



Targeted Tuberculin Skin Testing and Treatment of Latent Tuberculosis Infection in Children and Adolescents:

FREQUENTLY ASKED QUESTIONS

Charles P. Felton National Tuberculosis Center
Samuel L. Kountz Pavilion
15 West 136th Street, 6th Floor
New York, NY 10037
telephone: 212-939-8254
fax: 212-939-8259
Website: <http://www.harlemtbcenter.org>





**Targeted Tuberculin Skin
Testing and Treatment of
Latent Tuberculosis Infection
in Children and Adolescents:**

**FREQUENTLY
ASKED
QUESTIONS**

ACKNOWLEDGEMENTS

The impetus for this document is ***Targeted Tuberculin Skin Testing and Treatment of Latent Tuberculosis Infection in Children and Adolescents***, Supplement to *PEDIATRICS*, Volume 114, Number 4, October, 2004, edited by Lisa Saiman, MD, MPH, Columbia University, New York, NY. The June 6-7, 2002 symposium, the efforts of the writing group, and the publication of the Supplement were sponsored by the Charles P. Felton National Tuberculosis Center at Harlem Hospital and funded by the Centers for Disease Control and Prevention.

This FAQ booklet was developed by Khadija Y. DeLoaché, MA of the Charles P. Felton National Tuberculosis Center at Harlem Hospital and Lisa-Gaye Robinson, MD of the Division of Pediatrics, Harlem Hospital.

A special note of appreciation is extended to Bill Bower, MPH and Paul Colson, PhD of the Charles P. Felton National Tuberculosis Center at Harlem Hospital, Wafaa El-Sadr, MD, MPH of Harlem Hospital, and Juyan Julia Zhou, MPH, MS of the College of Physicians and Surgeons, Columbia University. Thank you to the New York City Department of Health and Mental Hygiene, Bureau of Tuberculosis Control for their encouragement and support with this project.

The Charles P. Felton National Tuberculosis Center is a joint project of Harlem Hospital, Columbia University, Health & Hospitals Corporation, and the New York City Department of Health and Mental Hygiene, funded by the Centers for Disease Control and Prevention.

All material in this document is in the public domain and may be used and reprinted without special permission; citation as to source, however, is appreciated.

Suggested citation:

*Charles P. Felton National Tuberculosis Center
Targeted Tuberculin Skin Testing and Treatment of Latent Tuberculosis Infection
in Children and Adolescents: Frequently Asked Questions*

This document is available through the:

Charles P. Felton National Tuberculosis Center at Harlem Hospital
Samuel L. Kountz Pavilion, 15 W 136th Street, 6th Floor
New York, NY 10037
Tel: 212-939-8258 — Fax: 212-939-8259
Website: <http://www.harlemtbcenter.org>

Graphic design: Judith Rew

INTRODUCTION

Based on the October, 2004 Supplement to *Pediatrics*, ***Targeted Tuberculin Skin Testing and Treatment of Latent Tuberculosis Infection in Children and Adolescents***, this document responds to common questions from pediatricians who have attended slide presentations on this subject. We hope that it will answer concerns that arise from your everyday clinical practice as a pediatric healthcare provider. Please refer to the original supplement for in depth answers to these and other questions you may have.

In addition, you may be interested in the companion Continuing Education Curriculum and/or Slide Set by the same title to obtain CME, CNE or CEU credits, or the card or poster on risk assessment. A copy of the card is on the inside back cover of this booklet.

LIST OF ABBREVIATIONS

AAP	American Academy of Pediatrics
AIDS	acquired immunodeficiency syndrome
ATS	American Thoracic Society
BCG	bacillus Calmette-Guérin
CDC	Centers for Disease Control and Prevention
CT	computerized tomography
DOT	directly observed therapy
DTH	delayed-type hypersensitivity
ELISPOT®	enzyme linked immunospot
ESAT-6	early secreted antigenic target 6-kDa
HAART	highly active anti-retroviral therapy
HIV	human immunodeficiency virus
HRCT	high-resolution computerized tomography
IFN-g	interferon-gamma
INH	isoniazid
IUATLD	International Union against Tuberculosis and Lung Disease
LTBI	latent tuberculosis infection
MDR	multidrug-resistant
MPT	multiple puncture tests
NTM	nontuberculous mycobacteria
PPD	purified protein derivative
QFT	QuantiFERON®-TB
TB	tuberculosis
TNF	tumor necrosis factor
TST	tuberculin skin test
TU	tuberculin units
USPHS	United States Public Health Service

TARGETED TESTING

Why should I use a risk factor questionnaire?

Several recent studies have assessed risk factors for LTBI in pediatric populations and provided further justification for targeted tuberculin skin testing. Rather than the use of a TST as a screening tool, these studies have promoted the use of a questionnaire as a screening tool. While these studies assessed different populations, there were marked similarities in their findings. Targeted tuberculin skin testing using the risk factor questionnaire should dramatically reduce testing of children at low risk for LTBI and TB — and further improve the positive predictive value of TSTs.

What are the questions to ask?

1. Was the child born outside the U.S.?
2. Has the child traveled outside the U.S.?
3. Has the child been exposed to anyone with TB disease?
4. Does the child have close contact with a person who has a positive TB skin test?

What is the definition of a high-risk adult?

Past recommendations have suggested that exposure to adults at high risk of TB disease places a child at increased risk for LTBI and TB disease. However, few studies have characterized the magnitude of risk. More research is needed, as the definition of a high-risk adult varies from population to population. Some studies have validated the use of the following questions, depending on local TB epidemiology:

- Does the child spend time with anyone who has been in jail, prison, shelter, who uses illegal drugs, or has HIV?
- Has the child ever had raw milk or unpasteurized cheese?
- Is the child exposed to a household member who was born or has traveled outside the U.S.?

When is a TST indicated?

If any risk factors are present (a YES answer), plant a TST.

If answers to all questions are NO, a TST is not indicated.

What should I do in the case of children who are internationally adopted?

For over a decade the unique medical needs of internationally adopted children have been recognized, as these children are at risk for infectious diseases acquired in their countries of origin.

As the primary countries of origin have changed, the prevalence of prior BCG immunization, and possible exposure to TB disease (e.g., in orphanages) has increased. In addition, during the 1990s the rates of TB disease rose worldwide. TB disease is far less common than LTBI among internationally adopted children. Risk factors should be assessed on an individual basis in order to determine the need for placement of a TST.

Will I continue school-based screening for LTBI in children and adolescents?

Routine placement of TSTs at school entry has been used as an opportunity to screen children and adolescents for TB disease and LTBI. It has been recommended that only foreign-born students from countries with high case rates of TB be targeted for assessment for LTBI by tuberculin skin testing.

The data suggest that in some communities middle school and high school may be ideal settings to screen and test adolescents for LTBI due to the higher prevalence of infection. To be effective, a risk factor questionnaire should consider local TB epidemiology. The increased risk of developing reactivation and infectious TB among adolescents also makes school-based screening, targeted testing, and treatment are considered necessary.

How will associate investigations as a targeted tuberculin skin testing strategy be performed?

Associate investigations are traditionally performed by health departments, whereby the close contacts of children with LTBI (i.e., their associates) are tested to detect undiagnosed cases of infectious TB. However, associate investigations may detect greater numbers of associates with LTBI and thus may be considered a form of targeted testing for LTBI. The AAP currently recommends that the associates of children with a positive TST undergo tuberculin skin testing.

In general, most health departments perform associate investigations for children under 4 years of age with LTBI because young children are likely to have been recently infected and have a limited number of associates. This theoretically makes the likelihood of finding an active case of TB among their associates high.

Among high-risk populations, e.g., foreign-born persons, associate investigations can identify associates with a high prevalence of LTBI. Some health districts have further refined associate investigations by targeting efforts to non-BCG immunized children. These strategies may also enhance efforts to detect new cases of TB disease. The cost-effectiveness of associate investigations compared with other methods of targeted testing has not been studied.

What underlying medical conditions and concomitant medications increase the risk of progression to TB disease in a person infected with *M. tuberculosis*?

Several medical conditions and concomitant medications increase the risk of progression to TB disease in persons infected with *M. tuberculosis*. Thus, children and adolescents with such conditions or receiving such medications are candidates for LTBI screening. These medical conditions include HIV infection, diabetes, organ transplantation, chronic renal failure, and malignancies. The use of high dose steroids, chemotherapy, or agents with activity against tumor necrosis factor (TNF- α), e.g., infliximab (Remicade®) has also been associated with progression to TB disease. While the published reports linking TNF- α antagonists with active TB have been in adults, these agents are being increasingly used for the treatment of joint, skin, and gastrointestinal diseases in pediatric patients. The manufacturers of these agents recommend assessing patients for LTBI prior to use.

There are few published reports evaluating the risk of progression to TB disease in children and adolescents with LTBI who are receiving inhaled corticosteroids. However, the reports described a limited number of children followed for a relatively short period of time. Thus, larger studies with longer follow-up are needed.

Children receiving medical treatments or recently diagnosed with conditions known to predispose adults to progression to TB disease should have a TST and begin treatment immediately if LTBI is diagnosed.

DIAGNOSIS OF LATENT TB INFECTION

Is the tuberculin skin test (TST) the standard of diagnosis for LTBI?

Currently, a TST is the recommended method of identifying latent infection with *M. tuberculosis* in children and adolescents. The principle underlying the TST is the delayed-type hypersensitivity (DTH) reaction induced by the antigenic components of *M. tuberculosis*. However, it is important to recognize the limitations of the TST to maximize its usefulness in clinical practice. For discussion of new assays to diagnose LTBI, see page 15.

What is the Mantoux method for administration of TST?

The recommended TST is administration of the standardized PPD by the Mantoux method in which 0.1 ml of 5 TU of PPD tuberculin is injected intradermally to form a wheal approximately 6-10 mm in diameter. Other concentrations (1 or 250 TU per dose) are not well standardized, less sensitive and specific, and not recommended. Two tuberculin PPD preparations, *Aplisol*® and *Tubersol*®, are available in the U.S.

What is the delayed type of hypersensitivity (DTH) reaction?

DTH reaction to a TST manifests as an indurated area at the site of the intradermal injection and usually begins within 5-6 hours of administration of the PPD as previously sensitized lymphocytes, monocytes and macrophages infiltrate the site. The DTH reaches a maximum size by 48-72 hours and subsides over the subsequent few days. Proper reading of the TST includes measuring and recording the diameter of the area of *induration* in millimeters 48-72 hours after TST placement. An immediate wheal and flare reaction may occur, but usually disappears by 24 hours and should not be interpreted as a positive reaction to a TST. Rarely, the immediate reaction may be severe and experts suggest that it may be prudent not to retest such individuals.

When and how should a TST be measured?

The induration only should be measured. A negative TST should be recorded in millimeters, e.g., 00 mm, and not as “negative”. TSTs read after 72 hours of placement can underestimate the size of the initial DTH response and if the TST is < 10 mm, it should be repeated immediately.

What about using multiple puncture tests?

Multiple-puncture tests (MPTs), e.g., Tine, Aplitest, Mono-Vacc Test, and the Heaf test, introduce tuberculin antigen into the skin via prongs coated with dried tuberculin or puncture the skin through a liquid film of tuberculin. There are several limitations associated with MPTs including: [1] The amount of antigen introduced is not precise and reaction sizes are not standardized. [2] All potentially positive reactions must be followed by a Mantoux test, which increases cost and complexity of follow-up and prolongs the time until diagnosis and treatment. [3] MPTs may increase the potential for boosting. [4] MPTs have greater variability of sensitivity and specificity than the Mantoux method. [5] The practice of allowing parents to interpret MPTs in non-healthcare settings further diminishes the accuracy of the test.

What are the sensitivity and specificity of the Tuberculin Skin Test?

Unfortunately, there is no “gold standard” to diagnose LTBI. Thus, the sensitivity and specificity of the TST are difficult to calculate. The estimated sensitivity of currently available TSTs is based on the use of these tests in patients with TB disease and ranges from 80%-96%. Approximately 10% of immunocompetent children with TB disease have a negative TST. False negative and false positive TST may be caused by several factors.*

What are the factors associated with False Negative TSTs?

I. Active infections

TB disease, measles, and varicella may temporarily suppress the DTH response to a TST. Upper respiratory infections are not known to influence the DTH response to a TST. *

2. Live attenuated vaccines

Live attenuated vaccines such as measles, mumps, rubella, varicella, oral polio, BCG, and oral typhoid (TY21a) may temporarily suppress the DTH response to a TST. If the TST is indicated after a live attenuated vaccine, it will likely be most accurate if 6 weeks has passed since vaccine administration.*

*Additional information with data on specific studies related to this topic are included in the Supplement *Targeted Tuberculin Skin Testing and Treatment of Latent Tuberculosis Infection in Children and Adolescents, Pediatrics*, October, 2004.

How do corticosteroids affect the size of a TST reaction and the progression of LTBI to TB disease?

Corticosteroids may affect both the size of a TST reaction and the progression of LTBI to TB disease. In adults, 15 mg or more of daily prednisone may cause suppression of previously positive TSTs, but the exact risk is unknown. However, the dose, dosing frequency, and length of treatment with corticosteroids that confer risk for a false negative TST have not been defined for children and adolescents.

Does the CDC recommend anergy testing?

“Control” skin test antigens such as *Candida*, mumps vaccine, diphtheria or tetanus toxoid have been employed to assess a patient’s ability to mount a (DTH) response. This strategy attempted to improve the detection of a false negative TST reaction, particularly among HIV-infected individuals with low CD4 lymphocyte counts. However, the use of control skin test antigens has several limitations and is not recommended by the CDC as routine practice. [1] The antigens administered and the reproducibility of the DTH has not been standardized. [2] The diagnosis of anergy has not been associated with a high risk of developing TB disease. [3] Finally, no demonstrable benefit from empiric INH therapy to prevent TB disease has been noted for anergic HIV-infected persons.

What if the child had a previous BCG immunization?

Children born in countries with high case rates of TB disease are likely to have received BCG immunization in infancy. The World Health Organization estimates that 79% of the world’s population has received BCG vaccine. Twenty-two countries account for 80% of the world’s TB cases and include: India, China, Indonesia, Bangladesh, Nigeria, Pakistan, South Africa, the Philippines, Russia, Ethiopia, Kenya, DR Congo, Vietnam, UR Tanzania, Brazil, Thailand, Zimbabwe, Cambodia, Myanmar, Uganda, Afghanistan and Mozambique (www.who.int/gtb/Country_info/index.htm).

These nations recommend vaccination of children with BCG at birth and some countries, e.g., Brazil and Russia, revaccinate children during the school years. Mexico requires all children to receive BCG once between birth and 14 years of age, and the majority of children receive BCG by 5 years of age. Thus, the impact of previous BCG immunization on TSTs is of great interest to pediatric healthcare providers in the U.S. caring for foreign-born children.

Numerous studies have assessed the relationship between the BCG immunization and size of TST reaction to determine the extent of false positive reactions associated with BCG vaccine. Multiple studies assessed the size of a *single* TST reaction after a single BCG immunization. No significant effect of BCG immunization as a risk factor for LTBI was noted among children in New York, Northern Brazil, Uganda, and Botswana, but the numbers of children in these studies were modest as only a few hundred children per study were assessed. Larger surveys conducted in Malawi and Tanzania consisted of over 50,000 children, and found a higher prevalence of positive TSTs (≥ 10 mm) in children with a BCG scar when compared to children without a scar. It is somewhat difficult to compare these studies as [1] different methods were used to document BCG immunization, including immunization records and the presence of scars, [2] different vaccine strains and doses were administered, and [3] different TST methods were used.

In summary, BCG immunization has a variable affect on TSTs. A minority of vaccinated children has a TST > 10 mm and older children are more likely to have a positive TST suggesting the cumulative effect of exposure to TB disease and the risk of acquiring LTBI. Children who receive BCG after infancy or those who receive more than one BCG immunization also have an increased rate of positive TSTs. BCG immunization, especially if more than one BCG vaccination is given, is associated with boosting of the DTH response to TST. Unfortunately, reactivity from BCG cannot be distinguished from reactivity from true infection with *M. tuberculosis*, but data support the conclusion that children from countries with high case rates of TB disease are more likely to have a positive TST from LTBI than from BCG immunization.

What are the effects of nontuberculous in Mycobacterium on a TST reaction?

Over 200 *M. tuberculosis* antigens are found in the precipitates of PPD preparations. Many of these antigens are common to *M. bovis*, BCG, and nontuberculous Mycobacteria (NTM), e.g., *M. avium*, *M. intracellulare*, *M. fortuitum*, *M. abscessus* and *M. kansasii*, which can result in cross-reactivity and “false positive” reactions to TSTs. However, a true positive TST can result from disease caused by *M. bovis*.

Are there any other factors associated with a false positive TST?

Other than previous BCG vaccine and exposure to NTM, the factors known to cause a false positive TST are transfusion with whole blood from donors with known positive TST, an inexperienced or biased reader, or interpretive errors.

What is the “boosting effect”?

Over time, the DTH reaction response to mycobacterial antigens may wane, and thus a TST could be negative. However, with subsequent TSTs the DTH response may be stimulated by PPD and result in a positive reaction. Such a reaction can be misinterpreted as a recent TST conversion. This phenomenon is known as boosting, i.e., an increase in TST size caused by repetitive TSTs in an individual previously sensitized to mycobacterial antigens, particularly BCG and NTM. Boosting is minimized if TSTs are placed less than a week apart. However, if a person has not been infected with mycobacterial antigens, boosting will not occur.

How is the positive predictive value of the TST influenced?

The positive predictive value of the TST is influenced by the specificity of the test and the prevalence of *true* LTBI in the population being tested. The lower the prevalence of LTBI in a given population or the higher the prevalence of exposure to NTM or BCG vaccine, the more false positive TSTs will occur. This results in lower specificity and lower positive predictive value. Conversely, the positive predictive value of a TST is high when the prevalence of LTBI is high, such as among contacts of a case of TB disease.

The use of three cut-off levels (≥ 5 mm, ≥ 10 mm, ≥ 15 mm) to define a positive TST in different populations improves the positive predictive value of a TST. Thus, the definition of a positive TST depends on risk factors present in the individual being tested. The interpretation of a TST is stratified based on the mm of induration.

A smaller TST (≥ 5 mm) is interpreted as positive in children in whom the risk of LTBI (or TB disease) is higher. This lower cut-off level yields a higher sensitivity of the TST (i.e., fewer false negatives). Conversely, in children at lower risk for LTBI or TB disease, a larger cut-off level improves specificity, by reducing the number of false positive interpretations. Notably, California only uses two cut-off levels (≥ 5 mm or ≥ 10 mm). www.ctca.org/guideline/combined%20ltbl%20guide2002.pdf) Targeted tuberculin skin testing using the risk factor questionnaire should dramatically reduce testing of children at low risk for LTBI and TB — and further improve the positive predictive value of TSTs.

Who should administer and interpret a TST?

Several studies have emphasized that trained healthcare professionals must place, read and interpret TSTs. Laypersons and untrained healthcare workers frequently misinterpret TSTs. Only trained healthcare workers should plant, read, and interpret a TST.

What are the treatment regimens for LTBI in children and adolescents?

Treatment of LTBI with 9 months of daily isoniazid (INH) remains the recommended regimen for children and adolescents without a known source case or with a source case whose *M. tuberculosis* isolate is susceptible to INH.

Intermittent (twice-weekly or thrice-weekly) regimens are acceptable if these regimens are administered using a directly observed therapy (DOT) program.

Daily rifampin for 6 months is a suitable alternative for patients with LTBI who have been exposed to a source case whose isolate is resistant to INH, but susceptible to rifampin, or those who cannot tolerate INH.

Shorter course regimens with rifampin and pyrazinamide are *not* recommended due to hepatotoxicity observed in adults and the lack of clinical data in children.

Treatment of children and adolescents exposed to a source case with a multi-drug resistant (MDR) *M. tuberculosis* strain should be in consultation with an expert in the management of children with MDR-TB using DOT.

What are the toxicities associated with INH?

In general, INH is very well tolerated by children and adolescents. However, potential toxicities are hepatitis, neurological complaints including peripheral neuropathy, and gastrointestinal disturbances.

What about hepatotoxicity?

Three types of hepatotoxicity can occur secondary to INH. These include: [1] most commonly, an asymptomatic, transient elevation of transaminases, [2] a relatively rare clinical hepatitis that resolves when INH is discontinued, [3] and a very rare, fulminant hepatitis and liver failure leading to death or liver transplant.

The risk of hepatitis increases with age. In *adults*, the risk of elevated liver function tests secondary to INH is estimated to be 10-20%, the risk of clinical hepatitis is 1%, and the risk of death from hepatic failure is 0.1% overall. Severe effects are more likely in women and in individuals continuing to take INH despite the development of symptoms of hepatotoxicity. Children and adolescents receiving INH for treatment of LTBI are at decreased risk of developing hepatitis when compared with adults. While transient elevations of transaminases can occur in children and adolescents receiving INH, clinical hepatitis and fulminant hepatitis are rare.

How should a child be assessed for potential hepatitis?

Children and adolescents who are being assessed for treatment of LTBI with INH should have a history and physical examination performed to elicit risk factors for potential hepatitis secondary to INH.

What about hypersensitivity reactions to INH?

Skin rashes including maculopapular or morbilliform rashes can occur secondary to INH. Discontinuing the drug and re-challenging may clarify the etiology of the skin rash as INH-related. Fevers, pruritis, arthralgias secondary to INH have also been described.

How is QuantiFERON used to test for LTBI?

QuantiFERON® -TB QFT (Cellestis Limited, Carnegie, Victoria, Australia) is an FDA-approved diagnostic test for *M. tuberculosis* that quantifies interferon-gamma (IFN-g) released by sensitized lymphocytes. Whole blood containing lymphocytes is incubated with proteins from *M. tuberculosis*, *M. avium*, and control antigens. Following exposure to *M. tuberculosis* complex, lymphocytes that have been sensitized release IFN-g that can be quantified. This assay is approved for use in adults. Guidelines for using QFT for diagnosing LTBI in adults were published by the CDC in December 2002.

In December 2004, QuantiFERON® -TB Gold was approved by the FDA. This test uses antigens that are more specific for *M. tb* complex, but are not found in BCG strains and most non-tuberculous mycobacteria (NTM). This makes the test much more useful in clinical practice, as it can be used in any high risk population. Exclusions have been removed for contacts and TB suspects. However, there is still little data in children and immunosuppressed individuals.

How is Elispot used to test for LTBI?

ELISPOT (enzyme linked immunospot) is an investigational immunoassay that detects IFN-g molecules secreted by ESAT-6 specific T cells. ESAT-6 is a secreted antigen specifically expressed by *M. tuberculosis* complex, but absent in strains of *M. bovis* BCG vaccine and most NTM.

Are there any guidelines for these assays for children and adolescents?

These newer diagnostic assays show great promise and can differentiate T-cell response to *M. tuberculosis*, NTM, or BCG. Second generation Quantiferon tests are currently being evaluated and may prove more specific than the currently approved assays. There are no published studies in children to date.

REFERENCES

American Academy of Pediatrics. Tuberculosis. *Red Book: 2003 Report of the Committee on Infectious Diseases*. Elk Grove Village, IL, Plickering LK, ed: 2003; 642-660.

Centers for Disease Control and Prevention. "Management of persons exposed to multidrug-resistant tuberculosis." *MMWR Recomm Rep* 1992; 41(RR-11): 61-71.

Centers for Disease Control and Prevention. "General recommendations on immunization. Recommendations of the Advisory Committee on Immunization Practices (ACIP)." *MMWR Recomm Rep* 1994; 43(RR-1): 1-38.

Centers for Disease Control and Prevention. "Guidelines for preventing the transmission of Mycobacterium tuberculosis in health-care facilities, 1994." *MMWR Recomm Rep* 1994; 43(RR-13): 1-132.

Centers for Disease Control and Prevention. Reported tuberculosis in the United States, 1993. Atlanta, GA, U.S. Department of Health and Human Services. 1994.

Centers for Disease Control and Prevention. "Essential components of a tuberculosis prevention and control program. Recommendations of the Advisory Council for the Elimination of Tuberculosis." *MMWR Recomm Rep* 1995; 44(RR-11): 1-16.

Centers for Disease Control and Prevention. "Anergy skin testing and tuberculosis [corrected] preventive therapy for HIV-infected persons: revised recommendations." *MMWR Recomm Rep* 1997; 46(RR-15): 1-10.

Centers for Disease Control and Prevention. "Prevention and treatment of tuberculosis among patients infected with human immunodeficiency virus: principles of therapy and revised recommendations." *MMWR Recomm Rep* 1998; 47(RR-20): 1-58.

Centers for Disease Control and Prevention. "Update: fatal and severe liver Injuries associated with rifampin and pyrazinamide for latent tuberculosis infection, and revisions in American Thoracic Society/CDC Recommendations – United States, 2001." *MMWR* 2001; 50(34): 733-735.

Centers for Disease Control and Prevention. *Reported tuberculosis in the United States, 2001*. Atlanta, GA, U.S. Department of Health and Human Services. 2002.

Centers for Disease Control and Prevention. "Update: adverse event data and revised American Thoracic Society/CDC recommendations against the use of rifampin and pyrazinamide for treatment of latent tuberculosis infection — United States, 2003." *MMWR* 2003; 52(31): 735-739.

Saiman, L. et al. *Targeted Tuberculin Skin Testing and Treatment of Latent Tuberculosis Infection in Children and Adolescents*, Suppl. Pediatrics, Oct. 2004.

The following websites and educational materials describe proper administration and reading of TST:

www.cdc.gov/nchstp/tb/pubs/slidesets/core/Chapter4/test8.htm

www2.cdc.gov/nchstp_od/piweb/tborderform.asp

www.umdj.edu/ntbcweb/pr_frame.html

POCKET CARD

Screening Children & Adolescents for LTBI

Use a Risk Factor Questionnaire, Not A Needle!

Test for latent TB infection (LTBI) with a TST (Tuberculin Skin Test) **only if risk factors are present**.

- If any risk factors are present (a YES answer), **Plant a TST**.
- If answers to all questions are NO, a TST is not indicated.

1. Was the child born outside the U.S.?

If yes then ask:

- Where was the child born?

If the child was born in Africa, Asia, Latin America, or Eastern Europe, **Plant a TST**.

2. Has the child traveled outside the U.S.?

If yes, then ask:

- Where did the child travel?
- With whom did the child stay?
- How long did the child stay?

If the child stayed with friends or family members in Africa, Asia, Latin America, or Eastern Europe, for 1 week or more (cumulatively), **Plant a TST**.

3. Has the child been exposed to anyone with TB disease?

If yes, then determine if the person had TB disease or LTBI.

- When did the exposure occur?
- What was the nature of the contact?

If confirmed that the child has been exposed to someone with suspected or known TB disease,

Plant a TST and notify local health department as per local reporting guidelines.

4. Does the child have close contact with a person who has a positive TB skin test?

If yes, see Question 3 follow-up questions.

Also ask the following questions depending on the TB epidemiology in your area:

- Does the child spend time with anyone who has been in jail, prison, shelter, who uses illegal drugs, or has HIV?
- Has the child ever had raw milk or unpasteurized cheese?
- Is the child exposed to a household member who was born or has traveled outside the U.S.?

Based on Targeted Tuberculin Skin Testing and Treatment of Latent Tuberculosis Infection in Children and Adolescents, Supplement to *Pediatrics*, October, 2004.

