PREVENTION OF TUBERCULOSIS
IN
PERSONS ENROLLING IN
COLLEGES AND UNIVERSITIES IN CONNECTICUT

Recommendations of the
Connecticut Tuberculosis Elimination
Advisory Committee

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FORWARD

In October 1992, the Commissioner of the Department of Public Health established the Connecticut Tuberculosis Elimination Advisory Committee (TEAC)*. The TEAC has been ongoing since that time and has produced a number of recommendations to enhance tuberculosis control in Connecticut (1-3).

The purpose of the following recommendations is to set forth a consensus policy toward the prevention of tuberculosis transmission on college campuses in Connecticut and prevention of subsequent development of tuberculosis among persons who have been enrolled in degree programs in colleges in Connecticut. These recommendations are also part of a larger state strategy to gradually eliminate indigenous tuberculosis transmission in the state. They are intended to complement the American College Health Association Guidelines: Tuberculosis Screening on Campus (4).

These recommendations are particularly directed to relevant medical and administrative personnel in all colleges in Connecticut, especially those with large populations of international students.

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INTRODUCTION

BACKGROUND
General Problem of TB in Persons from High Incidence Areas of the World Who Reside in the US for Extended Time Periods

* An increasingly large percentage of all TB cases in the United States and Connecticut are in this group (>35% in US, 50% in CT).

* The absolute number of cases in this group is also increasing, especially among persons coming from areas of the world in which TB incidence is much higher than here (Asia, Central and South America, Caribbean, Africa)(5). The problem could get worse as the HIV/AIDS epidemic increasingly affects some of these areas, in particular, Asia, Central and South America.

* There is a high potential to keep this problem from growing and to try to reduce it. A total of 73% of all of Connecticut's TB cases in persons born outside the US and its territories entered the country when they were <35 years of age and, thus, would be candidates for preventive therapy if identified as having latent infection before they developed TB disease. Nearly 50% of cases are <35 years old. Because they have higher infection rates, screening persons born in high incidence countries would be more cost effective than screening persons born in the US.

* Prevention will be most effective if screening occurs as soon after arrival in the US as practical: 35% of TB cases in this group occur within 2 years of arrival to the US, 50% within 5 years of arrival (5).

* Tuberculin screening is not done as part of the admissions process for immigrants, only radiographic screening, and no screening is required of students.

* School and college-based programs have the potential to capture many such persons soon after arrival: 40-50% of all TB cases in this category are less than 23 years old when they arrive in the US.

College-specific Issues
The college/university setting is one in which there is both a high potential for TB transmission and for efforts to try to prevent it.

* Colleges tend to be highly congregate settings, both in the classroom and in residences, and thus provide special opportunities for large numbers of persons to be exposed to a person with TB. A number of college outbreaks have occurred with transmission to many other students (6).

* Most international students enter the US on student visas - there are no specific health requirements for them to reside in US for years, unlike immigrants. Many come from
countries with high TB rates and are at high risk of having latent or active TB infection. Many are also likely to stay beyond their tenure as students.

* Between 1991 and 1996, there were 9 TB cases in Connecticut college students, all foreign-born, most from Asia-India; none in persons born in US, all in colleges with bachelors and/or graduate programs; all in the 19-30 year old age range. In 1997, three more TB cases in college students were reported, including one in a community college and another in a US-born student who spent the summer in India. The estimated annual rate of TB among international students is >20/100,000, more than 4-fold higher than the rate among all persons in the US in the same age range.

* To prevent TB from occurring in college students, especially international students, there is a need to identify TB-infected students shortly after their arrival and assure that they get preventive therapy.

* All colleges in Connecticut require some form of health screening as part of their enrollment requirement and most have onsite health services with at least tuberculin screening capability. Thus, it is feasible for them to require tuberculin screening as part of the enrollment process and to assure that at least all enrollees from high risk areas of the world get it.

* The American College Health Association has recommendations for TB prevention that include screening of all international students (4).

* Resistance rates to isoniazid (INH) among TB cases that have developed after arrival in the US among persons from high incidence areas of the world are relatively low, less than 10%, making preventive therapy initiatives in them potentially highly effective (7).

Definitions

**Tuberculosis** - the state of disease caused by *Mycobacterium tuberculosis*. Persons with tuberculosis have actively multiplying TB bacilli and symptoms. If the lungs are involved and effective therapy has not been started or is not being taken, they have the potential to infect others. For purposes of these recommendations, "active" tuberculosis and "case" of tuberculosis are synonyms for tuberculosis.

**Tuberculous infection** - the state of being infected with *M. tuberculosis*. Tuberculous infection is usually manifest by a positive tuberculin skin test. A person with tuberculous infection can either have tuberculosis or latent tuberculous infection.
Latent tuberculous infection - the state of infection with *M. tuberculosis* in which TB bacilli are dormant, the infected person has no symptoms and infection is not contagious. A person with latent infection, however, is at lifetime risk of developing active tuberculosis from their latent infection unless appropriate preventive therapy is taken.

HIV infection - the state of being infected with *human immunodeficiency virus type 1*. This is usually manifest by a positive HIV antibody test and or a diagnosis of AIDS.

TB/HIV coinfection - the state of having simultaneous infection with both *M. tuberculosis* and HIV. A person with coinfection can have either tuberculosis or latent tuberculous infection. Those with latent tuberculous infection have a 7-10% risk per year of developing active tuberculosis.

International Student - a student who is not a citizen of the United States or its territories and who has entered the United States on a student visa, specifically to enroll in a US college/university.

Foreign-born Student - a student whose birthplace is other than the US and its territories, regardless of whether that student is now a citizen or has been a long-term resident of the United States. "Foreign-born students" include international students.

State Reporting Requirements

The following statutory requirements apply to reporting tuberculosis and tuberculous infection in Connecticut:

1. Tuberculosis is both physician and laboratory reportable within 12 and 48 hours of diagnosis respectively to the State Department of Public Health and to the local health department of the town of the patient's residence. Suspect cases are similarly reportable. Suspect cases include anyone on whom anti-tuberculosis therapy is empirically started pending confirmatory diagnosis and anyone on whom a positive smear for acid fast bacilli (AFB) is obtained.

2. TB/HIV coinfection is physician reportable within 48 hours of diagnosis. This includes HIV infection in cases of tuberculosis and persons with both latent tuberculous infection and HIV infection.

RECOMMENDATIONS

Based on these considerations, the CT TB Elimination Advisory Committee recommends that colleges and universities in Connecticut adopt policies and procedures to assure the

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1. *Connecticut General Statutes Sections 19a-5 and 19a-215, Public Health Code Section 19a-36. Penalty for not reporting a given case is up to $500.*
following to minimize the potential for tuberculosis transmission on college campuses and to diminish the long-term potential for tuberculosis to occur.

1. All students entering full time programs toward an associate, bachelor's, master's or doctoral degree should have an initial student health record that includes the results recorded in millimeters of induration of a tuberculin skin test using the Mantoux skin testing technique and performed in the United States within the year prior to the date of enrollment. For those students who enroll without a record of the results of a recent Mantoux tuberculin skin test, regardless of prior BCG vaccination, the university should assure that a tuberculin skin test is done within six months of enrollment. Because of their particularly high risk of having underlying tuberculous infection, special priority should be given to assuring that international and other foreign-born students from high incidence areas of the world\(^2\) get tuberculin testing during their first semester of enrollment.

2. All full and part-time health service employees should have a pre-employment tuberculin skin test. Those health service employees whose most recent result is negative should be retested annually.

3. College/university health services are encouraged to offer tuberculin screening and referral as indicated to family members accompanying full time international students.

4. College/university health services are also encouraged to perform a repeat tuberculin skin test on each student who has recently returned from living for at least 3 months outside the United States in a high TB incidence area of the world (see footnote 2). This recommendation includes international students from such areas who return to their country for at least three months.

5. All those screened for tuberculous infection who are found to have a positive tuberculin skin test as defined below should be medically evaluated to rule out active tuberculosis disease and evaluated for preventive therapy.

6. Aggressive efforts should be made to encourage all students with latent tuberculosis infection (positive skin test) to initiate and complete a standard course of preventive therapy for tuberculosis as soon after enrollment as possible, including the use of directly observed preventive therapy (DOPT) by the university health service, if feasible.

**SCREENING METHODS AND INTERPRETATION**

**Tuberculin Testing**

\(^2\) According to data from the US Centers for Disease Control and Prevention, high TB incidence areas of the world currently include all countries in Asia including India and Pakistan, Africa, Central America, South America and the Caribbean.
* All testing should be done using the Mantoux intradermal test technique using PPD (purified protein derivative). This includes testing reported as part of the enrollment process as well as testing done by the college student health service. Multiple puncture test techniques are not acceptable in this setting. Results should be recorded in millimeters of induration.

Interpretation
* An induration of \( \geq 5 \) mm should be considered indicative of TB infection (positive skin test) in any person who:
  a. is known to be HIV positive,
  b. is a recent close contact to an infectious case of tuberculosis,
  c. has a chest x-ray which shows upper lobe fibrotic lesions.

* All persons who have a tuberculin induration of 5-9 mm should be evaluated for each of the above factors.

* For persons without any of the above factors, an induration of \( \geq 10 \) mm indicates TB infection. A negative test does not necessarily rule out either latent or active tuberculosis.

BCG Vaccination
* A past history of BCG vaccination is not a contraindication to testing, nor should it be considered in the interpretation of test results. A positive skin test as defined above is more likely to represent true infection with \textit{M. tuberculosis} than a false positive reaction to BCG.

MANAGEMENT OF PERSONS WITH TUBERCULOUS INFECTION
* All persons with a positive tuberculin skin test who have not already completed a course
of anti-tuberculosis or preventive therapy should be evaluated by a specially trained student health service provider or referral physician for preventive therapy. This includes all those with positive results reported from testing occurring before their actual enrollment/employment as well as results from testing done onsite by the college student health service. Before being offered preventive therapy, each person should be evaluated for active tuberculosis and for medical contraindications to preventive therapy. Evaluation should minimally include a clinical review of systems for symptoms of active TB and acute or active liver disease, questioning for previous reactions to isoniazid, a chest radiograph, a urinalysis, and in adults, baseline liver function tests (8). Because most tuberculin positive students are likely to be international students and many will have had BCG vaccination, language and cultural barriers (including inaccurate perceptions about BCG) may be present that could interfere with their understanding of the meaning of a positive tuberculin skin test and the importance of taking preventive therapy for tuberculosis. Thus, it is important that each college identify a provider who already is/can be trained to perform such evaluations and to oversee preventive therapy.

*The usual preventive therapy regimen is isoniazid (INH). The recommended duration of INH preventive treatment is 6 to 12 months of continuous therapy.
Fewer than 10% of all persons with TB in Connecticut, including those born outside the US, have INH-resistant tuberculosis. Thus, INH remains the antibiotic of choice for preventive therapy for latent tuberculous infection in both US and foreign-born persons without a clear history of exposure to INH-resistant tuberculosis. Twelve months is recommended for persons with HIV infection and other forms of immunosuppression and for adults, including college-age students, with abnormal chest films that show fibrotic lesions likely representing old healed tuberculosis and adults with silicosis. Other infected persons should receive a minimum of 6 continuous months and 12 months, if possible. In addition to a daily dose regimen, INH can be given twice weekly at a dose of 15 mg/kg. An alternative to the 12 month regimen for adults with fibrotic lesions or silicosis is a 4-month regimen of INH and rifampin (8).

*Active efforts to assure continuity of treatment are essential to the completion of preventive therapy. Each college should have a tracking system in place for all students with tuberculous infections. Colleges with onsite student health services should consider administering daily or twice-weekly DOPT to all medically evaluated, latently TB-infected enrollees for whom there are no contraindications to preventive therapy. Any student or employee started on self-administered preventive therapy should be closely monitored by the student or employee health service in addition to being monitored by any outside health care provider who may be involved in initiating their preventive therapy. No one who is started on self-administered preventive therapy should be prescribed more than a one month supply of INH at a time.

*Persons with TB-HIV coinfection have an extraordinary risk of developing tuberculosis. They should be reported immediately to the state TB Program and local health
department as required by state law. The state TB Program has resources to provide outreach and DOPT (directly observed preventive therapy) to all persons with TB-HIV coinfection.

**RESOURCES**

* No one should be denied preventive therapy because of cost considerations. Free INH and other antituberculosis drugs can be obtained from the state TB Program (860-509-7722). For persons who have no third party coverage for TB preventive care, the state TB Program will reimburse at Medicaid rates for medical evaluation and follow-up services including chest x-rays, blood work and physician or home visits.

**TRAINING AND EVALUATION**

* The administrator of the student health service at each college should be responsible for assuring that staff who will be administering tuberculin and anergy skin tests are properly trained to place, read, record and interpret them. The state TB Program and the American Lung Association of CT have copies of the CDC video, "Tuberculin Skin Testing", which can supplement efforts to refresh staff in tuberculin skin test administration, reading and interpretation. In addition, copies of the CDC-developed "Core Curriculum on Tuberculosis" (9) with accompanying slides are similarly available for training of those who will be medically evaluating students with positive skin tests and who need tuberculosis-specific information. The American Lung Association of Connecticut can arrange for training of both college-based and contract physicians who may be involved in the medical evaluation and follow-up of tuberculin positive college students.

* Once an effort is made to adopt these recommendations, each college should evaluate the extent to which skin test results are being obtained on all full time admissions, the prevalence of positive tests, the extent to which students found to be positive are receiving appropriate evaluation, are being started on preventive therapy and are successfully completing therapy. The state TB Program is available to assist in the planning and interpretation of this type of program evaluation.

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4 Connecticut General Statutes Sections 19a-5 and 19a-215, Public Health Code Section 19a-36. Penalty for not reporting a given case is up to $500.
References
