen):** Isoniazid (INH) daily for 9 months or INH twice weekly for 9 months if given as directly observed therapy.
   • *Usual daily dose = 5 mg/kg, not to exceed 300 mg for adults.*
   • *Usual twice-weekly dose = 15 mg/kg, not to exceed 900 mg for adults.*

   B. INH daily for 6 months or INH twice weekly for 6 months if given as directly observed therapy.
   • *Usual daily dose = 5 mg/kg, not to exceed 300 mg for adults.*
   • *Usual twice-weekly dose = 15 mg/kg, not to exceed 900 mg for adults.*
   • *This regimen is not indicated for HIV-infected persons or for persons with fibrotic lesions on chest radiographs or for children.*

C. Rifampin daily for 4 months.
• *Usual daily dose = 10 mg/kg, not to exceed 600 mg for adults.*
• *This regimen is used with both HIV-negative and HIV-positive patients who cannot tolerate INH*
• *Minimum of 120 doses of rifampin administered within 6 months.*
• *Used with persons who are known to be contacts of patients with INHresistant,* rifampin-susceptible TB.

Baseline laboratory testing is not routinely indicated for all patients at the start of LTBI treatment. Baseline hepatic measurements of serum aminotransferases and bilirubin are indicated for patients whose initial evaluation suggests a liver disorder. Baseline testing is also indicated for patients with HIV infection, women who are pregnant or in the immediate postpartum period, persons with a history of liver disease (e.g., hepatitis B or C, alcoholic hepatitis or cirrhosis, persons who use alcohol regularly, and others who are at risk of chronic liver disease

Baseline laboratory testing is not routinely indicated in older persons. However, testing may be considered on an individual basis, particularly for patients who are taking other medications for chronic medical conditions. Active hepatitis and end-stage liver disease are relative contraindications to the use of INH.

During treatment of LTBI, patients should be clinically evaluated at least once a month for:

- Adherence to the prescribed regimen
- Signs and symptoms of active TB disease
- Signs and symptoms of hepatitis

Patients should be instructed to stop taking medication immediately and seek medical consultation if abdominal pain, emesis, jaundice, or other hepatitis symptoms develop.

Routine laboratory monitoring during treatment of LTBI with INH or rifampin is indicated only for those whose baseline tests suggest a liver disorder and for other persons with a risk of hepatic disease or for patients with symptoms compatible with hepatotoxicity to allow for the evaluation of possible adverse reactions that might occur during treatment.

Some evidence suggests that women, particularly black and Hispanic women, are at increased risk for fatal hepatitis associated with INH. This risk may also be increased during the postpartum period. These persons should be closely monitored for adverse reactions throughout the course of treatment.

About 10% to 20% of persons taking INH will have some mild, asymptomatic elevation of serum aminotransferase. These abnormalities tend to resolve even if INH is continued. If any of the measurements exceed three to five times the upper limit of normal or if the

patient reports symptoms of adverse reactions, the discontinuation of INH should be strongly considered.[ix]

A side effect noted of INH is peripheral neuropathy. It is dose related and is uncommon (less than 0.2%) at conventional doses. The risk is increased in persons with other conditions that may be associated with neuropathy such as nutritional deficiency, diabetes, HIV infection, renal failure, and alcoholism, as well as for pregnant and breastfeeding women. Pyridoxine supplementation (B6) 25 mg/day is recommended for patients with these conditions to help prevent this neuropathy.

Mild central nervous system (CNS) effects such as sleepiness, insomnia or headaches are common with INH and may necessitate adjustments in the timing of administration of the drug to enhance compliance. Taking medications a couple of hours after eating rather than first thing in the morning on a completely empty stomach can often eliminate nausea and gastrointestinal (GI) disturbances. Bedtime is also a good time to suggest taking INH.

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[i] Targeted Tuberculin Testing and Treatment of Latent Tuberculosis Infection, MMWR June 9, 2000 / Vol. 49 / No. RR-6

[ii] Controlling Tuberculosis in the United States. MMWR 54; RR-12; pp 46; November 4, 2005.

[iii] Trends in Tuberculosis Incidence --- United States, 2006. MMWR 56; March 23, 2007.

[iv] Targeted Tuberculin Testing and Treatment of Latent Tuberculosis Infection, MMWR June 9, 2000 / Vol. 49 / No. RR-6

[v] Targeted Tuberculin Testing and Treatment of Latent Tuberculosis Infection, MMWR June 9, 2000 / Vol. 49 / No. RR-6

[vi] American College Health Association, November 2000, Tuberculosis Screening of College and University Students.

[vii] Department of Public Health and Environment, Disease Control and Environmental Epidemiology Division, 6 CCR 1009-1, State Board of Health Rules and Regulations Pertaining to Epidemic and Communicable Disease Control.

[viii] CDC fact sheet, BCG vaccine

[ix] Core Curriculum, What the Clinician Should Know, Fourth Edition, 2000, Centers for Disease Control and Prevention