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Tuberculosis Is a Pediatric Issue

We should not let the declining rate of tuberculosis in the United States lull us into missing opportunities for identifying and treating children who have latent infection or are at risk for the disease.

Happily, the tuberculosis rate in 2006 was the lowest recorded since national reporting began in 1953. The 13,767 reported cases last year, or 4.6 per 100,000 population, represents a 3.2% decline from the rate in 2005. However, the rate of decline in TB has slowed since 2000. From 1993 through 2000, the average annual percentage decline in TB incidence was 7.3% per year. Since 2000, that rate has been just 3.8% per year, according to the latest data from the Centers for Disease Control and Prevention (MMWR 2007;56:245-50).

Trends among children have been similar. In 2005, the latest year for which age-specific data are available, there were 863 cases among children aged 0-14 years, a rate of 1.4 per 100,000. Among those aged 15-24 years, the 1,542 cases represented a rate of 3.7 per 100,000. Both rates were slightly lower than in 2004 (1.6 and 3.8 per 100,000, respectively), and significantly less than the 2.9 and 5.0 rates seen in 1993. But, as with the entire population, the decline has slowed among children, too.

Although the highest rates of TB in the United States are still among ethnic minorities in large urban areas, the disease is not limited to those populations. The proportion of TB cases among foreign-born individuals has increased each year since 1993; such cases now account for about one-fourth of all TB cases. In 2006, 56% of those were from five countries: Mexico, the Philippines, Vietnam, India, and China. Most of the foreign-born individuals in the United States who progress from latent TB infection to TB disease became infected while abroad. These cases represent immigrants, internationally adopted children from countries with high TB rates, and children exposed during foreign travel.

For physicians in the United States who provide primary care for children, identifying children who are at risk for TB is critical. In 2004, the American Academy of Pediatrics (AAP), the American Thoracic Society (ATS), and the CDC issued a comprehensive set of guidelines we all should follow, entitled "Targeted Tuberculin Skin Testing and Treatment of Latent Tuberculosis Infection in Children and Adolescents" (Pediatrics 2004;114:1175).

The three organizations' Pediatric Tuberculosis Collaborative Group recommended four questions to be asked about every patient:

► Was the child born outside the United States? (If yes, ask in which country. If the child was born in Africa, Asia, Latin America, or Eastern Europe, place a tuberculin skin test [TST]).

► Has the child traveled outside the United States? (If yes, ask where. If the child stayed with friends or family in any of the above-mentioned areas for a week or longer, place a TST test.)

► Has the child been exposed to anyone with TB disease? (If yes, a series of questions should follow to determine if the person had TB or latent disease, when the exposure occurred, and the nature of the contact. If exposure is confirmed, place a TST test. If the child has been in contact with someone who has TB disease, notify local health authorities and consult with an infectious disease specialist.)

► Does the child have close contact with a person who has a positive TB skin test? (Ask the same follow-up questions as in the preceding.)

The only TB test now recommended is the intradermal injection of 5 tuberculin units of purified protein derivative from *Mycobacterium tuberculosis* administered by the Mantoux technique.

The AAP/ATC/CDC guidelines define positive TST results in children and adolescents using three cutoff levels for the transverse diameter of the reaction: less than or equal to 5 mm, 10 mm, and 15 mm.

The 5-mm cutoff is used for children at high risk, including those in close contact with TB cases, those with positive findings on chest radiograph, or those with clinical evidence of TB disease.

The 10-mm cutoff is for those at mod-

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erate risk, including children less than 4 years of age, those with concomitant medical conditions, or those who were born in a country with a high TB prevalence.

The highest cutoff, 15 mm, is reserved for children aged 4 and older with no known risk factors.

Most physicians are familiar with the correct technique for TB testing, but fewer have had experience in interpreting the results. Guidelines suggest that the reaction must be read by a trained health care provider at 48-72 hours after placement. Interpretation should not be left to the parents. In fact, your office practice personnel may not be experienced either and, therefore, it may not be appropriate to place and read TST in the practice setting.

Evidence suggests that interpretation of TST even by health care providers may be fraught with error. In one study of 107 health care providers including 52 practicing pediatricians, 33 pediatric house officers, and 10 pediatric academicians, 93% identified a known tuberculin converter as tuberculin negative, based on their interpretation of the degree of induration. When presented with an induration of 15 mm, the group's median reading of its size was only 10 mm (Chest 1998;113:1175-7).

Live virus vaccines—measles, mumps, rubella, and varicella—can suppress the TST response. Also be aware that in patients treated with systemic corticosteroids or inpatients who have been treated with the newer tumor necrosis factor antagonists, a false-negative test result can occur, while prior receipt of the BCG vaccine—given at birth in many TB-endemic countries—can produce a false-positive result. However, most children with a history of the BCG vaccine and a positive skin test result have latent tuberculosis. In these instances, consultation with your local infectious disease specialist will be helpful.

Perhaps most important, the identification of children with latent TB infection (LTBI) or tuberculosis disease (who rarely if ever are at risk to transmit TB when less than 10 years of age) is a sentinel event that should provoke an aggressive investigation targeting adult close contacts.

Here in Kansas City, we recently had a TB outbreak in a day care center, mostly among children born in the United States, which was related to their exposure to a foreign-born adult residing in the day care home. Epidemiologic details are being investigated; a combination of problems caused by language barrier, difficulty tracing contacts, and poor record keeping in an unlicensed facility complicate the process.

The guidelines also address treatment for latent TB infection. Daily isoniazid for 9 months is the standard treatment regimen for children and adolescents without a known source case, or those with a source case known to be infected with a susceptible strain. Intermittent regimens are acceptable if given within a directly observed therapy program. Daily rifampin for 6 months is a suitable alternative for those with isoniazid-resistant/rifampin-susceptible strains, or those who can't tolerate isoniazid.

Treatment of LTBI and tuberculosis disease generally should involve the help of your local TB expert. While the proportion of TB cases resistant to both isoniazid and rifampin remained at 1.2% from 2004 to 2005, and isoniazid remains the standard drug for LTBI treatment, we can't be complacent. In 2005, foreign-born individuals accounted for 81.5% of the 124 multidrug-resistant TB cases, and, according to the CDC, that percentage continues to grow. Treatment in such cases is more complicated, involving several drugs that are not generally used in the treatment of TB, and follow-up is important. ■

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