

## Tuberculosis in Children and Adolescents

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**Summary** Tuberculosis (TB) in children and adolescents differs markedly from that in adults. This Guideline has been revised to reflect current evidence regarding risk of infection and infectivity, and to provide guidance on the diagnosis, preventative therapy and treatment of tuberculosis in children and adolescents.

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**Author Branch** Communicable Diseases

**Branch contact** Julie Hunt 9391 9277

**Applies to** Area Health Services/Chief Executive Governed Statutory Health Corporation, Board Governed Statutory Health Corporations, Affiliated Health Organisations, Community Health Centres, Public Hospitals

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**Distributed to** Public Health System, Community Health Centres, Divisions of General Practice, Government Medical Officers, NSW Ambulance Service, NSW Department of Health, Public Health Units, Public Hospitals, Private Hospitals and Day Procedure Centres

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# TUBERCULOSIS IN CHILDREN AND ADOLESCENTS

## Introduction

Tuberculosis (TB) in children and adolescents differs markedly from that in adults.

Many children acquire tuberculosis infection, which is characterised by delayed hypersensitivity and few organisms, but relatively few develop the disease. However, the risk of doing so remains life long. While the initial infection in most children occurs in the lungs, TB in children and adolescents should be considered, at least potentially, to be a systemic disease. The primary complex, comprising the site of infection and the involved regional lymph nodes, may heal or complications may develop from enlargement of these lymph nodes or their rupture and the spread of bacilli into the bloodstream, giving rise to disseminated disease. The risk of dissemination is greatest within the first 12-24 months after infection and in the first 3 years of life.

The following are important aspects of the disease in children and adolescents:

### Risk of disease following primary infection

Data derived from studies in the United Kingdom in the 1950's and 60's, for children followed for up to two years after being infected, indicated that the risk of development of radiological changes in the chest consistent with TB infection were greatest in the first year of life and decreased progressively thereafter.<sup>i</sup>

These studies demonstrated the span of risk for children progressing to active disease over a two year period as follows: children aged less than 1 year - 23 to 43%, children aged 1 to 5 years - 11 to 24%, children aged 6 to 10 years - 8 to 25% and for children aged 11 to 15 years – 16% with females having a higher rate of disease than males.

For children with a normal chest x-ray at the time of their first positive tuberculin skin test the lifetime risk of developing TB is between 2 and 10%. These risks are related to general health, nutrition and other disease states. Although one might expect, with better nutrition and living standards, that currently, the lifetime risk may be lower, there is some Australian data from adult research that indicate that this may not be the case.<sup>ii</sup>

### Infectivity

TB in children is primary TB, a disease which is predominantly one of delayed hypersensitivity with few organisms and variable immune response. Childhood TB is rarely contagious because:

- children usually have a small bacterial load,
- children very rarely have cavitating disease, and
- children usually swallow their sputum, and have a far less effective cough than adults.

Rarely children, and occasionally adolescents, may be infectious and have adult type disease.

### Diagnosis

Diagnosis of TB infection is based on tuberculin skin testing (TST).

**Table 1: Recommended stratification of TST induration size to identify those requiring assessment for preventive therapy. \***

The selection of an appropriate cut off for referral is influenced by the probability that the TST represents recent infection and the risk of progression to active disease if there is infection with TB.

<b>≥ 5 mm</b>	<b>≥ 10 mm<sup>#</sup></b>	<b>≥ 15 mm<sup>#</sup></b>
Recent high risk contacts of persons with infectious TB	Born or resident in countries with high prevalence of TB (>50 cases / 100,000pp)	Children ≥ 4 years of age without any risk factors
HIV infection or other immune suppressed (including steroids)	Locally identified high risk populations	
TST conversion in the last 2 years	Children < 4 years of age	
Chest X-Ray evidence of past untreated TB	Travel or stay in high prevalence countries	
	Persons with certain medical conditions (eg diabetes; prolonged corticosteroid or immunosuppressive therapy; haematological malignancies (eg Hodgkins, lymphoma); chronic renal failure; low body weight & malnutrition	

\* All children < four years of age who have had close contact with a case of infectious TB should receive preventive therapy irrespective of TST response, until the second TST (3 months later) proves negative.

# BCG vaccination is unlikely to affect TST interpretation in children vaccinated ≥ 5 years previous. However, where BCG is recent (within 5 years) or where there have been 2 or more BCG vaccinations, the above stratification may need to be modified and the TST results should be interpreted individually by physicians experienced in TB medicine.

Diagnosis of TB disease is based on clinical symptoms and signs, chest x-ray or other investigations and smear and culture of infected body material (if available).

### **Preventive therapy**

Preventive therapy in children with TB infection and no evidence of the disease is used to:

- reduce the lifelong risk of developing TB disease
- reduce the risk of developing TB disease in the years immediately after acquiring the infection, particularly disseminated disease in children under the age of four years.

Six months isoniazid preventive therapy should be considered for otherwise healthy children and adolescents who have evidence of TB infection and no evidence of TB disease.

The incidence of liver toxicity from isoniazid in children is extremely low and routine monitoring of liver function is not recommended. Prophylactic pyridoxine is not normally recommended with isoniazid in children. Pyridoxine is recommended for children and adolescents on meat and milk deficient diets, those with nutritional deficiencies including all symptomatic HIV infected children, exclusively breast feed infants older than 6 months of age and pregnant adolescents.<sup>iii</sup>

Child contacts of patients with drug resistant TB and especially multi-drug resistant TB should be individually assessed by an expert in TB care and treatment.

Children who have evidence of TB infection and show changes consistent with TB disease on a chest x-ray (including mediastinal lymphadenopathy) should be regarded as having the disease and given full treatment.

## **Treatment**

Children with TB disease should be treated according to the guidelines published in the Journal of Paediatrics and Child Health.<sup>iv</sup>

Directly observed therapy (DOT) should be regarded as the method of choice for TB treatment in NSW. DOT may be undertaken by well-motivated parents. When this occurs, regular contact (at least weekly) with the treating team is essential. Decisions relating to the supervision of TB medication need to be made by the treating team on a case-by-case basis.

## **References:**

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<sup>i</sup> Miller FJW, Seale RME, Taylor MD. TB in Children. Boston; Little Brown & Co. 1963, page 231 - 232.

<sup>ii</sup> Marks G, Bai J, Simpson SE, et al. Incidence of Tuberculosis among a cohort of tuberculin positive refugees in Australia. Reappraising the estimates of risk. American Journal of Respiratory Care Medicine 2000; 162: 1851 - 1854.

<sup>iii</sup> American Academy of Pediatrics. Tuberculosis. In: Pickering LK, ed. 2000 Red Book: Report of the Committee on Infectious Diseases. 25<sup>th</sup> ed. Elk Grove Village, IL: American Academy of Pediatrics; 2000: page 604

<sup>iv</sup> VOSS LM, et al. Position Paper Management of tuberculosis in children. Journal of Pediatrics and Child Health (2000) 36, 530 – 536.

**Robyn Kruk**  
**DIRECTOR-GENERAL**