

ACHA Guidelines

Tuberculosis Screening and Targeted Testing of College and University Students

Purpose

Screening and targeted testing for tuberculosis (TB) is a key strategy for controlling and preventing infection on college and university campuses. Early detection provides an opportunity to promote the health of affected individuals through prompt diagnosis and treatment while preventing potential spread to others. Implementation of a screening and targeted testing program not only addresses this public health concern in campus communities but also contributes to the larger public health goal of reducing the burden of TB in the United States.

The intent of this document is to provide guidelines for screening the incoming student population, targeting those at increased risk for TB testing, and to review appropriate follow-up care for students diagnosed with latent TB infection (LTBI) or TB disease.

Definitions

In this document, “screening” refers to the process of identifying persons at high risk for TB infection and disease. Screening is conducted through a questionnaire where the student identifies risk factors for TB infection and disease. “Testing” refers to the testing procedure for diagnosing LTBI, i.e., the Mantoux tuberculin skin test (TST), or the blood test interferon gamma release assay (IGRA).

Another important distinction to make is between “population” risk and “medical” risk. Populations at risk for LTBI or TB disease are identified through epidemiological and population-based studies (see Table 1). A sample screening questionnaire has been developed using population-based risk factors (see Appendix B). It is designed for use by institutions for the incoming

student population, in order to appropriately target students at risk for TB who need testing.

Medical risks refer to those factors that place an individual who is infected with TB at high risk for progressing to active disease. Typically, medical risk factors are identified in individuals by health care providers in the clinic setting and testing is performed at the discretion of the provider (see Table 1). A medical risk assessment is available in Appendix C.

Whom to Screen

All incoming students should be screened for risk factors for TB through a screening questionnaire. The United States is primarily a low-incidence country, so most U.S.-born incoming students will not have risk factors for TB and will not need TB testing. However, international students arriving from countries with an increased incidence of TB should be tested because this subpopulation has been identified epidemiologically as having a higher incidence of LTBI and is subsequently at increased risk for developing active TB disease.¹ All incoming students should be screened. Only those students with identifiable risk factors for LTBI and/or TB disease should be tested. Students with a documented previous positive test should not be retested.

High-incidence areas are defined as countries with an annual incidence of TB disease of greater than or equal to 20 cases per 100,000 population. Most countries in Africa, Asia, Central America, Eastern Europe and South America are included in this definition (see

¹ CDC. Controlling Tuberculosis in the United States: Recommendations from the American Thoracic Society, CDC, and the Infectious Diseases Society of America. *MMWR* November 2005; 54 (No. RR-12): 4-5.

Appendix A). For a current list of high-incidence and low-incidence countries, refer to the World Health Organization (WHO) database. Incoming students otherwise at low risk should not be tested for TB.

Continuing students should be tested only when their activities place them at risk for a new infection or to meet an academic programmatic requirement. While it would be welcomed, no evidence-based data exists that identifies the amount of time spent in a given high-risk country that constitutes significant exposure. Students should discuss the specific travel circumstances with a health care provider who would then determine the appropriate evaluation.

Activities that may result in increased risk may include, but are not limited to, volunteering, conducting research, mentoring, studying

abroad, traveling, visiting relatives, or employment which may involve close contact with individuals in areas with increased incidence of TB whether domestically or internationally (see Appendix A). Sponsors of these programs or health care providers caring for these students prior to the activity should inform students of this risk and recommend testing 8 to 10 weeks afterwards.

Health profession students, whether incoming or continuing, should be tested annually.

In the clinical setting, health care providers are encouraged to identify students who are at increased risk of LTBI or TB disease through screening, and to test students at risk using tuberculin skin test (TST) or interferon gamma release assays (IGRAs) as part of a routine evaluation.

TABLE 1

High-risk groups who should be tested for TB infection and/or progression to TB disease²

For Tuberculosis Infection (Population risks):

- Foreign-born persons who have immigrated within the last 5 years* from countries with high incidence of TB disease (see Appendix A)
- Persons with a history of travel** to/in areas with a high incidence of TB disease
- Persons with signs and symptoms of active TB disease
- Close contacts of a person known or suspected to have TB disease
- Employees, residents and volunteers of high-risk congregate settings (e.g., correctional facilities, nursing homes, homeless shelters, hospitals, and other health care facilities)
- Some medically underserved, low income populations as defined locally
- High-risk racial or ethnic minority populations defined locally as having an increased prevalence of TB disease
- Persons who inject illicit drugs or other groups of high-risk substance users (e.g., crack cocaine)

*future CDC updates may eliminate the 5 year time frame

**The significance of the travel exposure should be discussed with a health care provider and evaluated.

For Progression to Tuberculosis Disease (Medical risks):

- Persons with HIV/AIDS
- Persons whose TB skin tests (TSTs) have converted to positive (with ≥ 10 mm increase) within the past 2 years
- Persons with a history of inadequately treated TB, including persons with chest radiographic findings consistent with previous TB disease
- Persons who use illicit drugs or other groups of high-risk substance users
- Persons with the following medical conditions that place them at risk for disease if infection occurs: silicosis, diabetes mellitus, end stage renal disease/chronic renal failure, some hematologic disorders (e.g., leukemias and lymphomas), other malignancies (e.g., carcinoma of head, neck, or lung), low body weight $\geq 10\%$ below ideal body weight, prolonged corticosteroid use (e.g., prednisone 15 mg/d for 1 month), use of other immunosuppressive treatments (e.g., tumor necrosis factor-alpha [TNF- α] antagonists), organ transplantation, gastrectomy or jejunoileal bypass, chronic malabsorption syndromes

² Adapted from: CDC. Guidelines for preventing the transmission of *Mycobacterium tuberculosis* in health-care settings, 2005. MMWR December 2005; 54 (No. RR-17): 4-5; CDC. Core curriculum on Tuberculosis: What the clinician should know. 4th ed. Atlanta, GA: US Department of Health and Human Services, CDC, 2000; CDC. Guide for primary health care providers: Targeted tuberculin testing and treatment of latent tuberculosis infection. MMWR June 2000; 49 (No. RR-6): 7-9.

When to Screen and Test

TB screening should occur by questionnaire prior to arrival on campus in conjunction with verification of prematriculation immunization requirements. TB testing, directed at high-risk students only, should take place no sooner than 3-6 months prior to college entrance and should be completed by the second quarter/semester registration.

How to Test

Tuberculin Skin Test (TST)

At the present time, the Mantoux test is the only acceptable TST. To perform this test, inject 0.1 ml of purified protein derivative (PPD) tuberculin containing 5 tuberculin units (TU) intradermally into the volar (inner) surface of either forearm.

A history of BCG vaccination should **not** preclude tuberculin skin testing of students.

TST can be administered during pregnancy.

If a student has recently received a live virus vaccination, skin testing should be delayed for 4-6 weeks after the student received the vaccination. However, a TST can be performed on the same day as live virus administration without compromising the integrity of the result.

Two-step testing is particularly important and should be considered for the initial skin testing of persons who will be retested periodically, e.g., all health profession students, workers, and volunteers. Two-step testing is more reliable in identifying remote infection (e.g. infection in childhood). If the first test is positive, the person should be considered infected. If the first test is negative, a repeat test should be administered 1-3 weeks later. If the second test is positive, consider the person infected. If there is documentation of a negative TST within the prior 12 months, only one TST needs to be done, and this is considered the second of the two-step tests.

Interferon Gamma Release Assays (IGRAs)

At the present time, the IGRA method may be used in all circumstances in which the TST is currently used. According to the most recent published U.S. Centers for Disease Control and

Prevention (CDC) TB infection control guidelines,² the sensitivity of the IGRA method for LTBI might be less than the TST and IGRAs should be used with caution in immunocompromised patients as it has not been used extensively in this group.

In direct comparisons, the sensitivity of the IGRAs is similar to that of the TST in infected persons with culture-positive TB. The IGRAs are expected to be more specific than the TST as they will not react to BCG vaccine or to many commonly encountered nontuberculous mycobacteria.

Two-step testing is not needed with IGRAs. The effect of the live virus administration on IGRA results has not been fully investigated.

Currently, the CDC supports the use of IGRAs as an acceptable alternative to TSTs, but does not advocate using it as a confirmatory test for persons with a positive TST. It should be noted that some other countries are utilizing the IGRAs as confirmatory tests for positive TSTs.

How to Interpret the TST

The TST should be read 48 to 72 hours after injection of PPD by measuring the transverse diameter of the induration across the forearm, perpendicular to the long axis. Redness or bruising is not measured.

The results are recorded in millimeters (mm) of induration. If no induration is present, "0 mm" is recorded.

Interpretation of the TST depends on both the millimeters of induration and the factors related to risk of exposure to TB disease and risk for progression to TB disease once infected.

>5mm is positive in the following:

- recent close contacts of an individual with infectious TB disease
- persons with fibrotic changes on a prior chest x-ray, consistent with past TB disease
- organ transplant recipients
- immunosuppressed persons: taking equivalent of >15 mg/d of prednisone for >1 month; taking TNF- α antagonist.
- persons with HIV/AIDS

>10mm is positive in the following:

- persons born in a high prevalence country or who resided in one for a significant* amount of time
- history of illicit drug use
- mycobacteriology laboratory personnel
- history of resident, worker, or volunteer in high-risk congregate settings
- persons with the following clinical conditions: silicosis, diabetes mellitus, chronic renal failure, leukemias and lymphomas, head, neck, or lung cancer, low body weight (>10% below ideal), gastrectomy or intestinal bypass, chronic malabsorption syndromes

>15mm is positive in the following:

- persons with no known risk factors for TB disease

**The significance of the exposure should be discussed with a health care provider and evaluated.*

What to do When the TST or IGRA Is Positive

Persons with a positive TST or IGRA must undergo chest radiography and medical exam. If any x-ray changes or signs and symptoms of active TB are identified, active TB disease must be excluded.

If the chest x-ray and medical exam are normal, treatment for LTBI should be recommended since this greatly reduces the risk of TB infection progressing to TB disease in the student and serves to reduce the burden of TB in the U.S. Treatment is most important for those with a particularly high risk for progression from latent infection to active disease including individuals who had a TST conversion within 2 years, those with HIV/AIDS or other clinical conditions associated with suppressed immunity (see Whom To Screen). Treatment with INH daily for 9 months is the preferred regimen; however other regimens may be appropriate.³

³ Guide for Primary Health Care Providers: Targeted Tuberculin Testing and Treatment of Latent Tuberculosis Infection. www.cdc.gov/tb/pubs/LTBI/treatment.htm.

⁴ Official ATS Statement: Hepatotoxicity of Anti-tuberculosis Therapy, *Am J Respir Crit Care Med*, vol 174, pp 935 – 952, 2006.

Completion of treatment should be a high priority and should be supported by providing education in the student's primary language, insuring confidentiality, offering incentives to mark treatment milestones and case management by a culturally competent health care provider to build trust and gain buy-in.

Laboratory testing should be performed for patients who are taking treatment for LTBI to evaluate possible adverse reactions. Routine laboratory monitoring of ALT, AST, bilirubin during treatment of LTBI is indicated only for students

- with a history of liver disorder,
- with a risk of hepatic disease,
- who regularly use alcohol,
- with HIV/AIDS,
- who are pregnant or up to 3 months post-partum, or
- who are taking medications with a potential for liver toxicity.⁴

All others receiving treatment for LTBI need only monthly review of symptoms to monitor for medication side effects.

Post-treatment follow up should include providing the student documentation of TST or IGRA results, chest radiograph results, and the dosage and duration of medication treatment. Students who have completed LTBI therapy, as well as those who elected not to take therapy, should be educated regarding signs and symptoms of TB disease and instructed to seek medical care immediately upon developing any of the signs or symptoms of TB.

Additional Resources *(in addition to footnotes)*

ATS/CDC/IDSA. Treatment of Tuberculosis. *MMWR* June 2003; 52 (No.RR-11).

Francis J. Curry National Tuberculosis Center: TB Program Manual Template. (www.nationaltbcenter.edu/resources/tb_manual_template.cfm/)

Heartland National TB Center: Model Tuberculosis Prevention Program for College Campuses, June 007 Edition (www.heartlandntbc.org/products/model_tb_prevention_program_college_campuses.pdf)

APPENDIX A

Countries with Estimated or Reported Tuberculosis Incidence, 2006

(Source: World Health Organization)

For future updates, refer to www.who.int/globalatlas/dataQuery/default.asp

“High Incidence” areas are defined as areas with reported or estimated incidence of ≥ 20 cases per 100,000 population

Afghanistan, Algeria, Angola, Anguilla, Argentina, Armenia, Azerbaijan, Bahamas, Bahrain, Bangladesh, Belarus, Belize, Benin, Bhutan, Bolivia, Bosnia & Herzegovina, Botswana, Brazil, Brunei Darussalam, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, China, Columbia, Comoros, Congo, Congo DR, Cote d’Ivoire, Croatia, Djibouti, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, French Polynesia, Gabon, Gambia, Georgia, Ghana, Guam, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, India, Indonesia, Iran, Iraq, Japan, Kazakhstan, Kenya, Kiribati, Korea-DPR, Korea-Rep, Kuwait, Kyrgyzstan, Lao PDR, Latvia, Lesotho, Liberia, Lithuania, Macedonia-TFYR, Madagascar, Malawi, Malaysia, Maldives, Mali, Marshall Islands, Mauritania, Mauritius, Mexico, Micronesia, Moldova-Rep, Mongolia, Montenegro, Morocco, Mozambique, Myanmar, Namibia, Nauru, Nepal, New Caledonia, Nicaragua, Niger, Nigeria, Niue, Northern Mariana Islands, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Romania, Russian Federation, Rwanda, St. Vincent & the Grenadines, Sao Tome & Principe, Saudi Arabia, Senegal, Seychelles, Sierra Leone, Singapore, Solomon Islands, Somalia, South Africa, Spain, Sri Lanka, Sudan, Suriname, Syrian Arab Republic, Swaziland, Tajikistan, Tanzania-UR, Thailand, Timor-Leste, Togo, Tokelau, Tonga, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Wallis & Futuna Islands, West Bank & Gaza Strip, Yemen, Zambia, Zimbabwe

“Low Incidence” areas are defined as areas with reported or estimated incidence of < 20 cases per 100,000 population

Albania, America Samoa, Andorra, Antigua and Barbuda, Australia, Austria, Barbados, Belgium, Bermuda, British Virgin Islands, Canada, Cayman Islands, Chile, Cook Islands, Costa Rica, Cuba, Cyprus, Czech Republic, Denmark, Dominica, Finland, France, Germany, Greece, Grenada, Hungary, Iceland, Ireland, Israel, Italy, Jamaica, Jordan, Lebanon, Libyan Arab Jamahiriya, Luxembourg, Malta, Monaco, Montserrat, Netherlands, Netherlands Antilles, New Zealand, Norway, Puerto Rico, Saint Kitts and Nevis, St. Lucia, Samoa, San Marino, Slovakia, Slovenia, Sweden, Switzerland, Trinidad and Tobago, Turks and Caicos Islands, United Arab Emirates, United Kingdom, United States Virgin Islands, United States of America

APPENDIX B

Tool for Institutional Use to be Completed by Incoming Students

Tuberculosis (TB) Screening Questionnaire

Please answer the following questions:

- Have you ever had a positive TB skin test? Yes No
- Have you ever had close contact with anyone who was sick with TB? Yes No
- Were you born in one of the countries listed below and arrived in the U.S. within the past 5 years? * (If yes, please CIRCLE the country) Yes No
- Have you ever traveled** to/in one or more of the countries listed below? (If yes, please CHECK the country/ies) Yes No
- Have you ever been vaccinated with BCG? Yes No

*future CDC updates may eliminate the 5 year time frame

** The significance of the travel exposure should be discussed with a health care provider and evaluated.

Afghanistan	Congo DR	Kenya	New Caledonia	Sri Lanka
Algeria	Cote d'Ivoire	Kiribati	Nicaragua	Sudan
Angola	Croatia	Korea-DPR	Niger	Suriname
Anguilla	Djibouti	Korea-Republic	Nigeria	Syrian Arab Republic
Argentina	Dominican Republic	Kuwait	Niue	Swaziland
Armenia	Ecuador	Kyrgyzstan	N. Mariana Islands	Tajikistan
Azerbaijan	Egypt	Lao PDR	Pakistan	Tanzania-UR
Bahamas	El Salvador	Latvia	Palau	Thailand
Bahrain	Equatorial Guinea	Lesotho	Panama	Timor-Leste
Bangladesh	Eritrea	Liberia	Papua New Guinea	Togo
Belarus	Estonia	Lithuania	Paraguay	Tokelau
Belize	Ethiopia	Macedonia-TFYR	Peru	Tonga
Benin	Fiji	Madagascar	Philippines	Tunisia
Bhutan	French Polynesia	Malawi	Poland	Turkey
Bolivia	Gabon	Malaysia	Portugal	Turkmenistan
Bosnia & Herzegovina	Gambia	Maldives	Qatar	Tuvalu
Botswana	Georgia	Mali	Romania	Uganda
Brazil	Ghana	Marshall Islands	Russian Federation	Ukraine
Brunei Darussalam	Guam	Mauritania	Rwanda	Uruguay
Bulgaria	Guatemala	Mauritius	St. Vincent &	Uzbekistan
Burkina Faso	Guinea	Mexico	The Grenadines	Vanuatu
Burundi	Guinea-Bissau	Micronesia	Sao Tome & Principe	Venezuela
Cambodia	Guyana	Moldova-Rep.	Saudi Arabia	Viet Nam
Cameroon	Haiti	Mongolia	Senegal	Wallis & Futuna Islands
Cape Verde	Honduras	Montenegro	Seychelles	W. Bank & Gaza Strip
Central African Rep.	India	Morocco	Sierra Leone	Yemen
Chad	Indonesia	Mozambique	Singapore	Zambia
China	Iran	Myanmar	Solomon Islands	Zimbabwe
Colombia	Iraq	Namibia	Somalia	
Comoros	Japan	Nauru	South Africa	
Congo	Kazakhstan	Nepal	Spain	

Source: World Health Organization Global Tuberculosis Control, WHO Report 2006, Countries with Tuberculosis incidence rates of ≥ 20 cases per 100,000 population. For future updates, refer to www.who.int/globalatlas/dataQuery/default.asp

If the answer is YES to any of the above questions, [insert your college/university name] requires that a health care provider complete a tuberculosis risk assessment (to be completed within 6 months prior to the start of classes).

If the answer to all of the above questions is NO, no further testing or further action is required.

3. Interferon Gamma Release Assay (IGRA)

Date Obtained: ___/___/___ (specify method) QFT-G QFT-GIT other ___
M D Y

Result: Negative ___ Positive ___ Intermediate ___

Date Obtained: ___/___/___ (specify method) QFT-G QFT-GIT other ___
M D Y

Result: Negative ___ Positive ___ Intermediate ___

4. Chest x-ray: (Required if TST or IGRA is positive)

Date of chest x-ray: ___/___/___ Result: normal ___ abnormal ___
M D Y

**Interpretation guidelines

>5 mm is positive:

- Recent close contacts of an individual with infectious TB
- Persons with fibrotic changes on a prior chest x-ray consistent with past TB disease
- Organ transplant recipients
- Immunosuppressed persons: taking > 15 mg/d of prednisone for > 1 month; taking a TNF- α antagonist
- Persons with HIV/AIDS

>10 mm is positive:

- Persons born in a high prevalence country or who resided in one for a significant* amount of time
- History of illicit drug use
- Mycobacteriology laboratory personnel
- History of resident, worker or volunteer in high-risk congregate settings
- Persons with the following clinical conditions: silicosis, diabetes mellitus, chronic renal failure, leukemias and lymphomas, head, neck or lung cancer, low body weight (>10% below ideal), gastrectomy or intestinal bypass, chronic malabsorption syndromes

>15 mm is positive:


- Persons with no known risk factors for TB disease

**The significance of the exposure should be discussed with a health care provider and evaluated.*

END of SAMPLE FORM

If reproduced for use by a college or university health center, please insert your health center's contact information.
This form should not be returned to ACHA.

Prepared by ACHA's Tuberculosis Guidelines Task Force

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