Tuberculosis

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Epidemiology in New Zealand

Tuberculosis (TB) remains an important communicable disease in New Zealand. Incidence rates in recent years have been higher than those in Australia, the United States, and Canada, and slightly lower than the rate in the United Kingdom.

More detailed epidemiological information is available on the Institute of Environmental Science and Research (ESR) surveillance website at www.surv.esr.cri.nz.

Case definition

Clinical description

A chronic bacterial infection caused by Mycobacterium complex, including *M. tuberculosis* or *M. bovis*, characterised histopathologically by the formation of granulomas. Most infections are asymptomatic or non-progressive. The most common site of infection is the lung (pulmonary TB), where TB infection classically causes an asymmetrical pulmonary infiltrate, which undergoes caseation, cavity formation and fibrosis if it progresses. Young children with active TB disease may present with symptoms of fever, lassitude and cough. Older children and adults with active TB disease may present with symptoms of anorexia, fatigue, weight loss, chills, night sweats, cough, haemoptysis and chest pain.

Any organ can be affected by extrapulmonary TB, causing meningitis, pleurisy, pericarditis, bone or joint infection, renal infection, gastrointestinal tract infection, peritonitis or lymphadenitis, or disseminating via the bloodstream and affecting multiple organs (disseminated TB).

Types of tuberculosis

- **Tuberculosis disease: new case:** Active TB in a person who has never been treated for TB before, or has active disease from a new genotype.

- **Tuberculosis disease: relapse or reactivation:** Active TB in a person whose tuberculosis has been non-infectious or quiescent following full, partial or no treatment.

- **Tuberculosis: latent infection (LTBI):** A person with both of the following:
  - positive Mantoux test, Mantoux conversion or positive interferon-gamma release assay (IGRA) test
  - no evidence of active disease.

- **Tuberculosis: old disease on preventive treatment:** no active disease or latent infection.

For more information, see the *Guidelines for Tuberculosis Control in New Zealand 2010* (Ministry of Health 2010).
Laboratory test for diagnosis

**Laboratory confirmation requires** at least one of the following:

- positive culture for *M. tuberculosis* complex
- positive microscopic examination for acid-fast bacilli when a culture has not been or cannot be obtained
- demonstration of *M. tuberculosis* complex nucleic acid directly from specimens
- histology strongly suggestive of tuberculosis when there is a strong clinical probability.

Note: Positive nucleic acid tests do not show whether the organisms are viable or not and may be positive after successful treatment. They should not be used to diagnose treatment failure.

Case classification

For active TB:

- **Under investigation:** A suspected case that has been notified, but information is not yet available to classify it as probable, confirmed or not a case.
- **Probable:** Presumptive (without laboratory confirmation). There is no laboratory confirmation but:
  - there are symptoms or signs compatible with active tuberculosis, such as compatible radiology or clinical evidence of current disease, and
  - full anti-tuberculous treatment has been started by a clinician.
- **Confirmed:** A clinically compatible illness that is laboratory confirmed.
- **Not a case:** A case that has been investigated and subsequently found not to meet the case definition.

There is no legal obligation to notify latent TB infection or old disease on preventive treatment, but such notification is useful for surveillance purposes. All cases of latent TB infection under treatment should be reported to the medical officer of health, with patient consent, and details should be entered into EpiSurv.
Spread of infection

Incubation period
The period from infection to demonstrable primary lesion or significant tuberculin (Mantoux) reaction is between 2 and 10 weeks.¹ The lifetime risk of developing active TB disease after infection is about 5–10 percent in adults overall. However, the risk is inversely proportional to age at the time of infection (that is, young children have a greater risk of developing active disease). The risk is also greater in people with predisposing medical conditions and immunosuppression (and of these, HIV is the strongest risk factor). While the risk of developing active TB disease is greatest within the first year or two after infection, the risk can persist for a lifetime.

Mode of transmission
Transmission is by inhalation of airborne droplets produced by people with pulmonary or laryngeal TB, especially during coughing or sneezing. People with extrapulmonary TB alone cannot transmit the infection to others. People with latent TB infection are not infectious. Bovine TB (M. bovis) may also be transmitted from infected cattle to humans by ingestion of contaminated unpasteurised milk or milk products or by airborne droplet spread to people who work closely with cattle.

Period of communicability
Untreated adults and adolescents with pulmonary TB may be intermittently infectious for years. Children under the age of 12 years are rarely infectious. For the purposes of contact tracing, the Guidelines for Tuberculosis Control in New Zealand 2010 (Ministry of Health 2010) recommend that the onset of communicability be taken as the onset of cough for the index case, or as 3 months before diagnosis if the onset of cough is not known or there is no history of cough. This period may need to be extended if the source case is strongly sputum smear-positive or if a large proportion of contacts are found to have been infected.

Once a person with pulmonary TB has been commenced on effective treatment, the risk of transmission declines over 2–4 weeks to negligible levels in most cases. Therefore most people with pulmonary TB who have been on at least 2 weeks of effective antituberculous treatment can be considered non-infectious to others. However, this may not apply in cases who are initially sputum smear-positive or have extensive lung involvement at diagnosis. In these cases, sputum may remain culture-positive for 2–3 months or longer. The duration of infectivity on treatment is correlated with the pre-treatment smear grade (acid-fast bacilli per high-powered field).

¹ Mantoux conversion occurs within 8 weeks of infection. Therefore, when testing contacts of infectious TB cases for conversion, the first Mantoux test should be done as soon as possible and the second Mantoux test should be done 8 weeks after the date of the last contact with the source case. see the Guidelines for Tuberculosis Control in New Zealand 2010 (Ministry of Health 2010).
For further details regarding the period of infectiousness, see the Guidelines for Tuberculosis Control in New Zealand 2010 (Ministry of Health 2010).

**Notification procedure**

Attending medical practitioners or laboratories must immediately notify the local medical officer of health of suspected or confirmed cases.

**Management of case**

**Investigation**

In partnership with primary health care, respiratory and infection diseases physicians. Obtain a history of travel, possible human sources and exposure to cattle or unpasteurised milk. Ensure laboratory confirmation by culture of clinical specimens, especially sputum, has been attempted.

Investigation of the case and contacts should begin without waiting for full culture results if history, sputum smears or chest radiographs are suggestive of TB. The investigation should follow the recommendations in the Guidelines for Tuberculosis Control in New Zealand 2010 (Ministry of Health 2010).

An outbreak is defined as two or more cases that are linked by epidemiological investigation or DNA fingerprinting and that do not all live in the same household.

**Restriction**

In a health care facility, isolation and airborne precautions are indicated for cases with active pulmonary or laryngeal TB. Cases who do not warrant hospitalisation and who will comply with infection control precautions may be isolated at home. Details of isolation precautions and criteria for removal of precautions are listed in the Guidelines for Tuberculosis Control in New Zealand 2010 (Ministry of Health 2010). For information on applying to a District Court judge for an order to isolate an infectious case (as a last resort for non-compliant infectious cases), see A Guide to Section 16 of the Tuberculosis Act 1948 (Ministry of Health 1996).

**Treatment**

Ideally the case would be under the care of a specialist respiratory or infectious diseases physician. Combination therapy is used for at least 6 months but may extend to 9–12 months or longer in some cases. Please refer to the Guidelines for Tuberculosis Control in New Zealand 2010 (Ministry of Health 2010).
Counselling

Advise the case and their caregivers of the nature of the infection and its mode of transmission. Emphasise the need to complete the full course of medication and for contact investigation and follow-up of both case and contacts.

Public health staff should also assess whether directly observed therapy (DOT) is indicated. Please refer to the *Guidelines for Tuberculosis Control in New Zealand 2010* (Ministry of Health 2010).

Management of contacts

Definition and investigation

Refer to the *Guidelines for Tuberculosis Control in New Zealand 2010* (Ministry of Health 2010).

Restriction

Nil if well. If symptomatic of pulmonary TB, restrict social interaction until urgent chest radiographs can be taken.

Prophylaxis

For advice on treatment of latent TB infection in contacts, refer to the *Guidelines for Tuberculosis Control in New Zealand 2010* (Ministry of Health 2010). For treatment of active TB disease in contacts (who, if active TB disease is diagnosed, are cases), see ‘Management of case’ above.

BCG vaccination is targeted at babies at high risk (for eligibility criteria, see the *Immunisation Handbook 2011*).

Counselling

Advise contacts of the risk of TB, the screening needed and the role of treatment for latent TB infection. For those identified as having been exposed to TB (whether given anti-tuberculosis treatment or not), advise on the lifelong risk of developing active disease, the typical symptoms of TB and the need to seek early medical attention if symptoms develop.

Other control measures

Identification of source

Refer to the Guidelines for Tuberculosis Control in New Zealand 2010 (Ministry of Health 2010).
**Disinfection**

Clean and disinfect surfaces and articles soiled with sputum or other contaminated bodily fluids. For further details, refer to Appendix 1: Disinfection.

Recommendations for cleaning, disinfecting and sterilising equipment are contained in the following standards:

1. SNZ HB 8149:2001 *Microbiological Surveillance of Flexible Hollow Endoscopes*
2. AS/NZS 4815:2006 *Office-based Health Care Facilities. Reprocessing of reusable medical and surgical instruments and maintenance of the associated environment*
3. AS/NZS 4187:2003 *Cleaning, Disinfecting and Sterilising Reusable Medical and Surgical Instruments and Equipment, and Maintenance of Associated Environments in Health Care Facilities.*

**Health education**

Medical officers of health are responsible for health education in the event of a cluster of cases. For details on communication with the community and other health professionals, see the *Guidelines for Tuberculosis Control in New Zealand 2010* (Ministry of Health 2010).

**Reporting**

Ensure complete case information is entered into EpiSurv.

If a cluster of epidemiologically linked cases occurs, complete the Outbreak Report Form in EpiSurv.

All new cases of multi-drug resistance (MDR) or extreme drug resistance (XDR), and cases where an overseas source of infection is suspected, should be discussed with the Communicable Diseases Team at the Ministry of Health.

**References and further information**

